Tutorial_Human Genome Annotation

1. Introduction

1.1. What is genome annotation?

Over the past years, we have learnt that there are a number of chromosomes and genes in our genome. Counting the number of chromosomes is fairly easy but students might find difficult to say how many genes we have in our genome. If you can get an answer for this, could you tell how many genes encode protein and how many do not?

To answer this question, we need to access the database for gene annotation. Gene annotation is the process of making nucleotide sequence meaningful - where genes are located? whether it is protein-coding or noncoding. If you would like to get an overview of gene annotation, please find this link.

One of well-known collaborative efforts in gene annotation is the GENCODE consortium. It is a part of the Encyclopedia of DNA Elements (The ENCODE project consortium) and aims to identify all gene features in the human genome using a combination of computational analysis, manual annotation, and experimental validation (Harrow et al. 2012). You might find another database for gene annotation, like RefSeq, CCDS, and need to understand differences between them.

In this tutorial, we will access to gene annotation from the GENCODE consortium and explore genes and functional elements in our genome.

1.2. Aims

What we will do with this dataset:

Be familiar with gene annotation modality. Tidy data and create a table for your analysis. Apply tidyverse functions for data munging.

Please note that there is better solution for getting gene annotation in R if you use a biomart. Our tutorial is only designed to have a practice on tidyverse exercise.

2. Explore your data

2.1. Unboxing your dataset

This tutorial will use a gene annotation file from the GENCODE. You will need to download the file from the GENCODE. If you are using terminal, please download file using wget:

```
# Run from your terminal, not R console
# wget ftp://ftp.ebi.ac.uk/pub/databases/gencode/Gencode_human/release_31/gencode.v31.basic.annotation.
# Once you downloaded the file, you won't need to download it again. So please comment out the command
```

```
# Run from your terminal, not R console
#gzcat gencode.v31.basic.annotation.gtf.gz | head -7
```

The file is the GFT file format, which you will find most commonly in gene annotation. Please read the file format thoroughly in the link above. For the tutorial, we need to load two packages. If the package is not installed in your system, please install it.

tidyverse, a package you have learnt from the chapter 5. readr, a package provides a fast and friendly way to read. Since the file gencode.v31.basic.annotation.gtf.gz is pretty large, you will need some function to load data quickly into your workspace. readr in a part of tidyverse, so you can just load tidyverse to use readr functions.

Let's load the GTF file into your workspace. We will use read_delim function from the readr package. This is much faster loading than read.delim or read.csv from R base. However, please keep in mind that some parameters and output class for read_delim are slightly different from them.

```
library(readr)
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --

## v ggplot2 3.3.5     v dplyr   1.0.7
## v tibble  3.1.2     v stringr 1.4.0
## v tidyr   1.1.3     v forcats 0.5.1
## v purrr   0.3.4

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
d= read_delim("gencode.v31.basic.annotation.gtf.gz",
delim="\t",skip=5,progress=F,
col_names=F)
```

```
## Rows: 1756502 Columns: 9

## -- Column specification --------------------------------------------------------
## Delimiter: "\t"
## chr (7): X1, X2, X3, X6, X7, X8, X9
## dbl (2): X4, X5

##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
View(d)
```

Can you find out what the parameters mean? Few things to note are: The GTF file contains the first few lines for comments (#). In general, the file contains description, provider, date, format.

The GTF file does not have column names so you will need to assign 'FALSE for col_names.

This is sort of canonical way to load your dataset into R. However, we are using a GTF format, which is specific to gene annotation so we can use a package to specifically handle a GTF file.

Here I introduce the package rtracklayer. Let's install the package first.

```
#if(!requireNamespace("BiocManager",quietly=TRUE))
#  install.packages("BiocManager")
#BiocManager::install("rtracklayer")
```

Then, now you can read the GTF file using this package. Then, you can check the class of the object d.

```
d_r=rtracklayer::import("gencode.v31.basic.annotation.gtf.gz")
d_r
```

```
## GRanges object with 1756502 ranges and 21 metadata columns:
##             seqnames       ranges strand |   source       type      score
##                <Rle>    <IRanges>  <Rle> | <factor>   <factor> <numeric>
##         [1]     chr1 11869-14409      + |   HAVANA gene              NA
##         [2]     chr1 11869-14409      + |   HAVANA transcript        NA
##         [3]     chr1 11869-12227      + |   HAVANA exon              NA
##         [4]     chr1 12613-12721      + |   HAVANA exon              NA
##         [5]     chr1 13221-14409      + |   HAVANA exon              NA
##         ...      ...          ...    ... .      ...        ...       ...
##   [1756498]     chrM 15888-15953      + |  ENSEMBL transcript        NA
##   [1756499]     chrM 15888-15953      + |  ENSEMBL exon              NA
##   [1756500]     chrM 15956-16023      - |  ENSEMBL gene              NA
##   [1756501]     chrM 15956-16023      - |  ENSEMBL transcript        NA
##   [1756502]     chrM 15956-16023      - |  ENSEMBL exon              NA
##               phase           gene_id                gene_type   gene_name
##           <integer>       <character>              <character> <character>
##         [1]     <NA> ENSG00000223972.5 transcribed_unproces..     DDX11L1
##         [2]     <NA> ENSG00000223972.5 transcribed_unproces..     DDX11L1
##         [3]     <NA> ENSG00000223972.5 transcribed_unproces..     DDX11L1
##         [4]     <NA> ENSG00000223972.5 transcribed_unproces..     DDX11L1
##         [5]     <NA> ENSG00000223972.5 transcribed_unproces..     DDX11L1
##         ...      ...               ...                      ...         ...
##   [1756498]     <NA> ENSG00000210195.2                  Mt_tRNA       MT-TT
##   [1756499]     <NA> ENSG00000210195.2                  Mt_tRNA       MT-TT
##   [1756500]     <NA> ENSG00000210196.2                  Mt_tRNA       MT-TP
##   [1756501]     <NA> ENSG00000210196.2                  Mt_tRNA       MT-TP
##   [1756502]     <NA> ENSG00000210196.2                  Mt_tRNA       MT-TP
##              level    hgnc_id          havana_gene    transcript_id
##          <character> <character>        <character>      <character>
##         [1]        2  HGNC:37102 OTTHUMG00000000961.2             <NA>
##         [2]        2  HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
##         [3]        2  HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
##         [4]        2  HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
##         [5]        2  HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
##         ...      ...        ...                ...              ...
##   [1756498]        3   HGNC:7499                <NA> ENST00000387460.2
##   [1756499]        3   HGNC:7499                <NA> ENST00000387460.2
##   [1756500]        3   HGNC:7494                <NA>             <NA>
##   [1756501]        3   HGNC:7494                <NA> ENST00000387461.2
##   [1756502]        3   HGNC:7494                <NA> ENST00000387461.2
##           transcript_type transcript_name transcript_support_level
##               <character>     <character>              <character>
##         [1]         <NA>            <NA>                     <NA>
##         [2]       lncRNA       DDX11L1-202                        1
```

3

```
##          [3]         lncRNA      DDX11L1-202                             1
##          [4]         lncRNA      DDX11L1-202                             1
##          [5]         lncRNA      DDX11L1-202                             1
##          ...            ...              ...                           ...
##    [1756498]         Mt_tRNA       MT-TT-201                            NA
##    [1756499]         Mt_tRNA       MT-TT-201                            NA
##    [1756500]           <NA>            <NA>                          <NA>
##    [1756501]         Mt_tRNA       MT-TP-201                            NA
##    [1756502]         Mt_tRNA       MT-TP-201                            NA
##                       tag    havana_transcript exon_number          exon_id
##               <character>          <character> <character>      <character>
##          [1]        <NA>                 <NA>        <NA>             <NA>
##          [2]       basic OTTHUMT00000362751.1        <NA>             <NA>
##          [3]       basic OTTHUMT00000362751.1           1 ENSE00002234944.1
##          [4]       basic OTTHUMT00000362751.1           2 ENSE00003582793.1
##          [5]       basic OTTHUMT00000362751.1           3 ENSE00002312635.1
##          ...         ...                  ...         ...               ...
##    [1756498]       basic                 <NA>        <NA>             <NA>
##    [1756499]       basic                 <NA>           1 ENSE00001544475.2
##    [1756500]        <NA>                 <NA>        <NA>             <NA>
##    [1756501]       basic                 <NA>        <NA>             <NA>
##    [1756502]       basic                 <NA>           1 ENSE00001544473.2
##                       ont   protein_id      ccdsid
##               <character> <character> <character>
##          [1]        <NA>        <NA>        <NA>
##          [2]        <NA>        <NA>        <NA>
##          [3]        <NA>        <NA>        <NA>
##          [4]        <NA>        <NA>        <NA>
##          [5]        <NA>        <NA>        <NA>
##          ...         ...         ...         ...
##    [1756498]        <NA>        <NA>        <NA>
##    [1756499]        <NA>        <NA>        <NA>
##    [1756500]        <NA>        <NA>        <NA>
##    [1756501]        <NA>        <NA>        <NA>
##    [1756502]        <NA>        <NA>        <NA>
##    -------
##    seqinfo: 25 sequences from an unspecified genome; no seqlengths
```

```
View(d_r)
class(d)
```

```
## [1] "spec_tbl_df" "tbl_df"      "tbl"         "data.frame"
```

You will find out that this is GRanges class. This is from the package Genomic Range, specifically dealing with genomic datasets but we are not heading into this in this tutorial. So please find this information if you are serious on this.

We are converting d into a data frame as following:

```
d_r=d_r%>%as.data.frame()
```

Let's overview few lines from the data frame, and explore what you get in this object.

4

```
head(d_r)
```

```
##   seqnames start   end width strand source      type score phase
## 1     chr1 11869 14409  2541      + HAVANA      gene    NA    NA
## 2     chr1 11869 14409  2541      + HAVANA transcript    NA    NA
## 3     chr1 11869 12227   359      + HAVANA      exon    NA    NA
## 4     chr1 12613 12721   109      + HAVANA      exon    NA    NA
## 5     chr1 13221 14409  1189      + HAVANA      exon    NA    NA
## 6     chr1 12010 13670  1661      + HAVANA transcript    NA    NA
##             gene_id                          gene_type gene_name level
## 1 ENSG00000223972.5 transcribed_unprocessed_pseudogene   DDX11L1     2
## 2 ENSG00000223972.5 transcribed_unprocessed_pseudogene   DDX11L1     2
## 3 ENSG00000223972.5 transcribed_unprocessed_pseudogene   DDX11L1     2
## 4 ENSG00000223972.5 transcribed_unprocessed_pseudogene   DDX11L1     2
## 5 ENSG00000223972.5 transcribed_unprocessed_pseudogene   DDX11L1     2
## 6 ENSG00000223972.5 transcribed_unprocessed_pseudogene   DDX11L1     2
##       hgnc_id          havana_gene     transcript_id
## 1 HGNC:37102 OTTHUMG00000000961.2              <NA>
## 2 HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
## 3 HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
## 4 HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
## 5 HGNC:37102 OTTHUMG00000000961.2 ENST00000456328.2
## 6 HGNC:37102 OTTHUMG00000000961.2 ENST00000450305.2
##                       transcript_type transcript_name transcript_support_level
## 1                                <NA>            <NA>                     <NA>
## 2                              lncRNA     DDX11L1-202                        1
## 3                              lncRNA     DDX11L1-202                        1
## 4                              lncRNA     DDX11L1-202                        1
## 5                              lncRNA     DDX11L1-202                        1
## 6 transcribed_unprocessed_pseudogene     DDX11L1-201                       NA
##     tag      havana_transcript exon_number          exon_id        ont
## 1  <NA>                  <NA>        <NA>             <NA>       <NA>
## 2 basic OTTHUMT00000362751.1        <NA>             <NA>       <NA>
## 3 basic OTTHUMT00000362751.1           1 ENSE00002234944.1       <NA>
## 4 basic OTTHUMT00000362751.1           2 ENSE00003582793.1       <NA>
## 5 basic OTTHUMT00000362751.1           3 ENSE00002312635.1       <NA>
## 6 basic OTTHUMT00000002844.2        <NA>             <NA> PGO:0000019
##   protein_id ccdsid
## 1       <NA>   <NA>
## 2       <NA>   <NA>
## 3       <NA>   <NA>
## 4       <NA>   <NA>
## 5       <NA>   <NA>
## 6       <NA>   <NA>
```

```
View(d_r)
```

One thing you can find is that there is no columns in the data frame. Let's match which information is provided in columns. You can find the instruction page in the website (link).

Based on this, you can assign a name for 9 columns. One thing to remember is you should not use space for the column name. Spacing in the column name is actually working but not a good habit for your code. So please replace a space with underscore in the column name.

```r
# Assign column names according to the GENCODE instruction.
cols=c("chrom","source","feature_type","start","end","score","strand","phase","info")
```

Now you can set up the column names into the col_names parameter, and load the file into a data frame.

```r
d=read_delim("gencode.v31.basic.annotation.gtf.gz",
             delim="\t",skip=5,
             progress=F,
             col_names = cols)
```

```
## Rows: 1756502 Columns: 9
```

```
## -- Column specification --------------------------------------------------------
## Delimiter: "\t"
## chr (7): chrom, source, feature_type, score, strand, phase, info
## dbl (2): start, end
```

```
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

You can find the column names are now all set.

```r
head(d)
```

```
## # A tibble: 6 x 9
##   chrom source feature_type start    end score strand phase info
##   <chr> <chr>  <chr>        <dbl>  <dbl> <chr> <chr>  <chr> <chr>
## 1 chr1  HAVANA gene         11869  14409 .     +      .     "gene_id \"ENSG00000~
## 2 chr1  HAVANA transcript   11869  14409 .     +      .     "gene_id \"ENSG00000~
## 3 chr1  HAVANA exon         11869  12227 .     +      .     "gene_id \"ENSG00000~
## 4 chr1  HAVANA exon         12613  12721 .     +      .     "gene_id \"ENSG00000~
## 5 chr1  HAVANA exon         13221  14409 .     +      .     "gene_id \"ENSG00000~
## 6 chr1  HAVANA transcript   12010  13670 .     +      .     "gene_id \"ENSG00000~
```

When you loaded the file, you see the message about the data class. You might want to overview this data.

```r
summary(d)
```

```
##     chrom              source          feature_type           start
##  Length:1756502     Length:1756502     Length:1756502     Min.   :       577
##  Class :character   Class :character   Class :character   1st Qu.: 32101517
##  Mode  :character   Mode  :character   Mode  :character   Median : 61732754
##                                                           Mean   : 75288563
##                                                           3rd Qu.:111760181
##                                                           Max.   :248936581
##      end               score              strand              phase
##  Min.   :       647  Length:1756502     Length:1756502     Length:1756502
##  1st Qu.: 32107331   Class :character   Class :character   Class :character
##  Median : 61738373   Mode  :character   Mode  :character   Mode  :character
```

```
##  Mean    : 75292632
##  3rd Qu.:111763007
##  Max.    :248937043
##      info
##  Length:1756502
##  Class :character
##  Mode  :character
##
##
##
```

2.2. How many feature types in the GENCODE dataset?

As instructed in the GENCODE website, the GENCODE dataset provides a range of annotations for the feature type. You can check feature types using _____ function.

```
d%>%
  group_by(feature_type)%>%
  count(feature_type)
```

```
## # A tibble: 8 x 2
## # Groups:   feature_type [8]
##    feature_type          n
##    <chr>             <int>
## 1 CDS              567862
## 2 exon             744835
## 3 gene              60603
## 4 Selenocysteine       96
## 5 start_codon       57886
## 6 stop_codon        57775
## 7 transcript       108243
## 8 UTR              159202
```

```
# table(d$feature_type)
```

How many feature types provided in the GENCODE? And how many items stored for each feature type? Please write down the number of feature types from the dataset. Also, if you are not familiar with these types, it would be good to put one or two sentences that can describe each type).

2.3. How many genes we have?

Let's count the number of genes in our genome. Since we know that the column feature_type contains rows with gene, which contains obviously annotations for genes. We might want to subset those rows from the data frame.

```
d1=filter(d,feature_type=="gene")
# d1=d[d$feature_type=="gene"]
```

2.4. Ensembl, Havana and CCDS.

Gene annotation for the human genome is provided by multiple organizations with different gene annotation methods and strategy. This means that information can be varying by resources, and users need to understand heterogeniety inherent in annotation databases.

The GENCODE project utlizes two sources of gene annotation.

1.Havana: Manual gene annotation (detailed strategy in here) 2.Ensembl: Automatic gene annotation (detailed strategy in here)

It provides the combination of Ensembl/HAVANA gene set as the default gene annotation for the human genome. In addition, they also guarantee that all transcripts from the Consensus Coding Sequence (CCDS) set are present in the GENCODE gene set. The CCDS project is a collaborative effort to identify a core set of protein coding regions that are consistently annotated and of high quality. Initial results from the Consensus CDS (CCDS) project are now available through the appropriate Ensembl gene pages and from the CCDS project page at NCBI. The CCDS set is built by consensus among Ensembl, the National Center for Biotechnology Information (NCBI), and the HUGO Gene Nomenclature Committee (HGNC) for human (link).

Right. Then now we count how many genes annotated with HAVANA and ENSEMBL.

```
d%>%
  group_by(source)%>%
  count(source)
```

```
## # A tibble: 2 x 2
## # Groups:   source [2]
##   source        n
##   <chr>     <int>
## 1 ENSEMBL  245185
## 2 HAVANA  1511317
```

2.5. do.call

Since the last column info contains a long string for multiple annotations, we will need to split it to extract each annotation. For example, the first line for transcript annotation looks like this:

chr1 HAVANA transcript 11869 14409 . + . gene_id "ENSG00000223972.5"; transcript_id "ENST00000456328.2"; gene_type "transcribed_unprocessed_pseudogene"; gene_name "DDX11L1"; transcript_type "lncRNA"; transcript_name "DDX11L1-202"; level 2; transcript_support_level "1"; hgnc_id "HGNC:37102"; tag "basic"; havana_gene "OTTHUMG00000000961.2"; havana_transcript "OTTHUMT00000362751.1";

If you would like to split transcript_support_level and create a new column, you can use strsplit function.

```
a = 'chr1    HAVANA    transcript    11869    14409    .    +    .    gene_id "ENSG00000223972.5"; tran
strsplit(a, 'transcript_support_level\\s+"')
```

```
## [[1]]
## [1] "chr1    HAVANA    transcript    11869    14409    .    +    .    gene_id \"ENSG00000223972.5\";
## [2] "1\"; hgnc_id \"HGNC:37102\"; tag \"basic\"; havana_gene \"OTTHUMG00000000961.2\"; havana_transc
```

After split the string, you can select the second item in the list ([[1]][2]).

```
strsplit(a, 'transcript_support_level\\s+"')[[1]][2]
```

```
## [1] "1\"; hgnc_id \"HGNC:37102\"; tag \"basic\"; havana_gene \"OTTHUMG00000000961.2\"; havana_transc:
```

You can find the 1 in the first position, which you will need to split again.

```
b = strsplit(a, 'transcript_support_level\\s+"')[[1]][2]
strsplit(b, '\\"')
```

```
## [[1]]
##  [1] "1"                    "; hgnc_id "            "HGNC:37102"
##  [4] "; tag "               "basic"                 "; havana_gene "
##  [7] "OTTHUMG00000000961.2" "; havana_transcript " "OTTHUMT00000362751.1"
## [10] ";"
```

From this, you will get the first item in the list ([[1]][1]).

Now you would like to apply strsplit function across vectors. For this, do.call function can be easily implemented to strsplit over the vectors from one column. Let's try this.

```
head(do.call(rbind.data.frame,strsplit(a,'transcript_support_level\\s+"'))[[2]])
```

```
## [1] "1\"; hgnc_id \"HGNC:37102\"; tag \"basic\"; havana_gene \"OTTHUMG00000000961.2\"; havana_transc:
```

Now you can write two lines of codes to process two steps we discussed above.

```
# First filter transcripts and create a data frame.
d2 <- d %>% filter(feature_type == 'transcript')
View(d)
View(d2)

# Now apply the functions.
d2$transcript_support_level<-
  as.character(do.call(rbind.data.frame, strsplit(d2$info, 'transcript_support_level\\s+"'))[[2]])

d2$transcript_support_level<-
  as.character(do.call(rbind.data.frame, strsplit(d2$transcript_support_level, '\\"'))[[1]])
```

Now you can check the strsplit works.

```
head(d2$transcript_support_level)
```

```
## [1] "1"  "NA" "NA" "NA" "5"  "5"
```

You can use the same method to extract other annotations, like gene_id, gene_name etc.

3. Exercises

Here I list the questions for group activity. You will need to pick up one session for three questions for your group. It will be your quiz on the next class. If you have done your session, you can of course go ahead and take other sessions for your practice.

Please note that it is an exercise for tidyverse functions, which you will need to use in your code. In addition, you will need to write an one-line code for each question using pipe %>%.

For questions, you should read some information thoroughly, including:

3.1. Annotation of transcripts in our genome

1. Computes the number of transcripts per gene. What is the mean number of transcripts per gene? What is the quantile (25%, 50%, 75%) for these numbers? Which gene has the greatest number of transcript?

```
my_1<-d_r%>%
  filter(type=="transcript")%>%
  group_by(gene_id)%>%
  count()

my_1%>%
  ungroup()%>%
  summarise(mean=mean(n),
            quantile(n,seq(0,1,0.25)),
            max=gene_id[which.max(n)])
```

```
## # A tibble: 5 x 3
##     mean 'quantile(n, seq(0, 1, 0.25))' max
##    <dbl>                         <dbl> <chr>
## 1  1.79                             1 ENSG00000109339.22
## 2  1.79                             1 ENSG00000109339.22
## 3  1.79                             1 ENSG00000109339.22
## 4  1.79                             2 ENSG00000109339.22
## 5  1.79                            87 ENSG00000109339.22
```

2. Compute the number of transcripts per gene among gene biotypes. For example, compare the number of transcript per gene between protein-coding genes, long noncoding genes, pseudogenes.

```
my_2<-d_r%>%
  filter(type=="transcript")%>%
  group_by(gene_id)%>%
  summarise(n=n(),gene_type=gene_type)
```

```
## 'summarise()' has grouped output by 'gene_id'. You can override using the '.groups' argument.
```

```
my_2%>%
  group_by(gene_type)%>%
  summarise(mean(n),
            "0%"=quantile(n,0),
            "25%"=quantile(n,0.25),
```

```
            "50%"=quantile(n,0.5),
            "75%"=quantile(n,0.75),
            "100%"=quantile(n,1))
```

```
## # A tibble: 40 x 7
##    gene_type       ‘mean(n)‘  ‘0%‘ ‘25%‘ ‘50%‘ ‘75%‘ ‘100%‘
##    <chr>               <dbl> <dbl> <dbl> <dbl> <dbl>  <dbl>
##  1 IG_C_gene               1     1     1     1     1      1
##  2 IG_C_pseudogene         1     1     1     1     1      1
##  3 IG_D_gene               1     1     1     1     1      1
##  4 IG_J_gene               1     1     1     1     1      1
##  5 IG_J_pseudogene         1     1     1     1     1      1
##  6 IG_pseudogene           1     1     1     1     1      1
##  7 IG_V_gene               1     1     1     1     1      1
##  8 IG_V_pseudogene         1     1     1     1     1      1
##  9 lncRNA               3.17     1     1     1     3     38
## 10 miRNA                   1     1     1     1     1      1
## # ... with 30 more rows
```

3. Final task is to compute the number of transcripts per gene per chromosome.

```
my_3<-d_r%>%
  filter(type=="transcript")%>%
  group_by(gene_id)%>%
  summarise(n=n(),seqnames=seqnames)
```

```
## ‘summarise()‘ has grouped output by 'gene_id'. You can override using the ‘.groups‘ argument.
```

```
my_3%>%
  group_by(seqnames)%>%
  summarise(mean(n),
            "0%"=quantile(n,0),
            "25%"=quantile(n,0.25),
            "50%"=quantile(n,0.5),
            "75%"=quantile(n,0.75),
            "100%"=quantile(n,1))
```

```
## # A tibble: 25 x 7
##    seqnames ‘mean(n)‘  ‘0%‘ ‘25%‘ ‘50%‘ ‘75%‘ ‘100%‘
##    <fct>        <dbl> <dbl> <dbl> <dbl> <dbl>  <dbl>
##  1 chr1          3.58     1     1     2     4     33
##  2 chr2          3.65     1     1     2     5     31
##  3 chr3          4.70     1     1     3     5     39
##  4 chr4          4.89     1     1     2     5     87
##  5 chr5          3.30     1     1     2     4     20
##  6 chr6          3.71     1     1     2     5     34
##  7 chr7          3.56     1     1     2     5     34
##  8 chr8          3.90     1     1     2     5     30
##  9 chr9          3.17     1     1     2     4     17
## 10 chr10         4.32     1     1     2     5     39
## # ... with 15 more rows
```

3.2. Gene length in the GENCODE

1.What is the average length of human genes?

```
d_r%>%
  filter(type=="gene")%>%
  summarise(mean(width))
```

```
##   mean(width)
## 1    32629.02
```

2. Is the distribution of gene length differed by autosomal and sex chromosomes? Please calculate the quantiles (0%, 25%, 50%, 75%, 100%) of the gene length for each group.

```
d_r%>%
  filter(type=="gene" & seqnames%in%c("chrX","chrY"))%>%
  summarise(q=seq(0,1,0.25),sex_distribution=quantile(width,seq(0,1,0.25)))
```

```
##      q sex_distribution
## 1 0.00               48
## 2 0.25              473
## 3 0.50             1912
## 4 0.75            13502
## 5 1.00          2241765
```

```
d_r%>%
  filter(type=="gene" & seqnames%in%c("chrX","chrY","chrM")==FALSE)%>%
  summarise(q=seq(0,1,0.25),autosomal_distribution=quantile(width,seq(0,1,0.25)))
```

```
##      q autosomal_distribution
## 1 0.00                      8
## 2 0.25                    565
## 3 0.50                   3779
## 4 0.75                  25813
## 5 1.00                2473537
```

3. Is the distribution of gene length differed by gene biotype? Please calculate the quantiles (0%, 25%, 50%, 75%, 100%) of the gene length for each group.

```
d_r%>%
  filter(type=="gene")%>%
  group_by(gene_type)%>%
  summarise("0%"=quantile(width,0),
            "25%"=quantile(width,0.25),
            "50%"=quantile(width,0.5),
            "75%"=quantile(width,0.75),
            "100%"=quantile(width,1))
```

```
## # A tibble: 40 x 6
##    gene_type      `0%` `25%` `50%`  `75%`  `100%`
##    <chr>         <dbl> <dbl> <dbl>  <dbl>   <dbl>
```

```
##  1 IG_C_gene          441  477.  4590.  5479.       8914
##  2 IG_C_pseudogene    248  313    317    734        5211
##  3 IG_D_gene           11   17     20     31          37
##  4 IG_J_gene           33   38.2   49     67.8       176
##  5 IG_J_pseudogene     50   52.5   55     57.5        60
##  6 IG_pseudogene      306  306    306    306         306
##  7 IG_V_gene          294  496.   522    572.     176628
##  8 IG_V_pseudogene     28  271    416.   458.        792
##  9 lncRNA              68 1874.  6272. 24774.     1375317
## 10 miRNA               41   70     80     91         180
## # ... with 30 more rows
```

3.3. Transcript support levels (TSL)

The GENCODE TSL provides a consistent method of evaluating the level of support that a GENCODE transcript annotation is actually expressed in humans.

1. With transcript, how many transcripts are categorized for each TSL?

```
d_r%>%
  filter(type=="transcript")%>%
  group_by(transcript_support_level)%>%
  count()
```

```
## # A tibble: 7 x 2
## # Groups:   transcript_support_level [7]
##    transcript_support_level      n
##    <chr>                     <int>
## 1 1                         31801
## 2 2                         13372
## 3 3                          7228
## 4 4                          2245
## 5 5                         13674
## 6 NA                        27843
## 7 <NA>                      12080
```

2. From the first question, please count the number of transcript for each TSL by gene biotype.

```
d_r%>%
  filter(type=="transcript")%>%
  group_by(gene_type,transcript_support_level)%>%
  summarise(n=n())
```

```
## `summarise()` has grouped output by 'gene_type'. You can override using the `.groups` argument.
```

```
## # A tibble: 91 x 3
## # Groups:   gene_type [40]
##    gene_type      transcript_support_level      n
##    <chr>          <chr>                     <int>
##  1 IG_C_gene      1                             1
##  2 IG_C_gene      5                             1
```

```
##  3 IG_C_gene      NA                             7
##  4 IG_C_gene      <NA>                           5
##  5 IG_C_pseudogene NA                            9
##  6 IG_D_gene      NA                            37
##  7 IG_J_gene      NA                            18
##  8 IG_J_pseudogene NA                            3
##  9 IG_pseudogene   NA                            1
## 10 IG_V_gene       5                             3
## # ... with 81 more rows
```

3. From the first question, please count the number of transcript for each TSL by source.

```r
d_r%>%
  filter(type=="transcript")%>%
  group_by(source,transcript_support_level)%>%
  summarise(n=n())
```

```
## 'summarise()' has grouped output by 'source'. You can override using the '.groups' argument.
```

```
## # A tibble: 14 x 3
## # Groups:   source [2]
##    source  transcript_support_level     n
##    <fct>   <chr>                    <int>
##  1 HAVANA  1                        29434
##  2 HAVANA  2                        12052
##  3 HAVANA  3                         6964
##  4 HAVANA  4                         2116
##  5 HAVANA  5                        10157
##  6 HAVANA  NA                       19962
##  7 HAVANA  <NA>                     11901
##  8 ENSEMBL 1                         2367
##  9 ENSEMBL 2                         1320
## 10 ENSEMBL 3                          264
## 11 ENSEMBL 4                          129
## 12 ENSEMBL 5                         3517
## 13 ENSEMBL NA                        7881
## 14 ENSEMBL <NA>                       179
```

3.4. CCDS in the GENCODE

1. With gene, please create a data frame with the columns - gene_id, gene_name, hgnc_id, gene_type, chromosome, start, end, and strand. Then, please create new columns for presence of hgnc and ccds. For example, you can put 1 in the column isHgnc, if hgnc annotation is avaiable, or 0 if not. Then, you can put 1 in the column isCCDS, if ccds annotation is avaiable, or 0 if not.

```r
my_4<-d_r%>%
  select(gene_id,gene_name,hgnc_id,gene_type,seqnames,start,end,strand)
my_4<-as.data.frame(my_4)

my_4<-my_4%>%
  mutate(isHgnc=(ifelse(is.na(hgnc_id)==TRUE,0,1)),
         isCCDS=(ifelse(is.na(d_r$ccdsid)==TRUE,0,1)))
my_4
```

```
##                gene_id   gene_name      hgnc_id
## 1   ENSG00000223972.5      DDX11L1  HGNC:37102
## 2   ENSG00000223972.5      DDX11L1  HGNC:37102
## 3   ENSG00000223972.5      DDX11L1  HGNC:37102
## 4   ENSG00000223972.5      DDX11L1  HGNC:37102
## 5   ENSG00000223972.5      DDX11L1  HGNC:37102
## 6   ENSG00000223972.5      DDX11L1  HGNC:37102
## 7   ENSG00000223972.5      DDX11L1  HGNC:37102
## 8   ENSG00000223972.5      DDX11L1  HGNC:37102
## 9   ENSG00000223972.5      DDX11L1  HGNC:37102
## 10  ENSG00000223972.5      DDX11L1  HGNC:37102
## 11  ENSG00000223972.5      DDX11L1  HGNC:37102
## 12  ENSG00000223972.5      DDX11L1  HGNC:37102
## 13  ENSG00000227232.5       WASH7P  HGNC:38034
## 14  ENSG00000227232.5       WASH7P  HGNC:38034
## 15  ENSG00000227232.5       WASH7P  HGNC:38034
## 16  ENSG00000227232.5       WASH7P  HGNC:38034
## 17  ENSG00000227232.5       WASH7P  HGNC:38034
## 18  ENSG00000227232.5       WASH7P  HGNC:38034
## 19  ENSG00000227232.5       WASH7P  HGNC:38034
## 20  ENSG00000227232.5       WASH7P  HGNC:38034
## 21  ENSG00000227232.5       WASH7P  HGNC:38034
## 22  ENSG00000227232.5       WASH7P  HGNC:38034
## 23  ENSG00000227232.5       WASH7P  HGNC:38034
## 24  ENSG00000227232.5       WASH7P  HGNC:38034
## 25  ENSG00000227232.5       WASH7P  HGNC:38034
## 26  ENSG00000278267.1     MIR6859-1  HGNC:50039
## 27  ENSG00000278267.1     MIR6859-1  HGNC:50039
## 28  ENSG00000278267.1     MIR6859-1  HGNC:50039
## 29  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 30  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 31  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 32  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 33  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 34  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 35  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 36  ENSG00000243485.5    MIR1302-2HG  HGNC:52482
## 37  ENSG00000284332.1     MIR1302-2  HGNC:35294
## 38  ENSG00000284332.1     MIR1302-2  HGNC:35294
## 39  ENSG00000284332.1     MIR1302-2  HGNC:35294
## 40  ENSG00000237613.2       FAM138A  HGNC:32334
## 41  ENSG00000237613.2       FAM138A  HGNC:32334
## 42  ENSG00000237613.2       FAM138A  HGNC:32334
## 43  ENSG00000237613.2       FAM138A  HGNC:32334
## 44  ENSG00000237613.2       FAM138A  HGNC:32334
## 45  ENSG00000268020.3        OR4G4P  HGNC:14822
## 46  ENSG00000268020.3        OR4G4P  HGNC:14822
## 47  ENSG00000268020.3        OR4G4P  HGNC:14822
## 48  ENSG00000240361.2       OR4G11P  HGNC:31276
## 49  ENSG00000240361.2       OR4G11P  HGNC:31276
## 50  ENSG00000240361.2       OR4G11P  HGNC:31276
## 51  ENSG00000240361.2       OR4G11P  HGNC:31276
## 52  ENSG00000240361.2       OR4G11P  HGNC:31276
## 53  ENSG00000240361.2       OR4G11P  HGNC:31276
```

```
## 54  ENSG00000240361.2     OR4G11P HGNC:31276
## 55  ENSG00000186092.6        OR4F5 HGNC:14825
## 56  ENSG00000186092.6        OR4F5 HGNC:14825
## 57  ENSG00000186092.6        OR4F5 HGNC:14825
## 58  ENSG00000186092.6        OR4F5 HGNC:14825
## 59  ENSG00000186092.6        OR4F5 HGNC:14825
## 60  ENSG00000186092.6        OR4F5 HGNC:14825
## 61  ENSG00000186092.6        OR4F5 HGNC:14825
## 62  ENSG00000186092.6        OR4F5 HGNC:14825
## 63  ENSG00000186092.6        OR4F5 HGNC:14825
## 64  ENSG00000186092.6        OR4F5 HGNC:14825
## 65  ENSG00000186092.6        OR4F5 HGNC:14825
## 66  ENSG00000186092.6        OR4F5 HGNC:14825
## 67  ENSG00000186092.6        OR4F5 HGNC:14825
## 68  ENSG00000186092.6        OR4F5 HGNC:14825
## 69  ENSG00000186092.6        OR4F5 HGNC:14825
## 70  ENSG00000186092.6        OR4F5 HGNC:14825
## 71  ENSG00000186092.6        OR4F5 HGNC:14825
## 72  ENSG00000186092.6        OR4F5 HGNC:14825
## 73  ENSG00000186092.6        OR4F5 HGNC:14825
## 74  ENSG00000238009.6     AL627309.1        <NA>
## 75  ENSG00000238009.6     AL627309.1        <NA>
## 76  ENSG00000238009.6     AL627309.1        <NA>
## 77  ENSG00000238009.6     AL627309.1        <NA>
## 78  ENSG00000238009.6     AL627309.1        <NA>
## 79  ENSG00000238009.6     AL627309.1        <NA>
## 80  ENSG00000238009.6     AL627309.1        <NA>
## 81  ENSG00000238009.6     AL627309.1        <NA>
## 82  ENSG00000238009.6     AL627309.1        <NA>
## 83  ENSG00000238009.6     AL627309.1        <NA>
## 84  ENSG00000238009.6     AL627309.1        <NA>
## 85  ENSG00000239945.1     AL627309.3        <NA>
## 86  ENSG00000239945.1     AL627309.3        <NA>
## 87  ENSG00000239945.1     AL627309.3        <NA>
## 88  ENSG00000239945.1     AL627309.3        <NA>
## 89  ENSG00000233750.3       CICP27 HGNC:48835
## 90  ENSG00000233750.3       CICP27 HGNC:48835
## 91  ENSG00000233750.3       CICP27 HGNC:48835
## 92  ENSG00000268903.1     AL627309.6        <NA>
## 93  ENSG00000268903.1     AL627309.6        <NA>
## 94  ENSG00000268903.1     AL627309.6        <NA>
## 95  ENSG00000269981.1     AL627309.7        <NA>
## 96  ENSG00000269981.1     AL627309.7        <NA>
## 97  ENSG00000269981.1     AL627309.7        <NA>
## 98  ENSG00000239906.1     AL627309.2        <NA>
## 99  ENSG00000239906.1     AL627309.2        <NA>
## 100 ENSG00000239906.1     AL627309.2        <NA>
## 101 ENSG00000239906.1     AL627309.2        <NA>
## 102 ENSG00000241860.7     AL627309.5        <NA>
## 103 ENSG00000241860.7     AL627309.5        <NA>
## 104 ENSG00000241860.7     AL627309.5        <NA>
## 105 ENSG00000241860.7     AL627309.5        <NA>
## 106 ENSG00000241860.7     AL627309.5        <NA>
## 107 ENSG00000241860.7     AL627309.5        <NA>
```

```
## 108   ENSG00000241860.7    AL627309.5      <NA>
## 109   ENSG00000241860.7    AL627309.5      <NA>
## 110   ENSG00000241860.7    AL627309.5      <NA>
## 111   ENSG00000241860.7    AL627309.5      <NA>
## 112   ENSG00000241860.7    AL627309.5      <NA>
## 113   ENSG00000241860.7    AL627309.5      <NA>
## 114   ENSG00000241860.7    AL627309.5      <NA>
## 115   ENSG00000241860.7    AL627309.5      <NA>
## 116   ENSG00000241860.7    AL627309.5      <NA>
## 117   ENSG00000241860.7    AL627309.5      <NA>
## 118   ENSG00000241860.7    AL627309.5      <NA>
## 119   ENSG00000222623.1    RNU6-1100P HGNC:48063
## 120   ENSG00000222623.1    RNU6-1100P HGNC:48063
## 121   ENSG00000222623.1    RNU6-1100P HGNC:48063
## 122   ENSG00000241599.1    AL627309.4      <NA>
## 123   ENSG00000241599.1    AL627309.4      <NA>
## 124   ENSG00000241599.1    AL627309.4      <NA>
## 125   ENSG00000241599.1    AL627309.4      <NA>
## 126   ENSG00000279928.2    FO538757.1      <NA>
## 127   ENSG00000279928.2    FO538757.1      <NA>
## 128   ENSG00000279928.2    FO538757.1      <NA>
## 129   ENSG00000279928.2    FO538757.1      <NA>
## 130   ENSG00000279928.2    FO538757.1      <NA>
## 131   ENSG00000279928.2    FO538757.1      <NA>
## 132   ENSG00000279928.2    FO538757.1      <NA>
## 133   ENSG00000279457.4        WASH9P HGNC:53981
## 134   ENSG00000279457.4        WASH9P HGNC:53981
## 135   ENSG00000279457.4        WASH9P HGNC:53981
## 136   ENSG00000279457.4        WASH9P HGNC:53981
## 137   ENSG00000279457.4        WASH9P HGNC:53981
## 138   ENSG00000279457.4        WASH9P HGNC:53981
## 139   ENSG00000279457.4        WASH9P HGNC:53981
## 140   ENSG00000279457.4        WASH9P HGNC:53981
## 141   ENSG00000279457.4        WASH9P HGNC:53981
## 142   ENSG00000279457.4        WASH9P HGNC:53981
## 143   ENSG00000279457.4        WASH9P HGNC:53981
## 144   ENSG00000279457.4        WASH9P HGNC:53981
## 145   ENSG00000273874.1    MIR6859-2 HGNC:49954
## 146   ENSG00000273874.1    MIR6859-2 HGNC:49954
## 147   ENSG00000273874.1    MIR6859-2 HGNC:49954
## 148  ENSG00000228463.10    AP006222.1      <NA>
## 149  ENSG00000228463.10    AP006222.1      <NA>
## 150  ENSG00000228463.10    AP006222.1      <NA>
## 151  ENSG00000228463.10    AP006222.1      <NA>
## 152  ENSG00000228463.10    AP006222.1      <NA>
## 153  ENSG00000228463.10    AP006222.1      <NA>
## 154  ENSG00000228463.10    AP006222.1      <NA>
## 155  ENSG00000228463.10    AP006222.1      <NA>
## 156  ENSG00000228463.10    AP006222.1      <NA>
## 157  ENSG00000228463.10    AP006222.1      <NA>
## 158  ENSG00000228463.10    AP006222.1      <NA>
## 159   ENSG00000286448.1    AP006222.2      <NA>
## 160   ENSG00000286448.1    AP006222.2      <NA>
## 161   ENSG00000286448.1    AP006222.2      <NA>
```

```
## 162   ENSG00000286448.1    AP006222.2       <NA>
## 163   ENSG00000236679.2    RPL23AP24 HGNC:36176
## 164   ENSG00000236679.2    RPL23AP24 HGNC:36176
## 165   ENSG00000236679.2    RPL23AP24 HGNC:36176
## 166   ENSG00000236601.2    AL732372.1       <NA>
## 167   ENSG00000236601.2    AL732372.1       <NA>
## 168   ENSG00000236601.2    AL732372.1       <NA>
## 169   ENSG00000236601.2    AL732372.1       <NA>
## 170  ENSG00000237094.12    AL732372.2       <NA>
## 171  ENSG00000237094.12    AL732372.2       <NA>
## 172  ENSG00000237094.12    AL732372.2       <NA>
## 173  ENSG00000237094.12    AL732372.2       <NA>
## 174  ENSG00000237094.12    AL732372.2       <NA>
## 175  ENSG00000237094.12    AL732372.2       <NA>
## 176  ENSG00000237094.12    AL732372.2       <NA>
## 177  ENSG00000237094.12    AL732372.2       <NA>
## 178  ENSG00000237094.12    AL732372.2       <NA>
## 179  ENSG00000237094.12    AL732372.2       <NA>
## 180  ENSG00000237094.12    AL732372.2       <NA>
## 181   ENSG00000269732.1      WBP1LP7 HGNC:43955
## 182   ENSG00000269732.1      WBP1LP7 HGNC:43955
## 183   ENSG00000269732.1      WBP1LP7 HGNC:43955
## 184   ENSG00000284733.1       OR4F29 HGNC:31275
## 185   ENSG00000284733.1       OR4F29 HGNC:31275
## 186   ENSG00000284733.1       OR4F29 HGNC:31275
## 187   ENSG00000284733.1       OR4F29 HGNC:31275
## 188   ENSG00000284733.1       OR4F29 HGNC:31275
## 189   ENSG00000284733.1       OR4F29 HGNC:31275
## 190   ENSG00000284733.1       OR4F29 HGNC:31275
## 191   ENSG00000284733.1       OR4F29 HGNC:31275
## 192   ENSG00000233653.3        CICP7 HGNC:37756
## 193   ENSG00000233653.3        CICP7 HGNC:37756
## 194   ENSG00000233653.3        CICP7 HGNC:37756
## 195   ENSG00000233653.3        CICP7 HGNC:37756
## 196   ENSG00000250575.1    AL732372.3       <NA>
## 197   ENSG00000250575.1    AL732372.3       <NA>
## 198   ENSG00000250575.1    AL732372.3       <NA>
## 199   ENSG00000250575.1    AL732372.3       <NA>
## 200   ENSG00000278757.1      RF00026       <NA>
## 201   ENSG00000278757.1      RF00026       <NA>
## 202   ENSG00000278757.1      RF00026       <NA>
## 203  ENSG00000230021.10    AL669831.3       <NA>
## 204  ENSG00000230021.10    AL669831.3       <NA>
## 205  ENSG00000230021.10    AL669831.3       <NA>
## 206  ENSG00000230021.10    AL669831.3       <NA>
## 207  ENSG00000230021.10    AL669831.3       <NA>
## 208  ENSG00000230021.10    AL669831.3       <NA>
## 209  ENSG00000230021.10    AL669831.3       <NA>
## 210  ENSG00000230021.10    AL669831.3       <NA>
## 211  ENSG00000230021.10    AL669831.3       <NA>
## 212  ENSG00000230021.10    AL669831.3       <NA>
## 213  ENSG00000230021.10    AL669831.3       <NA>
## 214  ENSG00000230021.10    AL669831.3       <NA>
## 215  ENSG00000230021.10    AL669831.3       <NA>
```

```
## 216   ENSG00000230021.10   AL669831.3      <NA>
## 217   ENSG00000230021.10   AL669831.3      <NA>
## 218   ENSG00000230021.10   AL669831.3      <NA>
## 219   ENSG00000235146.2    AC114498.1      <NA>
## 220   ENSG00000235146.2    AC114498.1      <NA>
## 221   ENSG00000235146.2    AC114498.1      <NA>
## 222   ENSG00000235146.2    AC114498.1      <NA>
## 223   ENSG00000225972.1     MTND1P23 HGNC:42092
## 224   ENSG00000225972.1     MTND1P23 HGNC:42092
## 225   ENSG00000225972.1     MTND1P23 HGNC:42092
## 226   ENSG00000225630.1     MTND2P28 HGNC:42129
## 227   ENSG00000225630.1     MTND2P28 HGNC:42129
## 228   ENSG00000225630.1     MTND2P28 HGNC:42129
## 229   ENSG00000237973.1     MTCO1P12 HGNC:52014
## 230   ENSG00000237973.1     MTCO1P12 HGNC:52014
## 231   ENSG00000237973.1     MTCO1P12 HGNC:52014
## 232   ENSG00000278791.1    AC114498.2      <NA>
## 233   ENSG00000278791.1    AC114498.2      <NA>
## 234   ENSG00000278791.1    AC114498.2      <NA>
## 235   ENSG00000229344.1     MTCO2P12 HGNC:52028
## 236   ENSG00000229344.1     MTCO2P12 HGNC:52028
## 237   ENSG00000229344.1     MTCO2P12 HGNC:52028
## 238   ENSG00000240409.1     MTATP8P1 HGNC:44571
## 239   ENSG00000240409.1     MTATP8P1 HGNC:44571
## 240   ENSG00000240409.1     MTATP8P1 HGNC:44571
## 241   ENSG00000248527.1     MTATP6P1 HGNC:44575
## 242   ENSG00000248527.1     MTATP6P1 HGNC:44575
## 243   ENSG00000248527.1     MTATP6P1 HGNC:44575
## 244   ENSG00000198744.5     MTCO3P12 HGNC:52042
## 245   ENSG00000198744.5     MTCO3P12 HGNC:52042
## 246   ENSG00000198744.5     MTCO3P12 HGNC:52042
## 247   ENSG00000268663.1      WBP1LP6 HGNC:43956
## 248   ENSG00000268663.1      WBP1LP6 HGNC:43956
## 249   ENSG00000268663.1      WBP1LP6 HGNC:43956
## 250   ENSG00000284662.1       OR4F16 HGNC:15079
## 251   ENSG00000284662.1       OR4F16 HGNC:15079
## 252   ENSG00000284662.1       OR4F16 HGNC:15079
## 253   ENSG00000284662.1       OR4F16 HGNC:15079
## 254   ENSG00000284662.1       OR4F16 HGNC:15079
## 255   ENSG00000284662.1       OR4F16 HGNC:15079
## 256   ENSG00000284662.1       OR4F16 HGNC:15079
## 257   ENSG00000284662.1       OR4F16 HGNC:15079
## 258   ENSG00000229376.3        CICP3 HGNC:37742
## 259   ENSG00000229376.3        CICP3 HGNC:37742
## 260   ENSG00000229376.3        CICP3 HGNC:37742
## 261   ENSG00000229376.3        CICP3 HGNC:37742
## 262   ENSG00000228327.3    AL669831.1      <NA>
## 263   ENSG00000228327.3    AL669831.1      <NA>
## 264   ENSG00000228327.3    AL669831.1      <NA>
## 265   ENSG00000228327.3    AL669831.1      <NA>
## 266   ENSG00000228327.3    AL669831.1      <NA>
## 267   ENSG00000228327.3    AL669831.1      <NA>
## 268   ENSG00000228327.3    AL669831.1      <NA>
## 269   ENSG00000228327.3    AL669831.1      <NA>
```

```
## 270   ENSG00000228327.3   AL669831.1        <NA>
## 271   ENSG00000228327.3   AL669831.1        <NA>
## 272   ENSG00000228327.3   AL669831.1        <NA>
## 273   ENSG00000228327.3   AL669831.1        <NA>
## 274   ENSG00000228327.3   AL669831.1        <NA>
## 275   ENSG00000228327.3   AL669831.1        <NA>
## 276   ENSG00000228327.3   AL669831.1        <NA>
## 277   ENSG00000228327.3   AL669831.1        <NA>
## 278   ENSG00000228327.3   AL669831.1        <NA>
## 279   ENSG00000228327.3   AL669831.1        <NA>
## 280   ENSG00000228327.3   AL669831.1        <NA>
## 281   ENSG00000228327.3   AL669831.1        <NA>
## 282   ENSG00000228327.3   AL669831.1        <NA>
## 283   ENSG00000228327.3   AL669831.1        <NA>
## 284   ENSG00000228327.3   AL669831.1        <NA>
## 285   ENSG00000228327.3   AL669831.1        <NA>
## 286   ENSG00000223181.1   RNU6-1199P HGNC:48162
## 287   ENSG00000223181.1   RNU6-1199P HGNC:48162
## 288   ENSG00000223181.1   RNU6-1199P HGNC:48162
## 289   ENSG00000229905.1   AL669831.2        <NA>
## 290   ENSG00000229905.1   AL669831.2        <NA>
## 291   ENSG00000229905.1   AL669831.2        <NA>
## 292   ENSG00000229905.1   AL669831.2        <NA>
## 293   ENSG00000237491.10  AL669831.5        <NA>
## 294   ENSG00000237491.10  AL669831.5        <NA>
## 295   ENSG00000237491.10  AL669831.5        <NA>
## 296   ENSG00000237491.10  AL669831.5        <NA>
## 297   ENSG00000237491.10  AL669831.5        <NA>
## 298   ENSG00000237491.10  AL669831.5        <NA>
## 299   ENSG00000237491.10  AL669831.5        <NA>
## 300   ENSG00000237491.10  AL669831.5        <NA>
## 301   ENSG00000237491.10  AL669831.5        <NA>
## 302   ENSG00000237491.10  AL669831.5        <NA>
## 303   ENSG00000237491.10  AL669831.5        <NA>
## 304   ENSG00000237491.10  AL669831.5        <NA>
## 305   ENSG00000237491.10  AL669831.5        <NA>
## 306   ENSG00000237491.10  AL669831.5        <NA>
## 307   ENSG00000237491.10  AL669831.5        <NA>
## 308   ENSG00000237491.10  AL669831.5        <NA>
## 309   ENSG00000237491.10  AL669831.5        <NA>
## 310   ENSG00000237491.10  AL669831.5        <NA>
## 311   ENSG00000237491.10  AL669831.5        <NA>
## 312   ENSG00000237491.10  AL669831.5        <NA>
## 313   ENSG00000237491.10  AL669831.5        <NA>
## 314   ENSG00000237491.10  AL669831.5        <NA>
## 315   ENSG00000237491.10  AL669831.5        <NA>
## 316   ENSG00000237491.10  AL669831.5        <NA>
## 317   ENSG00000237491.10  AL669831.5        <NA>
## 318   ENSG00000237491.10  AL669831.5        <NA>
## 319   ENSG00000237491.10  AL669831.5        <NA>
## 320   ENSG00000237491.10  AL669831.5        <NA>
## 321   ENSG00000237491.10  AL669831.5        <NA>
## 322   ENSG00000237491.10  AL669831.5        <NA>
## 323   ENSG00000285268.1   AL669831.7        <NA>
```

```
## 324   ENSG00000285268.1    AL669831.7      <NA>
## 325   ENSG00000285268.1    AL669831.7      <NA>
## 326   ENSG00000230092.7    AL669831.4      <NA>
## 327   ENSG00000230092.7    AL669831.4      <NA>
## 328   ENSG00000230092.7    AL669831.4      <NA>
## 329   ENSG00000230092.7    AL669831.4      <NA>
## 330   ENSG00000230092.7    AL669831.4      <NA>
## 331   ENSG00000230092.7    AL669831.4      <NA>
## 332   ENSG00000230092.7    AL669831.4      <NA>
## 333   ENSG00000230092.7    AL669831.4      <NA>
## 334   ENSG00000230092.7    AL669831.4      <NA>
## 335   ENSG00000230092.7    AL669831.4      <NA>
## 336   ENSG00000230092.7    AL669831.4      <NA>
## 337   ENSG00000177757.2       FAM87B HGNC:32236
## 338   ENSG00000177757.2       FAM87B HGNC:32236
## 339   ENSG00000177757.2       FAM87B HGNC:32236
## 340   ENSG00000177757.2       FAM87B HGNC:32236
## 341   ENSG00000228794.9    LINC01128 HGNC:49377
## 342   ENSG00000228794.9    LINC01128 HGNC:49377
## 343   ENSG00000228794.9    LINC01128 HGNC:49377
## 344   ENSG00000228794.9    LINC01128 HGNC:49377
## 345   ENSG00000228794.9    LINC01128 HGNC:49377
## 346   ENSG00000228794.9    LINC01128 HGNC:49377
## 347   ENSG00000228794.9    LINC01128 HGNC:49377
## 348   ENSG00000228794.9    LINC01128 HGNC:49377
## 349   ENSG00000228794.9    LINC01128 HGNC:49377
## 350   ENSG00000228794.9    LINC01128 HGNC:49377
## 351   ENSG00000228794.9    LINC01128 HGNC:49377
## 352   ENSG00000228794.9    LINC01128 HGNC:49377
## 353   ENSG00000228794.9    LINC01128 HGNC:49377
## 354   ENSG00000228794.9    LINC01128 HGNC:49377
## 355   ENSG00000228794.9    LINC01128 HGNC:49377
## 356   ENSG00000228794.9    LINC01128 HGNC:49377
## 357   ENSG00000228794.9    LINC01128 HGNC:49377
## 358   ENSG00000228794.9    LINC01128 HGNC:49377
## 359   ENSG00000228794.9    LINC01128 HGNC:49377
## 360   ENSG00000228794.9    LINC01128 HGNC:49377
## 361   ENSG00000228794.9    LINC01128 HGNC:49377
## 362   ENSG00000228794.9    LINC01128 HGNC:49377
## 363   ENSG00000228794.9    LINC01128 HGNC:49377
## 364   ENSG00000228794.9    LINC01128 HGNC:49377
## 365   ENSG00000228794.9    LINC01128 HGNC:49377
## 366   ENSG00000228794.9    LINC01128 HGNC:49377
## 367   ENSG00000228794.9    LINC01128 HGNC:49377
## 368   ENSG00000228794.9    LINC01128 HGNC:49377
## 369   ENSG00000228794.9    LINC01128 HGNC:49377
## 370   ENSG00000228794.9    LINC01128 HGNC:49377
## 371   ENSG00000228794.9    LINC01128 HGNC:49377
## 372   ENSG00000228794.9    LINC01128 HGNC:49377
## 373   ENSG00000228794.9    LINC01128 HGNC:49377
## 374   ENSG00000228794.9    LINC01128 HGNC:49377
## 375   ENSG00000228794.9    LINC01128 HGNC:49377
## 376   ENSG00000228794.9    LINC01128 HGNC:49377
## 377   ENSG00000228794.9    LINC01128 HGNC:49377
```

```
## 378   ENSG00000228794.9     LINC01128 HGNC:49377
## 379   ENSG00000228794.9     LINC01128 HGNC:49377
## 380   ENSG00000228794.9     LINC01128 HGNC:49377
## 381   ENSG00000228794.9     LINC01128 HGNC:49377
## 382   ENSG00000228794.9     LINC01128 HGNC:49377
## 383   ENSG00000228794.9     LINC01128 HGNC:49377
## 384   ENSG00000228794.9     LINC01128 HGNC:49377
## 385   ENSG00000228794.9     LINC01128 HGNC:49377
## 386   ENSG00000228794.9     LINC01128 HGNC:49377
## 387   ENSG00000228794.9     LINC01128 HGNC:49377
## 388   ENSG00000228794.9     LINC01128 HGNC:49377
## 389   ENSG00000228794.9     LINC01128 HGNC:49377
## 390   ENSG00000228794.9     LINC01128 HGNC:49377
## 391   ENSG00000228794.9     LINC01128 HGNC:49377
## 392   ENSG00000228794.9     LINC01128 HGNC:49377
## 393   ENSG00000228794.9     LINC01128 HGNC:49377
## 394   ENSG00000228794.9     LINC01128 HGNC:49377
## 395   ENSG00000228794.9     LINC01128 HGNC:49377
## 396   ENSG00000228794.9     LINC01128 HGNC:49377
## 397   ENSG00000228794.9     LINC01128 HGNC:49377
## 398   ENSG00000228794.9     LINC01128 HGNC:49377
## 399   ENSG00000228794.9     LINC01128 HGNC:49377
## 400   ENSG00000228794.9     LINC01128 HGNC:49377
## 401   ENSG00000228794.9     LINC01128 HGNC:49377
## 402   ENSG00000228794.9     LINC01128 HGNC:49377
## 403   ENSG00000225880.5     LINC00115 HGNC:26211
## 404   ENSG00000225880.5     LINC00115 HGNC:26211
## 405   ENSG00000225880.5     LINC00115 HGNC:26211
## 406   ENSG00000230368.2        FAM41C HGNC:27635
## 407   ENSG00000230368.2        FAM41C HGNC:27635
## 408   ENSG00000230368.2        FAM41C HGNC:27635
## 409   ENSG00000230368.2        FAM41C HGNC:27635
## 410   ENSG00000230368.2        FAM41C HGNC:27635
## 411   ENSG00000230368.2        FAM41C HGNC:27635
## 412   ENSG00000230368.2        FAM41C HGNC:27635
## 413   ENSG00000230368.2        FAM41C HGNC:27635
## 414   ENSG00000230368.2        FAM41C HGNC:27635
## 415   ENSG00000230368.2        FAM41C HGNC:27635
## 416   ENSG00000234711.1      TUBB8P11 HGNC:32337
## 417   ENSG00000234711.1      TUBB8P11 HGNC:32337
## 418   ENSG00000234711.1      TUBB8P11 HGNC:32337
## 419   ENSG00000283040.1    AL669831.6       <NA>
## 420   ENSG00000283040.1    AL669831.6       <NA>
## 421   ENSG00000283040.1    AL669831.6       <NA>
## 422   ENSG00000283040.1    AL669831.6       <NA>
## 423   ENSG00000283040.1    AL669831.6       <NA>
## 424   ENSG00000283040.1    AL669831.6       <NA>
## 425   ENSG00000283040.1    AL669831.6       <NA>
## 426   ENSG00000272438.1    AL645608.6       <NA>
## 427   ENSG00000272438.1    AL645608.6       <NA>
## 428   ENSG00000272438.1    AL645608.6       <NA>
## 429   ENSG00000272438.1    AL645608.6       <NA>
## 430   ENSG00000230699.2    AL645608.2       <NA>
## 431   ENSG00000230699.2    AL645608.2       <NA>
```

```
## 432   ENSG00000230699.2   AL645608.2      <NA>
## 433   ENSG00000230699.2   AL645608.2      <NA>
## 434   ENSG00000241180.1   AL645608.4      <NA>
## 435   ENSG00000241180.1   AL645608.4      <NA>
## 436   ENSG00000241180.1   AL645608.4      <NA>
## 437   ENSG00000241180.1   AL645608.4      <NA>
## 438   ENSG00000223764.2   LINC02593 HGNC:53933
## 439   ENSG00000223764.2   LINC02593 HGNC:53933
## 440   ENSG00000223764.2   LINC02593 HGNC:53933
## 441   ENSG00000223764.2   LINC02593 HGNC:53933
## 442   ENSG00000223764.2   LINC02593 HGNC:53933
## 443   ENSG00000223764.2   LINC02593 HGNC:53933
## 444   ENSG00000187634.12      SAMD11 HGNC:28706
## 445   ENSG00000187634.12      SAMD11 HGNC:28706
## 446   ENSG00000187634.12      SAMD11 HGNC:28706
## 447   ENSG00000187634.12      SAMD11 HGNC:28706
## 448   ENSG00000187634.12      SAMD11 HGNC:28706
## 449   ENSG00000187634.12      SAMD11 HGNC:28706
## 450   ENSG00000187634.12      SAMD11 HGNC:28706
## 451   ENSG00000187634.12      SAMD11 HGNC:28706
## 452   ENSG00000187634.12      SAMD11 HGNC:28706
## 453   ENSG00000187634.12      SAMD11 HGNC:28706
## 454   ENSG00000187634.12      SAMD11 HGNC:28706
## 455   ENSG00000187634.12      SAMD11 HGNC:28706
## 456   ENSG00000187634.12      SAMD11 HGNC:28706
## 457   ENSG00000187634.12      SAMD11 HGNC:28706
## 458   ENSG00000187634.12      SAMD11 HGNC:28706
## 459   ENSG00000187634.12      SAMD11 HGNC:28706
## 460   ENSG00000187634.12      SAMD11 HGNC:28706
## 461   ENSG00000187634.12      SAMD11 HGNC:28706
## 462   ENSG00000187634.12      SAMD11 HGNC:28706
## 463   ENSG00000187634.12      SAMD11 HGNC:28706
## 464   ENSG00000187634.12      SAMD11 HGNC:28706
## 465   ENSG00000187634.12      SAMD11 HGNC:28706
## 466   ENSG00000187634.12      SAMD11 HGNC:28706
## 467   ENSG00000187634.12      SAMD11 HGNC:28706
## 468   ENSG00000187634.12      SAMD11 HGNC:28706
## 469   ENSG00000187634.12      SAMD11 HGNC:28706
## 470   ENSG00000187634.12      SAMD11 HGNC:28706
## 471   ENSG00000187634.12      SAMD11 HGNC:28706
## 472   ENSG00000187634.12      SAMD11 HGNC:28706
## 473   ENSG00000187634.12      SAMD11 HGNC:28706
## 474   ENSG00000187634.12      SAMD11 HGNC:28706
## 475   ENSG00000187634.12      SAMD11 HGNC:28706
## 476   ENSG00000187634.12      SAMD11 HGNC:28706
## 477   ENSG00000187634.12      SAMD11 HGNC:28706
## 478   ENSG00000187634.12      SAMD11 HGNC:28706
## 479   ENSG00000187634.12      SAMD11 HGNC:28706
## 480   ENSG00000187634.12      SAMD11 HGNC:28706
## 481   ENSG00000187634.12      SAMD11 HGNC:28706
## 482   ENSG00000187634.12      SAMD11 HGNC:28706
## 483   ENSG00000187634.12      SAMD11 HGNC:28706
## 484   ENSG00000187634.12      SAMD11 HGNC:28706
## 485   ENSG00000187634.12      SAMD11 HGNC:28706
```

```
## 486  ENSG00000187634.12      SAMD11 HGNC:28706
## 487  ENSG00000187634.12      SAMD11 HGNC:28706
## 488  ENSG00000187634.12      SAMD11 HGNC:28706
## 489  ENSG00000187634.12      SAMD11 HGNC:28706
## 490  ENSG00000187634.12      SAMD11 HGNC:28706
## 491  ENSG00000187634.12      SAMD11 HGNC:28706
## 492  ENSG00000187634.12      SAMD11 HGNC:28706
## 493  ENSG00000187634.12      SAMD11 HGNC:28706
## 494  ENSG00000187634.12      SAMD11 HGNC:28706
## 495  ENSG00000187634.12      SAMD11 HGNC:28706
## 496  ENSG00000187634.12      SAMD11 HGNC:28706
## 497  ENSG00000187634.12      SAMD11 HGNC:28706
## 498  ENSG00000187634.12      SAMD11 HGNC:28706
## 499  ENSG00000187634.12      SAMD11 HGNC:28706
## 500  ENSG00000187634.12      SAMD11 HGNC:28706
## 501  ENSG00000187634.12      SAMD11 HGNC:28706
## 502  ENSG00000187634.12      SAMD11 HGNC:28706
## 503  ENSG00000187634.12      SAMD11 HGNC:28706
## 504  ENSG00000187634.12      SAMD11 HGNC:28706
## 505  ENSG00000187634.12      SAMD11 HGNC:28706
## 506  ENSG00000187634.12      SAMD11 HGNC:28706
## 507  ENSG00000187634.12      SAMD11 HGNC:28706
## 508  ENSG00000187634.12      SAMD11 HGNC:28706
## 509  ENSG00000187634.12      SAMD11 HGNC:28706
## 510  ENSG00000187634.12      SAMD11 HGNC:28706
## 511  ENSG00000187634.12      SAMD11 HGNC:28706
## 512  ENSG00000187634.12      SAMD11 HGNC:28706
## 513  ENSG00000187634.12      SAMD11 HGNC:28706
## 514  ENSG00000187634.12      SAMD11 HGNC:28706
## 515  ENSG00000187634.12      SAMD11 HGNC:28706
## 516  ENSG00000187634.12      SAMD11 HGNC:28706
## 517  ENSG00000187634.12      SAMD11 HGNC:28706
## 518  ENSG00000187634.12      SAMD11 HGNC:28706
## 519  ENSG00000187634.12      SAMD11 HGNC:28706
## 520  ENSG00000187634.12      SAMD11 HGNC:28706
## 521  ENSG00000187634.12      SAMD11 HGNC:28706
## 522  ENSG00000187634.12      SAMD11 HGNC:28706
## 523  ENSG00000187634.12      SAMD11 HGNC:28706
## 524  ENSG00000187634.12      SAMD11 HGNC:28706
## 525  ENSG00000187634.12      SAMD11 HGNC:28706
## 526  ENSG00000187634.12      SAMD11 HGNC:28706
## 527  ENSG00000187634.12      SAMD11 HGNC:28706
## 528  ENSG00000187634.12      SAMD11 HGNC:28706
## 529  ENSG00000187634.12      SAMD11 HGNC:28706
## 530  ENSG00000187634.12      SAMD11 HGNC:28706
## 531  ENSG00000187634.12      SAMD11 HGNC:28706
## 532  ENSG00000187634.12      SAMD11 HGNC:28706
## 533  ENSG00000187634.12      SAMD11 HGNC:28706
## 534  ENSG00000187634.12      SAMD11 HGNC:28706
## 535  ENSG00000187634.12      SAMD11 HGNC:28706
## 536  ENSG00000187634.12      SAMD11 HGNC:28706
## 537  ENSG00000187634.12      SAMD11 HGNC:28706
## 538  ENSG00000187634.12      SAMD11 HGNC:28706
## 539  ENSG00000187634.12      SAMD11 HGNC:28706
```

```
## 540   ENSG00000187634.12          SAMD11 HGNC:28706
## 541   ENSG00000187634.12          SAMD11 HGNC:28706
## 542   ENSG00000187634.12          SAMD11 HGNC:28706
## 543   ENSG00000187634.12          SAMD11 HGNC:28706
## 544   ENSG00000187634.12          SAMD11 HGNC:28706
## 545   ENSG00000187634.12          SAMD11 HGNC:28706
## 546   ENSG00000187634.12          SAMD11 HGNC:28706
## 547   ENSG00000187634.12          SAMD11 HGNC:28706
## 548   ENSG00000187634.12          SAMD11 HGNC:28706
## 549   ENSG00000187634.12          SAMD11 HGNC:28706
## 550   ENSG00000187634.12          SAMD11 HGNC:28706
## 551   ENSG00000187634.12          SAMD11 HGNC:28706
## 552   ENSG00000187634.12          SAMD11 HGNC:28706
## 553   ENSG00000187634.12          SAMD11 HGNC:28706
## 554   ENSG00000187634.12          SAMD11 HGNC:28706
## 555   ENSG00000187634.12          SAMD11 HGNC:28706
## 556   ENSG00000187634.12          SAMD11 HGNC:28706
## 557   ENSG00000187634.12          SAMD11 HGNC:28706
## 558   ENSG00000187634.12          SAMD11 HGNC:28706
## 559   ENSG00000187634.12          SAMD11 HGNC:28706
## 560   ENSG00000187634.12          SAMD11 HGNC:28706
## 561   ENSG00000187634.12          SAMD11 HGNC:28706
## 562   ENSG00000187634.12          SAMD11 HGNC:28706
## 563   ENSG00000187634.12          SAMD11 HGNC:28706
## 564   ENSG00000187634.12          SAMD11 HGNC:28706
## 565   ENSG00000187634.12          SAMD11 HGNC:28706
## 566   ENSG00000187634.12          SAMD11 HGNC:28706
## 567   ENSG00000187634.12          SAMD11 HGNC:28706
## 568   ENSG00000187634.12          SAMD11 HGNC:28706
## 569   ENSG00000187634.12          SAMD11 HGNC:28706
## 570   ENSG00000187634.12          SAMD11 HGNC:28706
## 571   ENSG00000187634.12          SAMD11 HGNC:28706
## 572   ENSG00000187634.12          SAMD11 HGNC:28706
## 573   ENSG00000187634.12          SAMD11 HGNC:28706
## 574   ENSG00000187634.12          SAMD11 HGNC:28706
## 575   ENSG00000187634.12          SAMD11 HGNC:28706
## 576   ENSG00000187634.12          SAMD11 HGNC:28706
## 577   ENSG00000187634.12          SAMD11 HGNC:28706
## 578   ENSG00000187634.12          SAMD11 HGNC:28706
## 579   ENSG00000187634.12          SAMD11 HGNC:28706
## 580   ENSG00000187634.12          SAMD11 HGNC:28706
## 581   ENSG00000187634.12          SAMD11 HGNC:28706
## 582   ENSG00000187634.12          SAMD11 HGNC:28706
## 583   ENSG00000187634.12          SAMD11 HGNC:28706
## 584   ENSG00000187634.12          SAMD11 HGNC:28706
## 585   ENSG00000187634.12          SAMD11 HGNC:28706
## 586   ENSG00000187634.12          SAMD11 HGNC:28706
## 587   ENSG00000187634.12          SAMD11 HGNC:28706
## 588   ENSG00000187634.12          SAMD11 HGNC:28706
## 589   ENSG00000187634.12          SAMD11 HGNC:28706
## 590   ENSG00000187634.12          SAMD11 HGNC:28706
## 591   ENSG00000187634.12          SAMD11 HGNC:28706
## 592   ENSG00000187634.12          SAMD11 HGNC:28706
## 593   ENSG00000187634.12          SAMD11 HGNC:28706
```

```
## 594  ENSG00000187634.12      SAMD11 HGNC:28706
## 595  ENSG00000187634.12      SAMD11 HGNC:28706
## 596  ENSG00000187634.12      SAMD11 HGNC:28706
## 597  ENSG00000187634.12      SAMD11 HGNC:28706
## 598  ENSG00000187634.12      SAMD11 HGNC:28706
## 599  ENSG00000187634.12      SAMD11 HGNC:28706
## 600  ENSG00000187634.12      SAMD11 HGNC:28706
## 601  ENSG00000187634.12      SAMD11 HGNC:28706
## 602  ENSG00000187634.12      SAMD11 HGNC:28706
## 603  ENSG00000187634.12      SAMD11 HGNC:28706
## 604  ENSG00000187634.12      SAMD11 HGNC:28706
## 605  ENSG00000187634.12      SAMD11 HGNC:28706
## 606  ENSG00000187634.12      SAMD11 HGNC:28706
## 607  ENSG00000187634.12      SAMD11 HGNC:28706
## 608  ENSG00000187634.12      SAMD11 HGNC:28706
## 609  ENSG00000187634.12      SAMD11 HGNC:28706
## 610  ENSG00000187634.12      SAMD11 HGNC:28706
## 611  ENSG00000187634.12      SAMD11 HGNC:28706
## 612  ENSG00000187634.12      SAMD11 HGNC:28706
## 613  ENSG00000187634.12      SAMD11 HGNC:28706
## 614  ENSG00000187634.12      SAMD11 HGNC:28706
## 615  ENSG00000187634.12      SAMD11 HGNC:28706
## 616  ENSG00000187634.12      SAMD11 HGNC:28706
## 617  ENSG00000187634.12      SAMD11 HGNC:28706
## 618  ENSG00000187634.12      SAMD11 HGNC:28706
## 619  ENSG00000187634.12      SAMD11 HGNC:28706
## 620  ENSG00000187634.12      SAMD11 HGNC:28706
## 621  ENSG00000187634.12      SAMD11 HGNC:28706
## 622  ENSG00000187634.12      SAMD11 HGNC:28706
## 623  ENSG00000187634.12      SAMD11 HGNC:28706
## 624  ENSG00000187634.12      SAMD11 HGNC:28706
## 625  ENSG00000187634.12      SAMD11 HGNC:28706
## 626  ENSG00000187634.12      SAMD11 HGNC:28706
## 627  ENSG00000187634.12      SAMD11 HGNC:28706
## 628  ENSG00000187634.12      SAMD11 HGNC:28706
## 629  ENSG00000187634.12      SAMD11 HGNC:28706
## 630  ENSG00000187634.12      SAMD11 HGNC:28706
## 631  ENSG00000187634.12      SAMD11 HGNC:28706
## 632  ENSG00000187634.12      SAMD11 HGNC:28706
## 633  ENSG00000187634.12      SAMD11 HGNC:28706
## 634  ENSG00000187634.12      SAMD11 HGNC:28706
## 635  ENSG00000187634.12      SAMD11 HGNC:28706
## 636  ENSG00000187634.12      SAMD11 HGNC:28706
## 637  ENSG00000187634.12      SAMD11 HGNC:28706
## 638  ENSG00000187634.12      SAMD11 HGNC:28706
## 639  ENSG00000187634.12      SAMD11 HGNC:28706
## 640  ENSG00000187634.12      SAMD11 HGNC:28706
## 641  ENSG00000187634.12      SAMD11 HGNC:28706
## 642  ENSG00000187634.12      SAMD11 HGNC:28706
## 643  ENSG00000187634.12      SAMD11 HGNC:28706
## 644  ENSG00000187634.12      SAMD11 HGNC:28706
## 645  ENSG00000187634.12      SAMD11 HGNC:28706
## 646  ENSG00000187634.12      SAMD11 HGNC:28706
## 647  ENSG00000187634.12      SAMD11 HGNC:28706
```

```
## 648   ENSG00000187634.12        SAMD11 HGNC:28706
## 649   ENSG00000187634.12        SAMD11 HGNC:28706
## 650   ENSG00000187634.12        SAMD11 HGNC:28706
## 651   ENSG00000187634.12        SAMD11 HGNC:28706
## 652   ENSG00000187634.12        SAMD11 HGNC:28706
## 653   ENSG00000187634.12        SAMD11 HGNC:28706
## 654   ENSG00000187634.12        SAMD11 HGNC:28706
## 655   ENSG00000187634.12        SAMD11 HGNC:28706
## 656   ENSG00000187634.12        SAMD11 HGNC:28706
## 657   ENSG00000187634.12        SAMD11 HGNC:28706
## 658   ENSG00000187634.12        SAMD11 HGNC:28706
## 659   ENSG00000187634.12        SAMD11 HGNC:28706
## 660   ENSG00000187634.12        SAMD11 HGNC:28706
## 661   ENSG00000187634.12        SAMD11 HGNC:28706
## 662   ENSG00000187634.12        SAMD11 HGNC:28706
## 663   ENSG00000187634.12        SAMD11 HGNC:28706
## 664   ENSG00000187634.12        SAMD11 HGNC:28706
## 665   ENSG00000187634.12        SAMD11 HGNC:28706
## 666   ENSG00000187634.12        SAMD11 HGNC:28706
## 667   ENSG00000187634.12        SAMD11 HGNC:28706
## 668   ENSG00000187634.12        SAMD11 HGNC:28706
## 669   ENSG00000187634.12        SAMD11 HGNC:28706
## 670   ENSG00000187634.12        SAMD11 HGNC:28706
## 671   ENSG00000187634.12        SAMD11 HGNC:28706
## 672   ENSG00000187634.12        SAMD11 HGNC:28706
## 673   ENSG00000187634.12        SAMD11 HGNC:28706
## 674   ENSG00000187634.12        SAMD11 HGNC:28706
## 675   ENSG00000187634.12        SAMD11 HGNC:28706
## 676   ENSG00000187634.12        SAMD11 HGNC:28706
## 677   ENSG00000187634.12        SAMD11 HGNC:28706
## 678   ENSG00000187634.12        SAMD11 HGNC:28706
## 679   ENSG00000187634.12        SAMD11 HGNC:28706
## 680   ENSG00000187634.12        SAMD11 HGNC:28706
## 681   ENSG00000187634.12        SAMD11 HGNC:28706
## 682   ENSG00000187634.12        SAMD11 HGNC:28706
## 683   ENSG00000187634.12        SAMD11 HGNC:28706
## 684   ENSG00000187634.12        SAMD11 HGNC:28706
## 685   ENSG00000187634.12        SAMD11 HGNC:28706
## 686   ENSG00000187634.12        SAMD11 HGNC:28706
## 687   ENSG00000187634.12        SAMD11 HGNC:28706
## 688   ENSG00000187634.12        SAMD11 HGNC:28706
## 689   ENSG00000187634.12        SAMD11 HGNC:28706
## 690   ENSG00000187634.12        SAMD11 HGNC:28706
## 691   ENSG00000187634.12        SAMD11 HGNC:28706
## 692   ENSG00000187634.12        SAMD11 HGNC:28706
## 693   ENSG00000187634.12        SAMD11 HGNC:28706
## 694   ENSG00000187634.12        SAMD11 HGNC:28706
## 695   ENSG00000187634.12        SAMD11 HGNC:28706
## 696   ENSG00000187634.12        SAMD11 HGNC:28706
## 697   ENSG00000187634.12        SAMD11 HGNC:28706
## 698   ENSG00000187634.12        SAMD11 HGNC:28706
## 699   ENSG00000187634.12        SAMD11 HGNC:28706
## 700   ENSG00000187634.12        SAMD11 HGNC:28706
## 701   ENSG00000187634.12        SAMD11 HGNC:28706
```

```
## 702 ENSG00000187634.12        SAMD11 HGNC:28706
## 703 ENSG00000187634.12        SAMD11 HGNC:28706
## 704 ENSG00000187634.12        SAMD11 HGNC:28706
## 705 ENSG00000187634.12        SAMD11 HGNC:28706
## 706 ENSG00000187634.12        SAMD11 HGNC:28706
## 707 ENSG00000187634.12        SAMD11 HGNC:28706
## 708 ENSG00000187634.12        SAMD11 HGNC:28706
## 709 ENSG00000187634.12        SAMD11 HGNC:28706
## 710 ENSG00000187634.12        SAMD11 HGNC:28706
## 711 ENSG00000187634.12        SAMD11 HGNC:28706
## 712 ENSG00000188976.11         NOC2L HGNC:24517
## 713 ENSG00000188976.11         NOC2L HGNC:24517
## 714 ENSG00000188976.11         NOC2L HGNC:24517
## 715 ENSG00000188976.11         NOC2L HGNC:24517
## 716 ENSG00000188976.11         NOC2L HGNC:24517
## 717 ENSG00000188976.11         NOC2L HGNC:24517
## 718 ENSG00000188976.11         NOC2L HGNC:24517
## 719 ENSG00000188976.11         NOC2L HGNC:24517
## 720 ENSG00000188976.11         NOC2L HGNC:24517
## 721 ENSG00000188976.11         NOC2L HGNC:24517
## 722 ENSG00000188976.11         NOC2L HGNC:24517
## 723 ENSG00000188976.11         NOC2L HGNC:24517
## 724 ENSG00000188976.11         NOC2L HGNC:24517
## 725 ENSG00000188976.11         NOC2L HGNC:24517
## 726 ENSG00000188976.11         NOC2L HGNC:24517
## 727 ENSG00000188976.11         NOC2L HGNC:24517
## 728 ENSG00000188976.11         NOC2L HGNC:24517
## 729 ENSG00000188976.11         NOC2L HGNC:24517
## 730 ENSG00000188976.11         NOC2L HGNC:24517
## 731 ENSG00000188976.11         NOC2L HGNC:24517
## 732 ENSG00000188976.11         NOC2L HGNC:24517
## 733 ENSG00000188976.11         NOC2L HGNC:24517
## 734 ENSG00000188976.11         NOC2L HGNC:24517
## 735 ENSG00000188976.11         NOC2L HGNC:24517
## 736 ENSG00000188976.11         NOC2L HGNC:24517
## 737 ENSG00000188976.11         NOC2L HGNC:24517
## 738 ENSG00000188976.11         NOC2L HGNC:24517
## 739 ENSG00000188976.11         NOC2L HGNC:24517
## 740 ENSG00000188976.11         NOC2L HGNC:24517
## 741 ENSG00000188976.11         NOC2L HGNC:24517
## 742 ENSG00000188976.11         NOC2L HGNC:24517
## 743 ENSG00000188976.11         NOC2L HGNC:24517
## 744 ENSG00000188976.11         NOC2L HGNC:24517
## 745 ENSG00000188976.11         NOC2L HGNC:24517
## 746 ENSG00000188976.11         NOC2L HGNC:24517
## 747 ENSG00000188976.11         NOC2L HGNC:24517
## 748 ENSG00000188976.11         NOC2L HGNC:24517
## 749 ENSG00000188976.11         NOC2L HGNC:24517
## 750 ENSG00000188976.11         NOC2L HGNC:24517
## 751 ENSG00000188976.11         NOC2L HGNC:24517
## 752 ENSG00000188976.11         NOC2L HGNC:24517
## 753 ENSG00000188976.11         NOC2L HGNC:24517
## 754 ENSG00000188976.11         NOC2L HGNC:24517
## 755 ENSG00000188976.11         NOC2L HGNC:24517
```

```
## 756 ENSG00000187961.14     KLHL17 HGNC:24023
## 757 ENSG00000187961.14     KLHL17 HGNC:24023
## 758 ENSG00000187961.14     KLHL17 HGNC:24023
## 759 ENSG00000187961.14     KLHL17 HGNC:24023
## 760 ENSG00000187961.14     KLHL17 HGNC:24023
## 761 ENSG00000187961.14     KLHL17 HGNC:24023
## 762 ENSG00000187961.14     KLHL17 HGNC:24023
## 763 ENSG00000187961.14     KLHL17 HGNC:24023
## 764 ENSG00000187961.14     KLHL17 HGNC:24023
## 765 ENSG00000187961.14     KLHL17 HGNC:24023
## 766 ENSG00000187961.14     KLHL17 HGNC:24023
## 767 ENSG00000187961.14     KLHL17 HGNC:24023
## 768 ENSG00000187961.14     KLHL17 HGNC:24023
## 769 ENSG00000187961.14     KLHL17 HGNC:24023
## 770 ENSG00000187961.14     KLHL17 HGNC:24023
## 771 ENSG00000187961.14     KLHL17 HGNC:24023
## 772 ENSG00000187961.14     KLHL17 HGNC:24023
## 773 ENSG00000187961.14     KLHL17 HGNC:24023
## 774 ENSG00000187961.14     KLHL17 HGNC:24023
## 775 ENSG00000187961.14     KLHL17 HGNC:24023
## 776 ENSG00000187961.14     KLHL17 HGNC:24023
## 777 ENSG00000187961.14     KLHL17 HGNC:24023
## 778 ENSG00000187961.14     KLHL17 HGNC:24023
## 779 ENSG00000187961.14     KLHL17 HGNC:24023
## 780 ENSG00000187961.14     KLHL17 HGNC:24023
## 781 ENSG00000187961.14     KLHL17 HGNC:24023
## 782 ENSG00000187961.14     KLHL17 HGNC:24023
## 783 ENSG00000187961.14     KLHL17 HGNC:24023
## 784 ENSG00000187961.14     KLHL17 HGNC:24023
## 785 ENSG00000187961.14     KLHL17 HGNC:24023
## 786 ENSG00000187961.14     KLHL17 HGNC:24023
## 787 ENSG00000187961.14     KLHL17 HGNC:24023
## 788 ENSG00000187961.14     KLHL17 HGNC:24023
## 789 ENSG00000187961.14     KLHL17 HGNC:24023
## 790 ENSG00000187961.14     KLHL17 HGNC:24023
## 791 ENSG00000187961.14     KLHL17 HGNC:24023
## 792 ENSG00000187961.14     KLHL17 HGNC:24023
## 793 ENSG00000187961.14     KLHL17 HGNC:24023
## 794 ENSG00000187961.14     KLHL17 HGNC:24023
## 795 ENSG00000187961.14     KLHL17 HGNC:24023
## 796 ENSG00000187961.14     KLHL17 HGNC:24023
## 797 ENSG00000187961.14     KLHL17 HGNC:24023
## 798 ENSG00000187961.14     KLHL17 HGNC:24023
## 799 ENSG00000187961.14     KLHL17 HGNC:24023
## 800 ENSG00000187961.14     KLHL17 HGNC:24023
## 801 ENSG00000187961.14     KLHL17 HGNC:24023
## 802 ENSG00000187961.14     KLHL17 HGNC:24023
## 803 ENSG00000187961.14     KLHL17 HGNC:24023
## 804 ENSG00000187961.14     KLHL17 HGNC:24023
## 805 ENSG00000187961.14     KLHL17 HGNC:24023
## 806 ENSG00000187961.14     KLHL17 HGNC:24023
## 807 ENSG00000187961.14     KLHL17 HGNC:24023
## 808 ENSG00000187961.14     KLHL17 HGNC:24023
## 809 ENSG00000187583.10    PLEKHN1 HGNC:25284
```

```
## 810   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 811   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 812   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 813   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 814   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 815   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 816   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 817   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 818   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 819   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 820   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 821   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 822   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 823   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 824   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 825   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 826   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 827   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 828   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 829   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 830   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 831   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 832   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 833   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 834   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 835   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 836   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 837   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 838   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 839   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 840   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 841   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 842   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 843   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 844   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 845   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 846   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 847   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 848   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 849   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 850   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 851   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 852   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 853   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 854   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 855   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 856   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 857   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 858   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 859   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 860   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 861   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 862   ENSG00000187583.10        PLEKHN1 HGNC:25284
## 863   ENSG00000187583.10        PLEKHN1 HGNC:25284
```

```
## 864     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 865     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 866     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 867     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 868     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 869     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 870     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 871     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 872     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 873     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 874     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 875     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 876     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 877     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 878     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 879     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 880     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 881     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 882     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 883     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 884     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 885     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 886     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 887     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 888     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 889     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 890     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 891     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 892     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 893     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 894     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 895     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 896     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 897     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 898     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 899     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 900     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 901     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 902     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 903     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 904     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 905     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 906     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 907     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 908     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 909     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 910     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 911     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 912     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 913     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 914     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 915     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 916     ENSG00000187583.10        PLEKHN1 HGNC:25284
## 917      ENSG00000187642.9          PERM1 HGNC:28208
```

```
## 918   ENSG00000187642.9        PERM1 HGNC:28208
## 919   ENSG00000187642.9        PERM1 HGNC:28208
## 920   ENSG00000187642.9        PERM1 HGNC:28208
## 921   ENSG00000187642.9        PERM1 HGNC:28208
## 922   ENSG00000187642.9        PERM1 HGNC:28208
## 923   ENSG00000187642.9        PERM1 HGNC:28208
## 924   ENSG00000187642.9        PERM1 HGNC:28208
## 925   ENSG00000187642.9        PERM1 HGNC:28208
## 926   ENSG00000187642.9        PERM1 HGNC:28208
## 927   ENSG00000187642.9        PERM1 HGNC:28208
## 928   ENSG00000187642.9        PERM1 HGNC:28208
## 929   ENSG00000187642.9        PERM1 HGNC:28208
## 930   ENSG00000187642.9        PERM1 HGNC:28208
## 931   ENSG00000187642.9        PERM1 HGNC:28208
## 932   ENSG00000187642.9        PERM1 HGNC:28208
## 933   ENSG00000187642.9        PERM1 HGNC:28208
## 934   ENSG00000187642.9        PERM1 HGNC:28208
## 935   ENSG00000187642.9        PERM1 HGNC:28208
## 936   ENSG00000187642.9        PERM1 HGNC:28208
## 937   ENSG00000187642.9        PERM1 HGNC:28208
## 938   ENSG00000187642.9        PERM1 HGNC:28208
## 939   ENSG00000187642.9        PERM1 HGNC:28208
## 940   ENSG00000187642.9        PERM1 HGNC:28208
## 941   ENSG00000187642.9        PERM1 HGNC:28208
## 942   ENSG00000187642.9        PERM1 HGNC:28208
## 943   ENSG00000272512.1   AL645608.7       <NA>
## 944   ENSG00000272512.1   AL645608.7       <NA>
## 945   ENSG00000272512.1   AL645608.7       <NA>
## 946   ENSG00000188290.10        HES4 HGNC:24149
## 947   ENSG00000188290.10        HES4 HGNC:24149
## 948   ENSG00000188290.10        HES4 HGNC:24149
## 949   ENSG00000188290.10        HES4 HGNC:24149
## 950   ENSG00000188290.10        HES4 HGNC:24149
## 951   ENSG00000188290.10        HES4 HGNC:24149
## 952   ENSG00000188290.10        HES4 HGNC:24149
## 953   ENSG00000188290.10        HES4 HGNC:24149
## 954   ENSG00000188290.10        HES4 HGNC:24149
## 955   ENSG00000188290.10        HES4 HGNC:24149
## 956   ENSG00000188290.10        HES4 HGNC:24149
## 957   ENSG00000188290.10        HES4 HGNC:24149
## 958   ENSG00000188290.10        HES4 HGNC:24149
## 959   ENSG00000188290.10        HES4 HGNC:24149
## 960   ENSG00000188290.10        HES4 HGNC:24149
## 961   ENSG00000188290.10        HES4 HGNC:24149
## 962   ENSG00000188290.10        HES4 HGNC:24149
## 963   ENSG00000188290.10        HES4 HGNC:24149
## 964   ENSG00000188290.10        HES4 HGNC:24149
## 965   ENSG00000188290.10        HES4 HGNC:24149
## 966   ENSG00000188290.10        HES4 HGNC:24149
## 967   ENSG00000188290.10        HES4 HGNC:24149
## 968   ENSG00000188290.10        HES4 HGNC:24149
## 969   ENSG00000188290.10        HES4 HGNC:24149
## 970   ENSG00000188290.10        HES4 HGNC:24149
## 971   ENSG00000188290.10        HES4 HGNC:24149
```

```
## 972   ENSG00000188290.10        HES4 HGNC:24149
## 973   ENSG00000188290.10        HES4 HGNC:24149
## 974   ENSG00000188290.10        HES4 HGNC:24149
## 975   ENSG00000188290.10        HES4 HGNC:24149
## 976   ENSG00000188290.10        HES4 HGNC:24149
## 977   ENSG00000188290.10        HES4 HGNC:24149
## 978   ENSG00000188290.10        HES4 HGNC:24149
## 979   ENSG00000188290.10        HES4 HGNC:24149
## 980   ENSG00000188290.10        HES4 HGNC:24149
## 981   ENSG00000188290.10        HES4 HGNC:24149
## 982   ENSG00000187608.10        ISG15  HGNC:4053
## 983   ENSG00000187608.10        ISG15  HGNC:4053
## 984   ENSG00000187608.10        ISG15  HGNC:4053
## 985   ENSG00000187608.10        ISG15  HGNC:4053
## 986   ENSG00000187608.10        ISG15  HGNC:4053
## 987   ENSG00000187608.10        ISG15  HGNC:4053
## 988   ENSG00000187608.10        ISG15  HGNC:4053
## 989   ENSG00000187608.10        ISG15  HGNC:4053
## 990   ENSG00000187608.10        ISG15  HGNC:4053
## 991   ENSG00000187608.10        ISG15  HGNC:4053
## 992   ENSG00000187608.10        ISG15  HGNC:4053
## 993   ENSG00000187608.10        ISG15  HGNC:4053
## 994   ENSG00000187608.10        ISG15  HGNC:4053
## 995   ENSG00000187608.10        ISG15  HGNC:4053
## 996   ENSG00000187608.10        ISG15  HGNC:4053
## 997   ENSG00000187608.10        ISG15  HGNC:4053
## 998   ENSG00000187608.10        ISG15  HGNC:4053
## 999   ENSG00000187608.10        ISG15  HGNC:4053
## 1000  ENSG00000187608.10        ISG15  HGNC:4053
## 1001  ENSG00000187608.10        ISG15  HGNC:4053
## 1002  ENSG00000187608.10        ISG15  HGNC:4053
## 1003   ENSG00000231702.2  AL645608.3       <NA>
## 1004   ENSG00000231702.2  AL645608.3       <NA>
## 1005   ENSG00000231702.2  AL645608.3       <NA>
## 1006   ENSG00000224969.1  AL645608.1       <NA>
## 1007   ENSG00000224969.1  AL645608.1       <NA>
## 1008   ENSG00000224969.1  AL645608.1       <NA>
## 1009   ENSG00000224969.1  AL645608.1       <NA>
## 1010  ENSG00000188157.15        AGRN   HGNC:329
## 1011  ENSG00000188157.15        AGRN   HGNC:329
## 1012  ENSG00000188157.15        AGRN   HGNC:329
## 1013  ENSG00000188157.15        AGRN   HGNC:329
## 1014  ENSG00000188157.15        AGRN   HGNC:329
## 1015  ENSG00000188157.15        AGRN   HGNC:329
## 1016  ENSG00000188157.15        AGRN   HGNC:329
## 1017  ENSG00000188157.15        AGRN   HGNC:329
## 1018  ENSG00000188157.15        AGRN   HGNC:329
## 1019  ENSG00000188157.15        AGRN   HGNC:329
## 1020  ENSG00000188157.15        AGRN   HGNC:329
## 1021  ENSG00000188157.15        AGRN   HGNC:329
## 1022  ENSG00000188157.15        AGRN   HGNC:329
## 1023  ENSG00000188157.15        AGRN   HGNC:329
## 1024  ENSG00000188157.15        AGRN   HGNC:329
## 1025  ENSG00000188157.15        AGRN   HGNC:329
```

```
## 1026 ENSG00000188157.15          AGRN   HGNC:329
## 1027 ENSG00000188157.15          AGRN   HGNC:329
## 1028 ENSG00000188157.15          AGRN   HGNC:329
## 1029 ENSG00000188157.15          AGRN   HGNC:329
## 1030 ENSG00000188157.15          AGRN   HGNC:329
## 1031 ENSG00000188157.15          AGRN   HGNC:329
## 1032 ENSG00000188157.15          AGRN   HGNC:329
## 1033 ENSG00000188157.15          AGRN   HGNC:329
## 1034 ENSG00000188157.15          AGRN   HGNC:329
## 1035 ENSG00000188157.15          AGRN   HGNC:329
## 1036 ENSG00000188157.15          AGRN   HGNC:329
## 1037 ENSG00000188157.15          AGRN   HGNC:329
## 1038 ENSG00000188157.15          AGRN   HGNC:329
## 1039 ENSG00000188157.15          AGRN   HGNC:329
## 1040 ENSG00000188157.15          AGRN   HGNC:329
## 1041 ENSG00000188157.15          AGRN   HGNC:329
## 1042 ENSG00000188157.15          AGRN   HGNC:329
## 1043 ENSG00000188157.15          AGRN   HGNC:329
## 1044 ENSG00000188157.15          AGRN   HGNC:329
## 1045 ENSG00000188157.15          AGRN   HGNC:329
## 1046 ENSG00000188157.15          AGRN   HGNC:329
## 1047 ENSG00000188157.15          AGRN   HGNC:329
## 1048 ENSG00000188157.15          AGRN   HGNC:329
## 1049 ENSG00000188157.15          AGRN   HGNC:329
## 1050 ENSG00000188157.15          AGRN   HGNC:329
## 1051 ENSG00000188157.15          AGRN   HGNC:329
## 1052 ENSG00000188157.15          AGRN   HGNC:329
## 1053 ENSG00000188157.15          AGRN   HGNC:329
## 1054 ENSG00000188157.15          AGRN   HGNC:329
## 1055 ENSG00000188157.15          AGRN   HGNC:329
## 1056 ENSG00000188157.15          AGRN   HGNC:329
## 1057 ENSG00000188157.15          AGRN   HGNC:329
## 1058 ENSG00000188157.15          AGRN   HGNC:329
## 1059 ENSG00000188157.15          AGRN   HGNC:329
## 1060 ENSG00000188157.15          AGRN   HGNC:329
## 1061 ENSG00000188157.15          AGRN   HGNC:329
## 1062 ENSG00000188157.15          AGRN   HGNC:329
## 1063 ENSG00000188157.15          AGRN   HGNC:329
## 1064 ENSG00000188157.15          AGRN   HGNC:329
## 1065 ENSG00000188157.15          AGRN   HGNC:329
## 1066 ENSG00000188157.15          AGRN   HGNC:329
## 1067 ENSG00000188157.15          AGRN   HGNC:329
## 1068 ENSG00000188157.15          AGRN   HGNC:329
## 1069 ENSG00000188157.15          AGRN   HGNC:329
## 1070 ENSG00000188157.15          AGRN   HGNC:329
## 1071 ENSG00000188157.15          AGRN   HGNC:329
## 1072 ENSG00000188157.15          AGRN   HGNC:329
## 1073 ENSG00000188157.15          AGRN   HGNC:329
## 1074 ENSG00000188157.15          AGRN   HGNC:329
## 1075 ENSG00000188157.15          AGRN   HGNC:329
## 1076 ENSG00000188157.15          AGRN   HGNC:329
## 1077 ENSG00000188157.15          AGRN   HGNC:329
## 1078 ENSG00000188157.15          AGRN   HGNC:329
## 1079 ENSG00000188157.15          AGRN   HGNC:329
```

```
## 1080 ENSG00000188157.15          AGRN   HGNC:329
## 1081 ENSG00000188157.15          AGRN   HGNC:329
## 1082 ENSG00000188157.15          AGRN   HGNC:329
## 1083 ENSG00000188157.15          AGRN   HGNC:329
## 1084 ENSG00000188157.15          AGRN   HGNC:329
## 1085 ENSG00000188157.15          AGRN   HGNC:329
## 1086 ENSG00000188157.15          AGRN   HGNC:329
## 1087 ENSG00000188157.15          AGRN   HGNC:329
## 1088 ENSG00000188157.15          AGRN   HGNC:329
## 1089 ENSG00000188157.15          AGRN   HGNC:329
## 1090 ENSG00000188157.15          AGRN   HGNC:329
## 1091 ENSG00000188157.15          AGRN   HGNC:329
## 1092 ENSG00000188157.15          AGRN   HGNC:329
## 1093 ENSG00000188157.15          AGRN   HGNC:329
## 1094 ENSG00000188157.15          AGRN   HGNC:329
## 1095 ENSG00000188157.15          AGRN   HGNC:329
## 1096 ENSG00000188157.15          AGRN   HGNC:329
## 1097 ENSG00000188157.15          AGRN   HGNC:329
## 1098 ENSG00000188157.15          AGRN   HGNC:329
## 1099 ENSG00000188157.15          AGRN   HGNC:329
## 1100 ENSG00000188157.15          AGRN   HGNC:329
## 1101 ENSG00000188157.15          AGRN   HGNC:329
## 1102 ENSG00000188157.15          AGRN   HGNC:329
## 1103 ENSG00000188157.15          AGRN   HGNC:329
## 1104 ENSG00000188157.15          AGRN   HGNC:329
## 1105 ENSG00000188157.15          AGRN   HGNC:329
## 1106 ENSG00000188157.15          AGRN   HGNC:329
## 1107 ENSG00000188157.15          AGRN   HGNC:329
## 1108 ENSG00000188157.15          AGRN   HGNC:329
## 1109 ENSG00000188157.15          AGRN   HGNC:329
## 1110 ENSG00000188157.15          AGRN   HGNC:329
## 1111 ENSG00000188157.15          AGRN   HGNC:329
## 1112 ENSG00000188157.15          AGRN   HGNC:329
## 1113 ENSG00000188157.15          AGRN   HGNC:329
## 1114 ENSG00000188157.15          AGRN   HGNC:329
## 1115 ENSG00000188157.15          AGRN   HGNC:329
## 1116 ENSG00000188157.15          AGRN   HGNC:329
## 1117 ENSG00000188157.15          AGRN   HGNC:329
## 1118 ENSG00000188157.15          AGRN   HGNC:329
## 1119 ENSG00000188157.15          AGRN   HGNC:329
## 1120 ENSG00000188157.15          AGRN   HGNC:329
## 1121 ENSG00000188157.15          AGRN   HGNC:329
## 1122 ENSG00000188157.15          AGRN   HGNC:329
## 1123 ENSG00000188157.15          AGRN   HGNC:329
## 1124 ENSG00000188157.15          AGRN   HGNC:329
## 1125 ENSG00000188157.15          AGRN   HGNC:329
## 1126 ENSG00000188157.15          AGRN   HGNC:329
## 1127 ENSG00000188157.15          AGRN   HGNC:329
## 1128 ENSG00000188157.15          AGRN   HGNC:329
## 1129 ENSG00000188157.15          AGRN   HGNC:329
## 1130 ENSG00000188157.15          AGRN   HGNC:329
## 1131 ENSG00000188157.15          AGRN   HGNC:329
## 1132 ENSG00000188157.15          AGRN   HGNC:329
## 1133 ENSG00000188157.15          AGRN   HGNC:329
```

```
## 1134 ENSG00000188157.15        AGRN   HGNC:329
## 1135 ENSG00000188157.15        AGRN   HGNC:329
## 1136 ENSG00000188157.15        AGRN   HGNC:329
## 1137 ENSG00000188157.15        AGRN   HGNC:329
## 1138 ENSG00000188157.15        AGRN   HGNC:329
## 1139 ENSG00000188157.15        AGRN   HGNC:329
## 1140 ENSG00000188157.15        AGRN   HGNC:329
## 1141 ENSG00000188157.15        AGRN   HGNC:329
## 1142 ENSG00000188157.15        AGRN   HGNC:329
## 1143 ENSG00000188157.15        AGRN   HGNC:329
## 1144 ENSG00000188157.15        AGRN   HGNC:329
## 1145 ENSG00000188157.15        AGRN   HGNC:329
## 1146 ENSG00000188157.15        AGRN   HGNC:329
## 1147 ENSG00000188157.15        AGRN   HGNC:329
## 1148 ENSG00000188157.15        AGRN   HGNC:329
## 1149 ENSG00000188157.15        AGRN   HGNC:329
## 1150 ENSG00000188157.15        AGRN   HGNC:329
## 1151 ENSG00000188157.15        AGRN   HGNC:329
## 1152 ENSG00000188157.15        AGRN   HGNC:329
## 1153 ENSG00000188157.15        AGRN   HGNC:329
## 1154 ENSG00000188157.15        AGRN   HGNC:329
## 1155 ENSG00000188157.15        AGRN   HGNC:329
## 1156 ENSG00000188157.15        AGRN   HGNC:329
## 1157 ENSG00000188157.15        AGRN   HGNC:329
## 1158 ENSG00000188157.15        AGRN   HGNC:329
## 1159 ENSG00000188157.15        AGRN   HGNC:329
## 1160 ENSG00000188157.15        AGRN   HGNC:329
## 1161 ENSG00000188157.15        AGRN   HGNC:329
## 1162 ENSG00000188157.15        AGRN   HGNC:329
## 1163 ENSG00000188157.15        AGRN   HGNC:329
## 1164 ENSG00000188157.15        AGRN   HGNC:329
## 1165 ENSG00000188157.15        AGRN   HGNC:329
## 1166 ENSG00000188157.15        AGRN   HGNC:329
## 1167 ENSG00000188157.15        AGRN   HGNC:329
## 1168 ENSG00000188157.15        AGRN   HGNC:329
## 1169 ENSG00000188157.15        AGRN   HGNC:329
## 1170 ENSG00000188157.15        AGRN   HGNC:329
## 1171  ENSG00000242590.1  AL645608.5       <NA>
## 1172  ENSG00000242590.1  AL645608.5       <NA>
## 1173  ENSG00000242590.1  AL645608.5       <NA>
## 1174  ENSG00000242590.1  AL645608.5       <NA>
## 1175 ENSG00000217801.10  AL390719.1       <NA>
## 1176 ENSG00000217801.10  AL390719.1       <NA>
## 1177 ENSG00000217801.10  AL390719.1       <NA>
## 1178 ENSG00000217801.10  AL390719.1       <NA>
## 1179 ENSG00000217801.10  AL390719.1       <NA>
## 1180 ENSG00000217801.10  AL390719.1       <NA>
## 1181 ENSG00000217801.10  AL390719.1       <NA>
## 1182 ENSG00000217801.10  AL390719.1       <NA>
## 1183 ENSG00000217801.10  AL390719.1       <NA>
## 1184 ENSG00000217801.10  AL390719.1       <NA>
## 1185 ENSG00000217801.10  AL390719.1       <NA>
## 1186 ENSG00000217801.10  AL390719.1       <NA>
## 1187 ENSG00000217801.10  AL390719.1       <NA>
```

```
## 1188 ENSG00000217801.10    AL390719.1       <NA>
## 1189 ENSG00000217801.10    AL390719.1       <NA>
## 1190 ENSG00000217801.10    AL390719.1       <NA>
## 1191 ENSG00000217801.10    AL390719.1       <NA>
## 1192 ENSG00000217801.10    AL390719.1       <NA>
## 1193  ENSG00000273443.1    AL645608.8       <NA>
## 1194  ENSG00000273443.1    AL645608.8       <NA>
## 1195  ENSG00000273443.1    AL645608.8       <NA>
## 1196  ENSG00000273443.1    AL645608.8       <NA>
## 1197  ENSG00000237330.3       RNF223 HGNC:40020
## 1198  ENSG00000237330.3       RNF223 HGNC:40020
## 1199  ENSG00000237330.3       RNF223 HGNC:40020
## 1200  ENSG00000237330.3       RNF223 HGNC:40020
## 1201  ENSG00000237330.3       RNF223 HGNC:40020
## 1202  ENSG00000237330.3       RNF223 HGNC:40020
## 1203  ENSG00000237330.3       RNF223 HGNC:40020
## 1204  ENSG00000237330.3       RNF223 HGNC:40020
## 1205  ENSG00000237330.3       RNF223 HGNC:40020
## 1206  ENSG00000237330.3       RNF223 HGNC:40020
## 1207 ENSG00000131591.17    C1orf159 HGNC:26062
## 1208 ENSG00000131591.17    C1orf159 HGNC:26062
## 1209 ENSG00000131591.17    C1orf159 HGNC:26062
## 1210 ENSG00000131591.17    C1orf159 HGNC:26062
## 1211 ENSG00000131591.17    C1orf159 HGNC:26062
## 1212 ENSG00000131591.17    C1orf159 HGNC:26062
## 1213 ENSG00000131591.17    C1orf159 HGNC:26062
## 1214 ENSG00000131591.17    C1orf159 HGNC:26062
## 1215 ENSG00000131591.17    C1orf159 HGNC:26062
## 1216 ENSG00000131591.17    C1orf159 HGNC:26062
## 1217 ENSG00000131591.17    C1orf159 HGNC:26062
## 1218 ENSG00000131591.17    C1orf159 HGNC:26062
## 1219 ENSG00000131591.17    C1orf159 HGNC:26062
## 1220 ENSG00000131591.17    C1orf159 HGNC:26062
## 1221 ENSG00000131591.17    C1orf159 HGNC:26062
## 1222 ENSG00000131591.17    C1orf159 HGNC:26062
## 1223 ENSG00000131591.17    C1orf159 HGNC:26062
## 1224 ENSG00000131591.17    C1orf159 HGNC:26062
## 1225 ENSG00000131591.17    C1orf159 HGNC:26062
## 1226 ENSG00000131591.17    C1orf159 HGNC:26062
## 1227 ENSG00000131591.17    C1orf159 HGNC:26062
## 1228 ENSG00000131591.17    C1orf159 HGNC:26062
## 1229 ENSG00000131591.17    C1orf159 HGNC:26062
## 1230 ENSG00000131591.17    C1orf159 HGNC:26062
## 1231 ENSG00000131591.17    C1orf159 HGNC:26062
## 1232 ENSG00000131591.17    C1orf159 HGNC:26062
## 1233 ENSG00000131591.17    C1orf159 HGNC:26062
## 1234 ENSG00000131591.17    C1orf159 HGNC:26062
## 1235 ENSG00000131591.17    C1orf159 HGNC:26062
## 1236 ENSG00000131591.17    C1orf159 HGNC:26062
## 1237 ENSG00000131591.17    C1orf159 HGNC:26062
## 1238 ENSG00000131591.17    C1orf159 HGNC:26062
## 1239 ENSG00000131591.17    C1orf159 HGNC:26062
## 1240 ENSG00000131591.17    C1orf159 HGNC:26062
## 1241 ENSG00000131591.17    C1orf159 HGNC:26062
```

```
## 1242 ENSG00000131591.17    C1orf159 HGNC:26062
## 1243 ENSG00000131591.17    C1orf159 HGNC:26062
## 1244 ENSG00000131591.17    C1orf159 HGNC:26062
## 1245 ENSG00000131591.17    C1orf159 HGNC:26062
## 1246 ENSG00000131591.17    C1orf159 HGNC:26062
## 1247 ENSG00000131591.17    C1orf159 HGNC:26062
## 1248 ENSG00000131591.17    C1orf159 HGNC:26062
## 1249 ENSG00000131591.17    C1orf159 HGNC:26062
## 1250 ENSG00000131591.17    C1orf159 HGNC:26062
## 1251 ENSG00000131591.17    C1orf159 HGNC:26062
## 1252 ENSG00000131591.17    C1orf159 HGNC:26062
## 1253 ENSG00000131591.17    C1orf159 HGNC:26062
## 1254 ENSG00000131591.17    C1orf159 HGNC:26062
## 1255 ENSG00000131591.17    C1orf159 HGNC:26062
## 1256 ENSG00000131591.17    C1orf159 HGNC:26062
## 1257 ENSG00000131591.17    C1orf159 HGNC:26062
## 1258 ENSG00000131591.17    C1orf159 HGNC:26062
## 1259 ENSG00000131591.17    C1orf159 HGNC:26062
## 1260 ENSG00000131591.17    C1orf159 HGNC:26062
## 1261 ENSG00000131591.17    C1orf159 HGNC:26062
## 1262 ENSG00000131591.17    C1orf159 HGNC:26062
## 1263 ENSG00000131591.17    C1orf159 HGNC:26062
## 1264 ENSG00000131591.17    C1orf159 HGNC:26062
## 1265 ENSG00000131591.17    C1orf159 HGNC:26062
## 1266 ENSG00000131591.17    C1orf159 HGNC:26062
## 1267 ENSG00000131591.17    C1orf159 HGNC:26062
## 1268 ENSG00000131591.17    C1orf159 HGNC:26062
## 1269 ENSG00000131591.17    C1orf159 HGNC:26062
## 1270 ENSG00000131591.17    C1orf159 HGNC:26062
## 1271 ENSG00000131591.17    C1orf159 HGNC:26062
## 1272 ENSG00000131591.17    C1orf159 HGNC:26062
## 1273 ENSG00000131591.17    C1orf159 HGNC:26062
## 1274 ENSG00000131591.17    C1orf159 HGNC:26062
## 1275 ENSG00000131591.17    C1orf159 HGNC:26062
## 1276 ENSG00000131591.17    C1orf159 HGNC:26062
## 1277 ENSG00000131591.17    C1orf159 HGNC:26062
## 1278 ENSG00000131591.17    C1orf159 HGNC:26062
## 1279 ENSG00000131591.17    C1orf159 HGNC:26062
## 1280 ENSG00000131591.17    C1orf159 HGNC:26062
## 1281 ENSG00000131591.17    C1orf159 HGNC:26062
## 1282 ENSG00000131591.17    C1orf159 HGNC:26062
## 1283 ENSG00000131591.17    C1orf159 HGNC:26062
## 1284 ENSG00000131591.17    C1orf159 HGNC:26062
## 1285 ENSG00000131591.17    C1orf159 HGNC:26062
## 1286 ENSG00000131591.17    C1orf159 HGNC:26062
## 1287 ENSG00000131591.17    C1orf159 HGNC:26062
## 1288 ENSG00000131591.17    C1orf159 HGNC:26062
## 1289 ENSG00000131591.17    C1orf159 HGNC:26062
## 1290 ENSG00000131591.17    C1orf159 HGNC:26062
## 1291 ENSG00000131591.17    C1orf159 HGNC:26062
## 1292 ENSG00000131591.17    C1orf159 HGNC:26062
## 1293 ENSG00000131591.17    C1orf159 HGNC:26062
## 1294 ENSG00000131591.17    C1orf159 HGNC:26062
## 1295 ENSG00000131591.17    C1orf159 HGNC:26062
```

```
## 1296 ENSG00000131591.17    C1orf159 HGNC:26062
## 1297 ENSG00000131591.17    C1orf159 HGNC:26062
## 1298 ENSG00000131591.17    C1orf159 HGNC:26062
## 1299 ENSG00000131591.17    C1orf159 HGNC:26062
## 1300 ENSG00000131591.17    C1orf159 HGNC:26062
## 1301 ENSG00000131591.17    C1orf159 HGNC:26062
## 1302 ENSG00000131591.17    C1orf159 HGNC:26062
## 1303 ENSG00000131591.17    C1orf159 HGNC:26062
## 1304 ENSG00000131591.17    C1orf159 HGNC:26062
## 1305 ENSG00000131591.17    C1orf159 HGNC:26062
## 1306 ENSG00000131591.17    C1orf159 HGNC:26062
## 1307 ENSG00000131591.17    C1orf159 HGNC:26062
## 1308  ENSG00000285812.1  AL390719.3      <NA>
## 1309  ENSG00000285812.1  AL390719.3      <NA>
## 1310  ENSG00000285812.1  AL390719.3      <NA>
## 1311  ENSG00000285812.1  AL390719.3      <NA>
## 1312  ENSG00000223823.1  LINC01342 HGNC:50551
## 1313  ENSG00000223823.1  LINC01342 HGNC:50551
## 1314  ENSG00000223823.1  LINC01342 HGNC:50551
## 1315  ENSG00000223823.1  LINC01342 HGNC:50551
## 1316  ENSG00000223823.1  LINC01342 HGNC:50551
## 1317  ENSG00000207730.3    MIR200B HGNC:31579
## 1318  ENSG00000207730.3    MIR200B HGNC:31579
## 1319  ENSG00000207730.3    MIR200B HGNC:31579
## 1320  ENSG00000207607.3    MIR200A HGNC:31578
## 1321  ENSG00000207607.3    MIR200A HGNC:31578
## 1322  ENSG00000207607.3    MIR200A HGNC:31578
## 1323  ENSG00000198976.1     MIR429 HGNC:13784
## 1324  ENSG00000198976.1     MIR429 HGNC:13784
## 1325  ENSG00000198976.1     MIR429 HGNC:13784
## 1326  ENSG00000272141.1  AL390719.2      <NA>
## 1327  ENSG00000272141.1  AL390719.2      <NA>
## 1328  ENSG00000272141.1  AL390719.2      <NA>
## 1329  ENSG00000205231.1  TTLL10-AS1 HGNC:41159
## 1330  ENSG00000205231.1  TTLL10-AS1 HGNC:41159
## 1331  ENSG00000205231.1  TTLL10-AS1 HGNC:41159
## 1332  ENSG00000205231.1  TTLL10-AS1 HGNC:41159
## 1333 ENSG00000162571.13      TTLL10 HGNC:26693
## 1334 ENSG00000162571.13      TTLL10 HGNC:26693
## 1335 ENSG00000162571.13      TTLL10 HGNC:26693
## 1336 ENSG00000162571.13      TTLL10 HGNC:26693
## 1337 ENSG00000162571.13      TTLL10 HGNC:26693
## 1338 ENSG00000162571.13      TTLL10 HGNC:26693
## 1339 ENSG00000162571.13      TTLL10 HGNC:26693
## 1340 ENSG00000162571.13      TTLL10 HGNC:26693
## 1341 ENSG00000162571.13      TTLL10 HGNC:26693
## 1342 ENSG00000162571.13      TTLL10 HGNC:26693
## 1343 ENSG00000162571.13      TTLL10 HGNC:26693
## 1344 ENSG00000162571.13      TTLL10 HGNC:26693
## 1345 ENSG00000162571.13      TTLL10 HGNC:26693
## 1346 ENSG00000162571.13      TTLL10 HGNC:26693
## 1347 ENSG00000162571.13      TTLL10 HGNC:26693
## 1348 ENSG00000162571.13      TTLL10 HGNC:26693
## 1349 ENSG00000162571.13      TTLL10 HGNC:26693
```

```
## 1350 ENSG00000162571.13          TTLL10 HGNC:26693
## 1351 ENSG00000162571.13          TTLL10 HGNC:26693
## 1352 ENSG00000162571.13          TTLL10 HGNC:26693
## 1353 ENSG00000162571.13          TTLL10 HGNC:26693
## 1354 ENSG00000162571.13          TTLL10 HGNC:26693
## 1355 ENSG00000162571.13          TTLL10 HGNC:26693
## 1356 ENSG00000162571.13          TTLL10 HGNC:26693
## 1357 ENSG00000162571.13          TTLL10 HGNC:26693
## 1358 ENSG00000162571.13          TTLL10 HGNC:26693
## 1359 ENSG00000162571.13          TTLL10 HGNC:26693
## 1360 ENSG00000162571.13          TTLL10 HGNC:26693
## 1361 ENSG00000162571.13          TTLL10 HGNC:26693
## 1362 ENSG00000162571.13          TTLL10 HGNC:26693
## 1363 ENSG00000162571.13          TTLL10 HGNC:26693
## 1364 ENSG00000162571.13          TTLL10 HGNC:26693
## 1365 ENSG00000162571.13          TTLL10 HGNC:26693
## 1366 ENSG00000162571.13          TTLL10 HGNC:26693
## 1367 ENSG00000162571.13          TTLL10 HGNC:26693
## 1368 ENSG00000162571.13          TTLL10 HGNC:26693
## 1369 ENSG00000162571.13          TTLL10 HGNC:26693
## 1370 ENSG00000162571.13          TTLL10 HGNC:26693
## 1371 ENSG00000162571.13          TTLL10 HGNC:26693
## 1372 ENSG00000162571.13          TTLL10 HGNC:26693
## 1373 ENSG00000162571.13          TTLL10 HGNC:26693
## 1374 ENSG00000162571.13          TTLL10 HGNC:26693
## 1375 ENSG00000162571.13          TTLL10 HGNC:26693
## 1376 ENSG00000162571.13          TTLL10 HGNC:26693
## 1377 ENSG00000162571.13          TTLL10 HGNC:26693
## 1378 ENSG00000162571.13          TTLL10 HGNC:26693
## 1379 ENSG00000162571.13          TTLL10 HGNC:26693
## 1380 ENSG00000162571.13          TTLL10 HGNC:26693
## 1381 ENSG00000162571.13          TTLL10 HGNC:26693
## 1382 ENSG00000162571.13          TTLL10 HGNC:26693
## 1383 ENSG00000162571.13          TTLL10 HGNC:26693
## 1384 ENSG00000162571.13          TTLL10 HGNC:26693
## 1385 ENSG00000162571.13          TTLL10 HGNC:26693
## 1386 ENSG00000162571.13          TTLL10 HGNC:26693
## 1387 ENSG00000162571.13          TTLL10 HGNC:26693
## 1388 ENSG00000162571.13          TTLL10 HGNC:26693
## 1389 ENSG00000162571.13          TTLL10 HGNC:26693
## 1390 ENSG00000162571.13          TTLL10 HGNC:26693
## 1391 ENSG00000162571.13          TTLL10 HGNC:26693
## 1392 ENSG00000162571.13          TTLL10 HGNC:26693
## 1393 ENSG00000162571.13          TTLL10 HGNC:26693
## 1394 ENSG00000162571.13          TTLL10 HGNC:26693
## 1395 ENSG00000162571.13          TTLL10 HGNC:26693
## 1396 ENSG00000162571.13          TTLL10 HGNC:26693
## 1397 ENSG00000162571.13          TTLL10 HGNC:26693
## 1398 ENSG00000162571.13          TTLL10 HGNC:26693
## 1399 ENSG00000162571.13          TTLL10 HGNC:26693
## 1400 ENSG00000162571.13          TTLL10 HGNC:26693
## 1401 ENSG00000162571.13          TTLL10 HGNC:26693
## 1402 ENSG00000162571.13          TTLL10 HGNC:26693
## 1403 ENSG00000162571.13          TTLL10 HGNC:26693
```

```
## 1404 ENSG00000162571.13        TTLL10 HGNC:26693
## 1405 ENSG00000162571.13        TTLL10 HGNC:26693
## 1406 ENSG00000162571.13        TTLL10 HGNC:26693
## 1407 ENSG00000162571.13        TTLL10 HGNC:26693
## 1408 ENSG00000162571.13        TTLL10 HGNC:26693
## 1409 ENSG00000162571.13        TTLL10 HGNC:26693
## 1410 ENSG00000162571.13        TTLL10 HGNC:26693
## 1411 ENSG00000162571.13        TTLL10 HGNC:26693
## 1412 ENSG00000162571.13        TTLL10 HGNC:26693
## 1413 ENSG00000162571.13        TTLL10 HGNC:26693
## 1414 ENSG00000162571.13        TTLL10 HGNC:26693
## 1415 ENSG00000162571.13        TTLL10 HGNC:26693
## 1416 ENSG00000162571.13        TTLL10 HGNC:26693
## 1417 ENSG00000162571.13        TTLL10 HGNC:26693
## 1418 ENSG00000162571.13        TTLL10 HGNC:26693
## 1419 ENSG00000162571.13        TTLL10 HGNC:26693
## 1420 ENSG00000162571.13        TTLL10 HGNC:26693
## 1421 ENSG00000162571.13        TTLL10 HGNC:26693
## 1422 ENSG00000162571.13        TTLL10 HGNC:26693
## 1423 ENSG00000162571.13        TTLL10 HGNC:26693
## 1424 ENSG00000162571.13        TTLL10 HGNC:26693
## 1425 ENSG00000162571.13        TTLL10 HGNC:26693
## 1426 ENSG00000162571.13        TTLL10 HGNC:26693
## 1427 ENSG00000162571.13        TTLL10 HGNC:26693
## 1428 ENSG00000162571.13        TTLL10 HGNC:26693
## 1429 ENSG00000162571.13        TTLL10 HGNC:26693
## 1430 ENSG00000162571.13        TTLL10 HGNC:26693
## 1431 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1432 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1433 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1434 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1435 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1436 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1437 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1438 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1439 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1440 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1441 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1442 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1443 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1444 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1445 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1446 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1447 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1448 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1449 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1450 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1451 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1452 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1453 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1454 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1455 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1456 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1457 ENSG00000186891.14      TNFRSF18 HGNC:11914
```

```
## 1458 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1459 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1460 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1461 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1462 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1463 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1464 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1465 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1466 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1467 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1468 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1469 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1470 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1471 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1472 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1473 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1474 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1475 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1476 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1477 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1478 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1479 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1480 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1481 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1482 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1483 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1484 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1485 ENSG00000186891.14      TNFRSF18 HGNC:11914
## 1486 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1487 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1488 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1489 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1490 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1491 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1492 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1493 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1494 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1495 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1496 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1497 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1498 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1499 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1500 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1501 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1502 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1503 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1504 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1505 ENSG00000186827.11       TNFRSF4 HGNC:11918
## 1506 ENSG00000078808.17          SDF4 HGNC:24188
## 1507 ENSG00000078808.17          SDF4 HGNC:24188
## 1508 ENSG00000078808.17          SDF4 HGNC:24188
## 1509 ENSG00000078808.17          SDF4 HGNC:24188
## 1510 ENSG00000078808.17          SDF4 HGNC:24188
## 1511 ENSG00000078808.17          SDF4 HGNC:24188
```

```
## 1512 ENSG00000078808.17          SDF4 HGNC:24188
## 1513 ENSG00000078808.17          SDF4 HGNC:24188
## 1514 ENSG00000078808.17          SDF4 HGNC:24188
## 1515 ENSG00000078808.17          SDF4 HGNC:24188
## 1516 ENSG00000078808.17          SDF4 HGNC:24188
## 1517 ENSG00000078808.17          SDF4 HGNC:24188
## 1518 ENSG00000078808.17          SDF4 HGNC:24188
## 1519 ENSG00000078808.17          SDF4 HGNC:24188
## 1520 ENSG00000078808.17          SDF4 HGNC:24188
## 1521 ENSG00000078808.17          SDF4 HGNC:24188
## 1522 ENSG00000078808.17          SDF4 HGNC:24188
## 1523 ENSG00000078808.17          SDF4 HGNC:24188
## 1524 ENSG00000078808.17          SDF4 HGNC:24188
## 1525 ENSG00000078808.17          SDF4 HGNC:24188
## 1526 ENSG00000078808.17          SDF4 HGNC:24188
## 1527 ENSG00000078808.17          SDF4 HGNC:24188
## 1528 ENSG00000078808.17          SDF4 HGNC:24188
## 1529 ENSG00000078808.17          SDF4 HGNC:24188
## 1530 ENSG00000078808.17          SDF4 HGNC:24188
## 1531 ENSG00000078808.17          SDF4 HGNC:24188
## 1532 ENSG00000078808.17          SDF4 HGNC:24188
## 1533 ENSG00000078808.17          SDF4 HGNC:24188
## 1534 ENSG00000078808.17          SDF4 HGNC:24188
## 1535 ENSG00000078808.17          SDF4 HGNC:24188
## 1536 ENSG00000078808.17          SDF4 HGNC:24188
## 1537 ENSG00000078808.17          SDF4 HGNC:24188
## 1538 ENSG00000078808.17          SDF4 HGNC:24188
## 1539 ENSG00000078808.17          SDF4 HGNC:24188
## 1540 ENSG00000078808.17          SDF4 HGNC:24188
## 1541 ENSG00000078808.17          SDF4 HGNC:24188
## 1542 ENSG00000078808.17          SDF4 HGNC:24188
## 1543 ENSG00000078808.17          SDF4 HGNC:24188
## 1544 ENSG00000078808.17          SDF4 HGNC:24188
## 1545 ENSG00000078808.17          SDF4 HGNC:24188
## 1546 ENSG00000078808.17          SDF4 HGNC:24188
## 1547 ENSG00000078808.17          SDF4 HGNC:24188
## 1548 ENSG00000078808.17          SDF4 HGNC:24188
## 1549 ENSG00000078808.17          SDF4 HGNC:24188
## 1550 ENSG00000078808.17          SDF4 HGNC:24188
## 1551 ENSG00000078808.17          SDF4 HGNC:24188
## 1552 ENSG00000078808.17          SDF4 HGNC:24188
## 1553 ENSG00000078808.17          SDF4 HGNC:24188
## 1554 ENSG00000078808.17          SDF4 HGNC:24188
## 1555 ENSG00000078808.17          SDF4 HGNC:24188
## 1556 ENSG00000078808.17          SDF4 HGNC:24188
## 1557 ENSG00000078808.17          SDF4 HGNC:24188
## 1558 ENSG00000078808.17          SDF4 HGNC:24188
## 1559 ENSG00000078808.17          SDF4 HGNC:24188
## 1560 ENSG00000078808.17          SDF4 HGNC:24188
## 1561 ENSG00000078808.17          SDF4 HGNC:24188
## 1562 ENSG00000078808.17          SDF4 HGNC:24188
## 1563 ENSG00000078808.17          SDF4 HGNC:24188
## 1564 ENSG00000078808.17          SDF4 HGNC:24188
## 1565 ENSG00000078808.17          SDF4 HGNC:24188
```

```
## 1566 ENSG00000078808.17          SDF4 HGNC:24188
## 1567 ENSG00000078808.17          SDF4 HGNC:24188
## 1568 ENSG00000078808.17          SDF4 HGNC:24188
## 1569 ENSG00000078808.17          SDF4 HGNC:24188
## 1570 ENSG00000078808.17          SDF4 HGNC:24188
## 1571 ENSG00000078808.17          SDF4 HGNC:24188
## 1572 ENSG00000078808.17          SDF4 HGNC:24188
## 1573 ENSG00000078808.17          SDF4 HGNC:24188
## 1574 ENSG00000078808.17          SDF4 HGNC:24188
## 1575 ENSG00000078808.17          SDF4 HGNC:24188
## 1576 ENSG00000078808.17          SDF4 HGNC:24188
## 1577 ENSG00000078808.17          SDF4 HGNC:24188
## 1578 ENSG00000078808.17          SDF4 HGNC:24188
## 1579 ENSG00000078808.17          SDF4 HGNC:24188
## 1580  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1581  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1582  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1583  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1584  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1585  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1586  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1587  ENSG00000176022.7       B3GALT6 HGNC:17978
## 1588  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1589  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1590  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1591  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1592  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1593  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1594  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1595  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1596  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1597  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1598  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1599  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1600  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1601  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1602  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1603  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1604  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1605  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1606  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1607  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1608  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1609  ENSG00000184163.3      C1QTNF12 HGNC:32308
## 1610  ENSG00000260179.1     AL162741.1        <NA>
## 1611  ENSG00000260179.1     AL162741.1        <NA>
## 1612  ENSG00000260179.1     AL162741.1        <NA>
## 1613 ENSG00000160087.20        UBE2J2 HGNC:19268
## 1614 ENSG00000160087.20        UBE2J2 HGNC:19268
## 1615 ENSG00000160087.20        UBE2J2 HGNC:19268
## 1616 ENSG00000160087.20        UBE2J2 HGNC:19268
## 1617 ENSG00000160087.20        UBE2J2 HGNC:19268
## 1618 ENSG00000160087.20        UBE2J2 HGNC:19268
## 1619 ENSG00000160087.20        UBE2J2 HGNC:19268
```

```
## 1620 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1621 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1622 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1623 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1624 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1625 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1626 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1627 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1628 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1629 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1630 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1631 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1632 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1633 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1634 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1635 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1636 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1637 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1638 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1639 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1640 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1641 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1642 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1643 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1644 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1645 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1646 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1647 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1648 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1649 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1650 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1651 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1652 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1653 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1654 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1655 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1656 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1657 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1658 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1659 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1660 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1661 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1662 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1663 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1664 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1665 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1666 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1667 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1668 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1669 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1670 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1671 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1672 ENSG00000160087.20          UBE2J2 HGNC:19268
## 1673 ENSG00000160087.20          UBE2J2 HGNC:19268
```

```
## 1674 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1675 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1676 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1677 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1678 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1679 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1680 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1681 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1682 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1683 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1684 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1685 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1686 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1687 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1688 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1689 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1690 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1691 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1692 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1693 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1694 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1695 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1696 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1697 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1698 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1699 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1700 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1701 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1702 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1703 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1704 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1705 ENSG00000160087.20      UBE2J2 HGNC:19268
## 1706  ENSG00000230415.1    LINC01786 HGNC:52575
## 1707  ENSG00000230415.1    LINC01786 HGNC:52575
## 1708  ENSG00000230415.1    LINC01786 HGNC:52575
## 1709  ENSG00000230415.1    LINC01786 HGNC:52575
## 1710  ENSG00000230415.1    LINC01786 HGNC:52575
## 1711  ENSG00000230415.1    LINC01786 HGNC:52575
## 1712  ENSG00000230415.1    LINC01786 HGNC:52575
## 1713  ENSG00000230415.1    LINC01786 HGNC:52575
## 1714 ENSG00000162572.20      SCNN1D HGNC:10601
## 1715 ENSG00000162572.20      SCNN1D HGNC:10601
## 1716 ENSG00000162572.20      SCNN1D HGNC:10601
## 1717 ENSG00000162572.20      SCNN1D HGNC:10601
## 1718 ENSG00000162572.20      SCNN1D HGNC:10601
## 1719 ENSG00000162572.20      SCNN1D HGNC:10601
## 1720 ENSG00000162572.20      SCNN1D HGNC:10601
## 1721 ENSG00000162572.20      SCNN1D HGNC:10601
## 1722 ENSG00000162572.20      SCNN1D HGNC:10601
## 1723 ENSG00000162572.20      SCNN1D HGNC:10601
## 1724 ENSG00000162572.20      SCNN1D HGNC:10601
## 1725 ENSG00000162572.20      SCNN1D HGNC:10601
## 1726 ENSG00000162572.20      SCNN1D HGNC:10601
## 1727 ENSG00000162572.20      SCNN1D HGNC:10601
```

```
## 1728 ENSG00000162572.20          SCNN1D HGNC:10601
## 1729 ENSG00000162572.20          SCNN1D HGNC:10601
## 1730 ENSG00000162572.20          SCNN1D HGNC:10601
## 1731 ENSG00000162572.20          SCNN1D HGNC:10601
## 1732 ENSG00000162572.20          SCNN1D HGNC:10601
## 1733 ENSG00000162572.20          SCNN1D HGNC:10601
## 1734 ENSG00000162572.20          SCNN1D HGNC:10601
## 1735 ENSG00000162572.20          SCNN1D HGNC:10601
## 1736 ENSG00000162572.20          SCNN1D HGNC:10601
## 1737 ENSG00000162572.20          SCNN1D HGNC:10601
## 1738 ENSG00000162572.20          SCNN1D HGNC:10601
## 1739 ENSG00000162572.20          SCNN1D HGNC:10601
## 1740 ENSG00000162572.20          SCNN1D HGNC:10601
## 1741 ENSG00000162572.20          SCNN1D HGNC:10601
## 1742 ENSG00000162572.20          SCNN1D HGNC:10601
## 1743 ENSG00000162572.20          SCNN1D HGNC:10601
## 1744 ENSG00000162572.20          SCNN1D HGNC:10601
## 1745 ENSG00000162572.20          SCNN1D HGNC:10601
## 1746 ENSG00000162572.20          SCNN1D HGNC:10601
## 1747 ENSG00000162572.20          SCNN1D HGNC:10601
## 1748 ENSG00000162572.20          SCNN1D HGNC:10601
## 1749 ENSG00000162572.20          SCNN1D HGNC:10601
## 1750 ENSG00000162572.20          SCNN1D HGNC:10601
## 1751 ENSG00000162572.20          SCNN1D HGNC:10601
## 1752 ENSG00000162572.20          SCNN1D HGNC:10601
## 1753 ENSG00000162572.20          SCNN1D HGNC:10601
## 1754 ENSG00000162572.20          SCNN1D HGNC:10601
## 1755 ENSG00000162572.20          SCNN1D HGNC:10601
## 1756 ENSG00000162572.20          SCNN1D HGNC:10601
## 1757 ENSG00000162572.20          SCNN1D HGNC:10601
## 1758 ENSG00000162572.20          SCNN1D HGNC:10601
## 1759 ENSG00000162572.20          SCNN1D HGNC:10601
## 1760 ENSG00000162572.20          SCNN1D HGNC:10601
## 1761 ENSG00000162572.20          SCNN1D HGNC:10601
## 1762 ENSG00000162572.20          SCNN1D HGNC:10601
## 1763 ENSG00000162572.20          SCNN1D HGNC:10601
## 1764 ENSG00000162572.20          SCNN1D HGNC:10601
## 1765 ENSG00000162572.20          SCNN1D HGNC:10601
## 1766 ENSG00000162572.20          SCNN1D HGNC:10601
## 1767 ENSG00000162572.20          SCNN1D HGNC:10601
## 1768 ENSG00000162572.20          SCNN1D HGNC:10601
## 1769 ENSG00000162572.20          SCNN1D HGNC:10601
## 1770 ENSG00000162572.20          SCNN1D HGNC:10601
## 1771 ENSG00000162572.20          SCNN1D HGNC:10601
## 1772 ENSG00000162572.20          SCNN1D HGNC:10601
## 1773 ENSG00000162572.20          SCNN1D HGNC:10601
## 1774 ENSG00000162572.20          SCNN1D HGNC:10601
## 1775 ENSG00000162572.20          SCNN1D HGNC:10601
## 1776 ENSG00000162572.20          SCNN1D HGNC:10601
## 1777 ENSG00000162572.20          SCNN1D HGNC:10601
## 1778 ENSG00000162572.20          SCNN1D HGNC:10601
## 1779 ENSG00000162572.20          SCNN1D HGNC:10601
## 1780 ENSG00000162572.20          SCNN1D HGNC:10601
## 1781 ENSG00000162572.20          SCNN1D HGNC:10601
```

```
## 1782 ENSG00000162572.20          SCNN1D HGNC:10601
## 1783 ENSG00000162572.20          SCNN1D HGNC:10601
## 1784 ENSG00000162572.20          SCNN1D HGNC:10601
## 1785 ENSG00000162572.20          SCNN1D HGNC:10601
## 1786 ENSG00000162572.20          SCNN1D HGNC:10601
## 1787 ENSG00000162572.20          SCNN1D HGNC:10601
## 1788 ENSG00000162572.20          SCNN1D HGNC:10601
## 1789 ENSG00000162572.20          SCNN1D HGNC:10601
## 1790 ENSG00000162572.20          SCNN1D HGNC:10601
## 1791 ENSG00000162572.20          SCNN1D HGNC:10601
## 1792 ENSG00000162572.20          SCNN1D HGNC:10601
## 1793 ENSG00000162572.20          SCNN1D HGNC:10601
## 1794 ENSG00000162572.20          SCNN1D HGNC:10601
## 1795 ENSG00000162572.20          SCNN1D HGNC:10601
## 1796 ENSG00000162572.20          SCNN1D HGNC:10601
## 1797 ENSG00000162572.20          SCNN1D HGNC:10601
## 1798 ENSG00000162572.20          SCNN1D HGNC:10601
## 1799 ENSG00000162572.20          SCNN1D HGNC:10601
## 1800 ENSG00000162572.20          SCNN1D HGNC:10601
## 1801 ENSG00000162572.20          SCNN1D HGNC:10601
## 1802 ENSG00000162572.20          SCNN1D HGNC:10601
## 1803 ENSG00000162572.20          SCNN1D HGNC:10601
## 1804 ENSG00000162572.20          SCNN1D HGNC:10601
## 1805 ENSG00000162572.20          SCNN1D HGNC:10601
## 1806 ENSG00000162572.20          SCNN1D HGNC:10601
## 1807 ENSG00000162572.20          SCNN1D HGNC:10601
## 1808 ENSG00000162572.20          SCNN1D HGNC:10601
## 1809 ENSG00000162572.20          SCNN1D HGNC:10601
## 1810 ENSG00000162572.20          SCNN1D HGNC:10601
## 1811 ENSG00000162572.20          SCNN1D HGNC:10601
## 1812 ENSG00000162572.20          SCNN1D HGNC:10601
## 1813 ENSG00000162572.20          SCNN1D HGNC:10601
## 1814 ENSG00000162572.20          SCNN1D HGNC:10601
## 1815 ENSG00000162572.20          SCNN1D HGNC:10601
## 1816 ENSG00000162572.20          SCNN1D HGNC:10601
## 1817 ENSG00000162572.20          SCNN1D HGNC:10601
## 1818 ENSG00000162572.20          SCNN1D HGNC:10601
## 1819 ENSG00000162572.20          SCNN1D HGNC:10601
## 1820 ENSG00000162572.20          SCNN1D HGNC:10601
## 1821 ENSG00000162572.20          SCNN1D HGNC:10601
## 1822 ENSG00000162572.20          SCNN1D HGNC:10601
## 1823 ENSG00000162572.20          SCNN1D HGNC:10601
## 1824 ENSG00000162572.20          SCNN1D HGNC:10601
## 1825 ENSG00000162572.20          SCNN1D HGNC:10601
## 1826 ENSG00000162572.20          SCNN1D HGNC:10601
## 1827 ENSG00000162572.20          SCNN1D HGNC:10601
## 1828 ENSG00000162572.20          SCNN1D HGNC:10601
## 1829 ENSG00000162572.20          SCNN1D HGNC:10601
## 1830 ENSG00000162572.20          SCNN1D HGNC:10601
## 1831 ENSG00000162572.20          SCNN1D HGNC:10601
## 1832 ENSG00000162572.20          SCNN1D HGNC:10601
## 1833 ENSG00000162572.20          SCNN1D HGNC:10601
## 1834 ENSG00000162572.20          SCNN1D HGNC:10601
## 1835 ENSG00000162572.20          SCNN1D HGNC:10601
```

```
## 1836 ENSG00000162572.20        SCNN1D HGNC:10601
## 1837 ENSG00000162572.20        SCNN1D HGNC:10601
## 1838 ENSG00000162572.20        SCNN1D HGNC:10601
## 1839 ENSG00000162572.20        SCNN1D HGNC:10601
## 1840 ENSG00000162572.20        SCNN1D HGNC:10601
## 1841 ENSG00000162572.20        SCNN1D HGNC:10601
## 1842 ENSG00000162572.20        SCNN1D HGNC:10601
## 1843 ENSG00000162572.20        SCNN1D HGNC:10601
## 1844 ENSG00000162572.20        SCNN1D HGNC:10601
## 1845 ENSG00000162572.20        SCNN1D HGNC:10601
## 1846 ENSG00000162572.20        SCNN1D HGNC:10601
## 1847 ENSG00000162572.20        SCNN1D HGNC:10601
## 1848 ENSG00000162572.20        SCNN1D HGNC:10601
## 1849 ENSG00000162572.20        SCNN1D HGNC:10601
## 1850 ENSG00000162572.20        SCNN1D HGNC:10601
## 1851 ENSG00000162572.20        SCNN1D HGNC:10601
## 1852 ENSG00000162572.20        SCNN1D HGNC:10601
## 1853 ENSG00000162572.20        SCNN1D HGNC:10601
## 1854 ENSG00000162572.20        SCNN1D HGNC:10601
## 1855 ENSG00000162572.20        SCNN1D HGNC:10601
## 1856 ENSG00000162572.20        SCNN1D HGNC:10601
## 1857 ENSG00000162572.20        SCNN1D HGNC:10601
## 1858 ENSG00000162572.20        SCNN1D HGNC:10601
## 1859 ENSG00000162572.20        SCNN1D HGNC:10601
## 1860 ENSG00000162572.20        SCNN1D HGNC:10601
## 1861 ENSG00000162572.20        SCNN1D HGNC:10601
## 1862 ENSG00000162572.20        SCNN1D HGNC:10601
## 1863 ENSG00000131584.19         ACAP3 HGNC:16754
## 1864 ENSG00000131584.19         ACAP3 HGNC:16754
## 1865 ENSG00000131584.19         ACAP3 HGNC:16754
## 1866 ENSG00000131584.19         ACAP3 HGNC:16754
## 1867 ENSG00000131584.19         ACAP3 HGNC:16754
## 1868 ENSG00000131584.19         ACAP3 HGNC:16754
## 1869 ENSG00000131584.19         ACAP3 HGNC:16754
## 1870 ENSG00000131584.19         ACAP3 HGNC:16754
## 1871 ENSG00000131584.19         ACAP3 HGNC:16754
## 1872 ENSG00000131584.19         ACAP3 HGNC:16754
## 1873 ENSG00000131584.19         ACAP3 HGNC:16754
## 1874 ENSG00000131584.19         ACAP3 HGNC:16754
## 1875 ENSG00000131584.19         ACAP3 HGNC:16754
## 1876 ENSG00000131584.19         ACAP3 HGNC:16754
## 1877 ENSG00000131584.19         ACAP3 HGNC:16754
## 1878 ENSG00000131584.19         ACAP3 HGNC:16754
## 1879 ENSG00000131584.19         ACAP3 HGNC:16754
## 1880 ENSG00000131584.19         ACAP3 HGNC:16754
## 1881 ENSG00000131584.19         ACAP3 HGNC:16754
## 1882 ENSG00000131584.19         ACAP3 HGNC:16754
## 1883 ENSG00000131584.19         ACAP3 HGNC:16754
## 1884 ENSG00000131584.19         ACAP3 HGNC:16754
## 1885 ENSG00000131584.19         ACAP3 HGNC:16754
## 1886 ENSG00000131584.19         ACAP3 HGNC:16754
## 1887 ENSG00000131584.19         ACAP3 HGNC:16754
## 1888 ENSG00000131584.19         ACAP3 HGNC:16754
## 1889 ENSG00000131584.19         ACAP3 HGNC:16754
```

```
## 1890 ENSG00000131584.19          ACAP3 HGNC:16754
## 1891 ENSG00000131584.19          ACAP3 HGNC:16754
## 1892 ENSG00000131584.19          ACAP3 HGNC:16754
## 1893 ENSG00000131584.19          ACAP3 HGNC:16754
## 1894 ENSG00000131584.19          ACAP3 HGNC:16754
## 1895 ENSG00000131584.19          ACAP3 HGNC:16754
## 1896 ENSG00000131584.19          ACAP3 HGNC:16754
## 1897 ENSG00000131584.19          ACAP3 HGNC:16754
## 1898 ENSG00000131584.19          ACAP3 HGNC:16754
## 1899 ENSG00000131584.19          ACAP3 HGNC:16754
## 1900 ENSG00000131584.19          ACAP3 HGNC:16754
## 1901 ENSG00000131584.19          ACAP3 HGNC:16754
## 1902 ENSG00000131584.19          ACAP3 HGNC:16754
## 1903 ENSG00000131584.19          ACAP3 HGNC:16754
## 1904 ENSG00000131584.19          ACAP3 HGNC:16754
## 1905 ENSG00000131584.19          ACAP3 HGNC:16754
## 1906 ENSG00000131584.19          ACAP3 HGNC:16754
## 1907 ENSG00000131584.19          ACAP3 HGNC:16754
## 1908 ENSG00000131584.19          ACAP3 HGNC:16754
## 1909 ENSG00000131584.19          ACAP3 HGNC:16754
## 1910 ENSG00000131584.19          ACAP3 HGNC:16754
## 1911 ENSG00000131584.19          ACAP3 HGNC:16754
## 1912 ENSG00000131584.19          ACAP3 HGNC:16754
## 1913 ENSG00000131584.19          ACAP3 HGNC:16754
## 1914 ENSG00000131584.19          ACAP3 HGNC:16754
## 1915 ENSG00000131584.19          ACAP3 HGNC:16754
## 1916 ENSG00000131584.19          ACAP3 HGNC:16754
## 1917 ENSG00000131584.19          ACAP3 HGNC:16754
## 1918 ENSG00000131584.19          ACAP3 HGNC:16754
## 1919 ENSG00000131584.19          ACAP3 HGNC:16754
## 1920 ENSG00000131584.19          ACAP3 HGNC:16754
## 1921 ENSG00000131584.19          ACAP3 HGNC:16754
## 1922 ENSG00000131584.19          ACAP3 HGNC:16754
## 1923 ENSG00000131584.19          ACAP3 HGNC:16754
## 1924 ENSG00000131584.19          ACAP3 HGNC:16754
## 1925 ENSG00000131584.19          ACAP3 HGNC:16754
## 1926 ENSG00000131584.19          ACAP3 HGNC:16754
## 1927 ENSG00000131584.19          ACAP3 HGNC:16754
## 1928 ENSG00000131584.19          ACAP3 HGNC:16754
## 1929 ENSG00000131584.19          ACAP3 HGNC:16754
## 1930 ENSG00000131584.19          ACAP3 HGNC:16754
## 1931 ENSG00000131584.19          ACAP3 HGNC:16754
## 1932 ENSG00000131584.19          ACAP3 HGNC:16754
## 1933 ENSG00000131584.19          ACAP3 HGNC:16754
## 1934 ENSG00000131584.19          ACAP3 HGNC:16754
## 1935 ENSG00000131584.19          ACAP3 HGNC:16754
## 1936 ENSG00000131584.19          ACAP3 HGNC:16754
## 1937 ENSG00000131584.19          ACAP3 HGNC:16754
## 1938 ENSG00000131584.19          ACAP3 HGNC:16754
## 1939 ENSG00000131584.19          ACAP3 HGNC:16754
## 1940 ENSG00000131584.19          ACAP3 HGNC:16754
## 1941 ENSG00000131584.19          ACAP3 HGNC:16754
## 1942 ENSG00000131584.19          ACAP3 HGNC:16754
## 1943 ENSG00000131584.19          ACAP3 HGNC:16754
```

```
## 1944 ENSG00000131584.19      ACAP3 HGNC:16754
## 1945 ENSG00000131584.19      ACAP3 HGNC:16754
## 1946 ENSG00000131584.19      ACAP3 HGNC:16754
## 1947 ENSG00000131584.19      ACAP3 HGNC:16754
## 1948 ENSG00000131584.19      ACAP3 HGNC:16754
## 1949 ENSG00000131584.19      ACAP3 HGNC:16754
## 1950 ENSG00000131584.19      ACAP3 HGNC:16754
## 1951 ENSG00000131584.19      ACAP3 HGNC:16754
## 1952 ENSG00000131584.19      ACAP3 HGNC:16754
## 1953 ENSG00000131584.19      ACAP3 HGNC:16754
## 1954 ENSG00000131584.19      ACAP3 HGNC:16754
## 1955 ENSG00000131584.19      ACAP3 HGNC:16754
## 1956 ENSG00000131584.19      ACAP3 HGNC:16754
## 1957 ENSG00000131584.19      ACAP3 HGNC:16754
## 1958 ENSG00000131584.19      ACAP3 HGNC:16754
## 1959 ENSG00000131584.19      ACAP3 HGNC:16754
## 1960 ENSG00000131584.19      ACAP3 HGNC:16754
## 1961 ENSG00000131584.19      ACAP3 HGNC:16754
## 1962 ENSG00000131584.19      ACAP3 HGNC:16754
## 1963  ENSG00000278073.1    MIR6726 HGNC:50009
## 1964  ENSG00000278073.1    MIR6726 HGNC:50009
## 1965  ENSG00000278073.1    MIR6726 HGNC:50009
## 1966 ENSG00000169972.12      PUSL1 HGNC:26914
## 1967 ENSG00000169972.12      PUSL1 HGNC:26914
## 1968 ENSG00000169972.12      PUSL1 HGNC:26914
## 1969 ENSG00000169972.12      PUSL1 HGNC:26914
## 1970 ENSG00000169972.12      PUSL1 HGNC:26914
## 1971 ENSG00000169972.12      PUSL1 HGNC:26914
## 1972 ENSG00000169972.12      PUSL1 HGNC:26914
## 1973 ENSG00000169972.12      PUSL1 HGNC:26914
## 1974 ENSG00000169972.12      PUSL1 HGNC:26914
## 1975 ENSG00000169972.12      PUSL1 HGNC:26914
## 1976 ENSG00000169972.12      PUSL1 HGNC:26914
## 1977 ENSG00000169972.12      PUSL1 HGNC:26914
## 1978 ENSG00000169972.12      PUSL1 HGNC:26914
## 1979 ENSG00000169972.12      PUSL1 HGNC:26914
## 1980 ENSG00000169972.12      PUSL1 HGNC:26914
## 1981 ENSG00000169972.12      PUSL1 HGNC:26914
## 1982 ENSG00000169972.12      PUSL1 HGNC:26914
## 1983 ENSG00000169972.12      PUSL1 HGNC:26914
## 1984 ENSG00000169972.12      PUSL1 HGNC:26914
## 1985 ENSG00000169972.12      PUSL1 HGNC:26914
## 1986 ENSG00000169972.12      PUSL1 HGNC:26914
## 1987 ENSG00000169972.12      PUSL1 HGNC:26914
## 1988 ENSG00000127054.20     INTS11 HGNC:26052
## 1989 ENSG00000127054.20     INTS11 HGNC:26052
## 1990 ENSG00000127054.20     INTS11 HGNC:26052
## 1991 ENSG00000127054.20     INTS11 HGNC:26052
## 1992 ENSG00000127054.20     INTS11 HGNC:26052
## 1993 ENSG00000127054.20     INTS11 HGNC:26052
## 1994 ENSG00000127054.20     INTS11 HGNC:26052
## 1995 ENSG00000127054.20     INTS11 HGNC:26052
## 1996 ENSG00000127054.20     INTS11 HGNC:26052
## 1997 ENSG00000127054.20     INTS11 HGNC:26052
```

```
## 1998 ENSG00000127054.20          INTS11 HGNC:26052
## 1999 ENSG00000127054.20          INTS11 HGNC:26052
## 2000 ENSG00000127054.20          INTS11 HGNC:26052
## 2001 ENSG00000127054.20          INTS11 HGNC:26052
## 2002 ENSG00000127054.20          INTS11 HGNC:26052
## 2003 ENSG00000127054.20          INTS11 HGNC:26052
## 2004 ENSG00000127054.20          INTS11 HGNC:26052
## 2005 ENSG00000127054.20          INTS11 HGNC:26052
## 2006 ENSG00000127054.20          INTS11 HGNC:26052
## 2007 ENSG00000127054.20          INTS11 HGNC:26052
## 2008 ENSG00000127054.20          INTS11 HGNC:26052
## 2009 ENSG00000127054.20          INTS11 HGNC:26052
## 2010 ENSG00000127054.20          INTS11 HGNC:26052
## 2011 ENSG00000127054.20          INTS11 HGNC:26052
## 2012 ENSG00000127054.20          INTS11 HGNC:26052
## 2013 ENSG00000127054.20          INTS11 HGNC:26052
## 2014 ENSG00000127054.20          INTS11 HGNC:26052
## 2015 ENSG00000127054.20          INTS11 HGNC:26052
## 2016 ENSG00000127054.20          INTS11 HGNC:26052
## 2017 ENSG00000127054.20          INTS11 HGNC:26052
## 2018 ENSG00000127054.20          INTS11 HGNC:26052
## 2019 ENSG00000127054.20          INTS11 HGNC:26052
## 2020 ENSG00000127054.20          INTS11 HGNC:26052
## 2021 ENSG00000127054.20          INTS11 HGNC:26052
## 2022 ENSG00000127054.20          INTS11 HGNC:26052
## 2023 ENSG00000127054.20          INTS11 HGNC:26052
## 2024 ENSG00000127054.20          INTS11 HGNC:26052
## 2025 ENSG00000127054.20          INTS11 HGNC:26052
## 2026 ENSG00000127054.20          INTS11 HGNC:26052
## 2027 ENSG00000127054.20          INTS11 HGNC:26052
## 2028 ENSG00000127054.20          INTS11 HGNC:26052
## 2029 ENSG00000127054.20          INTS11 HGNC:26052
## 2030 ENSG00000127054.20          INTS11 HGNC:26052
## 2031 ENSG00000127054.20          INTS11 HGNC:26052
## 2032 ENSG00000127054.20          INTS11 HGNC:26052
## 2033 ENSG00000127054.20          INTS11 HGNC:26052
## 2034 ENSG00000127054.20          INTS11 HGNC:26052
## 2035 ENSG00000127054.20          INTS11 HGNC:26052
## 2036 ENSG00000127054.20          INTS11 HGNC:26052
## 2037 ENSG00000127054.20          INTS11 HGNC:26052
## 2038 ENSG00000127054.20          INTS11 HGNC:26052
## 2039 ENSG00000127054.20          INTS11 HGNC:26052
## 2040 ENSG00000127054.20          INTS11 HGNC:26052
## 2041 ENSG00000127054.20          INTS11 HGNC:26052
## 2042 ENSG00000127054.20          INTS11 HGNC:26052
## 2043 ENSG00000127054.20          INTS11 HGNC:26052
## 2044 ENSG00000127054.20          INTS11 HGNC:26052
## 2045 ENSG00000127054.20          INTS11 HGNC:26052
## 2046 ENSG00000127054.20          INTS11 HGNC:26052
## 2047 ENSG00000127054.20          INTS11 HGNC:26052
## 2048 ENSG00000127054.20          INTS11 HGNC:26052
## 2049 ENSG00000127054.20          INTS11 HGNC:26052
## 2050 ENSG00000127054.20          INTS11 HGNC:26052
## 2051 ENSG00000127054.20          INTS11 HGNC:26052
```

```
## 2052 ENSG00000127054.20          INTS11 HGNC:26052
## 2053 ENSG00000127054.20          INTS11 HGNC:26052
## 2054 ENSG00000127054.20          INTS11 HGNC:26052
## 2055 ENSG00000127054.20          INTS11 HGNC:26052
## 2056 ENSG00000127054.20          INTS11 HGNC:26052
## 2057 ENSG00000127054.20          INTS11 HGNC:26052
## 2058 ENSG00000127054.20          INTS11 HGNC:26052
## 2059 ENSG00000127054.20          INTS11 HGNC:26052
## 2060 ENSG00000127054.20          INTS11 HGNC:26052
## 2061 ENSG00000127054.20          INTS11 HGNC:26052
## 2062 ENSG00000127054.20          INTS11 HGNC:26052
## 2063 ENSG00000127054.20          INTS11 HGNC:26052
## 2064 ENSG00000127054.20          INTS11 HGNC:26052
## 2065 ENSG00000127054.20          INTS11 HGNC:26052
## 2066 ENSG00000127054.20          INTS11 HGNC:26052
## 2067 ENSG00000127054.20          INTS11 HGNC:26052
## 2068 ENSG00000127054.20          INTS11 HGNC:26052
## 2069 ENSG00000127054.20          INTS11 HGNC:26052
## 2070 ENSG00000127054.20          INTS11 HGNC:26052
## 2071 ENSG00000127054.20          INTS11 HGNC:26052
## 2072 ENSG00000127054.20          INTS11 HGNC:26052
## 2073 ENSG00000127054.20          INTS11 HGNC:26052
## 2074 ENSG00000127054.20          INTS11 HGNC:26052
## 2075 ENSG00000127054.20          INTS11 HGNC:26052
## 2076 ENSG00000127054.20          INTS11 HGNC:26052
## 2077 ENSG00000127054.20          INTS11 HGNC:26052
## 2078 ENSG00000127054.20          INTS11 HGNC:26052
## 2079 ENSG00000127054.20          INTS11 HGNC:26052
## 2080 ENSG00000127054.20          INTS11 HGNC:26052
## 2081 ENSG00000127054.20          INTS11 HGNC:26052
## 2082 ENSG00000127054.20          INTS11 HGNC:26052
## 2083 ENSG00000127054.20          INTS11 HGNC:26052
## 2084 ENSG00000127054.20          INTS11 HGNC:26052
## 2085 ENSG00000127054.20          INTS11 HGNC:26052
## 2086 ENSG00000127054.20          INTS11 HGNC:26052
## 2087 ENSG00000127054.20          INTS11 HGNC:26052
## 2088 ENSG00000127054.20          INTS11 HGNC:26052
## 2089 ENSG00000127054.20          INTS11 HGNC:26052
## 2090 ENSG00000127054.20          INTS11 HGNC:26052
## 2091 ENSG00000127054.20          INTS11 HGNC:26052
## 2092 ENSG00000127054.20          INTS11 HGNC:26052
## 2093 ENSG00000127054.20          INTS11 HGNC:26052
## 2094 ENSG00000127054.20          INTS11 HGNC:26052
## 2095 ENSG00000127054.20          INTS11 HGNC:26052
## 2096 ENSG00000127054.20          INTS11 HGNC:26052
## 2097 ENSG00000127054.20          INTS11 HGNC:26052
## 2098 ENSG00000127054.20          INTS11 HGNC:26052
## 2099 ENSG00000127054.20          INTS11 HGNC:26052
## 2100 ENSG00000127054.20          INTS11 HGNC:26052
## 2101 ENSG00000127054.20          INTS11 HGNC:26052
## 2102 ENSG00000127054.20          INTS11 HGNC:26052
## 2103 ENSG00000127054.20          INTS11 HGNC:26052
## 2104 ENSG00000127054.20          INTS11 HGNC:26052
## 2105 ENSG00000127054.20          INTS11 HGNC:26052
```

```
## 2106 ENSG00000127054.20          INTS11 HGNC:26052
## 2107 ENSG00000127054.20          INTS11 HGNC:26052
## 2108 ENSG00000127054.20          INTS11 HGNC:26052
## 2109 ENSG00000127054.20          INTS11 HGNC:26052
## 2110 ENSG00000127054.20          INTS11 HGNC:26052
## 2111 ENSG00000127054.20          INTS11 HGNC:26052
## 2112 ENSG00000127054.20          INTS11 HGNC:26052
## 2113 ENSG00000127054.20          INTS11 HGNC:26052
## 2114 ENSG00000127054.20          INTS11 HGNC:26052
## 2115 ENSG00000127054.20          INTS11 HGNC:26052
## 2116 ENSG00000127054.20          INTS11 HGNC:26052
## 2117 ENSG00000127054.20          INTS11 HGNC:26052
## 2118 ENSG00000127054.20          INTS11 HGNC:26052
## 2119 ENSG00000127054.20          INTS11 HGNC:26052
## 2120 ENSG00000127054.20          INTS11 HGNC:26052
## 2121 ENSG00000127054.20          INTS11 HGNC:26052
## 2122 ENSG00000127054.20          INTS11 HGNC:26052
## 2123 ENSG00000127054.20          INTS11 HGNC:26052
## 2124 ENSG00000127054.20          INTS11 HGNC:26052
## 2125 ENSG00000127054.20          INTS11 HGNC:26052
## 2126 ENSG00000127054.20          INTS11 HGNC:26052
## 2127 ENSG00000127054.20          INTS11 HGNC:26052
## 2128 ENSG00000127054.20          INTS11 HGNC:26052
## 2129 ENSG00000127054.20          INTS11 HGNC:26052
## 2130 ENSG00000127054.20          INTS11 HGNC:26052
## 2131 ENSG00000127054.20          INTS11 HGNC:26052
## 2132 ENSG00000127054.20          INTS11 HGNC:26052
## 2133 ENSG00000127054.20          INTS11 HGNC:26052
## 2134 ENSG00000127054.20          INTS11 HGNC:26052
## 2135 ENSG00000127054.20          INTS11 HGNC:26052
## 2136 ENSG00000127054.20          INTS11 HGNC:26052
## 2137 ENSG00000127054.20          INTS11 HGNC:26052
## 2138 ENSG00000127054.20          INTS11 HGNC:26052
## 2139 ENSG00000127054.20          INTS11 HGNC:26052
## 2140 ENSG00000127054.20          INTS11 HGNC:26052
## 2141 ENSG00000127054.20          INTS11 HGNC:26052
## 2142 ENSG00000127054.20          INTS11 HGNC:26052
## 2143 ENSG00000127054.20          INTS11 HGNC:26052
## 2144 ENSG00000127054.20          INTS11 HGNC:26052
## 2145 ENSG00000127054.20          INTS11 HGNC:26052
## 2146 ENSG00000127054.20          INTS11 HGNC:26052
## 2147 ENSG00000127054.20          INTS11 HGNC:26052
## 2148 ENSG00000127054.20          INTS11 HGNC:26052
## 2149 ENSG00000127054.20          INTS11 HGNC:26052
## 2150 ENSG00000127054.20          INTS11 HGNC:26052
## 2151 ENSG00000127054.20          INTS11 HGNC:26052
## 2152 ENSG00000127054.20          INTS11 HGNC:26052
## 2153 ENSG00000127054.20          INTS11 HGNC:26052
## 2154 ENSG00000127054.20          INTS11 HGNC:26052
## 2155 ENSG00000127054.20          INTS11 HGNC:26052
## 2156 ENSG00000127054.20          INTS11 HGNC:26052
## 2157 ENSG00000127054.20          INTS11 HGNC:26052
## 2158 ENSG00000127054.20          INTS11 HGNC:26052
## 2159 ENSG00000127054.20          INTS11 HGNC:26052
```

```
## 2160 ENSG00000127054.20          INTS11 HGNC:26052
## 2161 ENSG00000127054.20          INTS11 HGNC:26052
## 2162 ENSG00000127054.20          INTS11 HGNC:26052
## 2163 ENSG00000127054.20          INTS11 HGNC:26052
## 2164 ENSG00000127054.20          INTS11 HGNC:26052
## 2165 ENSG00000127054.20          INTS11 HGNC:26052
## 2166 ENSG00000127054.20          INTS11 HGNC:26052
## 2167 ENSG00000127054.20          INTS11 HGNC:26052
## 2168 ENSG00000127054.20          INTS11 HGNC:26052
## 2169 ENSG00000127054.20          INTS11 HGNC:26052
## 2170 ENSG00000127054.20          INTS11 HGNC:26052
## 2171 ENSG00000127054.20          INTS11 HGNC:26052
## 2172 ENSG00000127054.20          INTS11 HGNC:26052
## 2173 ENSG00000127054.20          INTS11 HGNC:26052
## 2174 ENSG00000127054.20          INTS11 HGNC:26052
## 2175 ENSG00000127054.20          INTS11 HGNC:26052
## 2176 ENSG00000127054.20          INTS11 HGNC:26052
## 2177 ENSG00000127054.20          INTS11 HGNC:26052
## 2178 ENSG00000127054.20          INTS11 HGNC:26052
## 2179 ENSG00000127054.20          INTS11 HGNC:26052
## 2180 ENSG00000127054.20          INTS11 HGNC:26052
## 2181 ENSG00000127054.20          INTS11 HGNC:26052
## 2182 ENSG00000127054.20          INTS11 HGNC:26052
## 2183 ENSG00000127054.20          INTS11 HGNC:26052
## 2184 ENSG00000127054.20          INTS11 HGNC:26052
## 2185 ENSG00000127054.20          INTS11 HGNC:26052
## 2186 ENSG00000127054.20          INTS11 HGNC:26052
## 2187 ENSG00000127054.20          INTS11 HGNC:26052
## 2188 ENSG00000127054.20          INTS11 HGNC:26052
## 2189 ENSG00000127054.20          INTS11 HGNC:26052
## 2190 ENSG00000127054.20          INTS11 HGNC:26052
## 2191 ENSG00000127054.20          INTS11 HGNC:26052
## 2192 ENSG00000127054.20          INTS11 HGNC:26052
## 2193 ENSG00000127054.20          INTS11 HGNC:26052
## 2194 ENSG00000127054.20          INTS11 HGNC:26052
## 2195 ENSG00000127054.20          INTS11 HGNC:26052
## 2196 ENSG00000127054.20          INTS11 HGNC:26052
## 2197 ENSG00000127054.20          INTS11 HGNC:26052
## 2198 ENSG00000127054.20          INTS11 HGNC:26052
## 2199 ENSG00000127054.20          INTS11 HGNC:26052
## 2200 ENSG00000127054.20          INTS11 HGNC:26052
## 2201 ENSG00000127054.20          INTS11 HGNC:26052
## 2202 ENSG00000127054.20          INTS11 HGNC:26052
## 2203 ENSG00000127054.20          INTS11 HGNC:26052
## 2204 ENSG00000127054.20          INTS11 HGNC:26052
## 2205 ENSG00000127054.20          INTS11 HGNC:26052
## 2206 ENSG00000127054.20          INTS11 HGNC:26052
## 2207 ENSG00000127054.20          INTS11 HGNC:26052
## 2208 ENSG00000127054.20          INTS11 HGNC:26052
## 2209 ENSG00000127054.20          INTS11 HGNC:26052
## 2210 ENSG00000127054.20          INTS11 HGNC:26052
## 2211 ENSG00000127054.20          INTS11 HGNC:26052
## 2212 ENSG00000127054.20          INTS11 HGNC:26052
## 2213 ENSG00000127054.20          INTS11 HGNC:26052
```

```
## 2214 ENSG00000127054.20          INTS11 HGNC:26052
## 2215 ENSG00000127054.20          INTS11 HGNC:26052
## 2216 ENSG00000127054.20          INTS11 HGNC:26052
## 2217 ENSG00000127054.20          INTS11 HGNC:26052
## 2218 ENSG00000127054.20          INTS11 HGNC:26052
## 2219 ENSG00000127054.20          INTS11 HGNC:26052
## 2220 ENSG00000127054.20          INTS11 HGNC:26052
## 2221 ENSG00000127054.20          INTS11 HGNC:26052
## 2222 ENSG00000127054.20          INTS11 HGNC:26052
## 2223 ENSG00000127054.20          INTS11 HGNC:26052
## 2224 ENSG00000127054.20          INTS11 HGNC:26052
## 2225 ENSG00000127054.20          INTS11 HGNC:26052
## 2226 ENSG00000127054.20          INTS11 HGNC:26052
## 2227 ENSG00000127054.20          INTS11 HGNC:26052
## 2228 ENSG00000127054.20          INTS11 HGNC:26052
## 2229 ENSG00000127054.20          INTS11 HGNC:26052
## 2230 ENSG00000127054.20          INTS11 HGNC:26052
## 2231 ENSG00000127054.20          INTS11 HGNC:26052
## 2232 ENSG00000127054.20          INTS11 HGNC:26052
## 2233 ENSG00000127054.20          INTS11 HGNC:26052
## 2234 ENSG00000127054.20          INTS11 HGNC:26052
## 2235 ENSG00000127054.20          INTS11 HGNC:26052
## 2236 ENSG00000127054.20          INTS11 HGNC:26052
## 2237 ENSG00000127054.20          INTS11 HGNC:26052
## 2238 ENSG00000127054.20          INTS11 HGNC:26052
## 2239 ENSG00000127054.20          INTS11 HGNC:26052
## 2240 ENSG00000127054.20          INTS11 HGNC:26052
## 2241 ENSG00000127054.20          INTS11 HGNC:26052
## 2242 ENSG00000127054.20          INTS11 HGNC:26052
## 2243 ENSG00000127054.20          INTS11 HGNC:26052
## 2244 ENSG00000127054.20          INTS11 HGNC:26052
## 2245 ENSG00000127054.20          INTS11 HGNC:26052
## 2246 ENSG00000127054.20          INTS11 HGNC:26052
## 2247 ENSG00000127054.20          INTS11 HGNC:26052
## 2248 ENSG00000127054.20          INTS11 HGNC:26052
## 2249 ENSG00000127054.20          INTS11 HGNC:26052
## 2250 ENSG00000127054.20          INTS11 HGNC:26052
## 2251 ENSG00000127054.20          INTS11 HGNC:26052
## 2252 ENSG00000127054.20          INTS11 HGNC:26052
## 2253 ENSG00000127054.20          INTS11 HGNC:26052
## 2254 ENSG00000127054.20          INTS11 HGNC:26052
## 2255 ENSG00000127054.20          INTS11 HGNC:26052
## 2256 ENSG00000127054.20          INTS11 HGNC:26052
## 2257 ENSG00000127054.20          INTS11 HGNC:26052
## 2258 ENSG00000127054.20          INTS11 HGNC:26052
## 2259 ENSG00000127054.20          INTS11 HGNC:26052
## 2260 ENSG00000127054.20          INTS11 HGNC:26052
## 2261 ENSG00000127054.20          INTS11 HGNC:26052
## 2262 ENSG00000127054.20          INTS11 HGNC:26052
## 2263 ENSG00000127054.20          INTS11 HGNC:26052
## 2264 ENSG00000127054.20          INTS11 HGNC:26052
## 2265 ENSG00000127054.20          INTS11 HGNC:26052
## 2266 ENSG00000127054.20          INTS11 HGNC:26052
## 2267 ENSG00000127054.20          INTS11 HGNC:26052
```

```
## 2268 ENSG00000127054.20        INTS11 HGNC:26052
## 2269 ENSG00000127054.20        INTS11 HGNC:26052
## 2270 ENSG00000127054.20        INTS11 HGNC:26052
## 2271 ENSG00000127054.20        INTS11 HGNC:26052
## 2272 ENSG00000127054.20        INTS11 HGNC:26052
## 2273 ENSG00000127054.20        INTS11 HGNC:26052
## 2274 ENSG00000127054.20        INTS11 HGNC:26052
## 2275 ENSG00000127054.20        INTS11 HGNC:26052
## 2276 ENSG00000127054.20        INTS11 HGNC:26052
## 2277 ENSG00000127054.20        INTS11 HGNC:26052
## 2278 ENSG00000127054.20        INTS11 HGNC:26052
## 2279 ENSG00000127054.20        INTS11 HGNC:26052
## 2280 ENSG00000127054.20        INTS11 HGNC:26052
## 2281 ENSG00000127054.20        INTS11 HGNC:26052
## 2282 ENSG00000127054.20        INTS11 HGNC:26052
## 2283 ENSG00000127054.20        INTS11 HGNC:26052
## 2284 ENSG00000127054.20        INTS11 HGNC:26052
## 2285 ENSG00000127054.20        INTS11 HGNC:26052
## 2286 ENSG00000127054.20        INTS11 HGNC:26052
## 2287 ENSG00000127054.20        INTS11 HGNC:26052
## 2288 ENSG00000127054.20        INTS11 HGNC:26052
## 2289 ENSG00000127054.20        INTS11 HGNC:26052
## 2290 ENSG00000127054.20        INTS11 HGNC:26052
## 2291 ENSG00000127054.20        INTS11 HGNC:26052
## 2292 ENSG00000127054.20        INTS11 HGNC:26052
## 2293 ENSG00000127054.20        INTS11 HGNC:26052
## 2294 ENSG00000127054.20        INTS11 HGNC:26052
## 2295 ENSG00000127054.20        INTS11 HGNC:26052
## 2296 ENSG00000127054.20        INTS11 HGNC:26052
## 2297 ENSG00000127054.20        INTS11 HGNC:26052
## 2298 ENSG00000127054.20        INTS11 HGNC:26052
## 2299 ENSG00000127054.20        INTS11 HGNC:26052
## 2300 ENSG00000127054.20        INTS11 HGNC:26052
## 2301 ENSG00000127054.20        INTS11 HGNC:26052
## 2302 ENSG00000127054.20        INTS11 HGNC:26052
## 2303 ENSG00000127054.20        INTS11 HGNC:26052
## 2304 ENSG00000127054.20        INTS11 HGNC:26052
## 2305 ENSG00000127054.20        INTS11 HGNC:26052
## 2306 ENSG00000127054.20        INTS11 HGNC:26052
## 2307 ENSG00000127054.20        INTS11 HGNC:26052
## 2308 ENSG00000127054.20        INTS11 HGNC:26052
## 2309 ENSG00000127054.20        INTS11 HGNC:26052
## 2310 ENSG00000127054.20        INTS11 HGNC:26052
## 2311 ENSG00000127054.20        INTS11 HGNC:26052
## 2312 ENSG00000127054.20        INTS11 HGNC:26052
## 2313 ENSG00000127054.20        INTS11 HGNC:26052
## 2314 ENSG00000127054.20        INTS11 HGNC:26052
## 2315 ENSG00000127054.20        INTS11 HGNC:26052
## 2316 ENSG00000127054.20        INTS11 HGNC:26052
## 2317 ENSG00000127054.20        INTS11 HGNC:26052
## 2318 ENSG00000127054.20        INTS11 HGNC:26052
## 2319 ENSG00000127054.20        INTS11 HGNC:26052
## 2320 ENSG00000127054.20        INTS11 HGNC:26052
## 2321 ENSG00000127054.20        INTS11 HGNC:26052
```

```
## 2322 ENSG00000127054.20        INTS11 HGNC:26052
## 2323 ENSG00000127054.20        INTS11 HGNC:26052
## 2324 ENSG00000127054.20        INTS11 HGNC:26052
## 2325 ENSG00000127054.20        INTS11 HGNC:26052
## 2326 ENSG00000127054.20        INTS11 HGNC:26052
## 2327 ENSG00000127054.20        INTS11 HGNC:26052
## 2328 ENSG00000127054.20        INTS11 HGNC:26052
## 2329 ENSG00000127054.20        INTS11 HGNC:26052
## 2330 ENSG00000127054.20        INTS11 HGNC:26052
## 2331  ENSG00000283712.1       MIR6727 HGNC:50171
## 2332  ENSG00000283712.1       MIR6727 HGNC:50171
## 2333  ENSG00000283712.1       MIR6727 HGNC:50171
## 2334  ENSG00000240731.1     AL139287.1        <NA>
## 2335  ENSG00000240731.1     AL139287.1        <NA>
## 2336  ENSG00000240731.1     AL139287.1        <NA>
## 2337  ENSG00000240731.1     AL139287.1        <NA>
## 2338  ENSG00000224051.7          CPTP HGNC:28116
## 2339  ENSG00000224051.7          CPTP HGNC:28116
## 2340  ENSG00000224051.7          CPTP HGNC:28116
## 2341  ENSG00000224051.7          CPTP HGNC:28116
## 2342  ENSG00000224051.7          CPTP HGNC:28116
## 2343  ENSG00000224051.7          CPTP HGNC:28116
## 2344  ENSG00000224051.7          CPTP HGNC:28116
## 2345  ENSG00000224051.7          CPTP HGNC:28116
## 2346  ENSG00000224051.7          CPTP HGNC:28116
## 2347  ENSG00000224051.7          CPTP HGNC:28116
## 2348  ENSG00000224051.7          CPTP HGNC:28116
## 2349  ENSG00000224051.7          CPTP HGNC:28116
## 2350  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2351  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2352  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2353  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2354  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2355  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2356  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2357  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2358  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2359  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2360  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2361  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2362  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2363  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2364  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2365  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2366  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2367  ENSG00000169962.5        TAS1R3 HGNC:15661
## 2368 ENSG00000107404.20          DVL1   HGNC:3084
## 2369 ENSG00000107404.20          DVL1   HGNC:3084
## 2370 ENSG00000107404.20          DVL1   HGNC:3084
## 2371 ENSG00000107404.20          DVL1   HGNC:3084
## 2372 ENSG00000107404.20          DVL1   HGNC:3084
## 2373 ENSG00000107404.20          DVL1   HGNC:3084
## 2374 ENSG00000107404.20          DVL1   HGNC:3084
## 2375 ENSG00000107404.20          DVL1   HGNC:3084
```

```
## 2376 ENSG00000107404.20          DVL1  HGNC:3084
## 2377 ENSG00000107404.20          DVL1  HGNC:3084
## 2378 ENSG00000107404.20          DVL1  HGNC:3084
## 2379 ENSG00000107404.20          DVL1  HGNC:3084
## 2380 ENSG00000107404.20          DVL1  HGNC:3084
## 2381 ENSG00000107404.20          DVL1  HGNC:3084
## 2382 ENSG00000107404.20          DVL1  HGNC:3084
## 2383 ENSG00000107404.20          DVL1  HGNC:3084
## 2384 ENSG00000107404.20          DVL1  HGNC:3084
## 2385 ENSG00000107404.20          DVL1  HGNC:3084
## 2386 ENSG00000107404.20          DVL1  HGNC:3084
## 2387 ENSG00000107404.20          DVL1  HGNC:3084
## 2388 ENSG00000107404.20          DVL1  HGNC:3084
## 2389 ENSG00000107404.20          DVL1  HGNC:3084
## 2390 ENSG00000107404.20          DVL1  HGNC:3084
## 2391 ENSG00000107404.20          DVL1  HGNC:3084
## 2392 ENSG00000107404.20          DVL1  HGNC:3084
## 2393 ENSG00000107404.20          DVL1  HGNC:3084
## 2394 ENSG00000107404.20          DVL1  HGNC:3084
## 2395 ENSG00000107404.20          DVL1  HGNC:3084
## 2396 ENSG00000107404.20          DVL1  HGNC:3084
## 2397 ENSG00000107404.20          DVL1  HGNC:3084
## 2398 ENSG00000107404.20          DVL1  HGNC:3084
## 2399 ENSG00000107404.20          DVL1  HGNC:3084
## 2400 ENSG00000107404.20          DVL1  HGNC:3084
## 2401 ENSG00000107404.20          DVL1  HGNC:3084
## 2402 ENSG00000107404.20          DVL1  HGNC:3084
## 2403 ENSG00000107404.20          DVL1  HGNC:3084
## 2404 ENSG00000107404.20          DVL1  HGNC:3084
## 2405 ENSG00000107404.20          DVL1  HGNC:3084
## 2406 ENSG00000107404.20          DVL1  HGNC:3084
## 2407 ENSG00000107404.20          DVL1  HGNC:3084
## 2408 ENSG00000107404.20          DVL1  HGNC:3084
## 2409 ENSG00000107404.20          DVL1  HGNC:3084
## 2410 ENSG00000107404.20          DVL1  HGNC:3084
## 2411 ENSG00000107404.20          DVL1  HGNC:3084
## 2412 ENSG00000107404.20          DVL1  HGNC:3084
## 2413 ENSG00000107404.20          DVL1  HGNC:3084
## 2414 ENSG00000107404.20          DVL1  HGNC:3084
## 2415 ENSG00000107404.20          DVL1  HGNC:3084
## 2416 ENSG00000107404.20          DVL1  HGNC:3084
## 2417 ENSG00000107404.20          DVL1  HGNC:3084
## 2418 ENSG00000107404.20          DVL1  HGNC:3084
## 2419 ENSG00000107404.20          DVL1  HGNC:3084
## 2420 ENSG00000107404.20          DVL1  HGNC:3084
## 2421 ENSG00000107404.20          DVL1  HGNC:3084
## 2422 ENSG00000107404.20          DVL1  HGNC:3084
## 2423 ENSG00000107404.20          DVL1  HGNC:3084
## 2424 ENSG00000107404.20          DVL1  HGNC:3084
## 2425 ENSG00000107404.20          DVL1  HGNC:3084
## 2426 ENSG00000107404.20          DVL1  HGNC:3084
## 2427 ENSG00000107404.20          DVL1  HGNC:3084
## 2428 ENSG00000107404.20          DVL1  HGNC:3084
## 2429 ENSG00000107404.20          DVL1  HGNC:3084
```

```
## 2430 ENSG00000107404.20        DVL1  HGNC:3084
## 2431 ENSG00000107404.20        DVL1  HGNC:3084
## 2432 ENSG00000107404.20        DVL1  HGNC:3084
## 2433 ENSG00000107404.20        DVL1  HGNC:3084
## 2434 ENSG00000107404.20        DVL1  HGNC:3084
## 2435 ENSG00000107404.20        DVL1  HGNC:3084
## 2436 ENSG00000107404.20        DVL1  HGNC:3084
## 2437 ENSG00000107404.20        DVL1  HGNC:3084
## 2438 ENSG00000107404.20        DVL1  HGNC:3084
## 2439 ENSG00000107404.20        DVL1  HGNC:3084
## 2440 ENSG00000107404.20        DVL1  HGNC:3084
## 2441 ENSG00000107404.20        DVL1  HGNC:3084
## 2442 ENSG00000107404.20        DVL1  HGNC:3084
## 2443 ENSG00000107404.20        DVL1  HGNC:3084
## 2444 ENSG00000107404.20        DVL1  HGNC:3084
## 2445 ENSG00000107404.20        DVL1  HGNC:3084
## 2446 ENSG00000107404.20        DVL1  HGNC:3084
## 2447 ENSG00000107404.20        DVL1  HGNC:3084
## 2448 ENSG00000107404.20        DVL1  HGNC:3084
## 2449 ENSG00000107404.20        DVL1  HGNC:3084
## 2450 ENSG00000107404.20        DVL1  HGNC:3084
## 2451 ENSG00000107404.20        DVL1  HGNC:3084
## 2452 ENSG00000107404.20        DVL1  HGNC:3084
## 2453 ENSG00000107404.20        DVL1  HGNC:3084
## 2454 ENSG00000107404.20        DVL1  HGNC:3084
## 2455 ENSG00000107404.20        DVL1  HGNC:3084
## 2456 ENSG00000107404.20        DVL1  HGNC:3084
## 2457 ENSG00000107404.20        DVL1  HGNC:3084
## 2458 ENSG00000107404.20        DVL1  HGNC:3084
## 2459 ENSG00000107404.20        DVL1  HGNC:3084
## 2460 ENSG00000107404.20        DVL1  HGNC:3084
## 2461 ENSG00000107404.20        DVL1  HGNC:3084
## 2462  ENSG00000284372.1     MIR6808 HGNC:50046
## 2463  ENSG00000284372.1     MIR6808 HGNC:50046
## 2464  ENSG00000284372.1     MIR6808 HGNC:50046
## 2465 ENSG00000162576.16       MXRA8  HGNC:7542
## 2466 ENSG00000162576.16       MXRA8  HGNC:7542
## 2467 ENSG00000162576.16       MXRA8  HGNC:7542
## 2468 ENSG00000162576.16       MXRA8  HGNC:7542
## 2469 ENSG00000162576.16       MXRA8  HGNC:7542
## 2470 ENSG00000162576.16       MXRA8  HGNC:7542
## 2471 ENSG00000162576.16       MXRA8  HGNC:7542
## 2472 ENSG00000162576.16       MXRA8  HGNC:7542
## 2473 ENSG00000162576.16       MXRA8  HGNC:7542
## 2474 ENSG00000162576.16       MXRA8  HGNC:7542
## 2475 ENSG00000162576.16       MXRA8  HGNC:7542
## 2476 ENSG00000162576.16       MXRA8  HGNC:7542
## 2477 ENSG00000162576.16       MXRA8  HGNC:7542
## 2478 ENSG00000162576.16       MXRA8  HGNC:7542
## 2479 ENSG00000162576.16       MXRA8  HGNC:7542
## 2480 ENSG00000162576.16       MXRA8  HGNC:7542
## 2481 ENSG00000162576.16       MXRA8  HGNC:7542
## 2482 ENSG00000162576.16       MXRA8  HGNC:7542
## 2483 ENSG00000162576.16       MXRA8  HGNC:7542
```

```
## 2484 ENSG00000162576.16       MXRA8   HGNC:7542
## 2485 ENSG00000162576.16       MXRA8   HGNC:7542
## 2486 ENSG00000162576.16       MXRA8   HGNC:7542
## 2487 ENSG00000162576.16       MXRA8   HGNC:7542
## 2488 ENSG00000162576.16       MXRA8   HGNC:7542
## 2489 ENSG00000162576.16       MXRA8   HGNC:7542
## 2490 ENSG00000162576.16       MXRA8   HGNC:7542
## 2491 ENSG00000162576.16       MXRA8   HGNC:7542
## 2492 ENSG00000162576.16       MXRA8   HGNC:7542
## 2493 ENSG00000162576.16       MXRA8   HGNC:7542
## 2494 ENSG00000162576.16       MXRA8   HGNC:7542
## 2495 ENSG00000162576.16       MXRA8   HGNC:7542
## 2496 ENSG00000162576.16       MXRA8   HGNC:7542
## 2497 ENSG00000162576.16       MXRA8   HGNC:7542
## 2498 ENSG00000162576.16       MXRA8   HGNC:7542
## 2499 ENSG00000162576.16       MXRA8   HGNC:7542
## 2500 ENSG00000162576.16       MXRA8   HGNC:7542
## 2501 ENSG00000162576.16       MXRA8   HGNC:7542
## 2502 ENSG00000162576.16       MXRA8   HGNC:7542
## 2503 ENSG00000162576.16       MXRA8   HGNC:7542
## 2504 ENSG00000162576.16       MXRA8   HGNC:7542
## 2505 ENSG00000162576.16       MXRA8   HGNC:7542
## 2506 ENSG00000162576.16       MXRA8   HGNC:7542
## 2507 ENSG00000162576.16       MXRA8   HGNC:7542
## 2508 ENSG00000162576.16       MXRA8   HGNC:7542
## 2509 ENSG00000162576.16       MXRA8   HGNC:7542
## 2510 ENSG00000162576.16       MXRA8   HGNC:7542
## 2511 ENSG00000162576.16       MXRA8   HGNC:7542
## 2512 ENSG00000162576.16       MXRA8   HGNC:7542
## 2513 ENSG00000162576.16       MXRA8   HGNC:7542
## 2514 ENSG00000162576.16       MXRA8   HGNC:7542
## 2515 ENSG00000162576.16       MXRA8   HGNC:7542
## 2516 ENSG00000162576.16       MXRA8   HGNC:7542
## 2517 ENSG00000162576.16       MXRA8   HGNC:7542
## 2518 ENSG00000162576.16       MXRA8   HGNC:7542
## 2519 ENSG00000162576.16       MXRA8   HGNC:7542
## 2520 ENSG00000162576.16       MXRA8   HGNC:7542
## 2521 ENSG00000162576.16       MXRA8   HGNC:7542
## 2522 ENSG00000162576.16       MXRA8   HGNC:7542
## 2523 ENSG00000162576.16       MXRA8   HGNC:7542
## 2524 ENSG00000162576.16       MXRA8   HGNC:7542
## 2525 ENSG00000162576.16       MXRA8   HGNC:7542
## 2526 ENSG00000162576.16       MXRA8   HGNC:7542
## 2527 ENSG00000162576.16       MXRA8   HGNC:7542
## 2528 ENSG00000162576.16       MXRA8   HGNC:7542
## 2529 ENSG00000162576.16       MXRA8   HGNC:7542
## 2530 ENSG00000162576.16       MXRA8   HGNC:7542
## 2531 ENSG00000162576.16       MXRA8   HGNC:7542
## 2532 ENSG00000162576.16       MXRA8   HGNC:7542
## 2533 ENSG00000162576.16       MXRA8   HGNC:7542
## 2534 ENSG00000162576.16       MXRA8   HGNC:7542
## 2535 ENSG00000162576.16       MXRA8   HGNC:7542
## 2536 ENSG00000162576.16       MXRA8   HGNC:7542
## 2537 ENSG00000162576.16       MXRA8   HGNC:7542
```

```
## 2538 ENSG00000162576.16      MXRA8   HGNC:7542
## 2539 ENSG00000162576.16      MXRA8   HGNC:7542
## 2540 ENSG00000162576.16      MXRA8   HGNC:7542
## 2541 ENSG00000162576.16      MXRA8   HGNC:7542
## 2542 ENSG00000162576.16      MXRA8   HGNC:7542
## 2543 ENSG00000162576.16      MXRA8   HGNC:7542
## 2544 ENSG00000162576.16      MXRA8   HGNC:7542
## 2545 ENSG00000162576.16      MXRA8   HGNC:7542
## 2546 ENSG00000162576.16      MXRA8   HGNC:7542
## 2547 ENSG00000162576.16      MXRA8   HGNC:7542
## 2548 ENSG00000162576.16      MXRA8   HGNC:7542
## 2549 ENSG00000162576.16      MXRA8   HGNC:7542
## 2550 ENSG00000162576.16      MXRA8   HGNC:7542
## 2551 ENSG00000162576.16      MXRA8   HGNC:7542
## 2552 ENSG00000162576.16      MXRA8   HGNC:7542
## 2553 ENSG00000162576.16      MXRA8   HGNC:7542
## 2554 ENSG00000162576.16      MXRA8   HGNC:7542
## 2555 ENSG00000162576.16      MXRA8   HGNC:7542
## 2556 ENSG00000162576.16      MXRA8   HGNC:7542
## 2557 ENSG00000162576.16      MXRA8   HGNC:7542
## 2558 ENSG00000162576.16      MXRA8   HGNC:7542
## 2559 ENSG00000162576.16      MXRA8   HGNC:7542
## 2560 ENSG00000162576.16      MXRA8   HGNC:7542
## 2561 ENSG00000162576.16      MXRA8   HGNC:7542
## 2562 ENSG00000162576.16      MXRA8   HGNC:7542
## 2563 ENSG00000162576.16      MXRA8   HGNC:7542
## 2564 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2565 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2566 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2567 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2568 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2569 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2570 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2571 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2572 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2573 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2574 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2575 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2576 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2577 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2578 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2579 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2580 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2581 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2582 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2583 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2584 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2585 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2586 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2587 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2588 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2589 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2590 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2591 ENSG00000175756.13    AURKAIP1 HGNC:24114
```

```
## 2592 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2593 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2594 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2595 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2596 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2597 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2598 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2599 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2600 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2601 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2602 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2603 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2604 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2605 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2606 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2607 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2608 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2609 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2610 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2611 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2612 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2613 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2614 ENSG00000175756.13    AURKAIP1 HGNC:24114
## 2615  ENSG00000223663.2    NDUFB4P8 HGNC:45256
## 2616  ENSG00000223663.2    NDUFB4P8 HGNC:45256
## 2617  ENSG00000223663.2    NDUFB4P8 HGNC:45256
## 2618 ENSG00000221978.12       CCNL2 HGNC:20570
## 2619 ENSG00000221978.12       CCNL2 HGNC:20570
## 2620 ENSG00000221978.12       CCNL2 HGNC:20570
## 2621 ENSG00000221978.12       CCNL2 HGNC:20570
## 2622 ENSG00000221978.12       CCNL2 HGNC:20570
## 2623 ENSG00000221978.12       CCNL2 HGNC:20570
## 2624 ENSG00000221978.12       CCNL2 HGNC:20570
## 2625 ENSG00000221978.12       CCNL2 HGNC:20570
## 2626 ENSG00000221978.12       CCNL2 HGNC:20570
## 2627 ENSG00000221978.12       CCNL2 HGNC:20570
## 2628 ENSG00000221978.12       CCNL2 HGNC:20570
## 2629 ENSG00000221978.12       CCNL2 HGNC:20570
## 2630 ENSG00000221978.12       CCNL2 HGNC:20570
## 2631 ENSG00000221978.12       CCNL2 HGNC:20570
## 2632 ENSG00000221978.12       CCNL2 HGNC:20570
## 2633 ENSG00000221978.12       CCNL2 HGNC:20570
## 2634 ENSG00000221978.12       CCNL2 HGNC:20570
## 2635 ENSG00000221978.12       CCNL2 HGNC:20570
## 2636 ENSG00000221978.12       CCNL2 HGNC:20570
## 2637 ENSG00000221978.12       CCNL2 HGNC:20570
## 2638 ENSG00000221978.12       CCNL2 HGNC:20570
## 2639 ENSG00000221978.12       CCNL2 HGNC:20570
## 2640 ENSG00000221978.12       CCNL2 HGNC:20570
## 2641 ENSG00000221978.12       CCNL2 HGNC:20570
## 2642 ENSG00000221978.12       CCNL2 HGNC:20570
## 2643 ENSG00000221978.12       CCNL2 HGNC:20570
## 2644 ENSG00000221978.12       CCNL2 HGNC:20570
## 2645 ENSG00000221978.12       CCNL2 HGNC:20570
```

```
## 2646 ENSG00000221978.12        CCNL2 HGNC:20570
## 2647 ENSG00000221978.12        CCNL2 HGNC:20570
## 2648 ENSG00000221978.12        CCNL2 HGNC:20570
## 2649 ENSG00000221978.12        CCNL2 HGNC:20570
## 2650 ENSG00000221978.12        CCNL2 HGNC:20570
## 2651 ENSG00000221978.12        CCNL2 HGNC:20570
## 2652 ENSG00000221978.12        CCNL2 HGNC:20570
## 2653 ENSG00000221978.12        CCNL2 HGNC:20570
## 2654 ENSG00000221978.12        CCNL2 HGNC:20570
## 2655 ENSG00000221978.12        CCNL2 HGNC:20570
## 2656 ENSG00000221978.12        CCNL2 HGNC:20570
## 2657 ENSG00000221978.12        CCNL2 HGNC:20570
## 2658 ENSG00000221978.12        CCNL2 HGNC:20570
## 2659 ENSG00000221978.12        CCNL2 HGNC:20570
## 2660 ENSG00000221978.12        CCNL2 HGNC:20570
## 2661 ENSG00000221978.12        CCNL2 HGNC:20570
## 2662 ENSG00000221978.12        CCNL2 HGNC:20570
## 2663 ENSG00000221978.12        CCNL2 HGNC:20570
## 2664 ENSG00000221978.12        CCNL2 HGNC:20570
## 2665 ENSG00000221978.12        CCNL2 HGNC:20570
## 2666 ENSG00000221978.12        CCNL2 HGNC:20570
## 2667 ENSG00000221978.12        CCNL2 HGNC:20570
## 2668 ENSG00000221978.12        CCNL2 HGNC:20570
## 2669 ENSG00000221978.12        CCNL2 HGNC:20570
## 2670 ENSG00000221978.12        CCNL2 HGNC:20570
## 2671 ENSG00000221978.12        CCNL2 HGNC:20570
## 2672 ENSG00000221978.12        CCNL2 HGNC:20570
## 2673 ENSG00000221978.12        CCNL2 HGNC:20570
## 2674 ENSG00000221978.12        CCNL2 HGNC:20570
## 2675 ENSG00000221978.12        CCNL2 HGNC:20570
## 2676 ENSG00000221978.12        CCNL2 HGNC:20570
## 2677 ENSG00000221978.12        CCNL2 HGNC:20570
## 2678 ENSG00000221978.12        CCNL2 HGNC:20570
## 2679 ENSG00000221978.12        CCNL2 HGNC:20570
## 2680 ENSG00000221978.12        CCNL2 HGNC:20570
## 2681 ENSG00000221978.12        CCNL2 HGNC:20570
## 2682 ENSG00000221978.12        CCNL2 HGNC:20570
## 2683 ENSG00000221978.12        CCNL2 HGNC:20570
## 2684 ENSG00000221978.12        CCNL2 HGNC:20570
## 2685 ENSG00000221978.12        CCNL2 HGNC:20570
## 2686 ENSG00000221978.12        CCNL2 HGNC:20570
## 2687 ENSG00000221978.12        CCNL2 HGNC:20570
## 2688  ENSG00000224870.7  MRPL20-AS1 HGNC:27125
## 2689  ENSG00000224870.7  MRPL20-AS1 HGNC:27125
## 2690  ENSG00000224870.7  MRPL20-AS1 HGNC:27125
## 2691  ENSG00000224870.7  MRPL20-AS1 HGNC:27125
## 2692  ENSG00000224870.7  MRPL20-AS1 HGNC:27125
## 2693  ENSG00000242485.6      MRPL20 HGNC:14478
## 2694  ENSG00000242485.6      MRPL20 HGNC:14478
## 2695  ENSG00000242485.6      MRPL20 HGNC:14478
## 2696  ENSG00000242485.6      MRPL20 HGNC:14478
## 2697  ENSG00000242485.6      MRPL20 HGNC:14478
## 2698  ENSG00000242485.6      MRPL20 HGNC:14478
## 2699  ENSG00000242485.6      MRPL20 HGNC:14478
```

```
## 2700  ENSG00000242485.6      MRPL20 HGNC:14478
## 2701  ENSG00000242485.6      MRPL20 HGNC:14478
## 2702  ENSG00000242485.6      MRPL20 HGNC:14478
## 2703  ENSG00000242485.6      MRPL20 HGNC:14478
## 2704  ENSG00000242485.6      MRPL20 HGNC:14478
## 2705  ENSG00000242485.6      MRPL20 HGNC:14478
## 2706  ENSG00000242485.6      MRPL20 HGNC:14478
## 2707  ENSG00000242485.6      MRPL20 HGNC:14478
## 2708  ENSG00000242485.6      MRPL20 HGNC:14478
## 2709  ENSG00000242485.6      MRPL20 HGNC:14478
## 2710  ENSG00000242485.6      MRPL20 HGNC:14478
## 2711  ENSG00000242485.6      MRPL20 HGNC:14478
## 2712  ENSG00000242485.6      MRPL20 HGNC:14478
## 2713  ENSG00000242485.6      MRPL20 HGNC:14478
## 2714  ENSG00000242485.6      MRPL20 HGNC:14478
## 2715  ENSG00000242485.6      MRPL20 HGNC:14478
## 2716  ENSG00000242485.6      MRPL20 HGNC:14478
## 2717  ENSG00000242485.6      MRPL20 HGNC:14478
## 2718  ENSG00000264293.2    RN7SL657P HGNC:46673
## 2719  ENSG00000264293.2    RN7SL657P HGNC:46673
## 2720  ENSG00000264293.2    RN7SL657P HGNC:46673
## 2721  ENSG00000272455.1    AL391244.2       <NA>
## 2722  ENSG00000272455.1    AL391244.2       <NA>
## 2723  ENSG00000272455.1    AL391244.2       <NA>
## 2724  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2725  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2726  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2727  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2728  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2729  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2730  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2731  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2732  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2733  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2734  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2735  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2736  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2737  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2738  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2739  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2740  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2741  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2742  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2743  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2744  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2745  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2746  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2747  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2748  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2749  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2750  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2751  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2752  ENSG00000235098.8      ANKRD65 HGNC:42950
## 2753  ENSG00000235098.8      ANKRD65 HGNC:42950
```

```
## 2754   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2755   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2756   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2757   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2758   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2759   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2760   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2761   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2762   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2763   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2764   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2765   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2766   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2767   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2768   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2769   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2770   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2771   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2772   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2773   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2774   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2775   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2776   ENSG00000235098.8       ANKRD65 HGNC:42950
## 2777   ENSG00000225905.1     AL391244.1       <NA>
## 2778   ENSG00000225905.1     AL391244.1       <NA>
## 2779   ENSG00000225905.1     AL391244.1       <NA>
## 2780   ENSG00000225905.1     AL391244.1       <NA>
## 2781   ENSG00000205116.3       TMEM88B HGNC:37099
## 2782   ENSG00000205116.3       TMEM88B HGNC:37099
## 2783   ENSG00000205116.3       TMEM88B HGNC:37099
## 2784   ENSG00000205116.3       TMEM88B HGNC:37099
## 2785   ENSG00000205116.3       TMEM88B HGNC:37099
## 2786   ENSG00000205116.3       TMEM88B HGNC:37099
## 2787   ENSG00000205116.3       TMEM88B HGNC:37099
## 2788   ENSG00000205116.3       TMEM88B HGNC:37099
## 2789   ENSG00000205116.3       TMEM88B HGNC:37099
## 2790   ENSG00000225285.1     LINC01770 HGNC:52560
## 2791   ENSG00000225285.1     LINC01770 HGNC:52560
## 2792   ENSG00000225285.1     LINC01770 HGNC:52560
## 2793   ENSG00000225285.1     LINC01770 HGNC:52560
## 2794   ENSG00000225285.1     LINC01770 HGNC:52560
## 2795   ENSG00000225285.1     LINC01770 HGNC:52560
## 2796   ENSG00000225285.1     LINC01770 HGNC:52560
## 2797  ENSG00000179403.12          VWA1 HGNC:30910
## 2798  ENSG00000179403.12          VWA1 HGNC:30910
## 2799  ENSG00000179403.12          VWA1 HGNC:30910
## 2800  ENSG00000179403.12          VWA1 HGNC:30910
## 2801  ENSG00000179403.12          VWA1 HGNC:30910
## 2802  ENSG00000179403.12          VWA1 HGNC:30910
## 2803  ENSG00000179403.12          VWA1 HGNC:30910
## 2804  ENSG00000179403.12          VWA1 HGNC:30910
## 2805  ENSG00000179403.12          VWA1 HGNC:30910
## 2806  ENSG00000179403.12          VWA1 HGNC:30910
## 2807  ENSG00000179403.12          VWA1 HGNC:30910
```

```
## 2808 ENSG00000179403.12        VWA1 HGNC:30910
## 2809 ENSG00000179403.12        VWA1 HGNC:30910
## 2810 ENSG00000179403.12        VWA1 HGNC:30910
## 2811 ENSG00000179403.12        VWA1 HGNC:30910
## 2812 ENSG00000179403.12        VWA1 HGNC:30910
## 2813 ENSG00000179403.12        VWA1 HGNC:30910
## 2814 ENSG00000179403.12        VWA1 HGNC:30910
## 2815 ENSG00000179403.12        VWA1 HGNC:30910
## 2816 ENSG00000179403.12        VWA1 HGNC:30910
## 2817 ENSG00000179403.12        VWA1 HGNC:30910
## 2818 ENSG00000179403.12        VWA1 HGNC:30910
## 2819 ENSG00000179403.12        VWA1 HGNC:30910
## 2820  ENSG00000215915.9      ATAD3C HGNC:32151
## 2821  ENSG00000215915.9      ATAD3C HGNC:32151
## 2822  ENSG00000215915.9      ATAD3C HGNC:32151
## 2823  ENSG00000215915.9      ATAD3C HGNC:32151
## 2824  ENSG00000215915.9      ATAD3C HGNC:32151
## 2825  ENSG00000215915.9      ATAD3C HGNC:32151
## 2826  ENSG00000215915.9      ATAD3C HGNC:32151
## 2827  ENSG00000215915.9      ATAD3C HGNC:32151
## 2828  ENSG00000215915.9      ATAD3C HGNC:32151
## 2829  ENSG00000215915.9      ATAD3C HGNC:32151
## 2830  ENSG00000215915.9      ATAD3C HGNC:32151
## 2831  ENSG00000215915.9      ATAD3C HGNC:32151
## 2832  ENSG00000215915.9      ATAD3C HGNC:32151
## 2833  ENSG00000215915.9      ATAD3C HGNC:32151
## 2834  ENSG00000215915.9      ATAD3C HGNC:32151
## 2835  ENSG00000215915.9      ATAD3C HGNC:32151
## 2836  ENSG00000215915.9      ATAD3C HGNC:32151
## 2837  ENSG00000215915.9      ATAD3C HGNC:32151
## 2838  ENSG00000215915.9      ATAD3C HGNC:32151
## 2839  ENSG00000215915.9      ATAD3C HGNC:32151
## 2840  ENSG00000215915.9      ATAD3C HGNC:32151
## 2841  ENSG00000215915.9      ATAD3C HGNC:32151
## 2842  ENSG00000215915.9      ATAD3C HGNC:32151
## 2843  ENSG00000215915.9      ATAD3C HGNC:32151
## 2844  ENSG00000215915.9      ATAD3C HGNC:32151
## 2845  ENSG00000215915.9      ATAD3C HGNC:32151
## 2846  ENSG00000215915.9      ATAD3C HGNC:32151
## 2847  ENSG00000215915.9      ATAD3C HGNC:32151
## 2848  ENSG00000215915.9      ATAD3C HGNC:32151
## 2849  ENSG00000215915.9      ATAD3C HGNC:32151
## 2850 ENSG00000160072.19      ATAD3B HGNC:24007
## 2851 ENSG00000160072.19      ATAD3B HGNC:24007
## 2852 ENSG00000160072.19      ATAD3B HGNC:24007
## 2853 ENSG00000160072.19      ATAD3B HGNC:24007
## 2854 ENSG00000160072.19      ATAD3B HGNC:24007
## 2855 ENSG00000160072.19      ATAD3B HGNC:24007
## 2856 ENSG00000160072.19      ATAD3B HGNC:24007
## 2857 ENSG00000160072.19      ATAD3B HGNC:24007
## 2858 ENSG00000160072.19      ATAD3B HGNC:24007
## 2859 ENSG00000160072.19      ATAD3B HGNC:24007
## 2860 ENSG00000160072.19      ATAD3B HGNC:24007
## 2861 ENSG00000160072.19      ATAD3B HGNC:24007
```

```
## 2862 ENSG00000160072.19       ATAD3B HGNC:24007
## 2863 ENSG00000160072.19       ATAD3B HGNC:24007
## 2864 ENSG00000160072.19       ATAD3B HGNC:24007
## 2865 ENSG00000160072.19       ATAD3B HGNC:24007
## 2866 ENSG00000160072.19       ATAD3B HGNC:24007
## 2867 ENSG00000160072.19       ATAD3B HGNC:24007
## 2868 ENSG00000160072.19       ATAD3B HGNC:24007
## 2869 ENSG00000160072.19       ATAD3B HGNC:24007
## 2870 ENSG00000160072.19       ATAD3B HGNC:24007
## 2871 ENSG00000160072.19       ATAD3B HGNC:24007
## 2872 ENSG00000160072.19       ATAD3B HGNC:24007
## 2873 ENSG00000160072.19       ATAD3B HGNC:24007
## 2874 ENSG00000160072.19       ATAD3B HGNC:24007
## 2875 ENSG00000160072.19       ATAD3B HGNC:24007
## 2876 ENSG00000160072.19       ATAD3B HGNC:24007
## 2877 ENSG00000160072.19       ATAD3B HGNC:24007
## 2878 ENSG00000160072.19       ATAD3B HGNC:24007
## 2879 ENSG00000160072.19       ATAD3B HGNC:24007
## 2880 ENSG00000160072.19       ATAD3B HGNC:24007
## 2881 ENSG00000160072.19       ATAD3B HGNC:24007
## 2882 ENSG00000160072.19       ATAD3B HGNC:24007
## 2883 ENSG00000160072.19       ATAD3B HGNC:24007
## 2884 ENSG00000160072.19       ATAD3B HGNC:24007
## 2885 ENSG00000160072.19       ATAD3B HGNC:24007
## 2886 ENSG00000160072.19       ATAD3B HGNC:24007
## 2887 ENSG00000160072.19       ATAD3B HGNC:24007
## 2888  ENSG00000284740.1  AL645728.2        <NA>
## 2889  ENSG00000284740.1  AL645728.2        <NA>
## 2890  ENSG00000284740.1  AL645728.2        <NA>
## 2891  ENSG00000284740.1  AL645728.2        <NA>
## 2892  ENSG00000284740.1  AL645728.2        <NA>
## 2893  ENSG00000284740.1  AL645728.2        <NA>
## 2894  ENSG00000284740.1  AL645728.2        <NA>
## 2895 ENSG00000197785.13       ATAD3A HGNC:25567
## 2896 ENSG00000197785.13       ATAD3A HGNC:25567
## 2897 ENSG00000197785.13       ATAD3A HGNC:25567
## 2898 ENSG00000197785.13       ATAD3A HGNC:25567
## 2899 ENSG00000197785.13       ATAD3A HGNC:25567
## 2900 ENSG00000197785.13       ATAD3A HGNC:25567
## 2901 ENSG00000197785.13       ATAD3A HGNC:25567
## 2902 ENSG00000197785.13       ATAD3A HGNC:25567
## 2903 ENSG00000197785.13       ATAD3A HGNC:25567
## 2904 ENSG00000197785.13       ATAD3A HGNC:25567
## 2905 ENSG00000197785.13       ATAD3A HGNC:25567
## 2906 ENSG00000197785.13       ATAD3A HGNC:25567
## 2907 ENSG00000197785.13       ATAD3A HGNC:25567
## 2908 ENSG00000197785.13       ATAD3A HGNC:25567
## 2909 ENSG00000197785.13       ATAD3A HGNC:25567
## 2910 ENSG00000197785.13       ATAD3A HGNC:25567
## 2911 ENSG00000197785.13       ATAD3A HGNC:25567
## 2912 ENSG00000197785.13       ATAD3A HGNC:25567
## 2913 ENSG00000197785.13       ATAD3A HGNC:25567
## 2914 ENSG00000197785.13       ATAD3A HGNC:25567
## 2915 ENSG00000197785.13       ATAD3A HGNC:25567
```

```
## 2916 ENSG00000197785.13        ATAD3A HGNC:25567
## 2917 ENSG00000197785.13        ATAD3A HGNC:25567
## 2918 ENSG00000197785.13        ATAD3A HGNC:25567
## 2919 ENSG00000197785.13        ATAD3A HGNC:25567
## 2920 ENSG00000197785.13        ATAD3A HGNC:25567
## 2921 ENSG00000197785.13        ATAD3A HGNC:25567
## 2922 ENSG00000197785.13        ATAD3A HGNC:25567
## 2923 ENSG00000197785.13        ATAD3A HGNC:25567
## 2924 ENSG00000197785.13        ATAD3A HGNC:25567
## 2925 ENSG00000197785.13        ATAD3A HGNC:25567
## 2926 ENSG00000197785.13        ATAD3A HGNC:25567
## 2927 ENSG00000197785.13        ATAD3A HGNC:25567
## 2928 ENSG00000197785.13        ATAD3A HGNC:25567
## 2929 ENSG00000197785.13        ATAD3A HGNC:25567
## 2930 ENSG00000197785.13        ATAD3A HGNC:25567
## 2931 ENSG00000197785.13        ATAD3A HGNC:25567
## 2932 ENSG00000197785.13        ATAD3A HGNC:25567
## 2933 ENSG00000197785.13        ATAD3A HGNC:25567
## 2934 ENSG00000197785.13        ATAD3A HGNC:25567
## 2935 ENSG00000197785.13        ATAD3A HGNC:25567
## 2936 ENSG00000197785.13        ATAD3A HGNC:25567
## 2937 ENSG00000197785.13        ATAD3A HGNC:25567
## 2938 ENSG00000197785.13        ATAD3A HGNC:25567
## 2939 ENSG00000197785.13        ATAD3A HGNC:25567
## 2940 ENSG00000197785.13        ATAD3A HGNC:25567
## 2941 ENSG00000197785.13        ATAD3A HGNC:25567
## 2942 ENSG00000197785.13        ATAD3A HGNC:25567
## 2943 ENSG00000197785.13        ATAD3A HGNC:25567
## 2944 ENSG00000197785.13        ATAD3A HGNC:25567
## 2945 ENSG00000197785.13        ATAD3A HGNC:25567
## 2946 ENSG00000197785.13        ATAD3A HGNC:25567
## 2947 ENSG00000197785.13        ATAD3A HGNC:25567
## 2948 ENSG00000197785.13        ATAD3A HGNC:25567
## 2949 ENSG00000197785.13        ATAD3A HGNC:25567
## 2950 ENSG00000197785.13        ATAD3A HGNC:25567
## 2951 ENSG00000197785.13        ATAD3A HGNC:25567
## 2952 ENSG00000197785.13        ATAD3A HGNC:25567
## 2953 ENSG00000197785.13        ATAD3A HGNC:25567
## 2954 ENSG00000197785.13        ATAD3A HGNC:25567
## 2955 ENSG00000197785.13        ATAD3A HGNC:25567
## 2956 ENSG00000197785.13        ATAD3A HGNC:25567
## 2957 ENSG00000197785.13        ATAD3A HGNC:25567
## 2958 ENSG00000197785.13        ATAD3A HGNC:25567
## 2959 ENSG00000197785.13        ATAD3A HGNC:25567
## 2960 ENSG00000197785.13        ATAD3A HGNC:25567
## 2961 ENSG00000197785.13        ATAD3A HGNC:25567
## 2962 ENSG00000197785.13        ATAD3A HGNC:25567
## 2963 ENSG00000197785.13        ATAD3A HGNC:25567
## 2964 ENSG00000197785.13        ATAD3A HGNC:25567
## 2965 ENSG00000197785.13        ATAD3A HGNC:25567
## 2966 ENSG00000197785.13        ATAD3A HGNC:25567
## 2967 ENSG00000197785.13        ATAD3A HGNC:25567
## 2968 ENSG00000197785.13        ATAD3A HGNC:25567
## 2969 ENSG00000197785.13        ATAD3A HGNC:25567
```

```
## 2970 ENSG00000197785.13      ATAD3A HGNC:25567
## 2971 ENSG00000197785.13      ATAD3A HGNC:25567
## 2972 ENSG00000197785.13      ATAD3A HGNC:25567
## 2973 ENSG00000197785.13      ATAD3A HGNC:25567
## 2974 ENSG00000197785.13      ATAD3A HGNC:25567
## 2975 ENSG00000197785.13      ATAD3A HGNC:25567
## 2976 ENSG00000197785.13      ATAD3A HGNC:25567
## 2977 ENSG00000197785.13      ATAD3A HGNC:25567
## 2978 ENSG00000197785.13      ATAD3A HGNC:25567
## 2979 ENSG00000197785.13      ATAD3A HGNC:25567
## 2980 ENSG00000197785.13      ATAD3A HGNC:25567
## 2981 ENSG00000197785.13      ATAD3A HGNC:25567
## 2982 ENSG00000197785.13      ATAD3A HGNC:25567
## 2983 ENSG00000197785.13      ATAD3A HGNC:25567
## 2984 ENSG00000197785.13      ATAD3A HGNC:25567
## 2985 ENSG00000197785.13      ATAD3A HGNC:25567
## 2986 ENSG00000197785.13      ATAD3A HGNC:25567
## 2987 ENSG00000197785.13      ATAD3A HGNC:25567
## 2988 ENSG00000197785.13      ATAD3A HGNC:25567
## 2989 ENSG00000197785.13      ATAD3A HGNC:25567
## 2990 ENSG00000197785.13      ATAD3A HGNC:25567
## 2991 ENSG00000197785.13      ATAD3A HGNC:25567
## 2992 ENSG00000197785.13      ATAD3A HGNC:25567
## 2993 ENSG00000197785.13      ATAD3A HGNC:25567
## 2994 ENSG00000197785.13      ATAD3A HGNC:25567
## 2995 ENSG00000197785.13      ATAD3A HGNC:25567
## 2996 ENSG00000197785.13      ATAD3A HGNC:25567
## 2997 ENSG00000197785.13      ATAD3A HGNC:25567
## 2998 ENSG00000197785.13      ATAD3A HGNC:25567
## 2999 ENSG00000197785.13      ATAD3A HGNC:25567
## 3000 ENSG00000197785.13      ATAD3A HGNC:25567
## 3001 ENSG00000197785.13      ATAD3A HGNC:25567
## 3002 ENSG00000197785.13      ATAD3A HGNC:25567
## 3003 ENSG00000197785.13      ATAD3A HGNC:25567
## 3004 ENSG00000197785.13      ATAD3A HGNC:25567
## 3005 ENSG00000197785.13      ATAD3A HGNC:25567
## 3006 ENSG00000197785.13      ATAD3A HGNC:25567
## 3007  ENSG00000205090.9     TMEM240 HGNC:25186
## 3008  ENSG00000205090.9     TMEM240 HGNC:25186
## 3009  ENSG00000205090.9     TMEM240 HGNC:25186
## 3010  ENSG00000205090.9     TMEM240 HGNC:25186
## 3011  ENSG00000205090.9     TMEM240 HGNC:25186
## 3012  ENSG00000205090.9     TMEM240 HGNC:25186
## 3013  ENSG00000205090.9     TMEM240 HGNC:25186
## 3014  ENSG00000205090.9     TMEM240 HGNC:25186
## 3015  ENSG00000205090.9     TMEM240 HGNC:25186
## 3016  ENSG00000205090.9     TMEM240 HGNC:25186
## 3017  ENSG00000205090.9     TMEM240 HGNC:25186
## 3018  ENSG00000205090.9     TMEM240 HGNC:25186
## 3019  ENSG00000205090.9     TMEM240 HGNC:25186
## 3020  ENSG00000205090.9     TMEM240 HGNC:25186
## 3021  ENSG00000205090.9     TMEM240 HGNC:25186
## 3022  ENSG00000205090.9     TMEM240 HGNC:25186
## 3023  ENSG00000205090.9     TMEM240 HGNC:25186
```

```
## 3024  ENSG00000205090.9       TMEM240 HGNC:25186
## 3025  ENSG00000205090.9       TMEM240 HGNC:25186
## 3026  ENSG00000205090.9       TMEM240 HGNC:25186
## 3027  ENSG00000205090.9       TMEM240 HGNC:25186
## 3028  ENSG00000205090.9       TMEM240 HGNC:25186
## 3029  ENSG00000205090.9       TMEM240 HGNC:25186
## 3030  ENSG00000205090.9       TMEM240 HGNC:25186
## 3031  ENSG00000205090.9       TMEM240 HGNC:25186
## 3032  ENSG00000205090.9       TMEM240 HGNC:25186
## 3033  ENSG00000205090.9       TMEM240 HGNC:25186
## 3034  ENSG00000205090.9       TMEM240 HGNC:25186
## 3035  ENSG00000205090.9       TMEM240 HGNC:25186
## 3036  ENSG00000205090.9       TMEM240 HGNC:25186
## 3037  ENSG00000205090.9       TMEM240 HGNC:25186
## 3038  ENSG00000205090.9       TMEM240 HGNC:25186
## 3039  ENSG00000205090.9       TMEM240 HGNC:25186
## 3040  ENSG00000205090.9       TMEM240 HGNC:25186
## 3041  ENSG00000205090.9       TMEM240 HGNC:25186
## 3042  ENSG00000205090.9       TMEM240 HGNC:25186
## 3043  ENSG00000205090.9       TMEM240 HGNC:25186
## 3044  ENSG00000205090.9       TMEM240 HGNC:25186
## 3045 ENSG00000160075.12        SSU72 HGNC:25016
## 3046 ENSG00000160075.12        SSU72 HGNC:25016
## 3047 ENSG00000160075.12        SSU72 HGNC:25016
## 3048 ENSG00000160075.12        SSU72 HGNC:25016
## 3049 ENSG00000160075.12        SSU72 HGNC:25016
## 3050 ENSG00000160075.12        SSU72 HGNC:25016
## 3051 ENSG00000160075.12        SSU72 HGNC:25016
## 3052 ENSG00000160075.12        SSU72 HGNC:25016
## 3053 ENSG00000160075.12        SSU72 HGNC:25016
## 3054 ENSG00000160075.12        SSU72 HGNC:25016
## 3055 ENSG00000160075.12        SSU72 HGNC:25016
## 3056 ENSG00000160075.12        SSU72 HGNC:25016
## 3057 ENSG00000160075.12        SSU72 HGNC:25016
## 3058 ENSG00000160075.12        SSU72 HGNC:25016
## 3059 ENSG00000160075.12        SSU72 HGNC:25016
## 3060 ENSG00000160075.12        SSU72 HGNC:25016
## 3061 ENSG00000160075.12        SSU72 HGNC:25016
## 3062 ENSG00000160075.12        SSU72 HGNC:25016
## 3063 ENSG00000160075.12        SSU72 HGNC:25016
## 3064 ENSG00000160075.12        SSU72 HGNC:25016
## 3065 ENSG00000160075.12        SSU72 HGNC:25016
## 3066 ENSG00000160075.12        SSU72 HGNC:25016
## 3067 ENSG00000160075.12        SSU72 HGNC:25016
## 3068 ENSG00000160075.12        SSU72 HGNC:25016
## 3069 ENSG00000160075.12        SSU72 HGNC:25016
## 3070  ENSG00000215014.5    AL645728.1       <NA>
## 3071  ENSG00000215014.5    AL645728.1       <NA>
## 3072  ENSG00000215014.5    AL645728.1       <NA>
## 3073  ENSG00000215014.5    AL645728.1       <NA>
## 3074  ENSG00000274481.1    AL691432.3       <NA>
## 3075  ENSG00000274481.1    AL691432.3       <NA>
## 3076  ENSG00000274481.1    AL691432.3       <NA>
## 3077  ENSG00000228594.4        FNDC10 HGNC:42951
```

```
## 3078  ENSG00000228594.4       FNDC10 HGNC:42951
## 3079  ENSG00000228594.4       FNDC10 HGNC:42951
## 3080  ENSG00000228594.4       FNDC10 HGNC:42951
## 3081  ENSG00000228594.4       FNDC10 HGNC:42951
## 3082  ENSG00000228594.4       FNDC10 HGNC:42951
## 3083  ENSG00000228594.4       FNDC10 HGNC:42951
## 3084  ENSG00000228594.4       FNDC10 HGNC:42951
## 3085  ENSG00000286989.1 AL691432.4       <NA>
## 3086  ENSG00000286989.1 AL691432.4       <NA>
## 3087  ENSG00000286989.1 AL691432.4       <NA>
## 3088  ENSG00000286989.1 AL691432.4       <NA>
## 3089  ENSG00000286989.1 AL691432.4       <NA>
## 3090  ENSG00000272106.1 AL691432.2       <NA>
## 3091  ENSG00000272106.1 AL691432.2       <NA>
## 3092  ENSG00000272106.1 AL691432.2       <NA>
## 3093 ENSG00000197530.12         MIB2 HGNC:30577
## 3094 ENSG00000197530.12         MIB2 HGNC:30577
## 3095 ENSG00000197530.12         MIB2 HGNC:30577
## 3096 ENSG00000197530.12         MIB2 HGNC:30577
## 3097 ENSG00000197530.12         MIB2 HGNC:30577
## 3098 ENSG00000197530.12         MIB2 HGNC:30577
## 3099 ENSG00000197530.12         MIB2 HGNC:30577
## 3100 ENSG00000197530.12         MIB2 HGNC:30577
## 3101 ENSG00000197530.12         MIB2 HGNC:30577
## 3102 ENSG00000197530.12         MIB2 HGNC:30577
## 3103 ENSG00000197530.12         MIB2 HGNC:30577
## 3104 ENSG00000197530.12         MIB2 HGNC:30577
## 3105 ENSG00000197530.12         MIB2 HGNC:30577
## 3106 ENSG00000197530.12         MIB2 HGNC:30577
## 3107 ENSG00000197530.12         MIB2 HGNC:30577
## 3108 ENSG00000197530.12         MIB2 HGNC:30577
## 3109 ENSG00000197530.12         MIB2 HGNC:30577
## 3110 ENSG00000197530.12         MIB2 HGNC:30577
## 3111 ENSG00000197530.12         MIB2 HGNC:30577
## 3112 ENSG00000197530.12         MIB2 HGNC:30577
## 3113 ENSG00000197530.12         MIB2 HGNC:30577
## 3114 ENSG00000197530.12         MIB2 HGNC:30577
## 3115 ENSG00000197530.12         MIB2 HGNC:30577
## 3116 ENSG00000197530.12         MIB2 HGNC:30577
## 3117 ENSG00000197530.12         MIB2 HGNC:30577
## 3118 ENSG00000197530.12         MIB2 HGNC:30577
## 3119 ENSG00000197530.12         MIB2 HGNC:30577
## 3120 ENSG00000197530.12         MIB2 HGNC:30577
## 3121 ENSG00000197530.12         MIB2 HGNC:30577
## 3122 ENSG00000197530.12         MIB2 HGNC:30577
## 3123 ENSG00000197530.12         MIB2 HGNC:30577
## 3124 ENSG00000197530.12         MIB2 HGNC:30577
## 3125 ENSG00000197530.12         MIB2 HGNC:30577
## 3126 ENSG00000197530.12         MIB2 HGNC:30577
## 3127 ENSG00000197530.12         MIB2 HGNC:30577
## 3128 ENSG00000197530.12         MIB2 HGNC:30577
## 3129 ENSG00000197530.12         MIB2 HGNC:30577
## 3130 ENSG00000197530.12         MIB2 HGNC:30577
## 3131 ENSG00000197530.12         MIB2 HGNC:30577
```

```
## 3132 ENSG00000197530.12        MIB2 HGNC:30577
## 3133 ENSG00000197530.12        MIB2 HGNC:30577
## 3134 ENSG00000197530.12        MIB2 HGNC:30577
## 3135 ENSG00000197530.12        MIB2 HGNC:30577
## 3136 ENSG00000197530.12        MIB2 HGNC:30577
## 3137 ENSG00000197530.12        MIB2 HGNC:30577
## 3138 ENSG00000197530.12        MIB2 HGNC:30577
## 3139 ENSG00000197530.12        MIB2 HGNC:30577
## 3140 ENSG00000197530.12        MIB2 HGNC:30577
## 3141 ENSG00000197530.12        MIB2 HGNC:30577
## 3142 ENSG00000197530.12        MIB2 HGNC:30577
## 3143 ENSG00000197530.12        MIB2 HGNC:30577
## 3144 ENSG00000197530.12        MIB2 HGNC:30577
## 3145 ENSG00000197530.12        MIB2 HGNC:30577
## 3146 ENSG00000197530.12        MIB2 HGNC:30577
## 3147 ENSG00000197530.12        MIB2 HGNC:30577
## 3148 ENSG00000197530.12        MIB2 HGNC:30577
## 3149 ENSG00000197530.12        MIB2 HGNC:30577
## 3150 ENSG00000197530.12        MIB2 HGNC:30577
## 3151 ENSG00000197530.12        MIB2 HGNC:30577
## 3152 ENSG00000197530.12        MIB2 HGNC:30577
## 3153 ENSG00000197530.12        MIB2 HGNC:30577
## 3154 ENSG00000197530.12        MIB2 HGNC:30577
## 3155 ENSG00000197530.12        MIB2 HGNC:30577
## 3156 ENSG00000197530.12        MIB2 HGNC:30577
## 3157 ENSG00000197530.12        MIB2 HGNC:30577
## 3158 ENSG00000197530.12        MIB2 HGNC:30577
## 3159 ENSG00000197530.12        MIB2 HGNC:30577
## 3160 ENSG00000197530.12        MIB2 HGNC:30577
## 3161 ENSG00000197530.12        MIB2 HGNC:30577
## 3162 ENSG00000197530.12        MIB2 HGNC:30577
## 3163 ENSG00000197530.12        MIB2 HGNC:30577
## 3164 ENSG00000197530.12        MIB2 HGNC:30577
## 3165 ENSG00000197530.12        MIB2 HGNC:30577
## 3166 ENSG00000197530.12        MIB2 HGNC:30577
## 3167 ENSG00000197530.12        MIB2 HGNC:30577
## 3168 ENSG00000197530.12        MIB2 HGNC:30577
## 3169 ENSG00000197530.12        MIB2 HGNC:30577
## 3170 ENSG00000197530.12        MIB2 HGNC:30577
## 3171 ENSG00000197530.12        MIB2 HGNC:30577
## 3172 ENSG00000197530.12        MIB2 HGNC:30577
## 3173 ENSG00000197530.12        MIB2 HGNC:30577
## 3174 ENSG00000197530.12        MIB2 HGNC:30577
## 3175 ENSG00000197530.12        MIB2 HGNC:30577
## 3176 ENSG00000197530.12        MIB2 HGNC:30577
## 3177 ENSG00000197530.12        MIB2 HGNC:30577
## 3178 ENSG00000197530.12        MIB2 HGNC:30577
## 3179 ENSG00000197530.12        MIB2 HGNC:30577
## 3180 ENSG00000197530.12        MIB2 HGNC:30577
## 3181 ENSG00000197530.12        MIB2 HGNC:30577
## 3182 ENSG00000197530.12        MIB2 HGNC:30577
## 3183 ENSG00000197530.12        MIB2 HGNC:30577
## 3184 ENSG00000197530.12        MIB2 HGNC:30577
## 3185 ENSG00000197530.12        MIB2 HGNC:30577
```

```
## 3186 ENSG00000197530.12          MIB2 HGNC:30577
## 3187 ENSG00000197530.12          MIB2 HGNC:30577
## 3188 ENSG00000197530.12          MIB2 HGNC:30577
## 3189 ENSG00000197530.12          MIB2 HGNC:30577
## 3190 ENSG00000197530.12          MIB2 HGNC:30577
## 3191 ENSG00000197530.12          MIB2 HGNC:30577
## 3192 ENSG00000197530.12          MIB2 HGNC:30577
## 3193 ENSG00000197530.12          MIB2 HGNC:30577
## 3194 ENSG00000197530.12          MIB2 HGNC:30577
## 3195 ENSG00000197530.12          MIB2 HGNC:30577
## 3196 ENSG00000197530.12          MIB2 HGNC:30577
## 3197 ENSG00000197530.12          MIB2 HGNC:30577
## 3198 ENSG00000197530.12          MIB2 HGNC:30577
## 3199 ENSG00000197530.12          MIB2 HGNC:30577
## 3200 ENSG00000197530.12          MIB2 HGNC:30577
## 3201 ENSG00000197530.12          MIB2 HGNC:30577
## 3202 ENSG00000197530.12          MIB2 HGNC:30577
## 3203 ENSG00000197530.12          MIB2 HGNC:30577
## 3204 ENSG00000197530.12          MIB2 HGNC:30577
## 3205 ENSG00000197530.12          MIB2 HGNC:30577
## 3206 ENSG00000197530.12          MIB2 HGNC:30577
## 3207 ENSG00000197530.12          MIB2 HGNC:30577
## 3208 ENSG00000197530.12          MIB2 HGNC:30577
## 3209 ENSG00000197530.12          MIB2 HGNC:30577
## 3210 ENSG00000197530.12          MIB2 HGNC:30577
## 3211 ENSG00000197530.12          MIB2 HGNC:30577
## 3212 ENSG00000197530.12          MIB2 HGNC:30577
## 3213 ENSG00000197530.12          MIB2 HGNC:30577
## 3214 ENSG00000197530.12          MIB2 HGNC:30577
## 3215 ENSG00000197530.12          MIB2 HGNC:30577
## 3216 ENSG00000197530.12          MIB2 HGNC:30577
## 3217 ENSG00000197530.12          MIB2 HGNC:30577
## 3218 ENSG00000197530.12          MIB2 HGNC:30577
## 3219 ENSG00000197530.12          MIB2 HGNC:30577
## 3220 ENSG00000197530.12          MIB2 HGNC:30577
## 3221 ENSG00000197530.12          MIB2 HGNC:30577
## 3222 ENSG00000197530.12          MIB2 HGNC:30577
## 3223 ENSG00000197530.12          MIB2 HGNC:30577
## 3224 ENSG00000197530.12          MIB2 HGNC:30577
## 3225 ENSG00000197530.12          MIB2 HGNC:30577
## 3226 ENSG00000197530.12          MIB2 HGNC:30577
## 3227 ENSG00000197530.12          MIB2 HGNC:30577
## 3228 ENSG00000197530.12          MIB2 HGNC:30577
## 3229 ENSG00000197530.12          MIB2 HGNC:30577
## 3230 ENSG00000197530.12          MIB2 HGNC:30577
## 3231 ENSG00000197530.12          MIB2 HGNC:30577
## 3232 ENSG00000197530.12          MIB2 HGNC:30577
## 3233 ENSG00000197530.12          MIB2 HGNC:30577
## 3234 ENSG00000197530.12          MIB2 HGNC:30577
## 3235 ENSG00000197530.12          MIB2 HGNC:30577
## 3236 ENSG00000197530.12          MIB2 HGNC:30577
## 3237 ENSG00000197530.12          MIB2 HGNC:30577
## 3238 ENSG00000197530.12          MIB2 HGNC:30577
## 3239 ENSG00000197530.12          MIB2 HGNC:30577
```

```
## 3240 ENSG00000197530.12           MIB2 HGNC:30577
## 3241 ENSG00000197530.12           MIB2 HGNC:30577
## 3242 ENSG00000197530.12           MIB2 HGNC:30577
## 3243 ENSG00000197530.12           MIB2 HGNC:30577
## 3244 ENSG00000197530.12           MIB2 HGNC:30577
## 3245 ENSG00000197530.12           MIB2 HGNC:30577
## 3246 ENSG00000197530.12           MIB2 HGNC:30577
## 3247 ENSG00000197530.12           MIB2 HGNC:30577
## 3248 ENSG00000197530.12           MIB2 HGNC:30577
## 3249 ENSG00000197530.12           MIB2 HGNC:30577
## 3250 ENSG00000197530.12           MIB2 HGNC:30577
## 3251 ENSG00000197530.12           MIB2 HGNC:30577
## 3252 ENSG00000197530.12           MIB2 HGNC:30577
## 3253 ENSG00000197530.12           MIB2 HGNC:30577
## 3254 ENSG00000197530.12           MIB2 HGNC:30577
## 3255 ENSG00000197530.12           MIB2 HGNC:30577
## 3256 ENSG00000197530.12           MIB2 HGNC:30577
## 3257 ENSG00000197530.12           MIB2 HGNC:30577
## 3258 ENSG00000197530.12           MIB2 HGNC:30577
## 3259 ENSG00000197530.12           MIB2 HGNC:30577
## 3260 ENSG00000197530.12           MIB2 HGNC:30577
## 3261 ENSG00000197530.12           MIB2 HGNC:30577
## 3262 ENSG00000197530.12           MIB2 HGNC:30577
## 3263 ENSG00000197530.12           MIB2 HGNC:30577
## 3264 ENSG00000197530.12           MIB2 HGNC:30577
## 3265 ENSG00000197530.12           MIB2 HGNC:30577
## 3266 ENSG00000197530.12           MIB2 HGNC:30577
## 3267 ENSG00000197530.12           MIB2 HGNC:30577
## 3268 ENSG00000197530.12           MIB2 HGNC:30577
## 3269 ENSG00000197530.12           MIB2 HGNC:30577
## 3270 ENSG00000197530.12           MIB2 HGNC:30577
## 3271 ENSG00000197530.12           MIB2 HGNC:30577
## 3272 ENSG00000197530.12           MIB2 HGNC:30577
## 3273 ENSG00000197530.12           MIB2 HGNC:30577
## 3274 ENSG00000197530.12           MIB2 HGNC:30577
## 3275 ENSG00000197530.12           MIB2 HGNC:30577
## 3276 ENSG00000197530.12           MIB2 HGNC:30577
## 3277 ENSG00000197530.12           MIB2 HGNC:30577
## 3278 ENSG00000197530.12           MIB2 HGNC:30577
## 3279 ENSG00000197530.12           MIB2 HGNC:30577
## 3280 ENSG00000197530.12           MIB2 HGNC:30577
## 3281 ENSG00000197530.12           MIB2 HGNC:30577
## 3282 ENSG00000197530.12           MIB2 HGNC:30577
## 3283 ENSG00000197530.12           MIB2 HGNC:30577
## 3284 ENSG00000197530.12           MIB2 HGNC:30577
## 3285 ENSG00000197530.12           MIB2 HGNC:30577
## 3286 ENSG00000197530.12           MIB2 HGNC:30577
## 3287 ENSG00000197530.12           MIB2 HGNC:30577
## 3288 ENSG00000197530.12           MIB2 HGNC:30577
## 3289 ENSG00000197530.12           MIB2 HGNC:30577
## 3290 ENSG00000197530.12           MIB2 HGNC:30577
## 3291 ENSG00000197530.12           MIB2 HGNC:30577
## 3292 ENSG00000197530.12           MIB2 HGNC:30577
## 3293 ENSG00000197530.12           MIB2 HGNC:30577
```

```
## 3294 ENSG00000197530.12          MIB2 HGNC:30577
## 3295 ENSG00000197530.12          MIB2 HGNC:30577
## 3296 ENSG00000197530.12          MIB2 HGNC:30577
## 3297 ENSG00000197530.12          MIB2 HGNC:30577
## 3298 ENSG00000197530.12          MIB2 HGNC:30577
## 3299 ENSG00000197530.12          MIB2 HGNC:30577
## 3300 ENSG00000197530.12          MIB2 HGNC:30577
## 3301 ENSG00000197530.12          MIB2 HGNC:30577
## 3302 ENSG00000197530.12          MIB2 HGNC:30577
## 3303 ENSG00000197530.12          MIB2 HGNC:30577
## 3304 ENSG00000197530.12          MIB2 HGNC:30577
## 3305 ENSG00000197530.12          MIB2 HGNC:30577
## 3306 ENSG00000197530.12          MIB2 HGNC:30577
## 3307 ENSG00000197530.12          MIB2 HGNC:30577
## 3308 ENSG00000197530.12          MIB2 HGNC:30577
## 3309 ENSG00000197530.12          MIB2 HGNC:30577
## 3310 ENSG00000197530.12          MIB2 HGNC:30577
## 3311 ENSG00000197530.12          MIB2 HGNC:30577
## 3312 ENSG00000197530.12          MIB2 HGNC:30577
## 3313 ENSG00000197530.12          MIB2 HGNC:30577
## 3314 ENSG00000197530.12          MIB2 HGNC:30577
## 3315 ENSG00000197530.12          MIB2 HGNC:30577
## 3316 ENSG00000197530.12          MIB2 HGNC:30577
## 3317 ENSG00000197530.12          MIB2 HGNC:30577
## 3318 ENSG00000197530.12          MIB2 HGNC:30577
## 3319 ENSG00000197530.12          MIB2 HGNC:30577
## 3320 ENSG00000197530.12          MIB2 HGNC:30577
## 3321 ENSG00000197530.12          MIB2 HGNC:30577
## 3322 ENSG00000197530.12          MIB2 HGNC:30577
## 3323 ENSG00000197530.12          MIB2 HGNC:30577
## 3324 ENSG00000197530.12          MIB2 HGNC:30577
## 3325 ENSG00000197530.12          MIB2 HGNC:30577
## 3326 ENSG00000197530.12          MIB2 HGNC:30577
## 3327 ENSG00000197530.12          MIB2 HGNC:30577
## 3328 ENSG00000197530.12          MIB2 HGNC:30577
## 3329 ENSG00000197530.12          MIB2 HGNC:30577
## 3330 ENSG00000197530.12          MIB2 HGNC:30577
## 3331 ENSG00000197530.12          MIB2 HGNC:30577
## 3332 ENSG00000197530.12          MIB2 HGNC:30577
## 3333 ENSG00000197530.12          MIB2 HGNC:30577
## 3334 ENSG00000197530.12          MIB2 HGNC:30577
## 3335 ENSG00000197530.12          MIB2 HGNC:30577
## 3336 ENSG00000197530.12          MIB2 HGNC:30577
## 3337 ENSG00000197530.12          MIB2 HGNC:30577
## 3338 ENSG00000197530.12          MIB2 HGNC:30577
## 3339 ENSG00000197530.12          MIB2 HGNC:30577
## 3340 ENSG00000197530.12          MIB2 HGNC:30577
## 3341 ENSG00000197530.12          MIB2 HGNC:30577
## 3342 ENSG00000197530.12          MIB2 HGNC:30577
## 3343 ENSG00000197530.12          MIB2 HGNC:30577
## 3344 ENSG00000197530.12          MIB2 HGNC:30577
## 3345 ENSG00000197530.12          MIB2 HGNC:30577
## 3346 ENSG00000197530.12          MIB2 HGNC:30577
## 3347 ENSG00000197530.12          MIB2 HGNC:30577
```

```
## 3348 ENSG00000197530.12        MIB2 HGNC:30577
## 3349 ENSG00000197530.12        MIB2 HGNC:30577
## 3350 ENSG00000197530.12        MIB2 HGNC:30577
## 3351 ENSG00000197530.12        MIB2 HGNC:30577
## 3352 ENSG00000197530.12        MIB2 HGNC:30577
## 3353 ENSG00000197530.12        MIB2 HGNC:30577
## 3354 ENSG00000197530.12        MIB2 HGNC:30577
## 3355 ENSG00000197530.12        MIB2 HGNC:30577
## 3356 ENSG00000197530.12        MIB2 HGNC:30577
## 3357 ENSG00000197530.12        MIB2 HGNC:30577
## 3358 ENSG00000197530.12        MIB2 HGNC:30577
## 3359 ENSG00000197530.12        MIB2 HGNC:30577
## 3360 ENSG00000197530.12        MIB2 HGNC:30577
## 3361 ENSG00000197530.12        MIB2 HGNC:30577
## 3362 ENSG00000197530.12        MIB2 HGNC:30577
## 3363 ENSG00000197530.12        MIB2 HGNC:30577
## 3364 ENSG00000197530.12        MIB2 HGNC:30577
## 3365 ENSG00000197530.12        MIB2 HGNC:30577
## 3366 ENSG00000197530.12        MIB2 HGNC:30577
## 3367 ENSG00000197530.12        MIB2 HGNC:30577
## 3368 ENSG00000197530.12        MIB2 HGNC:30577
## 3369 ENSG00000197530.12        MIB2 HGNC:30577
## 3370 ENSG00000197530.12        MIB2 HGNC:30577
## 3371 ENSG00000197530.12        MIB2 HGNC:30577
## 3372 ENSG00000197530.12        MIB2 HGNC:30577
## 3373 ENSG00000197530.12        MIB2 HGNC:30577
## 3374 ENSG00000197530.12        MIB2 HGNC:30577
## 3375 ENSG00000197530.12        MIB2 HGNC:30577
## 3376 ENSG00000197530.12        MIB2 HGNC:30577
## 3377 ENSG00000197530.12        MIB2 HGNC:30577
## 3378 ENSG00000197530.12        MIB2 HGNC:30577
## 3379 ENSG00000197530.12        MIB2 HGNC:30577
## 3380 ENSG00000197530.12        MIB2 HGNC:30577
## 3381 ENSG00000197530.12        MIB2 HGNC:30577
## 3382 ENSG00000197530.12        MIB2 HGNC:30577
## 3383 ENSG00000197530.12        MIB2 HGNC:30577
## 3384 ENSG00000197530.12        MIB2 HGNC:30577
## 3385 ENSG00000197530.12        MIB2 HGNC:30577
## 3386 ENSG00000197530.12        MIB2 HGNC:30577
## 3387 ENSG00000197530.12        MIB2 HGNC:30577
## 3388 ENSG00000197530.12        MIB2 HGNC:30577
## 3389 ENSG00000197530.12        MIB2 HGNC:30577
## 3390 ENSG00000197530.12        MIB2 HGNC:30577
## 3391 ENSG00000197530.12        MIB2 HGNC:30577
## 3392 ENSG00000197530.12        MIB2 HGNC:30577
## 3393 ENSG00000197530.12        MIB2 HGNC:30577
## 3394 ENSG00000197530.12        MIB2 HGNC:30577
## 3395 ENSG00000197530.12        MIB2 HGNC:30577
## 3396 ENSG00000197530.12        MIB2 HGNC:30577
## 3397 ENSG00000189409.13      MMP23B  HGNC:7171
## 3398 ENSG00000189409.13      MMP23B  HGNC:7171
## 3399 ENSG00000189409.13      MMP23B  HGNC:7171
## 3400 ENSG00000189409.13      MMP23B  HGNC:7171
## 3401 ENSG00000189409.13      MMP23B  HGNC:7171
```

```
## 3402 ENSG00000189409.13      MMP23B  HGNC:7171
## 3403 ENSG00000189409.13      MMP23B  HGNC:7171
## 3404 ENSG00000189409.13      MMP23B  HGNC:7171
## 3405 ENSG00000189409.13      MMP23B  HGNC:7171
## 3406 ENSG00000189409.13      MMP23B  HGNC:7171
## 3407 ENSG00000189409.13      MMP23B  HGNC:7171
## 3408 ENSG00000189409.13      MMP23B  HGNC:7171
## 3409 ENSG00000189409.13      MMP23B  HGNC:7171
## 3410 ENSG00000189409.13      MMP23B  HGNC:7171
## 3411 ENSG00000189409.13      MMP23B  HGNC:7171
## 3412 ENSG00000189409.13      MMP23B  HGNC:7171
## 3413 ENSG00000189409.13      MMP23B  HGNC:7171
## 3414 ENSG00000189409.13      MMP23B  HGNC:7171
## 3415 ENSG00000189409.13      MMP23B  HGNC:7171
## 3416 ENSG00000189409.13      MMP23B  HGNC:7171
## 3417 ENSG00000189409.13      MMP23B  HGNC:7171
## 3418 ENSG00000189409.13      MMP23B  HGNC:7171
## 3419 ENSG00000189409.13      MMP23B  HGNC:7171
## 3420 ENSG00000189409.13      MMP23B  HGNC:7171
## 3421 ENSG00000189409.13      MMP23B  HGNC:7171
## 3422 ENSG00000189409.13      MMP23B  HGNC:7171
## 3423 ENSG00000189409.13      MMP23B  HGNC:7171
## 3424 ENSG00000189409.13      MMP23B  HGNC:7171
## 3425 ENSG00000189409.13      MMP23B  HGNC:7171
## 3426 ENSG00000189409.13      MMP23B  HGNC:7171
## 3427 ENSG00000189409.13      MMP23B  HGNC:7171
## 3428 ENSG00000189409.13      MMP23B  HGNC:7171
## 3429 ENSG00000189409.13      MMP23B  HGNC:7171
## 3430 ENSG00000189409.13      MMP23B  HGNC:7171
## 3431 ENSG00000189409.13      MMP23B  HGNC:7171
## 3432 ENSG00000189409.13      MMP23B  HGNC:7171
## 3433 ENSG00000189409.13      MMP23B  HGNC:7171
## 3434 ENSG00000189409.13      MMP23B  HGNC:7171
## 3435 ENSG00000189409.13      MMP23B  HGNC:7171
## 3436 ENSG00000189409.13      MMP23B  HGNC:7171
## 3437 ENSG00000189409.13      MMP23B  HGNC:7171
## 3438  ENSG00000248333.8      CDK11B  HGNC:1729
## 3439  ENSG00000248333.8      CDK11B  HGNC:1729
## 3440  ENSG00000248333.8      CDK11B  HGNC:1729
## 3441  ENSG00000248333.8      CDK11B  HGNC:1729
## 3442  ENSG00000248333.8      CDK11B  HGNC:1729
## 3443  ENSG00000248333.8      CDK11B  HGNC:1729
## 3444  ENSG00000248333.8      CDK11B  HGNC:1729
## 3445  ENSG00000248333.8      CDK11B  HGNC:1729
## 3446  ENSG00000248333.8      CDK11B  HGNC:1729
## 3447  ENSG00000248333.8      CDK11B  HGNC:1729
## 3448  ENSG00000248333.8      CDK11B  HGNC:1729
## 3449  ENSG00000248333.8      CDK11B  HGNC:1729
## 3450  ENSG00000248333.8      CDK11B  HGNC:1729
## 3451  ENSG00000248333.8      CDK11B  HGNC:1729
## 3452  ENSG00000248333.8      CDK11B  HGNC:1729
## 3453  ENSG00000248333.8      CDK11B  HGNC:1729
## 3454  ENSG00000248333.8      CDK11B  HGNC:1729
## 3455  ENSG00000248333.8      CDK11B  HGNC:1729
```

```
## 3456  ENSG00000248333.8       CDK11B  HGNC:1729
## 3457  ENSG00000248333.8       CDK11B  HGNC:1729
## 3458  ENSG00000248333.8       CDK11B  HGNC:1729
## 3459  ENSG00000248333.8       CDK11B  HGNC:1729
## 3460  ENSG00000248333.8       CDK11B  HGNC:1729
## 3461  ENSG00000248333.8       CDK11B  HGNC:1729
## 3462  ENSG00000248333.8       CDK11B  HGNC:1729
## 3463  ENSG00000248333.8       CDK11B  HGNC:1729
## 3464  ENSG00000248333.8       CDK11B  HGNC:1729
## 3465  ENSG00000248333.8       CDK11B  HGNC:1729
## 3466  ENSG00000248333.8       CDK11B  HGNC:1729
## 3467  ENSG00000248333.8       CDK11B  HGNC:1729
## 3468  ENSG00000248333.8       CDK11B  HGNC:1729
## 3469  ENSG00000248333.8       CDK11B  HGNC:1729
## 3470  ENSG00000248333.8       CDK11B  HGNC:1729
## 3471  ENSG00000248333.8       CDK11B  HGNC:1729
## 3472  ENSG00000248333.8       CDK11B  HGNC:1729
## 3473  ENSG00000248333.8       CDK11B  HGNC:1729
## 3474  ENSG00000248333.8       CDK11B  HGNC:1729
## 3475  ENSG00000248333.8       CDK11B  HGNC:1729
## 3476  ENSG00000248333.8       CDK11B  HGNC:1729
## 3477  ENSG00000248333.8       CDK11B  HGNC:1729
## 3478  ENSG00000248333.8       CDK11B  HGNC:1729
## 3479  ENSG00000248333.8       CDK11B  HGNC:1729
## 3480  ENSG00000248333.8       CDK11B  HGNC:1729
## 3481  ENSG00000248333.8       CDK11B  HGNC:1729
## 3482  ENSG00000248333.8       CDK11B  HGNC:1729
## 3483  ENSG00000248333.8       CDK11B  HGNC:1729
## 3484  ENSG00000248333.8       CDK11B  HGNC:1729
## 3485  ENSG00000248333.8       CDK11B  HGNC:1729
## 3486  ENSG00000248333.8       CDK11B  HGNC:1729
## 3487  ENSG00000248333.8       CDK11B  HGNC:1729
## 3488  ENSG00000248333.8       CDK11B  HGNC:1729
## 3489  ENSG00000248333.8       CDK11B  HGNC:1729
## 3490  ENSG00000248333.8       CDK11B  HGNC:1729
## 3491  ENSG00000248333.8       CDK11B  HGNC:1729
## 3492  ENSG00000248333.8       CDK11B  HGNC:1729
## 3493  ENSG00000248333.8       CDK11B  HGNC:1729
## 3494  ENSG00000248333.8       CDK11B  HGNC:1729
## 3495  ENSG00000248333.8       CDK11B  HGNC:1729
## 3496  ENSG00000248333.8       CDK11B  HGNC:1729
## 3497  ENSG00000248333.8       CDK11B  HGNC:1729
## 3498  ENSG00000248333.8       CDK11B  HGNC:1729
## 3499  ENSG00000248333.8       CDK11B  HGNC:1729
## 3500  ENSG00000248333.8       CDK11B  HGNC:1729
## 3501  ENSG00000248333.8       CDK11B  HGNC:1729
## 3502  ENSG00000248333.8       CDK11B  HGNC:1729
## 3503  ENSG00000248333.8       CDK11B  HGNC:1729
## 3504  ENSG00000248333.8       CDK11B  HGNC:1729
## 3505  ENSG00000248333.8       CDK11B  HGNC:1729
## 3506  ENSG00000248333.8       CDK11B  HGNC:1729
## 3507  ENSG00000248333.8       CDK11B  HGNC:1729
## 3508  ENSG00000248333.8       CDK11B  HGNC:1729
## 3509  ENSG00000248333.8       CDK11B  HGNC:1729
```

```
## 3510   ENSG00000248333.8        CDK11B   HGNC:1729
## 3511   ENSG00000248333.8        CDK11B   HGNC:1729
## 3512   ENSG00000248333.8        CDK11B   HGNC:1729
## 3513   ENSG00000248333.8        CDK11B   HGNC:1729
## 3514   ENSG00000248333.8        CDK11B   HGNC:1729
## 3515   ENSG00000248333.8        CDK11B   HGNC:1729
## 3516   ENSG00000248333.8        CDK11B   HGNC:1729
## 3517   ENSG00000248333.8        CDK11B   HGNC:1729
## 3518   ENSG00000248333.8        CDK11B   HGNC:1729
## 3519   ENSG00000248333.8        CDK11B   HGNC:1729
## 3520   ENSG00000248333.8        CDK11B   HGNC:1729
## 3521   ENSG00000248333.8        CDK11B   HGNC:1729
## 3522   ENSG00000248333.8        CDK11B   HGNC:1729
## 3523   ENSG00000248333.8        CDK11B   HGNC:1729
## 3524   ENSG00000248333.8        CDK11B   HGNC:1729
## 3525   ENSG00000248333.8        CDK11B   HGNC:1729
## 3526   ENSG00000248333.8        CDK11B   HGNC:1729
## 3527   ENSG00000248333.8        CDK11B   HGNC:1729
## 3528   ENSG00000248333.8        CDK11B   HGNC:1729
## 3529   ENSG00000248333.8        CDK11B   HGNC:1729
## 3530   ENSG00000248333.8        CDK11B   HGNC:1729
## 3531   ENSG00000248333.8        CDK11B   HGNC:1729
## 3532   ENSG00000248333.8        CDK11B   HGNC:1729
## 3533   ENSG00000248333.8        CDK11B   HGNC:1729
## 3534   ENSG00000248333.8        CDK11B   HGNC:1729
## 3535   ENSG00000248333.8        CDK11B   HGNC:1729
## 3536   ENSG00000248333.8        CDK11B   HGNC:1729
## 3537   ENSG00000248333.8        CDK11B   HGNC:1729
## 3538   ENSG00000248333.8        CDK11B   HGNC:1729
## 3539   ENSG00000248333.8        CDK11B   HGNC:1729
## 3540   ENSG00000248333.8        CDK11B   HGNC:1729
## 3541   ENSG00000248333.8        CDK11B   HGNC:1729
## 3542   ENSG00000248333.8        CDK11B   HGNC:1729
## 3543   ENSG00000248333.8        CDK11B   HGNC:1729
## 3544   ENSG00000248333.8        CDK11B   HGNC:1729
## 3545   ENSG00000248333.8        CDK11B   HGNC:1729
## 3546   ENSG00000248333.8        CDK11B   HGNC:1729
## 3547   ENSG00000248333.8        CDK11B   HGNC:1729
## 3548   ENSG00000248333.8        CDK11B   HGNC:1729
## 3549   ENSG00000248333.8        CDK11B   HGNC:1729
## 3550   ENSG00000248333.8        CDK11B   HGNC:1729
## 3551   ENSG00000248333.8        CDK11B   HGNC:1729
## 3552   ENSG00000248333.8        CDK11B   HGNC:1729
## 3553   ENSG00000248333.8        CDK11B   HGNC:1729
## 3554   ENSG00000248333.8        CDK11B   HGNC:1729
## 3555   ENSG00000248333.8        CDK11B   HGNC:1729
## 3556   ENSG00000248333.8        CDK11B   HGNC:1729
## 3557   ENSG00000248333.8        CDK11B   HGNC:1729
## 3558   ENSG00000248333.8        CDK11B   HGNC:1729
## 3559   ENSG00000248333.8        CDK11B   HGNC:1729
## 3560   ENSG00000248333.8        CDK11B   HGNC:1729
## 3561   ENSG00000248333.8        CDK11B   HGNC:1729
## 3562   ENSG00000248333.8        CDK11B   HGNC:1729
## 3563   ENSG00000248333.8        CDK11B   HGNC:1729
```

```
## 3564  ENSG00000248333.8        CDK11B  HGNC:1729
## 3565  ENSG00000248333.8        CDK11B  HGNC:1729
## 3566  ENSG00000248333.8        CDK11B  HGNC:1729
## 3567  ENSG00000248333.8        CDK11B  HGNC:1729
## 3568  ENSG00000248333.8        CDK11B  HGNC:1729
## 3569  ENSG00000248333.8        CDK11B  HGNC:1729
## 3570  ENSG00000248333.8        CDK11B  HGNC:1729
## 3571  ENSG00000248333.8        CDK11B  HGNC:1729
## 3572  ENSG00000248333.8        CDK11B  HGNC:1729
## 3573  ENSG00000248333.8        CDK11B  HGNC:1729
## 3574  ENSG00000248333.8        CDK11B  HGNC:1729
## 3575  ENSG00000248333.8        CDK11B  HGNC:1729
## 3576  ENSG00000248333.8        CDK11B  HGNC:1729
## 3577  ENSG00000248333.8        CDK11B  HGNC:1729
## 3578  ENSG00000248333.8        CDK11B  HGNC:1729
## 3579  ENSG00000248333.8        CDK11B  HGNC:1729
## 3580  ENSG00000248333.8        CDK11B  HGNC:1729
## 3581  ENSG00000248333.8        CDK11B  HGNC:1729
## 3582  ENSG00000248333.8        CDK11B  HGNC:1729
## 3583  ENSG00000248333.8        CDK11B  HGNC:1729
## 3584  ENSG00000248333.8        CDK11B  HGNC:1729
## 3585  ENSG00000248333.8        CDK11B  HGNC:1729
## 3586  ENSG00000248333.8        CDK11B  HGNC:1729
## 3587  ENSG00000248333.8        CDK11B  HGNC:1729
## 3588  ENSG00000248333.8        CDK11B  HGNC:1729
## 3589  ENSG00000248333.8        CDK11B  HGNC:1729
## 3590  ENSG00000248333.8        CDK11B  HGNC:1729
## 3591  ENSG00000248333.8        CDK11B  HGNC:1729
## 3592  ENSG00000248333.8        CDK11B  HGNC:1729
## 3593  ENSG00000248333.8        CDK11B  HGNC:1729
## 3594  ENSG00000248333.8        CDK11B  HGNC:1729
## 3595  ENSG00000248333.8        CDK11B  HGNC:1729
## 3596  ENSG00000248333.8        CDK11B  HGNC:1729
## 3597  ENSG00000248333.8        CDK11B  HGNC:1729
## 3598  ENSG00000248333.8        CDK11B  HGNC:1729
## 3599  ENSG00000248333.8        CDK11B  HGNC:1729
## 3600  ENSG00000248333.8        CDK11B  HGNC:1729
## 3601  ENSG00000248333.8        CDK11B  HGNC:1729
## 3602  ENSG00000248333.8        CDK11B  HGNC:1729
## 3603  ENSG00000248333.8        CDK11B  HGNC:1729
## 3604  ENSG00000248333.8        CDK11B  HGNC:1729
## 3605  ENSG00000248333.8        CDK11B  HGNC:1729
## 3606  ENSG00000248333.8        CDK11B  HGNC:1729
## 3607  ENSG00000248333.8        CDK11B  HGNC:1729
## 3608  ENSG00000248333.8        CDK11B  HGNC:1729
## 3609  ENSG00000248333.8        CDK11B  HGNC:1729
## 3610  ENSG00000248333.8        CDK11B  HGNC:1729
## 3611  ENSG00000248333.8        CDK11B  HGNC:1729
## 3612  ENSG00000248333.8        CDK11B  HGNC:1729
## 3613  ENSG00000248333.8        CDK11B  HGNC:1729
## 3614  ENSG00000248333.8        CDK11B  HGNC:1729
## 3615  ENSG00000248333.8        CDK11B  HGNC:1729
## 3616  ENSG00000248333.8        CDK11B  HGNC:1729
## 3617  ENSG00000248333.8        CDK11B  HGNC:1729
```

```
## 3618   ENSG00000248333.8          CDK11B   HGNC:1729
## 3619   ENSG00000248333.8          CDK11B   HGNC:1729
## 3620   ENSG00000248333.8          CDK11B   HGNC:1729
## 3621   ENSG00000248333.8          CDK11B   HGNC:1729
## 3622   ENSG00000248333.8          CDK11B   HGNC:1729
## 3623   ENSG00000248333.8          CDK11B   HGNC:1729
## 3624   ENSG00000248333.8          CDK11B   HGNC:1729
## 3625   ENSG00000248333.8          CDK11B   HGNC:1729
## 3626   ENSG00000248333.8          CDK11B   HGNC:1729
## 3627   ENSG00000248333.8          CDK11B   HGNC:1729
## 3628   ENSG00000248333.8          CDK11B   HGNC:1729
## 3629   ENSG00000248333.8          CDK11B   HGNC:1729
## 3630   ENSG00000248333.8          CDK11B   HGNC:1729
## 3631   ENSG00000248333.8          CDK11B   HGNC:1729
## 3632   ENSG00000248333.8          CDK11B   HGNC:1729
## 3633   ENSG00000248333.8          CDK11B   HGNC:1729
## 3634   ENSG00000248333.8          CDK11B   HGNC:1729
## 3635   ENSG00000248333.8          CDK11B   HGNC:1729
## 3636   ENSG00000248333.8          CDK11B   HGNC:1729
## 3637   ENSG00000248333.8          CDK11B   HGNC:1729
## 3638   ENSG00000248333.8          CDK11B   HGNC:1729
## 3639   ENSG00000248333.8          CDK11B   HGNC:1729
## 3640   ENSG00000248333.8          CDK11B   HGNC:1729
## 3641   ENSG00000248333.8          CDK11B   HGNC:1729
## 3642   ENSG00000248333.8          CDK11B   HGNC:1729
## 3643   ENSG00000248333.8          CDK11B   HGNC:1729
## 3644   ENSG00000248333.8          CDK11B   HGNC:1729
## 3645   ENSG00000248333.8          CDK11B   HGNC:1729
## 3646   ENSG00000248333.8          CDK11B   HGNC:1729
## 3647   ENSG00000248333.8          CDK11B   HGNC:1729
## 3648   ENSG00000248333.8          CDK11B   HGNC:1729
## 3649   ENSG00000248333.8          CDK11B   HGNC:1729
## 3650   ENSG00000248333.8          CDK11B   HGNC:1729
## 3651   ENSG00000248333.8          CDK11B   HGNC:1729
## 3652   ENSG00000248333.8          CDK11B   HGNC:1729
## 3653   ENSG00000248333.8          CDK11B   HGNC:1729
## 3654   ENSG00000248333.8          CDK11B   HGNC:1729
## 3655   ENSG00000248333.8          CDK11B   HGNC:1729
## 3656   ENSG00000248333.8          CDK11B   HGNC:1729
## 3657   ENSG00000248333.8          CDK11B   HGNC:1729
## 3658   ENSG00000248333.8          CDK11B   HGNC:1729
## 3659   ENSG00000248333.8          CDK11B   HGNC:1729
## 3660   ENSG00000248333.8          CDK11B   HGNC:1729
## 3661   ENSG00000248333.8          CDK11B   HGNC:1729
## 3662   ENSG00000248333.8          CDK11B   HGNC:1729
## 3663   ENSG00000248333.8          CDK11B   HGNC:1729
## 3664   ENSG00000248333.8          CDK11B   HGNC:1729
## 3665   ENSG00000248333.8          CDK11B   HGNC:1729
## 3666   ENSG00000248333.8          CDK11B   HGNC:1729
## 3667   ENSG00000248333.8          CDK11B   HGNC:1729
## 3668   ENSG00000248333.8          CDK11B   HGNC:1729
## 3669   ENSG00000248333.8          CDK11B   HGNC:1729
## 3670   ENSG00000248333.8          CDK11B   HGNC:1729
## 3671   ENSG00000248333.8          CDK11B   HGNC:1729
```

```
## 3672  ENSG00000248333.8      CDK11B  HGNC:1729
## 3673  ENSG00000248333.8      CDK11B  HGNC:1729
## 3674  ENSG00000248333.8      CDK11B  HGNC:1729
## 3675  ENSG00000248333.8      CDK11B  HGNC:1729
## 3676  ENSG00000248333.8      CDK11B  HGNC:1729
## 3677  ENSG00000248333.8      CDK11B  HGNC:1729
## 3678  ENSG00000248333.8      CDK11B  HGNC:1729
## 3679  ENSG00000248333.8      CDK11B  HGNC:1729
## 3680  ENSG00000248333.8      CDK11B  HGNC:1729
## 3681  ENSG00000248333.8      CDK11B  HGNC:1729
## 3682  ENSG00000248333.8      CDK11B  HGNC:1729
## 3683  ENSG00000248333.8      CDK11B  HGNC:1729
## 3684  ENSG00000248333.8      CDK11B  HGNC:1729
## 3685  ENSG00000248333.8      CDK11B  HGNC:1729
## 3686  ENSG00000248333.8      CDK11B  HGNC:1729
## 3687  ENSG00000248333.8      CDK11B  HGNC:1729
## 3688  ENSG00000248333.8      CDK11B  HGNC:1729
## 3689  ENSG00000248333.8      CDK11B  HGNC:1729
## 3690  ENSG00000248333.8      CDK11B  HGNC:1729
## 3691  ENSG00000248333.8      CDK11B  HGNC:1729
## 3692  ENSG00000248333.8      CDK11B  HGNC:1729
## 3693  ENSG00000248333.8      CDK11B  HGNC:1729
## 3694  ENSG00000248333.8      CDK11B  HGNC:1729
## 3695  ENSG00000248333.8      CDK11B  HGNC:1729
## 3696  ENSG00000248333.8      CDK11B  HGNC:1729
## 3697  ENSG00000248333.8      CDK11B  HGNC:1729
## 3698  ENSG00000248333.8      CDK11B  HGNC:1729
## 3699  ENSG00000248333.8      CDK11B  HGNC:1729
## 3700  ENSG00000248333.8      CDK11B  HGNC:1729
## 3701  ENSG00000248333.8      CDK11B  HGNC:1729
## 3702  ENSG00000248333.8      CDK11B  HGNC:1729
## 3703  ENSG00000248333.8      CDK11B  HGNC:1729
## 3704  ENSG00000248333.8      CDK11B  HGNC:1729
## 3705  ENSG00000248333.8      CDK11B  HGNC:1729
## 3706  ENSG00000248333.8      CDK11B  HGNC:1729
## 3707  ENSG00000248333.8      CDK11B  HGNC:1729
## 3708  ENSG00000248333.8      CDK11B  HGNC:1729
## 3709  ENSG00000248333.8      CDK11B  HGNC:1729
## 3710  ENSG00000248333.8      CDK11B  HGNC:1729
## 3711  ENSG00000248333.8      CDK11B  HGNC:1729
## 3712  ENSG00000248333.8      CDK11B  HGNC:1729
## 3713  ENSG00000248333.8      CDK11B  HGNC:1729
## 3714  ENSG00000248333.8      CDK11B  HGNC:1729
## 3715  ENSG00000248333.8      CDK11B  HGNC:1729
## 3716  ENSG00000248333.8      CDK11B  HGNC:1729
## 3717  ENSG00000248333.8      CDK11B  HGNC:1729
## 3718  ENSG00000248333.8      CDK11B  HGNC:1729
## 3719  ENSG00000248333.8      CDK11B  HGNC:1729
## 3720  ENSG00000248333.8      CDK11B  HGNC:1729
## 3721  ENSG00000272004.1   FO704657.1      <NA>
## 3722  ENSG00000272004.1   FO704657.1      <NA>
## 3723  ENSG00000272004.1   FO704657.1      <NA>
## 3724  ENSG00000272004.1   FO704657.1      <NA>
## 3725 ENSG00000189339.11      SLC35E2B HGNC:33941
```

```
## 3726 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3727 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3728 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3729 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3730 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3731 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3732 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3733 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3734 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3735 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3736 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3737 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3738 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3739 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3740 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3741 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3742 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3743 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3744 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3745 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3746 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3747 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3748 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3749 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3750 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3751 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3752 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3753 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3754 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3755 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3756 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3757 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3758 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3759 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3760 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3761 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3762 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3763 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3764 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3765 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3766 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3767 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3768 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3769 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3770 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3771 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3772 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3773 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3774 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3775 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3776 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3777 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3778 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3779 ENSG00000189339.11     SLC35E2B HGNC:33941
```

```
## 3780 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3781 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3782 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3783 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3784 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3785 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3786 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3787 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3788 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3789 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3790 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3791 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3792 ENSG00000189339.11     SLC35E2B HGNC:33941
## 3793  ENSG00000269737.2    AL691432.1      <NA>
## 3794  ENSG00000269737.2    AL691432.1      <NA>
## 3795  ENSG00000269737.2    AL691432.1      <NA>
## 3796  ENSG00000269737.2    AL691432.1      <NA>
## 3797  ENSG00000269737.2    AL691432.1      <NA>
## 3798  ENSG00000269737.2    AL691432.1      <NA>
## 3799  ENSG00000215914.4      MMP23A  HGNC:7170
## 3800  ENSG00000215914.4      MMP23A  HGNC:7170
## 3801  ENSG00000215914.4      MMP23A  HGNC:7170
## 3802  ENSG00000215914.4      MMP23A  HGNC:7170
## 3803  ENSG00000215914.4      MMP23A  HGNC:7170
## 3804  ENSG00000215914.4      MMP23A  HGNC:7170
## 3805  ENSG00000215914.4      MMP23A  HGNC:7170
## 3806  ENSG00000215914.4      MMP23A  HGNC:7170
## 3807  ENSG00000215914.4      MMP23A  HGNC:7170
## 3808 ENSG00000008128.23      CDK11A  HGNC:1730
## 3809 ENSG00000008128.23      CDK11A  HGNC:1730
## 3810 ENSG00000008128.23      CDK11A  HGNC:1730
## 3811 ENSG00000008128.23      CDK11A  HGNC:1730
## 3812 ENSG00000008128.23      CDK11A  HGNC:1730
## 3813 ENSG00000008128.23      CDK11A  HGNC:1730
## 3814 ENSG00000008128.23      CDK11A  HGNC:1730
## 3815 ENSG00000008128.23      CDK11A  HGNC:1730
## 3816 ENSG00000008128.23      CDK11A  HGNC:1730
## 3817 ENSG00000008128.23      CDK11A  HGNC:1730
## 3818 ENSG00000008128.23      CDK11A  HGNC:1730
## 3819 ENSG00000008128.23      CDK11A  HGNC:1730
## 3820 ENSG00000008128.23      CDK11A  HGNC:1730
## 3821 ENSG00000008128.23      CDK11A  HGNC:1730
## 3822 ENSG00000008128.23      CDK11A  HGNC:1730
## 3823 ENSG00000008128.23      CDK11A  HGNC:1730
## 3824 ENSG00000008128.23      CDK11A  HGNC:1730
## 3825 ENSG00000008128.23      CDK11A  HGNC:1730
## 3826 ENSG00000008128.23      CDK11A  HGNC:1730
## 3827 ENSG00000008128.23      CDK11A  HGNC:1730
## 3828 ENSG00000008128.23      CDK11A  HGNC:1730
## 3829 ENSG00000008128.23      CDK11A  HGNC:1730
## 3830 ENSG00000008128.23      CDK11A  HGNC:1730
## 3831 ENSG00000008128.23      CDK11A  HGNC:1730
## 3832 ENSG00000008128.23      CDK11A  HGNC:1730
## 3833 ENSG00000008128.23      CDK11A  HGNC:1730
```

```
## 3834 ENSG00000008128.23       CDK11A  HGNC:1730
## 3835 ENSG00000008128.23       CDK11A  HGNC:1730
## 3836 ENSG00000008128.23       CDK11A  HGNC:1730
## 3837 ENSG00000008128.23       CDK11A  HGNC:1730
## 3838 ENSG00000008128.23       CDK11A  HGNC:1730
## 3839 ENSG00000008128.23       CDK11A  HGNC:1730
## 3840 ENSG00000008128.23       CDK11A  HGNC:1730
## 3841 ENSG00000008128.23       CDK11A  HGNC:1730
## 3842 ENSG00000008128.23       CDK11A  HGNC:1730
## 3843 ENSG00000008128.23       CDK11A  HGNC:1730
## 3844 ENSG00000008128.23       CDK11A  HGNC:1730
## 3845 ENSG00000008128.23       CDK11A  HGNC:1730
## 3846 ENSG00000008128.23       CDK11A  HGNC:1730
## 3847 ENSG00000008128.23       CDK11A  HGNC:1730
## 3848 ENSG00000008128.23       CDK11A  HGNC:1730
## 3849 ENSG00000008128.23       CDK11A  HGNC:1730
## 3850 ENSG00000008128.23       CDK11A  HGNC:1730
## 3851 ENSG00000008128.23       CDK11A  HGNC:1730
## 3852 ENSG00000008128.23       CDK11A  HGNC:1730
## 3853 ENSG00000008128.23       CDK11A  HGNC:1730
## 3854 ENSG00000008128.23       CDK11A  HGNC:1730
## 3855 ENSG00000008128.23       CDK11A  HGNC:1730
## 3856 ENSG00000008128.23       CDK11A  HGNC:1730
## 3857 ENSG00000008128.23       CDK11A  HGNC:1730
## 3858 ENSG00000008128.23       CDK11A  HGNC:1730
## 3859 ENSG00000008128.23       CDK11A  HGNC:1730
## 3860 ENSG00000008128.23       CDK11A  HGNC:1730
## 3861 ENSG00000008128.23       CDK11A  HGNC:1730
## 3862 ENSG00000008128.23       CDK11A  HGNC:1730
## 3863 ENSG00000008128.23       CDK11A  HGNC:1730
## 3864 ENSG00000008128.23       CDK11A  HGNC:1730
## 3865 ENSG00000008128.23       CDK11A  HGNC:1730
## 3866 ENSG00000008128.23       CDK11A  HGNC:1730
## 3867 ENSG00000008128.23       CDK11A  HGNC:1730
## 3868 ENSG00000008128.23       CDK11A  HGNC:1730
## 3869 ENSG00000008128.23       CDK11A  HGNC:1730
## 3870 ENSG00000008128.23       CDK11A  HGNC:1730
## 3871 ENSG00000008128.23       CDK11A  HGNC:1730
## 3872 ENSG00000008128.23       CDK11A  HGNC:1730
## 3873 ENSG00000008128.23       CDK11A  HGNC:1730
## 3874 ENSG00000008128.23       CDK11A  HGNC:1730
## 3875 ENSG00000008128.23       CDK11A  HGNC:1730
## 3876 ENSG00000008128.23       CDK11A  HGNC:1730
## 3877 ENSG00000008128.23       CDK11A  HGNC:1730
## 3878 ENSG00000008128.23       CDK11A  HGNC:1730
## 3879 ENSG00000008128.23       CDK11A  HGNC:1730
## 3880 ENSG00000008128.23       CDK11A  HGNC:1730
## 3881 ENSG00000008128.23       CDK11A  HGNC:1730
## 3882 ENSG00000008128.23       CDK11A  HGNC:1730
## 3883 ENSG00000008128.23       CDK11A  HGNC:1730
## 3884 ENSG00000008128.23       CDK11A  HGNC:1730
## 3885 ENSG00000008128.23       CDK11A  HGNC:1730
## 3886 ENSG00000008128.23       CDK11A  HGNC:1730
## 3887 ENSG00000008128.23       CDK11A  HGNC:1730
```

```
## 3888 ENSG00000008128.23        CDK11A   HGNC:1730
## 3889 ENSG00000008128.23        CDK11A   HGNC:1730
## 3890 ENSG00000008128.23        CDK11A   HGNC:1730
## 3891 ENSG00000008128.23        CDK11A   HGNC:1730
## 3892 ENSG00000008128.23        CDK11A   HGNC:1730
## 3893 ENSG00000008128.23        CDK11A   HGNC:1730
## 3894 ENSG00000008128.23        CDK11A   HGNC:1730
## 3895 ENSG00000008128.23        CDK11A   HGNC:1730
## 3896 ENSG00000008128.23        CDK11A   HGNC:1730
## 3897 ENSG00000008128.23        CDK11A   HGNC:1730
## 3898 ENSG00000008128.23        CDK11A   HGNC:1730
## 3899 ENSG00000008128.23        CDK11A   HGNC:1730
## 3900 ENSG00000008128.23        CDK11A   HGNC:1730
## 3901 ENSG00000008128.23        CDK11A   HGNC:1730
## 3902 ENSG00000008128.23        CDK11A   HGNC:1730
## 3903 ENSG00000008128.23        CDK11A   HGNC:1730
## 3904 ENSG00000008128.23        CDK11A   HGNC:1730
## 3905 ENSG00000008128.23        CDK11A   HGNC:1730
## 3906 ENSG00000008128.23        CDK11A   HGNC:1730
## 3907 ENSG00000008128.23        CDK11A   HGNC:1730
## 3908 ENSG00000008128.23        CDK11A   HGNC:1730
## 3909 ENSG00000008128.23        CDK11A   HGNC:1730
## 3910 ENSG00000008128.23        CDK11A   HGNC:1730
## 3911 ENSG00000008128.23        CDK11A   HGNC:1730
## 3912 ENSG00000008128.23        CDK11A   HGNC:1730
## 3913 ENSG00000008128.23        CDK11A   HGNC:1730
## 3914 ENSG00000008128.23        CDK11A   HGNC:1730
## 3915 ENSG00000008128.23        CDK11A   HGNC:1730
## 3916 ENSG00000008128.23        CDK11A   HGNC:1730
## 3917 ENSG00000008128.23        CDK11A   HGNC:1730
## 3918 ENSG00000008128.23        CDK11A   HGNC:1730
## 3919 ENSG00000008128.23        CDK11A   HGNC:1730
## 3920 ENSG00000008128.23        CDK11A   HGNC:1730
## 3921 ENSG00000008128.23        CDK11A   HGNC:1730
## 3922 ENSG00000008128.23        CDK11A   HGNC:1730
## 3923 ENSG00000008128.23        CDK11A   HGNC:1730
## 3924 ENSG00000008128.23        CDK11A   HGNC:1730
## 3925 ENSG00000008128.23        CDK11A   HGNC:1730
## 3926 ENSG00000008128.23        CDK11A   HGNC:1730
## 3927 ENSG00000008128.23        CDK11A   HGNC:1730
## 3928 ENSG00000008128.23        CDK11A   HGNC:1730
## 3929 ENSG00000008128.23        CDK11A   HGNC:1730
## 3930 ENSG00000008128.23        CDK11A   HGNC:1730
## 3931 ENSG00000008128.23        CDK11A   HGNC:1730
## 3932 ENSG00000008128.23        CDK11A   HGNC:1730
## 3933 ENSG00000008128.23        CDK11A   HGNC:1730
## 3934 ENSG00000008128.23        CDK11A   HGNC:1730
## 3935 ENSG00000008128.23        CDK11A   HGNC:1730
## 3936 ENSG00000008128.23        CDK11A   HGNC:1730
## 3937 ENSG00000008128.23        CDK11A   HGNC:1730
## 3938 ENSG00000008128.23        CDK11A   HGNC:1730
## 3939 ENSG00000008128.23        CDK11A   HGNC:1730
## 3940 ENSG00000008128.23        CDK11A   HGNC:1730
## 3941 ENSG00000008128.23        CDK11A   HGNC:1730
```

```
## 3942 ENSG00000008128.23        CDK11A  HGNC:1730
## 3943 ENSG00000008128.23        CDK11A  HGNC:1730
## 3944 ENSG00000008128.23        CDK11A  HGNC:1730
## 3945 ENSG00000008128.23        CDK11A  HGNC:1730
## 3946 ENSG00000008128.23        CDK11A  HGNC:1730
## 3947 ENSG00000008128.23        CDK11A  HGNC:1730
## 3948 ENSG00000008128.23        CDK11A  HGNC:1730
## 3949 ENSG00000008128.23        CDK11A  HGNC:1730
## 3950 ENSG00000008128.23        CDK11A  HGNC:1730
## 3951 ENSG00000008128.23        CDK11A  HGNC:1730
## 3952 ENSG00000008128.23        CDK11A  HGNC:1730
## 3953 ENSG00000008128.23        CDK11A  HGNC:1730
## 3954 ENSG00000008128.23        CDK11A  HGNC:1730
## 3955 ENSG00000008128.23        CDK11A  HGNC:1730
## 3956 ENSG00000008128.23        CDK11A  HGNC:1730
## 3957 ENSG00000008128.23        CDK11A  HGNC:1730
## 3958 ENSG00000008128.23        CDK11A  HGNC:1730
## 3959 ENSG00000008128.23        CDK11A  HGNC:1730
## 3960 ENSG00000008128.23        CDK11A  HGNC:1730
## 3961 ENSG00000008128.23        CDK11A  HGNC:1730
## 3962 ENSG00000008128.23        CDK11A  HGNC:1730
## 3963 ENSG00000008128.23        CDK11A  HGNC:1730
## 3964 ENSG00000008128.23        CDK11A  HGNC:1730
## 3965 ENSG00000008128.23        CDK11A  HGNC:1730
## 3966 ENSG00000008128.23        CDK11A  HGNC:1730
## 3967 ENSG00000008128.23        CDK11A  HGNC:1730
## 3968 ENSG00000008128.23        CDK11A  HGNC:1730
## 3969 ENSG00000008128.23        CDK11A  HGNC:1730
## 3970 ENSG00000008128.23        CDK11A  HGNC:1730
## 3971 ENSG00000008128.23        CDK11A  HGNC:1730
## 3972 ENSG00000008128.23        CDK11A  HGNC:1730
## 3973 ENSG00000008128.23        CDK11A  HGNC:1730
## 3974 ENSG00000008128.23        CDK11A  HGNC:1730
## 3975 ENSG00000008128.23        CDK11A  HGNC:1730
## 3976 ENSG00000008128.23        CDK11A  HGNC:1730
## 3977 ENSG00000008128.23        CDK11A  HGNC:1730
## 3978 ENSG00000008128.23        CDK11A  HGNC:1730
## 3979 ENSG00000008128.23        CDK11A  HGNC:1730
## 3980 ENSG00000008128.23        CDK11A  HGNC:1730
## 3981 ENSG00000008128.23        CDK11A  HGNC:1730
## 3982 ENSG00000008128.23        CDK11A  HGNC:1730
## 3983 ENSG00000008128.23        CDK11A  HGNC:1730
## 3984 ENSG00000008128.23        CDK11A  HGNC:1730
## 3985 ENSG00000008128.23        CDK11A  HGNC:1730
## 3986 ENSG00000008128.23        CDK11A  HGNC:1730
## 3987 ENSG00000008128.23        CDK11A  HGNC:1730
## 3988 ENSG00000008128.23        CDK11A  HGNC:1730
## 3989 ENSG00000008128.23        CDK11A  HGNC:1730
## 3990 ENSG00000008128.23        CDK11A  HGNC:1730
## 3991 ENSG00000008128.23        CDK11A  HGNC:1730
## 3992 ENSG00000008128.23        CDK11A  HGNC:1730
## 3993 ENSG00000008128.23        CDK11A  HGNC:1730
## 3994 ENSG00000008128.23        CDK11A  HGNC:1730
## 3995 ENSG00000008128.23        CDK11A  HGNC:1730
```

```
## 3996 ENSG00000008128.23          CDK11A  HGNC:1730
## 3997 ENSG00000008128.23          CDK11A  HGNC:1730
## 3998 ENSG00000008128.23          CDK11A  HGNC:1730
## 3999 ENSG00000008128.23          CDK11A  HGNC:1730
## 4000 ENSG00000008128.23          CDK11A  HGNC:1730
## 4001 ENSG00000008128.23          CDK11A  HGNC:1730
## 4002 ENSG00000008128.23          CDK11A  HGNC:1730
## 4003 ENSG00000008128.23          CDK11A  HGNC:1730
## 4004 ENSG00000008128.23          CDK11A  HGNC:1730
## 4005 ENSG00000008128.23          CDK11A  HGNC:1730
## 4006 ENSG00000008128.23          CDK11A  HGNC:1730
## 4007 ENSG00000008128.23          CDK11A  HGNC:1730
## 4008 ENSG00000008128.23          CDK11A  HGNC:1730
## 4009 ENSG00000008128.23          CDK11A  HGNC:1730
## 4010 ENSG00000008128.23          CDK11A  HGNC:1730
## 4011 ENSG00000008128.23          CDK11A  HGNC:1730
## 4012 ENSG00000008128.23          CDK11A  HGNC:1730
## 4013 ENSG00000008128.23          CDK11A  HGNC:1730
## 4014 ENSG00000008128.23          CDK11A  HGNC:1730
## 4015 ENSG00000008128.23          CDK11A  HGNC:1730
## 4016 ENSG00000008128.23          CDK11A  HGNC:1730
## 4017 ENSG00000008128.23          CDK11A  HGNC:1730
## 4018 ENSG00000008128.23          CDK11A  HGNC:1730
## 4019 ENSG00000008128.23          CDK11A  HGNC:1730
## 4020 ENSG00000008128.23          CDK11A  HGNC:1730
## 4021 ENSG00000008128.23          CDK11A  HGNC:1730
## 4022 ENSG00000008128.23          CDK11A  HGNC:1730
## 4023 ENSG00000008128.23          CDK11A  HGNC:1730
## 4024 ENSG00000008128.23          CDK11A  HGNC:1730
## 4025 ENSG00000008128.23          CDK11A  HGNC:1730
## 4026 ENSG00000008128.23          CDK11A  HGNC:1730
## 4027 ENSG00000008128.23          CDK11A  HGNC:1730
## 4028 ENSG00000008128.23          CDK11A  HGNC:1730
## 4029 ENSG00000008128.23          CDK11A  HGNC:1730
## 4030 ENSG00000008128.23          CDK11A  HGNC:1730
## 4031 ENSG00000008128.23          CDK11A  HGNC:1730
## 4032 ENSG00000008128.23          CDK11A  HGNC:1730
## 4033 ENSG00000008128.23          CDK11A  HGNC:1730
## 4034 ENSG00000008128.23          CDK11A  HGNC:1730
## 4035 ENSG00000008128.23          CDK11A  HGNC:1730
## 4036 ENSG00000008128.23          CDK11A  HGNC:1730
## 4037 ENSG00000008128.23          CDK11A  HGNC:1730
## 4038 ENSG00000008128.23          CDK11A  HGNC:1730
## 4039 ENSG00000008128.23          CDK11A  HGNC:1730
## 4040 ENSG00000008128.23          CDK11A  HGNC:1730
## 4041 ENSG00000008128.23          CDK11A  HGNC:1730
## 4042 ENSG00000008128.23          CDK11A  HGNC:1730
## 4043 ENSG00000008128.23          CDK11A  HGNC:1730
## 4044 ENSG00000008128.23          CDK11A  HGNC:1730
## 4045 ENSG00000008128.23          CDK11A  HGNC:1730
## 4046 ENSG00000008128.23          CDK11A  HGNC:1730
## 4047 ENSG00000008128.23          CDK11A  HGNC:1730
## 4048 ENSG00000008128.23          CDK11A  HGNC:1730
## 4049 ENSG00000008128.23          CDK11A  HGNC:1730
```

```
## 4050 ENSG00000008128.23      CDK11A  HGNC:1730
## 4051 ENSG00000008128.23      CDK11A  HGNC:1730
## 4052 ENSG00000008128.23      CDK11A  HGNC:1730
## 4053 ENSG00000008128.23      CDK11A  HGNC:1730
## 4054 ENSG00000008128.23      CDK11A  HGNC:1730
## 4055 ENSG00000008128.23      CDK11A  HGNC:1730
## 4056 ENSG00000008128.23      CDK11A  HGNC:1730
## 4057 ENSG00000008128.23      CDK11A  HGNC:1730
## 4058 ENSG00000008128.23      CDK11A  HGNC:1730
## 4059 ENSG00000008128.23      CDK11A  HGNC:1730
## 4060 ENSG00000008128.23      CDK11A  HGNC:1730
## 4061 ENSG00000008128.23      CDK11A  HGNC:1730
## 4062 ENSG00000008128.23      CDK11A  HGNC:1730
## 4063 ENSG00000008128.23      CDK11A  HGNC:1730
## 4064 ENSG00000008128.23      CDK11A  HGNC:1730
## 4065 ENSG00000008128.23      CDK11A  HGNC:1730
## 4066 ENSG00000008128.23      CDK11A  HGNC:1730
## 4067 ENSG00000008128.23      CDK11A  HGNC:1730
## 4068 ENSG00000008128.23      CDK11A  HGNC:1730
## 4069 ENSG00000008128.23      CDK11A  HGNC:1730
## 4070 ENSG00000008128.23      CDK11A  HGNC:1730
## 4071 ENSG00000008128.23      CDK11A  HGNC:1730
## 4072 ENSG00000008128.23      CDK11A  HGNC:1730
## 4073 ENSG00000008128.23      CDK11A  HGNC:1730
## 4074 ENSG00000008128.23      CDK11A  HGNC:1730
## 4075 ENSG00000008128.23      CDK11A  HGNC:1730
## 4076 ENSG00000008128.23      CDK11A  HGNC:1730
## 4077  ENSG00000268575.1   AL031282.2       <NA>
## 4078  ENSG00000268575.1   AL031282.2       <NA>
## 4079  ENSG00000268575.1   AL031282.2       <NA>
## 4080  ENSG00000268575.1   AL031282.2       <NA>
## 4081  ENSG00000268575.1   AL031282.2       <NA>
## 4082  ENSG00000268575.1   AL031282.2       <NA>
## 4083  ENSG00000268575.1   AL031282.2       <NA>
## 4084  ENSG00000268575.1   AL031282.2       <NA>
## 4085  ENSG00000268575.1   AL031282.2       <NA>
## 4086  ENSG00000268575.1   AL031282.2       <NA>
## 4087  ENSG00000268575.1   AL031282.2       <NA>
## 4088  ENSG00000268575.1   AL031282.2       <NA>
## 4089  ENSG00000268575.1   AL031282.2       <NA>
## 4090  ENSG00000268575.1   AL031282.2       <NA>
## 4091  ENSG00000268575.1   AL031282.2       <NA>
## 4092  ENSG00000268575.1   AL031282.2       <NA>
## 4093  ENSG00000268575.1   AL031282.2       <NA>
## 4094  ENSG00000268575.1   AL031282.2       <NA>
## 4095  ENSG00000268575.1   AL031282.2       <NA>
## 4096  ENSG00000268575.1   AL031282.2       <NA>
## 4097  ENSG00000268575.1   AL031282.2       <NA>
## 4098  ENSG00000268575.1   AL031282.2       <NA>
## 4099  ENSG00000227775.3   AL031282.1       <NA>
## 4100  ENSG00000227775.3   AL031282.1       <NA>
## 4101  ENSG00000227775.3   AL031282.1       <NA>
## 4102  ENSG00000227775.3   AL031282.1       <NA>
## 4103  ENSG00000227775.3   AL031282.1       <NA>
```

```
## 4104  ENSG00000227775.3   AL031282.1      <NA>
## 4105  ENSG00000227775.3   AL031282.1      <NA>
## 4106  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4107  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4108  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4109  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4110  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4111  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4112  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4113  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4114  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4115  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4116  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4117  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4118  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4119  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4120  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4121  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4122  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4123  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4124  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4125  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4126  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4127  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4128  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4129  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4130  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4131  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4132  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4133  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4134  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4135  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4136  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4137  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4138  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4139  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4140  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4141  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4142  ENSG00000215790.7   SLC35E2A HGNC:20863
## 4143 ENSG00000008130.15       NADK HGNC:29831
## 4144 ENSG00000008130.15       NADK HGNC:29831
## 4145 ENSG00000008130.15       NADK HGNC:29831
## 4146 ENSG00000008130.15       NADK HGNC:29831
## 4147 ENSG00000008130.15       NADK HGNC:29831
## 4148 ENSG00000008130.15       NADK HGNC:29831
## 4149 ENSG00000008130.15       NADK HGNC:29831
## 4150 ENSG00000008130.15       NADK HGNC:29831
## 4151 ENSG00000008130.15       NADK HGNC:29831
## 4152 ENSG00000008130.15       NADK HGNC:29831
## 4153 ENSG00000008130.15       NADK HGNC:29831
## 4154 ENSG00000008130.15       NADK HGNC:29831
## 4155 ENSG00000008130.15       NADK HGNC:29831
## 4156 ENSG00000008130.15       NADK HGNC:29831
## 4157 ENSG00000008130.15       NADK HGNC:29831
```

```
## 4158 ENSG00000008130.15           NADK HGNC:29831
## 4159 ENSG00000008130.15           NADK HGNC:29831
## 4160 ENSG00000008130.15           NADK HGNC:29831
## 4161 ENSG00000008130.15           NADK HGNC:29831
## 4162 ENSG00000008130.15           NADK HGNC:29831
## 4163 ENSG00000008130.15           NADK HGNC:29831
## 4164 ENSG00000008130.15           NADK HGNC:29831
## 4165 ENSG00000008130.15           NADK HGNC:29831
## 4166 ENSG00000008130.15           NADK HGNC:29831
## 4167 ENSG00000008130.15           NADK HGNC:29831
## 4168 ENSG00000008130.15           NADK HGNC:29831
## 4169 ENSG00000008130.15           NADK HGNC:29831
## 4170 ENSG00000008130.15           NADK HGNC:29831
## 4171 ENSG00000008130.15           NADK HGNC:29831
## 4172 ENSG00000008130.15           NADK HGNC:29831
## 4173 ENSG00000008130.15           NADK HGNC:29831
## 4174 ENSG00000008130.15           NADK HGNC:29831
## 4175 ENSG00000008130.15           NADK HGNC:29831
## 4176 ENSG00000008130.15           NADK HGNC:29831
## 4177 ENSG00000008130.15           NADK HGNC:29831
## 4178 ENSG00000008130.15           NADK HGNC:29831
## 4179 ENSG00000008130.15           NADK HGNC:29831
## 4180 ENSG00000008130.15           NADK HGNC:29831
## 4181 ENSG00000008130.15           NADK HGNC:29831
## 4182 ENSG00000008130.15           NADK HGNC:29831
## 4183 ENSG00000008130.15           NADK HGNC:29831
## 4184 ENSG00000008130.15           NADK HGNC:29831
## 4185 ENSG00000008130.15           NADK HGNC:29831
## 4186 ENSG00000008130.15           NADK HGNC:29831
## 4187 ENSG00000008130.15           NADK HGNC:29831
## 4188 ENSG00000008130.15           NADK HGNC:29831
## 4189 ENSG00000008130.15           NADK HGNC:29831
## 4190 ENSG00000008130.15           NADK HGNC:29831
## 4191 ENSG00000008130.15           NADK HGNC:29831
## 4192 ENSG00000008130.15           NADK HGNC:29831
## 4193 ENSG00000008130.15           NADK HGNC:29831
## 4194 ENSG00000008130.15           NADK HGNC:29831
## 4195 ENSG00000008130.15           NADK HGNC:29831
## 4196 ENSG00000008130.15           NADK HGNC:29831
## 4197 ENSG00000008130.15           NADK HGNC:29831
## 4198 ENSG00000008130.15           NADK HGNC:29831
## 4199 ENSG00000008130.15           NADK HGNC:29831
## 4200 ENSG00000008130.15           NADK HGNC:29831
## 4201 ENSG00000008130.15           NADK HGNC:29831
## 4202 ENSG00000008130.15           NADK HGNC:29831
## 4203 ENSG00000008130.15           NADK HGNC:29831
## 4204 ENSG00000008130.15           NADK HGNC:29831
## 4205 ENSG00000008130.15           NADK HGNC:29831
## 4206 ENSG00000008130.15           NADK HGNC:29831
## 4207 ENSG00000008130.15           NADK HGNC:29831
## 4208 ENSG00000008130.15           NADK HGNC:29831
## 4209 ENSG00000008130.15           NADK HGNC:29831
## 4210 ENSG00000008130.15           NADK HGNC:29831
## 4211 ENSG00000008130.15           NADK HGNC:29831
```

```
## 4212 ENSG00000008130.15          NADK HGNC:29831
## 4213 ENSG00000008130.15          NADK HGNC:29831
## 4214 ENSG00000008130.15          NADK HGNC:29831
## 4215 ENSG00000008130.15          NADK HGNC:29831
## 4216 ENSG00000008130.15          NADK HGNC:29831
## 4217 ENSG00000008130.15          NADK HGNC:29831
## 4218 ENSG00000008130.15          NADK HGNC:29831
## 4219 ENSG00000008130.15          NADK HGNC:29831
## 4220 ENSG00000008130.15          NADK HGNC:29831
## 4221 ENSG00000008130.15          NADK HGNC:29831
## 4222 ENSG00000008130.15          NADK HGNC:29831
## 4223 ENSG00000008130.15          NADK HGNC:29831
## 4224 ENSG00000008130.15          NADK HGNC:29831
## 4225 ENSG00000008130.15          NADK HGNC:29831
## 4226 ENSG00000008130.15          NADK HGNC:29831
## 4227 ENSG00000008130.15          NADK HGNC:29831
## 4228 ENSG00000008130.15          NADK HGNC:29831
## 4229 ENSG00000008130.15          NADK HGNC:29831
## 4230 ENSG00000008130.15          NADK HGNC:29831
## 4231 ENSG00000008130.15          NADK HGNC:29831
## 4232 ENSG00000008130.15          NADK HGNC:29831
## 4233 ENSG00000008130.15          NADK HGNC:29831
## 4234 ENSG00000008130.15          NADK HGNC:29831
## 4235 ENSG00000078369.18          GNB1  HGNC:4396
## 4236 ENSG00000078369.18          GNB1  HGNC:4396
## 4237 ENSG00000078369.18          GNB1  HGNC:4396
## 4238 ENSG00000078369.18          GNB1  HGNC:4396
## 4239 ENSG00000078369.18          GNB1  HGNC:4396
## 4240 ENSG00000078369.18          GNB1  HGNC:4396
## 4241 ENSG00000078369.18          GNB1  HGNC:4396
## 4242 ENSG00000078369.18          GNB1  HGNC:4396
## 4243 ENSG00000078369.18          GNB1  HGNC:4396
## 4244 ENSG00000078369.18          GNB1  HGNC:4396
## 4245 ENSG00000078369.18          GNB1  HGNC:4396
## 4246 ENSG00000078369.18          GNB1  HGNC:4396
## 4247 ENSG00000078369.18          GNB1  HGNC:4396
## 4248 ENSG00000078369.18          GNB1  HGNC:4396
## 4249 ENSG00000078369.18          GNB1  HGNC:4396
## 4250 ENSG00000078369.18          GNB1  HGNC:4396
## 4251 ENSG00000078369.18          GNB1  HGNC:4396
## 4252 ENSG00000078369.18          GNB1  HGNC:4396
## 4253 ENSG00000078369.18          GNB1  HGNC:4396
## 4254 ENSG00000078369.18          GNB1  HGNC:4396
## 4255 ENSG00000078369.18          GNB1  HGNC:4396
## 4256 ENSG00000078369.18          GNB1  HGNC:4396
## 4257 ENSG00000078369.18          GNB1  HGNC:4396
## 4258 ENSG00000078369.18          GNB1  HGNC:4396
## 4259 ENSG00000078369.18          GNB1  HGNC:4396
## 4260 ENSG00000078369.18          GNB1  HGNC:4396
## 4261 ENSG00000078369.18          GNB1  HGNC:4396
## 4262 ENSG00000078369.18          GNB1  HGNC:4396
## 4263 ENSG00000078369.18          GNB1  HGNC:4396
## 4264 ENSG00000078369.18          GNB1  HGNC:4396
## 4265 ENSG00000078369.18          GNB1  HGNC:4396
```

```
## 4266 ENSG00000078369.18          GNB1   HGNC:4396
## 4267 ENSG00000078369.18          GNB1   HGNC:4396
## 4268 ENSG00000078369.18          GNB1   HGNC:4396
## 4269 ENSG00000078369.18          GNB1   HGNC:4396
## 4270 ENSG00000078369.18          GNB1   HGNC:4396
## 4271 ENSG00000078369.18          GNB1   HGNC:4396
## 4272 ENSG00000078369.18          GNB1   HGNC:4396
## 4273 ENSG00000078369.18          GNB1   HGNC:4396
## 4274 ENSG00000078369.18          GNB1   HGNC:4396
## 4275 ENSG00000078369.18          GNB1   HGNC:4396
## 4276 ENSG00000078369.18          GNB1   HGNC:4396
## 4277 ENSG00000078369.18          GNB1   HGNC:4396
## 4278 ENSG00000078369.18          GNB1   HGNC:4396
## 4279 ENSG00000078369.18          GNB1   HGNC:4396
## 4280 ENSG00000078369.18          GNB1   HGNC:4396
## 4281 ENSG00000078369.18          GNB1   HGNC:4396
## 4282 ENSG00000078369.18          GNB1   HGNC:4396
## 4283 ENSG00000078369.18          GNB1   HGNC:4396
## 4284 ENSG00000078369.18          GNB1   HGNC:4396
## 4285 ENSG00000078369.18          GNB1   HGNC:4396
## 4286 ENSG00000078369.18          GNB1   HGNC:4396
## 4287 ENSG00000078369.18          GNB1   HGNC:4396
## 4288 ENSG00000078369.18          GNB1   HGNC:4396
## 4289 ENSG00000078369.18          GNB1   HGNC:4396
## 4290 ENSG00000078369.18          GNB1   HGNC:4396
## 4291 ENSG00000078369.18          GNB1   HGNC:4396
## 4292 ENSG00000078369.18          GNB1   HGNC:4396
## 4293 ENSG00000078369.18          GNB1   HGNC:4396
## 4294 ENSG00000078369.18          GNB1   HGNC:4396
## 4295 ENSG00000078369.18          GNB1   HGNC:4396
## 4296 ENSG00000078369.18          GNB1   HGNC:4396
## 4297 ENSG00000078369.18          GNB1   HGNC:4396
## 4298 ENSG00000078369.18          GNB1   HGNC:4396
## 4299 ENSG00000078369.18          GNB1   HGNC:4396
## 4300 ENSG00000078369.18          GNB1   HGNC:4396
## 4301 ENSG00000078369.18          GNB1   HGNC:4396
## 4302 ENSG00000078369.18          GNB1   HGNC:4396
## 4303 ENSG00000078369.18          GNB1   HGNC:4396
## 4304 ENSG00000078369.18          GNB1   HGNC:4396
## 4305 ENSG00000078369.18          GNB1   HGNC:4396
## 4306 ENSG00000078369.18          GNB1   HGNC:4396
## 4307 ENSG00000078369.18          GNB1   HGNC:4396
## 4308 ENSG00000078369.18          GNB1   HGNC:4396
## 4309 ENSG00000078369.18          GNB1   HGNC:4396
## 4310 ENSG00000078369.18          GNB1   HGNC:4396
## 4311 ENSG00000078369.18          GNB1   HGNC:4396
## 4312 ENSG00000078369.18          GNB1   HGNC:4396
## 4313 ENSG00000078369.18          GNB1   HGNC:4396
## 4314 ENSG00000078369.18          GNB1   HGNC:4396
## 4315 ENSG00000078369.18          GNB1   HGNC:4396
## 4316 ENSG00000078369.18          GNB1   HGNC:4396
## 4317  ENSG00000231050.1    AL109917.1        <NA>
## 4318  ENSG00000231050.1    AL109917.1        <NA>
## 4319  ENSG00000231050.1    AL109917.1        <NA>
```

```
## 4320   ENSG00000231050.1   AL109917.1      <NA>
## 4321 ENSG00000169885.10    CALML6 HGNC:24193
## 4322 ENSG00000169885.10    CALML6 HGNC:24193
## 4323 ENSG00000169885.10    CALML6 HGNC:24193
## 4324 ENSG00000169885.10    CALML6 HGNC:24193
## 4325 ENSG00000169885.10    CALML6 HGNC:24193
## 4326 ENSG00000169885.10    CALML6 HGNC:24193
## 4327 ENSG00000169885.10    CALML6 HGNC:24193
## 4328 ENSG00000169885.10    CALML6 HGNC:24193
## 4329 ENSG00000169885.10    CALML6 HGNC:24193
## 4330 ENSG00000169885.10    CALML6 HGNC:24193
## 4331 ENSG00000169885.10    CALML6 HGNC:24193
## 4332 ENSG00000169885.10    CALML6 HGNC:24193
## 4333 ENSG00000169885.10    CALML6 HGNC:24193
## 4334 ENSG00000169885.10    CALML6 HGNC:24193
## 4335 ENSG00000169885.10    CALML6 HGNC:24193
## 4336 ENSG00000169885.10    CALML6 HGNC:24193
## 4337 ENSG00000178821.13    TMEM52 HGNC:27916
## 4338 ENSG00000178821.13    TMEM52 HGNC:27916
## 4339 ENSG00000178821.13    TMEM52 HGNC:27916
## 4340 ENSG00000178821.13    TMEM52 HGNC:27916
## 4341 ENSG00000178821.13    TMEM52 HGNC:27916
## 4342 ENSG00000178821.13    TMEM52 HGNC:27916
## 4343 ENSG00000178821.13    TMEM52 HGNC:27916
## 4344 ENSG00000178821.13    TMEM52 HGNC:27916
## 4345 ENSG00000178821.13    TMEM52 HGNC:27916
## 4346 ENSG00000178821.13    TMEM52 HGNC:27916
## 4347 ENSG00000178821.13    TMEM52 HGNC:27916
## 4348 ENSG00000178821.13    TMEM52 HGNC:27916
## 4349 ENSG00000178821.13    TMEM52 HGNC:27916
## 4350 ENSG00000178821.13    TMEM52 HGNC:27916
## 4351 ENSG00000178821.13    TMEM52 HGNC:27916
## 4352 ENSG00000178821.13    TMEM52 HGNC:27916
## 4353 ENSG00000178821.13    TMEM52 HGNC:27916
## 4354 ENSG00000178821.13    TMEM52 HGNC:27916
## 4355 ENSG00000178821.13    TMEM52 HGNC:27916
## 4356 ENSG00000178821.13    TMEM52 HGNC:27916
## 4357 ENSG00000178821.13    TMEM52 HGNC:27916
## 4358 ENSG00000178821.13    TMEM52 HGNC:27916
## 4359 ENSG00000178821.13    TMEM52 HGNC:27916
## 4360 ENSG00000178821.13    TMEM52 HGNC:27916
## 4361 ENSG00000178821.13    TMEM52 HGNC:27916
## 4362 ENSG00000142609.18    CFAP74 HGNC:29368
## 4363 ENSG00000142609.18    CFAP74 HGNC:29368
## 4364 ENSG00000142609.18    CFAP74 HGNC:29368
## 4365 ENSG00000142609.18    CFAP74 HGNC:29368
## 4366 ENSG00000142609.18    CFAP74 HGNC:29368
## 4367 ENSG00000142609.18    CFAP74 HGNC:29368
## 4368 ENSG00000142609.18    CFAP74 HGNC:29368
## 4369 ENSG00000142609.18    CFAP74 HGNC:29368
## 4370 ENSG00000142609.18    CFAP74 HGNC:29368
## 4371 ENSG00000142609.18    CFAP74 HGNC:29368
## 4372 ENSG00000142609.18    CFAP74 HGNC:29368
## 4373 ENSG00000142609.18    CFAP74 HGNC:29368
```

```
## 4374 ENSG00000142609.18          CFAP74 HGNC:29368
## 4375 ENSG00000142609.18          CFAP74 HGNC:29368
## 4376 ENSG00000142609.18          CFAP74 HGNC:29368
## 4377 ENSG00000142609.18          CFAP74 HGNC:29368
## 4378 ENSG00000142609.18          CFAP74 HGNC:29368
## 4379 ENSG00000142609.18          CFAP74 HGNC:29368
## 4380 ENSG00000142609.18          CFAP74 HGNC:29368
## 4381 ENSG00000142609.18          CFAP74 HGNC:29368
## 4382 ENSG00000142609.18          CFAP74 HGNC:29368
## 4383 ENSG00000142609.18          CFAP74 HGNC:29368
## 4384 ENSG00000142609.18          CFAP74 HGNC:29368
## 4385 ENSG00000142609.18          CFAP74 HGNC:29368
## 4386 ENSG00000142609.18          CFAP74 HGNC:29368
## 4387 ENSG00000142609.18          CFAP74 HGNC:29368
## 4388 ENSG00000142609.18          CFAP74 HGNC:29368
## 4389 ENSG00000142609.18          CFAP74 HGNC:29368
## 4390 ENSG00000142609.18          CFAP74 HGNC:29368
## 4391 ENSG00000142609.18          CFAP74 HGNC:29368
## 4392 ENSG00000142609.18          CFAP74 HGNC:29368
## 4393 ENSG00000142609.18          CFAP74 HGNC:29368
## 4394 ENSG00000142609.18          CFAP74 HGNC:29368
## 4395 ENSG00000142609.18          CFAP74 HGNC:29368
## 4396 ENSG00000142609.18          CFAP74 HGNC:29368
## 4397 ENSG00000142609.18          CFAP74 HGNC:29368
## 4398 ENSG00000142609.18          CFAP74 HGNC:29368
## 4399 ENSG00000142609.18          CFAP74 HGNC:29368
## 4400 ENSG00000142609.18          CFAP74 HGNC:29368
## 4401 ENSG00000142609.18          CFAP74 HGNC:29368
## 4402 ENSG00000142609.18          CFAP74 HGNC:29368
## 4403 ENSG00000142609.18          CFAP74 HGNC:29368
## 4404 ENSG00000142609.18          CFAP74 HGNC:29368
## 4405 ENSG00000142609.18          CFAP74 HGNC:29368
## 4406 ENSG00000142609.18          CFAP74 HGNC:29368
## 4407 ENSG00000142609.18          CFAP74 HGNC:29368
## 4408 ENSG00000142609.18          CFAP74 HGNC:29368
## 4409 ENSG00000142609.18          CFAP74 HGNC:29368
## 4410 ENSG00000142609.18          CFAP74 HGNC:29368
## 4411 ENSG00000142609.18          CFAP74 HGNC:29368
## 4412 ENSG00000142609.18          CFAP74 HGNC:29368
## 4413 ENSG00000142609.18          CFAP74 HGNC:29368
## 4414 ENSG00000142609.18          CFAP74 HGNC:29368
## 4415 ENSG00000142609.18          CFAP74 HGNC:29368
## 4416 ENSG00000142609.18          CFAP74 HGNC:29368
## 4417 ENSG00000142609.18          CFAP74 HGNC:29368
## 4418 ENSG00000142609.18          CFAP74 HGNC:29368
## 4419 ENSG00000142609.18          CFAP74 HGNC:29368
## 4420 ENSG00000142609.18          CFAP74 HGNC:29368
## 4421 ENSG00000142609.18          CFAP74 HGNC:29368
## 4422 ENSG00000142609.18          CFAP74 HGNC:29368
## 4423 ENSG00000142609.18          CFAP74 HGNC:29368
## 4424 ENSG00000142609.18          CFAP74 HGNC:29368
## 4425 ENSG00000142609.18          CFAP74 HGNC:29368
## 4426 ENSG00000142609.18          CFAP74 HGNC:29368
## 4427 ENSG00000142609.18          CFAP74 HGNC:29368
```

```
## 4428 ENSG00000142609.18       CFAP74 HGNC:29368
## 4429 ENSG00000142609.18       CFAP74 HGNC:29368
## 4430 ENSG00000142609.18       CFAP74 HGNC:29368
## 4431 ENSG00000142609.18       CFAP74 HGNC:29368
## 4432 ENSG00000142609.18       CFAP74 HGNC:29368
## 4433 ENSG00000142609.18       CFAP74 HGNC:29368
## 4434 ENSG00000142609.18       CFAP74 HGNC:29368
## 4435 ENSG00000142609.18       CFAP74 HGNC:29368
## 4436 ENSG00000142609.18       CFAP74 HGNC:29368
## 4437 ENSG00000142609.18       CFAP74 HGNC:29368
## 4438 ENSG00000142609.18       CFAP74 HGNC:29368
## 4439 ENSG00000142609.18       CFAP74 HGNC:29368
## 4440 ENSG00000142609.18       CFAP74 HGNC:29368
## 4441 ENSG00000142609.18       CFAP74 HGNC:29368
## 4442 ENSG00000142609.18       CFAP74 HGNC:29368
## 4443 ENSG00000142609.18       CFAP74 HGNC:29368
## 4444  ENSG00000233542.2    AL391845.2        <NA>
## 4445  ENSG00000233542.2    AL391845.2        <NA>
## 4446  ENSG00000233542.2    AL391845.2        <NA>
## 4447  ENSG00000233542.2    AL391845.2        <NA>
## 4448  ENSG00000233542.2    AL391845.2        <NA>
## 4449  ENSG00000233542.2    AL391845.2        <NA>
## 4450  ENSG00000233542.2    AL391845.2        <NA>
## 4451  ENSG00000233542.2    AL391845.2        <NA>
## 4452  ENSG00000187730.9         GABRD   HGNC:4084
## 4453  ENSG00000187730.9         GABRD   HGNC:4084
## 4454  ENSG00000187730.9         GABRD   HGNC:4084
## 4455  ENSG00000187730.9         GABRD   HGNC:4084
## 4456  ENSG00000187730.9         GABRD   HGNC:4084
## 4457  ENSG00000187730.9         GABRD   HGNC:4084
## 4458  ENSG00000187730.9         GABRD   HGNC:4084
## 4459  ENSG00000187730.9         GABRD   HGNC:4084
## 4460  ENSG00000187730.9         GABRD   HGNC:4084
## 4461  ENSG00000187730.9         GABRD   HGNC:4084
## 4462  ENSG00000187730.9         GABRD   HGNC:4084
## 4463  ENSG00000187730.9         GABRD   HGNC:4084
## 4464  ENSG00000187730.9         GABRD   HGNC:4084
## 4465  ENSG00000187730.9         GABRD   HGNC:4084
## 4466  ENSG00000187730.9         GABRD   HGNC:4084
## 4467  ENSG00000187730.9         GABRD   HGNC:4084
## 4468  ENSG00000187730.9         GABRD   HGNC:4084
## 4469  ENSG00000187730.9         GABRD   HGNC:4084
## 4470  ENSG00000187730.9         GABRD   HGNC:4084
## 4471  ENSG00000187730.9         GABRD   HGNC:4084
## 4472  ENSG00000187730.9         GABRD   HGNC:4084
## 4473  ENSG00000187730.9         GABRD   HGNC:4084
## 4474  ENSG00000187730.9         GABRD   HGNC:4084
## 4475  ENSG00000187730.9         GABRD   HGNC:4084
## 4476  ENSG00000187730.9         GABRD   HGNC:4084
## 4477  ENSG00000187730.9         GABRD   HGNC:4084
## 4478  ENSG00000187730.9         GABRD   HGNC:4084
## 4479  ENSG00000187730.9         GABRD   HGNC:4084
## 4480  ENSG00000187730.9         GABRD   HGNC:4084
## 4481  ENSG00000187730.9         GABRD   HGNC:4084
```

```
## 4482   ENSG00000187730.9        GABRD   HGNC:4084
## 4483   ENSG00000187730.9        GABRD   HGNC:4084
## 4484   ENSG00000187730.9        GABRD   HGNC:4084
## 4485   ENSG00000187730.9        GABRD   HGNC:4084
## 4486   ENSG00000187730.9        GABRD   HGNC:4084
## 4487   ENSG00000187730.9        GABRD   HGNC:4084
## 4488   ENSG00000187730.9        GABRD   HGNC:4084
## 4489   ENSG00000187730.9        GABRD   HGNC:4084
## 4490   ENSG00000187730.9        GABRD   HGNC:4084
## 4491   ENSG00000187730.9        GABRD   HGNC:4084
## 4492   ENSG00000187730.9        GABRD   HGNC:4084
## 4493   ENSG00000187730.9        GABRD   HGNC:4084
## 4494   ENSG00000187730.9        GABRD   HGNC:4084
## 4495   ENSG00000187730.9        GABRD   HGNC:4084
## 4496   ENSG00000187730.9        GABRD   HGNC:4084
## 4497   ENSG00000187730.9        GABRD   HGNC:4084
## 4498   ENSG00000187730.9        GABRD   HGNC:4084
## 4499   ENSG00000187730.9        GABRD   HGNC:4084
## 4500   ENSG00000187730.9        GABRD   HGNC:4084
## 4501   ENSG00000187730.9        GABRD   HGNC:4084
## 4502   ENSG00000187730.9        GABRD   HGNC:4084
## 4503   ENSG00000187730.9        GABRD   HGNC:4084
## 4504   ENSG00000187730.9        GABRD   HGNC:4084
## 4505   ENSG00000187730.9        GABRD   HGNC:4084
## 4506   ENSG00000187730.9        GABRD   HGNC:4084
## 4507   ENSG00000187730.9        GABRD   HGNC:4084
## 4508   ENSG00000187730.9        GABRD   HGNC:4084
## 4509   ENSG00000187730.9        GABRD   HGNC:4084
## 4510   ENSG00000187730.9        GABRD   HGNC:4084
## 4511   ENSG00000187730.9        GABRD   HGNC:4084
## 4512   ENSG00000187730.9        GABRD   HGNC:4084
## 4513   ENSG00000187730.9        GABRD   HGNC:4084
## 4514   ENSG00000187730.9        GABRD   HGNC:4084
## 4515   ENSG00000187730.9        GABRD   HGNC:4084
## 4516   ENSG00000187730.9        GABRD   HGNC:4084
## 4517   ENSG00000187730.9        GABRD   HGNC:4084
## 4518   ENSG00000187730.9        GABRD   HGNC:4084
## 4519   ENSG00000187730.9        GABRD   HGNC:4084
## 4520   ENSG00000187730.9        GABRD   HGNC:4084
## 4521   ENSG00000187730.9        GABRD   HGNC:4084
## 4522   ENSG00000187730.9        GABRD   HGNC:4084
## 4523   ENSG00000187730.9        GABRD   HGNC:4084
## 4524   ENSG00000187730.9        GABRD   HGNC:4084
## 4525   ENSG00000187730.9        GABRD   HGNC:4084
## 4526   ENSG00000187730.9        GABRD   HGNC:4084
## 4527   ENSG00000187730.9        GABRD   HGNC:4084
## 4528   ENSG00000187730.9        GABRD   HGNC:4084
## 4529   ENSG00000187730.9        GABRD   HGNC:4084
## 4530   ENSG00000187730.9        GABRD   HGNC:4084
## 4531   ENSG00000187730.9        GABRD   HGNC:4084
## 4532   ENSG00000187730.9        GABRD   HGNC:4084
## 4533   ENSG00000187730.9        GABRD   HGNC:4084
## 4534   ENSG00000187730.9        GABRD   HGNC:4084
## 4535   ENSG00000187730.9        GABRD   HGNC:4084
```

```
## 4536   ENSG00000187730.9         GABRD   HGNC:4084
## 4537   ENSG00000187730.9         GABRD   HGNC:4084
## 4538   ENSG00000187730.9         GABRD   HGNC:4084
## 4539   ENSG00000187730.9         GABRD   HGNC:4084
## 4540   ENSG00000187730.9         GABRD   HGNC:4084
## 4541   ENSG00000187730.9         GABRD   HGNC:4084
## 4542   ENSG00000187730.9         GABRD   HGNC:4084
## 4543   ENSG00000226969.1    AL391845.1        <NA>
## 4544   ENSG00000226969.1    AL391845.1        <NA>
## 4545   ENSG00000226969.1    AL391845.1        <NA>
## 4546   ENSG00000226969.1    AL391845.1        <NA>
## 4547   ENSG00000226969.1    AL391845.1        <NA>
## 4548 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4549 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4550 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4551 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4552 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4553 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4554 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4555 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4556 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4557 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4558 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4559 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4560 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4561 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4562 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4563 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4564 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4565 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4566 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4567 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4568 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4569 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4570 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4571 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4572 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4573 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4574 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4575 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4576 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4577 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4578 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4579 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4580 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4581 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4582 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4583 ENSG00000067606.17         PRKCZ   HGNC:9412
## 4584   ENSG00000271806.1    AL590822.2        <NA>
## 4585   ENSG00000271806.1    AL590822.2        <NA>
## 4586   ENSG00000271806.1    AL590822.2        <NA>
## 4587   ENSG00000182873.5    PRKCZ-AS1 HGNC:40477
## 4588   ENSG00000182873.5    PRKCZ-AS1 HGNC:40477
## 4589   ENSG00000182873.5    PRKCZ-AS1 HGNC:40477
```

```
## 4590  ENSG00000182873.5   PRKCZ-AS1 HGNC:40477
## 4591  ENSG00000182873.5   PRKCZ-AS1 HGNC:40477
## 4592  ENSG00000182873.5   PRKCZ-AS1 HGNC:40477
## 4593  ENSG00000182873.5   PRKCZ-AS1 HGNC:40477
## 4594  ENSG00000182873.5   PRKCZ-AS1 HGNC:40477
## 4595 ENSG00000162585.17       FAAP20 HGNC:26428
## 4596 ENSG00000162585.17       FAAP20 HGNC:26428
## 4597 ENSG00000162585.17       FAAP20 HGNC:26428
## 4598 ENSG00000162585.17       FAAP20 HGNC:26428
## 4599 ENSG00000162585.17       FAAP20 HGNC:26428
## 4600 ENSG00000162585.17       FAAP20 HGNC:26428
## 4601 ENSG00000162585.17       FAAP20 HGNC:26428
## 4602 ENSG00000162585.17       FAAP20 HGNC:26428
## 4603 ENSG00000162585.17       FAAP20 HGNC:26428
## 4604 ENSG00000162585.17       FAAP20 HGNC:26428
## 4605 ENSG00000162585.17       FAAP20 HGNC:26428
## 4606 ENSG00000162585.17       FAAP20 HGNC:26428
## 4607 ENSG00000162585.17       FAAP20 HGNC:26428
## 4608 ENSG00000162585.17       FAAP20 HGNC:26428
## 4609 ENSG00000162585.17       FAAP20 HGNC:26428
## 4610 ENSG00000162585.17       FAAP20 HGNC:26428
## 4611 ENSG00000162585.17       FAAP20 HGNC:26428
## 4612 ENSG00000162585.17       FAAP20 HGNC:26428
## 4613 ENSG00000162585.17       FAAP20 HGNC:26428
## 4614 ENSG00000162585.17       FAAP20 HGNC:26428
## 4615 ENSG00000162585.17       FAAP20 HGNC:26428
## 4616 ENSG00000162585.17       FAAP20 HGNC:26428
## 4617 ENSG00000162585.17       FAAP20 HGNC:26428
## 4618 ENSG00000162585.17       FAAP20 HGNC:26428
## 4619 ENSG00000162585.17       FAAP20 HGNC:26428
## 4620  ENSG00000234396.3   AL590822.1       <NA>
## 4621  ENSG00000234396.3   AL590822.1       <NA>
## 4622  ENSG00000234396.3   AL590822.1       <NA>
## 4623  ENSG00000234396.3   AL590822.1       <NA>
## 4624 ENSG00000157933.10          SKI HGNC:10896
## 4625 ENSG00000157933.10          SKI HGNC:10896
## 4626 ENSG00000157933.10          SKI HGNC:10896
## 4627 ENSG00000157933.10          SKI HGNC:10896
## 4628 ENSG00000157933.10          SKI HGNC:10896
## 4629 ENSG00000157933.10          SKI HGNC:10896
## 4630 ENSG00000157933.10          SKI HGNC:10896
## 4631 ENSG00000157933.10          SKI HGNC:10896
## 4632 ENSG00000157933.10          SKI HGNC:10896
## 4633 ENSG00000157933.10          SKI HGNC:10896
## 4634 ENSG00000157933.10          SKI HGNC:10896
## 4635 ENSG00000157933.10          SKI HGNC:10896
## 4636 ENSG00000157933.10          SKI HGNC:10896
## 4637 ENSG00000157933.10          SKI HGNC:10896
## 4638 ENSG00000157933.10          SKI HGNC:10896
## 4639 ENSG00000157933.10          SKI HGNC:10896
## 4640 ENSG00000157933.10          SKI HGNC:10896
## 4641 ENSG00000157933.10          SKI HGNC:10896
## 4642 ENSG00000157933.10          SKI HGNC:10896
## 4643 ENSG00000157933.10          SKI HGNC:10896
```

```
## 4644  ENSG00000287356.1  AL590822.3      <NA>
## 4645  ENSG00000287356.1  AL590822.3      <NA>
## 4646  ENSG00000287356.1  AL590822.3      <NA>
## 4647  ENSG00000287356.1  AL590822.3      <NA>
## 4648  ENSG00000287356.1  AL590822.3      <NA>
## 4649  ENSG00000287356.1  AL590822.3      <NA>
## 4650  ENSG00000287356.1  AL590822.3      <NA>
## 4651  ENSG00000287356.1  AL590822.3      <NA>
## 4652  ENSG00000287356.1  AL590822.3      <NA>
## 4653  ENSG00000287356.1  AL590822.3      <NA>
## 4654 ENSG00000116151.14        MORN1 HGNC:25852
## 4655 ENSG00000116151.14        MORN1 HGNC:25852
## 4656 ENSG00000116151.14        MORN1 HGNC:25852
## 4657 ENSG00000116151.14        MORN1 HGNC:25852
## 4658 ENSG00000116151.14        MORN1 HGNC:25852
## 4659 ENSG00000116151.14        MORN1 HGNC:25852
## 4660 ENSG00000116151.14        MORN1 HGNC:25852
## 4661 ENSG00000116151.14        MORN1 HGNC:25852
## 4662 ENSG00000116151.14        MORN1 HGNC:25852
## 4663 ENSG00000116151.14        MORN1 HGNC:25852
## 4664 ENSG00000116151.14        MORN1 HGNC:25852
## 4665 ENSG00000116151.14        MORN1 HGNC:25852
## 4666 ENSG00000116151.14        MORN1 HGNC:25852
## 4667 ENSG00000116151.14        MORN1 HGNC:25852
## 4668 ENSG00000116151.14        MORN1 HGNC:25852
## 4669 ENSG00000116151.14        MORN1 HGNC:25852
## 4670 ENSG00000116151.14        MORN1 HGNC:25852
## 4671 ENSG00000116151.14        MORN1 HGNC:25852
## 4672 ENSG00000116151.14        MORN1 HGNC:25852
## 4673 ENSG00000116151.14        MORN1 HGNC:25852
## 4674 ENSG00000116151.14        MORN1 HGNC:25852
## 4675 ENSG00000116151.14        MORN1 HGNC:25852
## 4676 ENSG00000116151.14        MORN1 HGNC:25852
## 4677 ENSG00000116151.14        MORN1 HGNC:25852
## 4678 ENSG00000116151.14        MORN1 HGNC:25852
## 4679 ENSG00000116151.14        MORN1 HGNC:25852
## 4680 ENSG00000116151.14        MORN1 HGNC:25852
## 4681 ENSG00000116151.14        MORN1 HGNC:25852
## 4682 ENSG00000116151.14        MORN1 HGNC:25852
## 4683 ENSG00000116151.14        MORN1 HGNC:25852
## 4684 ENSG00000116151.14        MORN1 HGNC:25852
## 4685 ENSG00000116151.14        MORN1 HGNC:25852
## 4686 ENSG00000116151.14        MORN1 HGNC:25852
## 4687 ENSG00000116151.14        MORN1 HGNC:25852
## 4688 ENSG00000116151.14        MORN1 HGNC:25852
## 4689 ENSG00000116151.14        MORN1 HGNC:25852
## 4690 ENSG00000116151.14        MORN1 HGNC:25852
## 4691 ENSG00000116151.14        MORN1 HGNC:25852
## 4692 ENSG00000116151.14        MORN1 HGNC:25852
## 4693 ENSG00000116151.14        MORN1 HGNC:25852
## 4694 ENSG00000116151.14        MORN1 HGNC:25852
## 4695 ENSG00000116151.14        MORN1 HGNC:25852
## 4696 ENSG00000116151.14        MORN1 HGNC:25852
## 4697 ENSG00000116151.14        MORN1 HGNC:25852
```

```
## 4698 ENSG00000116151.14        MORN1 HGNC:25852
## 4699 ENSG00000116151.14        MORN1 HGNC:25852
## 4700 ENSG00000116151.14        MORN1 HGNC:25852
## 4701 ENSG00000116151.14        MORN1 HGNC:25852
## 4702 ENSG00000116151.14        MORN1 HGNC:25852
## 4703 ENSG00000116151.14        MORN1 HGNC:25852
## 4704 ENSG00000116151.14        MORN1 HGNC:25852
## 4705 ENSG00000116151.14        MORN1 HGNC:25852
## 4706 ENSG00000116151.14        MORN1 HGNC:25852
## 4707 ENSG00000116151.14        MORN1 HGNC:25852
## 4708 ENSG00000116151.14        MORN1 HGNC:25852
## 4709 ENSG00000116151.14        MORN1 HGNC:25852
## 4710 ENSG00000116151.14        MORN1 HGNC:25852
## 4711 ENSG00000116151.14        MORN1 HGNC:25852
## 4712 ENSG00000116151.14        MORN1 HGNC:25852
## 4713 ENSG00000116151.14        MORN1 HGNC:25852
## 4714 ENSG00000116151.14        MORN1 HGNC:25852
## 4715  ENSG00000272161.1   AL589739.1        <NA>
## 4716  ENSG00000272161.1   AL589739.1        <NA>
## 4717  ENSG00000272161.1   AL589739.1        <NA>
## 4718  ENSG00000269896.2   AL513477.1        <NA>
## 4719  ENSG00000269896.2   AL513477.1        <NA>
## 4720  ENSG00000269896.2   AL513477.1        <NA>
## 4721  ENSG00000269896.2   AL513477.1        <NA>
## 4722  ENSG00000269896.2   AL513477.1        <NA>
## 4723  ENSG00000272420.1   AL513477.2        <NA>
## 4724  ENSG00000272420.1   AL513477.2        <NA>
## 4725  ENSG00000272420.1   AL513477.2        <NA>
## 4726 ENSG00000157916.20         RER1 HGNC:30309
## 4727 ENSG00000157916.20         RER1 HGNC:30309
## 4728 ENSG00000157916.20         RER1 HGNC:30309
## 4729 ENSG00000157916.20         RER1 HGNC:30309
## 4730 ENSG00000157916.20         RER1 HGNC:30309
## 4731 ENSG00000157916.20         RER1 HGNC:30309
## 4732 ENSG00000157916.20         RER1 HGNC:30309
## 4733 ENSG00000157916.20         RER1 HGNC:30309
## 4734 ENSG00000157916.20         RER1 HGNC:30309
## 4735 ENSG00000157916.20         RER1 HGNC:30309
## 4736 ENSG00000157916.20         RER1 HGNC:30309
## 4737 ENSG00000157916.20         RER1 HGNC:30309
## 4738 ENSG00000157916.20         RER1 HGNC:30309
## 4739 ENSG00000157916.20         RER1 HGNC:30309
## 4740 ENSG00000157916.20         RER1 HGNC:30309
## 4741 ENSG00000157916.20         RER1 HGNC:30309
## 4742 ENSG00000157916.20         RER1 HGNC:30309
## 4743 ENSG00000157916.20         RER1 HGNC:30309
## 4744 ENSG00000157916.20         RER1 HGNC:30309
## 4745 ENSG00000157916.20         RER1 HGNC:30309
## 4746 ENSG00000157916.20         RER1 HGNC:30309
## 4747 ENSG00000157916.20         RER1 HGNC:30309
## 4748 ENSG00000157916.20         RER1 HGNC:30309
## 4749 ENSG00000157916.20         RER1 HGNC:30309
## 4750 ENSG00000157916.20         RER1 HGNC:30309
## 4751 ENSG00000157916.20         RER1 HGNC:30309
```

```
## 4752 ENSG00000157916.20            RER1 HGNC:30309
## 4753 ENSG00000157916.20            RER1 HGNC:30309
## 4754 ENSG00000157916.20            RER1 HGNC:30309
## 4755 ENSG00000157916.20            RER1 HGNC:30309
## 4756 ENSG00000157916.20            RER1 HGNC:30309
## 4757 ENSG00000157916.20            RER1 HGNC:30309
## 4758 ENSG00000157916.20            RER1 HGNC:30309
## 4759 ENSG00000157916.20            RER1 HGNC:30309
## 4760 ENSG00000157916.20            RER1 HGNC:30309
## 4761 ENSG00000157916.20            RER1 HGNC:30309
## 4762 ENSG00000157916.20            RER1 HGNC:30309
## 4763 ENSG00000157916.20            RER1 HGNC:30309
## 4764 ENSG00000157916.20            RER1 HGNC:30309
## 4765 ENSG00000157916.20            RER1 HGNC:30309
## 4766 ENSG00000157916.20            RER1 HGNC:30309
## 4767 ENSG00000157916.20            RER1 HGNC:30309
## 4768 ENSG00000157916.20            RER1 HGNC:30309
## 4769 ENSG00000157916.20            RER1 HGNC:30309
## 4770 ENSG00000157916.20            RER1 HGNC:30309
## 4771 ENSG00000157916.20            RER1 HGNC:30309
## 4772 ENSG00000157916.20            RER1 HGNC:30309
## 4773 ENSG00000157916.20            RER1 HGNC:30309
## 4774 ENSG00000157916.20            RER1 HGNC:30309
## 4775 ENSG00000157916.20            RER1 HGNC:30309
## 4776 ENSG00000157916.20            RER1 HGNC:30309
## 4777 ENSG00000157916.20            RER1 HGNC:30309
## 4778 ENSG00000157916.20            RER1 HGNC:30309
## 4779 ENSG00000157916.20            RER1 HGNC:30309
## 4780 ENSG00000157916.20            RER1 HGNC:30309
## 4781 ENSG00000157916.20            RER1 HGNC:30309
## 4782 ENSG00000157916.20            RER1 HGNC:30309
## 4783 ENSG00000157916.20            RER1 HGNC:30309
## 4784 ENSG00000157916.20            RER1 HGNC:30309
## 4785 ENSG00000157916.20            RER1 HGNC:30309
## 4786 ENSG00000157916.20            RER1 HGNC:30309
## 4787 ENSG00000157916.20            RER1 HGNC:30309
## 4788 ENSG00000157916.20            RER1 HGNC:30309
## 4789 ENSG00000157916.20            RER1 HGNC:30309
## 4790 ENSG00000157916.20            RER1 HGNC:30309
## 4791 ENSG00000157916.20            RER1 HGNC:30309
## 4792 ENSG00000157916.20            RER1 HGNC:30309
## 4793 ENSG00000157916.20            RER1 HGNC:30309
## 4794 ENSG00000157916.20            RER1 HGNC:30309
## 4795 ENSG00000157916.20            RER1 HGNC:30309
## 4796 ENSG00000157916.20            RER1 HGNC:30309
## 4797 ENSG00000157916.20            RER1 HGNC:30309
## 4798 ENSG00000157916.20            RER1 HGNC:30309
## 4799 ENSG00000157916.20            RER1 HGNC:30309
## 4800 ENSG00000157916.20            RER1 HGNC:30309
## 4801 ENSG00000157916.20            RER1 HGNC:30309
## 4802 ENSG00000157916.20            RER1 HGNC:30309
## 4803 ENSG00000157916.20            RER1 HGNC:30309
## 4804 ENSG00000157916.20            RER1 HGNC:30309
## 4805 ENSG00000157916.20            RER1 HGNC:30309
```

```
## 4806 ENSG00000157916.20       RER1 HGNC:30309
## 4807 ENSG00000157916.20       RER1 HGNC:30309
## 4808 ENSG00000157916.20       RER1 HGNC:30309
## 4809 ENSG00000157916.20       RER1 HGNC:30309
## 4810 ENSG00000157916.20       RER1 HGNC:30309
## 4811 ENSG00000157916.20       RER1 HGNC:30309
## 4812 ENSG00000157916.20       RER1 HGNC:30309
## 4813 ENSG00000157916.20       RER1 HGNC:30309
## 4814 ENSG00000157911.10      PEX10  HGNC:8851
## 4815 ENSG00000157911.10      PEX10  HGNC:8851
## 4816 ENSG00000157911.10      PEX10  HGNC:8851
## 4817 ENSG00000157911.10      PEX10  HGNC:8851
## 4818 ENSG00000157911.10      PEX10  HGNC:8851
## 4819 ENSG00000157911.10      PEX10  HGNC:8851
## 4820 ENSG00000157911.10      PEX10  HGNC:8851
## 4821 ENSG00000157911.10      PEX10  HGNC:8851
## 4822 ENSG00000157911.10      PEX10  HGNC:8851
## 4823 ENSG00000157911.10      PEX10  HGNC:8851
## 4824 ENSG00000157911.10      PEX10  HGNC:8851
## 4825 ENSG00000157911.10      PEX10  HGNC:8851
## 4826 ENSG00000157911.10      PEX10  HGNC:8851
## 4827 ENSG00000157911.10      PEX10  HGNC:8851
## 4828 ENSG00000157911.10      PEX10  HGNC:8851
## 4829 ENSG00000157911.10      PEX10  HGNC:8851
## 4830 ENSG00000157911.10      PEX10  HGNC:8851
## 4831 ENSG00000157911.10      PEX10  HGNC:8851
## 4832 ENSG00000157911.10      PEX10  HGNC:8851
## 4833 ENSG00000157911.10      PEX10  HGNC:8851
## 4834 ENSG00000157911.10      PEX10  HGNC:8851
## 4835 ENSG00000157911.10      PEX10  HGNC:8851
## 4836 ENSG00000157911.10      PEX10  HGNC:8851
## 4837 ENSG00000157911.10      PEX10  HGNC:8851
## 4838 ENSG00000157911.10      PEX10  HGNC:8851
## 4839 ENSG00000157911.10      PEX10  HGNC:8851
## 4840 ENSG00000157911.10      PEX10  HGNC:8851
## 4841 ENSG00000157911.10      PEX10  HGNC:8851
## 4842 ENSG00000157911.10      PEX10  HGNC:8851
## 4843 ENSG00000157911.10      PEX10  HGNC:8851
## 4844 ENSG00000157911.10      PEX10  HGNC:8851
## 4845 ENSG00000157911.10      PEX10  HGNC:8851
## 4846 ENSG00000157911.10      PEX10  HGNC:8851
## 4847 ENSG00000157911.10      PEX10  HGNC:8851
## 4848 ENSG00000157911.10      PEX10  HGNC:8851
## 4849 ENSG00000157911.10      PEX10  HGNC:8851
## 4850 ENSG00000157911.10      PEX10  HGNC:8851
## 4851 ENSG00000157911.10      PEX10  HGNC:8851
## 4852 ENSG00000157911.10      PEX10  HGNC:8851
## 4853 ENSG00000157911.10      PEX10  HGNC:8851
## 4854 ENSG00000157911.10      PEX10  HGNC:8851
## 4855 ENSG00000157911.10      PEX10  HGNC:8851
## 4856 ENSG00000157911.10      PEX10  HGNC:8851
## 4857 ENSG00000157911.10      PEX10  HGNC:8851
## 4858 ENSG00000157911.10      PEX10  HGNC:8851
## 4859 ENSG00000157911.10      PEX10  HGNC:8851
```

```
## 4860 ENSG00000157911.10       PEX10   HGNC:8851
## 4861 ENSG00000157911.10       PEX10   HGNC:8851
## 4862 ENSG00000157911.10       PEX10   HGNC:8851
## 4863 ENSG00000157911.10       PEX10   HGNC:8851
## 4864 ENSG00000157911.10       PEX10   HGNC:8851
## 4865 ENSG00000157911.10       PEX10   HGNC:8851
## 4866 ENSG00000149527.18       PLCH2 HGNC:29037
## 4867 ENSG00000149527.18       PLCH2 HGNC:29037
## 4868 ENSG00000149527.18       PLCH2 HGNC:29037
## 4869 ENSG00000149527.18       PLCH2 HGNC:29037
## 4870 ENSG00000149527.18       PLCH2 HGNC:29037
## 4871 ENSG00000149527.18       PLCH2 HGNC:29037
## 4872 ENSG00000149527.18       PLCH2 HGNC:29037
## 4873 ENSG00000149527.18       PLCH2 HGNC:29037
## 4874 ENSG00000149527.18       PLCH2 HGNC:29037
## 4875 ENSG00000149527.18       PLCH2 HGNC:29037
## 4876 ENSG00000149527.18       PLCH2 HGNC:29037
## 4877 ENSG00000149527.18       PLCH2 HGNC:29037
## 4878 ENSG00000149527.18       PLCH2 HGNC:29037
## 4879 ENSG00000149527.18       PLCH2 HGNC:29037
## 4880 ENSG00000149527.18       PLCH2 HGNC:29037
## 4881 ENSG00000149527.18       PLCH2 HGNC:29037
## 4882 ENSG00000149527.18       PLCH2 HGNC:29037
## 4883 ENSG00000149527.18       PLCH2 HGNC:29037
## 4884 ENSG00000149527.18       PLCH2 HGNC:29037
## 4885 ENSG00000149527.18       PLCH2 HGNC:29037
## 4886 ENSG00000149527.18       PLCH2 HGNC:29037
## 4887 ENSG00000149527.18       PLCH2 HGNC:29037
## 4888 ENSG00000149527.18       PLCH2 HGNC:29037
## 4889 ENSG00000149527.18       PLCH2 HGNC:29037
## 4890 ENSG00000149527.18       PLCH2 HGNC:29037
## 4891 ENSG00000149527.18       PLCH2 HGNC:29037
## 4892 ENSG00000149527.18       PLCH2 HGNC:29037
## 4893 ENSG00000149527.18       PLCH2 HGNC:29037
## 4894 ENSG00000149527.18       PLCH2 HGNC:29037
## 4895 ENSG00000149527.18       PLCH2 HGNC:29037
## 4896 ENSG00000149527.18       PLCH2 HGNC:29037
## 4897 ENSG00000149527.18       PLCH2 HGNC:29037
## 4898 ENSG00000149527.18       PLCH2 HGNC:29037
## 4899 ENSG00000149527.18       PLCH2 HGNC:29037
## 4900 ENSG00000149527.18       PLCH2 HGNC:29037
## 4901 ENSG00000149527.18       PLCH2 HGNC:29037
## 4902 ENSG00000149527.18       PLCH2 HGNC:29037
## 4903 ENSG00000149527.18       PLCH2 HGNC:29037
## 4904 ENSG00000149527.18       PLCH2 HGNC:29037
## 4905 ENSG00000149527.18       PLCH2 HGNC:29037
## 4906 ENSG00000149527.18       PLCH2 HGNC:29037
## 4907 ENSG00000149527.18       PLCH2 HGNC:29037
## 4908 ENSG00000149527.18       PLCH2 HGNC:29037
## 4909 ENSG00000149527.18       PLCH2 HGNC:29037
## 4910 ENSG00000149527.18       PLCH2 HGNC:29037
## 4911 ENSG00000149527.18       PLCH2 HGNC:29037
## 4912 ENSG00000149527.18       PLCH2 HGNC:29037
## 4913 ENSG00000149527.18       PLCH2 HGNC:29037
```

```
## 4914 ENSG00000149527.18          PLCH2 HGNC:29037
## 4915 ENSG00000149527.18          PLCH2 HGNC:29037
## 4916 ENSG00000149527.18          PLCH2 HGNC:29037
## 4917 ENSG00000149527.18          PLCH2 HGNC:29037
## 4918 ENSG00000149527.18          PLCH2 HGNC:29037
## 4919 ENSG00000149527.18          PLCH2 HGNC:29037
## 4920 ENSG00000149527.18          PLCH2 HGNC:29037
## 4921 ENSG00000149527.18          PLCH2 HGNC:29037
## 4922 ENSG00000149527.18          PLCH2 HGNC:29037
## 4923 ENSG00000149527.18          PLCH2 HGNC:29037
## 4924 ENSG00000149527.18          PLCH2 HGNC:29037
## 4925 ENSG00000149527.18          PLCH2 HGNC:29037
## 4926 ENSG00000149527.18          PLCH2 HGNC:29037
## 4927 ENSG00000149527.18          PLCH2 HGNC:29037
## 4928 ENSG00000149527.18          PLCH2 HGNC:29037
## 4929 ENSG00000149527.18          PLCH2 HGNC:29037
## 4930 ENSG00000149527.18          PLCH2 HGNC:29037
## 4931 ENSG00000149527.18          PLCH2 HGNC:29037
## 4932 ENSG00000149527.18          PLCH2 HGNC:29037
## 4933 ENSG00000149527.18          PLCH2 HGNC:29037
## 4934 ENSG00000149527.18          PLCH2 HGNC:29037
## 4935 ENSG00000149527.18          PLCH2 HGNC:29037
## 4936 ENSG00000149527.18          PLCH2 HGNC:29037
## 4937 ENSG00000149527.18          PLCH2 HGNC:29037
## 4938 ENSG00000149527.18          PLCH2 HGNC:29037
## 4939 ENSG00000149527.18          PLCH2 HGNC:29037
## 4940 ENSG00000149527.18          PLCH2 HGNC:29037
## 4941 ENSG00000149527.18          PLCH2 HGNC:29037
## 4942 ENSG00000149527.18          PLCH2 HGNC:29037
## 4943 ENSG00000149527.18          PLCH2 HGNC:29037
## 4944 ENSG00000149527.18          PLCH2 HGNC:29037
## 4945 ENSG00000149527.18          PLCH2 HGNC:29037
## 4946 ENSG00000149527.18          PLCH2 HGNC:29037
## 4947 ENSG00000149527.18          PLCH2 HGNC:29037
## 4948 ENSG00000149527.18          PLCH2 HGNC:29037
## 4949 ENSG00000149527.18          PLCH2 HGNC:29037
## 4950 ENSG00000149527.18          PLCH2 HGNC:29037
## 4951 ENSG00000149527.18          PLCH2 HGNC:29037
## 4952 ENSG00000149527.18          PLCH2 HGNC:29037
## 4953 ENSG00000149527.18          PLCH2 HGNC:29037
## 4954 ENSG00000149527.18          PLCH2 HGNC:29037
## 4955 ENSG00000149527.18          PLCH2 HGNC:29037
## 4956 ENSG00000149527.18          PLCH2 HGNC:29037
## 4957 ENSG00000149527.18          PLCH2 HGNC:29037
## 4958 ENSG00000149527.18          PLCH2 HGNC:29037
## 4959 ENSG00000149527.18          PLCH2 HGNC:29037
## 4960 ENSG00000149527.18          PLCH2 HGNC:29037
## 4961 ENSG00000149527.18          PLCH2 HGNC:29037
## 4962 ENSG00000149527.18          PLCH2 HGNC:29037
## 4963 ENSG00000149527.18          PLCH2 HGNC:29037
## 4964 ENSG00000149527.18          PLCH2 HGNC:29037
## 4965 ENSG00000149527.18          PLCH2 HGNC:29037
## 4966 ENSG00000149527.18          PLCH2 HGNC:29037
## 4967 ENSG00000149527.18          PLCH2 HGNC:29037
```

```
## 4968 ENSG00000149527.18         PLCH2 HGNC:29037
## 4969 ENSG00000149527.18         PLCH2 HGNC:29037
## 4970 ENSG00000149527.18         PLCH2 HGNC:29037
## 4971 ENSG00000149527.18         PLCH2 HGNC:29037
## 4972 ENSG00000149527.18         PLCH2 HGNC:29037
## 4973 ENSG00000149527.18         PLCH2 HGNC:29037
## 4974 ENSG00000149527.18         PLCH2 HGNC:29037
## 4975 ENSG00000149527.18         PLCH2 HGNC:29037
## 4976 ENSG00000149527.18         PLCH2 HGNC:29037
## 4977 ENSG00000149527.18         PLCH2 HGNC:29037
## 4978 ENSG00000149527.18         PLCH2 HGNC:29037
## 4979 ENSG00000149527.18         PLCH2 HGNC:29037
## 4980 ENSG00000149527.18         PLCH2 HGNC:29037
## 4981 ENSG00000149527.18         PLCH2 HGNC:29037
## 4982 ENSG00000149527.18         PLCH2 HGNC:29037
## 4983 ENSG00000149527.18         PLCH2 HGNC:29037
## 4984 ENSG00000149527.18         PLCH2 HGNC:29037
## 4985 ENSG00000149527.18         PLCH2 HGNC:29037
## 4986 ENSG00000149527.18         PLCH2 HGNC:29037
## 4987 ENSG00000149527.18         PLCH2 HGNC:29037
## 4988 ENSG00000149527.18         PLCH2 HGNC:29037
## 4989 ENSG00000149527.18         PLCH2 HGNC:29037
## 4990 ENSG00000149527.18         PLCH2 HGNC:29037
## 4991 ENSG00000149527.18         PLCH2 HGNC:29037
## 4992 ENSG00000149527.18         PLCH2 HGNC:29037
## 4993 ENSG00000149527.18         PLCH2 HGNC:29037
## 4994 ENSG00000149527.18         PLCH2 HGNC:29037
## 4995 ENSG00000149527.18         PLCH2 HGNC:29037
## 4996 ENSG00000149527.18         PLCH2 HGNC:29037
## 4997 ENSG00000149527.18         PLCH2 HGNC:29037
## 4998 ENSG00000149527.18         PLCH2 HGNC:29037
## 4999 ENSG00000149527.18         PLCH2 HGNC:29037
## 5000 ENSG00000149527.18         PLCH2 HGNC:29037
## 5001 ENSG00000149527.18         PLCH2 HGNC:29037
## 5002 ENSG00000149527.18         PLCH2 HGNC:29037
## 5003 ENSG00000149527.18         PLCH2 HGNC:29037
## 5004 ENSG00000149527.18         PLCH2 HGNC:29037
## 5005 ENSG00000149527.18         PLCH2 HGNC:29037
## 5006 ENSG00000149527.18         PLCH2 HGNC:29037
## 5007 ENSG00000149527.18         PLCH2 HGNC:29037
## 5008 ENSG00000149527.18         PLCH2 HGNC:29037
## 5009 ENSG00000149527.18         PLCH2 HGNC:29037
## 5010 ENSG00000149527.18         PLCH2 HGNC:29037
## 5011 ENSG00000149527.18         PLCH2 HGNC:29037
## 5012 ENSG00000149527.18         PLCH2 HGNC:29037
## 5013 ENSG00000149527.18         PLCH2 HGNC:29037
## 5014  ENSG00000224387.1  AL139246.1        <NA>
## 5015  ENSG00000224387.1  AL139246.1        <NA>
## 5016  ENSG00000224387.1  AL139246.1        <NA>
## 5017  ENSG00000224387.1  AL139246.1        <NA>
## 5018  ENSG00000229393.1  AL139246.4        <NA>
## 5019  ENSG00000229393.1  AL139246.4        <NA>
## 5020  ENSG00000229393.1  AL139246.4        <NA>
## 5021  ENSG00000229393.1  AL139246.4        <NA>
```

```
## 5022 ENSG00000157881.14          PANK4 HGNC:19366
## 5023 ENSG00000157881.14          PANK4 HGNC:19366
## 5024 ENSG00000157881.14          PANK4 HGNC:19366
## 5025 ENSG00000157881.14          PANK4 HGNC:19366
## 5026 ENSG00000157881.14          PANK4 HGNC:19366
## 5027 ENSG00000157881.14          PANK4 HGNC:19366
## 5028 ENSG00000157881.14          PANK4 HGNC:19366
## 5029 ENSG00000157881.14          PANK4 HGNC:19366
## 5030 ENSG00000157881.14          PANK4 HGNC:19366
## 5031 ENSG00000157881.14          PANK4 HGNC:19366
## 5032 ENSG00000157881.14          PANK4 HGNC:19366
## 5033 ENSG00000157881.14          PANK4 HGNC:19366
## 5034 ENSG00000157881.14          PANK4 HGNC:19366
## 5035 ENSG00000157881.14          PANK4 HGNC:19366
## 5036 ENSG00000157881.14          PANK4 HGNC:19366
## 5037 ENSG00000157881.14          PANK4 HGNC:19366
## 5038 ENSG00000157881.14          PANK4 HGNC:19366
## 5039 ENSG00000157881.14          PANK4 HGNC:19366
## 5040 ENSG00000157881.14          PANK4 HGNC:19366
## 5041 ENSG00000157881.14          PANK4 HGNC:19366
## 5042 ENSG00000157881.14          PANK4 HGNC:19366
## 5043 ENSG00000157881.14          PANK4 HGNC:19366
## 5044 ENSG00000157881.14          PANK4 HGNC:19366
## 5045 ENSG00000157881.14          PANK4 HGNC:19366
## 5046 ENSG00000157881.14          PANK4 HGNC:19366
## 5047 ENSG00000157881.14          PANK4 HGNC:19366
## 5048 ENSG00000157881.14          PANK4 HGNC:19366
## 5049 ENSG00000157881.14          PANK4 HGNC:19366
## 5050 ENSG00000157881.14          PANK4 HGNC:19366
## 5051 ENSG00000157881.14          PANK4 HGNC:19366
## 5052 ENSG00000157881.14          PANK4 HGNC:19366
## 5053 ENSG00000157881.14          PANK4 HGNC:19366
## 5054 ENSG00000157881.14          PANK4 HGNC:19366
## 5055 ENSG00000157881.14          PANK4 HGNC:19366
## 5056 ENSG00000157881.14          PANK4 HGNC:19366
## 5057 ENSG00000157881.14          PANK4 HGNC:19366
## 5058 ENSG00000157881.14          PANK4 HGNC:19366
## 5059 ENSG00000157881.14          PANK4 HGNC:19366
## 5060 ENSG00000157881.14          PANK4 HGNC:19366
## 5061 ENSG00000157881.14          PANK4 HGNC:19366
## 5062 ENSG00000157881.14          PANK4 HGNC:19366
## 5063 ENSG00000157881.14          PANK4 HGNC:19366
## 5064 ENSG00000157881.14          PANK4 HGNC:19366
## 5065 ENSG00000157881.14          PANK4 HGNC:19366
## 5066 ENSG00000157881.14          PANK4 HGNC:19366
## 5067 ENSG00000157881.14          PANK4 HGNC:19366
## 5068 ENSG00000157881.14          PANK4 HGNC:19366
## 5069 ENSG00000157881.14          PANK4 HGNC:19366
## 5070 ENSG00000157881.14          PANK4 HGNC:19366
## 5071 ENSG00000157881.14          PANK4 HGNC:19366
## 5072 ENSG00000157881.14          PANK4 HGNC:19366
## 5073 ENSG00000157881.14          PANK4 HGNC:19366
## 5074 ENSG00000157881.14          PANK4 HGNC:19366
## 5075 ENSG00000157881.14          PANK4 HGNC:19366
```

```
## 5076 ENSG00000157881.14        PANK4 HGNC:19366
## 5077 ENSG00000157881.14        PANK4 HGNC:19366
## 5078 ENSG00000157881.14        PANK4 HGNC:19366
## 5079 ENSG00000157881.14        PANK4 HGNC:19366
## 5080 ENSG00000157881.14        PANK4 HGNC:19366
## 5081 ENSG00000157881.14        PANK4 HGNC:19366
## 5082 ENSG00000157881.14        PANK4 HGNC:19366
## 5083 ENSG00000157881.14        PANK4 HGNC:19366
## 5084 ENSG00000157881.14        PANK4 HGNC:19366
## 5085 ENSG00000157881.14        PANK4 HGNC:19366
## 5086 ENSG00000157881.14        PANK4 HGNC:19366
## 5087 ENSG00000157881.14        PANK4 HGNC:19366
## 5088 ENSG00000157881.14        PANK4 HGNC:19366
## 5089 ENSG00000157881.14        PANK4 HGNC:19366
## 5090 ENSG00000157881.14        PANK4 HGNC:19366
## 5091 ENSG00000157881.14        PANK4 HGNC:19366
## 5092 ENSG00000157881.14        PANK4 HGNC:19366
## 5093 ENSG00000157881.14        PANK4 HGNC:19366
## 5094 ENSG00000157881.14        PANK4 HGNC:19366
## 5095 ENSG00000157881.14        PANK4 HGNC:19366
## 5096 ENSG00000157881.14        PANK4 HGNC:19366
## 5097 ENSG00000157881.14        PANK4 HGNC:19366
## 5098 ENSG00000157881.14        PANK4 HGNC:19366
## 5099 ENSG00000157881.14        PANK4 HGNC:19366
## 5100 ENSG00000157881.14        PANK4 HGNC:19366
## 5101 ENSG00000157881.14        PANK4 HGNC:19366
## 5102 ENSG00000157881.14        PANK4 HGNC:19366
## 5103 ENSG00000157881.14        PANK4 HGNC:19366
## 5104 ENSG00000157881.14        PANK4 HGNC:19366
## 5105 ENSG00000157881.14        PANK4 HGNC:19366
## 5106 ENSG00000157881.14        PANK4 HGNC:19366
## 5107 ENSG00000157881.14        PANK4 HGNC:19366
## 5108 ENSG00000157881.14        PANK4 HGNC:19366
## 5109 ENSG00000157881.14        PANK4 HGNC:19366
## 5110 ENSG00000157881.14        PANK4 HGNC:19366
## 5111 ENSG00000157881.14        PANK4 HGNC:19366
## 5112 ENSG00000157881.14        PANK4 HGNC:19366
## 5113 ENSG00000157881.14        PANK4 HGNC:19366
## 5114 ENSG00000157881.14        PANK4 HGNC:19366
## 5115 ENSG00000157881.14        PANK4 HGNC:19366
## 5116 ENSG00000157881.14        PANK4 HGNC:19366
## 5117 ENSG00000157881.14        PANK4 HGNC:19366
## 5118 ENSG00000157881.14        PANK4 HGNC:19366
## 5119 ENSG00000157881.14        PANK4 HGNC:19366
## 5120 ENSG00000157881.14        PANK4 HGNC:19366
## 5121 ENSG00000157881.14        PANK4 HGNC:19366
## 5122 ENSG00000157881.14        PANK4 HGNC:19366
## 5123 ENSG00000157881.14        PANK4 HGNC:19366
## 5124 ENSG00000157881.14        PANK4 HGNC:19366
## 5125 ENSG00000157881.14        PANK4 HGNC:19366
## 5126 ENSG00000157881.14        PANK4 HGNC:19366
## 5127 ENSG00000157881.14        PANK4 HGNC:19366
## 5128 ENSG00000157881.14        PANK4 HGNC:19366
## 5129 ENSG00000157881.14        PANK4 HGNC:19366
```

```
## 5130 ENSG00000157881.14           PANK4 HGNC:19366
## 5131 ENSG00000157881.14           PANK4 HGNC:19366
## 5132 ENSG00000157881.14           PANK4 HGNC:19366
## 5133 ENSG00000157881.14           PANK4 HGNC:19366
## 5134 ENSG00000157881.14           PANK4 HGNC:19366
## 5135 ENSG00000157881.14           PANK4 HGNC:19366
## 5136 ENSG00000157881.14           PANK4 HGNC:19366
## 5137 ENSG00000157881.14           PANK4 HGNC:19366
## 5138 ENSG00000157881.14           PANK4 HGNC:19366
## 5139 ENSG00000157881.14           PANK4 HGNC:19366
## 5140 ENSG00000157881.14           PANK4 HGNC:19366
## 5141 ENSG00000157881.14           PANK4 HGNC:19366
## 5142 ENSG00000157881.14           PANK4 HGNC:19366
## 5143 ENSG00000157881.14           PANK4 HGNC:19366
## 5144 ENSG00000157881.14           PANK4 HGNC:19366
## 5145 ENSG00000157881.14           PANK4 HGNC:19366
## 5146 ENSG00000157881.14           PANK4 HGNC:19366
## 5147 ENSG00000157881.14           PANK4 HGNC:19366
## 5148 ENSG00000157881.14           PANK4 HGNC:19366
## 5149 ENSG00000157881.14           PANK4 HGNC:19366
## 5150 ENSG00000157881.14           PANK4 HGNC:19366
## 5151  ENSG00000197921.6            HES5 HGNC:19764
## 5152  ENSG00000197921.6            HES5 HGNC:19764
## 5153  ENSG00000197921.6            HES5 HGNC:19764
## 5154  ENSG00000197921.6            HES5 HGNC:19764
## 5155  ENSG00000197921.6            HES5 HGNC:19764
## 5156  ENSG00000197921.6            HES5 HGNC:19764
## 5157  ENSG00000197921.6            HES5 HGNC:19764
## 5158  ENSG00000197921.6            HES5 HGNC:19764
## 5159  ENSG00000197921.6            HES5 HGNC:19764
## 5160  ENSG00000197921.6            HES5 HGNC:19764
## 5161  ENSG00000197921.6            HES5 HGNC:19764
## 5162  ENSG00000197921.6            HES5 HGNC:19764
## 5163  ENSG00000272449.2      AL139246.5        <NA>
## 5164  ENSG00000272449.2      AL139246.5        <NA>
## 5165  ENSG00000272449.2      AL139246.5        <NA>
## 5166  ENSG00000272449.2      AL139246.5        <NA>
## 5167  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5168  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5169  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5170  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5171  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5172  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5173  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5174  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5175  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5176  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5177  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5178  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5179  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5180  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5181  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5182  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5183  ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
```

```
## 5184   ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5185   ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5186   ENSG00000238164.6 TNFRSF14-AS1 HGNC:26966
## 5187 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5188 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5189 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5190 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5191 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5192 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5193 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5194 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5195 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5196 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5197 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5198 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5199 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5200 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5201 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5202 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5203 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5204 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5205 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5206 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5207 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5208 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5209 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5210 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5211 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5212 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5213 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5214 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5215 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5216 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5217 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5218 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5219 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5220 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5221 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5222 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5223 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5224 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5225 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5226 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5227 ENSG00000157873.17     TNFRSF14 HGNC:11912
## 5228   ENSG00000225931.3   AL139246.2      <NA>
## 5229   ENSG00000225931.3   AL139246.2      <NA>
## 5230   ENSG00000225931.3   AL139246.2      <NA>
## 5231   ENSG00000225931.3   AL139246.2      <NA>
## 5232   ENSG00000225931.3   AL139246.2      <NA>
## 5233   ENSG00000228037.1   AL139246.3      <NA>
## 5234   ENSG00000228037.1   AL139246.3      <NA>
## 5235   ENSG00000228037.1   AL139246.3      <NA>
## 5236   ENSG00000228037.1   AL139246.3      <NA>
## 5237   ENSG00000228037.1   AL139246.3      <NA>
```

```
## 5238 ENSG00000157870.16        PRXL2B HGNC:28390
## 5239 ENSG00000157870.16        PRXL2B HGNC:28390
## 5240 ENSG00000157870.16        PRXL2B HGNC:28390
## 5241 ENSG00000157870.16        PRXL2B HGNC:28390
## 5242 ENSG00000157870.16        PRXL2B HGNC:28390
## 5243 ENSG00000157870.16        PRXL2B HGNC:28390
## 5244 ENSG00000157870.16        PRXL2B HGNC:28390
## 5245 ENSG00000157870.16        PRXL2B HGNC:28390
## 5246 ENSG00000157870.16        PRXL2B HGNC:28390
## 5247 ENSG00000157870.16        PRXL2B HGNC:28390
## 5248 ENSG00000157870.16        PRXL2B HGNC:28390
## 5249 ENSG00000157870.16        PRXL2B HGNC:28390
## 5250 ENSG00000157870.16        PRXL2B HGNC:28390
## 5251 ENSG00000157870.16        PRXL2B HGNC:28390
## 5252 ENSG00000157870.16        PRXL2B HGNC:28390
## 5253 ENSG00000157870.16        PRXL2B HGNC:28390
## 5254 ENSG00000157870.16        PRXL2B HGNC:28390
## 5255 ENSG00000157870.16        PRXL2B HGNC:28390
## 5256 ENSG00000157870.16        PRXL2B HGNC:28390
## 5257 ENSG00000157870.16        PRXL2B HGNC:28390
## 5258 ENSG00000157870.16        PRXL2B HGNC:28390
## 5259 ENSG00000157870.16        PRXL2B HGNC:28390
## 5260 ENSG00000157870.16        PRXL2B HGNC:28390
## 5261 ENSG00000157870.16        PRXL2B HGNC:28390
## 5262 ENSG00000157870.16        PRXL2B HGNC:28390
## 5263 ENSG00000157870.16        PRXL2B HGNC:28390
## 5264 ENSG00000157870.16        PRXL2B HGNC:28390
## 5265 ENSG00000157870.16        PRXL2B HGNC:28390
## 5266 ENSG00000157870.16        PRXL2B HGNC:28390
## 5267 ENSG00000157870.16        PRXL2B HGNC:28390
## 5268 ENSG00000157870.16        PRXL2B HGNC:28390
## 5269 ENSG00000157870.16        PRXL2B HGNC:28390
## 5270 ENSG00000157870.16        PRXL2B HGNC:28390
## 5271 ENSG00000157870.16        PRXL2B HGNC:28390
## 5272 ENSG00000157870.16        PRXL2B HGNC:28390
## 5273 ENSG00000157870.16        PRXL2B HGNC:28390
## 5274 ENSG00000157870.16        PRXL2B HGNC:28390
## 5275 ENSG00000157870.16        PRXL2B HGNC:28390
## 5276 ENSG00000157870.16        PRXL2B HGNC:28390
## 5277 ENSG00000157870.16        PRXL2B HGNC:28390
## 5278 ENSG00000157870.16        PRXL2B HGNC:28390
## 5279 ENSG00000157870.16        PRXL2B HGNC:28390
## 5280 ENSG00000157870.16        PRXL2B HGNC:28390
## 5281 ENSG00000157870.16        PRXL2B HGNC:28390
## 5282 ENSG00000157870.16        PRXL2B HGNC:28390
## 5283 ENSG00000157870.16        PRXL2B HGNC:28390
## 5284 ENSG00000157870.16        PRXL2B HGNC:28390
## 5285 ENSG00000157870.16        PRXL2B HGNC:28390
## 5286 ENSG00000157870.16        PRXL2B HGNC:28390
## 5287 ENSG00000157870.16        PRXL2B HGNC:28390
## 5288 ENSG00000157870.16        PRXL2B HGNC:28390
## 5289 ENSG00000157870.16        PRXL2B HGNC:28390
## 5290 ENSG00000157870.16        PRXL2B HGNC:28390
## 5291 ENSG00000157870.16        PRXL2B HGNC:28390
```

```
## 5292 ENSG00000157870.16          PRXL2B HGNC:28390
## 5293 ENSG00000157870.16          PRXL2B HGNC:28390
## 5294 ENSG00000157870.16          PRXL2B HGNC:28390
## 5295 ENSG00000157870.16          PRXL2B HGNC:28390
## 5296 ENSG00000157870.16          PRXL2B HGNC:28390
## 5297 ENSG00000157870.16          PRXL2B HGNC:28390
## 5298 ENSG00000157870.16          PRXL2B HGNC:28390
## 5299 ENSG00000157870.16          PRXL2B HGNC:28390
## 5300 ENSG00000157870.16          PRXL2B HGNC:28390
## 5301 ENSG00000157870.16          PRXL2B HGNC:28390
## 5302 ENSG00000157870.16          PRXL2B HGNC:28390
## 5303 ENSG00000157870.16          PRXL2B HGNC:28390
## 5304 ENSG00000157870.16          PRXL2B HGNC:28390
## 5305 ENSG00000157870.16          PRXL2B HGNC:28390
## 5306 ENSG00000157870.16          PRXL2B HGNC:28390
## 5307 ENSG00000157870.16          PRXL2B HGNC:28390
## 5308 ENSG00000157870.16          PRXL2B HGNC:28390
## 5309 ENSG00000157870.16          PRXL2B HGNC:28390
## 5310 ENSG00000157870.16          PRXL2B HGNC:28390
## 5311 ENSG00000157870.16          PRXL2B HGNC:28390
## 5312 ENSG00000157870.16          PRXL2B HGNC:28390
## 5313 ENSG00000157870.16          PRXL2B HGNC:28390
## 5314 ENSG00000157870.16          PRXL2B HGNC:28390
## 5315 ENSG00000157870.16          PRXL2B HGNC:28390
## 5316 ENSG00000157870.16          PRXL2B HGNC:28390
## 5317 ENSG00000157870.16          PRXL2B HGNC:28390
## 5318 ENSG00000157870.16          PRXL2B HGNC:28390
## 5319 ENSG00000157870.16          PRXL2B HGNC:28390
## 5320 ENSG00000157870.16          PRXL2B HGNC:28390
## 5321 ENSG00000157870.16          PRXL2B HGNC:28390
## 5322 ENSG00000157870.16          PRXL2B HGNC:28390
## 5323 ENSG00000157870.16          PRXL2B HGNC:28390
## 5324 ENSG00000157870.16          PRXL2B HGNC:28390
## 5325 ENSG00000157870.16          PRXL2B HGNC:28390
## 5326 ENSG00000157870.16          PRXL2B HGNC:28390
## 5327 ENSG00000157870.16          PRXL2B HGNC:28390
## 5328 ENSG00000157870.16          PRXL2B HGNC:28390
## 5329 ENSG00000157870.16          PRXL2B HGNC:28390
## 5330 ENSG00000157870.16          PRXL2B HGNC:28390
## 5331 ENSG00000157870.16          PRXL2B HGNC:28390
## 5332 ENSG00000157870.16          PRXL2B HGNC:28390
## 5333 ENSG00000157870.16          PRXL2B HGNC:28390
## 5334 ENSG00000157870.16          PRXL2B HGNC:28390
## 5335 ENSG00000157870.16          PRXL2B HGNC:28390
## 5336 ENSG00000157870.16          PRXL2B HGNC:28390
## 5337 ENSG00000157870.16          PRXL2B HGNC:28390
## 5338 ENSG00000157870.16          PRXL2B HGNC:28390
## 5339 ENSG00000157870.16          PRXL2B HGNC:28390
## 5340 ENSG00000157870.16          PRXL2B HGNC:28390
## 5341 ENSG00000157870.16          PRXL2B HGNC:28390
## 5342 ENSG00000157870.16          PRXL2B HGNC:28390
## 5343 ENSG00000157870.16          PRXL2B HGNC:28390
## 5344 ENSG00000157870.16          PRXL2B HGNC:28390
## 5345 ENSG00000157870.16          PRXL2B HGNC:28390
```

```
## 5346 ENSG00000157870.16      PRXL2B HGNC:28390
## 5347 ENSG00000157870.16      PRXL2B HGNC:28390
## 5348 ENSG00000157870.16      PRXL2B HGNC:28390
## 5349 ENSG00000142606.16       MMEL1 HGNC:14668
## 5350 ENSG00000142606.16       MMEL1 HGNC:14668
## 5351 ENSG00000142606.16       MMEL1 HGNC:14668
## 5352 ENSG00000142606.16       MMEL1 HGNC:14668
## 5353 ENSG00000142606.16       MMEL1 HGNC:14668
## 5354 ENSG00000142606.16       MMEL1 HGNC:14668
## 5355 ENSG00000142606.16       MMEL1 HGNC:14668
## 5356 ENSG00000142606.16       MMEL1 HGNC:14668
## 5357 ENSG00000142606.16       MMEL1 HGNC:14668
## 5358 ENSG00000142606.16       MMEL1 HGNC:14668
## 5359 ENSG00000142606.16       MMEL1 HGNC:14668
## 5360 ENSG00000142606.16       MMEL1 HGNC:14668
## 5361 ENSG00000142606.16       MMEL1 HGNC:14668
## 5362 ENSG00000142606.16       MMEL1 HGNC:14668
## 5363 ENSG00000142606.16       MMEL1 HGNC:14668
## 5364 ENSG00000142606.16       MMEL1 HGNC:14668
## 5365 ENSG00000142606.16       MMEL1 HGNC:14668
## 5366 ENSG00000142606.16       MMEL1 HGNC:14668
## 5367 ENSG00000142606.16       MMEL1 HGNC:14668
## 5368 ENSG00000142606.16       MMEL1 HGNC:14668
## 5369 ENSG00000142606.16       MMEL1 HGNC:14668
## 5370 ENSG00000142606.16       MMEL1 HGNC:14668
## 5371 ENSG00000142606.16       MMEL1 HGNC:14668
## 5372 ENSG00000142606.16       MMEL1 HGNC:14668
## 5373 ENSG00000142606.16       MMEL1 HGNC:14668
## 5374 ENSG00000142606.16       MMEL1 HGNC:14668
## 5375 ENSG00000142606.16       MMEL1 HGNC:14668
## 5376 ENSG00000142606.16       MMEL1 HGNC:14668
## 5377 ENSG00000142606.16       MMEL1 HGNC:14668
## 5378 ENSG00000142606.16       MMEL1 HGNC:14668
## 5379 ENSG00000142606.16       MMEL1 HGNC:14668
## 5380 ENSG00000142606.16       MMEL1 HGNC:14668
## 5381 ENSG00000142606.16       MMEL1 HGNC:14668
## 5382 ENSG00000142606.16       MMEL1 HGNC:14668
## 5383 ENSG00000142606.16       MMEL1 HGNC:14668
## 5384 ENSG00000142606.16       MMEL1 HGNC:14668
## 5385 ENSG00000142606.16       MMEL1 HGNC:14668
## 5386 ENSG00000142606.16       MMEL1 HGNC:14668
## 5387 ENSG00000142606.16       MMEL1 HGNC:14668
## 5388 ENSG00000142606.16       MMEL1 HGNC:14668
## 5389 ENSG00000142606.16       MMEL1 HGNC:14668
## 5390 ENSG00000142606.16       MMEL1 HGNC:14668
## 5391 ENSG00000142606.16       MMEL1 HGNC:14668
## 5392 ENSG00000142606.16       MMEL1 HGNC:14668
## 5393 ENSG00000142606.16       MMEL1 HGNC:14668
## 5394 ENSG00000142606.16       MMEL1 HGNC:14668
## 5395 ENSG00000142606.16       MMEL1 HGNC:14668
## 5396 ENSG00000142606.16       MMEL1 HGNC:14668
## 5397 ENSG00000142606.16       MMEL1 HGNC:14668
## 5398 ENSG00000142606.16       MMEL1 HGNC:14668
## 5399 ENSG00000142606.16       MMEL1 HGNC:14668
```

```
## 5400 ENSG00000142606.16        MMEL1 HGNC:14668
## 5401 ENSG00000142606.16        MMEL1 HGNC:14668
## 5402 ENSG00000142606.16        MMEL1 HGNC:14668
## 5403 ENSG00000142606.16        MMEL1 HGNC:14668
## 5404 ENSG00000142606.16        MMEL1 HGNC:14668
## 5405 ENSG00000142606.16        MMEL1 HGNC:14668
## 5406 ENSG00000142606.16        MMEL1 HGNC:14668
## 5407 ENSG00000142606.16        MMEL1 HGNC:14668
## 5408 ENSG00000142606.16        MMEL1 HGNC:14668
## 5409 ENSG00000142606.16        MMEL1 HGNC:14668
## 5410 ENSG00000142606.16        MMEL1 HGNC:14668
## 5411 ENSG00000142606.16        MMEL1 HGNC:14668
## 5412 ENSG00000142606.16        MMEL1 HGNC:14668
## 5413 ENSG00000142606.16        MMEL1 HGNC:14668
## 5414 ENSG00000142606.16        MMEL1 HGNC:14668
## 5415 ENSG00000142606.16        MMEL1 HGNC:14668
## 5416 ENSG00000142606.16        MMEL1 HGNC:14668
## 5417 ENSG00000142606.16        MMEL1 HGNC:14668
## 5418 ENSG00000142606.16        MMEL1 HGNC:14668
## 5419 ENSG00000142606.16        MMEL1 HGNC:14668
## 5420 ENSG00000142606.16        MMEL1 HGNC:14668
## 5421 ENSG00000142606.16        MMEL1 HGNC:14668
## 5422 ENSG00000142606.16        MMEL1 HGNC:14668
## 5423 ENSG00000142606.16        MMEL1 HGNC:14668
## 5424 ENSG00000142606.16        MMEL1 HGNC:14668
## 5425 ENSG00000142606.16        MMEL1 HGNC:14668
## 5426 ENSG00000142606.16        MMEL1 HGNC:14668
## 5427 ENSG00000142606.16        MMEL1 HGNC:14668
## 5428 ENSG00000142606.16        MMEL1 HGNC:14668
## 5429 ENSG00000142606.16        MMEL1 HGNC:14668
## 5430 ENSG00000142606.16        MMEL1 HGNC:14668
## 5431 ENSG00000142606.16        MMEL1 HGNC:14668
## 5432 ENSG00000142606.16        MMEL1 HGNC:14668
## 5433 ENSG00000142606.16        MMEL1 HGNC:14668
## 5434 ENSG00000142606.16        MMEL1 HGNC:14668
## 5435 ENSG00000142606.16        MMEL1 HGNC:14668
## 5436 ENSG00000142606.16        MMEL1 HGNC:14668
## 5437 ENSG00000142606.16        MMEL1 HGNC:14668
## 5438 ENSG00000142606.16        MMEL1 HGNC:14668
## 5439 ENSG00000142606.16        MMEL1 HGNC:14668
## 5440 ENSG00000142606.16        MMEL1 HGNC:14668
## 5441 ENSG00000142606.16        MMEL1 HGNC:14668
## 5442 ENSG00000142606.16        MMEL1 HGNC:14668
## 5443 ENSG00000142606.16        MMEL1 HGNC:14668
## 5444 ENSG00000142606.16        MMEL1 HGNC:14668
## 5445 ENSG00000142606.16        MMEL1 HGNC:14668
## 5446  ENSG00000237058.1   AL831784.1       <NA>
## 5447  ENSG00000237058.1   AL831784.1       <NA>
## 5448  ENSG00000237058.1   AL831784.1       <NA>
## 5449  ENSG00000237058.1   AL831784.1       <NA>
## 5450 ENSG00000215912.12        TTC34 HGNC:34297
## 5451 ENSG00000215912.12        TTC34 HGNC:34297
## 5452 ENSG00000215912.12        TTC34 HGNC:34297
## 5453 ENSG00000215912.12        TTC34 HGNC:34297
```

```
## 5454 ENSG00000215912.12          TTC34 HGNC:34297
## 5455 ENSG00000215912.12          TTC34 HGNC:34297
## 5456 ENSG00000215912.12          TTC34 HGNC:34297
## 5457 ENSG00000215912.12          TTC34 HGNC:34297
## 5458 ENSG00000215912.12          TTC34 HGNC:34297
## 5459 ENSG00000215912.12          TTC34 HGNC:34297
## 5460 ENSG00000215912.12          TTC34 HGNC:34297
## 5461 ENSG00000215912.12          TTC34 HGNC:34297
## 5462 ENSG00000215912.12          TTC34 HGNC:34297
## 5463 ENSG00000215912.12          TTC34 HGNC:34297
## 5464 ENSG00000215912.12          TTC34 HGNC:34297
## 5465 ENSG00000215912.12          TTC34 HGNC:34297
## 5466 ENSG00000215912.12          TTC34 HGNC:34297
## 5467 ENSG00000215912.12          TTC34 HGNC:34297
## 5468 ENSG00000215912.12          TTC34 HGNC:34297
## 5469 ENSG00000215912.12          TTC34 HGNC:34297
## 5470 ENSG00000215912.12          TTC34 HGNC:34297
## 5471 ENSG00000215912.12          TTC34 HGNC:34297
## 5472 ENSG00000215912.12          TTC34 HGNC:34297
## 5473 ENSG00000215912.12          TTC34 HGNC:34297
## 5474 ENSG00000215912.12          TTC34 HGNC:34297
## 5475 ENSG00000215912.12          TTC34 HGNC:34297
## 5476 ENSG00000215912.12          TTC34 HGNC:34297
## 5477 ENSG00000215912.12          TTC34 HGNC:34297
## 5478 ENSG00000215912.12          TTC34 HGNC:34297
## 5479 ENSG00000215912.12          TTC34 HGNC:34297
## 5480 ENSG00000215912.12          TTC34 HGNC:34297
## 5481 ENSG00000215912.12          TTC34 HGNC:34297
## 5482 ENSG00000215912.12          TTC34 HGNC:34297
## 5483 ENSG00000215912.12          TTC34 HGNC:34297
## 5484 ENSG00000215912.12          TTC34 HGNC:34297
## 5485 ENSG00000215912.12          TTC34 HGNC:34297
## 5486 ENSG00000215912.12          TTC34 HGNC:34297
## 5487 ENSG00000215912.12          TTC34 HGNC:34297
## 5488 ENSG00000215912.12          TTC34 HGNC:34297
## 5489 ENSG00000215912.12          TTC34 HGNC:34297
## 5490 ENSG00000215912.12          TTC34 HGNC:34297
## 5491 ENSG00000215912.12          TTC34 HGNC:34297
## 5492 ENSG00000215912.12          TTC34 HGNC:34297
## 5493  ENSG00000285945.1      AC242022.2        <NA>
## 5494  ENSG00000285945.1      AC242022.2        <NA>
## 5495  ENSG00000285945.1      AC242022.2        <NA>
## 5496  ENSG00000285945.1      AC242022.2        <NA>
## 5497  ENSG00000285945.1      AC242022.2        <NA>
## 5498  ENSG00000283259.1      AC242022.1        <NA>
## 5499  ENSG00000283259.1      AC242022.1        <NA>
## 5500  ENSG00000283259.1      AC242022.1        <NA>
## 5501  ENSG00000283259.1      AC242022.1        <NA>
## 5502  ENSG00000283259.1      AC242022.1        <NA>
## 5503  ENSG00000283259.1      AC242022.1        <NA>
## 5504  ENSG00000283259.1      AC242022.1        <NA>
## 5505  ENSG00000283259.1      AC242022.1        <NA>
## 5506  ENSG00000283259.1      AC242022.1        <NA>
## 5507  ENSG00000283259.1      AC242022.1        <NA>
```

```
## 5508    ENSG00000283259.1     AC242022.1      <NA>
## 5509    ENSG00000283259.1     AC242022.1      <NA>
## 5510    ENSG00000233234.1     AL592464.2      <NA>
## 5511    ENSG00000233234.1     AL592464.2      <NA>
## 5512    ENSG00000233234.1     AL592464.2      <NA>
## 5513    ENSG00000233234.1     AL592464.2      <NA>
## 5514    ENSG00000287396.1     AL592464.3      <NA>
## 5515    ENSG00000287396.1     AL592464.3      <NA>
## 5516    ENSG00000287396.1     AL592464.3      <NA>
## 5517    ENSG00000287396.1     AL592464.3      <NA>
## 5518    ENSG00000231630.1     AL592464.1      <NA>
## 5519    ENSG00000231630.1     AL592464.1      <NA>
## 5520    ENSG00000231630.1     AL592464.1      <NA>
## 5521    ENSG00000231630.1     AL592464.1      <NA>
## 5522    ENSG00000284745.1     AL589702.1      <NA>
## 5523    ENSG00000284745.1     AL589702.1      <NA>
## 5524    ENSG00000284745.1     AL589702.1      <NA>
## 5525    ENSG00000284745.1     AL589702.1      <NA>
## 5526    ENSG00000284745.1     AL589702.1      <NA>
## 5527    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5528    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5529    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5530    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5531    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5532    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5533    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5534    ENSG00000169717.6        ACTRT2 HGNC:24026
## 5535   ENSG00000177133.11     PRDM16-DT HGNC:48664
## 5536   ENSG00000177133.11     PRDM16-DT HGNC:48664
## 5537   ENSG00000177133.11     PRDM16-DT HGNC:48664
## 5538   ENSG00000177133.11     PRDM16-DT HGNC:48664
## 5539   ENSG00000142611.17        PRDM16 HGNC:14000
## 5540   ENSG00000142611.17        PRDM16 HGNC:14000
## 5541   ENSG00000142611.17        PRDM16 HGNC:14000
## 5542   ENSG00000142611.17        PRDM16 HGNC:14000
## 5543   ENSG00000142611.17        PRDM16 HGNC:14000
## 5544   ENSG00000142611.17        PRDM16 HGNC:14000
## 5545   ENSG00000142611.17        PRDM16 HGNC:14000
## 5546   ENSG00000142611.17        PRDM16 HGNC:14000
## 5547   ENSG00000142611.17        PRDM16 HGNC:14000
## 5548   ENSG00000142611.17        PRDM16 HGNC:14000
## 5549   ENSG00000142611.17        PRDM16 HGNC:14000
## 5550   ENSG00000142611.17        PRDM16 HGNC:14000
## 5551   ENSG00000142611.17        PRDM16 HGNC:14000
## 5552   ENSG00000142611.17        PRDM16 HGNC:14000
## 5553   ENSG00000142611.17        PRDM16 HGNC:14000
## 5554   ENSG00000142611.17        PRDM16 HGNC:14000
## 5555   ENSG00000142611.17        PRDM16 HGNC:14000
## 5556   ENSG00000142611.17        PRDM16 HGNC:14000
## 5557   ENSG00000142611.17        PRDM16 HGNC:14000
## 5558   ENSG00000142611.17        PRDM16 HGNC:14000
## 5559   ENSG00000142611.17        PRDM16 HGNC:14000
## 5560   ENSG00000142611.17        PRDM16 HGNC:14000
## 5561   ENSG00000142611.17        PRDM16 HGNC:14000
```

```
## 5562 ENSG00000142611.17         PRDM16 HGNC:14000
## 5563 ENSG00000142611.17         PRDM16 HGNC:14000
## 5564 ENSG00000142611.17         PRDM16 HGNC:14000
## 5565 ENSG00000142611.17         PRDM16 HGNC:14000
## 5566 ENSG00000142611.17         PRDM16 HGNC:14000
## 5567 ENSG00000142611.17         PRDM16 HGNC:14000
## 5568 ENSG00000142611.17         PRDM16 HGNC:14000
## 5569 ENSG00000142611.17         PRDM16 HGNC:14000
## 5570 ENSG00000142611.17         PRDM16 HGNC:14000
## 5571 ENSG00000142611.17         PRDM16 HGNC:14000
## 5572 ENSG00000142611.17         PRDM16 HGNC:14000
## 5573 ENSG00000142611.17         PRDM16 HGNC:14000
## 5574 ENSG00000142611.17         PRDM16 HGNC:14000
## 5575 ENSG00000142611.17         PRDM16 HGNC:14000
## 5576 ENSG00000142611.17         PRDM16 HGNC:14000
## 5577 ENSG00000142611.17         PRDM16 HGNC:14000
## 5578 ENSG00000142611.17         PRDM16 HGNC:14000
## 5579 ENSG00000142611.17         PRDM16 HGNC:14000
## 5580 ENSG00000142611.17         PRDM16 HGNC:14000
## 5581 ENSG00000142611.17         PRDM16 HGNC:14000
## 5582 ENSG00000142611.17         PRDM16 HGNC:14000
## 5583 ENSG00000142611.17         PRDM16 HGNC:14000
## 5584 ENSG00000142611.17         PRDM16 HGNC:14000
## 5585 ENSG00000142611.17         PRDM16 HGNC:14000
## 5586 ENSG00000142611.17         PRDM16 HGNC:14000
## 5587 ENSG00000142611.17         PRDM16 HGNC:14000
## 5588 ENSG00000142611.17         PRDM16 HGNC:14000
## 5589 ENSG00000142611.17         PRDM16 HGNC:14000
## 5590 ENSG00000142611.17         PRDM16 HGNC:14000
## 5591 ENSG00000142611.17         PRDM16 HGNC:14000
## 5592 ENSG00000142611.17         PRDM16 HGNC:14000
## 5593 ENSG00000142611.17         PRDM16 HGNC:14000
## 5594 ENSG00000142611.17         PRDM16 HGNC:14000
## 5595 ENSG00000142611.17         PRDM16 HGNC:14000
## 5596 ENSG00000142611.17         PRDM16 HGNC:14000
## 5597 ENSG00000142611.17         PRDM16 HGNC:14000
## 5598 ENSG00000142611.17         PRDM16 HGNC:14000
## 5599 ENSG00000142611.17         PRDM16 HGNC:14000
## 5600 ENSG00000142611.17         PRDM16 HGNC:14000
## 5601 ENSG00000142611.17         PRDM16 HGNC:14000
## 5602 ENSG00000142611.17         PRDM16 HGNC:14000
## 5603 ENSG00000142611.17         PRDM16 HGNC:14000
## 5604 ENSG00000142611.17         PRDM16 HGNC:14000
## 5605 ENSG00000142611.17         PRDM16 HGNC:14000
## 5606 ENSG00000142611.17         PRDM16 HGNC:14000
## 5607 ENSG00000142611.17         PRDM16 HGNC:14000
## 5608 ENSG00000142611.17         PRDM16 HGNC:14000
## 5609 ENSG00000142611.17         PRDM16 HGNC:14000
## 5610 ENSG00000142611.17         PRDM16 HGNC:14000
## 5611 ENSG00000142611.17         PRDM16 HGNC:14000
## 5612 ENSG00000142611.17         PRDM16 HGNC:14000
## 5613 ENSG00000142611.17         PRDM16 HGNC:14000
## 5614 ENSG00000142611.17         PRDM16 HGNC:14000
## 5615 ENSG00000142611.17         PRDM16 HGNC:14000
```

```
## 5616 ENSG00000142611.17          PRDM16 HGNC:14000
## 5617 ENSG00000142611.17          PRDM16 HGNC:14000
## 5618 ENSG00000142611.17          PRDM16 HGNC:14000
## 5619 ENSG00000142611.17          PRDM16 HGNC:14000
## 5620 ENSG00000142611.17          PRDM16 HGNC:14000
## 5621 ENSG00000142611.17          PRDM16 HGNC:14000
## 5622 ENSG00000142611.17          PRDM16 HGNC:14000
## 5623 ENSG00000142611.17          PRDM16 HGNC:14000
## 5624 ENSG00000142611.17          PRDM16 HGNC:14000
## 5625 ENSG00000142611.17          PRDM16 HGNC:14000
## 5626 ENSG00000142611.17          PRDM16 HGNC:14000
## 5627 ENSG00000142611.17          PRDM16 HGNC:14000
## 5628 ENSG00000142611.17          PRDM16 HGNC:14000
## 5629 ENSG00000142611.17          PRDM16 HGNC:14000
## 5630 ENSG00000142611.17          PRDM16 HGNC:14000
## 5631 ENSG00000142611.17          PRDM16 HGNC:14000
## 5632 ENSG00000142611.17          PRDM16 HGNC:14000
## 5633 ENSG00000142611.17          PRDM16 HGNC:14000
## 5634 ENSG00000142611.17          PRDM16 HGNC:14000
## 5635 ENSG00000142611.17          PRDM16 HGNC:14000
## 5636 ENSG00000142611.17          PRDM16 HGNC:14000
## 5637 ENSG00000142611.17          PRDM16 HGNC:14000
## 5638 ENSG00000142611.17          PRDM16 HGNC:14000
## 5639 ENSG00000142611.17          PRDM16 HGNC:14000
## 5640 ENSG00000142611.17          PRDM16 HGNC:14000
## 5641 ENSG00000142611.17          PRDM16 HGNC:14000
## 5642 ENSG00000142611.17          PRDM16 HGNC:14000
## 5643 ENSG00000142611.17          PRDM16 HGNC:14000
## 5644 ENSG00000142611.17          PRDM16 HGNC:14000
## 5645 ENSG00000142611.17          PRDM16 HGNC:14000
## 5646 ENSG00000142611.17          PRDM16 HGNC:14000
## 5647 ENSG00000142611.17          PRDM16 HGNC:14000
## 5648 ENSG00000142611.17          PRDM16 HGNC:14000
## 5649 ENSG00000142611.17          PRDM16 HGNC:14000
## 5650 ENSG00000142611.17          PRDM16 HGNC:14000
## 5651 ENSG00000142611.17          PRDM16 HGNC:14000
## 5652 ENSG00000142611.17          PRDM16 HGNC:14000
## 5653 ENSG00000142611.17          PRDM16 HGNC:14000
## 5654 ENSG00000142611.17          PRDM16 HGNC:14000
## 5655 ENSG00000142611.17          PRDM16 HGNC:14000
## 5656 ENSG00000142611.17          PRDM16 HGNC:14000
## 5657 ENSG00000142611.17          PRDM16 HGNC:14000
## 5658 ENSG00000142611.17          PRDM16 HGNC:14000
## 5659 ENSG00000142611.17          PRDM16 HGNC:14000
## 5660 ENSG00000142611.17          PRDM16 HGNC:14000
## 5661 ENSG00000142611.17          PRDM16 HGNC:14000
## 5662 ENSG00000142611.17          PRDM16 HGNC:14000
## 5663 ENSG00000142611.17          PRDM16 HGNC:14000
## 5664 ENSG00000142611.17          PRDM16 HGNC:14000
## 5665 ENSG00000142611.17          PRDM16 HGNC:14000
## 5666 ENSG00000142611.17          PRDM16 HGNC:14000
## 5667 ENSG00000142611.17          PRDM16 HGNC:14000
## 5668 ENSG00000142611.17          PRDM16 HGNC:14000
## 5669 ENSG00000142611.17          PRDM16 HGNC:14000
```

```
## 5670 ENSG00000142611.17        PRDM16 HGNC:14000
## 5671 ENSG00000142611.17        PRDM16 HGNC:14000
## 5672 ENSG00000142611.17        PRDM16 HGNC:14000
## 5673 ENSG00000142611.17        PRDM16 HGNC:14000
## 5674 ENSG00000142611.17        PRDM16 HGNC:14000
## 5675 ENSG00000142611.17        PRDM16 HGNC:14000
## 5676 ENSG00000142611.17        PRDM16 HGNC:14000
## 5677 ENSG00000142611.17        PRDM16 HGNC:14000
## 5678 ENSG00000142611.17        PRDM16 HGNC:14000
## 5679 ENSG00000142611.17        PRDM16 HGNC:14000
## 5680 ENSG00000142611.17        PRDM16 HGNC:14000
## 5681 ENSG00000142611.17        PRDM16 HGNC:14000
## 5682 ENSG00000142611.17        PRDM16 HGNC:14000
## 5683 ENSG00000142611.17        PRDM16 HGNC:14000
## 5684 ENSG00000142611.17        PRDM16 HGNC:14000
## 5685 ENSG00000142611.17        PRDM16 HGNC:14000
## 5686 ENSG00000142611.17        PRDM16 HGNC:14000
## 5687 ENSG00000142611.17        PRDM16 HGNC:14000
## 5688 ENSG00000142611.17        PRDM16 HGNC:14000
## 5689 ENSG00000142611.17        PRDM16 HGNC:14000
## 5690 ENSG00000142611.17        PRDM16 HGNC:14000
## 5691 ENSG00000142611.17        PRDM16 HGNC:14000
## 5692  ENSG00000283572.1        MIR4251 HGNC:38370
## 5693  ENSG00000283572.1        MIR4251 HGNC:38370
## 5694  ENSG00000283572.1        MIR4251 HGNC:38370
## 5695  ENSG00000226286.1     AL008733.1       <NA>
## 5696  ENSG00000226286.1     AL008733.1       <NA>
## 5697  ENSG00000226286.1     AL008733.1       <NA>
## 5698  ENSG00000226286.1     AL008733.1       <NA>
## 5699  ENSG00000279839.1     AL512383.1       <NA>
## 5700  ENSG00000279839.1     AL512383.1       <NA>
## 5701  ENSG00000279839.1     AL512383.1       <NA>
## 5702  ENSG00000272235.1     AL590438.1       <NA>
## 5703  ENSG00000272235.1     AL590438.1       <NA>
## 5704  ENSG00000272235.1     AL590438.1       <NA>
## 5705  ENSG00000287828.1     AL354743.2       <NA>
## 5706  ENSG00000287828.1     AL354743.2       <NA>
## 5707  ENSG00000287828.1     AL354743.2       <NA>
## 5708  ENSG00000287828.1     AL354743.2       <NA>
## 5709  ENSG00000286518.1     AL354743.1       <NA>
## 5710  ENSG00000286518.1     AL354743.1       <NA>
## 5711  ENSG00000286518.1     AL354743.1       <NA>
## 5712  ENSG00000286518.1     AL354743.1       <NA>
## 5713 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5714 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5715 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5716 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5717 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5718 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5719 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5720 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5721 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5722 ENSG00000130762.15       ARHGEF16 HGNC:15515
## 5723 ENSG00000130762.15       ARHGEF16 HGNC:15515
```

```
## 5724 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5725 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5726 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5727 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5728 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5729 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5730 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5731 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5732 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5733 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5734 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5735 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5736 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5737 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5738 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5739 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5740 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5741 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5742 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5743 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5744 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5745 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5746 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5747 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5748 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5749 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5750 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5751 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5752 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5753 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5754 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5755 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5756 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5757 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5758 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5759 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5760 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5761 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5762 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5763 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5764 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5765 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5766 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5767 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5768 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5769 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5770 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5771 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5772 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5773 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5774 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5775 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5776 ENSG00000130762.15        ARHGEF16 HGNC:15515
## 5777 ENSG00000130762.15        ARHGEF16 HGNC:15515
```

```
## 5778 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5779 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5780 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5781 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5782 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5783 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5784 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5785 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5786 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5787 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5788 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5789 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5790 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5791 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5792 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5793 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5794 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5795 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5796 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5797 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5798 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5799 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5800 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5801 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5802 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5803 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5804 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5805 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5806 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5807 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5808 ENSG00000130762.15      ARHGEF16 HGNC:15515
## 5809  ENSG00000272088.1     AL512413.1        <NA>
## 5810  ENSG00000272088.1     AL512413.1        <NA>
## 5811  ENSG00000272088.1     AL512413.1        <NA>
## 5812 ENSG00000162591.16         MEGF6  HGNC:3232
## 5813 ENSG00000162591.16         MEGF6  HGNC:3232
## 5814 ENSG00000162591.16         MEGF6  HGNC:3232
## 5815 ENSG00000162591.16         MEGF6  HGNC:3232
## 5816 ENSG00000162591.16         MEGF6  HGNC:3232
## 5817 ENSG00000162591.16         MEGF6  HGNC:3232
## 5818 ENSG00000162591.16         MEGF6  HGNC:3232
## 5819 ENSG00000162591.16         MEGF6  HGNC:3232
## 5820 ENSG00000162591.16         MEGF6  HGNC:3232
## 5821 ENSG00000162591.16         MEGF6  HGNC:3232
## 5822 ENSG00000162591.16         MEGF6  HGNC:3232
## 5823 ENSG00000162591.16         MEGF6  HGNC:3232
## 5824 ENSG00000162591.16         MEGF6  HGNC:3232
## 5825 ENSG00000162591.16         MEGF6  HGNC:3232
## 5826 ENSG00000162591.16         MEGF6  HGNC:3232
## 5827 ENSG00000162591.16         MEGF6  HGNC:3232
## 5828 ENSG00000162591.16         MEGF6  HGNC:3232
## 5829 ENSG00000162591.16         MEGF6  HGNC:3232
## 5830 ENSG00000162591.16         MEGF6  HGNC:3232
## 5831 ENSG00000162591.16         MEGF6  HGNC:3232
```

```
## 5832 ENSG00000162591.16          MEGF6   HGNC:3232
## 5833 ENSG00000162591.16          MEGF6   HGNC:3232
## 5834 ENSG00000162591.16          MEGF6   HGNC:3232
## 5835 ENSG00000162591.16          MEGF6   HGNC:3232
## 5836 ENSG00000162591.16          MEGF6   HGNC:3232
## 5837 ENSG00000162591.16          MEGF6   HGNC:3232
## 5838 ENSG00000162591.16          MEGF6   HGNC:3232
## 5839 ENSG00000162591.16          MEGF6   HGNC:3232
## 5840 ENSG00000162591.16          MEGF6   HGNC:3232
## 5841 ENSG00000162591.16          MEGF6   HGNC:3232
## 5842 ENSG00000162591.16          MEGF6   HGNC:3232
## 5843 ENSG00000162591.16          MEGF6   HGNC:3232
## 5844 ENSG00000162591.16          MEGF6   HGNC:3232
## 5845 ENSG00000162591.16          MEGF6   HGNC:3232
## 5846 ENSG00000162591.16          MEGF6   HGNC:3232
## 5847 ENSG00000162591.16          MEGF6   HGNC:3232
## 5848 ENSG00000162591.16          MEGF6   HGNC:3232
## 5849 ENSG00000162591.16          MEGF6   HGNC:3232
## 5850 ENSG00000162591.16          MEGF6   HGNC:3232
## 5851 ENSG00000162591.16          MEGF6   HGNC:3232
## 5852 ENSG00000162591.16          MEGF6   HGNC:3232
## 5853 ENSG00000162591.16          MEGF6   HGNC:3232
## 5854 ENSG00000162591.16          MEGF6   HGNC:3232
## 5855 ENSG00000162591.16          MEGF6   HGNC:3232
## 5856 ENSG00000162591.16          MEGF6   HGNC:3232
## 5857 ENSG00000162591.16          MEGF6   HGNC:3232
## 5858 ENSG00000162591.16          MEGF6   HGNC:3232
## 5859 ENSG00000162591.16          MEGF6   HGNC:3232
## 5860 ENSG00000162591.16          MEGF6   HGNC:3232
## 5861 ENSG00000162591.16          MEGF6   HGNC:3232
## 5862 ENSG00000162591.16          MEGF6   HGNC:3232
## 5863 ENSG00000162591.16          MEGF6   HGNC:3232
## 5864 ENSG00000162591.16          MEGF6   HGNC:3232
## 5865 ENSG00000162591.16          MEGF6   HGNC:3232
## 5866 ENSG00000162591.16          MEGF6   HGNC:3232
## 5867 ENSG00000162591.16          MEGF6   HGNC:3232
## 5868 ENSG00000162591.16          MEGF6   HGNC:3232
## 5869 ENSG00000162591.16          MEGF6   HGNC:3232
## 5870 ENSG00000162591.16          MEGF6   HGNC:3232
## 5871 ENSG00000162591.16          MEGF6   HGNC:3232
## 5872 ENSG00000162591.16          MEGF6   HGNC:3232
## 5873 ENSG00000162591.16          MEGF6   HGNC:3232
## 5874 ENSG00000162591.16          MEGF6   HGNC:3232
## 5875 ENSG00000162591.16          MEGF6   HGNC:3232
## 5876 ENSG00000162591.16          MEGF6   HGNC:3232
## 5877 ENSG00000162591.16          MEGF6   HGNC:3232
## 5878 ENSG00000162591.16          MEGF6   HGNC:3232
## 5879 ENSG00000162591.16          MEGF6   HGNC:3232
## 5880 ENSG00000162591.16          MEGF6   HGNC:3232
## 5881 ENSG00000162591.16          MEGF6   HGNC:3232
## 5882 ENSG00000162591.16          MEGF6   HGNC:3232
## 5883 ENSG00000162591.16          MEGF6   HGNC:3232
## 5884 ENSG00000162591.16          MEGF6   HGNC:3232
## 5885 ENSG00000162591.16          MEGF6   HGNC:3232
```

```
## 5886 ENSG00000162591.16          MEGF6   HGNC:3232
## 5887 ENSG00000162591.16          MEGF6   HGNC:3232
## 5888 ENSG00000162591.16          MEGF6   HGNC:3232
## 5889 ENSG00000162591.16          MEGF6   HGNC:3232
## 5890 ENSG00000162591.16          MEGF6   HGNC:3232
## 5891 ENSG00000162591.16          MEGF6   HGNC:3232
## 5892 ENSG00000162591.16          MEGF6   HGNC:3232
## 5893 ENSG00000162591.16          MEGF6   HGNC:3232
## 5894 ENSG00000162591.16          MEGF6   HGNC:3232
## 5895 ENSG00000162591.16          MEGF6   HGNC:3232
## 5896 ENSG00000162591.16          MEGF6   HGNC:3232
## 5897 ENSG00000162591.16          MEGF6   HGNC:3232
## 5898 ENSG00000162591.16          MEGF6   HGNC:3232
## 5899 ENSG00000162591.16          MEGF6   HGNC:3232
## 5900 ENSG00000162591.16          MEGF6   HGNC:3232
## 5901 ENSG00000162591.16          MEGF6   HGNC:3232
## 5902 ENSG00000162591.16          MEGF6   HGNC:3232
## 5903 ENSG00000162591.16          MEGF6   HGNC:3232
## 5904 ENSG00000162591.16          MEGF6   HGNC:3232
## 5905 ENSG00000162591.16          MEGF6   HGNC:3232
## 5906 ENSG00000162591.16          MEGF6   HGNC:3232
## 5907 ENSG00000162591.16          MEGF6   HGNC:3232
## 5908 ENSG00000162591.16          MEGF6   HGNC:3232
## 5909 ENSG00000162591.16          MEGF6   HGNC:3232
## 5910 ENSG00000162591.16          MEGF6   HGNC:3232
## 5911 ENSG00000162591.16          MEGF6   HGNC:3232
## 5912 ENSG00000162591.16          MEGF6   HGNC:3232
## 5913 ENSG00000162591.16          MEGF6   HGNC:3232
## 5914 ENSG00000162591.16          MEGF6   HGNC:3232
## 5915 ENSG00000162591.16          MEGF6   HGNC:3232
## 5916 ENSG00000162591.16          MEGF6   HGNC:3232
## 5917 ENSG00000162591.16          MEGF6   HGNC:3232
## 5918 ENSG00000162591.16          MEGF6   HGNC:3232
## 5919 ENSG00000162591.16          MEGF6   HGNC:3232
## 5920 ENSG00000162591.16          MEGF6   HGNC:3232
## 5921 ENSG00000162591.16          MEGF6   HGNC:3232
## 5922 ENSG00000162591.16          MEGF6   HGNC:3232
## 5923 ENSG00000162591.16          MEGF6   HGNC:3232
## 5924 ENSG00000162591.16          MEGF6   HGNC:3232
## 5925 ENSG00000162591.16          MEGF6   HGNC:3232
## 5926 ENSG00000162591.16          MEGF6   HGNC:3232
## 5927 ENSG00000162591.16          MEGF6   HGNC:3232
## 5928 ENSG00000162591.16          MEGF6   HGNC:3232
## 5929 ENSG00000162591.16          MEGF6   HGNC:3232
## 5930 ENSG00000162591.16          MEGF6   HGNC:3232
## 5931 ENSG00000162591.16          MEGF6   HGNC:3232
## 5932 ENSG00000162591.16          MEGF6   HGNC:3232
## 5933 ENSG00000162591.16          MEGF6   HGNC:3232
## 5934 ENSG00000162591.16          MEGF6   HGNC:3232
## 5935 ENSG00000162591.16          MEGF6   HGNC:3232
## 5936 ENSG00000162591.16          MEGF6   HGNC:3232
## 5937 ENSG00000162591.16          MEGF6   HGNC:3232
## 5938 ENSG00000162591.16          MEGF6   HGNC:3232
## 5939 ENSG00000162591.16          MEGF6   HGNC:3232
```

```
## 5940 ENSG00000162591.16        MEGF6  HGNC:3232
## 5941 ENSG00000162591.16        MEGF6  HGNC:3232
## 5942 ENSG00000162591.16        MEGF6  HGNC:3232
## 5943 ENSG00000162591.16        MEGF6  HGNC:3232
## 5944 ENSG00000162591.16        MEGF6  HGNC:3232
## 5945 ENSG00000162591.16        MEGF6  HGNC:3232
## 5946 ENSG00000162591.16        MEGF6  HGNC:3232
## 5947 ENSG00000162591.16        MEGF6  HGNC:3232
## 5948 ENSG00000162591.16        MEGF6  HGNC:3232
## 5949 ENSG00000162591.16        MEGF6  HGNC:3232
## 5950 ENSG00000162591.16        MEGF6  HGNC:3232
## 5951 ENSG00000162591.16        MEGF6  HGNC:3232
## 5952 ENSG00000162591.16        MEGF6  HGNC:3232
## 5953 ENSG00000162591.16        MEGF6  HGNC:3232
## 5954 ENSG00000162591.16        MEGF6  HGNC:3232
## 5955 ENSG00000162591.16        MEGF6  HGNC:3232
## 5956 ENSG00000162591.16        MEGF6  HGNC:3232
## 5957  ENSG00000207776.1      MIR551A HGNC:32806
## 5958  ENSG00000207776.1      MIR551A HGNC:32806
## 5959  ENSG00000207776.1      MIR551A HGNC:32806
## 5960  ENSG00000238260.1   AL513320.1       <NA>
## 5961  ENSG00000238260.1   AL513320.1       <NA>
## 5962  ENSG00000238260.1   AL513320.1       <NA>
## 5963  ENSG00000238260.1   AL513320.1       <NA>
## 5964  ENSG00000238260.1   AL513320.1       <NA>
## 5965 ENSG00000158109.15       TPRG1L HGNC:27007
## 5966 ENSG00000158109.15       TPRG1L HGNC:27007
## 5967 ENSG00000158109.15       TPRG1L HGNC:27007
## 5968 ENSG00000158109.15       TPRG1L HGNC:27007
## 5969 ENSG00000158109.15       TPRG1L HGNC:27007
## 5970 ENSG00000158109.15       TPRG1L HGNC:27007
## 5971 ENSG00000158109.15       TPRG1L HGNC:27007
## 5972 ENSG00000158109.15       TPRG1L HGNC:27007
## 5973 ENSG00000158109.15       TPRG1L HGNC:27007
## 5974 ENSG00000158109.15       TPRG1L HGNC:27007
## 5975 ENSG00000158109.15       TPRG1L HGNC:27007
## 5976 ENSG00000158109.15       TPRG1L HGNC:27007
## 5977 ENSG00000158109.15       TPRG1L HGNC:27007
## 5978 ENSG00000158109.15       TPRG1L HGNC:27007
## 5979 ENSG00000158109.15       TPRG1L HGNC:27007
## 5980 ENSG00000158109.15       TPRG1L HGNC:27007
## 5981 ENSG00000158109.15       TPRG1L HGNC:27007
## 5982 ENSG00000158109.15       TPRG1L HGNC:27007
## 5983 ENSG00000158109.15       TPRG1L HGNC:27007
## 5984 ENSG00000158109.15       TPRG1L HGNC:27007
## 5985 ENSG00000158109.15       TPRG1L HGNC:27007
## 5986 ENSG00000158109.15       TPRG1L HGNC:27007
## 5987 ENSG00000158109.15       TPRG1L HGNC:27007
## 5988 ENSG00000158109.15       TPRG1L HGNC:27007
## 5989 ENSG00000158109.15       TPRG1L HGNC:27007
## 5990 ENSG00000158109.15       TPRG1L HGNC:27007
## 5991 ENSG00000158109.15       TPRG1L HGNC:27007
## 5992 ENSG00000158109.15       TPRG1L HGNC:27007
## 5993 ENSG00000158109.15       TPRG1L HGNC:27007
```

```
## 5994 ENSG00000116213.16          WRAP73 HGNC:12759
## 5995 ENSG00000116213.16          WRAP73 HGNC:12759
## 5996 ENSG00000116213.16          WRAP73 HGNC:12759
## 5997 ENSG00000116213.16          WRAP73 HGNC:12759
## 5998 ENSG00000116213.16          WRAP73 HGNC:12759
## 5999 ENSG00000116213.16          WRAP73 HGNC:12759
## 6000 ENSG00000116213.16          WRAP73 HGNC:12759
## 6001 ENSG00000116213.16          WRAP73 HGNC:12759
## 6002 ENSG00000116213.16          WRAP73 HGNC:12759
## 6003 ENSG00000116213.16          WRAP73 HGNC:12759
## 6004 ENSG00000116213.16          WRAP73 HGNC:12759
## 6005 ENSG00000116213.16          WRAP73 HGNC:12759
## 6006 ENSG00000116213.16          WRAP73 HGNC:12759
## 6007 ENSG00000116213.16          WRAP73 HGNC:12759
## 6008 ENSG00000116213.16          WRAP73 HGNC:12759
## 6009 ENSG00000116213.16          WRAP73 HGNC:12759
## 6010 ENSG00000116213.16          WRAP73 HGNC:12759
## 6011 ENSG00000116213.16          WRAP73 HGNC:12759
## 6012 ENSG00000116213.16          WRAP73 HGNC:12759
## 6013 ENSG00000116213.16          WRAP73 HGNC:12759
## 6014 ENSG00000116213.16          WRAP73 HGNC:12759
## 6015 ENSG00000116213.16          WRAP73 HGNC:12759
## 6016 ENSG00000116213.16          WRAP73 HGNC:12759
## 6017 ENSG00000116213.16          WRAP73 HGNC:12759
## 6018 ENSG00000116213.16          WRAP73 HGNC:12759
## 6019 ENSG00000116213.16          WRAP73 HGNC:12759
## 6020 ENSG00000116213.16          WRAP73 HGNC:12759
## 6021 ENSG00000116213.16          WRAP73 HGNC:12759
## 6022 ENSG00000116213.16          WRAP73 HGNC:12759
## 6023 ENSG00000116213.16          WRAP73 HGNC:12759
## 6024 ENSG00000116213.16          WRAP73 HGNC:12759
## 6025 ENSG00000116213.16          WRAP73 HGNC:12759
## 6026 ENSG00000116213.16          WRAP73 HGNC:12759
## 6027 ENSG00000116213.16          WRAP73 HGNC:12759
## 6028 ENSG00000116213.16          WRAP73 HGNC:12759
## 6029 ENSG00000116213.16          WRAP73 HGNC:12759
## 6030 ENSG00000116213.16          WRAP73 HGNC:12759
## 6031 ENSG00000116213.16          WRAP73 HGNC:12759
## 6032 ENSG00000116213.16          WRAP73 HGNC:12759
## 6033 ENSG00000116213.16          WRAP73 HGNC:12759
## 6034 ENSG00000116213.16          WRAP73 HGNC:12759
## 6035 ENSG00000116213.16          WRAP73 HGNC:12759
## 6036 ENSG00000116213.16          WRAP73 HGNC:12759
## 6037 ENSG00000116213.16          WRAP73 HGNC:12759
## 6038 ENSG00000116213.16          WRAP73 HGNC:12759
## 6039 ENSG00000116213.16          WRAP73 HGNC:12759
## 6040 ENSG00000116213.16          WRAP73 HGNC:12759
## 6041 ENSG00000116213.16          WRAP73 HGNC:12759
## 6042 ENSG00000116213.16          WRAP73 HGNC:12759
## 6043 ENSG00000116213.16          WRAP73 HGNC:12759
## 6044 ENSG00000116213.16          WRAP73 HGNC:12759
## 6045 ENSG00000116213.16          WRAP73 HGNC:12759
## 6046 ENSG00000116213.16          WRAP73 HGNC:12759
## 6047 ENSG00000116213.16          WRAP73 HGNC:12759
```

```
## 6048 ENSG00000116213.16      WRAP73 HGNC:12759
## 6049 ENSG00000116213.16      WRAP73 HGNC:12759
## 6050 ENSG00000116213.16      WRAP73 HGNC:12759
## 6051 ENSG00000078900.15       TP73 HGNC:12003
## 6052 ENSG00000078900.15       TP73 HGNC:12003
## 6053 ENSG00000078900.15       TP73 HGNC:12003
## 6054 ENSG00000078900.15       TP73 HGNC:12003
## 6055 ENSG00000078900.15       TP73 HGNC:12003
## 6056 ENSG00000078900.15       TP73 HGNC:12003
## 6057 ENSG00000078900.15       TP73 HGNC:12003
## 6058 ENSG00000078900.15       TP73 HGNC:12003
## 6059 ENSG00000078900.15       TP73 HGNC:12003
## 6060 ENSG00000078900.15       TP73 HGNC:12003
## 6061 ENSG00000078900.15       TP73 HGNC:12003
## 6062 ENSG00000078900.15       TP73 HGNC:12003
## 6063 ENSG00000078900.15       TP73 HGNC:12003
## 6064 ENSG00000078900.15       TP73 HGNC:12003
## 6065 ENSG00000078900.15       TP73 HGNC:12003
## 6066 ENSG00000078900.15       TP73 HGNC:12003
## 6067 ENSG00000078900.15       TP73 HGNC:12003
## 6068 ENSG00000078900.15       TP73 HGNC:12003
## 6069 ENSG00000078900.15       TP73 HGNC:12003
## 6070 ENSG00000078900.15       TP73 HGNC:12003
## 6071 ENSG00000078900.15       TP73 HGNC:12003
## 6072 ENSG00000078900.15       TP73 HGNC:12003
## 6073 ENSG00000078900.15       TP73 HGNC:12003
## 6074 ENSG00000078900.15       TP73 HGNC:12003
## 6075 ENSG00000078900.15       TP73 HGNC:12003
## 6076 ENSG00000078900.15       TP73 HGNC:12003
## 6077 ENSG00000078900.15       TP73 HGNC:12003
## 6078 ENSG00000078900.15       TP73 HGNC:12003
## 6079 ENSG00000078900.15       TP73 HGNC:12003
## 6080 ENSG00000078900.15       TP73 HGNC:12003
## 6081 ENSG00000078900.15       TP73 HGNC:12003
## 6082 ENSG00000078900.15       TP73 HGNC:12003
## 6083 ENSG00000078900.15       TP73 HGNC:12003
## 6084 ENSG00000078900.15       TP73 HGNC:12003
## 6085 ENSG00000078900.15       TP73 HGNC:12003
## 6086 ENSG00000078900.15       TP73 HGNC:12003
## 6087 ENSG00000078900.15       TP73 HGNC:12003
## 6088 ENSG00000078900.15       TP73 HGNC:12003
## 6089 ENSG00000078900.15       TP73 HGNC:12003
## 6090 ENSG00000078900.15       TP73 HGNC:12003
## 6091 ENSG00000078900.15       TP73 HGNC:12003
## 6092 ENSG00000078900.15       TP73 HGNC:12003
## 6093 ENSG00000078900.15       TP73 HGNC:12003
## 6094 ENSG00000078900.15       TP73 HGNC:12003
## 6095 ENSG00000078900.15       TP73 HGNC:12003
## 6096 ENSG00000078900.15       TP73 HGNC:12003
## 6097 ENSG00000078900.15       TP73 HGNC:12003
## 6098 ENSG00000078900.15       TP73 HGNC:12003
## 6099 ENSG00000078900.15       TP73 HGNC:12003
## 6100 ENSG00000078900.15       TP73 HGNC:12003
## 6101 ENSG00000078900.15       TP73 HGNC:12003
```

```
## 6102 ENSG00000078900.15          TP73 HGNC:12003
## 6103 ENSG00000078900.15          TP73 HGNC:12003
## 6104 ENSG00000078900.15          TP73 HGNC:12003
## 6105 ENSG00000078900.15          TP73 HGNC:12003
## 6106 ENSG00000078900.15          TP73 HGNC:12003
## 6107 ENSG00000078900.15          TP73 HGNC:12003
## 6108 ENSG00000078900.15          TP73 HGNC:12003
## 6109 ENSG00000078900.15          TP73 HGNC:12003
## 6110 ENSG00000078900.15          TP73 HGNC:12003
## 6111 ENSG00000078900.15          TP73 HGNC:12003
## 6112 ENSG00000078900.15          TP73 HGNC:12003
## 6113 ENSG00000078900.15          TP73 HGNC:12003
## 6114 ENSG00000078900.15          TP73 HGNC:12003
## 6115 ENSG00000078900.15          TP73 HGNC:12003
## 6116 ENSG00000078900.15          TP73 HGNC:12003
## 6117 ENSG00000078900.15          TP73 HGNC:12003
## 6118 ENSG00000078900.15          TP73 HGNC:12003
## 6119 ENSG00000078900.15          TP73 HGNC:12003
## 6120 ENSG00000078900.15          TP73 HGNC:12003
## 6121 ENSG00000078900.15          TP73 HGNC:12003
## 6122 ENSG00000078900.15          TP73 HGNC:12003
## 6123 ENSG00000078900.15          TP73 HGNC:12003
## 6124 ENSG00000078900.15          TP73 HGNC:12003
## 6125 ENSG00000078900.15          TP73 HGNC:12003
## 6126 ENSG00000078900.15          TP73 HGNC:12003
## 6127 ENSG00000078900.15          TP73 HGNC:12003
## 6128 ENSG00000078900.15          TP73 HGNC:12003
## 6129 ENSG00000078900.15          TP73 HGNC:12003
## 6130 ENSG00000078900.15          TP73 HGNC:12003
## 6131 ENSG00000078900.15          TP73 HGNC:12003
## 6132 ENSG00000078900.15          TP73 HGNC:12003
## 6133 ENSG00000078900.15          TP73 HGNC:12003
## 6134 ENSG00000078900.15          TP73 HGNC:12003
## 6135 ENSG00000078900.15          TP73 HGNC:12003
## 6136 ENSG00000078900.15          TP73 HGNC:12003
## 6137 ENSG00000078900.15          TP73 HGNC:12003
## 6138 ENSG00000078900.15          TP73 HGNC:12003
## 6139 ENSG00000078900.15          TP73 HGNC:12003
## 6140 ENSG00000078900.15          TP73 HGNC:12003
## 6141 ENSG00000078900.15          TP73 HGNC:12003
## 6142 ENSG00000078900.15          TP73 HGNC:12003
## 6143 ENSG00000078900.15          TP73 HGNC:12003
## 6144 ENSG00000078900.15          TP73 HGNC:12003
## 6145 ENSG00000078900.15          TP73 HGNC:12003
## 6146 ENSG00000078900.15          TP73 HGNC:12003
## 6147 ENSG00000078900.15          TP73 HGNC:12003
## 6148 ENSG00000078900.15          TP73 HGNC:12003
## 6149 ENSG00000078900.15          TP73 HGNC:12003
## 6150 ENSG00000078900.15          TP73 HGNC:12003
## 6151 ENSG00000078900.15          TP73 HGNC:12003
## 6152 ENSG00000078900.15          TP73 HGNC:12003
## 6153 ENSG00000078900.15          TP73 HGNC:12003
## 6154 ENSG00000078900.15          TP73 HGNC:12003
## 6155 ENSG00000078900.15          TP73 HGNC:12003
```

```
## 6156 ENSG00000078900.15          TP73 HGNC:12003
## 6157 ENSG00000078900.15          TP73 HGNC:12003
## 6158 ENSG00000078900.15          TP73 HGNC:12003
## 6159 ENSG00000078900.15          TP73 HGNC:12003
## 6160 ENSG00000078900.15          TP73 HGNC:12003
## 6161 ENSG00000078900.15          TP73 HGNC:12003
## 6162 ENSG00000078900.15          TP73 HGNC:12003
## 6163 ENSG00000078900.15          TP73 HGNC:12003
## 6164 ENSG00000078900.15          TP73 HGNC:12003
## 6165 ENSG00000078900.15          TP73 HGNC:12003
## 6166 ENSG00000078900.15          TP73 HGNC:12003
## 6167 ENSG00000078900.15          TP73 HGNC:12003
## 6168 ENSG00000078900.15          TP73 HGNC:12003
## 6169 ENSG00000078900.15          TP73 HGNC:12003
## 6170 ENSG00000078900.15          TP73 HGNC:12003
## 6171 ENSG00000078900.15          TP73 HGNC:12003
## 6172 ENSG00000078900.15          TP73 HGNC:12003
## 6173 ENSG00000078900.15          TP73 HGNC:12003
## 6174 ENSG00000078900.15          TP73 HGNC:12003
## 6175 ENSG00000078900.15          TP73 HGNC:12003
## 6176 ENSG00000078900.15          TP73 HGNC:12003
## 6177 ENSG00000078900.15          TP73 HGNC:12003
## 6178 ENSG00000078900.15          TP73 HGNC:12003
## 6179 ENSG00000078900.15          TP73 HGNC:12003
## 6180 ENSG00000078900.15          TP73 HGNC:12003
## 6181 ENSG00000078900.15          TP73 HGNC:12003
## 6182 ENSG00000078900.15          TP73 HGNC:12003
## 6183 ENSG00000078900.15          TP73 HGNC:12003
## 6184 ENSG00000078900.15          TP73 HGNC:12003
## 6185 ENSG00000078900.15          TP73 HGNC:12003
## 6186 ENSG00000078900.15          TP73 HGNC:12003
## 6187 ENSG00000078900.15          TP73 HGNC:12003
## 6188 ENSG00000078900.15          TP73 HGNC:12003
## 6189 ENSG00000078900.15          TP73 HGNC:12003
## 6190 ENSG00000078900.15          TP73 HGNC:12003
## 6191 ENSG00000078900.15          TP73 HGNC:12003
## 6192 ENSG00000078900.15          TP73 HGNC:12003
## 6193 ENSG00000078900.15          TP73 HGNC:12003
## 6194 ENSG00000078900.15          TP73 HGNC:12003
## 6195 ENSG00000078900.15          TP73 HGNC:12003
## 6196 ENSG00000078900.15          TP73 HGNC:12003
## 6197 ENSG00000078900.15          TP73 HGNC:12003
## 6198 ENSG00000078900.15          TP73 HGNC:12003
## 6199 ENSG00000078900.15          TP73 HGNC:12003
## 6200 ENSG00000078900.15          TP73 HGNC:12003
## 6201 ENSG00000078900.15          TP73 HGNC:12003
## 6202 ENSG00000078900.15          TP73 HGNC:12003
## 6203 ENSG00000078900.15          TP73 HGNC:12003
## 6204 ENSG00000078900.15          TP73 HGNC:12003
## 6205 ENSG00000078900.15          TP73 HGNC:12003
## 6206 ENSG00000078900.15          TP73 HGNC:12003
## 6207 ENSG00000078900.15          TP73 HGNC:12003
## 6208 ENSG00000078900.15          TP73 HGNC:12003
## 6209 ENSG00000078900.15          TP73 HGNC:12003
```

```
## 6210 ENSG00000078900.15          TP73 HGNC:12003
## 6211 ENSG00000078900.15          TP73 HGNC:12003
## 6212 ENSG00000078900.15          TP73 HGNC:12003
## 6213 ENSG00000078900.15          TP73 HGNC:12003
## 6214 ENSG00000078900.15          TP73 HGNC:12003
## 6215 ENSG00000078900.15          TP73 HGNC:12003
## 6216 ENSG00000078900.15          TP73 HGNC:12003
## 6217 ENSG00000078900.15          TP73 HGNC:12003
## 6218 ENSG00000078900.15          TP73 HGNC:12003
## 6219 ENSG00000078900.15          TP73 HGNC:12003
## 6220 ENSG00000078900.15          TP73 HGNC:12003
## 6221 ENSG00000078900.15          TP73 HGNC:12003
## 6222 ENSG00000078900.15          TP73 HGNC:12003
## 6223 ENSG00000078900.15          TP73 HGNC:12003
## 6224 ENSG00000078900.15          TP73 HGNC:12003
## 6225 ENSG00000078900.15          TP73 HGNC:12003
## 6226 ENSG00000078900.15          TP73 HGNC:12003
## 6227 ENSG00000078900.15          TP73 HGNC:12003
## 6228 ENSG00000078900.15          TP73 HGNC:12003
## 6229 ENSG00000078900.15          TP73 HGNC:12003
## 6230 ENSG00000078900.15          TP73 HGNC:12003
## 6231 ENSG00000078900.15          TP73 HGNC:12003
## 6232 ENSG00000078900.15          TP73 HGNC:12003
## 6233 ENSG00000078900.15          TP73 HGNC:12003
## 6234 ENSG00000078900.15          TP73 HGNC:12003
## 6235 ENSG00000078900.15          TP73 HGNC:12003
## 6236 ENSG00000078900.15          TP73 HGNC:12003
## 6237 ENSG00000078900.15          TP73 HGNC:12003
## 6238 ENSG00000078900.15          TP73 HGNC:12003
## 6239 ENSG00000078900.15          TP73 HGNC:12003
## 6240 ENSG00000078900.15          TP73 HGNC:12003
## 6241 ENSG00000078900.15          TP73 HGNC:12003
## 6242 ENSG00000078900.15          TP73 HGNC:12003
## 6243 ENSG00000078900.15          TP73 HGNC:12003
## 6244 ENSG00000078900.15          TP73 HGNC:12003
## 6245 ENSG00000078900.15          TP73 HGNC:12003
## 6246 ENSG00000078900.15          TP73 HGNC:12003
## 6247 ENSG00000078900.15          TP73 HGNC:12003
## 6248 ENSG00000078900.15          TP73 HGNC:12003
## 6249 ENSG00000078900.15          TP73 HGNC:12003
## 6250 ENSG00000078900.15          TP73 HGNC:12003
## 6251 ENSG00000078900.15          TP73 HGNC:12003
## 6252 ENSG00000078900.15          TP73 HGNC:12003
## 6253 ENSG00000078900.15          TP73 HGNC:12003
## 6254 ENSG00000078900.15          TP73 HGNC:12003
## 6255 ENSG00000078900.15          TP73 HGNC:12003
## 6256 ENSG00000078900.15          TP73 HGNC:12003
## 6257 ENSG00000078900.15          TP73 HGNC:12003
## 6258 ENSG00000078900.15          TP73 HGNC:12003
## 6259 ENSG00000078900.15          TP73 HGNC:12003
## 6260 ENSG00000078900.15          TP73 HGNC:12003
## 6261 ENSG00000078900.15          TP73 HGNC:12003
## 6262 ENSG00000078900.15          TP73 HGNC:12003
## 6263 ENSG00000078900.15          TP73 HGNC:12003
```

```
## 6264 ENSG00000078900.15           TP73 HGNC:12003
## 6265 ENSG00000078900.15           TP73 HGNC:12003
## 6266 ENSG00000078900.15           TP73 HGNC:12003
## 6267 ENSG00000078900.15           TP73 HGNC:12003
## 6268 ENSG00000078900.15           TP73 HGNC:12003
## 6269 ENSG00000078900.15           TP73 HGNC:12003
## 6270 ENSG00000078900.15           TP73 HGNC:12003
## 6271 ENSG00000078900.15           TP73 HGNC:12003
## 6272 ENSG00000078900.15           TP73 HGNC:12003
## 6273 ENSG00000078900.15           TP73 HGNC:12003
## 6274 ENSG00000078900.15           TP73 HGNC:12003
## 6275 ENSG00000078900.15           TP73 HGNC:12003
## 6276 ENSG00000078900.15           TP73 HGNC:12003
## 6277 ENSG00000078900.15           TP73 HGNC:12003
## 6278 ENSG00000078900.15           TP73 HGNC:12003
## 6279 ENSG00000078900.15           TP73 HGNC:12003
## 6280 ENSG00000078900.15           TP73 HGNC:12003
## 6281 ENSG00000078900.15           TP73 HGNC:12003
## 6282 ENSG00000078900.15           TP73 HGNC:12003
## 6283 ENSG00000078900.15           TP73 HGNC:12003
## 6284 ENSG00000078900.15           TP73 HGNC:12003
## 6285 ENSG00000078900.15           TP73 HGNC:12003
## 6286 ENSG00000078900.15           TP73 HGNC:12003
## 6287 ENSG00000078900.15           TP73 HGNC:12003
## 6288 ENSG00000078900.15           TP73 HGNC:12003
## 6289 ENSG00000078900.15           TP73 HGNC:12003
## 6290 ENSG00000078900.15           TP73 HGNC:12003
## 6291 ENSG00000078900.15           TP73 HGNC:12003
## 6292 ENSG00000078900.15           TP73 HGNC:12003
## 6293 ENSG00000078900.15           TP73 HGNC:12003
## 6294 ENSG00000078900.15           TP73 HGNC:12003
## 6295 ENSG00000078900.15           TP73 HGNC:12003
## 6296 ENSG00000078900.15           TP73 HGNC:12003
## 6297 ENSG00000078900.15           TP73 HGNC:12003
## 6298 ENSG00000078900.15           TP73 HGNC:12003
## 6299 ENSG00000078900.15           TP73 HGNC:12003
## 6300 ENSG00000078900.15           TP73 HGNC:12003
## 6301 ENSG00000078900.15           TP73 HGNC:12003
## 6302 ENSG00000078900.15           TP73 HGNC:12003
## 6303 ENSG00000078900.15           TP73 HGNC:12003
## 6304 ENSG00000078900.15           TP73 HGNC:12003
## 6305 ENSG00000078900.15           TP73 HGNC:12003
## 6306 ENSG00000078900.15           TP73 HGNC:12003
## 6307 ENSG00000078900.15           TP73 HGNC:12003
## 6308 ENSG00000078900.15           TP73 HGNC:12003
## 6309 ENSG00000078900.15           TP73 HGNC:12003
## 6310 ENSG00000078900.15           TP73 HGNC:12003
## 6311 ENSG00000078900.15           TP73 HGNC:12003
## 6312 ENSG00000078900.15           TP73 HGNC:12003
## 6313 ENSG00000078900.15           TP73 HGNC:12003
## 6314 ENSG00000078900.15           TP73 HGNC:12003
## 6315 ENSG00000078900.15           TP73 HGNC:12003
## 6316 ENSG00000078900.15           TP73 HGNC:12003
## 6317 ENSG00000078900.15           TP73 HGNC:12003
```

```
## 6318 ENSG00000078900.15          TP73 HGNC:12003
## 6319 ENSG00000078900.15          TP73 HGNC:12003
## 6320 ENSG00000078900.15          TP73 HGNC:12003
## 6321 ENSG00000078900.15          TP73 HGNC:12003
## 6322 ENSG00000078900.15          TP73 HGNC:12003
## 6323 ENSG00000078900.15          TP73 HGNC:12003
## 6324 ENSG00000078900.15          TP73 HGNC:12003
## 6325 ENSG00000078900.15          TP73 HGNC:12003
## 6326 ENSG00000078900.15          TP73 HGNC:12003
## 6327 ENSG00000078900.15          TP73 HGNC:12003
## 6328 ENSG00000078900.15          TP73 HGNC:12003
## 6329 ENSG00000078900.15          TP73 HGNC:12003
## 6330 ENSG00000078900.15          TP73 HGNC:12003
## 6331 ENSG00000078900.15          TP73 HGNC:12003
## 6332 ENSG00000078900.15          TP73 HGNC:12003
## 6333 ENSG00000078900.15          TP73 HGNC:12003
## 6334 ENSG00000078900.15          TP73 HGNC:12003
## 6335 ENSG00000078900.15          TP73 HGNC:12003
## 6336 ENSG00000078900.15          TP73 HGNC:12003
## 6337 ENSG00000078900.15          TP73 HGNC:12003
## 6338 ENSG00000078900.15          TP73 HGNC:12003
## 6339 ENSG00000078900.15          TP73 HGNC:12003
## 6340 ENSG00000078900.15          TP73 HGNC:12003
## 6341 ENSG00000078900.15          TP73 HGNC:12003
## 6342 ENSG00000078900.15          TP73 HGNC:12003
## 6343 ENSG00000078900.15          TP73 HGNC:12003
## 6344 ENSG00000078900.15          TP73 HGNC:12003
## 6345 ENSG00000078900.15          TP73 HGNC:12003
## 6346 ENSG00000078900.15          TP73 HGNC:12003
## 6347 ENSG00000078900.15          TP73 HGNC:12003
## 6348 ENSG00000078900.15          TP73 HGNC:12003
## 6349 ENSG00000078900.15          TP73 HGNC:12003
## 6350 ENSG00000078900.15          TP73 HGNC:12003
## 6351 ENSG00000078900.15          TP73 HGNC:12003
## 6352 ENSG00000078900.15          TP73 HGNC:12003
## 6353 ENSG00000078900.15          TP73 HGNC:12003
## 6354 ENSG00000078900.15          TP73 HGNC:12003
## 6355 ENSG00000078900.15          TP73 HGNC:12003
## 6356 ENSG00000078900.15          TP73 HGNC:12003
## 6357 ENSG00000078900.15          TP73 HGNC:12003
## 6358 ENSG00000078900.15          TP73 HGNC:12003
## 6359 ENSG00000078900.15          TP73 HGNC:12003
## 6360 ENSG00000078900.15          TP73 HGNC:12003
## 6361 ENSG00000078900.15          TP73 HGNC:12003
## 6362 ENSG00000078900.15          TP73 HGNC:12003
## 6363 ENSG00000078900.15          TP73 HGNC:12003
## 6364 ENSG00000078900.15          TP73 HGNC:12003
## 6365  ENSG00000227589.1   AL136528.1       <NA>
## 6366  ENSG00000227589.1   AL136528.1       <NA>
## 6367  ENSG00000227589.1   AL136528.1       <NA>
## 6368  ENSG00000227589.1   AL136528.1       <NA>
## 6369  ENSG00000227589.1   AL136528.1       <NA>
## 6370  ENSG00000235131.1   AL136528.2       <NA>
## 6371  ENSG00000235131.1   AL136528.2       <NA>
```

```
## 6372   ENSG00000235131.1    AL136528.2      <NA>
## 6373   ENSG00000235131.1    AL136528.2      <NA>
## 6374 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6375 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6376 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6377 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6378 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6379 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6380 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6381 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6382 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6383 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6384 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6385 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6386 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6387 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6388 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6389 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6390 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6391 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6392 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6393 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6394 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6395 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6396 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6397 ENSG00000227372.12      TP73-AS1 HGNC:29052
## 6398   ENSG00000276189.1      RF02197      <NA>
## 6399   ENSG00000276189.1      RF02197      <NA>
## 6400   ENSG00000276189.1      RF02197      <NA>
## 6401 ENSG00000162592.10        CCDC27 HGNC:26546
## 6402 ENSG00000162592.10        CCDC27 HGNC:26546
## 6403 ENSG00000162592.10        CCDC27 HGNC:26546
## 6404 ENSG00000162592.10        CCDC27 HGNC:26546
## 6405 ENSG00000162592.10        CCDC27 HGNC:26546
## 6406 ENSG00000162592.10        CCDC27 HGNC:26546
## 6407 ENSG00000162592.10        CCDC27 HGNC:26546
## 6408 ENSG00000162592.10        CCDC27 HGNC:26546
## 6409 ENSG00000162592.10        CCDC27 HGNC:26546
## 6410 ENSG00000162592.10        CCDC27 HGNC:26546
## 6411 ENSG00000162592.10        CCDC27 HGNC:26546
## 6412 ENSG00000162592.10        CCDC27 HGNC:26546
## 6413 ENSG00000162592.10        CCDC27 HGNC:26546
## 6414 ENSG00000162592.10        CCDC27 HGNC:26546
## 6415 ENSG00000162592.10        CCDC27 HGNC:26546
## 6416 ENSG00000162592.10        CCDC27 HGNC:26546
## 6417 ENSG00000162592.10        CCDC27 HGNC:26546
## 6418 ENSG00000162592.10        CCDC27 HGNC:26546
## 6419 ENSG00000162592.10        CCDC27 HGNC:26546
## 6420 ENSG00000162592.10        CCDC27 HGNC:26546
## 6421 ENSG00000162592.10        CCDC27 HGNC:26546
## 6422 ENSG00000162592.10        CCDC27 HGNC:26546
## 6423 ENSG00000162592.10        CCDC27 HGNC:26546
## 6424 ENSG00000162592.10        CCDC27 HGNC:26546
## 6425 ENSG00000162592.10        CCDC27 HGNC:26546
```

```
## 6426 ENSG00000162592.10      CCDC27 HGNC:26546
## 6427 ENSG00000162592.10      CCDC27 HGNC:26546
## 6428 ENSG00000162592.10      CCDC27 HGNC:26546
## 6429 ENSG00000162592.10      CCDC27 HGNC:26546
## 6430 ENSG00000162592.10      CCDC27 HGNC:26546
## 6431  ENSG00000235169.8       SMIM1 HGNC:44204
## 6432  ENSG00000235169.8       SMIM1 HGNC:44204
## 6433  ENSG00000235169.8       SMIM1 HGNC:44204
## 6434  ENSG00000235169.8       SMIM1 HGNC:44204
## 6435  ENSG00000235169.8       SMIM1 HGNC:44204
## 6436  ENSG00000235169.8       SMIM1 HGNC:44204
## 6437  ENSG00000235169.8       SMIM1 HGNC:44204
## 6438  ENSG00000235169.8       SMIM1 HGNC:44204
## 6439  ENSG00000235169.8       SMIM1 HGNC:44204
## 6440  ENSG00000235169.8       SMIM1 HGNC:44204
## 6441  ENSG00000235169.8       SMIM1 HGNC:44204
## 6442  ENSG00000235169.8       SMIM1 HGNC:44204
## 6443  ENSG00000235169.8       SMIM1 HGNC:44204
## 6444  ENSG00000235169.8       SMIM1 HGNC:44204
## 6445  ENSG00000235169.8       SMIM1 HGNC:44204
## 6446  ENSG00000235169.8       SMIM1 HGNC:44204
## 6447  ENSG00000235169.8       SMIM1 HGNC:44204
## 6448  ENSG00000235169.8       SMIM1 HGNC:44204
## 6449  ENSG00000235169.8       SMIM1 HGNC:44204
## 6450  ENSG00000235169.8       SMIM1 HGNC:44204
## 6451  ENSG00000235169.8       SMIM1 HGNC:44204
## 6452  ENSG00000235169.8       SMIM1 HGNC:44204
## 6453  ENSG00000235169.8       SMIM1 HGNC:44204
## 6454  ENSG00000235169.8       SMIM1 HGNC:44204
## 6455  ENSG00000235169.8       SMIM1 HGNC:44204
## 6456 ENSG00000130764.10      LRRC47 HGNC:29207
## 6457 ENSG00000130764.10      LRRC47 HGNC:29207
## 6458 ENSG00000130764.10      LRRC47 HGNC:29207
## 6459 ENSG00000130764.10      LRRC47 HGNC:29207
## 6460 ENSG00000130764.10      LRRC47 HGNC:29207
## 6461 ENSG00000130764.10      LRRC47 HGNC:29207
## 6462 ENSG00000130764.10      LRRC47 HGNC:29207
## 6463 ENSG00000130764.10      LRRC47 HGNC:29207
## 6464 ENSG00000130764.10      LRRC47 HGNC:29207
## 6465 ENSG00000130764.10      LRRC47 HGNC:29207
## 6466 ENSG00000130764.10      LRRC47 HGNC:29207
## 6467 ENSG00000130764.10      LRRC47 HGNC:29207
## 6468 ENSG00000130764.10      LRRC47 HGNC:29207
## 6469 ENSG00000130764.10      LRRC47 HGNC:29207
## 6470 ENSG00000130764.10      LRRC47 HGNC:29207
## 6471 ENSG00000130764.10      LRRC47 HGNC:29207
## 6472 ENSG00000130764.10      LRRC47 HGNC:29207
## 6473 ENSG00000130764.10      LRRC47 HGNC:29207
## 6474 ENSG00000130764.10      LRRC47 HGNC:29207
## 6475 ENSG00000130764.10      LRRC47 HGNC:29207
## 6476  ENSG00000266075.2    RN7SL574P HGNC:46590
## 6477  ENSG00000266075.2    RN7SL574P HGNC:46590
## 6478  ENSG00000266075.2    RN7SL574P HGNC:46590
## 6479  ENSG00000272153.1    AL365330.1      <NA>
```

```
## 6480    ENSG00000272153.1    AL365330.1       <NA>
## 6481    ENSG00000272153.1    AL365330.1       <NA>
## 6482 ENSG00000116198.13          CEP104 HGNC:24866
## 6483 ENSG00000116198.13          CEP104 HGNC:24866
## 6484 ENSG00000116198.13          CEP104 HGNC:24866
## 6485 ENSG00000116198.13          CEP104 HGNC:24866
## 6486 ENSG00000116198.13          CEP104 HGNC:24866
## 6487 ENSG00000116198.13          CEP104 HGNC:24866
## 6488 ENSG00000116198.13          CEP104 HGNC:24866
## 6489 ENSG00000116198.13          CEP104 HGNC:24866
## 6490 ENSG00000116198.13          CEP104 HGNC:24866
## 6491 ENSG00000116198.13          CEP104 HGNC:24866
## 6492 ENSG00000116198.13          CEP104 HGNC:24866
## 6493 ENSG00000116198.13          CEP104 HGNC:24866
## 6494 ENSG00000116198.13          CEP104 HGNC:24866
## 6495 ENSG00000116198.13          CEP104 HGNC:24866
## 6496 ENSG00000116198.13          CEP104 HGNC:24866
## 6497 ENSG00000116198.13          CEP104 HGNC:24866
## 6498 ENSG00000116198.13          CEP104 HGNC:24866
## 6499 ENSG00000116198.13          CEP104 HGNC:24866
## 6500 ENSG00000116198.13          CEP104 HGNC:24866
## 6501 ENSG00000116198.13          CEP104 HGNC:24866
## 6502 ENSG00000116198.13          CEP104 HGNC:24866
## 6503 ENSG00000116198.13          CEP104 HGNC:24866
## 6504 ENSG00000116198.13          CEP104 HGNC:24866
## 6505 ENSG00000116198.13          CEP104 HGNC:24866
## 6506 ENSG00000116198.13          CEP104 HGNC:24866
## 6507 ENSG00000116198.13          CEP104 HGNC:24866
## 6508 ENSG00000116198.13          CEP104 HGNC:24866
## 6509 ENSG00000116198.13          CEP104 HGNC:24866
## 6510 ENSG00000116198.13          CEP104 HGNC:24866
## 6511 ENSG00000116198.13          CEP104 HGNC:24866
## 6512 ENSG00000116198.13          CEP104 HGNC:24866
## 6513 ENSG00000116198.13          CEP104 HGNC:24866
## 6514 ENSG00000116198.13          CEP104 HGNC:24866
## 6515 ENSG00000116198.13          CEP104 HGNC:24866
## 6516 ENSG00000116198.13          CEP104 HGNC:24866
## 6517 ENSG00000116198.13          CEP104 HGNC:24866
## 6518 ENSG00000116198.13          CEP104 HGNC:24866
## 6519 ENSG00000116198.13          CEP104 HGNC:24866
## 6520 ENSG00000116198.13          CEP104 HGNC:24866
## 6521 ENSG00000116198.13          CEP104 HGNC:24866
## 6522 ENSG00000116198.13          CEP104 HGNC:24866
## 6523 ENSG00000116198.13          CEP104 HGNC:24866
## 6524 ENSG00000116198.13          CEP104 HGNC:24866
## 6525 ENSG00000116198.13          CEP104 HGNC:24866
## 6526 ENSG00000116198.13          CEP104 HGNC:24866
## 6527 ENSG00000116198.13          CEP104 HGNC:24866
## 6528 ENSG00000116198.13          CEP104 HGNC:24866
## 6529 ENSG00000116198.13          CEP104 HGNC:24866
## 6530 ENSG00000116198.13          CEP104 HGNC:24866
## 6531 ENSG00000116198.13          CEP104 HGNC:24866
## 6532 ENSG00000116198.13          CEP104 HGNC:24866
## 6533 ENSG00000116198.13          CEP104 HGNC:24866
```

```
## 6534 ENSG00000116198.13        CEP104 HGNC:24866
## 6535 ENSG00000116198.13        CEP104 HGNC:24866
## 6536 ENSG00000116198.13        CEP104 HGNC:24866
## 6537 ENSG00000116198.13        CEP104 HGNC:24866
## 6538 ENSG00000116198.13        CEP104 HGNC:24866
## 6539 ENSG00000116198.13        CEP104 HGNC:24866
## 6540 ENSG00000116198.13        CEP104 HGNC:24866
## 6541 ENSG00000116198.13        CEP104 HGNC:24866
## 6542 ENSG00000116198.13        CEP104 HGNC:24866
## 6543 ENSG00000116198.13        CEP104 HGNC:24866
## 6544 ENSG00000116198.13        CEP104 HGNC:24866
## 6545 ENSG00000116198.13        CEP104 HGNC:24866
## 6546 ENSG00000116198.13        CEP104 HGNC:24866
## 6547 ENSG00000116198.13        CEP104 HGNC:24866
## 6548 ENSG00000116198.13        CEP104 HGNC:24866
## 6549 ENSG00000116198.13        CEP104 HGNC:24866
## 6550 ENSG00000116198.13        CEP104 HGNC:24866
## 6551 ENSG00000169598.15         DFFB   HGNC:2773
## 6552 ENSG00000169598.15         DFFB   HGNC:2773
## 6553 ENSG00000169598.15         DFFB   HGNC:2773
## 6554 ENSG00000169598.15         DFFB   HGNC:2773
## 6555 ENSG00000169598.15         DFFB   HGNC:2773
## 6556 ENSG00000169598.15         DFFB   HGNC:2773
## 6557 ENSG00000169598.15         DFFB   HGNC:2773
## 6558 ENSG00000169598.15         DFFB   HGNC:2773
## 6559 ENSG00000169598.15         DFFB   HGNC:2773
## 6560 ENSG00000169598.15         DFFB   HGNC:2773
## 6561 ENSG00000169598.15         DFFB   HGNC:2773
## 6562 ENSG00000169598.15         DFFB   HGNC:2773
## 6563 ENSG00000169598.15         DFFB   HGNC:2773
## 6564 ENSG00000169598.15         DFFB   HGNC:2773
## 6565 ENSG00000169598.15         DFFB   HGNC:2773
## 6566 ENSG00000169598.15         DFFB   HGNC:2773
## 6567 ENSG00000169598.15         DFFB   HGNC:2773
## 6568 ENSG00000169598.15         DFFB   HGNC:2773
## 6569 ENSG00000169598.15         DFFB   HGNC:2773
## 6570 ENSG00000169598.15         DFFB   HGNC:2773
## 6571 ENSG00000169598.15         DFFB   HGNC:2773
## 6572 ENSG00000169598.15         DFFB   HGNC:2773
## 6573 ENSG00000169598.15         DFFB   HGNC:2773
## 6574 ENSG00000169598.15         DFFB   HGNC:2773
## 6575 ENSG00000169598.15         DFFB   HGNC:2773
## 6576 ENSG00000169598.15         DFFB   HGNC:2773
## 6577 ENSG00000169598.15         DFFB   HGNC:2773
## 6578 ENSG00000169598.15         DFFB   HGNC:2773
## 6579 ENSG00000169598.15         DFFB   HGNC:2773
## 6580 ENSG00000169598.15         DFFB   HGNC:2773
## 6581 ENSG00000169598.15         DFFB   HGNC:2773
## 6582 ENSG00000169598.15         DFFB   HGNC:2773
## 6583 ENSG00000169598.15         DFFB   HGNC:2773
## 6584 ENSG00000169598.15         DFFB   HGNC:2773
## 6585 ENSG00000169598.15         DFFB   HGNC:2773
## 6586 ENSG00000169598.15         DFFB   HGNC:2773
## 6587 ENSG00000169598.15         DFFB   HGNC:2773
```

```
## 6588 ENSG00000169598.15        DFFB   HGNC:2773
## 6589 ENSG00000169598.15        DFFB   HGNC:2773
## 6590 ENSG00000169598.15        DFFB   HGNC:2773
## 6591 ENSG00000169598.15        DFFB   HGNC:2773
## 6592 ENSG00000169598.15        DFFB   HGNC:2773
## 6593 ENSG00000169598.15        DFFB   HGNC:2773
## 6594 ENSG00000169598.15        DFFB   HGNC:2773
## 6595 ENSG00000169598.15        DFFB   HGNC:2773
## 6596 ENSG00000169598.15        DFFB   HGNC:2773
## 6597 ENSG00000169598.15        DFFB   HGNC:2773
## 6598 ENSG00000169598.15        DFFB   HGNC:2773
## 6599 ENSG00000169598.15        DFFB   HGNC:2773
## 6600 ENSG00000169598.15        DFFB   HGNC:2773
## 6601 ENSG00000169598.15        DFFB   HGNC:2773
## 6602 ENSG00000169598.15        DFFB   HGNC:2773
## 6603 ENSG00000169598.15        DFFB   HGNC:2773
## 6604 ENSG00000169598.15        DFFB   HGNC:2773
## 6605 ENSG00000169598.15        DFFB   HGNC:2773
## 6606 ENSG00000169598.15        DFFB   HGNC:2773
## 6607 ENSG00000169598.15        DFFB   HGNC:2773
## 6608 ENSG00000169598.15        DFFB   HGNC:2773
## 6609 ENSG00000169598.15        DFFB   HGNC:2773
## 6610 ENSG00000169598.15        DFFB   HGNC:2773
## 6611 ENSG00000169598.15        DFFB   HGNC:2773
## 6612 ENSG00000169598.15        DFFB   HGNC:2773
## 6613 ENSG00000169598.15        DFFB   HGNC:2773
## 6614 ENSG00000198912.11    C1orf174 HGNC:27915
## 6615 ENSG00000198912.11    C1orf174 HGNC:27915
## 6616 ENSG00000198912.11    C1orf174 HGNC:27915
## 6617 ENSG00000198912.11    C1orf174 HGNC:27915
## 6618 ENSG00000198912.11    C1orf174 HGNC:27915
## 6619 ENSG00000198912.11    C1orf174 HGNC:27915
## 6620 ENSG00000198912.11    C1orf174 HGNC:27915
## 6621 ENSG00000198912.11    C1orf174 HGNC:27915
## 6622 ENSG00000198912.11    C1orf174 HGNC:27915
## 6623 ENSG00000198912.11    C1orf174 HGNC:27915
## 6624 ENSG00000198912.11    C1orf174 HGNC:27915
## 6625 ENSG00000198912.11    C1orf174 HGNC:27915
## 6626 ENSG00000198912.11    C1orf174 HGNC:27915
## 6627 ENSG00000198912.11    C1orf174 HGNC:27915
## 6628  ENSG00000236423.6    LINC01134 HGNC:49449
## 6629  ENSG00000236423.6    LINC01134 HGNC:49449
## 6630  ENSG00000236423.6    LINC01134 HGNC:49449
## 6631  ENSG00000236423.6    LINC01134 HGNC:49449
## 6632  ENSG00000236423.6    LINC01134 HGNC:49449
## 6633  ENSG00000236423.6    LINC01134 HGNC:49449
## 6634  ENSG00000236423.6    LINC01134 HGNC:49449
## 6635  ENSG00000236423.6    LINC01134 HGNC:49449
## 6636  ENSG00000236423.6    LINC01134 HGNC:49449
## 6637  ENSG00000233304.7    LINC01346 HGNC:50563
## 6638  ENSG00000233304.7    LINC01346 HGNC:50563
## 6639  ENSG00000233304.7    LINC01346 HGNC:50563
## 6640  ENSG00000233304.7    LINC01346 HGNC:50563
## 6641  ENSG00000233304.7    LINC01346 HGNC:50563
```

```
## 6642   ENSG00000233304.7     LINC01346 HGNC:50563
## 6643   ENSG00000233304.7     LINC01346 HGNC:50563
## 6644   ENSG00000233304.7     LINC01346 HGNC:50563
## 6645   ENSG00000226374.3     LINC01345 HGNC:50564
## 6646   ENSG00000226374.3     LINC01345 HGNC:50564
## 6647   ENSG00000226374.3     LINC01345 HGNC:50564
## 6648   ENSG00000226374.3     LINC01345 HGNC:50564
## 6649   ENSG00000226374.3     LINC01345 HGNC:50564
## 6650   ENSG00000226374.3     LINC01345 HGNC:50564
## 6651   ENSG00000226374.3     LINC01345 HGNC:50564
## 6652   ENSG00000226374.3     LINC01345 HGNC:50564
## 6653   ENSG00000284668.2     AL805961.1      <NA>
## 6654   ENSG00000284668.2     AL805961.1      <NA>
## 6655   ENSG00000284668.2     AL805961.1      <NA>
## 6656   ENSG00000284668.2     AL805961.1      <NA>
## 6657   ENSG00000284668.2     AL805961.1      <NA>
## 6658   ENSG00000284668.2     AL805961.1      <NA>
## 6659   ENSG00000284668.2     AL805961.1      <NA>
## 6660   ENSG00000284668.2     AL805961.1      <NA>
## 6661   ENSG00000284668.2     AL805961.1      <NA>
## 6662   ENSG00000284668.2     AL805961.1      <NA>
## 6663   ENSG00000284668.2     AL805961.1      <NA>
## 6664   ENSG00000284668.2     AL805961.1      <NA>
## 6665   ENSG00000284668.2     AL805961.1      <NA>
## 6666   ENSG00000284668.2     AL805961.1      <NA>
## 6667   ENSG00000284668.2     AL805961.1      <NA>
## 6668   ENSG00000284668.2     AL805961.1      <NA>
## 6669   ENSG00000284668.2     AL805961.1      <NA>
## 6670   ENSG00000284703.1     AL805961.2      <NA>
## 6671   ENSG00000284703.1     AL805961.2      <NA>
## 6672   ENSG00000284703.1     AL805961.2      <NA>
## 6673   ENSG00000284703.1     AL805961.2      <NA>
## 6674   ENSG00000229280.1       EEF1DP6 HGNC:51456
## 6675   ENSG00000229280.1       EEF1DP6 HGNC:51456
## 6676   ENSG00000229280.1       EEF1DP6 HGNC:51456
## 6677   ENSG00000235054.4     LINC01777 HGNC:52567
## 6678   ENSG00000235054.4     LINC01777 HGNC:52567
## 6679   ENSG00000235054.4     LINC01777 HGNC:52567
## 6680   ENSG00000235054.4     LINC01777 HGNC:52567
## 6681   ENSG00000235054.4     LINC01777 HGNC:52567
## 6682   ENSG00000235054.4     LINC01777 HGNC:52567
## 6683   ENSG00000235054.4     LINC01777 HGNC:52567
## 6684   ENSG00000235054.4     LINC01777 HGNC:52567
## 6685   ENSG00000284694.1     AL355602.1      <NA>
## 6686   ENSG00000284694.1     AL355602.1      <NA>
## 6687   ENSG00000284694.1     AL355602.1      <NA>
## 6688   ENSG00000284694.1     AL355602.1      <NA>
## 6689   ENSG00000227169.2       Z98747.1      <NA>
## 6690   ENSG00000227169.2       Z98747.1      <NA>
## 6691   ENSG00000227169.2       Z98747.1      <NA>
## 6692   ENSG00000227169.2       Z98747.1      <NA>
## 6693   ENSG00000232596.3     LINC01646 HGNC:52433
## 6694   ENSG00000232596.3     LINC01646 HGNC:52433
## 6695   ENSG00000232596.3     LINC01646 HGNC:52433
```

```
## 6696  ENSG00000232596.3     LINC01646 HGNC:52433
## 6697  ENSG00000232596.3     LINC01646 HGNC:52433
## 6698  ENSG00000232596.3     LINC01646 HGNC:52433
## 6699  ENSG00000232596.3     LINC01646 HGNC:52433
## 6700  ENSG00000232596.3     LINC01646 HGNC:52433
## 6701  ENSG00000232596.3     LINC01646 HGNC:52433
## 6702  ENSG00000232596.3     LINC01646 HGNC:52433
## 6703  ENSG00000232596.3     LINC01646 HGNC:52433
## 6704  ENSG00000232596.3     LINC01646 HGNC:52433
## 6705  ENSG00000232596.3     LINC01646 HGNC:52433
## 6706  ENSG00000232596.3     LINC01646 HGNC:52433
## 6707  ENSG00000232596.3     LINC01646 HGNC:52433
## 6708  ENSG00000232596.3     LINC01646 HGNC:52433
## 6709  ENSG00000232596.3     LINC01646 HGNC:52433
## 6710  ENSG00000232596.3     LINC01646 HGNC:52433
## 6711  ENSG00000232596.3     LINC01646 HGNC:52433
## 6712  ENSG00000232596.3     LINC01646 HGNC:52433
## 6713  ENSG00000232596.3     LINC01646 HGNC:52433
## 6714 ENSG00000196581.10        AJAP1 HGNC:30801
## 6715 ENSG00000196581.10        AJAP1 HGNC:30801
## 6716 ENSG00000196581.10        AJAP1 HGNC:30801
## 6717 ENSG00000196581.10        AJAP1 HGNC:30801
## 6718 ENSG00000196581.10        AJAP1 HGNC:30801
## 6719 ENSG00000196581.10        AJAP1 HGNC:30801
## 6720 ENSG00000196581.10        AJAP1 HGNC:30801
## 6721 ENSG00000196581.10        AJAP1 HGNC:30801
## 6722 ENSG00000196581.10        AJAP1 HGNC:30801
## 6723 ENSG00000196581.10        AJAP1 HGNC:30801
## 6724 ENSG00000196581.10        AJAP1 HGNC:30801
## 6725 ENSG00000196581.10        AJAP1 HGNC:30801
## 6726 ENSG00000196581.10        AJAP1 HGNC:30801
## 6727 ENSG00000196581.10        AJAP1 HGNC:30801
## 6728 ENSG00000196581.10        AJAP1 HGNC:30801
## 6729 ENSG00000196581.10        AJAP1 HGNC:30801
## 6730 ENSG00000196581.10        AJAP1 HGNC:30801
## 6731 ENSG00000196581.10        AJAP1 HGNC:30801
## 6732 ENSG00000196581.10        AJAP1 HGNC:30801
## 6733 ENSG00000196581.10        AJAP1 HGNC:30801
## 6734 ENSG00000196581.10        AJAP1 HGNC:30801
## 6735 ENSG00000196581.10        AJAP1 HGNC:30801
## 6736 ENSG00000196581.10        AJAP1 HGNC:30801
## 6737 ENSG00000196581.10        AJAP1 HGNC:30801
## 6738 ENSG00000196581.10        AJAP1 HGNC:30801
## 6739 ENSG00000196581.10        AJAP1 HGNC:30801
## 6740 ENSG00000196581.10        AJAP1 HGNC:30801
## 6741 ENSG00000196581.10        AJAP1 HGNC:30801
## 6742 ENSG00000196581.10        AJAP1 HGNC:30801
## 6743 ENSG00000196581.10        AJAP1 HGNC:30801
## 6744 ENSG00000196581.10        AJAP1 HGNC:30801
## 6745 ENSG00000196581.10        AJAP1 HGNC:30801
## 6746 ENSG00000196581.10        AJAP1 HGNC:30801
## 6747 ENSG00000196581.10        AJAP1 HGNC:30801
## 6748 ENSG00000196581.10        AJAP1 HGNC:30801
## 6749  ENSG00000287586.1      Z98886.1       <NA>
```

```
## 6750   ENSG00000287586.1    Z98886.1     <NA>
## 6751   ENSG00000287586.1    Z98886.1     <NA>
## 6752   ENSG00000287586.1    Z98886.1     <NA>
## 6753   ENSG00000284739.1   BX005132.2    <NA>
## 6754   ENSG00000284739.1   BX005132.2    <NA>
## 6755   ENSG00000284739.1   BX005132.2    <NA>
## 6756   ENSG00000284739.1   BX005132.2    <NA>
## 6757   ENSG00000284739.1   BX005132.2    <NA>
## 6758   ENSG00000284674.1   BX005132.1    <NA>
## 6759   ENSG00000284674.1   BX005132.1    <NA>
## 6760   ENSG00000284674.1   BX005132.1    <NA>
## 6761   ENSG00000284674.1   BX005132.1    <NA>
## 6762   ENSG00000284674.1   BX005132.1    <NA>
## 6763   ENSG00000284674.1   BX005132.1    <NA>
## 6764   ENSG00000284674.1   BX005132.1    <NA>
## 6765   ENSG00000231510.1   AL691497.1    <NA>
## 6766   ENSG00000231510.1   AL691497.1    <NA>
## 6767   ENSG00000231510.1   AL691497.1    <NA>
## 6768   ENSG00000231510.1   AL691497.1    <NA>
## 6769   ENSG00000231510.1   AL691497.1    <NA>
## 6770   ENSG00000231510.1   AL691497.1    <NA>
## 6771   ENSG00000284616.1   AL139823.1    <NA>
## 6772   ENSG00000284616.1   AL139823.1    <NA>
## 6773   ENSG00000284616.1   AL139823.1    <NA>
## 6774   ENSG00000284616.1   AL139823.1    <NA>
## 6775   ENSG00000284616.1   AL139823.1    <NA>
## 6776   ENSG00000284616.1   AL139823.1    <NA>
## 6777   ENSG00000284692.2    Z98259.3     <NA>
## 6778   ENSG00000284692.2    Z98259.3     <NA>
## 6779   ENSG00000284692.2    Z98259.3     <NA>
## 6780   ENSG00000284692.2    Z98259.3     <NA>
## 6781   ENSG00000284692.2    Z98259.3     <NA>
## 6782   ENSG00000284692.2    Z98259.3     <NA>
## 6783   ENSG00000284692.2    Z98259.3     <NA>
## 6784   ENSG00000284692.2    Z98259.3     <NA>
## 6785   ENSG00000284692.2    Z98259.3     <NA>
## 6786   ENSG00000284692.2    Z98259.3     <NA>
## 6787   ENSG00000284666.1    Z98259.2     <NA>
## 6788   ENSG00000284666.1    Z98259.2     <NA>
## 6789   ENSG00000284666.1    Z98259.2     <NA>
## 6790   ENSG00000284666.1    Z98259.2     <NA>
## 6791   ENSG00000260972.1    Z98259.1     <NA>
## 6792   ENSG00000260972.1    Z98259.1     <NA>
## 6793   ENSG00000260972.1    Z98259.1     <NA>
## 6794   ENSG00000283356.1    Z97988.2     <NA>
## 6795   ENSG00000283356.1    Z97988.2     <NA>
## 6796   ENSG00000283356.1    Z97988.2     <NA>
## 6797   ENSG00000236948.2   AL365255.1    <NA>
## 6798   ENSG00000236948.2   AL365255.1    <NA>
## 6799   ENSG00000236948.2   AL365255.1    <NA>
## 6800   ENSG00000236948.2   AL365255.1    <NA>
## 6801   ENSG00000236948.2   AL365255.1    <NA>
## 6802   ENSG00000236948.2   AL365255.1    <NA>
## 6803   ENSG00000236948.2   AL365255.1    <NA>
```

```
## 6804  ENSG00000236948.2   AL365255.1      <NA>
## 6805  ENSG00000264341.1    Z97988.1       <NA>
## 6806  ENSG00000264341.1    Z97988.1       <NA>
## 6807  ENSG00000264341.1    Z97988.1       <NA>
## 6808  ENSG00000264101.1   MIR4689 HGNC:41895
## 6809  ENSG00000264101.1   MIR4689 HGNC:41895
## 6810  ENSG00000264101.1   MIR4689 HGNC:41895
## 6811 ENSG00000131697.18      NPHP4 HGNC:19104
## 6812 ENSG00000131697.18      NPHP4 HGNC:19104
## 6813 ENSG00000131697.18      NPHP4 HGNC:19104
## 6814 ENSG00000131697.18      NPHP4 HGNC:19104
## 6815 ENSG00000131697.18      NPHP4 HGNC:19104
## 6816 ENSG00000131697.18      NPHP4 HGNC:19104
## 6817 ENSG00000131697.18      NPHP4 HGNC:19104
## 6818 ENSG00000131697.18      NPHP4 HGNC:19104
## 6819 ENSG00000131697.18      NPHP4 HGNC:19104
## 6820 ENSG00000131697.18      NPHP4 HGNC:19104
## 6821 ENSG00000131697.18      NPHP4 HGNC:19104
## 6822 ENSG00000131697.18      NPHP4 HGNC:19104
## 6823 ENSG00000131697.18      NPHP4 HGNC:19104
## 6824 ENSG00000131697.18      NPHP4 HGNC:19104
## 6825 ENSG00000131697.18      NPHP4 HGNC:19104
## 6826 ENSG00000131697.18      NPHP4 HGNC:19104
## 6827 ENSG00000131697.18      NPHP4 HGNC:19104
## 6828 ENSG00000131697.18      NPHP4 HGNC:19104
## 6829 ENSG00000131697.18      NPHP4 HGNC:19104
## 6830 ENSG00000131697.18      NPHP4 HGNC:19104
## 6831 ENSG00000131697.18      NPHP4 HGNC:19104
## 6832 ENSG00000131697.18      NPHP4 HGNC:19104
## 6833 ENSG00000131697.18      NPHP4 HGNC:19104
## 6834 ENSG00000131697.18      NPHP4 HGNC:19104
## 6835 ENSG00000131697.18      NPHP4 HGNC:19104
## 6836 ENSG00000131697.18      NPHP4 HGNC:19104
## 6837 ENSG00000131697.18      NPHP4 HGNC:19104
## 6838 ENSG00000131697.18      NPHP4 HGNC:19104
## 6839 ENSG00000131697.18      NPHP4 HGNC:19104
## 6840 ENSG00000131697.18      NPHP4 HGNC:19104
## 6841 ENSG00000131697.18      NPHP4 HGNC:19104
## 6842 ENSG00000131697.18      NPHP4 HGNC:19104
## 6843 ENSG00000131697.18      NPHP4 HGNC:19104
## 6844 ENSG00000131697.18      NPHP4 HGNC:19104
## 6845 ENSG00000131697.18      NPHP4 HGNC:19104
## 6846 ENSG00000131697.18      NPHP4 HGNC:19104
## 6847 ENSG00000131697.18      NPHP4 HGNC:19104
## 6848 ENSG00000131697.18      NPHP4 HGNC:19104
## 6849 ENSG00000131697.18      NPHP4 HGNC:19104
## 6850 ENSG00000131697.18      NPHP4 HGNC:19104
## 6851 ENSG00000131697.18      NPHP4 HGNC:19104
## 6852 ENSG00000131697.18      NPHP4 HGNC:19104
## 6853 ENSG00000131697.18      NPHP4 HGNC:19104
## 6854 ENSG00000131697.18      NPHP4 HGNC:19104
## 6855 ENSG00000131697.18      NPHP4 HGNC:19104
## 6856 ENSG00000131697.18      NPHP4 HGNC:19104
## 6857 ENSG00000131697.18      NPHP4 HGNC:19104
```

```
## 6858 ENSG00000131697.18        NPHP4 HGNC:19104
## 6859 ENSG00000131697.18        NPHP4 HGNC:19104
## 6860 ENSG00000131697.18        NPHP4 HGNC:19104
## 6861 ENSG00000131697.18        NPHP4 HGNC:19104
## 6862 ENSG00000131697.18        NPHP4 HGNC:19104
## 6863 ENSG00000131697.18        NPHP4 HGNC:19104
## 6864 ENSG00000131697.18        NPHP4 HGNC:19104
## 6865 ENSG00000131697.18        NPHP4 HGNC:19104
## 6866 ENSG00000131697.18        NPHP4 HGNC:19104
## 6867 ENSG00000131697.18        NPHP4 HGNC:19104
## 6868 ENSG00000131697.18        NPHP4 HGNC:19104
## 6869 ENSG00000131697.18        NPHP4 HGNC:19104
## 6870 ENSG00000131697.18        NPHP4 HGNC:19104
## 6871 ENSG00000131697.18        NPHP4 HGNC:19104
## 6872 ENSG00000131697.18        NPHP4 HGNC:19104
## 6873 ENSG00000131697.18        NPHP4 HGNC:19104
## 6874 ENSG00000131697.18        NPHP4 HGNC:19104
## 6875 ENSG00000131697.18        NPHP4 HGNC:19104
## 6876 ENSG00000131697.18        NPHP4 HGNC:19104
## 6877 ENSG00000131697.18        NPHP4 HGNC:19104
## 6878 ENSG00000131697.18        NPHP4 HGNC:19104
## 6879 ENSG00000131697.18        NPHP4 HGNC:19104
## 6880 ENSG00000131697.18        NPHP4 HGNC:19104
## 6881 ENSG00000131697.18        NPHP4 HGNC:19104
## 6882 ENSG00000131697.18        NPHP4 HGNC:19104
## 6883 ENSG00000131697.18        NPHP4 HGNC:19104
## 6884 ENSG00000131697.18        NPHP4 HGNC:19104
## 6885 ENSG00000131697.18        NPHP4 HGNC:19104
## 6886 ENSG00000131697.18        NPHP4 HGNC:19104
## 6887 ENSG00000131697.18        NPHP4 HGNC:19104
## 6888 ENSG00000131697.18        NPHP4 HGNC:19104
## 6889 ENSG00000131697.18        NPHP4 HGNC:19104
## 6890 ENSG00000131697.18        NPHP4 HGNC:19104
## 6891 ENSG00000131697.18        NPHP4 HGNC:19104
## 6892 ENSG00000131697.18        NPHP4 HGNC:19104
## 6893 ENSG00000131697.18        NPHP4 HGNC:19104
## 6894 ENSG00000131697.18        NPHP4 HGNC:19104
## 6895 ENSG00000131697.18        NPHP4 HGNC:19104
## 6896 ENSG00000131697.18        NPHP4 HGNC:19104
## 6897 ENSG00000131697.18        NPHP4 HGNC:19104
## 6898 ENSG00000131697.18        NPHP4 HGNC:19104
## 6899 ENSG00000131697.18        NPHP4 HGNC:19104
## 6900 ENSG00000131697.18        NPHP4 HGNC:19104
## 6901 ENSG00000131697.18        NPHP4 HGNC:19104
## 6902 ENSG00000131697.18        NPHP4 HGNC:19104
## 6903 ENSG00000131697.18        NPHP4 HGNC:19104
## 6904 ENSG00000131697.18        NPHP4 HGNC:19104
## 6905 ENSG00000131697.18        NPHP4 HGNC:19104
## 6906 ENSG00000131697.18        NPHP4 HGNC:19104
## 6907 ENSG00000131697.18        NPHP4 HGNC:19104
## 6908 ENSG00000131697.18        NPHP4 HGNC:19104
## 6909 ENSG00000131697.18        NPHP4 HGNC:19104
## 6910 ENSG00000131697.18        NPHP4 HGNC:19104
## 6911 ENSG00000131697.18        NPHP4 HGNC:19104
```

```
## 6912 ENSG00000131697.18          NPHP4 HGNC:19104
## 6913 ENSG00000131697.18          NPHP4 HGNC:19104
## 6914 ENSG00000131697.18          NPHP4 HGNC:19104
## 6915 ENSG00000131697.18          NPHP4 HGNC:19104
## 6916 ENSG00000131697.18          NPHP4 HGNC:19104
## 6917 ENSG00000131697.18          NPHP4 HGNC:19104
## 6918 ENSG00000131697.18          NPHP4 HGNC:19104
## 6919 ENSG00000131697.18          NPHP4 HGNC:19104
## 6920 ENSG00000131697.18          NPHP4 HGNC:19104
## 6921 ENSG00000131697.18          NPHP4 HGNC:19104
## 6922 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6923 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6924 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6925 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6926 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6927 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6928 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6929 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6930 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6931 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6932 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6933 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6934 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6935 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6936 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6937 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6938 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6939 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6940 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6941 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6942 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6943 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6944 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6945 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6946 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6947 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6948 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6949 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6950 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6951 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6952 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6953 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6954 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6955 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6956 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6957 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6958 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6959 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6960 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6961 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6962 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6963 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6964 ENSG00000069424.15        KCNAB2  HGNC:6229
## 6965 ENSG00000069424.15        KCNAB2  HGNC:6229
```

```
## 6966 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6967 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6968 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6969 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6970 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6971 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6972 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6973 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6974 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6975 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6976 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6977 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6978 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6979 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6980 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6981 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6982 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6983 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6984 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6985 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6986 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6987 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6988 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6989 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6990 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6991 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6992 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6993 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6994 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6995 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6996 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6997 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6998 ENSG00000069424.15       KCNAB2  HGNC:6229
## 6999 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7000 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7001 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7002 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7003 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7004 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7005 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7006 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7007 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7008 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7009 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7010 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7011 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7012 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7013 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7014 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7015 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7016 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7017 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7018 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7019 ENSG00000069424.15       KCNAB2  HGNC:6229
```

```
## 7020 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7021 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7022 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7023 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7024 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7025 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7026 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7027 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7028 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7029 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7030 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7031 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7032 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7033 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7034 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7035 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7036 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7037 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7038 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7039 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7040 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7041 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7042 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7043 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7044 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7045 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7046 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7047 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7048 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7049 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7050 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7051 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7052 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7053 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7054 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7055 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7056 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7057 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7058 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7059 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7060 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7061 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7062 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7063 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7064 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7065 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7066 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7067 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7068 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7069 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7070 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7071 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7072 ENSG00000069424.15          KCNAB2   HGNC:6229
## 7073 ENSG00000069424.15          KCNAB2   HGNC:6229
```

```
## 7074 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7075 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7076 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7077 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7078 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7079 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7080 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7081 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7082 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7083 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7084 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7085 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7086 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7087 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7088 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7089 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7090 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7091 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7092 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7093 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7094 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7095 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7096 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7097 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7098 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7099 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7100 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7101 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7102 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7103 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7104 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7105 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7106 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7107 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7108 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7109 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7110 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7111 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7112 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7113 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7114 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7115 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7116 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7117 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7118 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7119 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7120 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7121 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7122 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7123 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7124 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7125 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7126 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7127 ENSG00000069424.15          KCNAB2  HGNC:6229
```

```
## 7128 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7129 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7130 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7131 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7132 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7133 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7134 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7135 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7136 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7137 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7138 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7139 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7140 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7141 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7142 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7143 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7144 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7145 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7146 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7147 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7148 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7149 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7150 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7151 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7152 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7153 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7154 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7155 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7156 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7157 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7158 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7159 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7160 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7161 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7162 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7163 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7164 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7165 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7166 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7167 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7168 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7169 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7170 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7171 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7172 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7173 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7174 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7175 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7176 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7177 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7178 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7179 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7180 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7181 ENSG00000069424.15        KCNAB2  HGNC:6229
```

```
## 7182 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7183 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7184 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7185 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7186 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7187 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7188 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7189 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7190 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7191 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7192 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7193 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7194 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7195 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7196 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7197 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7198 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7199 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7200 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7201 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7202 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7203 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7204 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7205 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7206 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7207 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7208 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7209 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7210 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7211 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7212 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7213 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7214 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7215 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7216 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7217 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7218 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7219 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7220 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7221 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7222 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7223 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7224 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7225 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7226 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7227 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7228 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7229 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7230 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7231 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7232 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7233 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7234 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7235 ENSG00000069424.15          KCNAB2  HGNC:6229
```

```
## 7236 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7237 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7238 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7239 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7240 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7241 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7242 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7243 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7244 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7245 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7246 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7247 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7248 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7249 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7250 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7251 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7252 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7253 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7254 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7255 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7256 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7257 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7258 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7259 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7260 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7261 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7262 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7263 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7264 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7265 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7266 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7267 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7268 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7269 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7270 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7271 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7272 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7273 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7274 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7275 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7276 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7277 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7278 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7279 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7280 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7281 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7282 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7283 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7284 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7285 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7286 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7287 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7288 ENSG00000069424.15        KCNAB2   HGNC:6229
## 7289 ENSG00000069424.15        KCNAB2   HGNC:6229
```

```
## 7290 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7291 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7292 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7293 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7294 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7295 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7296 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7297 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7298 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7299 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7300 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7301 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7302 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7303 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7304 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7305 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7306 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7307 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7308 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7309 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7310 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7311 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7312 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7313 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7314 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7315 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7316 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7317 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7318 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7319 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7320 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7321 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7322 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7323 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7324 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7325 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7326 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7327 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7328 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7329 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7330 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7331 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7332 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7333 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7334 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7335 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7336 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7337 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7338 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7339 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7340 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7341 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7342 ENSG00000069424.15        KCNAB2  HGNC:6229
## 7343 ENSG00000069424.15        KCNAB2  HGNC:6229
```

```
## 7344 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7345 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7346 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7347 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7348 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7349 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7350 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7351 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7352 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7353 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7354 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7355 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7356 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7357 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7358 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7359 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7360 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7361 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7362 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7363 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7364 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7365 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7366 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7367 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7368 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7369 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7370 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7371 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7372 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7373 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7374 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7375 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7376 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7377 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7378 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7379 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7380 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7381 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7382 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7383 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7384 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7385 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7386 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7387 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7388 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7389 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7390 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7391 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7392 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7393 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7394 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7395 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7396 ENSG00000069424.15       KCNAB2  HGNC:6229
## 7397 ENSG00000069424.15       KCNAB2  HGNC:6229
```

```
## 7398 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7399 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7400 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7401 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7402 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7403 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7404 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7405 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7406 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7407 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7408 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7409 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7410 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7411 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7412 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7413 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7414 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7415 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7416 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7417 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7418 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7419 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7420 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7421 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7422 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7423 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7424 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7425 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7426 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7427 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7428 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7429 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7430 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7431 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7432 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7433 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7434 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7435 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7436 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7437 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7438 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7439 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7440 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7441 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7442 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7443 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7444 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7445 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7446 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7447 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7448 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7449 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7450 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7451 ENSG00000069424.15      KCNAB2  HGNC:6229
```

```
## 7452 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7453 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7454 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7455 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7456 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7457 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7458 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7459 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7460 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7461 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7462 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7463 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7464 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7465 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7466 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7467 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7468 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7469 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7470 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7471 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7472 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7473 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7474 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7475 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7476 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7477 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7478 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7479 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7480 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7481 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7482 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7483 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7484 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7485 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7486 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7487 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7488 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7489 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7490 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7491 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7492 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7493 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7494 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7495 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7496 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7497 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7498 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7499 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7500 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7501 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7502 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7503 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7504 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7505 ENSG00000069424.15          KCNAB2  HGNC:6229
```

```
## 7506 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7507 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7508 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7509 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7510 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7511 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7512 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7513 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7514 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7515 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7516 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7517 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7518 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7519 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7520 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7521 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7522 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7523 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7524 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7525 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7526 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7527 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7528 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7529 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7530 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7531 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7532 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7533 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7534 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7535 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7536 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7537 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7538 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7539 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7540 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7541 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7542 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7543 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7544 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7545 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7546 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7547 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7548 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7549 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7550 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7551 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7552 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7553 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7554 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7555 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7556 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7557 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7558 ENSG00000069424.15          KCNAB2  HGNC:6229
## 7559 ENSG00000069424.15          KCNAB2  HGNC:6229
```

```
## 7560 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7561 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7562 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7563 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7564 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7565 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7566 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7567 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7568 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7569 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7570 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7571 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7572 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7573 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7574 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7575 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7576 ENSG00000069424.15      KCNAB2  HGNC:6229
## 7577 ENSG00000116254.18       CHD5 HGNC:16816
## 7578 ENSG00000116254.18       CHD5 HGNC:16816
## 7579 ENSG00000116254.18       CHD5 HGNC:16816
## 7580 ENSG00000116254.18       CHD5 HGNC:16816
## 7581 ENSG00000116254.18       CHD5 HGNC:16816
## 7582 ENSG00000116254.18       CHD5 HGNC:16816
## 7583 ENSG00000116254.18       CHD5 HGNC:16816
## 7584 ENSG00000116254.18       CHD5 HGNC:16816
## 7585 ENSG00000116254.18       CHD5 HGNC:16816
## 7586 ENSG00000116254.18       CHD5 HGNC:16816
## 7587 ENSG00000116254.18       CHD5 HGNC:16816
## 7588 ENSG00000116254.18       CHD5 HGNC:16816
## 7589 ENSG00000116254.18       CHD5 HGNC:16816
## 7590 ENSG00000116254.18       CHD5 HGNC:16816
## 7591 ENSG00000116254.18       CHD5 HGNC:16816
## 7592 ENSG00000116254.18       CHD5 HGNC:16816
## 7593 ENSG00000116254.18       CHD5 HGNC:16816
## 7594 ENSG00000116254.18       CHD5 HGNC:16816
## 7595 ENSG00000116254.18       CHD5 HGNC:16816
## 7596 ENSG00000116254.18       CHD5 HGNC:16816
## 7597 ENSG00000116254.18       CHD5 HGNC:16816
## 7598 ENSG00000116254.18       CHD5 HGNC:16816
## 7599 ENSG00000116254.18       CHD5 HGNC:16816
## 7600 ENSG00000116254.18       CHD5 HGNC:16816
## 7601 ENSG00000116254.18       CHD5 HGNC:16816
## 7602 ENSG00000116254.18       CHD5 HGNC:16816
## 7603 ENSG00000116254.18       CHD5 HGNC:16816
## 7604 ENSG00000116254.18       CHD5 HGNC:16816
## 7605 ENSG00000116254.18       CHD5 HGNC:16816
## 7606 ENSG00000116254.18       CHD5 HGNC:16816
## 7607 ENSG00000116254.18       CHD5 HGNC:16816
## 7608 ENSG00000116254.18       CHD5 HGNC:16816
## 7609 ENSG00000116254.18       CHD5 HGNC:16816
## 7610 ENSG00000116254.18       CHD5 HGNC:16816
## 7611 ENSG00000116254.18       CHD5 HGNC:16816
## 7612 ENSG00000116254.18       CHD5 HGNC:16816
## 7613 ENSG00000116254.18       CHD5 HGNC:16816
```

```
## 7614 ENSG00000116254.18          CHD5 HGNC:16816
## 7615 ENSG00000116254.18          CHD5 HGNC:16816
## 7616 ENSG00000116254.18          CHD5 HGNC:16816
## 7617 ENSG00000116254.18          CHD5 HGNC:16816
## 7618 ENSG00000116254.18          CHD5 HGNC:16816
## 7619 ENSG00000116254.18          CHD5 HGNC:16816
## 7620 ENSG00000116254.18          CHD5 HGNC:16816
## 7621 ENSG00000116254.18          CHD5 HGNC:16816
## 7622 ENSG00000116254.18          CHD5 HGNC:16816
## 7623 ENSG00000116254.18          CHD5 HGNC:16816
## 7624 ENSG00000116254.18          CHD5 HGNC:16816
## 7625 ENSG00000116254.18          CHD5 HGNC:16816
## 7626 ENSG00000116254.18          CHD5 HGNC:16816
## 7627 ENSG00000116254.18          CHD5 HGNC:16816
## 7628 ENSG00000116254.18          CHD5 HGNC:16816
## 7629 ENSG00000116254.18          CHD5 HGNC:16816
## 7630 ENSG00000116254.18          CHD5 HGNC:16816
## 7631 ENSG00000116254.18          CHD5 HGNC:16816
## 7632 ENSG00000116254.18          CHD5 HGNC:16816
## 7633 ENSG00000116254.18          CHD5 HGNC:16816
## 7634 ENSG00000116254.18          CHD5 HGNC:16816
## 7635 ENSG00000116254.18          CHD5 HGNC:16816
## 7636 ENSG00000116254.18          CHD5 HGNC:16816
## 7637 ENSG00000116254.18          CHD5 HGNC:16816
## 7638 ENSG00000116254.18          CHD5 HGNC:16816
## 7639 ENSG00000116254.18          CHD5 HGNC:16816
## 7640 ENSG00000116254.18          CHD5 HGNC:16816
## 7641 ENSG00000116254.18          CHD5 HGNC:16816
## 7642 ENSG00000116254.18          CHD5 HGNC:16816
## 7643 ENSG00000116254.18          CHD5 HGNC:16816
## 7644 ENSG00000116254.18          CHD5 HGNC:16816
## 7645 ENSG00000116254.18          CHD5 HGNC:16816
## 7646 ENSG00000116254.18          CHD5 HGNC:16816
## 7647 ENSG00000116254.18          CHD5 HGNC:16816
## 7648 ENSG00000116254.18          CHD5 HGNC:16816
## 7649 ENSG00000116254.18          CHD5 HGNC:16816
## 7650 ENSG00000116254.18          CHD5 HGNC:16816
## 7651 ENSG00000116254.18          CHD5 HGNC:16816
## 7652 ENSG00000116254.18          CHD5 HGNC:16816
## 7653 ENSG00000116254.18          CHD5 HGNC:16816
## 7654 ENSG00000116254.18          CHD5 HGNC:16816
## 7655 ENSG00000116254.18          CHD5 HGNC:16816
## 7656 ENSG00000116254.18          CHD5 HGNC:16816
## 7657 ENSG00000116254.18          CHD5 HGNC:16816
## 7658 ENSG00000116254.18          CHD5 HGNC:16816
## 7659 ENSG00000116254.18          CHD5 HGNC:16816
## 7660 ENSG00000116254.18          CHD5 HGNC:16816
## 7661 ENSG00000116254.18          CHD5 HGNC:16816
## 7662 ENSG00000116254.18          CHD5 HGNC:16816
## 7663 ENSG00000116254.18          CHD5 HGNC:16816
## 7664 ENSG00000116254.18          CHD5 HGNC:16816
## 7665 ENSG00000116254.18          CHD5 HGNC:16816
## 7666 ENSG00000116254.18          CHD5 HGNC:16816
## 7667  ENSG00000285629.1     AL031847.2      <NA>
```

```
## 7668  ENSG00000285629.1   AL031847.2       <NA>
## 7669  ENSG00000285629.1   AL031847.2       <NA>
## 7670  ENSG00000285629.1   AL031847.2       <NA>
## 7671  ENSG00000285629.1   AL031847.2       <NA>
## 7672  ENSG00000285629.1   AL031847.2       <NA>
## 7673  ENSG00000285629.1   AL031847.2       <NA>
## 7674  ENSG00000285629.1   AL031847.2       <NA>
## 7675  ENSG00000285629.1   AL031847.2       <NA>
## 7676  ENSG00000285629.1   AL031847.2       <NA>
## 7677  ENSG00000285629.1   AL031847.2       <NA>
## 7678  ENSG00000285629.1   AL031847.2       <NA>
## 7679  ENSG00000285629.1   AL031847.2       <NA>
## 7680  ENSG00000285629.1   AL031847.2       <NA>
## 7681  ENSG00000285629.1   AL031847.2       <NA>
## 7682  ENSG00000285629.1   AL031847.2       <NA>
## 7683 ENSG00000116251.11      RPL22 HGNC:10315
## 7684 ENSG00000116251.11      RPL22 HGNC:10315
## 7685 ENSG00000116251.11      RPL22 HGNC:10315
## 7686 ENSG00000116251.11      RPL22 HGNC:10315
## 7687 ENSG00000116251.11      RPL22 HGNC:10315
## 7688 ENSG00000116251.11      RPL22 HGNC:10315
## 7689 ENSG00000116251.11      RPL22 HGNC:10315
## 7690 ENSG00000116251.11      RPL22 HGNC:10315
## 7691 ENSG00000116251.11      RPL22 HGNC:10315
## 7692 ENSG00000116251.11      RPL22 HGNC:10315
## 7693 ENSG00000116251.11      RPL22 HGNC:10315
## 7694 ENSG00000116251.11      RPL22 HGNC:10315
## 7695 ENSG00000116251.11      RPL22 HGNC:10315
## 7696 ENSG00000116251.11      RPL22 HGNC:10315
## 7697 ENSG00000116251.11      RPL22 HGNC:10315
## 7698 ENSG00000116251.11      RPL22 HGNC:10315
## 7699 ENSG00000116251.11      RPL22 HGNC:10315
## 7700 ENSG00000116251.11      RPL22 HGNC:10315
## 7701 ENSG00000116251.11      RPL22 HGNC:10315
## 7702 ENSG00000116251.11      RPL22 HGNC:10315
## 7703 ENSG00000116251.11      RPL22 HGNC:10315
## 7704 ENSG00000116251.11      RPL22 HGNC:10315
## 7705 ENSG00000116251.11      RPL22 HGNC:10315
## 7706 ENSG00000116251.11      RPL22 HGNC:10315
## 7707 ENSG00000116251.11      RPL22 HGNC:10315
## 7708 ENSG00000116251.11      RPL22 HGNC:10315
## 7709 ENSG00000116251.11      RPL22 HGNC:10315
## 7710  ENSG00000226944.1   AL031847.1       <NA>
## 7711  ENSG00000226944.1   AL031847.1       <NA>
## 7712  ENSG00000226944.1   AL031847.1       <NA>
## 7713  ENSG00000226944.1   AL031847.1       <NA>
## 7714  ENSG00000226944.1   AL031847.1       <NA>
## 7715 ENSG00000158286.13     RNF207 HGNC:32947
## 7716 ENSG00000158286.13     RNF207 HGNC:32947
## 7717 ENSG00000158286.13     RNF207 HGNC:32947
## 7718 ENSG00000158286.13     RNF207 HGNC:32947
## 7719 ENSG00000158286.13     RNF207 HGNC:32947
## 7720 ENSG00000158286.13     RNF207 HGNC:32947
## 7721 ENSG00000158286.13     RNF207 HGNC:32947
```

```
## 7722 ENSG00000158286.13      RNF207 HGNC:32947
## 7723 ENSG00000158286.13      RNF207 HGNC:32947
## 7724 ENSG00000158286.13      RNF207 HGNC:32947
## 7725 ENSG00000158286.13      RNF207 HGNC:32947
## 7726 ENSG00000158286.13      RNF207 HGNC:32947
## 7727 ENSG00000158286.13      RNF207 HGNC:32947
## 7728 ENSG00000158286.13      RNF207 HGNC:32947
## 7729 ENSG00000158286.13      RNF207 HGNC:32947
## 7730 ENSG00000158286.13      RNF207 HGNC:32947
## 7731 ENSG00000158286.13      RNF207 HGNC:32947
## 7732 ENSG00000158286.13      RNF207 HGNC:32947
## 7733 ENSG00000158286.13      RNF207 HGNC:32947
## 7734 ENSG00000158286.13      RNF207 HGNC:32947
## 7735 ENSG00000158286.13      RNF207 HGNC:32947
## 7736 ENSG00000158286.13      RNF207 HGNC:32947
## 7737 ENSG00000158286.13      RNF207 HGNC:32947
## 7738 ENSG00000158286.13      RNF207 HGNC:32947
## 7739 ENSG00000158286.13      RNF207 HGNC:32947
## 7740 ENSG00000158286.13      RNF207 HGNC:32947
## 7741 ENSG00000158286.13      RNF207 HGNC:32947
## 7742 ENSG00000158286.13      RNF207 HGNC:32947
## 7743 ENSG00000158286.13      RNF207 HGNC:32947
## 7744 ENSG00000158286.13      RNF207 HGNC:32947
## 7745 ENSG00000158286.13      RNF207 HGNC:32947
## 7746 ENSG00000158286.13      RNF207 HGNC:32947
## 7747 ENSG00000158286.13      RNF207 HGNC:32947
## 7748 ENSG00000158286.13      RNF207 HGNC:32947
## 7749 ENSG00000158286.13      RNF207 HGNC:32947
## 7750 ENSG00000158286.13      RNF207 HGNC:32947
## 7751 ENSG00000158286.13      RNF207 HGNC:32947
## 7752 ENSG00000158286.13      RNF207 HGNC:32947
## 7753 ENSG00000158286.13      RNF207 HGNC:32947
## 7754 ENSG00000158286.13      RNF207 HGNC:32947
## 7755 ENSG00000158286.13      RNF207 HGNC:32947
## 7756 ENSG00000116237.16        ICMT  HGNC:5350
## 7757 ENSG00000116237.16        ICMT  HGNC:5350
## 7758 ENSG00000116237.16        ICMT  HGNC:5350
## 7759 ENSG00000116237.16        ICMT  HGNC:5350
## 7760 ENSG00000116237.16        ICMT  HGNC:5350
## 7761 ENSG00000116237.16        ICMT  HGNC:5350
## 7762 ENSG00000116237.16        ICMT  HGNC:5350
## 7763 ENSG00000116237.16        ICMT  HGNC:5350
## 7764 ENSG00000116237.16        ICMT  HGNC:5350
## 7765 ENSG00000116237.16        ICMT  HGNC:5350
## 7766 ENSG00000116237.16        ICMT  HGNC:5350
## 7767 ENSG00000116237.16        ICMT  HGNC:5350
## 7768 ENSG00000116237.16        ICMT  HGNC:5350
## 7769 ENSG00000116237.16        ICMT  HGNC:5350
## 7770 ENSG00000116237.16        ICMT  HGNC:5350
## 7771 ENSG00000116237.16        ICMT  HGNC:5350
## 7772  ENSG00000225077.3   LINC00337 HGNC:28620
## 7773  ENSG00000225077.3   LINC00337 HGNC:28620
## 7774  ENSG00000225077.3   LINC00337 HGNC:28620
## 7775  ENSG00000225077.3   LINC00337 HGNC:28620
```

```
## 7776  ENSG00000225077.3    LINC00337 HGNC:28620
## 7777  ENSG00000225077.3    LINC00337 HGNC:28620
## 7778  ENSG00000225077.3    LINC00337 HGNC:28620
## 7779  ENSG00000225077.3    LINC00337 HGNC:28620
## 7780  ENSG00000225077.3    LINC00337 HGNC:28620
## 7781  ENSG00000225077.3    LINC00337 HGNC:28620
## 7782  ENSG00000225077.3    LINC00337 HGNC:28620
## 7783  ENSG00000225077.3    LINC00337 HGNC:28620
## 7784  ENSG00000173673.7         HES3 HGNC:26226
## 7785  ENSG00000173673.7         HES3 HGNC:26226
## 7786  ENSG00000173673.7         HES3 HGNC:26226
## 7787  ENSG00000173673.7         HES3 HGNC:26226
## 7788  ENSG00000173673.7         HES3 HGNC:26226
## 7789  ENSG00000173673.7         HES3 HGNC:26226
## 7790  ENSG00000173673.7         HES3 HGNC:26226
## 7791  ENSG00000173673.7         HES3 HGNC:26226
## 7792  ENSG00000173673.7         HES3 HGNC:26226
## 7793  ENSG00000173673.7         HES3 HGNC:26226
## 7794  ENSG00000173673.7         HES3 HGNC:26226
## 7795  ENSG00000173673.7         HES3 HGNC:26226
## 7796  ENSG00000173673.7         HES3 HGNC:26226
## 7797  ENSG00000173673.7         HES3 HGNC:26226
## 7798  ENSG00000158292.7       GPR153 HGNC:23618
## 7799  ENSG00000158292.7       GPR153 HGNC:23618
## 7800  ENSG00000158292.7       GPR153 HGNC:23618
## 7801  ENSG00000158292.7       GPR153 HGNC:23618
## 7802  ENSG00000158292.7       GPR153 HGNC:23618
## 7803  ENSG00000158292.7       GPR153 HGNC:23618
## 7804  ENSG00000158292.7       GPR153 HGNC:23618
## 7805  ENSG00000158292.7       GPR153 HGNC:23618
## 7806  ENSG00000158292.7       GPR153 HGNC:23618
## 7807  ENSG00000158292.7       GPR153 HGNC:23618
## 7808  ENSG00000158292.7       GPR153 HGNC:23618
## 7809  ENSG00000158292.7       GPR153 HGNC:23618
## 7810  ENSG00000158292.7       GPR153 HGNC:23618
## 7811  ENSG00000158292.7       GPR153 HGNC:23618
## 7812  ENSG00000158292.7       GPR153 HGNC:23618
## 7813  ENSG00000158292.7       GPR153 HGNC:23618
## 7814  ENSG00000158292.7       GPR153 HGNC:23618
## 7815  ENSG00000158292.7       GPR153 HGNC:23618
## 7816 ENSG00000097021.19        ACOT7 HGNC:24157
## 7817 ENSG00000097021.19        ACOT7 HGNC:24157
## 7818 ENSG00000097021.19        ACOT7 HGNC:24157
## 7819 ENSG00000097021.19        ACOT7 HGNC:24157
## 7820 ENSG00000097021.19        ACOT7 HGNC:24157
## 7821 ENSG00000097021.19        ACOT7 HGNC:24157
## 7822 ENSG00000097021.19        ACOT7 HGNC:24157
## 7823 ENSG00000097021.19        ACOT7 HGNC:24157
## 7824 ENSG00000097021.19        ACOT7 HGNC:24157
## 7825 ENSG00000097021.19        ACOT7 HGNC:24157
## 7826 ENSG00000097021.19        ACOT7 HGNC:24157
## 7827 ENSG00000097021.19        ACOT7 HGNC:24157
## 7828 ENSG00000097021.19        ACOT7 HGNC:24157
## 7829 ENSG00000097021.19        ACOT7 HGNC:24157
```

```
## 7830 ENSG00000097021.19          ACOT7 HGNC:24157
## 7831 ENSG00000097021.19          ACOT7 HGNC:24157
## 7832 ENSG00000097021.19          ACOT7 HGNC:24157
## 7833 ENSG00000097021.19          ACOT7 HGNC:24157
## 7834 ENSG00000097021.19          ACOT7 HGNC:24157
## 7835 ENSG00000097021.19          ACOT7 HGNC:24157
## 7836 ENSG00000097021.19          ACOT7 HGNC:24157
## 7837 ENSG00000097021.19          ACOT7 HGNC:24157
## 7838 ENSG00000097021.19          ACOT7 HGNC:24157
## 7839 ENSG00000097021.19          ACOT7 HGNC:24157
## 7840 ENSG00000097021.19          ACOT7 HGNC:24157
## 7841 ENSG00000097021.19          ACOT7 HGNC:24157
## 7842 ENSG00000097021.19          ACOT7 HGNC:24157
## 7843 ENSG00000097021.19          ACOT7 HGNC:24157
## 7844 ENSG00000097021.19          ACOT7 HGNC:24157
## 7845 ENSG00000097021.19          ACOT7 HGNC:24157
## 7846 ENSG00000097021.19          ACOT7 HGNC:24157
## 7847 ENSG00000097021.19          ACOT7 HGNC:24157
## 7848 ENSG00000097021.19          ACOT7 HGNC:24157
## 7849 ENSG00000097021.19          ACOT7 HGNC:24157
## 7850 ENSG00000097021.19          ACOT7 HGNC:24157
## 7851 ENSG00000097021.19          ACOT7 HGNC:24157
## 7852 ENSG00000097021.19          ACOT7 HGNC:24157
## 7853 ENSG00000097021.19          ACOT7 HGNC:24157
## 7854 ENSG00000097021.19          ACOT7 HGNC:24157
## 7855 ENSG00000097021.19          ACOT7 HGNC:24157
## 7856 ENSG00000097021.19          ACOT7 HGNC:24157
## 7857 ENSG00000097021.19          ACOT7 HGNC:24157
## 7858 ENSG00000097021.19          ACOT7 HGNC:24157
## 7859 ENSG00000097021.19          ACOT7 HGNC:24157
## 7860 ENSG00000097021.19          ACOT7 HGNC:24157
## 7861 ENSG00000097021.19          ACOT7 HGNC:24157
## 7862 ENSG00000097021.19          ACOT7 HGNC:24157
## 7863 ENSG00000097021.19          ACOT7 HGNC:24157
## 7864 ENSG00000097021.19          ACOT7 HGNC:24157
## 7865 ENSG00000097021.19          ACOT7 HGNC:24157
## 7866 ENSG00000097021.19          ACOT7 HGNC:24157
## 7867 ENSG00000097021.19          ACOT7 HGNC:24157
## 7868 ENSG00000097021.19          ACOT7 HGNC:24157
## 7869 ENSG00000097021.19          ACOT7 HGNC:24157
## 7870 ENSG00000097021.19          ACOT7 HGNC:24157
## 7871 ENSG00000097021.19          ACOT7 HGNC:24157
## 7872 ENSG00000097021.19          ACOT7 HGNC:24157
## 7873 ENSG00000097021.19          ACOT7 HGNC:24157
## 7874 ENSG00000097021.19          ACOT7 HGNC:24157
## 7875 ENSG00000097021.19          ACOT7 HGNC:24157
## 7876 ENSG00000097021.19          ACOT7 HGNC:24157
## 7877 ENSG00000097021.19          ACOT7 HGNC:24157
## 7878 ENSG00000097021.19          ACOT7 HGNC:24157
## 7879 ENSG00000097021.19          ACOT7 HGNC:24157
## 7880 ENSG00000097021.19          ACOT7 HGNC:24157
## 7881 ENSG00000097021.19          ACOT7 HGNC:24157
## 7882 ENSG00000097021.19          ACOT7 HGNC:24157
## 7883 ENSG00000097021.19          ACOT7 HGNC:24157
```

```
## 7884 ENSG00000097021.19          ACOT7 HGNC:24157
## 7885 ENSG00000097021.19          ACOT7 HGNC:24157
## 7886 ENSG00000097021.19          ACOT7 HGNC:24157
## 7887 ENSG00000097021.19          ACOT7 HGNC:24157
## 7888 ENSG00000097021.19          ACOT7 HGNC:24157
## 7889 ENSG00000097021.19          ACOT7 HGNC:24157
## 7890 ENSG00000097021.19          ACOT7 HGNC:24157
## 7891 ENSG00000097021.19          ACOT7 HGNC:24157
## 7892 ENSG00000097021.19          ACOT7 HGNC:24157
## 7893 ENSG00000097021.19          ACOT7 HGNC:24157
## 7894 ENSG00000097021.19          ACOT7 HGNC:24157
## 7895 ENSG00000097021.19          ACOT7 HGNC:24157
## 7896 ENSG00000097021.19          ACOT7 HGNC:24157
## 7897 ENSG00000097021.19          ACOT7 HGNC:24157
## 7898 ENSG00000097021.19          ACOT7 HGNC:24157
## 7899 ENSG00000097021.19          ACOT7 HGNC:24157
## 7900 ENSG00000097021.19          ACOT7 HGNC:24157
## 7901 ENSG00000097021.19          ACOT7 HGNC:24157
## 7902 ENSG00000097021.19          ACOT7 HGNC:24157
## 7903 ENSG00000097021.19          ACOT7 HGNC:24157
## 7904 ENSG00000097021.19          ACOT7 HGNC:24157
## 7905 ENSG00000097021.19          ACOT7 HGNC:24157
## 7906 ENSG00000097021.19          ACOT7 HGNC:24157
## 7907 ENSG00000097021.19          ACOT7 HGNC:24157
## 7908 ENSG00000097021.19          ACOT7 HGNC:24157
## 7909 ENSG00000097021.19          ACOT7 HGNC:24157
## 7910 ENSG00000097021.19          ACOT7 HGNC:24157
## 7911 ENSG00000097021.19          ACOT7 HGNC:24157
## 7912 ENSG00000097021.19          ACOT7 HGNC:24157
## 7913 ENSG00000097021.19          ACOT7 HGNC:24157
## 7914 ENSG00000097021.19          ACOT7 HGNC:24157
## 7915 ENSG00000097021.19          ACOT7 HGNC:24157
## 7916 ENSG00000097021.19          ACOT7 HGNC:24157
## 7917 ENSG00000097021.19          ACOT7 HGNC:24157
## 7918 ENSG00000097021.19          ACOT7 HGNC:24157
## 7919 ENSG00000097021.19          ACOT7 HGNC:24157
## 7920 ENSG00000097021.19          ACOT7 HGNC:24157
## 7921 ENSG00000097021.19          ACOT7 HGNC:24157
## 7922 ENSG00000097021.19          ACOT7 HGNC:24157
## 7923 ENSG00000097021.19          ACOT7 HGNC:24157
## 7924 ENSG00000097021.19          ACOT7 HGNC:24157
## 7925 ENSG00000097021.19          ACOT7 HGNC:24157
## 7926 ENSG00000097021.19          ACOT7 HGNC:24157
## 7927 ENSG00000097021.19          ACOT7 HGNC:24157
## 7928 ENSG00000097021.19          ACOT7 HGNC:24157
## 7929 ENSG00000097021.19          ACOT7 HGNC:24157
## 7930 ENSG00000097021.19          ACOT7 HGNC:24157
## 7931 ENSG00000097021.19          ACOT7 HGNC:24157
## 7932 ENSG00000097021.19          ACOT7 HGNC:24157
## 7933 ENSG00000097021.19          ACOT7 HGNC:24157
## 7934 ENSG00000097021.19          ACOT7 HGNC:24157
## 7935 ENSG00000097021.19          ACOT7 HGNC:24157
## 7936 ENSG00000097021.19          ACOT7 HGNC:24157
## 7937 ENSG00000097021.19          ACOT7 HGNC:24157
```

```
## 7938 ENSG00000097021.19        ACOT7 HGNC:24157
## 7939 ENSG00000097021.19        ACOT7 HGNC:24157
## 7940 ENSG00000097021.19        ACOT7 HGNC:24157
## 7941 ENSG00000097021.19        ACOT7 HGNC:24157
## 7942 ENSG00000097021.19        ACOT7 HGNC:24157
## 7943 ENSG00000097021.19        ACOT7 HGNC:24157
## 7944 ENSG00000097021.19        ACOT7 HGNC:24157
## 7945 ENSG00000097021.19        ACOT7 HGNC:24157
## 7946 ENSG00000097021.19        ACOT7 HGNC:24157
## 7947 ENSG00000097021.19        ACOT7 HGNC:24157
## 7948 ENSG00000097021.19        ACOT7 HGNC:24157
## 7949 ENSG00000097021.19        ACOT7 HGNC:24157
## 7950 ENSG00000097021.19        ACOT7 HGNC:24157
## 7951 ENSG00000097021.19        ACOT7 HGNC:24157
## 7952 ENSG00000097021.19        ACOT7 HGNC:24157
## 7953 ENSG00000097021.19        ACOT7 HGNC:24157
## 7954 ENSG00000097021.19        ACOT7 HGNC:24157
## 7955  ENSG00000271746.1    AL031848.2       <NA>
## 7956  ENSG00000271746.1    AL031848.2       <NA>
## 7957  ENSG00000271746.1    AL031848.2       <NA>
## 7958 ENSG00000069812.11         HES2 HGNC:16005
## 7959 ENSG00000069812.11         HES2 HGNC:16005
## 7960 ENSG00000069812.11         HES2 HGNC:16005
## 7961 ENSG00000069812.11         HES2 HGNC:16005
## 7962 ENSG00000069812.11         HES2 HGNC:16005
## 7963 ENSG00000069812.11         HES2 HGNC:16005
## 7964 ENSG00000069812.11         HES2 HGNC:16005
## 7965 ENSG00000069812.11         HES2 HGNC:16005
## 7966 ENSG00000069812.11         HES2 HGNC:16005
## 7967 ENSG00000069812.11         HES2 HGNC:16005
## 7968 ENSG00000069812.11         HES2 HGNC:16005
## 7969 ENSG00000069812.11         HES2 HGNC:16005
## 7970 ENSG00000069812.11         HES2 HGNC:16005
## 7971 ENSG00000069812.11         HES2 HGNC:16005
## 7972 ENSG00000069812.11         HES2 HGNC:16005
## 7973 ENSG00000069812.11         HES2 HGNC:16005
## 7974 ENSG00000069812.11         HES2 HGNC:16005
## 7975 ENSG00000069812.11         HES2 HGNC:16005
## 7976 ENSG00000069812.11         HES2 HGNC:16005
## 7977 ENSG00000069812.11         HES2 HGNC:16005
## 7978 ENSG00000069812.11         HES2 HGNC:16005
## 7979 ENSG00000069812.11         HES2 HGNC:16005
## 7980 ENSG00000069812.11         HES2 HGNC:16005
## 7981 ENSG00000069812.11         HES2 HGNC:16005
## 7982 ENSG00000069812.11         HES2 HGNC:16005
## 7983 ENSG00000069812.11         HES2 HGNC:16005
## 7984 ENSG00000069812.11         HES2 HGNC:16005
## 7985 ENSG00000069812.11         HES2 HGNC:16005
## 7986 ENSG00000069812.11         HES2 HGNC:16005
## 7987 ENSG00000069812.11         HES2 HGNC:16005
## 7988 ENSG00000069812.11         HES2 HGNC:16005
## 7989 ENSG00000069812.11         HES2 HGNC:16005
## 7990 ENSG00000069812.11         HES2 HGNC:16005
## 7991 ENSG00000069812.11         HES2 HGNC:16005
```

```
## 7992 ENSG00000069812.11          HES2 HGNC:16005
## 7993 ENSG00000069812.11          HES2 HGNC:16005
## 7994 ENSG00000069812.11          HES2 HGNC:16005
## 7995 ENSG00000069812.11          HES2 HGNC:16005
## 7996 ENSG00000069812.11          HES2 HGNC:16005
## 7997 ENSG00000069812.11          HES2 HGNC:16005
## 7998 ENSG00000069812.11          HES2 HGNC:16005
## 7999 ENSG00000069812.11          HES2 HGNC:16005
## 8000 ENSG00000069812.11          HES2 HGNC:16005
## 8001 ENSG00000069812.11          HES2 HGNC:16005
## 8002 ENSG00000069812.11          HES2 HGNC:16005
## 8003 ENSG00000069812.11          HES2 HGNC:16005
## 8004 ENSG00000069812.11          HES2 HGNC:16005
## 8005 ENSG00000069812.11          HES2 HGNC:16005
## 8006 ENSG00000069812.11          HES2 HGNC:16005
## 8007 ENSG00000069812.11          HES2 HGNC:16005
## 8008 ENSG00000069812.11          HES2 HGNC:16005
## 8009 ENSG00000069812.11          HES2 HGNC:16005
## 8010 ENSG00000069812.11          HES2 HGNC:16005
## 8011 ENSG00000069812.11          HES2 HGNC:16005
## 8012 ENSG00000069812.11          HES2 HGNC:16005
## 8013 ENSG00000069812.11          HES2 HGNC:16005
## 8014 ENSG00000069812.11          HES2 HGNC:16005
## 8015 ENSG00000069812.11          HES2 HGNC:16005
## 8016 ENSG00000069812.11          HES2 HGNC:16005
## 8017 ENSG00000069812.11          HES2 HGNC:16005
## 8018 ENSG00000187017.17          ESPN HGNC:13281
## 8019 ENSG00000187017.17          ESPN HGNC:13281
## 8020 ENSG00000187017.17          ESPN HGNC:13281
## 8021 ENSG00000187017.17          ESPN HGNC:13281
## 8022 ENSG00000187017.17          ESPN HGNC:13281
## 8023 ENSG00000187017.17          ESPN HGNC:13281
## 8024 ENSG00000187017.17          ESPN HGNC:13281
## 8025 ENSG00000187017.17          ESPN HGNC:13281
## 8026 ENSG00000187017.17          ESPN HGNC:13281
## 8027 ENSG00000187017.17          ESPN HGNC:13281
## 8028 ENSG00000187017.17          ESPN HGNC:13281
## 8029 ENSG00000187017.17          ESPN HGNC:13281
## 8030 ENSG00000187017.17          ESPN HGNC:13281
## 8031 ENSG00000187017.17          ESPN HGNC:13281
## 8032 ENSG00000187017.17          ESPN HGNC:13281
## 8033 ENSG00000187017.17          ESPN HGNC:13281
## 8034 ENSG00000187017.17          ESPN HGNC:13281
## 8035 ENSG00000187017.17          ESPN HGNC:13281
## 8036 ENSG00000187017.17          ESPN HGNC:13281
## 8037 ENSG00000187017.17          ESPN HGNC:13281
## 8038 ENSG00000187017.17          ESPN HGNC:13281
## 8039 ENSG00000187017.17          ESPN HGNC:13281
## 8040 ENSG00000187017.17          ESPN HGNC:13281
## 8041 ENSG00000187017.17          ESPN HGNC:13281
## 8042 ENSG00000187017.17          ESPN HGNC:13281
## 8043 ENSG00000187017.17          ESPN HGNC:13281
## 8044 ENSG00000187017.17          ESPN HGNC:13281
## 8045 ENSG00000187017.17          ESPN HGNC:13281
```

```
## 8046 ENSG00000187017.17          ESPN HGNC:13281
## 8047 ENSG00000187017.17          ESPN HGNC:13281
## 8048 ENSG00000187017.17          ESPN HGNC:13281
## 8049 ENSG00000187017.17          ESPN HGNC:13281
## 8050 ENSG00000187017.17          ESPN HGNC:13281
## 8051 ENSG00000187017.17          ESPN HGNC:13281
## 8052 ENSG00000187017.17          ESPN HGNC:13281
## 8053 ENSG00000187017.17          ESPN HGNC:13281
## 8054 ENSG00000187017.17          ESPN HGNC:13281
## 8055 ENSG00000187017.17          ESPN HGNC:13281
## 8056 ENSG00000187017.17          ESPN HGNC:13281
## 8057 ENSG00000187017.17          ESPN HGNC:13281
## 8058 ENSG00000187017.17          ESPN HGNC:13281
## 8059 ENSG00000187017.17          ESPN HGNC:13281
## 8060 ENSG00000187017.17          ESPN HGNC:13281
## 8061 ENSG00000187017.17          ESPN HGNC:13281
## 8062 ENSG00000187017.17          ESPN HGNC:13281
## 8063 ENSG00000187017.17          ESPN HGNC:13281
## 8064 ENSG00000187017.17          ESPN HGNC:13281
## 8065 ENSG00000187017.17          ESPN HGNC:13281
## 8066 ENSG00000187017.17          ESPN HGNC:13281
## 8067 ENSG00000187017.17          ESPN HGNC:13281
## 8068 ENSG00000187017.17          ESPN HGNC:13281
## 8069 ENSG00000187017.17          ESPN HGNC:13281
## 8070 ENSG00000187017.17          ESPN HGNC:13281
## 8071 ENSG00000187017.17          ESPN HGNC:13281
## 8072 ENSG00000187017.17          ESPN HGNC:13281
## 8073 ENSG00000187017.17          ESPN HGNC:13281
## 8074 ENSG00000187017.17          ESPN HGNC:13281
## 8075 ENSG00000187017.17          ESPN HGNC:13281
## 8076 ENSG00000187017.17          ESPN HGNC:13281
## 8077 ENSG00000187017.17          ESPN HGNC:13281
## 8078 ENSG00000187017.17          ESPN HGNC:13281
## 8079 ENSG00000187017.17          ESPN HGNC:13281
## 8080 ENSG00000187017.17          ESPN HGNC:13281
## 8081 ENSG00000187017.17          ESPN HGNC:13281
## 8082 ENSG00000187017.17          ESPN HGNC:13281
## 8083 ENSG00000187017.17          ESPN HGNC:13281
## 8084 ENSG00000187017.17          ESPN HGNC:13281
## 8085 ENSG00000187017.17          ESPN HGNC:13281
## 8086 ENSG00000187017.17          ESPN HGNC:13281
## 8087 ENSG00000187017.17          ESPN HGNC:13281
## 8088 ENSG00000187017.17          ESPN HGNC:13281
## 8089 ENSG00000187017.17          ESPN HGNC:13281
## 8090 ENSG00000187017.17          ESPN HGNC:13281
## 8091 ENSG00000187017.17          ESPN HGNC:13281
## 8092 ENSG00000187017.17          ESPN HGNC:13281
## 8093 ENSG00000187017.17          ESPN HGNC:13281
## 8094 ENSG00000187017.17          ESPN HGNC:13281
## 8095 ENSG00000187017.17          ESPN HGNC:13281
## 8096 ENSG00000187017.17          ESPN HGNC:13281
## 8097 ENSG00000187017.17          ESPN HGNC:13281
## 8098 ENSG00000187017.17          ESPN HGNC:13281
## 8099 ENSG00000187017.17          ESPN HGNC:13281
```

```
## 8100 ENSG00000187017.17        ESPN HGNC:13281
## 8101 ENSG00000187017.17        ESPN HGNC:13281
## 8102 ENSG00000187017.17        ESPN HGNC:13281
## 8103 ENSG00000187017.17        ESPN HGNC:13281
## 8104 ENSG00000187017.17        ESPN HGNC:13281
## 8105 ENSG00000187017.17        ESPN HGNC:13281
## 8106 ENSG00000187017.17        ESPN HGNC:13281
## 8107 ENSG00000187017.17        ESPN HGNC:13281
## 8108 ENSG00000187017.17        ESPN HGNC:13281
## 8109 ENSG00000187017.17        ESPN HGNC:13281
## 8110 ENSG00000187017.17        ESPN HGNC:13281
## 8111 ENSG00000187017.17        ESPN HGNC:13281
## 8112 ENSG00000187017.17        ESPN HGNC:13281
## 8113 ENSG00000187017.17        ESPN HGNC:13281
## 8114 ENSG00000187017.17        ESPN HGNC:13281
## 8115 ENSG00000187017.17        ESPN HGNC:13281
## 8116 ENSG00000187017.17        ESPN HGNC:13281
## 8117 ENSG00000187017.17        ESPN HGNC:13281
## 8118 ENSG00000187017.17        ESPN HGNC:13281
## 8119  ENSG00000265392.1     MIR4252 HGNC:38384
## 8120  ENSG00000265392.1     MIR4252 HGNC:38384
## 8121  ENSG00000265392.1     MIR4252 HGNC:38384
## 8122  ENSG00000231868.1   AL031848.1       <NA>
## 8123  ENSG00000231868.1   AL031848.1       <NA>
## 8124  ENSG00000231868.1   AL031848.1       <NA>
## 8125  ENSG00000231868.1   AL031848.1       <NA>
## 8126  ENSG00000231868.1   AL031848.1       <NA>
## 8127 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8128 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8129 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8130 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8131 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8132 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8133 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8134 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8135 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8136 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8137 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8138 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8139 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8140 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8141 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8142 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8143 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8144 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8145 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8146 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8147 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8148 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8149 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8150 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8151 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8152 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8153 ENSG00000215788.10    TNFRSF25 HGNC:11910
```

```
## 8154 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8155 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8156 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8157 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8158 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8159 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8160 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8161 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8162 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8163 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8164 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8165 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8166 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8167 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8168 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8169 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8170 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8171 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8172 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8173 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8174 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8175 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8176 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8177 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8178 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8179 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8180 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8181 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8182 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8183 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8184 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8185 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8186 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8187 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8188 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8189 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8190 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8191 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8192 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8193 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8194 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8195 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8196 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8197 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8198 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8199 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8200 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8201 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8202 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8203 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8204 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8205 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8206 ENSG00000215788.10      TNFRSF25 HGNC:11910
## 8207 ENSG00000215788.10      TNFRSF25 HGNC:11910
```

```
## 8208 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8209 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8210 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8211 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8212 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8213 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8214 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8215 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8216 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8217 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8218 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8219 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8220 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8221 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8222 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8223 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8224 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8225 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8226 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8227 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8228 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8229 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8230 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8231 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8232 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8233 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8234 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8235 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8236 ENSG00000215788.10    TNFRSF25 HGNC:11910
## 8237 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8238 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8239 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8240 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8241 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8242 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8243 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8244 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8245 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8246 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8247 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8248 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8249 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8250 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8251 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8252 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8253 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8254 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8255 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8256 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8257 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8258 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8259 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8260 ENSG00000171680.21     PLEKHG5 HGNC:29105
## 8261 ENSG00000171680.21     PLEKHG5 HGNC:29105
```

```
## 8262 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8263 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8264 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8265 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8266 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8267 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8268 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8269 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8270 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8271 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8272 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8273 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8274 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8275 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8276 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8277 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8278 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8279 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8280 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8281 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8282 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8283 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8284 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8285 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8286 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8287 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8288 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8289 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8290 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8291 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8292 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8293 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8294 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8295 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8296 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8297 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8298 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8299 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8300 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8301 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8302 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8303 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8304 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8305 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8306 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8307 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8308 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8309 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8310 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8311 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8312 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8313 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8314 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8315 ENSG00000171680.21          PLEKHG5 HGNC:29105
```

```
## 8316 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8317 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8318 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8319 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8320 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8321 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8322 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8323 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8324 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8325 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8326 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8327 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8328 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8329 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8330 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8331 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8332 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8333 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8334 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8335 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8336 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8337 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8338 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8339 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8340 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8341 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8342 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8343 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8344 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8345 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8346 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8347 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8348 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8349 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8350 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8351 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8352 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8353 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8354 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8355 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8356 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8357 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8358 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8359 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8360 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8361 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8362 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8363 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8364 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8365 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8366 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8367 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8368 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8369 ENSG00000171680.21          PLEKHG5 HGNC:29105
```

```
## 8370 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8371 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8372 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8373 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8374 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8375 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8376 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8377 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8378 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8379 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8380 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8381 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8382 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8383 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8384 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8385 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8386 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8387 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8388 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8389 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8390 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8391 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8392 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8393 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8394 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8395 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8396 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8397 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8398 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8399 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8400 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8401 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8402 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8403 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8404 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8405 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8406 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8407 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8408 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8409 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8410 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8411 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8412 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8413 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8414 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8415 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8416 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8417 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8418 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8419 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8420 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8421 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8422 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8423 ENSG00000171680.21        PLEKHG5 HGNC:29105
```

```
## 8424 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8425 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8426 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8427 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8428 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8429 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8430 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8431 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8432 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8433 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8434 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8435 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8436 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8437 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8438 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8439 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8440 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8441 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8442 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8443 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8444 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8445 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8446 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8447 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8448 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8449 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8450 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8451 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8452 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8453 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8454 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8455 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8456 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8457 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8458 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8459 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8460 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8461 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8462 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8463 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8464 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8465 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8466 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8467 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8468 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8469 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8470 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8471 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8472 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8473 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8474 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8475 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8476 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8477 ENSG00000171680.21          PLEKHG5 HGNC:29105
```

```
## 8478 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8479 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8480 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8481 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8482 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8483 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8484 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8485 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8486 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8487 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8488 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8489 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8490 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8491 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8492 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8493 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8494 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8495 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8496 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8497 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8498 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8499 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8500 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8501 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8502 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8503 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8504 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8505 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8506 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8507 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8508 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8509 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8510 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8511 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8512 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8513 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8514 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8515 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8516 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8517 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8518 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8519 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8520 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8521 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8522 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8523 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8524 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8525 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8526 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8527 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8528 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8529 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8530 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8531 ENSG00000171680.21        PLEKHG5 HGNC:29105
```

```
## 8532 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8533 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8534 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8535 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8536 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8537 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8538 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8539 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8540 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8541 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8542 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8543 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8544 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8545 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8546 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8547 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8548 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8549 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8550 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8551 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8552 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8553 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8554 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8555 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8556 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8557 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8558 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8559 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8560 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8561 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8562 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8563 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8564 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8565 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8566 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8567 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8568 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8569 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8570 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8571 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8572 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8573 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8574 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8575 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8576 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8577 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8578 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8579 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8580 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8581 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8582 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8583 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8584 ENSG00000171680.21          PLEKHG5 HGNC:29105
## 8585 ENSG00000171680.21          PLEKHG5 HGNC:29105
```

```
## 8586 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8587 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8588 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8589 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8590 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8591 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8592 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8593 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8594 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8595 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8596 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8597 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8598 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8599 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8600 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8601 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8602 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8603 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8604 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8605 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8606 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8607 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8608 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8609 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8610 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8611 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8612 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8613 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8614 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8615 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8616 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8617 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8618 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8619 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8620 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8621 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8622 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8623 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8624 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8625 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8626 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8627 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8628 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8629 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8630 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8631 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8632 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8633 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8634 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8635 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8636 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8637 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8638 ENSG00000171680.21        PLEKHG5 HGNC:29105
## 8639 ENSG00000171680.21        PLEKHG5 HGNC:29105
```

```
## 8640 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8641 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8642 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8643 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8644 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8645 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8646 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8647 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8648 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8649 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8650 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8651 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8652 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8653 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8654 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8655 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8656 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8657 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8658 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8659 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8660 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8661 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8662 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8663 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8664 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8665 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8666 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8667 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8668 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8669 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8670 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8671 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8672 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8673 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8674 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8675 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8676 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8677 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8678 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8679 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8680 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8681 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8682 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8683 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8684 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8685 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8686 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8687 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8688 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8689 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8690 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8691 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8692 ENSG00000171680.21       PLEKHG5 HGNC:29105
## 8693 ENSG00000171680.21       PLEKHG5 HGNC:29105
```

```
## 8694 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8695 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8696 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8697 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8698 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8699 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8700 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8701 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8702 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8703 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8704 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8705 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8706 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8707 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8708 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8709 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8710 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8711 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8712 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8713 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8714 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8715 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8716 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8717 ENSG00000171680.21    PLEKHG5 HGNC:29105
## 8718 ENSG00000162408.11       NOL9 HGNC:26265
## 8719 ENSG00000162408.11       NOL9 HGNC:26265
## 8720 ENSG00000162408.11       NOL9 HGNC:26265
## 8721 ENSG00000162408.11       NOL9 HGNC:26265
## 8722 ENSG00000162408.11       NOL9 HGNC:26265
## 8723 ENSG00000162408.11       NOL9 HGNC:26265
## 8724 ENSG00000162408.11       NOL9 HGNC:26265
## 8725 ENSG00000162408.11       NOL9 HGNC:26265
## 8726 ENSG00000162408.11       NOL9 HGNC:26265
## 8727 ENSG00000162408.11       NOL9 HGNC:26265
## 8728 ENSG00000162408.11       NOL9 HGNC:26265
## 8729 ENSG00000162408.11       NOL9 HGNC:26265
## 8730 ENSG00000162408.11       NOL9 HGNC:26265
## 8731 ENSG00000162408.11       NOL9 HGNC:26265
## 8732 ENSG00000162408.11       NOL9 HGNC:26265
## 8733 ENSG00000162408.11       NOL9 HGNC:26265
## 8734 ENSG00000162408.11       NOL9 HGNC:26265
## 8735 ENSG00000162408.11       NOL9 HGNC:26265
## 8736 ENSG00000162408.11       NOL9 HGNC:26265
## 8737 ENSG00000162408.11       NOL9 HGNC:26265
## 8738 ENSG00000162408.11       NOL9 HGNC:26265
## 8739 ENSG00000162408.11       NOL9 HGNC:26265
## 8740 ENSG00000162408.11       NOL9 HGNC:26265
## 8741 ENSG00000162408.11       NOL9 HGNC:26265
## 8742 ENSG00000162408.11       NOL9 HGNC:26265
## 8743 ENSG00000162408.11       NOL9 HGNC:26265
## 8744 ENSG00000162408.11       NOL9 HGNC:26265
## 8745 ENSG00000162408.11       NOL9 HGNC:26265
## 8746 ENSG00000162408.11       NOL9 HGNC:26265
## 8747 ENSG00000162408.11       NOL9 HGNC:26265
```

```
## 8748  ENSG00000253022.1   RNU6-731P HGNC:47694
## 8749  ENSG00000253022.1   RNU6-731P HGNC:47694
## 8750  ENSG00000253022.1   RNU6-731P HGNC:47694
## 8751  ENSG00000229519.2  AL591866.1      <NA>
## 8752  ENSG00000229519.2  AL591866.1      <NA>
## 8753  ENSG00000229519.2  AL591866.1      <NA>
## 8754  ENSG00000229519.2  AL591866.1      <NA>
## 8755 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8756 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8757 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8758 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8759 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8760 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8761 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8762 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8763 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8764 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8765 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8766 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8767 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8768 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8769 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8770 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8771 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8772 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8773 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8774 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8775 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8776 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8777 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8778 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8779 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8780 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8781 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8782 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8783 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8784 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8785 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8786 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8787 ENSG00000173662.21      TAS1R1 HGNC:14448
## 8788 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8789 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8790 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8791 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8792 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8793 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8794 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8795 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8796 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8797 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8798 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8799 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8800 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8801 ENSG00000204859.13      ZBTB48  HGNC:4930
```

```
## 8802 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8803 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8804 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8805 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8806 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8807 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8808 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8809 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8810 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8811 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8812 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8813 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8814 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8815 ENSG00000204859.13      ZBTB48  HGNC:4930
## 8816 ENSG00000162413.16      KLHL21 HGNC:29041
## 8817 ENSG00000162413.16      KLHL21 HGNC:29041
## 8818 ENSG00000162413.16      KLHL21 HGNC:29041
## 8819 ENSG00000162413.16      KLHL21 HGNC:29041
## 8820 ENSG00000162413.16      KLHL21 HGNC:29041
## 8821 ENSG00000162413.16      KLHL21 HGNC:29041
## 8822 ENSG00000162413.16      KLHL21 HGNC:29041
## 8823 ENSG00000162413.16      KLHL21 HGNC:29041
## 8824 ENSG00000162413.16      KLHL21 HGNC:29041
## 8825 ENSG00000162413.16      KLHL21 HGNC:29041
## 8826 ENSG00000162413.16      KLHL21 HGNC:29041
## 8827 ENSG00000162413.16      KLHL21 HGNC:29041
## 8828 ENSG00000162413.16      KLHL21 HGNC:29041
## 8829 ENSG00000162413.16      KLHL21 HGNC:29041
## 8830 ENSG00000162413.16      KLHL21 HGNC:29041
## 8831 ENSG00000162413.16      KLHL21 HGNC:29041
## 8832 ENSG00000162413.16      KLHL21 HGNC:29041
## 8833 ENSG00000162413.16      KLHL21 HGNC:29041
## 8834 ENSG00000162413.16      KLHL21 HGNC:29041
## 8835 ENSG00000162413.16      KLHL21 HGNC:29041
## 8836 ENSG00000162413.16      KLHL21 HGNC:29041
## 8837 ENSG00000162413.16      KLHL21 HGNC:29041
## 8838 ENSG00000162413.16      KLHL21 HGNC:29041
## 8839 ENSG00000162413.16      KLHL21 HGNC:29041
## 8840 ENSG00000162413.16      KLHL21 HGNC:29041
## 8841 ENSG00000162413.16      KLHL21 HGNC:29041
## 8842 ENSG00000162413.16      KLHL21 HGNC:29041
## 8843 ENSG00000162413.16      KLHL21 HGNC:29041
## 8844 ENSG00000162413.16      KLHL21 HGNC:29041
## 8845 ENSG00000162413.16      KLHL21 HGNC:29041
## 8846 ENSG00000162413.16      KLHL21 HGNC:29041
## 8847 ENSG00000162413.16      KLHL21 HGNC:29041
## 8848 ENSG00000162413.16      KLHL21 HGNC:29041
## 8849 ENSG00000162413.16      KLHL21 HGNC:29041
## 8850 ENSG00000162413.16      KLHL21 HGNC:29041
## 8851 ENSG00000162413.16      KLHL21 HGNC:29041
## 8852 ENSG00000162413.16      KLHL21 HGNC:29041
## 8853 ENSG00000162413.16      KLHL21 HGNC:29041
## 8854 ENSG00000162413.16      KLHL21 HGNC:29041
## 8855 ENSG00000162413.16      KLHL21 HGNC:29041
```

```
## 8856 ENSG00000162413.16      KLHL21 HGNC:29041
## 8857 ENSG00000162413.16      KLHL21 HGNC:29041
## 8858 ENSG00000162413.16      KLHL21 HGNC:29041
## 8859 ENSG00000162413.16      KLHL21 HGNC:29041
## 8860 ENSG00000162413.16      KLHL21 HGNC:29041
## 8861 ENSG00000162413.16      KLHL21 HGNC:29041
## 8862 ENSG00000162413.16      KLHL21 HGNC:29041
## 8863 ENSG00000162413.16      KLHL21 HGNC:29041
## 8864 ENSG00000162413.16      KLHL21 HGNC:29041
## 8865 ENSG00000162413.16      KLHL21 HGNC:29041
## 8866 ENSG00000162413.16      KLHL21 HGNC:29041
## 8867 ENSG00000162413.16      KLHL21 HGNC:29041
## 8868 ENSG00000162413.16      KLHL21 HGNC:29041
## 8869 ENSG00000162413.16      KLHL21 HGNC:29041
## 8870 ENSG00000162413.16      KLHL21 HGNC:29041
## 8871 ENSG00000162413.16      KLHL21 HGNC:29041
## 8872 ENSG00000162413.16      KLHL21 HGNC:29041
## 8873 ENSG00000162413.16      KLHL21 HGNC:29041
## 8874 ENSG00000162413.16      KLHL21 HGNC:29041
## 8875  ENSG00000116273.6       PHF13 HGNC:22983
## 8876  ENSG00000116273.6       PHF13 HGNC:22983
## 8877  ENSG00000116273.6       PHF13 HGNC:22983
## 8878  ENSG00000116273.6       PHF13 HGNC:22983
## 8879  ENSG00000116273.6       PHF13 HGNC:22983
## 8880  ENSG00000116273.6       PHF13 HGNC:22983
## 8881  ENSG00000116273.6       PHF13 HGNC:22983
## 8882  ENSG00000116273.6       PHF13 HGNC:22983
## 8883  ENSG00000116273.6       PHF13 HGNC:22983
## 8884  ENSG00000116273.6       PHF13 HGNC:22983
## 8885  ENSG00000116273.6       PHF13 HGNC:22983
## 8886  ENSG00000116273.6       PHF13 HGNC:22983
## 8887  ENSG00000116273.6       PHF13 HGNC:22983
## 8888  ENSG00000116273.6       PHF13 HGNC:22983
## 8889 ENSG00000041988.15      THAP3 HGNC:20855
## 8890 ENSG00000041988.15      THAP3 HGNC:20855
## 8891 ENSG00000041988.15      THAP3 HGNC:20855
## 8892 ENSG00000041988.15      THAP3 HGNC:20855
## 8893 ENSG00000041988.15      THAP3 HGNC:20855
## 8894 ENSG00000041988.15      THAP3 HGNC:20855
## 8895 ENSG00000041988.15      THAP3 HGNC:20855
## 8896 ENSG00000041988.15      THAP3 HGNC:20855
## 8897 ENSG00000041988.15      THAP3 HGNC:20855
## 8898 ENSG00000041988.15      THAP3 HGNC:20855
## 8899 ENSG00000041988.15      THAP3 HGNC:20855
## 8900 ENSG00000041988.15      THAP3 HGNC:20855
## 8901 ENSG00000041988.15      THAP3 HGNC:20855
## 8902 ENSG00000041988.15      THAP3 HGNC:20855
## 8903 ENSG00000041988.15      THAP3 HGNC:20855
## 8904 ENSG00000041988.15      THAP3 HGNC:20855
## 8905 ENSG00000041988.15      THAP3 HGNC:20855
## 8906 ENSG00000041988.15      THAP3 HGNC:20855
## 8907 ENSG00000041988.15      THAP3 HGNC:20855
## 8908 ENSG00000041988.15      THAP3 HGNC:20855
## 8909 ENSG00000041988.15      THAP3 HGNC:20855
```

```
## 8910 ENSG00000041988.15       THAP3 HGNC:20855
## 8911 ENSG00000041988.15       THAP3 HGNC:20855
## 8912 ENSG00000041988.15       THAP3 HGNC:20855
## 8913 ENSG00000041988.15       THAP3 HGNC:20855
## 8914 ENSG00000041988.15       THAP3 HGNC:20855
## 8915 ENSG00000041988.15       THAP3 HGNC:20855
## 8916 ENSG00000041988.15       THAP3 HGNC:20855
## 8917 ENSG00000041988.15       THAP3 HGNC:20855
## 8918 ENSG00000041988.15       THAP3 HGNC:20855
## 8919 ENSG00000041988.15       THAP3 HGNC:20855
## 8920 ENSG00000041988.15       THAP3 HGNC:20855
## 8921 ENSG00000041988.15       THAP3 HGNC:20855
## 8922 ENSG00000041988.15       THAP3 HGNC:20855
## 8923 ENSG00000041988.15       THAP3 HGNC:20855
## 8924 ENSG00000041988.15       THAP3 HGNC:20855
## 8925 ENSG00000041988.15       THAP3 HGNC:20855
## 8926 ENSG00000041988.15       THAP3 HGNC:20855
## 8927 ENSG00000041988.15       THAP3 HGNC:20855
## 8928 ENSG00000041988.15       THAP3 HGNC:20855
## 8929 ENSG00000041988.15       THAP3 HGNC:20855
## 8930 ENSG00000041988.15       THAP3 HGNC:20855
## 8931 ENSG00000041988.15       THAP3 HGNC:20855
## 8932 ENSG00000041988.15       THAP3 HGNC:20855
## 8933 ENSG00000041988.15       THAP3 HGNC:20855
## 8934 ENSG00000041988.15       THAP3 HGNC:20855
## 8935 ENSG00000041988.15       THAP3 HGNC:20855
## 8936 ENSG00000041988.15       THAP3 HGNC:20855
## 8937 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8938 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8939 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8940 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8941 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8942 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8943 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8944 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8945 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8946 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8947 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8948 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8949 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8950 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8951 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8952 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8953 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8954 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8955 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8956 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8957 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8958 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8959 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8960 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8961 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8962 ENSG00000007923.16     DNAJC11 HGNC:25570
## 8963 ENSG00000007923.16     DNAJC11 HGNC:25570
```

```
## 8964 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8965 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8966 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8967 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8968 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8969 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8970 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8971 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8972 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8973 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8974 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8975 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8976 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8977 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8978 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8979 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8980 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8981 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8982 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8983 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8984 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8985 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8986 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8987 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8988 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8989 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8990 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8991 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8992 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8993 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8994 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8995 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8996 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8997 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8998 ENSG00000007923.16      DNAJC11 HGNC:25570
## 8999 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9000 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9001 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9002 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9003 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9004 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9005 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9006 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9007 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9008 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9009 ENSG00000007923.16      DNAJC11 HGNC:25570
## 9010  ENSG00000228750.7    LINC01672 HGNC:52460
## 9011  ENSG00000228750.7    LINC01672 HGNC:52460
## 9012  ENSG00000228750.7    LINC01672 HGNC:52460
## 9013  ENSG00000228750.7    LINC01672 HGNC:52460
## 9014  ENSG00000228750.7    LINC01672 HGNC:52460
## 9015  ENSG00000228750.7    LINC01672 HGNC:52460
## 9016  ENSG00000228750.7    LINC01672 HGNC:52460
## 9017  ENSG00000228750.7    LINC01672 HGNC:52460
```

```
## 9018  ENSG00000284744.1   AL591163.1     <NA>
## 9019  ENSG00000284744.1   AL591163.1     <NA>
## 9020  ENSG00000284744.1   AL591163.1     <NA>
## 9021  ENSG00000284744.1   AL591163.1     <NA>
## 9022  ENSG00000284744.1   AL591163.1     <NA>
## 9023  ENSG00000237436.1   CAMTA1-DT HGNC:53020
## 9024  ENSG00000237436.1   CAMTA1-DT HGNC:53020
## 9025  ENSG00000237436.1   CAMTA1-DT HGNC:53020
## 9026  ENSG00000237436.1   CAMTA1-DT HGNC:53020
## 9027  ENSG00000237436.1   CAMTA1-DT HGNC:53020
## 9028 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9029 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9030 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9031 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9032 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9033 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9034 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9035 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9036 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9037 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9038 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9039 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9040 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9041 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9042 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9043 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9044 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9045 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9046 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9047 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9048 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9049 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9050 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9051 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9052 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9053 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9054 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9055 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9056 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9057 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9058 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9059 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9060 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9061 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9062 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9063 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9064 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9065 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9066 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9067 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9068 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9069 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9070 ENSG00000171735.19     CAMTA1 HGNC:18806
## 9071 ENSG00000171735.19     CAMTA1 HGNC:18806
```

```
## 9072 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9073 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9074 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9075 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9076 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9077 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9078 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9079 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9080 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9081 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9082 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9083 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9084 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9085 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9086 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9087 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9088 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9089 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9090 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9091 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9092 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9093 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9094 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9095 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9096 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9097 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9098 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9099 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9100 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9101 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9102 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9103 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9104 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9105 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9106 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9107 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9108 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9109 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9110 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9111 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9112 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9113 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9114 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9115 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9116 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9117 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9118 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9119 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9120 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9121 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9122 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9123 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9124 ENSG00000171735.19          CAMTA1 HGNC:18806
## 9125 ENSG00000171735.19          CAMTA1 HGNC:18806
```

```
## 9126 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9127 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9128 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9129 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9130 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9131 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9132 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9133 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9134 ENSG00000171735.19        CAMTA1 HGNC:18806
## 9135  ENSG00000227950.1     AL590128.1        <NA>
## 9136  ENSG00000227950.1     AL590128.1        <NA>
## 9137  ENSG00000227950.1     AL590128.1        <NA>
## 9138  ENSG00000237365.1     AL512330.1        <NA>
## 9139  ENSG00000237365.1     AL512330.1        <NA>
## 9140  ENSG00000237365.1     AL512330.1        <NA>
## 9141  ENSG00000237365.1     AL512330.1        <NA>
## 9142  ENSG00000207056.1       RNU1-8P HGNC:48307
## 9143  ENSG00000207056.1       RNU1-8P HGNC:48307
## 9144  ENSG00000207056.1       RNU1-8P HGNC:48307
## 9145  ENSG00000237402.1    CAMTA1-IT1 HGNC:41446
## 9146  ENSG00000237402.1    CAMTA1-IT1 HGNC:41446
## 9147  ENSG00000237402.1    CAMTA1-IT1 HGNC:41446
## 9148  ENSG00000237402.1    CAMTA1-IT1 HGNC:41446
## 9149  ENSG00000237728.2      Z97987.1        <NA>
## 9150  ENSG00000237728.2      Z97987.1        <NA>
## 9151  ENSG00000237728.2      Z97987.1        <NA>
## 9152  ENSG00000237728.2      Z97987.1        <NA>
## 9153  ENSG00000237728.2      Z97987.1        <NA>
## 9154  ENSG00000237728.2      Z97987.1        <NA>
## 9155  ENSG00000237728.2      Z97987.1        <NA>
## 9156  ENSG00000237728.2      Z97987.1        <NA>
## 9157  ENSG00000225126.1     AL365194.1        <NA>
## 9158  ENSG00000225126.1     AL365194.1        <NA>
## 9159  ENSG00000225126.1     AL365194.1        <NA>
## 9160  ENSG00000225126.1     AL365194.1        <NA>
## 9161  ENSG00000270171.1     AL359881.3        <NA>
## 9162  ENSG00000270171.1     AL359881.3        <NA>
## 9163  ENSG00000270171.1     AL359881.3        <NA>
## 9164  ENSG00000270035.1     AL359881.2        <NA>
## 9165  ENSG00000270035.1     AL359881.2        <NA>
## 9166  ENSG00000270035.1     AL359881.2        <NA>
## 9167  ENSG00000269978.1     AL359881.1        <NA>
## 9168  ENSG00000269978.1     AL359881.1        <NA>
## 9169  ENSG00000269978.1     AL359881.1        <NA>
## 9170 ENSG00000049245.13         VAMP3 HGNC:12644
## 9171 ENSG00000049245.13         VAMP3 HGNC:12644
## 9172 ENSG00000049245.13         VAMP3 HGNC:12644
## 9173 ENSG00000049245.13         VAMP3 HGNC:12644
## 9174 ENSG00000049245.13         VAMP3 HGNC:12644
## 9175 ENSG00000049245.13         VAMP3 HGNC:12644
## 9176 ENSG00000049245.13         VAMP3 HGNC:12644
## 9177 ENSG00000049245.13         VAMP3 HGNC:12644
## 9178 ENSG00000049245.13         VAMP3 HGNC:12644
## 9179 ENSG00000049245.13         VAMP3 HGNC:12644
```

```
## 9180 ENSG00000049245.13      VAMP3 HGNC:12644
## 9181 ENSG00000049245.13      VAMP3 HGNC:12644
## 9182 ENSG00000049245.13      VAMP3 HGNC:12644
## 9183 ENSG00000049245.13      VAMP3 HGNC:12644
## 9184 ENSG00000049245.13      VAMP3 HGNC:12644
## 9185 ENSG00000049245.13      VAMP3 HGNC:12644
## 9186 ENSG00000049245.13      VAMP3 HGNC:12644
## 9187 ENSG00000049245.13      VAMP3 HGNC:12644
## 9188 ENSG00000049245.13      VAMP3 HGNC:12644
## 9189 ENSG00000049245.13      VAMP3 HGNC:12644
## 9190 ENSG00000049245.13      VAMP3 HGNC:12644
## 9191 ENSG00000049245.13      VAMP3 HGNC:12644
## 9192 ENSG00000049245.13      VAMP3 HGNC:12644
## 9193 ENSG00000049245.13      VAMP3 HGNC:12644
## 9194 ENSG00000049245.13      VAMP3 HGNC:12644
## 9195 ENSG00000049245.13      VAMP3 HGNC:12644
## 9196 ENSG00000049245.13      VAMP3 HGNC:12644
## 9197 ENSG00000049245.13      VAMP3 HGNC:12644
## 9198 ENSG00000049245.13      VAMP3 HGNC:12644
## 9199 ENSG00000049245.13      VAMP3 HGNC:12644
## 9200 ENSG00000049245.13      VAMP3 HGNC:12644
## 9201 ENSG00000049245.13      VAMP3 HGNC:12644
## 9202  ENSG00000269925.1    Z98884.2      <NA>
## 9203  ENSG00000269925.1    Z98884.2      <NA>
## 9204  ENSG00000269925.1    Z98884.2      <NA>
## 9205 ENSG00000049246.14      PER3  HGNC:8847
## 9206 ENSG00000049246.14      PER3  HGNC:8847
## 9207 ENSG00000049246.14      PER3  HGNC:8847
## 9208 ENSG00000049246.14      PER3  HGNC:8847
## 9209 ENSG00000049246.14      PER3  HGNC:8847
## 9210 ENSG00000049246.14      PER3  HGNC:8847
## 9211 ENSG00000049246.14      PER3  HGNC:8847
## 9212 ENSG00000049246.14      PER3  HGNC:8847
## 9213 ENSG00000049246.14      PER3  HGNC:8847
## 9214 ENSG00000049246.14      PER3  HGNC:8847
## 9215 ENSG00000049246.14      PER3  HGNC:8847
## 9216 ENSG00000049246.14      PER3  HGNC:8847
## 9217 ENSG00000049246.14      PER3  HGNC:8847
## 9218 ENSG00000049246.14      PER3  HGNC:8847
## 9219 ENSG00000049246.14      PER3  HGNC:8847
## 9220 ENSG00000049246.14      PER3  HGNC:8847
## 9221 ENSG00000049246.14      PER3  HGNC:8847
## 9222 ENSG00000049246.14      PER3  HGNC:8847
## 9223 ENSG00000049246.14      PER3  HGNC:8847
## 9224 ENSG00000049246.14      PER3  HGNC:8847
## 9225 ENSG00000049246.14      PER3  HGNC:8847
## 9226 ENSG00000049246.14      PER3  HGNC:8847
## 9227 ENSG00000049246.14      PER3  HGNC:8847
## 9228 ENSG00000049246.14      PER3  HGNC:8847
## 9229 ENSG00000049246.14      PER3  HGNC:8847
## 9230 ENSG00000049246.14      PER3  HGNC:8847
## 9231 ENSG00000049246.14      PER3  HGNC:8847
## 9232 ENSG00000049246.14      PER3  HGNC:8847
## 9233 ENSG00000049246.14      PER3  HGNC:8847
```

```
## 9234 ENSG00000049246.14          PER3   HGNC:8847
## 9235 ENSG00000049246.14          PER3   HGNC:8847
## 9236 ENSG00000049246.14          PER3   HGNC:8847
## 9237 ENSG00000049246.14          PER3   HGNC:8847
## 9238 ENSG00000049246.14          PER3   HGNC:8847
## 9239 ENSG00000049246.14          PER3   HGNC:8847
## 9240 ENSG00000049246.14          PER3   HGNC:8847
## 9241 ENSG00000049246.14          PER3   HGNC:8847
## 9242 ENSG00000049246.14          PER3   HGNC:8847
## 9243 ENSG00000049246.14          PER3   HGNC:8847
## 9244 ENSG00000049246.14          PER3   HGNC:8847
## 9245 ENSG00000049246.14          PER3   HGNC:8847
## 9246 ENSG00000049246.14          PER3   HGNC:8847
## 9247 ENSG00000049246.14          PER3   HGNC:8847
## 9248 ENSG00000049246.14          PER3   HGNC:8847
## 9249 ENSG00000049246.14          PER3   HGNC:8847
## 9250 ENSG00000049246.14          PER3   HGNC:8847
## 9251 ENSG00000049246.14          PER3   HGNC:8847
## 9252 ENSG00000049246.14          PER3   HGNC:8847
## 9253 ENSG00000049246.14          PER3   HGNC:8847
## 9254 ENSG00000049246.14          PER3   HGNC:8847
## 9255 ENSG00000049246.14          PER3   HGNC:8847
## 9256 ENSG00000049246.14          PER3   HGNC:8847
## 9257 ENSG00000049246.14          PER3   HGNC:8847
## 9258 ENSG00000049246.14          PER3   HGNC:8847
## 9259 ENSG00000049246.14          PER3   HGNC:8847
## 9260 ENSG00000049246.14          PER3   HGNC:8847
## 9261 ENSG00000049246.14          PER3   HGNC:8847
## 9262 ENSG00000049246.14          PER3   HGNC:8847
## 9263 ENSG00000049246.14          PER3   HGNC:8847
## 9264 ENSG00000049246.14          PER3   HGNC:8847
## 9265 ENSG00000049246.14          PER3   HGNC:8847
## 9266 ENSG00000049246.14          PER3   HGNC:8847
## 9267 ENSG00000049246.14          PER3   HGNC:8847
## 9268 ENSG00000049246.14          PER3   HGNC:8847
## 9269 ENSG00000049246.14          PER3   HGNC:8847
## 9270 ENSG00000049246.14          PER3   HGNC:8847
## 9271 ENSG00000049246.14          PER3   HGNC:8847
## 9272 ENSG00000049246.14          PER3   HGNC:8847
## 9273 ENSG00000049246.14          PER3   HGNC:8847
## 9274 ENSG00000049246.14          PER3   HGNC:8847
## 9275 ENSG00000049246.14          PER3   HGNC:8847
## 9276 ENSG00000049246.14          PER3   HGNC:8847
## 9277 ENSG00000049246.14          PER3   HGNC:8847
## 9278 ENSG00000049246.14          PER3   HGNC:8847
## 9279 ENSG00000049246.14          PER3   HGNC:8847
## 9280 ENSG00000049246.14          PER3   HGNC:8847
## 9281 ENSG00000049246.14          PER3   HGNC:8847
## 9282 ENSG00000049246.14          PER3   HGNC:8847
## 9283 ENSG00000049246.14          PER3   HGNC:8847
## 9284 ENSG00000049246.14          PER3   HGNC:8847
## 9285 ENSG00000049246.14          PER3   HGNC:8847
## 9286 ENSG00000049246.14          PER3   HGNC:8847
## 9287 ENSG00000049246.14          PER3   HGNC:8847
```

```
## 9288 ENSG00000049246.14          PER3    HGNC:8847
## 9289 ENSG00000049246.14          PER3    HGNC:8847
## 9290 ENSG00000049246.14          PER3    HGNC:8847
## 9291 ENSG00000049246.14          PER3    HGNC:8847
## 9292 ENSG00000049246.14          PER3    HGNC:8847
## 9293 ENSG00000049246.14          PER3    HGNC:8847
## 9294 ENSG00000049246.14          PER3    HGNC:8847
## 9295 ENSG00000049246.14          PER3    HGNC:8847
## 9296 ENSG00000049246.14          PER3    HGNC:8847
## 9297 ENSG00000049246.14          PER3    HGNC:8847
## 9298 ENSG00000049246.14          PER3    HGNC:8847
## 9299 ENSG00000049246.14          PER3    HGNC:8847
## 9300 ENSG00000049246.14          PER3    HGNC:8847
## 9301 ENSG00000049246.14          PER3    HGNC:8847
## 9302 ENSG00000049246.14          PER3    HGNC:8847
## 9303 ENSG00000049246.14          PER3    HGNC:8847
## 9304 ENSG00000049246.14          PER3    HGNC:8847
## 9305 ENSG00000049246.14          PER3    HGNC:8847
## 9306 ENSG00000049246.14          PER3    HGNC:8847
## 9307 ENSG00000049246.14          PER3    HGNC:8847
## 9308 ENSG00000049246.14          PER3    HGNC:8847
## 9309 ENSG00000049246.14          PER3    HGNC:8847
## 9310 ENSG00000049246.14          PER3    HGNC:8847
## 9311 ENSG00000049246.14          PER3    HGNC:8847
## 9312 ENSG00000049246.14          PER3    HGNC:8847
## 9313 ENSG00000049246.14          PER3    HGNC:8847
## 9314 ENSG00000049246.14          PER3    HGNC:8847
## 9315 ENSG00000049246.14          PER3    HGNC:8847
## 9316 ENSG00000049246.14          PER3    HGNC:8847
## 9317 ENSG00000049246.14          PER3    HGNC:8847
## 9318 ENSG00000049246.14          PER3    HGNC:8847
## 9319 ENSG00000049246.14          PER3    HGNC:8847
## 9320 ENSG00000049246.14          PER3    HGNC:8847
## 9321 ENSG00000049246.14          PER3    HGNC:8847
## 9322 ENSG00000049246.14          PER3    HGNC:8847
## 9323 ENSG00000049246.14          PER3    HGNC:8847
## 9324 ENSG00000049246.14          PER3    HGNC:8847
## 9325 ENSG00000049246.14          PER3    HGNC:8847
## 9326 ENSG00000049246.14          PER3    HGNC:8847
## 9327 ENSG00000049246.14          PER3    HGNC:8847
## 9328 ENSG00000049246.14          PER3    HGNC:8847
## 9329 ENSG00000049246.14          PER3    HGNC:8847
## 9330 ENSG00000049246.14          PER3    HGNC:8847
## 9331 ENSG00000049246.14          PER3    HGNC:8847
## 9332 ENSG00000049246.14          PER3    HGNC:8847
## 9333 ENSG00000049246.14          PER3    HGNC:8847
## 9334 ENSG00000049246.14          PER3    HGNC:8847
## 9335 ENSG00000049246.14          PER3    HGNC:8847
## 9336 ENSG00000049246.14          PER3    HGNC:8847
## 9337 ENSG00000049246.14          PER3    HGNC:8847
## 9338 ENSG00000049246.14          PER3    HGNC:8847
## 9339 ENSG00000049246.14          PER3    HGNC:8847
## 9340 ENSG00000049246.14          PER3    HGNC:8847
## 9341 ENSG00000049246.14          PER3    HGNC:8847
```

```
## 9342 ENSG00000049246.14          PER3   HGNC:8847
## 9343 ENSG00000049246.14          PER3   HGNC:8847
## 9344 ENSG00000049246.14          PER3   HGNC:8847
## 9345 ENSG00000049246.14          PER3   HGNC:8847
## 9346 ENSG00000049246.14          PER3   HGNC:8847
## 9347 ENSG00000049246.14          PER3   HGNC:8847
## 9348 ENSG00000049246.14          PER3   HGNC:8847
## 9349 ENSG00000049246.14          PER3   HGNC:8847
## 9350 ENSG00000049246.14          PER3   HGNC:8847
## 9351 ENSG00000049246.14          PER3   HGNC:8847
## 9352 ENSG00000049246.14          PER3   HGNC:8847
## 9353 ENSG00000049246.14          PER3   HGNC:8847
## 9354 ENSG00000049246.14          PER3   HGNC:8847
## 9355 ENSG00000049246.14          PER3   HGNC:8847
## 9356 ENSG00000049246.14          PER3   HGNC:8847
## 9357 ENSG00000049246.14          PER3   HGNC:8847
## 9358 ENSG00000049246.14          PER3   HGNC:8847
## 9359 ENSG00000049246.14          PER3   HGNC:8847
## 9360 ENSG00000049246.14          PER3   HGNC:8847
## 9361 ENSG00000049246.14          PER3   HGNC:8847
## 9362 ENSG00000049246.14          PER3   HGNC:8847
## 9363 ENSG00000049246.14          PER3   HGNC:8847
## 9364 ENSG00000049246.14          PER3   HGNC:8847
## 9365 ENSG00000049246.14          PER3   HGNC:8847
## 9366 ENSG00000049246.14          PER3   HGNC:8847
## 9367 ENSG00000049246.14          PER3   HGNC:8847
## 9368 ENSG00000049246.14          PER3   HGNC:8847
## 9369 ENSG00000049246.14          PER3   HGNC:8847
## 9370 ENSG00000049246.14          PER3   HGNC:8847
## 9371 ENSG00000049246.14          PER3   HGNC:8847
## 9372 ENSG00000049246.14          PER3   HGNC:8847
## 9373 ENSG00000049246.14          PER3   HGNC:8847
## 9374 ENSG00000049246.14          PER3   HGNC:8847
## 9375 ENSG00000049246.14          PER3   HGNC:8847
## 9376 ENSG00000049246.14          PER3   HGNC:8847
## 9377 ENSG00000049246.14          PER3   HGNC:8847
## 9378 ENSG00000049246.14          PER3   HGNC:8847
## 9379 ENSG00000049246.14          PER3   HGNC:8847
## 9380 ENSG00000049246.14          PER3   HGNC:8847
## 9381 ENSG00000049246.14          PER3   HGNC:8847
## 9382 ENSG00000049246.14          PER3   HGNC:8847
## 9383 ENSG00000049246.14          PER3   HGNC:8847
## 9384 ENSG00000049246.14          PER3   HGNC:8847
## 9385 ENSG00000049246.14          PER3   HGNC:8847
## 9386 ENSG00000049246.14          PER3   HGNC:8847
## 9387 ENSG00000049246.14          PER3   HGNC:8847
## 9388 ENSG00000049246.14          PER3   HGNC:8847
## 9389 ENSG00000049246.14          PER3   HGNC:8847
## 9390 ENSG00000049246.14          PER3   HGNC:8847
## 9391 ENSG00000049246.14          PER3   HGNC:8847
## 9392 ENSG00000049246.14          PER3   HGNC:8847
## 9393 ENSG00000049246.14          PER3   HGNC:8847
## 9394 ENSG00000049246.14          PER3   HGNC:8847
## 9395 ENSG00000049246.14          PER3   HGNC:8847
```

```
## 9396 ENSG00000049246.14        PER3  HGNC:8847
## 9397 ENSG00000049246.14        PER3  HGNC:8847
## 9398 ENSG00000049246.14        PER3  HGNC:8847
## 9399 ENSG00000049246.14        PER3  HGNC:8847
## 9400 ENSG00000049246.14        PER3  HGNC:8847
## 9401 ENSG00000049246.14        PER3  HGNC:8847
## 9402 ENSG00000049246.14        PER3  HGNC:8847
## 9403 ENSG00000049246.14        PER3  HGNC:8847
## 9404 ENSG00000049246.14        PER3  HGNC:8847
## 9405 ENSG00000049246.14        PER3  HGNC:8847
## 9406 ENSG00000049246.14        PER3  HGNC:8847
## 9407 ENSG00000049246.14        PER3  HGNC:8847
## 9408 ENSG00000049246.14        PER3  HGNC:8847
## 9409 ENSG00000049246.14        PER3  HGNC:8847
## 9410 ENSG00000049246.14        PER3  HGNC:8847
## 9411 ENSG00000049246.14        PER3  HGNC:8847
## 9412 ENSG00000049246.14        PER3  HGNC:8847
## 9413 ENSG00000049246.14        PER3  HGNC:8847
## 9414 ENSG00000049246.14        PER3  HGNC:8847
## 9415 ENSG00000049246.14        PER3  HGNC:8847
## 9416 ENSG00000049246.14        PER3  HGNC:8847
## 9417 ENSG00000049246.14        PER3  HGNC:8847
## 9418 ENSG00000049246.14        PER3  HGNC:8847
## 9419 ENSG00000049246.14        PER3  HGNC:8847
## 9420 ENSG00000049246.14        PER3  HGNC:8847
## 9421 ENSG00000049246.14        PER3  HGNC:8847
## 9422 ENSG00000049246.14        PER3  HGNC:8847
## 9423 ENSG00000049246.14        PER3  HGNC:8847
## 9424 ENSG00000049246.14        PER3  HGNC:8847
## 9425  ENSG00000236266.1    Z98884.1       <NA>
## 9426  ENSG00000236266.1    Z98884.1       <NA>
## 9427  ENSG00000236266.1    Z98884.1       <NA>
## 9428  ENSG00000236266.1    Z98884.1       <NA>
## 9429  ENSG00000236266.1    Z98884.1       <NA>
## 9430 ENSG00000049247.13       UTS2 HGNC:12636
## 9431 ENSG00000049247.13       UTS2 HGNC:12636
## 9432 ENSG00000049247.13       UTS2 HGNC:12636
## 9433 ENSG00000049247.13       UTS2 HGNC:12636
## 9434 ENSG00000049247.13       UTS2 HGNC:12636
## 9435 ENSG00000049247.13       UTS2 HGNC:12636
## 9436 ENSG00000049247.13       UTS2 HGNC:12636
## 9437 ENSG00000049247.13       UTS2 HGNC:12636
## 9438 ENSG00000049247.13       UTS2 HGNC:12636
## 9439 ENSG00000049247.13       UTS2 HGNC:12636
## 9440 ENSG00000049247.13       UTS2 HGNC:12636
## 9441 ENSG00000049247.13       UTS2 HGNC:12636
## 9442 ENSG00000049247.13       UTS2 HGNC:12636
## 9443 ENSG00000049247.13       UTS2 HGNC:12636
## 9444 ENSG00000049247.13       UTS2 HGNC:12636
## 9445 ENSG00000049247.13       UTS2 HGNC:12636
## 9446 ENSG00000049247.13       UTS2 HGNC:12636
## 9447 ENSG00000049247.13       UTS2 HGNC:12636
## 9448 ENSG00000049247.13       UTS2 HGNC:12636
## 9449 ENSG00000049247.13       UTS2 HGNC:12636
```

```
## 9450 ENSG00000049247.13        UTS2 HGNC:12636
## 9451 ENSG00000049247.13        UTS2 HGNC:12636
## 9452 ENSG00000049247.13        UTS2 HGNC:12636
## 9453 ENSG00000049247.13        UTS2 HGNC:12636
## 9454 ENSG00000049247.13        UTS2 HGNC:12636
## 9455 ENSG00000049247.13        UTS2 HGNC:12636
## 9456 ENSG00000049247.13        UTS2 HGNC:12636
## 9457 ENSG00000049247.13        UTS2 HGNC:12636
## 9458 ENSG00000049247.13        UTS2 HGNC:12636
## 9459 ENSG00000049247.13        UTS2 HGNC:12636
## 9460 ENSG00000049247.13        UTS2 HGNC:12636
## 9461 ENSG00000049247.13        UTS2 HGNC:12636
## 9462 ENSG00000049247.13        UTS2 HGNC:12636
## 9463 ENSG00000049247.13        UTS2 HGNC:12636
## 9464 ENSG00000049247.13        UTS2 HGNC:12636
## 9465 ENSG00000049247.13        UTS2 HGNC:12636
## 9466 ENSG00000049247.13        UTS2 HGNC:12636
## 9467 ENSG00000049247.13        UTS2 HGNC:12636
## 9468 ENSG00000049247.13        UTS2 HGNC:12636
## 9469 ENSG00000049247.13        UTS2 HGNC:12636
## 9470 ENSG00000049247.13        UTS2 HGNC:12636
## 9471 ENSG00000049247.13        UTS2 HGNC:12636
## 9472 ENSG00000049247.13        UTS2 HGNC:12636
## 9473 ENSG00000049247.13        UTS2 HGNC:12636
## 9474 ENSG00000049247.13        UTS2 HGNC:12636
## 9475 ENSG00000049247.13        UTS2 HGNC:12636
## 9476 ENSG00000049247.13        UTS2 HGNC:12636
## 9477  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9478  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9479  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9480  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9481  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9482  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9483  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9484  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9485  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9486  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9487  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9488  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9489  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9490  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9491  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9492  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9493  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9494  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9495  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9496  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9497  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9498  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9499  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9500  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9501  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9502  ENSG00000049249.8    TNFRSF9 HGNC:11924
## 9503  ENSG00000049249.8    TNFRSF9 HGNC:11924
```

```
## 9504    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9505    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9506    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9507    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9508    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9509    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9510    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9511    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9512    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9513    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9514    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9515    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9516    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9517    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9518    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9519    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9520    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9521    ENSG00000049249.8       TNFRSF9 HGNC:11924
## 9522    ENSG00000270330.1     AL009183.1      <NA>
## 9523    ENSG00000270330.1     AL009183.1      <NA>
## 9524    ENSG00000270330.1     AL009183.1      <NA>
## 9525 ENSG00000116288.13         PARK7 HGNC:16369
## 9526 ENSG00000116288.13         PARK7 HGNC:16369
## 9527 ENSG00000116288.13         PARK7 HGNC:16369
## 9528 ENSG00000116288.13         PARK7 HGNC:16369
## 9529 ENSG00000116288.13         PARK7 HGNC:16369
## 9530 ENSG00000116288.13         PARK7 HGNC:16369
## 9531 ENSG00000116288.13         PARK7 HGNC:16369
## 9532 ENSG00000116288.13         PARK7 HGNC:16369
## 9533 ENSG00000116288.13         PARK7 HGNC:16369
## 9534 ENSG00000116288.13         PARK7 HGNC:16369
## 9535 ENSG00000116288.13         PARK7 HGNC:16369
## 9536 ENSG00000116288.13         PARK7 HGNC:16369
## 9537 ENSG00000116288.13         PARK7 HGNC:16369
## 9538 ENSG00000116288.13         PARK7 HGNC:16369
## 9539 ENSG00000116288.13         PARK7 HGNC:16369
## 9540 ENSG00000116288.13         PARK7 HGNC:16369
## 9541 ENSG00000116288.13         PARK7 HGNC:16369
## 9542 ENSG00000116288.13         PARK7 HGNC:16369
## 9543 ENSG00000116288.13         PARK7 HGNC:16369
## 9544 ENSG00000116288.13         PARK7 HGNC:16369
## 9545 ENSG00000116288.13         PARK7 HGNC:16369
## 9546 ENSG00000116288.13         PARK7 HGNC:16369
## 9547 ENSG00000116288.13         PARK7 HGNC:16369
## 9548 ENSG00000116288.13         PARK7 HGNC:16369
## 9549 ENSG00000116288.13         PARK7 HGNC:16369
## 9550 ENSG00000116288.13         PARK7 HGNC:16369
## 9551 ENSG00000116288.13         PARK7 HGNC:16369
## 9552 ENSG00000116288.13         PARK7 HGNC:16369
## 9553 ENSG00000116288.13         PARK7 HGNC:16369
## 9554 ENSG00000116288.13         PARK7 HGNC:16369
## 9555 ENSG00000116288.13         PARK7 HGNC:16369
## 9556 ENSG00000116288.13         PARK7 HGNC:16369
## 9557 ENSG00000116288.13         PARK7 HGNC:16369
```

```
## 9558 ENSG00000116288.13            PARK7 HGNC:16369
## 9559 ENSG00000116288.13            PARK7 HGNC:16369
## 9560 ENSG00000116288.13            PARK7 HGNC:16369
## 9561 ENSG00000116288.13            PARK7 HGNC:16369
## 9562 ENSG00000116288.13            PARK7 HGNC:16369
## 9563 ENSG00000116288.13            PARK7 HGNC:16369
## 9564 ENSG00000116288.13            PARK7 HGNC:16369
## 9565 ENSG00000116288.13            PARK7 HGNC:16369
## 9566 ENSG00000116288.13            PARK7 HGNC:16369
## 9567 ENSG00000116288.13            PARK7 HGNC:16369
## 9568 ENSG00000116288.13            PARK7 HGNC:16369
## 9569 ENSG00000116288.13            PARK7 HGNC:16369
## 9570 ENSG00000116288.13            PARK7 HGNC:16369
## 9571 ENSG00000116288.13            PARK7 HGNC:16369
## 9572 ENSG00000116288.13            PARK7 HGNC:16369
## 9573 ENSG00000116288.13            PARK7 HGNC:16369
## 9574 ENSG00000116288.13            PARK7 HGNC:16369
## 9575 ENSG00000116288.13            PARK7 HGNC:16369
## 9576 ENSG00000116288.13            PARK7 HGNC:16369
## 9577 ENSG00000116288.13            PARK7 HGNC:16369
## 9578 ENSG00000116288.13            PARK7 HGNC:16369
## 9579 ENSG00000116288.13            PARK7 HGNC:16369
## 9580 ENSG00000116288.13            PARK7 HGNC:16369
## 9581 ENSG00000116288.13            PARK7 HGNC:16369
## 9582 ENSG00000116288.13            PARK7 HGNC:16369
## 9583 ENSG00000116288.13            PARK7 HGNC:16369
## 9584 ENSG00000116288.13            PARK7 HGNC:16369
## 9585 ENSG00000116288.13            PARK7 HGNC:16369
## 9586 ENSG00000116288.13            PARK7 HGNC:16369
## 9587 ENSG00000116288.13            PARK7 HGNC:16369
## 9588 ENSG00000116288.13            PARK7 HGNC:16369
## 9589 ENSG00000116288.13            PARK7 HGNC:16369
## 9590 ENSG00000116288.13            PARK7 HGNC:16369
## 9591 ENSG00000116288.13            PARK7 HGNC:16369
## 9592 ENSG00000116288.13            PARK7 HGNC:16369
## 9593 ENSG00000116288.13            PARK7 HGNC:16369
## 9594 ENSG00000116288.13            PARK7 HGNC:16369
## 9595 ENSG00000116288.13            PARK7 HGNC:16369
## 9596 ENSG00000116288.13            PARK7 HGNC:16369
## 9597 ENSG00000116288.13            PARK7 HGNC:16369
## 9598 ENSG00000116288.13            PARK7 HGNC:16369
## 9599 ENSG00000116288.13            PARK7 HGNC:16369
## 9600 ENSG00000116288.13            PARK7 HGNC:16369
## 9601 ENSG00000116288.13            PARK7 HGNC:16369
## 9602 ENSG00000116288.13            PARK7 HGNC:16369
## 9603 ENSG00000116288.13            PARK7 HGNC:16369
## 9604 ENSG00000116288.13            PARK7 HGNC:16369
## 9605 ENSG00000116288.13            PARK7 HGNC:16369
## 9606 ENSG00000116288.13            PARK7 HGNC:16369
## 9607 ENSG00000116288.13            PARK7 HGNC:16369
## 9608 ENSG00000116288.13            PARK7 HGNC:16369
## 9609 ENSG00000116288.13            PARK7 HGNC:16369
## 9610 ENSG00000116288.13            PARK7 HGNC:16369
## 9611 ENSG00000116288.13            PARK7 HGNC:16369
```

```
## 9612 ENSG00000116288.13          PARK7 HGNC:16369
## 9613 ENSG00000116288.13          PARK7 HGNC:16369
## 9614 ENSG00000116288.13          PARK7 HGNC:16369
## 9615 ENSG00000116288.13          PARK7 HGNC:16369
## 9616 ENSG00000116288.13          PARK7 HGNC:16369
## 9617 ENSG00000116288.13          PARK7 HGNC:16369
## 9618 ENSG00000116288.13          PARK7 HGNC:16369
## 9619  ENSG00000200344.1        RF00019      <NA>
## 9620  ENSG00000200344.1        RF00019      <NA>
## 9621  ENSG00000200344.1        RF00019      <NA>
## 9622  ENSG00000284747.1     AL034417.4      <NA>
## 9623  ENSG00000284747.1     AL034417.4      <NA>
## 9624  ENSG00000284747.1     AL034417.4      <NA>
## 9625  ENSG00000284747.1     AL034417.4      <NA>
## 9626  ENSG00000284747.1     AL034417.4      <NA>
## 9627  ENSG00000284747.1     AL034417.4      <NA>
## 9628  ENSG00000284747.1     AL034417.4      <NA>
## 9629  ENSG00000284747.1     AL034417.4      <NA>
## 9630  ENSG00000284747.1     AL034417.4      <NA>
## 9631  ENSG00000284747.1     AL034417.4      <NA>
## 9632  ENSG00000284747.1     AL034417.4      <NA>
## 9633  ENSG00000284716.1     AL034417.3      <NA>
## 9634  ENSG00000284716.1     AL034417.3      <NA>
## 9635  ENSG00000284716.1     AL034417.3      <NA>
## 9636  ENSG00000284716.1     AL034417.3      <NA>
## 9637 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9638 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9639 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9640 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9641 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9642 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9643 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9644 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9645 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9646 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9647 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9648 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9649 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9650 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9651 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9652 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9653 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9654 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9655 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9656 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9657 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9658 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9659 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9660 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9661 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9662 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9663 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9664 ENSG00000116285.13         ERRFI1 HGNC:18185
## 9665 ENSG00000116285.13         ERRFI1 HGNC:18185
```

```
## 9666 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9667 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9668 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9669 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9670 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9671 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9672 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9673 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9674 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9675 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9676 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9677 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9678 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9679 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9680 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9681 ENSG00000116285.13       ERRFI1 HGNC:18185
## 9682  ENSG00000238290.1   AL034417.2       <NA>
## 9683  ENSG00000238290.1   AL034417.2       <NA>
## 9684  ENSG00000238290.1   AL034417.2       <NA>
## 9685  ENSG00000238290.1   AL034417.2       <NA>
## 9686  ENSG00000238290.1   AL034417.2       <NA>
## 9687  ENSG00000232848.1   AL034417.1       <NA>
## 9688  ENSG00000232848.1   AL034417.1       <NA>
## 9689  ENSG00000232848.1   AL034417.1       <NA>
## 9690  ENSG00000232848.1   AL034417.1       <NA>
## 9691  ENSG00000229305.1   AL358876.1       <NA>
## 9692  ENSG00000229305.1   AL358876.1       <NA>
## 9693  ENSG00000229305.1   AL358876.1       <NA>
## 9694  ENSG00000229305.1   AL358876.1       <NA>
## 9695  ENSG00000229305.1   AL358876.1       <NA>
## 9696  ENSG00000229305.1   AL358876.1       <NA>
## 9697  ENSG00000227634.3   LINC01714 HGNC:52501
## 9698  ENSG00000227634.3   LINC01714 HGNC:52501
## 9699  ENSG00000227634.3   LINC01714 HGNC:52501
## 9700  ENSG00000227634.3   LINC01714 HGNC:52501
## 9701  ENSG00000227634.3   LINC01714 HGNC:52501
## 9702  ENSG00000227634.3   LINC01714 HGNC:52501
## 9703  ENSG00000227634.3   LINC01714 HGNC:52501
## 9704  ENSG00000227634.3   LINC01714 HGNC:52501
## 9705  ENSG00000227634.3   LINC01714 HGNC:52501
## 9706  ENSG00000227634.3   LINC01714 HGNC:52501
## 9707  ENSG00000227634.3   LINC01714 HGNC:52501
## 9708  ENSG00000227634.3   LINC01714 HGNC:52501
## 9709  ENSG00000200975.1     RNU1-7P HGNC:48306
## 9710  ENSG00000200975.1     RNU1-7P HGNC:48306
## 9711  ENSG00000200975.1     RNU1-7P HGNC:48306
## 9712  ENSG00000233645.1   AL358876.2       <NA>
## 9713  ENSG00000233645.1   AL358876.2       <NA>
## 9714  ENSG00000233645.1   AL358876.2       <NA>
## 9715  ENSG00000233645.1   AL358876.2       <NA>
## 9716  ENSG00000251977.1   RNU6-991P HGNC:47954
## 9717  ENSG00000251977.1   RNU6-991P HGNC:47954
## 9718  ENSG00000251977.1   RNU6-991P HGNC:47954
## 9719 ENSG00000162426.14      SLC45A1 HGNC:17939
```

```
## 9720 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9721 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9722 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9723 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9724 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9725 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9726 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9727 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9728 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9729 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9730 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9731 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9732 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9733 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9734 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9735 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9736 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9737 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9738 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9739 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9740 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9741 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9742 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9743 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9744 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9745 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9746 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9747 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9748 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9749 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9750 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9751 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9752 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9753 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9754 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9755 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9756 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9757 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9758 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9759 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9760 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9761 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9762 ENSG00000162426.14      SLC45A1 HGNC:17939
## 9763   ENSG00000252254.1     RF00019      <NA>
## 9764   ENSG00000252254.1     RF00019      <NA>
## 9765   ENSG00000252254.1     RF00019      <NA>
## 9766 ENSG00000142599.19         RERE  HGNC:9965
## 9767 ENSG00000142599.19         RERE  HGNC:9965
## 9768 ENSG00000142599.19         RERE  HGNC:9965
## 9769 ENSG00000142599.19         RERE  HGNC:9965
## 9770 ENSG00000142599.19         RERE  HGNC:9965
## 9771 ENSG00000142599.19         RERE  HGNC:9965
## 9772 ENSG00000142599.19         RERE  HGNC:9965
## 9773 ENSG00000142599.19         RERE  HGNC:9965
```

```
## 9774 ENSG00000142599.19          RERE   HGNC:9965
## 9775 ENSG00000142599.19          RERE   HGNC:9965
## 9776 ENSG00000142599.19          RERE   HGNC:9965
## 9777 ENSG00000142599.19          RERE   HGNC:9965
## 9778 ENSG00000142599.19          RERE   HGNC:9965
## 9779 ENSG00000142599.19          RERE   HGNC:9965
## 9780 ENSG00000142599.19          RERE   HGNC:9965
## 9781 ENSG00000142599.19          RERE   HGNC:9965
## 9782 ENSG00000142599.19          RERE   HGNC:9965
## 9783 ENSG00000142599.19          RERE   HGNC:9965
## 9784 ENSG00000142599.19          RERE   HGNC:9965
## 9785 ENSG00000142599.19          RERE   HGNC:9965
## 9786 ENSG00000142599.19          RERE   HGNC:9965
## 9787 ENSG00000142599.19          RERE   HGNC:9965
## 9788 ENSG00000142599.19          RERE   HGNC:9965
## 9789 ENSG00000142599.19          RERE   HGNC:9965
## 9790 ENSG00000142599.19          RERE   HGNC:9965
## 9791 ENSG00000142599.19          RERE   HGNC:9965
## 9792 ENSG00000142599.19          RERE   HGNC:9965
## 9793 ENSG00000142599.19          RERE   HGNC:9965
## 9794 ENSG00000142599.19          RERE   HGNC:9965
## 9795 ENSG00000142599.19          RERE   HGNC:9965
## 9796 ENSG00000142599.19          RERE   HGNC:9965
## 9797 ENSG00000142599.19          RERE   HGNC:9965
## 9798 ENSG00000142599.19          RERE   HGNC:9965
## 9799 ENSG00000142599.19          RERE   HGNC:9965
## 9800 ENSG00000142599.19          RERE   HGNC:9965
## 9801 ENSG00000142599.19          RERE   HGNC:9965
## 9802 ENSG00000142599.19          RERE   HGNC:9965
## 9803 ENSG00000142599.19          RERE   HGNC:9965
## 9804 ENSG00000142599.19          RERE   HGNC:9965
## 9805 ENSG00000142599.19          RERE   HGNC:9965
## 9806 ENSG00000142599.19          RERE   HGNC:9965
## 9807 ENSG00000142599.19          RERE   HGNC:9965
## 9808 ENSG00000142599.19          RERE   HGNC:9965
## 9809 ENSG00000142599.19          RERE   HGNC:9965
## 9810 ENSG00000142599.19          RERE   HGNC:9965
## 9811 ENSG00000142599.19          RERE   HGNC:9965
## 9812 ENSG00000142599.19          RERE   HGNC:9965
## 9813 ENSG00000142599.19          RERE   HGNC:9965
## 9814 ENSG00000142599.19          RERE   HGNC:9965
## 9815 ENSG00000142599.19          RERE   HGNC:9965
## 9816 ENSG00000142599.19          RERE   HGNC:9965
## 9817 ENSG00000142599.19          RERE   HGNC:9965
## 9818 ENSG00000142599.19          RERE   HGNC:9965
## 9819 ENSG00000142599.19          RERE   HGNC:9965
## 9820 ENSG00000142599.19          RERE   HGNC:9965
## 9821 ENSG00000142599.19          RERE   HGNC:9965
## 9822 ENSG00000142599.19          RERE   HGNC:9965
## 9823 ENSG00000142599.19          RERE   HGNC:9965
## 9824 ENSG00000142599.19          RERE   HGNC:9965
## 9825 ENSG00000142599.19          RERE   HGNC:9965
## 9826 ENSG00000142599.19          RERE   HGNC:9965
## 9827 ENSG00000142599.19          RERE   HGNC:9965
```

```
## 9828 ENSG00000142599.19          RERE   HGNC:9965
## 9829 ENSG00000142599.19          RERE   HGNC:9965
## 9830 ENSG00000142599.19          RERE   HGNC:9965
## 9831 ENSG00000142599.19          RERE   HGNC:9965
## 9832 ENSG00000142599.19          RERE   HGNC:9965
## 9833 ENSG00000142599.19          RERE   HGNC:9965
## 9834 ENSG00000142599.19          RERE   HGNC:9965
## 9835 ENSG00000142599.19          RERE   HGNC:9965
## 9836 ENSG00000142599.19          RERE   HGNC:9965
## 9837 ENSG00000142599.19          RERE   HGNC:9965
## 9838 ENSG00000142599.19          RERE   HGNC:9965
## 9839 ENSG00000142599.19          RERE   HGNC:9965
## 9840 ENSG00000142599.19          RERE   HGNC:9965
## 9841 ENSG00000142599.19          RERE   HGNC:9965
## 9842 ENSG00000142599.19          RERE   HGNC:9965
## 9843 ENSG00000142599.19          RERE   HGNC:9965
## 9844 ENSG00000142599.19          RERE   HGNC:9965
## 9845 ENSG00000142599.19          RERE   HGNC:9965
## 9846 ENSG00000142599.19          RERE   HGNC:9965
## 9847 ENSG00000142599.19          RERE   HGNC:9965
## 9848 ENSG00000142599.19          RERE   HGNC:9965
## 9849 ENSG00000142599.19          RERE   HGNC:9965
## 9850 ENSG00000142599.19          RERE   HGNC:9965
## 9851 ENSG00000142599.19          RERE   HGNC:9965
## 9852 ENSG00000142599.19          RERE   HGNC:9965
## 9853 ENSG00000142599.19          RERE   HGNC:9965
## 9854 ENSG00000142599.19          RERE   HGNC:9965
## 9855 ENSG00000142599.19          RERE   HGNC:9965
## 9856 ENSG00000142599.19          RERE   HGNC:9965
## 9857 ENSG00000142599.19          RERE   HGNC:9965
## 9858 ENSG00000142599.19          RERE   HGNC:9965
## 9859 ENSG00000142599.19          RERE   HGNC:9965
## 9860 ENSG00000142599.19          RERE   HGNC:9965
## 9861 ENSG00000142599.19          RERE   HGNC:9965
## 9862 ENSG00000142599.19          RERE   HGNC:9965
## 9863 ENSG00000142599.19          RERE   HGNC:9965
## 9864 ENSG00000142599.19          RERE   HGNC:9965
## 9865 ENSG00000142599.19          RERE   HGNC:9965
## 9866 ENSG00000142599.19          RERE   HGNC:9965
## 9867 ENSG00000142599.19          RERE   HGNC:9965
## 9868 ENSG00000142599.19          RERE   HGNC:9965
## 9869 ENSG00000142599.19          RERE   HGNC:9965
## 9870 ENSG00000142599.19          RERE   HGNC:9965
## 9871 ENSG00000142599.19          RERE   HGNC:9965
## 9872 ENSG00000142599.19          RERE   HGNC:9965
## 9873 ENSG00000142599.19          RERE   HGNC:9965
## 9874 ENSG00000142599.19          RERE   HGNC:9965
## 9875 ENSG00000142599.19          RERE   HGNC:9965
## 9876 ENSG00000142599.19          RERE   HGNC:9965
## 9877 ENSG00000142599.19          RERE   HGNC:9965
## 9878 ENSG00000142599.19          RERE   HGNC:9965
## 9879 ENSG00000142599.19          RERE   HGNC:9965
## 9880 ENSG00000142599.19          RERE   HGNC:9965
## 9881 ENSG00000142599.19          RERE   HGNC:9965
```

```
## 9882 ENSG00000142599.19          RERE   HGNC:9965
## 9883 ENSG00000142599.19          RERE   HGNC:9965
## 9884 ENSG00000142599.19          RERE   HGNC:9965
## 9885 ENSG00000142599.19          RERE   HGNC:9965
## 9886 ENSG00000142599.19          RERE   HGNC:9965
## 9887 ENSG00000142599.19          RERE   HGNC:9965
## 9888 ENSG00000142599.19          RERE   HGNC:9965
## 9889 ENSG00000142599.19          RERE   HGNC:9965
## 9890 ENSG00000142599.19          RERE   HGNC:9965
## 9891 ENSG00000142599.19          RERE   HGNC:9965
## 9892 ENSG00000142599.19          RERE   HGNC:9965
## 9893 ENSG00000142599.19          RERE   HGNC:9965
## 9894 ENSG00000142599.19          RERE   HGNC:9965
## 9895 ENSG00000142599.19          RERE   HGNC:9965
## 9896 ENSG00000142599.19          RERE   HGNC:9965
## 9897 ENSG00000142599.19          RERE   HGNC:9965
## 9898 ENSG00000142599.19          RERE   HGNC:9965
## 9899 ENSG00000142599.19          RERE   HGNC:9965
## 9900 ENSG00000142599.19          RERE   HGNC:9965
## 9901 ENSG00000142599.19          RERE   HGNC:9965
## 9902 ENSG00000142599.19          RERE   HGNC:9965
## 9903 ENSG00000142599.19          RERE   HGNC:9965
## 9904 ENSG00000142599.19          RERE   HGNC:9965
## 9905 ENSG00000142599.19          RERE   HGNC:9965
## 9906 ENSG00000142599.19          RERE   HGNC:9965
## 9907 ENSG00000142599.19          RERE   HGNC:9965
## 9908 ENSG00000142599.19          RERE   HGNC:9965
## 9909 ENSG00000142599.19          RERE   HGNC:9965
## 9910 ENSG00000142599.19          RERE   HGNC:9965
## 9911 ENSG00000142599.19          RERE   HGNC:9965
## 9912 ENSG00000142599.19          RERE   HGNC:9965
## 9913 ENSG00000142599.19          RERE   HGNC:9965
## 9914 ENSG00000142599.19          RERE   HGNC:9965
## 9915 ENSG00000142599.19          RERE   HGNC:9965
## 9916 ENSG00000142599.19          RERE   HGNC:9965
## 9917 ENSG00000142599.19          RERE   HGNC:9965
## 9918 ENSG00000142599.19          RERE   HGNC:9965
## 9919 ENSG00000142599.19          RERE   HGNC:9965
## 9920 ENSG00000142599.19          RERE   HGNC:9965
## 9921 ENSG00000142599.19          RERE   HGNC:9965
## 9922 ENSG00000142599.19          RERE   HGNC:9965
## 9923 ENSG00000142599.19          RERE   HGNC:9965
## 9924 ENSG00000142599.19          RERE   HGNC:9965
## 9925 ENSG00000142599.19          RERE   HGNC:9965
## 9926 ENSG00000142599.19          RERE   HGNC:9965
## 9927 ENSG00000142599.19          RERE   HGNC:9965
## 9928 ENSG00000142599.19          RERE   HGNC:9965
## 9929 ENSG00000142599.19          RERE   HGNC:9965
## 9930 ENSG00000142599.19          RERE   HGNC:9965
## 9931 ENSG00000142599.19          RERE   HGNC:9965
## 9932 ENSG00000142599.19          RERE   HGNC:9965
## 9933 ENSG00000142599.19          RERE   HGNC:9965
## 9934 ENSG00000142599.19          RERE   HGNC:9965
## 9935 ENSG00000142599.19          RERE   HGNC:9965
```

```
## 9936 ENSG00000142599.19        RERE   HGNC:9965
## 9937 ENSG00000142599.19        RERE   HGNC:9965
## 9938 ENSG00000142599.19        RERE   HGNC:9965
## 9939 ENSG00000142599.19        RERE   HGNC:9965
## 9940 ENSG00000142599.19        RERE   HGNC:9965
## 9941 ENSG00000142599.19        RERE   HGNC:9965
## 9942 ENSG00000142599.19        RERE   HGNC:9965
## 9943 ENSG00000142599.19        RERE   HGNC:9965
## 9944 ENSG00000142599.19        RERE   HGNC:9965
## 9945 ENSG00000142599.19        RERE   HGNC:9965
## 9946 ENSG00000142599.19        RERE   HGNC:9965
## 9947 ENSG00000142599.19        RERE   HGNC:9965
## 9948 ENSG00000142599.19        RERE   HGNC:9965
## 9949 ENSG00000142599.19        RERE   HGNC:9965
## 9950 ENSG00000142599.19        RERE   HGNC:9965
## 9951 ENSG00000142599.19        RERE   HGNC:9965
## 9952 ENSG00000142599.19        RERE   HGNC:9965
## 9953 ENSG00000142599.19        RERE   HGNC:9965
## 9954 ENSG00000142599.19        RERE   HGNC:9965
## 9955 ENSG00000142599.19        RERE   HGNC:9965
## 9956 ENSG00000142599.19        RERE   HGNC:9965
## 9957 ENSG00000142599.19        RERE   HGNC:9965
## 9958 ENSG00000142599.19        RERE   HGNC:9965
## 9959 ENSG00000142599.19        RERE   HGNC:9965
## 9960 ENSG00000142599.19        RERE   HGNC:9965
## 9961 ENSG00000142599.19        RERE   HGNC:9965
## 9962 ENSG00000142599.19        RERE   HGNC:9965
## 9963 ENSG00000142599.19        RERE   HGNC:9965
## 9964 ENSG00000142599.19        RERE   HGNC:9965
## 9965 ENSG00000142599.19        RERE   HGNC:9965
## 9966 ENSG00000142599.19        RERE   HGNC:9965
## 9967 ENSG00000142599.19        RERE   HGNC:9965
## 9968 ENSG00000142599.19        RERE   HGNC:9965
## 9969 ENSG00000142599.19        RERE   HGNC:9965
## 9970 ENSG00000142599.19        RERE   HGNC:9965
## 9971 ENSG00000142599.19        RERE   HGNC:9965
## 9972 ENSG00000142599.19        RERE   HGNC:9965
## 9973 ENSG00000142599.19        RERE   HGNC:9965
## 9974 ENSG00000142599.19        RERE   HGNC:9965
## 9975 ENSG00000142599.19        RERE   HGNC:9965
## 9976 ENSG00000142599.19        RERE   HGNC:9965
## 9977 ENSG00000142599.19        RERE   HGNC:9965
## 9978 ENSG00000142599.19        RERE   HGNC:9965
## 9979 ENSG00000142599.19        RERE   HGNC:9965
## 9980 ENSG00000142599.19        RERE   HGNC:9965
## 9981 ENSG00000142599.19        RERE   HGNC:9965
## 9982 ENSG00000142599.19        RERE   HGNC:9965
## 9983 ENSG00000142599.19        RERE   HGNC:9965
## 9984 ENSG00000142599.19        RERE   HGNC:9965
## 9985 ENSG00000142599.19        RERE   HGNC:9965
## 9986 ENSG00000142599.19        RERE   HGNC:9965
## 9987 ENSG00000142599.19        RERE   HGNC:9965
## 9988 ENSG00000142599.19        RERE   HGNC:9965
## 9989 ENSG00000142599.19        RERE   HGNC:9965
```

```
## 9990 ENSG00000142599.19          RERE    HGNC:9965
## 9991 ENSG00000142599.19          RERE    HGNC:9965
## 9992 ENSG00000142599.19          RERE    HGNC:9965
## 9993 ENSG00000142599.19          RERE    HGNC:9965
## 9994 ENSG00000142599.19          RERE    HGNC:9965
## 9995 ENSG00000142599.19          RERE    HGNC:9965
## 9996 ENSG00000142599.19          RERE    HGNC:9965
## 9997 ENSG00000142599.19          RERE    HGNC:9965
## 9998 ENSG00000142599.19          RERE    HGNC:9965
## 9999 ENSG00000142599.19          RERE    HGNC:9965
##                                 gene_type seqnames   start     end strand isHgnc
## 1     transcribed_unprocessed_pseudogene      chr1   11869   14409      +      1
## 2     transcribed_unprocessed_pseudogene      chr1   11869   14409      +      1
## 3     transcribed_unprocessed_pseudogene      chr1   11869   12227      +      1
## 4     transcribed_unprocessed_pseudogene      chr1   12613   12721      +      1
## 5     transcribed_unprocessed_pseudogene      chr1   13221   14409      +      1
## 6     transcribed_unprocessed_pseudogene      chr1   12010   13670      +      1
## 7     transcribed_unprocessed_pseudogene      chr1   12010   12057      +      1
## 8     transcribed_unprocessed_pseudogene      chr1   12179   12227      +      1
## 9     transcribed_unprocessed_pseudogene      chr1   12613   12697      +      1
## 10    transcribed_unprocessed_pseudogene      chr1   12975   13052      +      1
## 11    transcribed_unprocessed_pseudogene      chr1   13221   13374      +      1
## 12    transcribed_unprocessed_pseudogene      chr1   13453   13670      +      1
## 13              unprocessed_pseudogene      chr1   14404   29570      -      1
## 14              unprocessed_pseudogene      chr1   14404   29570      -      1
## 15              unprocessed_pseudogene      chr1   29534   29570      -      1
## 16              unprocessed_pseudogene      chr1   24738   24891      -      1
## 17              unprocessed_pseudogene      chr1   18268   18366      -      1
## 18              unprocessed_pseudogene      chr1   17915   18061      -      1
## 19              unprocessed_pseudogene      chr1   17606   17742      -      1
## 20              unprocessed_pseudogene      chr1   17233   17368      -      1
## 21              unprocessed_pseudogene      chr1   16858   17055      -      1
## 22              unprocessed_pseudogene      chr1   16607   16765      -      1
## 23              unprocessed_pseudogene      chr1   15796   15947      -      1
## 24              unprocessed_pseudogene      chr1   15005   15038      -      1
## 25              unprocessed_pseudogene      chr1   14404   14501      -      1
## 26                            miRNA      chr1   17369   17436      -      1
## 27                            miRNA      chr1   17369   17436      -      1
## 28                            miRNA      chr1   17369   17436      -      1
## 29                           lncRNA      chr1   29554   31109      +      1
## 30                           lncRNA      chr1   29554   31097      +      1
## 31                           lncRNA      chr1   29554   30039      +      1
## 32                           lncRNA      chr1   30564   30667      +      1
## 33                           lncRNA      chr1   30976   31097      +      1
## 34                           lncRNA      chr1   30267   31109      +      1
## 35                           lncRNA      chr1   30267   30667      +      1
## 36                           lncRNA      chr1   30976   31109      +      1
## 37                            miRNA      chr1   30366   30503      +      1
## 38                            miRNA      chr1   30366   30503      +      1
## 39                            miRNA      chr1   30366   30503      +      1
## 40                           lncRNA      chr1   34554   36081      -      1
## 41                           lncRNA      chr1   34554   36081      -      1
## 42                           lncRNA      chr1   35721   36081      -      1
## 43                           lncRNA      chr1   35277   35481      -      1
```

```
## 44                                    lncRNA  chr1   34554   35174    -    1
## 45              unprocessed_pseudogene  chr1   52473   53312    +    1
## 46              unprocessed_pseudogene  chr1   52473   53312    +    1
## 47              unprocessed_pseudogene  chr1   52473   53312    +    1
## 48  transcribed_unprocessed_pseudogene  chr1   57598   64116    +    1
## 49  transcribed_unprocessed_pseudogene  chr1   57598   64116    +    1
## 50  transcribed_unprocessed_pseudogene  chr1   57598   57653    +    1
## 51  transcribed_unprocessed_pseudogene  chr1   58700   58856    +    1
## 52  transcribed_unprocessed_pseudogene  chr1   62916   64116    +    1
## 53  transcribed_unprocessed_pseudogene  chr1   62949   63887    +    1
## 54  transcribed_unprocessed_pseudogene  chr1   62949   63887    +    1
## 55                       protein_coding  chr1   65419   71585    +    1
## 56                       protein_coding  chr1   65419   71585    +    1
## 57                       protein_coding  chr1   65419   65433    +    1
## 58                       protein_coding  chr1   65520   65573    +    1
## 59                       protein_coding  chr1   65565   65573    +    1
## 60                       protein_coding  chr1   65565   65567    +    1
## 61                       protein_coding  chr1   69037   71585    +    1
## 62                       protein_coding  chr1   69037   70005    +    1
## 63                       protein_coding  chr1   70006   70008    +    1
## 64                       protein_coding  chr1   65419   65433    +    1
## 65                       protein_coding  chr1   65520   65564    +    1
## 66                       protein_coding  chr1   70006   71585    +    1
## 67                       protein_coding  chr1   69055   70108    +    1
## 68                       protein_coding  chr1   69055   70108    +    1
## 69                       protein_coding  chr1   69091   70005    +    1
## 70                       protein_coding  chr1   69091   69093    +    1
## 71                       protein_coding  chr1   70006   70008    +    1
## 72                       protein_coding  chr1   69055   69090    +    1
## 73                       protein_coding  chr1   70006   70108    +    1
## 74                                lncRNA  chr1   89295  133723    -    0
## 75                                lncRNA  chr1   89295  120932    -    0
## 76                                lncRNA  chr1  120775  120932    -    0
## 77                                lncRNA  chr1  112700  112804    -    0
## 78                                lncRNA  chr1   92091   92240    -    0
## 79                                lncRNA  chr1   89295   91629    -    0
## 80                                lncRNA  chr1  120725  133723    -    0
## 81                                lncRNA  chr1  133374  133723    -    0
## 82                                lncRNA  chr1  129055  129223    -    0
## 83                                lncRNA  chr1  120874  120932    -    0
## 84                                lncRNA  chr1  120725  120869    -    0
## 85                                lncRNA  chr1   89551   91105    -    0
## 86                                lncRNA  chr1   89551   91105    -    0
## 87                                lncRNA  chr1   90287   91105    -    0
## 88                                lncRNA  chr1   89551   90050    -    0
## 89              processed_pseudogene  chr1  131025  134836    +    1
## 90              processed_pseudogene  chr1  131025  134836    +    1
## 91              processed_pseudogene  chr1  131025  134836    +    1
## 92              processed_pseudogene  chr1  135141  135895    -    0
## 93              processed_pseudogene  chr1  135141  135895    -    0
## 94              processed_pseudogene  chr1  135141  135895    -    0
## 95              processed_pseudogene  chr1  137682  137965    -    0
## 96              processed_pseudogene  chr1  137682  137965    -    0
## 97              processed_pseudogene  chr1  137682  137965    -    0
```

```
## 98                                     lncRNA    chr1 139790 140339       -       0
## 99                                     lncRNA    chr1 139790 140339       -       0
## 100                                    lncRNA    chr1 140075 140339       -       0
## 101                                    lncRNA    chr1 139790 139847       -       0
## 102                                    lncRNA    chr1 141474 173862       -       0
## 103                                    lncRNA    chr1 141474 149707       -       0
## 104                                    lncRNA    chr1 146386 149707       -       0
## 105                                    lncRNA    chr1 141474 143011       -       0
## 106                                    lncRNA    chr1 146386 173862       -       0
## 107                                    lncRNA    chr1 173753 173862       -       0
## 108                                    lncRNA    chr1 172557 172688       -       0
## 109                                    lncRNA    chr1 169049 169264       -       0
## 110                                    lncRNA    chr1 168100 168165       -       0
## 111                                    lncRNA    chr1 165884 165942       -       0
## 112                                    lncRNA    chr1 164263 164791       -       0
## 113                                    lncRNA    chr1 155767 155831       -       0
## 114                                    lncRNA    chr1 146386 146509       -       0
## 115                                    lncRNA    chr1 165491 169210       -       0
## 116                                    lncRNA    chr1 169049 169210       -       0
## 117                                    lncRNA    chr1 167959 168165       -       0
## 118                                    lncRNA    chr1 165491 165942       -       0
## 119                                      snRNA   chr1 157784 157887       -       1
## 120                                      snRNA   chr1 157784 157887       -       1
## 121                                      snRNA   chr1 157784 157887       -       1
## 122                                     lncRNA   chr1 160446 161525       +       0
## 123                                     lncRNA   chr1 160446 161525       +       0
## 124                                     lncRNA   chr1 160446 160690       +       0
## 125                                     lncRNA   chr1 161314 161525       +       0
## 126            unprocessed_pseudogene   chr1 182696 184174       +       0
## 127            unprocessed_pseudogene   chr1 182696 184174       +       0
## 128            unprocessed_pseudogene   chr1 182696 182746       +       0
## 129            unprocessed_pseudogene   chr1 183132 183216       +       0
## 130            unprocessed_pseudogene   chr1 183494 183571       +       0
## 131            unprocessed_pseudogene   chr1 183740 183901       +       0
## 132            unprocessed_pseudogene   chr1 183981 184174       +       0
## 133            unprocessed_pseudogene   chr1 185217 195411       -       1
## 134            unprocessed_pseudogene   chr1 185217 195411       -       1
## 135            unprocessed_pseudogene   chr1 195263 195411       -       1
## 136            unprocessed_pseudogene   chr1 188791 188902       -       1
## 137            unprocessed_pseudogene   chr1 188439 188584       -       1
## 138            unprocessed_pseudogene   chr1 188130 188266       -       1
## 139            unprocessed_pseudogene   chr1 187755 187890       -       1
## 140            unprocessed_pseudogene   chr1 187376 187577       -       1
## 141            unprocessed_pseudogene   chr1 187129 187287       -       1
## 142            unprocessed_pseudogene   chr1 186317 186469       -       1
## 143            unprocessed_pseudogene   chr1 185491 185559       -       1
## 144            unprocessed_pseudogene   chr1 185217 185350       -       1
## 145                                      miRNA   chr1 187891 187958       -       1
## 146                                      miRNA   chr1 187891 187958       -       1
## 147                                      miRNA   chr1 187891 187958       -       1
## 148   transcribed_processed_pseudogene   chr1 257864 359681       -       0
## 149   transcribed_processed_pseudogene   chr1 257864 264733       -       0
## 150   transcribed_processed_pseudogene   chr1 264604 264733       -       0
## 151   transcribed_processed_pseudogene   chr1 257864 259025       -       0
```

```
## 152   transcribed_processed_pseudogene   chr1 258144 359681   -   0
## 153   transcribed_processed_pseudogene   chr1 359345 359681   -   0
## 154   transcribed_processed_pseudogene   chr1 358049 358183   -   0
## 155   transcribed_processed_pseudogene   chr1 356685 357586   -   0
## 156   transcribed_processed_pseudogene   chr1 258144 259025   -   0
## 157   transcribed_processed_pseudogene   chr1 258568 259024   -   0
## 158   transcribed_processed_pseudogene   chr1 258568 259024   -   0
## 159                            lncRNA   chr1 266855 268655   +   0
## 160                            lncRNA   chr1 266855 268655   +   0
## 161                            lncRNA   chr1 266855 267056   +   0
## 162                            lncRNA   chr1 268122 268655   +   0
## 163               processed_pseudogene   chr1 347982 348366   -   1
## 164               processed_pseudogene   chr1 347982 348366   -   1
## 165               processed_pseudogene   chr1 347982 348366   -   1
## 166                            lncRNA   chr1 358857 366052   +   0
## 167                            lncRNA   chr1 360057 366052   +   0
## 168                            lncRNA   chr1 360057 360168   +   0
## 169                            lncRNA   chr1 365171 366052   +   0
## 170   transcribed_unprocessed_pseudogene chr1 365389 522928   -   0
## 171   transcribed_unprocessed_pseudogene chr1 365389 366151   -   0
## 172   transcribed_unprocessed_pseudogene chr1 366019 366151   -   0
## 173   transcribed_unprocessed_pseudogene chr1 365389 365692   -   0
## 174   transcribed_unprocessed_pseudogene chr1 485026 485208   -   0
## 175   transcribed_unprocessed_pseudogene chr1 485026 485208   -   0
## 176   transcribed_unprocessed_pseudogene chr1 504865 522928   -   0
## 177   transcribed_unprocessed_pseudogene chr1 522859 522928   -   0
## 178   transcribed_unprocessed_pseudogene chr1 517185 517266   -   0
## 179   transcribed_unprocessed_pseudogene chr1 514359 514423   -   0
## 180   transcribed_unprocessed_pseudogene chr1 504865 505103   -   0
## 181               processed_pseudogene   chr1 439870 440232   +   1
## 182               processed_pseudogene   chr1 439870 440232   +   1
## 183               processed_pseudogene   chr1 439870 440232   +   1
## 184                     protein_coding   chr1 450703 451697   -   1
## 185                     protein_coding   chr1 450703 451697   -   1
## 186                     protein_coding   chr1 450703 451697   -   1
## 187                     protein_coding   chr1 450743 451678   -   1
## 188                     protein_coding   chr1 451676 451678   -   1
## 189                     protein_coding   chr1 450740 450742   -   1
## 190                     protein_coding   chr1 450703 450742   -   1
## 191                     protein_coding   chr1 451679 451697   -   1
## 192               processed_pseudogene   chr1 487101 489906   +   1
## 193               processed_pseudogene   chr1 487101 489906   +   1
## 194               processed_pseudogene   chr1 487101 489387   +   1
## 195               processed_pseudogene   chr1 489717 489906   +   1
## 196             unprocessed_pseudogene   chr1 491225 493241   -   0
## 197             unprocessed_pseudogene   chr1 491225 493241   -   0
## 198             unprocessed_pseudogene   chr1 492768 493241   -   0
## 199             unprocessed_pseudogene   chr1 491225 491989   -   0
## 200                             snRNA   chr1 516376 516479   -   0
## 201                             snRNA   chr1 516376 516479   -   0
## 202                             snRNA   chr1 516376 516479   -   0
## 203   transcribed_processed_pseudogene   chr1 586071 827796   -   0
## 204   transcribed_processed_pseudogene   chr1 586071 612813   -   0
## 205   transcribed_processed_pseudogene   chr1 612741 612813   -   0
```

```
## 206    transcribed_processed_pseudogene   chr1 607955 608056   -   0
## 207    transcribed_processed_pseudogene   chr1 601398 601577   -   0
## 208    transcribed_processed_pseudogene   chr1 594629 594756   -   0
## 209    transcribed_processed_pseudogene   chr1 586821 586955   -   0
## 210    transcribed_processed_pseudogene   chr1 586071 586358   -   0
## 211    transcribed_processed_pseudogene   chr1 594308 827796   -   0
## 212    transcribed_processed_pseudogene   chr1 827670 827796   -   0
## 213    transcribed_processed_pseudogene   chr1 698927 698959   -   0
## 214    transcribed_processed_pseudogene   chr1 607955 608056   -   0
## 215    transcribed_processed_pseudogene   chr1 601398 601577   -   0
## 216    transcribed_processed_pseudogene   chr1 594308 594756   -   0
## 217    transcribed_processed_pseudogene   chr1 720024 720206   -   0
## 218    transcribed_processed_pseudogene   chr1 720024 720206   -   0
## 219                             lncRNA    chr1 587629 594768   +   0
## 220                             lncRNA    chr1 587629 594768   +   0
## 221                             lncRNA    chr1 587629 587701   +   0
## 222                             lncRNA    chr1 594235 594768   +   0
## 223              unprocessed_pseudogene   chr1 629062 629433   +   1
## 224              unprocessed_pseudogene   chr1 629062 629433   +   1
## 225              unprocessed_pseudogene   chr1 629062 629433   +   1
## 226              unprocessed_pseudogene   chr1 629640 630683   +   1
## 227              unprocessed_pseudogene   chr1 629640 630683   +   1
## 228              unprocessed_pseudogene   chr1 629640 630683   +   1
## 229              unprocessed_pseudogene   chr1 631074 632616   +   1
## 230              unprocessed_pseudogene   chr1 631074 632616   +   1
## 231              unprocessed_pseudogene   chr1 631074 632616   +   1
## 232                              miRNA   chr1 632325 632413   -   0
## 233                              miRNA   chr1 632325 632413   -   0
## 234                              miRNA   chr1 632325 632413   -   0
## 235              unprocessed_pseudogene   chr1 632757 633438   +   1
## 236              unprocessed_pseudogene   chr1 632757 633438   +   1
## 237              unprocessed_pseudogene   chr1 632757 633438   +   1
## 238              unprocessed_pseudogene   chr1 633535 633741   +   1
## 239              unprocessed_pseudogene   chr1 633535 633741   +   1
## 240              unprocessed_pseudogene   chr1 633535 633741   +   1
## 241              unprocessed_pseudogene   chr1 633696 634376   +   1
## 242              unprocessed_pseudogene   chr1 633696 634376   +   1
## 243              unprocessed_pseudogene   chr1 633696 634376   +   1
## 244              unprocessed_pseudogene   chr1 634376 634922   +   1
## 245              unprocessed_pseudogene   chr1 634376 634922   +   1
## 246              unprocessed_pseudogene   chr1 634376 634922   +   1
## 247                processed_pseudogene  chr1 674842 675265   +   1
## 248                processed_pseudogene  chr1 674842 675265   +   1
## 249                processed_pseudogene  chr1 674842 675265   +   1
## 250                      protein_coding  chr1 685679 686673   -   1
## 251                      protein_coding  chr1 685679 686673   -   1
## 252                      protein_coding  chr1 685679 686673   -   1
## 253                      protein_coding  chr1 685719 686654   -   1
## 254                      protein_coding  chr1 686652 686654   -   1
## 255                      protein_coding  chr1 685716 685718   -   1
## 256                      protein_coding  chr1 685679 685718   -   1
## 257                      protein_coding  chr1 686655 686673   -   1
## 258                processed_pseudogene  chr1 722092 724903   +   1
## 259                processed_pseudogene  chr1 722092 724903   +   1
```

```
## 260                  processed_pseudogene chr1 722092 724360 +  1
## 261                  processed_pseudogene chr1 724718 724903 +  1
## 262 transcribed_unprocessed_pseudogene chr1 725885 778626 -  0
## 263 transcribed_unprocessed_pseudogene chr1 725885 778626 -  0
## 264 transcribed_unprocessed_pseudogene chr1 778284 778626 -  0
## 265 transcribed_unprocessed_pseudogene chr1 774171 774280 -  0
## 266 transcribed_unprocessed_pseudogene chr1 772976 773107 -  0
## 267 transcribed_unprocessed_pseudogene chr1 769497 769712 -  0
## 268 transcribed_unprocessed_pseudogene chr1 768548 768613 -  0
## 269 transcribed_unprocessed_pseudogene chr1 766329 766387 -  0
## 270 transcribed_unprocessed_pseudogene chr1 764723 765247 -  0
## 271 transcribed_unprocessed_pseudogene chr1 758967 759123 -  0
## 272 transcribed_unprocessed_pseudogene chr1 756077 756141 -  0
## 273 transcribed_unprocessed_pseudogene chr1 746695 746818 -  0
## 274 transcribed_unprocessed_pseudogene chr1 744728 744825 -  0
## 275 transcribed_unprocessed_pseudogene chr1 744195 744391 -  0
## 276 transcribed_unprocessed_pseudogene chr1 743180 743350 -  0
## 277 transcribed_unprocessed_pseudogene chr1 735423 735613 -  0
## 278 transcribed_unprocessed_pseudogene chr1 733307 733364 -  0
## 279 transcribed_unprocessed_pseudogene chr1 725885 729804 -  0
## 280 transcribed_unprocessed_pseudogene chr1 764723 774280 -  0
## 281 transcribed_unprocessed_pseudogene chr1 774171 774280 -  0
## 282 transcribed_unprocessed_pseudogene chr1 768548 768613 -  0
## 283 transcribed_unprocessed_pseudogene chr1 766329 766387 -  0
## 284 transcribed_unprocessed_pseudogene chr1 765144 765247 -  0
## 285 transcribed_unprocessed_pseudogene chr1 764723 764800 -  0
## 286                                snRNA chr1 758233 758336 -  1
## 287                                snRNA chr1 758233 758336 -  1
## 288                                snRNA chr1 758233 758336 -  1
## 289                               lncRNA chr1 760911 761989 +  0
## 290                               lncRNA chr1 760911 761989 +  0
## 291                               lncRNA chr1 760911 761154 +  0
## 292                               lncRNA chr1 761778 761989 +  0
## 293                               lncRNA chr1 778747 810065 +  0
## 294                               lncRNA chr1 778758 810062 +  0
## 295                               lncRNA chr1 778758 779092 +  0
## 296                               lncRNA chr1 803919 804222 +  0
## 297                               lncRNA chr1 804776 804966 +  0
## 298                               lncRNA chr1 807217 807323 +  0
## 299                               lncRNA chr1 809622 810062 +  0
## 300                               lncRNA chr1 778760 805270 +  0
## 301                               lncRNA chr1 778760 779092 +  0
## 302                               lncRNA chr1 803567 803667 +  0
## 303                               lncRNA chr1 803951 804222 +  0
## 304                               lncRNA chr1 804776 805270 +  0
## 305                               lncRNA chr1 778770 784690 +  0
## 306                               lncRNA chr1 778770 779092 +  0
## 307                               lncRNA chr1 781937 782136 +  0
## 308                               lncRNA chr1 784370 784690 +  0
## 309                               lncRNA chr1 778802 810057 +  0
## 310                               lncRNA chr1 778802 779092 +  0
## 311                               lncRNA chr1 803919 804222 +  0
## 312                               lncRNA chr1 804776 804840 +  0
## 313                               lncRNA chr1 807217 807323 +  0
```

```
## 314                                     lncRNA    chr1  809658  810057    +    0
## 315                                     lncRNA    chr1  778972  808378    +    0
## 316                                     lncRNA    chr1  778972  779092    +    0
## 317                                     lncRNA    chr1  803922  804222    +    0
## 318                                     lncRNA    chr1  804776  804966    +    0
## 319                                     lncRNA    chr1  807217  808378    +    0
## 320                                     lncRNA    chr1  803934  807435    +    0
## 321                                     lncRNA    chr1  803934  804222    +    0
## 322                                     lncRNA    chr1  804776  807435    +    0
## 323      transcribed_processed_pseudogene       chr1  781937  782050    +    0
## 324      transcribed_processed_pseudogene       chr1  781937  782050    +    0
## 325      transcribed_processed_pseudogene       chr1  781937  782050    +    0
## 326    transcribed_unprocessed_pseudogene       chr1  800879  817712    -    0
## 327    transcribed_unprocessed_pseudogene       chr1  800879  817712    -    0
## 328    transcribed_unprocessed_pseudogene       chr1  817373  817712    -    0
## 329    transcribed_unprocessed_pseudogene       chr1  810067  810170    -    0
## 330    transcribed_unprocessed_pseudogene       chr1  808574  808623    -    0
## 331    transcribed_unprocessed_pseudogene       chr1  805799  805891    -    0
## 332    transcribed_unprocessed_pseudogene       chr1  800879  801163    -    0
## 333    transcribed_unprocessed_pseudogene       chr1  805799  810161    -    0
## 334    transcribed_unprocessed_pseudogene       chr1  810067  810161    -    0
## 335    transcribed_unprocessed_pseudogene       chr1  808574  808623    -    0
## 336    transcribed_unprocessed_pseudogene       chr1  805799  805891    -    0
## 337                                     lncRNA    chr1  817371  819837    +    1
## 338                                     lncRNA    chr1  817371  819837    +    1
## 339                                     lncRNA    chr1  817371  818202    +    1
## 340                                     lncRNA    chr1  818723  819837    +    1
## 341                                     lncRNA    chr1  825138  868202    +    1
## 342                                     lncRNA    chr1  827598  859446    +    1
## 343                                     lncRNA    chr1  827598  827775    +    1
## 344                                     lncRNA    chr1  829003  829104    +    1
## 345                                     lncRNA    chr1  851927  852110    +    1
## 346                                     lncRNA    chr1  852671  852766    +    1
## 347                                     lncRNA    chr1  853391  859446    +    1
## 348                                     lncRNA    chr1  827604  859085    +    1
## 349                                     lncRNA    chr1  827604  827775    +    1
## 350                                     lncRNA    chr1  829003  829104    +    1
## 351                                     lncRNA    chr1  841200  844498    +    1
## 352                                     lncRNA    chr1  847654  847806    +    1
## 353                                     lncRNA    chr1  851927  852110    +    1
## 354                                     lncRNA    chr1  852671  852766    +    1
## 355                                     lncRNA    chr1  853391  855136    +    1
## 356                                     lncRNA    chr1  856449  859085    +    1
## 357                                     lncRNA    chr1  827638  859408    +    1
## 358                                     lncRNA    chr1  827638  827775    +    1
## 359                                     lncRNA    chr1  829003  829104    +    1
## 360                                     lncRNA    chr1  847654  847806    +    1
## 361                                     lncRNA    chr1  849484  849602    +    1
## 362                                     lncRNA    chr1  851927  852110    +    1
## 363                                     lncRNA    chr1  852671  852766    +    1
## 364                                     lncRNA    chr1  853391  855121    +    1
## 365                                     lncRNA    chr1  856449  859408    +    1
## 366                                     lncRNA    chr1  827654  854096    +    1
## 367                                     lncRNA    chr1  827654  827775    +    1
```

```
## 368                                   lncRNA   chr1  829003  829104   +    1
## 369                                   lncRNA   chr1  847654  847806   +    1
## 370                                   lncRNA   chr1  849484  849602   +    1
## 371                                   lncRNA   chr1  850181  850351   +    1
## 372                                   lncRNA   chr1  851927  852110   +    1
## 373                                   lncRNA   chr1  852671  852766   +    1
## 374                                   lncRNA   chr1  853391  854096   +    1
## 375                                   lncRNA   chr1  827667  854385   +    1
## 376                                   lncRNA   chr1  827667  827775   +    1
## 377                                   lncRNA   chr1  829003  829104   +    1
## 378                                   lncRNA   chr1  847654  847806   +    1
## 379                                   lncRNA   chr1  849484  849602   +    1
## 380                                   lncRNA   chr1  850178  850351   +    1
## 381                                   lncRNA   chr1  851927  852110   +    1
## 382                                   lncRNA   chr1  852671  852766   +    1
## 383                                   lncRNA   chr1  853391  854385   +    1
## 384                                   lncRNA   chr1  827673  857246   +    1
## 385                                   lncRNA   chr1  827673  827775   +    1
## 386                                   lncRNA   chr1  829003  829104   +    1
## 387                                   lncRNA   chr1  851927  852014   +    1
## 388                                   lncRNA   chr1  852671  852766   +    1
## 389                                   lncRNA   chr1  853391  855136   +    1
## 390                                   lncRNA   chr1  856449  857246   +    1
## 391                                   lncRNA   chr1  827700  854376   +    1
## 392                                   lncRNA   chr1  827700  827775   +    1
## 393                                   lncRNA   chr1  829003  829104   +    1
## 394                                   lncRNA   chr1  841200  841373   +    1
## 395                                   lncRNA   chr1  847654  847806   +    1
## 396                                   lncRNA   chr1  851927  852110   +    1
## 397                                   lncRNA   chr1  852671  852766   +    1
## 398                                   lncRNA   chr1  853391  854376   +    1
## 399                                   lncRNA   chr1  860227  868202   +    1
## 400                                   lncRNA   chr1  860227  861273   +    1
## 401                                   lncRNA   chr1  865260  865499   +    1
## 402                                   lncRNA   chr1  867420  868202   +    1
## 403                                   lncRNA   chr1  826206  827522   −    1
## 404                                   lncRNA   chr1  826206  827522   −    1
## 405                                   lncRNA   chr1  826206  827522   −    1
## 406                                   lncRNA   chr1  868071  876903   −    1
## 407                                   lncRNA   chr1  868071  876903   −    1
## 408                                   lncRNA   chr1  876746  876903   −    1
## 409                                   lncRNA   chr1  874112  875155   −    1
## 410                                   lncRNA   chr1  868071  868675   −    1
## 411                                   lncRNA   chr1  868240  870201   −    1
## 412                                   lncRNA   chr1  870086  870201   −    1
## 413                                   lncRNA   chr1  869528  869575   −    1
## 414                                   lncRNA   chr1  868627  868675   −    1
## 415                                   lncRNA   chr1  868240  868530   −    1
## 416            unprocessed_pseudogene   chr1  873292  874349   +    1
## 417            unprocessed_pseudogene   chr1  873292  874349   +    1
## 418            unprocessed_pseudogene   chr1  873292  874349   +    1
## 419 transcribed_unprocessed_pseudogene chr1  874529  877234   −    0
## 420 transcribed_unprocessed_pseudogene chr1  874529  877234   −    0
## 421 transcribed_unprocessed_pseudogene chr1  876755  877234   −    0
```

```
## 422 transcribed_unprocessed_pseudogene  chr1 876527 876611  -  0
## 423 transcribed_unprocessed_pseudogene  chr1 875526 875625  -  0
## 424 transcribed_unprocessed_pseudogene  chr1 875047 875155  -  0
## 425 transcribed_unprocessed_pseudogene  chr1 874529 874591  -  0
## 426                            lncRNA  chr1 904834 915976  +  0
## 427                            lncRNA  chr1 904834 915976  +  0
## 428                            lncRNA  chr1 904834 904957  +  0
## 429                            lncRNA  chr1 915750 915976  +  0
## 430                            lncRNA  chr1 911435 914948  +  0
## 431                            lncRNA  chr1 911435 914948  +  0
## 432                            lncRNA  chr1 911435 911473  +  0
## 433                            lncRNA  chr1 911945 914948  +  0
## 434                            lncRNA  chr1 914171 914971  +  0
## 435                            lncRNA  chr1 914171 914971  +  0
## 436                            lncRNA  chr1 914171 914444  +  0
## 437                            lncRNA  chr1 914803 914971  +  0
## 438                            lncRNA  chr1 916865 921016  -  1
## 439                            lncRNA  chr1 916870 919692  -  1
## 440                            lncRNA  chr1 919335 919692  -  1
## 441                            lncRNA  chr1 918825 918915  -  1
## 442                            lncRNA  chr1 918022 918110  -  1
## 443                            lncRNA  chr1 916870 917720  -  1
## 444                     protein_coding  chr1 923928 944581  +  1
## 445                     protein_coding  chr1 925731 944574  +  1
## 446                     protein_coding  chr1 925731 925800  +  1
## 447                     protein_coding  chr1 925922 926013  +  1
## 448                     protein_coding  chr1 925942 926013  +  1
## 449                     protein_coding  chr1 925942 925944  +  1
## 450                     protein_coding  chr1 930155 930336  +  1
## 451                     protein_coding  chr1 930155 930336  +  1
## 452                     protein_coding  chr1 931039 931089  +  1
## 453                     protein_coding  chr1 931039 931089  +  1
## 454                     protein_coding  chr1 935772 935896  +  1
## 455                     protein_coding  chr1 935772 935896  +  1
## 456                     protein_coding  chr1 939040 939129  +  1
## 457                     protein_coding  chr1 939040 939129  +  1
## 458                     protein_coding  chr1 939275 939460  +  1
## 459                     protein_coding  chr1 939275 939460  +  1
## 460                     protein_coding  chr1 941144 941306  +  1
## 461                     protein_coding  chr1 941144 941306  +  1
## 462                     protein_coding  chr1 942136 942251  +  1
## 463                     protein_coding  chr1 942136 942251  +  1
## 464                     protein_coding  chr1 942410 942488  +  1
## 465                     protein_coding  chr1 942410 942488  +  1
## 466                     protein_coding  chr1 942559 943058  +  1
## 467                     protein_coding  chr1 942559 943058  +  1
## 468                     protein_coding  chr1 943253 943377  +  1
## 469                     protein_coding  chr1 943253 943377  +  1
## 470                     protein_coding  chr1 943698 943808  +  1
## 471                     protein_coding  chr1 943698 943808  +  1
## 472                     protein_coding  chr1 943908 944574  +  1
## 473                     protein_coding  chr1 943908 944150  +  1
## 474                     protein_coding  chr1 944151 944153  +  1
## 475                     protein_coding  chr1 925731 925800  +  1
```

```
## 476            protein_coding  chr1  925922  925941  +  1
## 477            protein_coding  chr1  944151  944574  +  1
## 478            protein_coding  chr1  925741  944581  +  1
## 479            protein_coding  chr1  925741  925800  +  1
## 480            protein_coding  chr1  925922  926013  +  1
## 481            protein_coding  chr1  925942  926013  +  1
## 482            protein_coding  chr1  925942  925944  +  1
## 483            protein_coding  chr1  930155  930336  +  1
## 484            protein_coding  chr1  930155  930336  +  1
## 485            protein_coding  chr1  935772  935896  +  1
## 486            protein_coding  chr1  935772  935896  +  1
## 487            protein_coding  chr1  939040  939129  +  1
## 488            protein_coding  chr1  939040  939129  +  1
## 489            protein_coding  chr1  939272  939412  +  1
## 490            protein_coding  chr1  939272  939412  +  1
## 491            protein_coding  chr1  942410  942488  +  1
## 492            protein_coding  chr1  942410  942488  +  1
## 493            protein_coding  chr1  942559  943058  +  1
## 494            protein_coding  chr1  942559  943058  +  1
## 495            protein_coding  chr1  943253  943377  +  1
## 496            protein_coding  chr1  943253  943377  +  1
## 497            protein_coding  chr1  943698  943808  +  1
## 498            protein_coding  chr1  943698  943808  +  1
## 499            protein_coding  chr1  943908  944581  +  1
## 500            protein_coding  chr1  943908  944150  +  1
## 501            protein_coding  chr1  944151  944153  +  1
## 502            protein_coding  chr1  925741  925800  +  1
## 503            protein_coding  chr1  925922  925941  +  1
## 504            protein_coding  chr1  944151  944581  +  1
## 505            protein_coding  chr1  925741  944581  +  1
## 506            protein_coding  chr1  925741  925800  +  1
## 507            protein_coding  chr1  925922  926013  +  1
## 508            protein_coding  chr1  925942  926013  +  1
## 509            protein_coding  chr1  925942  925944  +  1
## 510            protein_coding  chr1  930155  930336  +  1
## 511            protein_coding  chr1  930155  930336  +  1
## 512            protein_coding  chr1  931039  931089  +  1
## 513            protein_coding  chr1  931039  931089  +  1
## 514            protein_coding  chr1  935772  935896  +  1
## 515            protein_coding  chr1  935772  935896  +  1
## 516            protein_coding  chr1  939040  939129  +  1
## 517            protein_coding  chr1  939040  939129  +  1
## 518            protein_coding  chr1  939272  939460  +  1
## 519            protein_coding  chr1  939272  939460  +  1
## 520            protein_coding  chr1  941144  941306  +  1
## 521            protein_coding  chr1  941144  941306  +  1
## 522            protein_coding  chr1  942136  942251  +  1
## 523            protein_coding  chr1  942136  942251  +  1
## 524            protein_coding  chr1  942410  942488  +  1
## 525            protein_coding  chr1  942410  942488  +  1
## 526            protein_coding  chr1  942559  943058  +  1
## 527            protein_coding  chr1  942559  943058  +  1
## 528            protein_coding  chr1  943253  943377  +  1
## 529            protein_coding  chr1  943253  943377  +  1
```

```
## 530                    protein_coding   chr1  943698  943808   +   1
## 531                    protein_coding   chr1  943698  943808   +   1
## 532                    protein_coding   chr1  943908  944581   +   1
## 533                    protein_coding   chr1  943908  944150   +   1
## 534                    protein_coding   chr1  944151  944153   +   1
## 535                    protein_coding   chr1  925741  925800   +   1
## 536                    protein_coding   chr1  925922  925941   +   1
## 537                    protein_coding   chr1  944151  944581   +   1
## 538                    protein_coding   chr1  925741  944581   +   1
## 539                    protein_coding   chr1  925741  925800   +   1
## 540                    protein_coding   chr1  925922  926013   +   1
## 541                    protein_coding   chr1  925942  926013   +   1
## 542                    protein_coding   chr1  925942  925944   +   1
## 543                    protein_coding   chr1  930155  930336   +   1
## 544                    protein_coding   chr1  930155  930336   +   1
## 545                    protein_coding   chr1  931039  931089   +   1
## 546                    protein_coding   chr1  931039  931089   +   1
## 547                    protein_coding   chr1  935772  935805   +   1
## 548                    protein_coding   chr1  935772  935805   +   1
## 549                    protein_coding   chr1  941172  941306   +   1
## 550                    protein_coding   chr1  941172  941306   +   1
## 551                    protein_coding   chr1  942136  942251   +   1
## 552                    protein_coding   chr1  942136  942251   +   1
## 553                    protein_coding   chr1  942410  942488   +   1
## 554                    protein_coding   chr1  942410  942488   +   1
## 555                    protein_coding   chr1  942559  943058   +   1
## 556                    protein_coding   chr1  942559  942852   +   1
## 557                    protein_coding   chr1  942853  942855   +   1
## 558                    protein_coding   chr1  943253  943377   +   1
## 559                    protein_coding   chr1  943698  943808   +   1
## 560                    protein_coding   chr1  943908  944581   +   1
## 561                    protein_coding   chr1  925741  925800   +   1
## 562                    protein_coding   chr1  925922  925941   +   1
## 563                    protein_coding   chr1  942853  943058   +   1
## 564                    protein_coding   chr1  943253  943377   +   1
## 565                    protein_coding   chr1  943698  943808   +   1
## 566                    protein_coding   chr1  943908  944581   +   1
## 567                    protein_coding   chr1  925741  944581   +   1
## 568                    protein_coding   chr1  925741  925800   +   1
## 569                    protein_coding   chr1  925922  926013   +   1
## 570                    protein_coding   chr1  925942  926013   +   1
## 571                    protein_coding   chr1  925942  925944   +   1
## 572                    protein_coding   chr1  930155  930336   +   1
## 573                    protein_coding   chr1  930155  930336   +   1
## 574                    protein_coding   chr1  931039  931089   +   1
## 575                    protein_coding   chr1  931039  931089   +   1
## 576                    protein_coding   chr1  935772  935896   +   1
## 577                    protein_coding   chr1  935772  935896   +   1
## 578                    protein_coding   chr1  939040  939129   +   1
## 579                    protein_coding   chr1  939040  939129   +   1
## 580                    protein_coding   chr1  939275  939460   +   1
## 581                    protein_coding   chr1  939275  939460   +   1
## 582                    protein_coding   chr1  942136  942251   +   1
## 583                    protein_coding   chr1  942136  942251   +   1
```

```
## 584                    protein_coding   chr1  942410  942488   +    1
## 585                    protein_coding   chr1  942410  942488   +    1
## 586                    protein_coding   chr1  942559  943058   +    1
## 587                    protein_coding   chr1  942559  942692   +    1
## 588                    protein_coding   chr1  942693  942695   +    1
## 589                    protein_coding   chr1  943253  943377   +    1
## 590                    protein_coding   chr1  943698  943808   +    1
## 591                    protein_coding   chr1  943908  944581   +    1
## 592                    protein_coding   chr1  925741  925800   +    1
## 593                    protein_coding   chr1  925922  925941   +    1
## 594                    protein_coding   chr1  942693  943058   +    1
## 595                    protein_coding   chr1  943253  943377   +    1
## 596                    protein_coding   chr1  943698  943808   +    1
## 597                    protein_coding   chr1  943908  944581   +    1
## 598                    protein_coding   chr1  925741  944581   +    1
## 599                    protein_coding   chr1  925741  925800   +    1
## 600                    protein_coding   chr1  925922  926013   +    1
## 601                    protein_coding   chr1  925942  926013   +    1
## 602                    protein_coding   chr1  925942  925944   +    1
## 603                    protein_coding   chr1  930155  930336   +    1
## 604                    protein_coding   chr1  930155  930336   +    1
## 605                    protein_coding   chr1  931039  931089   +    1
## 606                    protein_coding   chr1  931039  931089   +    1
## 607                    protein_coding   chr1  935772  935896   +    1
## 608                    protein_coding   chr1  935772  935896   +    1
## 609                    protein_coding   chr1  939040  939129   +    1
## 610                    protein_coding   chr1  939040  939129   +    1
## 611                    protein_coding   chr1  941144  941306   +    1
## 612                    protein_coding   chr1  941144  941306   +    1
## 613                    protein_coding   chr1  942136  942251   +    1
## 614                    protein_coding   chr1  942136  942251   +    1
## 615                    protein_coding   chr1  942410  942488   +    1
## 616                    protein_coding   chr1  942410  942488   +    1
## 617                    protein_coding   chr1  942559  943058   +    1
## 618                    protein_coding   chr1  942559  943058   +    1
## 619                    protein_coding   chr1  943253  943377   +    1
## 620                    protein_coding   chr1  943253  943377   +    1
## 621                    protein_coding   chr1  943698  943808   +    1
## 622                    protein_coding   chr1  943698  943808   +    1
## 623                    protein_coding   chr1  943908  944581   +    1
## 624                    protein_coding   chr1  943908  944150   +    1
## 625                    protein_coding   chr1  944151  944153   +    1
## 626                    protein_coding   chr1  925741  925800   +    1
## 627                    protein_coding   chr1  925922  925941   +    1
## 628                    protein_coding   chr1  944151  944581   +    1
## 629                    protein_coding   chr1  925741  944581   +    1
## 630                    protein_coding   chr1  925741  925800   +    1
## 631                    protein_coding   chr1  925922  926013   +    1
## 632                    protein_coding   chr1  925942  926013   +    1
## 633                    protein_coding   chr1  925942  925944   +    1
## 634                    protein_coding   chr1  930155  930336   +    1
## 635                    protein_coding   chr1  930155  930336   +    1
## 636                    protein_coding   chr1  931039  931089   +    1
## 637                    protein_coding   chr1  931039  931089   +    1
```

211

```
## 638                        protein_coding   chr1   935772   935896   +   1
## 639                        protein_coding   chr1   935772   935896   +   1
## 640                        protein_coding   chr1   939040   939129   +   1
## 641                        protein_coding   chr1   939040   939129   +   1
## 642                        protein_coding   chr1   939272   939412   +   1
## 643                        protein_coding   chr1   939272   939412   +   1
## 644                        protein_coding   chr1   942410   942488   +   1
## 645                        protein_coding   chr1   942410   942488   +   1
## 646                        protein_coding   chr1   942559   943058   +   1
## 647                        protein_coding   chr1   942559   943058   +   1
## 648                        protein_coding   chr1   943253   943377   +   1
## 649                        protein_coding   chr1   943253   943377   +   1
## 650                        protein_coding   chr1   943698   943808   +   1
## 651                        protein_coding   chr1   943698   943808   +   1
## 652                        protein_coding   chr1   943908   944581   +   1
## 653                        protein_coding   chr1   943908   944150   +   1
## 654                        protein_coding   chr1   944151   944153   +   1
## 655                        protein_coding   chr1   925741   925800   +   1
## 656                        protein_coding   chr1   925922   925941   +   1
## 657                        protein_coding   chr1   944151   944581   +   1
## 658                        protein_coding   chr1   925741   944581   +   1
## 659                        protein_coding   chr1   925741   925800   +   1
## 660                        protein_coding   chr1   925922   926013   +   1
## 661                        protein_coding   chr1   925942   926013   +   1
## 662                        protein_coding   chr1   925942   925944   +   1
## 663                        protein_coding   chr1   930155   930336   +   1
## 664                        protein_coding   chr1   930155   930336   +   1
## 665                        protein_coding   chr1   931039   931089   +   1
## 666                        protein_coding   chr1   931039   931089   +   1
## 667                        protein_coding   chr1   942410   942488   +   1
## 668                        protein_coding   chr1   942410   942488   +   1
## 669                        protein_coding   chr1   942559   943058   +   1
## 670                        protein_coding   chr1   942559   942852   +   1
## 671                        protein_coding   chr1   942853   942855   +   1
## 672                        protein_coding   chr1   943253   943377   +   1
## 673                        protein_coding   chr1   943698   943808   +   1
## 674                        protein_coding   chr1   943908   944581   +   1
## 675                        protein_coding   chr1   925741   925800   +   1
## 676                        protein_coding   chr1   925922   925941   +   1
## 677                        protein_coding   chr1   942853   943058   +   1
## 678                        protein_coding   chr1   943253   943377   +   1
## 679                        protein_coding   chr1   943698   943808   +   1
## 680                        protein_coding   chr1   943908   944581   +   1
## 681                        protein_coding   chr1   925741   944581   +   1
## 682                        protein_coding   chr1   925741   925800   +   1
## 683                        protein_coding   chr1   925922   926013   +   1
## 684                        protein_coding   chr1   925942   926013   +   1
## 685                        protein_coding   chr1   925942   925944   +   1
## 686                        protein_coding   chr1   930155   930336   +   1
## 687                        protein_coding   chr1   930155   930336   +   1
## 688                        protein_coding   chr1   931039   931089   +   1
## 689                        protein_coding   chr1   931039   931089   +   1
## 690                        protein_coding   chr1   935772   935896   +   1
## 691                        protein_coding   chr1   935772   935896   +   1
```

```
## 692                    protein_coding  chr1 939040 939129  +    1
## 693                    protein_coding  chr1 939040 939129  +    1
## 694                    protein_coding  chr1 939275 939412  +    1
## 695                    protein_coding  chr1 939275 939412  +    1
## 696                    protein_coding  chr1 941144 941230  +    1
## 697                    protein_coding  chr1 941144 941230  +    1
## 698                    protein_coding  chr1 942410 942488  +    1
## 699                    protein_coding  chr1 942410 942488  +    1
## 700                    protein_coding  chr1 942559 943058  +    1
## 701                    protein_coding  chr1 942559 943058  +    1
## 702                    protein_coding  chr1 943253 943377  +    1
## 703                    protein_coding  chr1 943253 943377  +    1
## 704                    protein_coding  chr1 943698 943808  +    1
## 705                    protein_coding  chr1 943698 943808  +    1
## 706                    protein_coding  chr1 943908 944581  +    1
## 707                    protein_coding  chr1 943908 944150  +    1
## 708                    protein_coding  chr1 944151 944153  +    1
## 709                    protein_coding  chr1 925741 925800  +    1
## 710                    protein_coding  chr1 925922 925941  +    1
## 711                    protein_coding  chr1 944151 944581  +    1
## 712                    protein_coding  chr1 944203 959309  -    1
## 713                    protein_coding  chr1 944203 959256  -    1
## 714                    protein_coding  chr1 959215 959256  -    1
## 715                    protein_coding  chr1 959215 959240  -    1
## 716                    protein_coding  chr1 959238 959240  -    1
## 717                    protein_coding  chr1 958929 959081  -    1
## 718                    protein_coding  chr1 958929 959081  -    1
## 719                    protein_coding  chr1 957099 957273  -    1
## 720                    protein_coding  chr1 957099 957273  -    1
## 721                    protein_coding  chr1 956894 957025  -    1
## 722                    protein_coding  chr1 956894 957025  -    1
## 723                    protein_coding  chr1 956095 956215  -    1
## 724                    protein_coding  chr1 956095 956215  -    1
## 725                    protein_coding  chr1 955923 956013  -    1
## 726                    protein_coding  chr1 955923 956013  -    1
## 727                    protein_coding  chr1 954004 954082  -    1
## 728                    protein_coding  chr1 954004 954082  -    1
## 729                    protein_coding  chr1 953782 953892  -    1
## 730                    protein_coding  chr1 953782 953892  -    1
## 731                    protein_coding  chr1 953175 953288  -    1
## 732                    protein_coding  chr1 953175 953288  -    1
## 733                    protein_coding  chr1 952412 952600  -    1
## 734                    protein_coding  chr1 952412 952600  -    1
## 735                    protein_coding  chr1 952000 952139  -    1
## 736                    protein_coding  chr1 952000 952139  -    1
## 737                    protein_coding  chr1 951127 951238  -    1
## 738                    protein_coding  chr1 951127 951238  -    1
## 739                    protein_coding  chr1 948490 948603  -    1
## 740                    protein_coding  chr1 948490 948603  -    1
## 741                    protein_coding  chr1 948131 948232  -    1
## 742                    protein_coding  chr1 948131 948232  -    1
## 743                    protein_coding  chr1 946402 946545  -    1
## 744                    protein_coding  chr1 946402 946545  -    1
## 745                    protein_coding  chr1 946173 946286  -    1
```

```
## 746                    protein_coding   chr1  946173  946286    -    1
## 747                    protein_coding   chr1  945518  945653    -    1
## 748                    protein_coding   chr1  945518  945653    -    1
## 749                    protein_coding   chr1  945057  945146    -    1
## 750                    protein_coding   chr1  945057  945146    -    1
## 751                    protein_coding   chr1  944203  944800    -    1
## 752                    protein_coding   chr1  944697  944800    -    1
## 753                    protein_coding   chr1  944694  944696    -    1
## 754                    protein_coding   chr1  959241  959256    -    1
## 755                    protein_coding   chr1  944203  944696    -    1
## 756                    protein_coding   chr1  960584  965719    +    1
## 757                    protein_coding   chr1  960584  965719    +    1
## 758                    protein_coding   chr1  960584  960800    +    1
## 759                    protein_coding   chr1  960694  960800    +    1
## 760                    protein_coding   chr1  960694  960696    +    1
## 761                    protein_coding   chr1  961293  961552    +    1
## 762                    protein_coding   chr1  961293  961552    +    1
## 763                    protein_coding   chr1  961629  961750    +    1
## 764                    protein_coding   chr1  961629  961750    +    1
## 765                    protein_coding   chr1  961826  962047    +    1
## 766                    protein_coding   chr1  961826  962047    +    1
## 767                    protein_coding   chr1  962355  962471    +    1
## 768                    protein_coding   chr1  962355  962471    +    1
## 769                    protein_coding   chr1  962704  962917    +    1
## 770                    protein_coding   chr1  962704  962917    +    1
## 771                    protein_coding   chr1  963109  963253    +    1
## 772                    protein_coding   chr1  963109  963253    +    1
## 773                    protein_coding   chr1  963337  963504    +    1
## 774                    protein_coding   chr1  963337  963504    +    1
## 775                    protein_coding   chr1  963920  964008    +    1
## 776                    protein_coding   chr1  963920  964008    +    1
## 777                    protein_coding   chr1  964107  964180    +    1
## 778                    protein_coding   chr1  964107  964180    +    1
## 779                    protein_coding   chr1  964349  964530    +    1
## 780                    protein_coding   chr1  964349  964530    +    1
## 781                    protein_coding   chr1  964963  965719    +    1
## 782                    protein_coding   chr1  964963  965188    +    1
## 783                    protein_coding   chr1  965189  965191    +    1
## 784                    protein_coding   chr1  960584  960693    +    1
## 785                    protein_coding   chr1  965189  965719    +    1
## 786                    protein_coding   chr1  960639  965602    +    1
## 787                    protein_coding   chr1  960639  960699    +    1
## 788                    protein_coding   chr1  962082  962471    +    1
## 789                    protein_coding   chr1  962704  962917    +    1
## 790                    protein_coding   chr1  962707  962917    +    1
## 791                    protein_coding   chr1  962707  962709    +    1
## 792                    protein_coding   chr1  963109  963253    +    1
## 793                    protein_coding   chr1  963109  963253    +    1
## 794                    protein_coding   chr1  963337  963504    +    1
## 795                    protein_coding   chr1  963337  963504    +    1
## 796                    protein_coding   chr1  963920  964008    +    1
## 797                    protein_coding   chr1  963920  964008    +    1
## 798                    protein_coding   chr1  964107  964167    +    1
## 799                    protein_coding   chr1  964107  964167    +    1
```

```
## 800                         protein_coding    chr1   964349   964530      +      1
## 801                         protein_coding    chr1   964349   964349      +      1
## 802                         protein_coding    chr1   964350   964352      +      1
## 803                         protein_coding    chr1   964963   965602      +      1
## 804                         protein_coding    chr1   960639   960699      +      1
## 805                         protein_coding    chr1   962082   962471      +      1
## 806                         protein_coding    chr1   962704   962706      +      1
## 807                         protein_coding    chr1   964350   964530      +      1
## 808                         protein_coding    chr1   964963   965602      +      1
## 809                         protein_coding    chr1   966497   975865      +      1
## 810                         protein_coding    chr1   966497   975108      +      1
## 811                         protein_coding    chr1   966497   966614      +      1
## 812                         protein_coding    chr1   966532   966614      +      1
## 813                         protein_coding    chr1   966532   966534      +      1
## 814                         protein_coding    chr1   966704   966803      +      1
## 815                         protein_coding    chr1   966704   966803      +      1
## 816                         protein_coding    chr1   970277   970423      +      1
## 817                         protein_coding    chr1   970277   970423      +      1
## 818                         protein_coding    chr1   970521   970601      +      1
## 819                         protein_coding    chr1   970521   970601      +      1
## 820                         protein_coding    chr1   970686   970758      +      1
## 821                         protein_coding    chr1   970686   970758      +      1
## 822                         protein_coding    chr1   970879   971006      +      1
## 823                         protein_coding    chr1   970879   971006      +      1
## 824                         protein_coding    chr1   971113   971208      +      1
## 825                         protein_coding    chr1   971113   971208      +      1
## 826                         protein_coding    chr1   971324   971404      +      1
## 827                         protein_coding    chr1   971324   971404      +      1
## 828                         protein_coding    chr1   972075   972150      +      1
## 829                         protein_coding    chr1   972075   972150      +      1
## 830                         protein_coding    chr1   972288   972424      +      1
## 831                         protein_coding    chr1   972288   972424      +      1
## 832                         protein_coding    chr1   972861   973010      +      1
## 833                         protein_coding    chr1   972861   973010      +      1
## 834                         protein_coding    chr1   973186   973326      +      1
## 835                         protein_coding    chr1   973186   973326      +      1
## 836                         protein_coding    chr1   973500   973640      +      1
## 837                         protein_coding    chr1   973500   973640      +      1
## 838                         protein_coding    chr1   973833   974051      +      1
## 839                         protein_coding    chr1   973833   974051      +      1
## 840                         protein_coding    chr1   974316   974364      +      1
## 841                         protein_coding    chr1   974316   974364      +      1
## 842                         protein_coding    chr1   974442   975108      +      1
## 843                         protein_coding    chr1   974442   974572      +      1
## 844                         protein_coding    chr1   974573   974575      +      1
## 845                         protein_coding    chr1   966497   966531      +      1
## 846                         protein_coding    chr1   974573   975108      +      1
## 847                         protein_coding    chr1   966502   975008      +      1
## 848                         protein_coding    chr1   966502   966614      +      1
## 849                         protein_coding    chr1   966532   966614      +      1
## 850                         protein_coding    chr1   966532   966534      +      1
## 851                         protein_coding    chr1   966704   966803      +      1
## 852                         protein_coding    chr1   966704   966803      +      1
## 853                         protein_coding    chr1   970277   970423      +      1
```

```
## 854                    protein_coding   chr1  970277  970423   +    1
## 855                    protein_coding   chr1  970521  970601   +    1
## 856                    protein_coding   chr1  970521  970601   +    1
## 857                    protein_coding   chr1  970686  971006   +    1
## 858                    protein_coding   chr1  970686  971006   +    1
## 859                    protein_coding   chr1  971077  971208   +    1
## 860                    protein_coding   chr1  971077  971208   +    1
## 861                    protein_coding   chr1  971324  971404   +    1
## 862                    protein_coding   chr1  971324  971404   +    1
## 863                    protein_coding   chr1  972075  972150   +    1
## 864                    protein_coding   chr1  972075  972150   +    1
## 865                    protein_coding   chr1  972288  972424   +    1
## 866                    protein_coding   chr1  972288  972424   +    1
## 867                    protein_coding   chr1  972861  973010   +    1
## 868                    protein_coding   chr1  972861  973010   +    1
## 869                    protein_coding   chr1  973186  973326   +    1
## 870                    protein_coding   chr1  973186  973326   +    1
## 871                    protein_coding   chr1  973500  973640   +    1
## 872                    protein_coding   chr1  973500  973640   +    1
## 873                    protein_coding   chr1  973833  974051   +    1
## 874                    protein_coding   chr1  973833  974051   +    1
## 875                    protein_coding   chr1  974316  974364   +    1
## 876                    protein_coding   chr1  974316  974364   +    1
## 877                    protein_coding   chr1  974442  975008   +    1
## 878                    protein_coding   chr1  974442  974572   +    1
## 879                    protein_coding   chr1  974573  974575   +    1
## 880                    protein_coding   chr1  966502  966531   +    1
## 881                    protein_coding   chr1  974573  975008   +    1
## 882                    protein_coding   chr1  966502  975008   +    1
## 883                    protein_coding   chr1  966502  966614   +    1
## 884                    protein_coding   chr1  966532  966614   +    1
## 885                    protein_coding   chr1  966532  966534   +    1
## 886                    protein_coding   chr1  966704  966803   +    1
## 887                    protein_coding   chr1  966704  966803   +    1
## 888                    protein_coding   chr1  970277  970423   +    1
## 889                    protein_coding   chr1  970277  970423   +    1
## 890                    protein_coding   chr1  970521  970601   +    1
## 891                    protein_coding   chr1  970521  970601   +    1
## 892                    protein_coding   chr1  970686  970758   +    1
## 893                    protein_coding   chr1  970686  970758   +    1
## 894                    protein_coding   chr1  970879  971006   +    1
## 895                    protein_coding   chr1  970879  971006   +    1
## 896                    protein_coding   chr1  971077  971208   +    1
## 897                    protein_coding   chr1  971077  971208   +    1
## 898                    protein_coding   chr1  971324  971404   +    1
## 899                    protein_coding   chr1  971324  971404   +    1
## 900                    protein_coding   chr1  972075  972150   +    1
## 901                    protein_coding   chr1  972075  972150   +    1
## 902                    protein_coding   chr1  972288  972424   +    1
## 903                    protein_coding   chr1  972288  972424   +    1
## 904                    protein_coding   chr1  972861  973010   +    1
## 905                    protein_coding   chr1  972861  973010   +    1
## 906                    protein_coding   chr1  973500  973640   +    1
## 907                    protein_coding   chr1  973500  973640   +    1
```

216

```
## 908                      protein_coding   chr1  973833  974051    +    1
## 909                      protein_coding   chr1  973833  974051    +    1
## 910                      protein_coding   chr1  974316  974364    +    1
## 911                      protein_coding   chr1  974316  974364    +    1
## 912                      protein_coding   chr1  974442  975008    +    1
## 913                      protein_coding   chr1  974442  974572    +    1
## 914                      protein_coding   chr1  974573  974575    +    1
## 915                      protein_coding   chr1  966502  966531    +    1
## 916                      protein_coding   chr1  974573  975008    +    1
## 917                      protein_coding   chr1  975204  982093    -    1
## 918                      protein_coding   chr1  975204  982093    -    1
## 919                      protein_coding   chr1  982065  982093    -    1
## 920                      protein_coding   chr1  981137  981173    -    1
## 921                      protein_coding   chr1  981137  981166    -    1
## 922                      protein_coding   chr1  981164  981166    -    1
## 923                      protein_coding   chr1  978881  980657    -    1
## 924                      protein_coding   chr1  978881  980657    -    1
## 925                      protein_coding   chr1  976499  976624    -    1
## 926                      protein_coding   chr1  976499  976624    -    1
## 927                      protein_coding   chr1  975204  976269    -    1
## 928                      protein_coding   chr1  976175  976269    -    1
## 929                      protein_coding   chr1  976172  976174    -    1
## 930                      protein_coding   chr1  982065  982093    -    1
## 931                      protein_coding   chr1  981167  981173    -    1
## 932                      protein_coding   chr1  975204  976174    -    1
## 933                      protein_coding   chr1  975205  981029    -    1
## 934                      protein_coding   chr1  978881  981029    -    1
## 935                      protein_coding   chr1  978881  981029    -    1
## 936                      protein_coding   chr1  981027  981029    -    1
## 937                      protein_coding   chr1  976499  976624    -    1
## 938                      protein_coding   chr1  976499  976624    -    1
## 939                      protein_coding   chr1  975205  976269    -    1
## 940                      protein_coding   chr1  976175  976269    -    1
## 941                      protein_coding   chr1  976172  976174    -    1
## 942                      protein_coding   chr1  975205  976174    -    1
## 943                              lncRNA   chr1  995966  998051    -    0
## 944                              lncRNA   chr1  995966  998051    -    0
## 945                              lncRNA   chr1  995966  998051    -    0
## 946                      protein_coding   chr1  998962 1000172    -    1
## 947                      protein_coding   chr1  998962 1000172    -    1
## 948                      protein_coding   chr1  999692 1000172    -    1
## 949                      protein_coding   chr1  999692  999973    -    1
## 950                      protein_coding   chr1  999971  999973    -    1
## 951                      protein_coding   chr1  999526  999613    -    1
## 952                      protein_coding   chr1  999526  999613    -    1
## 953                      protein_coding   chr1  998962  999432    -    1
## 954                      protein_coding   chr1  999062  999432    -    1
## 955                      protein_coding   chr1  999059  999061    -    1
## 956                      protein_coding   chr1  999974 1000172    -    1
## 957                      protein_coding   chr1  998962  999061    -    1
## 958                      protein_coding   chr1  998964 1000111    -    1
## 959                      protein_coding   chr1  999866 1000111    -    1
## 960                      protein_coding   chr1  999866  999973    -    1
## 961                      protein_coding   chr1  999971  999973    -    1
```

217

```
## 962               protein_coding chr1  999692  999787      -    1
## 963               protein_coding chr1  999692  999787      -    1
## 964               protein_coding chr1  999526  999613      -    1
## 965               protein_coding chr1  999526  999613      -    1
## 966               protein_coding chr1  998964  999432      -    1
## 967               protein_coding chr1  999062  999432      -    1
## 968               protein_coding chr1  999059  999061      -    1
## 969               protein_coding chr1  999974 1000111      -    1
## 970               protein_coding chr1  998964  999061      -    1
## 971               protein_coding chr1  998970  999981      -    1
## 972               protein_coding chr1  999866  999981      -    1
## 973               protein_coding chr1  999866  999973      -    1
## 974               protein_coding chr1  999971  999973      -    1
## 975               protein_coding chr1  999526  999613      -    1
## 976               protein_coding chr1  999526  999613      -    1
## 977               protein_coding chr1  998970  999432      -    1
## 978               protein_coding chr1  999062  999432      -    1
## 979               protein_coding chr1  999059  999061      -    1
## 980               protein_coding chr1  999974  999981      -    1
## 981               protein_coding chr1  998970  999061      -    1
## 982               protein_coding chr1 1001138 1014540      +    1
## 983               protein_coding chr1 1001138 1014540      +    1
## 984               protein_coding chr1 1001138 1001281      +    1
## 985               protein_coding chr1 1008194 1008279      +    1
## 986               protein_coding chr1 1013984 1014540      +    1
## 987               protein_coding chr1 1014005 1014475      +    1
## 988               protein_coding chr1 1014005 1014007      +    1
## 989               protein_coding chr1 1014476 1014478      +    1
## 990               protein_coding chr1 1001138 1001281      +    1
## 991               protein_coding chr1 1008194 1008279      +    1
## 992               protein_coding chr1 1013984 1014004      +    1
## 993               protein_coding chr1 1014476 1014540      +    1
## 994               protein_coding chr1 1013497 1014540      +    1
## 995               protein_coding chr1 1013497 1013576      +    1
## 996               protein_coding chr1 1013574 1013576      +    1
## 997               protein_coding chr1 1013574 1013576      +    1
## 998               protein_coding chr1 1013984 1014540      +    1
## 999               protein_coding chr1 1013984 1014475      +    1
## 1000              protein_coding chr1 1014476 1014478      +    1
## 1001              protein_coding chr1 1013497 1013573      +    1
## 1002              protein_coding chr1 1014476 1014540      +    1
## 1003         processed_pseudogene chr1 1008076 1008229      -    0
## 1004         processed_pseudogene chr1 1008076 1008229      -    0
## 1005         processed_pseudogene chr1 1008076 1008229      -    0
## 1006                       lncRNA chr1 1011997 1013193      -    0
## 1007                       lncRNA chr1 1011997 1013193      -    0
## 1008                       lncRNA chr1 1012917 1013193      -    0
## 1009                       lncRNA chr1 1011997 1012190      -    0
## 1010              protein_coding chr1 1020120 1056118      +    1
## 1011              protein_coding chr1 1020120 1056116      +    1
## 1012              protein_coding chr1 1020120 1020373      +    1
## 1013              protein_coding chr1 1020173 1020373      +    1
## 1014              protein_coding chr1 1020173 1020175      +    1
## 1015              protein_coding chr1 1022201 1022462      +    1
```

```
## 1016                         protein_coding     chr1 1022201 1022462      +        1
## 1017                         protein_coding     chr1 1035277 1035324      +        1
## 1018                         protein_coding     chr1 1035277 1035324      +        1
## 1019                         protein_coding     chr1 1040665 1040880      +        1
## 1020                         protein_coding     chr1 1040665 1040880      +        1
## 1021                         protein_coding     chr1 1041173 1041397      +        1
## 1022                         protein_coding     chr1 1041173 1041397      +        1
## 1023                         protein_coding     chr1 1041478 1041702      +        1
## 1024                         protein_coding     chr1 1041478 1041702      +        1
## 1025                         protein_coding     chr1 1041956 1042162      +        1
## 1026                         protein_coding     chr1 1041956 1042162      +        1
## 1027                         protein_coding     chr1 1043239 1043457      +        1
## 1028                         protein_coding     chr1 1043239 1043457      +        1
## 1029                         protein_coding     chr1 1043538 1043732      +        1
## 1030                         protein_coding     chr1 1043538 1043732      +        1
## 1031                         protein_coding     chr1 1043823 1044023      +        1
## 1032                         protein_coding     chr1 1043823 1044023      +        1
## 1033                         protein_coding     chr1 1044109 1044257      +        1
## 1034                         protein_coding     chr1 1044109 1044257      +        1
## 1035                         protein_coding     chr1 1044334 1044439      +        1
## 1036                         protein_coding     chr1 1044334 1044439      +        1
## 1037                         protein_coding     chr1 1045161 1045277      +        1
## 1038                         protein_coding     chr1 1045161 1045277      +        1
## 1039                         protein_coding     chr1 1045359 1045523      +        1
## 1040                         protein_coding     chr1 1045359 1045523      +        1
## 1041                         protein_coding     chr1 1045733 1045876      +        1
## 1042                         protein_coding     chr1 1045733 1045876      +        1
## 1043                         protein_coding     chr1 1045964 1046088      +        1
## 1044                         protein_coding     chr1 1045964 1046088      +        1
## 1045                         protein_coding     chr1 1046160 1046265      +        1
## 1046                         protein_coding     chr1 1046160 1046265      +        1
## 1047                         protein_coding     chr1 1046397 1046735      +        1
## 1048                         protein_coding     chr1 1046397 1046735      +        1
## 1049                         protein_coding     chr1 1046820 1046957      +        1
## 1050                         protein_coding     chr1 1046820 1046957      +        1
## 1051                         protein_coding     chr1 1047327 1047454      +        1
## 1052                         protein_coding     chr1 1047327 1047454      +        1
## 1053                         protein_coding     chr1 1047573 1047687      +        1
## 1054                         protein_coding     chr1 1047573 1047687      +        1
## 1055                         protein_coding     chr1 1047776 1047895      +        1
## 1056                         protein_coding     chr1 1047776 1047895      +        1
## 1057                         protein_coding     chr1 1048012 1048365      +        1
## 1058                         protein_coding     chr1 1048012 1048365      +        1
## 1059                         protein_coding     chr1 1048867 1049059      +        1
## 1060                         protein_coding     chr1 1048867 1049059      +        1
## 1061                         protein_coding     chr1 1049236 1049451      +        1
## 1062                         protein_coding     chr1 1049236 1049451      +        1
## 1063                         protein_coding     chr1 1049566 1049795      +        1
## 1064                         protein_coding     chr1 1049566 1049795      +        1
## 1065                         protein_coding     chr1 1049903 1050037      +        1
## 1066                         protein_coding     chr1 1049903 1050037      +        1
## 1067                         protein_coding     chr1 1050233 1050329      +        1
## 1068                         protein_coding     chr1 1050233 1050329      +        1
## 1069                         protein_coding     chr1 1050427 1050591      +        1
```

```
## 1070                    protein_coding    chr1 1050427 1050591    +    1
## 1071                    protein_coding    chr1 1050726 1050837    +    1
## 1072                    protein_coding    chr1 1050726 1050837    +    1
## 1073                    protein_coding    chr1 1051253 1051369    +    1
## 1074                    protein_coding    chr1 1051253 1051369    +    1
## 1075                    protein_coding    chr1 1051453 1051645    +    1
## 1076                    protein_coding    chr1 1051453 1051645    +    1
## 1077                    protein_coding    chr1 1051728 1051815    +    1
## 1078                    protein_coding    chr1 1051728 1051815    +    1
## 1079                    protein_coding    chr1 1053753 1053977    +    1
## 1080                    protein_coding    chr1 1053753 1053977    +    1
## 1081                    protein_coding    chr1 1054448 1054551    +    1
## 1082                    protein_coding    chr1 1054448 1054551    +    1
## 1083                    protein_coding    chr1 1054824 1056116    +    1
## 1084                    protein_coding    chr1 1054824 1054978    +    1
## 1085                    protein_coding    chr1 1054979 1054981    +    1
## 1086                    protein_coding    chr1 1020120 1020172    +    1
## 1087                    protein_coding    chr1 1054979 1056116    +    1
## 1088                    protein_coding    chr1 1020123 1056118    +    1
## 1089                    protein_coding    chr1 1020123 1020373    +    1
## 1090                    protein_coding    chr1 1022201 1022462    +    1
## 1091                    protein_coding    chr1 1022414 1022462    +    1
## 1092                    protein_coding    chr1 1022414 1022416    +    1
## 1093                    protein_coding    chr1 1035277 1035324    +    1
## 1094                    protein_coding    chr1 1035277 1035324    +    1
## 1095                    protein_coding    chr1 1040665 1040880    +    1
## 1096                    protein_coding    chr1 1040665 1040880    +    1
## 1097                    protein_coding    chr1 1041173 1041397    +    1
## 1098                    protein_coding    chr1 1041173 1041397    +    1
## 1099                    protein_coding    chr1 1041478 1041702    +    1
## 1100                    protein_coding    chr1 1041478 1041702    +    1
## 1101                    protein_coding    chr1 1041956 1042162    +    1
## 1102                    protein_coding    chr1 1041956 1042162    +    1
## 1103                    protein_coding    chr1 1043239 1043457    +    1
## 1104                    protein_coding    chr1 1043239 1043457    +    1
## 1105                    protein_coding    chr1 1043538 1043732    +    1
## 1106                    protein_coding    chr1 1043538 1043732    +    1
## 1107                    protein_coding    chr1 1043823 1044023    +    1
## 1108                    protein_coding    chr1 1043823 1044023    +    1
## 1109                    protein_coding    chr1 1044109 1044257    +    1
## 1110                    protein_coding    chr1 1044109 1044257    +    1
## 1111                    protein_coding    chr1 1044334 1044439    +    1
## 1112                    protein_coding    chr1 1044334 1044439    +    1
## 1113                    protein_coding    chr1 1045161 1045277    +    1
## 1114                    protein_coding    chr1 1045161 1045277    +    1
## 1115                    protein_coding    chr1 1045359 1045523    +    1
## 1116                    protein_coding    chr1 1045359 1045523    +    1
## 1117                    protein_coding    chr1 1045733 1045876    +    1
## 1118                    protein_coding    chr1 1045733 1045876    +    1
## 1119                    protein_coding    chr1 1045964 1046088    +    1
## 1120                    protein_coding    chr1 1045964 1046088    +    1
## 1121                    protein_coding    chr1 1046160 1046265    +    1
## 1122                    protein_coding    chr1 1046160 1046265    +    1
## 1123                    protein_coding    chr1 1046397 1046735    +    1
```

```
## 1124                               protein_coding   chr1 1046397 1046735      +         1
## 1125                               protein_coding   chr1 1046820 1046957      +         1
## 1126                               protein_coding   chr1 1046820 1046957      +         1
## 1127                               protein_coding   chr1 1047327 1047454      +         1
## 1128                               protein_coding   chr1 1047327 1047454      +         1
## 1129                               protein_coding   chr1 1047573 1047687      +         1
## 1130                               protein_coding   chr1 1047573 1047687      +         1
## 1131                               protein_coding   chr1 1047776 1047895      +         1
## 1132                               protein_coding   chr1 1047776 1047895      +         1
## 1133                               protein_coding   chr1 1048012 1048365      +         1
## 1134                               protein_coding   chr1 1048012 1048365      +         1
## 1135                               protein_coding   chr1 1048867 1049059      +         1
## 1136                               protein_coding   chr1 1048867 1049059      +         1
## 1137                               protein_coding   chr1 1049236 1049451      +         1
## 1138                               protein_coding   chr1 1049236 1049451      +         1
## 1139                               protein_coding   chr1 1049566 1049795      +         1
## 1140                               protein_coding   chr1 1049566 1049795      +         1
## 1141                               protein_coding   chr1 1049903 1050037      +         1
## 1142                               protein_coding   chr1 1049903 1050037      +         1
## 1143                               protein_coding   chr1 1050233 1050329      +         1
## 1144                               protein_coding   chr1 1050233 1050329      +         1
## 1145                               protein_coding   chr1 1050427 1050591      +         1
## 1146                               protein_coding   chr1 1050427 1050591      +         1
## 1147                               protein_coding   chr1 1050726 1050837      +         1
## 1148                               protein_coding   chr1 1050726 1050837      +         1
## 1149                               protein_coding   chr1 1051032 1051043      +         1
## 1150                               protein_coding   chr1 1051032 1051043      +         1
## 1151                               protein_coding   chr1 1051253 1051369      +         1
## 1152                               protein_coding   chr1 1051253 1051369      +         1
## 1153                               protein_coding   chr1 1051453 1051645      +         1
## 1154                               protein_coding   chr1 1051453 1051645      +         1
## 1155                               protein_coding   chr1 1051728 1051815      +         1
## 1156                               protein_coding   chr1 1051728 1051815      +         1
## 1157                               protein_coding   chr1 1051993 1052016      +         1
## 1158                               protein_coding   chr1 1051993 1052016      +         1
## 1159                               protein_coding   chr1 1053461 1053493      +         1
## 1160                               protein_coding   chr1 1053461 1053493      +         1
## 1161                               protein_coding   chr1 1053753 1053977      +         1
## 1162                               protein_coding   chr1 1053753 1053977      +         1
## 1163                               protein_coding   chr1 1054448 1054551      +         1
## 1164                               protein_coding   chr1 1054448 1054551      +         1
## 1165                               protein_coding   chr1 1054824 1056118      +         1
## 1166                               protein_coding   chr1 1054824 1054978      +         1
## 1167                               protein_coding   chr1 1054979 1054981      +         1
## 1168                               protein_coding   chr1 1020123 1020373      +         1
## 1169                               protein_coding   chr1 1022201 1022413      +         1
## 1170                               protein_coding   chr1 1054979 1056118      +         1
## 1171                                       lncRNA   chr1 1055033 1056116      +         0
## 1172                                       lncRNA   chr1 1055033 1056116      +         0
## 1173                                       lncRNA   chr1 1055033 1055215      +         0
## 1174                                       lncRNA   chr1 1055898 1056116      +         0
## 1175 transcribed_unprocessed_pseudogene   chr1 1059708 1069355      +         0
## 1176 transcribed_unprocessed_pseudogene   chr1 1059708 1066459      +         0
## 1177 transcribed_unprocessed_pseudogene   chr1 1059708 1059782      +         0
```

```
## 1178 transcribed_unprocessed_pseudogene    chr1 1060277 1060393    +    0
## 1179 transcribed_unprocessed_pseudogene    chr1 1061020 1061117    +    0
## 1180 transcribed_unprocessed_pseudogene    chr1 1063079 1063201    +    0
## 1181 transcribed_unprocessed_pseudogene    chr1 1065830 1066459    +    0
## 1182 transcribed_unprocessed_pseudogene    chr1 1063079 1069355    +    0
## 1183 transcribed_unprocessed_pseudogene    chr1 1063079 1063201    +    0
## 1184 transcribed_unprocessed_pseudogene    chr1 1063480 1063566    +    0
## 1185 transcribed_unprocessed_pseudogene    chr1 1064210 1064401    +    0
## 1186 transcribed_unprocessed_pseudogene    chr1 1064490 1064589    +    0
## 1187 transcribed_unprocessed_pseudogene    chr1 1065352 1065475    +    0
## 1188 transcribed_unprocessed_pseudogene    chr1 1066587 1066667    +    0
## 1189 transcribed_unprocessed_pseudogene    chr1 1067566 1067646    +    0
## 1190 transcribed_unprocessed_pseudogene    chr1 1067869 1068003    +    0
## 1191 transcribed_unprocessed_pseudogene    chr1 1068577 1068724    +    0
## 1192 transcribed_unprocessed_pseudogene    chr1 1069208 1069355    +    0
## 1193                             lncRNA    chr1 1062208 1063288    -    0
## 1194                             lncRNA    chr1 1062208 1063288    -    0
## 1195                             lncRNA    chr1 1063061 1063288    -    0
## 1196                             lncRNA    chr1 1062208 1062808    -    0
## 1197                     protein_coding    chr1 1070967 1074306    -    1
## 1198                     protein_coding    chr1 1070967 1074306    -    1
## 1199                     protein_coding    chr1 1074016 1074306    -    1
## 1200                     protein_coding    chr1 1070967 1072575    -    1
## 1201                     protein_coding    chr1 1071820 1072566    -    1
## 1202                     protein_coding    chr1 1072564 1072566    -    1
## 1203                     protein_coding    chr1 1071817 1071819    -    1
## 1204                     protein_coding    chr1 1074016 1074306    -    1
## 1205                     protein_coding    chr1 1070967 1071819    -    1
## 1206                     protein_coding    chr1 1072567 1072575    -    1
## 1207                     protein_coding    chr1 1081818 1116361    -    1
## 1208                     protein_coding    chr1 1081818 1116081    -    1
## 1209                     protein_coding    chr1 1116060 1116081    -    1
## 1210                     protein_coding    chr1 1115022 1115075    -    1
## 1211                     protein_coding    chr1 1091991 1092103    -    1
## 1212                     protein_coding    chr1 1091472 1091565    -    1
## 1213                     protein_coding    chr1 1091472 1091543    -    1
## 1214                     protein_coding    chr1 1091541 1091543    -    1
## 1215                     protein_coding    chr1 1090876 1090983    -    1
## 1216                     protein_coding    chr1 1090876 1090983    -    1
## 1217                     protein_coding    chr1 1090353 1090428    -    1
## 1218                     protein_coding    chr1 1090353 1090428    -    1
## 1219                     protein_coding    chr1 1087502 1087597    -    1
## 1220                     protein_coding    chr1 1087502 1087597    -    1
## 1221                     protein_coding    chr1 1087139 1087204    -    1
## 1222                     protein_coding    chr1 1087139 1087204    -    1
## 1223                     protein_coding    chr1 1085878 1086012    -    1
## 1224                     protein_coding    chr1 1085878 1086012    -    1
## 1225                     protein_coding    chr1 1084481 1084506    -    1
## 1226                     protein_coding    chr1 1084481 1084506    -    1
## 1227                     protein_coding    chr1 1083915 1084383    -    1
## 1228                     protein_coding    chr1 1083915 1084383    -    1
## 1229                     protein_coding    chr1 1081818 1082987    -    1
## 1230                     protein_coding    chr1 1082896 1082987    -    1
## 1231                     protein_coding    chr1 1082893 1082895    -    1
```

```
## 1232                 protein_coding   chr1 1116060 1116081   -    1
## 1233                 protein_coding   chr1 1115022 1115075   -    1
## 1234                 protein_coding   chr1 1091991 1092103   -    1
## 1235                 protein_coding   chr1 1091544 1091565   -    1
## 1236                 protein_coding   chr1 1081818 1082895   -    1
## 1237                 protein_coding   chr1 1081823 1116098   -    1
## 1238                 protein_coding   chr1 1116060 1116098   -    1
## 1239                 protein_coding   chr1 1091991 1092103   -    1
## 1240                 protein_coding   chr1 1091472 1091565   -    1
## 1241                 protein_coding   chr1 1091472 1091543   -    1
## 1242                 protein_coding   chr1 1091541 1091543   -    1
## 1243                 protein_coding   chr1 1090353 1090428   -    1
## 1244                 protein_coding   chr1 1090353 1090428   -    1
## 1245                 protein_coding   chr1 1087502 1087597   -    1
## 1246                 protein_coding   chr1 1087502 1087597   -    1
## 1247                 protein_coding   chr1 1087139 1087204   -    1
## 1248                 protein_coding   chr1 1087139 1087204   -    1
## 1249                 protein_coding   chr1 1085878 1086012   -    1
## 1250                 protein_coding   chr1 1085878 1086012   -    1
## 1251                 protein_coding   chr1 1084481 1084506   -    1
## 1252                 protein_coding   chr1 1084481 1084506   -    1
## 1253                 protein_coding   chr1 1084353 1084383   -    1
## 1254                 protein_coding   chr1 1084353 1084383   -    1
## 1255                 protein_coding   chr1 1081823 1082987   -    1
## 1256                 protein_coding   chr1 1082896 1082987   -    1
## 1257                 protein_coding   chr1 1082893 1082895   -    1
## 1258                 protein_coding   chr1 1116060 1116098   -    1
## 1259                 protein_coding   chr1 1091991 1092103   -    1
## 1260                 protein_coding   chr1 1091544 1091565   -    1
## 1261                 protein_coding   chr1 1081823 1082895   -    1
## 1262                 protein_coding   chr1 1082235 1092174   -    1
## 1263                 protein_coding   chr1 1091472 1092174   -    1
## 1264                 protein_coding   chr1 1091472 1091543   -    1
## 1265                 protein_coding   chr1 1091541 1091543   -    1
## 1266                 protein_coding   chr1 1090353 1090428   -    1
## 1267                 protein_coding   chr1 1090353 1090428   -    1
## 1268                 protein_coding   chr1 1087502 1087597   -    1
## 1269                 protein_coding   chr1 1087502 1087597   -    1
## 1270                 protein_coding   chr1 1087139 1087204   -    1
## 1271                 protein_coding   chr1 1087139 1087204   -    1
## 1272                 protein_coding   chr1 1085878 1086012   -    1
## 1273                 protein_coding   chr1 1085878 1086012   -    1
## 1274                 protein_coding   chr1 1084481 1084506   -    1
## 1275                 protein_coding   chr1 1084481 1084506   -    1
## 1276                 protein_coding   chr1 1083915 1084383   -    1
## 1277                 protein_coding   chr1 1083915 1084383   -    1
## 1278                 protein_coding   chr1 1082235 1082987   -    1
## 1279                 protein_coding   chr1 1082896 1082987   -    1
## 1280                 protein_coding   chr1 1082893 1082895   -    1
## 1281                 protein_coding   chr1 1091544 1092174   -    1
## 1282                 protein_coding   chr1 1082235 1082895   -    1
## 1283                 protein_coding   chr1 1082700 1106127   -    1
## 1284                 protein_coding   chr1 1105956 1106127   -    1
## 1285                 protein_coding   chr1 1091991 1092103   -    1
```

```
## 1286                   protein_coding   chr1 1091472 1091565       -       1
## 1287                   protein_coding   chr1 1091472 1091543       -       1
## 1288                   protein_coding   chr1 1091541 1091543       -       1
## 1289                   protein_coding   chr1 1090353 1090428       -       1
## 1290                   protein_coding   chr1 1090353 1090428       -       1
## 1291                   protein_coding   chr1 1087502 1087597       -       1
## 1292                   protein_coding   chr1 1087502 1087597       -       1
## 1293                   protein_coding   chr1 1087139 1087204       -       1
## 1294                   protein_coding   chr1 1087139 1087204       -       1
## 1295                   protein_coding   chr1 1085878 1086012       -       1
## 1296                   protein_coding   chr1 1085878 1086012       -       1
## 1297                   protein_coding   chr1 1084481 1084506       -       1
## 1298                   protein_coding   chr1 1084481 1084506       -       1
## 1299                   protein_coding   chr1 1084353 1084383       -       1
## 1300                   protein_coding   chr1 1084353 1084383       -       1
## 1301                   protein_coding   chr1 1082700 1082987       -       1
## 1302                   protein_coding   chr1 1082896 1082987       -       1
## 1303                   protein_coding   chr1 1082893 1082895       -       1
## 1304                   protein_coding   chr1 1105956 1106127       -       1
## 1305                   protein_coding   chr1 1091991 1092103       -       1
## 1306                   protein_coding   chr1 1091544 1091565       -       1
## 1307                   protein_coding   chr1 1082700 1082895       -       1
## 1308                           lncRNA   chr1 1097585 1104598       +       0
## 1309                           lncRNA   chr1 1097585 1104598       +       0
## 1310                           lncRNA   chr1 1097585 1098113       +       0
## 1311                           lncRNA   chr1 1104033 1104598       +       0
## 1312                           lncRNA   chr1 1137017 1144056       +       1
## 1313                           lncRNA   chr1 1137017 1144056       +       1
## 1314                           lncRNA   chr1 1137017 1137110       +       1
## 1315                           lncRNA   chr1 1140825 1141032       +       1
## 1316                           lncRNA   chr1 1142739 1144056       +       1
## 1317                            miRNA   chr1 1167104 1167198       +       1
## 1318                            miRNA   chr1 1167104 1167198       +       1
## 1319                            miRNA   chr1 1167104 1167198       +       1
## 1320                            miRNA   chr1 1167863 1167952       +       1
## 1321                            miRNA   chr1 1167863 1167952       +       1
## 1322                            miRNA   chr1 1167863 1167952       +       1
## 1323                            miRNA   chr1 1169005 1169087       +       1
## 1324                            miRNA   chr1 1169005 1169087       +       1
## 1325                            miRNA   chr1 1169005 1169087       +       1
## 1326                           lncRNA   chr1 1169357 1170343       +       0
## 1327                           lncRNA   chr1 1169357 1170343       +       0
## 1328                           lncRNA   chr1 1169357 1170343       +       0
## 1329                           lncRNA   chr1 1173056 1179555       -       1
## 1330                           lncRNA   chr1 1173056 1179555       -       1
## 1331                           lncRNA   chr1 1179365 1179555       -       1
## 1332                           lncRNA   chr1 1173056 1176396       -       1
## 1333                   protein_coding   chr1 1173884 1197935       +       1
## 1334                   protein_coding   chr1 1173903 1197935       +       1
## 1335                   protein_coding   chr1 1173903 1173926       +       1
## 1336                   protein_coding   chr1 1174266 1174321       +       1
## 1337                   protein_coding   chr1 1174424 1174489       +       1
## 1338                   protein_coding   chr1 1179189 1179333       +       1
## 1339                   protein_coding   chr1 1179216 1179333       +       1
```

```
## 1340                    protein_coding      chr1 1179216 1179218      +      1
## 1341                    protein_coding      chr1 1179657 1179737      +      1
## 1342                    protein_coding      chr1 1179657 1179737      +      1
## 1343                    protein_coding      chr1 1180034 1180340      +      1
## 1344                    protein_coding      chr1 1180034 1180340      +      1
## 1345                    protein_coding      chr1 1180483 1180601      +      1
## 1346                    protein_coding      chr1 1180483 1180601      +      1
## 1347                    protein_coding      chr1 1180731 1180860      +      1
## 1348                    protein_coding      chr1 1180731 1180860      +      1
## 1349                    protein_coding      chr1 1181741 1181815      +      1
## 1350                    protein_coding      chr1 1181741 1181815      +      1
## 1351                    protein_coding      chr1 1182361 1182446      +      1
## 1352                    protein_coding      chr1 1182361 1182446      +      1
## 1353                    protein_coding      chr1 1182876 1183047      +      1
## 1354                    protein_coding      chr1 1182876 1183047      +      1
## 1355                    protein_coding      chr1 1183920 1184091      +      1
## 1356                    protein_coding      chr1 1183920 1184091      +      1
## 1357                    protein_coding      chr1 1184969 1185109      +      1
## 1358                    protein_coding      chr1 1184969 1185109      +      1
## 1359                    protein_coding      chr1 1196600 1196716      +      1
## 1360                    protein_coding      chr1 1196600 1196716      +      1
## 1361                    protein_coding      chr1 1197093 1197186      +      1
## 1362                    protein_coding      chr1 1197093 1197186      +      1
## 1363                    protein_coding      chr1 1197438 1197935      +      1
## 1364                    protein_coding      chr1 1197438 1197844      +      1
## 1365                    protein_coding      chr1 1197845 1197847      +      1
## 1366                    protein_coding      chr1 1173903 1173926      +      1
## 1367                    protein_coding      chr1 1174266 1174321      +      1
## 1368                    protein_coding      chr1 1174424 1174489      +      1
## 1369                    protein_coding      chr1 1179189 1179215      +      1
## 1370                    protein_coding      chr1 1197845 1197935      +      1
## 1371                    protein_coding      chr1 1173906 1197933      +      1
## 1372                    protein_coding      chr1 1173906 1173926      +      1
## 1373                    protein_coding      chr1 1174285 1174321      +      1
## 1374                    protein_coding      chr1 1174424 1174489      +      1
## 1375                    protein_coding      chr1 1179189 1179333      +      1
## 1376                    protein_coding      chr1 1179216 1179333      +      1
## 1377                    protein_coding      chr1 1179216 1179218      +      1
## 1378                    protein_coding      chr1 1179657 1179737      +      1
## 1379                    protein_coding      chr1 1179657 1179737      +      1
## 1380                    protein_coding      chr1 1180034 1180340      +      1
## 1381                    protein_coding      chr1 1180034 1180340      +      1
## 1382                    protein_coding      chr1 1180483 1180601      +      1
## 1383                    protein_coding      chr1 1180483 1180601      +      1
## 1384                    protein_coding      chr1 1180731 1180860      +      1
## 1385                    protein_coding      chr1 1180731 1180860      +      1
## 1386                    protein_coding      chr1 1181741 1181815      +      1
## 1387                    protein_coding      chr1 1181741 1181815      +      1
## 1388                    protein_coding      chr1 1182361 1182446      +      1
## 1389                    protein_coding      chr1 1182361 1182446      +      1
## 1390                    protein_coding      chr1 1182876 1183047      +      1
## 1391                    protein_coding      chr1 1182876 1183047      +      1
## 1392                    protein_coding      chr1 1183920 1184091      +      1
## 1393                    protein_coding      chr1 1183920 1184091      +      1
```

```
## 1394                     protein_coding     chr1 1184969 1185109     +     1
## 1395                     protein_coding     chr1 1184969 1185109     +     1
## 1396                     protein_coding     chr1 1196600 1196716     +     1
## 1397                     protein_coding     chr1 1196600 1196716     +     1
## 1398                     protein_coding     chr1 1197093 1197186     +     1
## 1399                     protein_coding     chr1 1197093 1197186     +     1
## 1400                     protein_coding     chr1 1197438 1197933     +     1
## 1401                     protein_coding     chr1 1197438 1197844     +     1
## 1402                     protein_coding     chr1 1197845 1197847     +     1
## 1403                     protein_coding     chr1 1173906 1173926     +     1
## 1404                     protein_coding     chr1 1174285 1174321     +     1
## 1405                     protein_coding     chr1 1174424 1174489     +     1
## 1406                     protein_coding     chr1 1179189 1179215     +     1
## 1407                     protein_coding     chr1 1197845 1197933     +     1
## 1408                     protein_coding     chr1 1179697 1185864     +     1
## 1409                     protein_coding     chr1 1179697 1179853     +     1
## 1410                     protein_coding     chr1 1180034 1180340     +     1
## 1411                     protein_coding     chr1 1180054 1180340     +     1
## 1412                     protein_coding     chr1 1180054 1180056     +     1
## 1413                     protein_coding     chr1 1180483 1180601     +     1
## 1414                     protein_coding     chr1 1180483 1180601     +     1
## 1415                     protein_coding     chr1 1180731 1180860     +     1
## 1416                     protein_coding     chr1 1180731 1180860     +     1
## 1417                     protein_coding     chr1 1181741 1181815     +     1
## 1418                     protein_coding     chr1 1181741 1181815     +     1
## 1419                     protein_coding     chr1 1182361 1182446     +     1
## 1420                     protein_coding     chr1 1182361 1182446     +     1
## 1421                     protein_coding     chr1 1182876 1183047     +     1
## 1422                     protein_coding     chr1 1182876 1183047     +     1
## 1423                     protein_coding     chr1 1183920 1184091     +     1
## 1424                     protein_coding     chr1 1183920 1184091     +     1
## 1425                     protein_coding     chr1 1184969 1185864     +     1
## 1426                     protein_coding     chr1 1184969 1185139     +     1
## 1427                     protein_coding     chr1 1185140 1185142     +     1
## 1428                     protein_coding     chr1 1179697 1179853     +     1
## 1429                     protein_coding     chr1 1180034 1180053     +     1
## 1430                     protein_coding     chr1 1185140 1185864     +     1
## 1431                     protein_coding     chr1 1203508 1206592     −     1
## 1432                     protein_coding     chr1 1203508 1206571     −     1
## 1433                     protein_coding     chr1 1206385 1206571     −     1
## 1434                     protein_coding     chr1 1206385 1206571     −     1
## 1435                     protein_coding     chr1 1206569 1206571     −     1
## 1436                     protein_coding     chr1 1205370 1205492     −     1
## 1437                     protein_coding     chr1 1205370 1205492     −     1
## 1438                     protein_coding     chr1 1204399 1204486     −     1
## 1439                     protein_coding     chr1 1204399 1204486     −     1
## 1440                     protein_coding     chr1 1203508 1203960     −     1
## 1441                     protein_coding     chr1 1203594 1203960     −     1
## 1442                     protein_coding     chr1 1203591 1203593     −     1
## 1443                     protein_coding     chr1 1203508 1203593     −     1
## 1444                     protein_coding     chr1 1203508 1206592     −     1
## 1445                     protein_coding     chr1 1206385 1206592     −     1
## 1446                     protein_coding     chr1 1206385 1206571     −     1
## 1447                     protein_coding     chr1 1206569 1206571     −     1
```

```
## 1448                 protein_coding   chr1 1205370 1205492    -    1
## 1449                 protein_coding   chr1 1205370 1205492    -    1
## 1450                 protein_coding   chr1 1204399 1204486    -    1
## 1451                 protein_coding   chr1 1204399 1204486    -    1
## 1452                 protein_coding   chr1 1204034 1204236    -    1
## 1453                 protein_coding   chr1 1204034 1204236    -    1
## 1454                 protein_coding   chr1 1203508 1203968    -    1
## 1455                 protein_coding   chr1 1203847 1203968    -    1
## 1456                 protein_coding   chr1 1203844 1203846    -    1
## 1457                 protein_coding   chr1 1206572 1206592    -    1
## 1458                 protein_coding   chr1 1203508 1203846    -    1
## 1459                 protein_coding   chr1 1203844 1205680    -    1
## 1460                 protein_coding   chr1 1205370 1205680    -    1
## 1461                 protein_coding   chr1 1205370 1205463    -    1
## 1462                 protein_coding   chr1 1205461 1205463    -    1
## 1463                 protein_coding   chr1 1204399 1204486    -    1
## 1464                 protein_coding   chr1 1204399 1204486    -    1
## 1465                 protein_coding   chr1 1204034 1204236    -    1
## 1466                 protein_coding   chr1 1204034 1204236    -    1
## 1467                 protein_coding   chr1 1203844 1203968    -    1
## 1468                 protein_coding   chr1 1203847 1203968    -    1
## 1469                 protein_coding   chr1 1203844 1203846    -    1
## 1470                 protein_coding   chr1 1205464 1205680    -    1
## 1471                 protein_coding   chr1 1203844 1203846    -    1
## 1472                 protein_coding   chr1 1203844 1206571    -    1
## 1473                 protein_coding   chr1 1206385 1206571    -    1
## 1474                 protein_coding   chr1 1206385 1206571    -    1
## 1475                 protein_coding   chr1 1206569 1206571    -    1
## 1476                 protein_coding   chr1 1205370 1205492    -    1
## 1477                 protein_coding   chr1 1205370 1205492    -    1
## 1478                 protein_coding   chr1 1204399 1204486    -    1
## 1479                 protein_coding   chr1 1204399 1204486    -    1
## 1480                 protein_coding   chr1 1204055 1204236    -    1
## 1481                 protein_coding   chr1 1204055 1204236    -    1
## 1482                 protein_coding   chr1 1203844 1203968    -    1
## 1483                 protein_coding   chr1 1203847 1203968    -    1
## 1484                 protein_coding   chr1 1203844 1203846    -    1
## 1485                 protein_coding   chr1 1203844 1203846    -    1
## 1486                 protein_coding   chr1 1211340 1214153    -    1
## 1487                 protein_coding   chr1 1211340 1214153    -    1
## 1488                 protein_coding   chr1 1213983 1214153    -    1
## 1489                 protein_coding   chr1 1213983 1214127    -    1
## 1490                 protein_coding   chr1 1214125 1214127    -    1
## 1491                 protein_coding   chr1 1213663 1213785    -    1
## 1492                 protein_coding   chr1 1213663 1213785    -    1
## 1493                 protein_coding   chr1 1212992 1213093    -    1
## 1494                 protein_coding   chr1 1212992 1213093    -    1
## 1495                 protein_coding   chr1 1212638 1212704    -    1
## 1496                 protein_coding   chr1 1212638 1212704    -    1
## 1497                 protein_coding   chr1 1211942 1212138    -    1
## 1498                 protein_coding   chr1 1211942 1212138    -    1
## 1499                 protein_coding   chr1 1211704 1211832    -    1
## 1500                 protein_coding   chr1 1211704 1211832    -    1
## 1501                 protein_coding   chr1 1211340 1211625    -    1
```

```
## 1502                    protein_coding     chr1 1211558 1211625      -        1
## 1503                    protein_coding     chr1 1211555 1211557      -        1
## 1504                    protein_coding     chr1 1214128 1214153      -        1
## 1505                    protein_coding     chr1 1211340 1211557      -        1
## 1506                    protein_coding     chr1 1216908 1232067      -        1
## 1507                    protein_coding     chr1 1216908 1232001      -        1
## 1508                    protein_coding     chr1 1231892 1232001      -        1
## 1509                    protein_coding     chr1 1228468 1228946      -        1
## 1510                    protein_coding     chr1 1228468 1228772      -        1
## 1511                    protein_coding     chr1 1228770 1228772      -        1
## 1512                    protein_coding     chr1 1223832 1223968      -        1
## 1513                    protein_coding     chr1 1223832 1223968      -        1
## 1514                    protein_coding     chr1 1223244 1223357      -        1
## 1515                    protein_coding     chr1 1223244 1223357      -        1
## 1516                    protein_coding     chr1 1218769 1218927      -        1
## 1517                    protein_coding     chr1 1218769 1218927      -        1
## 1518                    protein_coding     chr1 1218458 1218633      -        1
## 1519                    protein_coding     chr1 1218458 1218633      -        1
## 1520                    protein_coding     chr1 1216908 1217688      -        1
## 1521                    protein_coding     chr1 1217515 1217688      -        1
## 1522                    protein_coding     chr1 1217512 1217514      -        1
## 1523                    protein_coding     chr1 1231892 1232001      -        1
## 1524                    protein_coding     chr1 1228773 1228946      -        1
## 1525                    protein_coding     chr1 1216908 1217514      -        1
## 1526                    protein_coding     chr1 1216909 1232067      -        1
## 1527                    protein_coding     chr1 1231892 1232067      -        1
## 1528                    protein_coding     chr1 1228468 1228946      -        1
## 1529                    protein_coding     chr1 1228468 1228793      -        1
## 1530                    protein_coding     chr1 1228791 1228793      -        1
## 1531                    protein_coding     chr1 1223832 1223968      -        1
## 1532                    protein_coding     chr1 1223832 1223968      -        1
## 1533                    protein_coding     chr1 1223244 1223357      -        1
## 1534                    protein_coding     chr1 1223244 1223357      -        1
## 1535                    protein_coding     chr1 1218769 1218927      -        1
## 1536                    protein_coding     chr1 1218769 1218927      -        1
## 1537                    protein_coding     chr1 1218458 1218633      -        1
## 1538                    protein_coding     chr1 1218458 1218633      -        1
## 1539                    protein_coding     chr1 1216909 1217804      -        1
## 1540                    protein_coding     chr1 1217673 1217804      -        1
## 1541                    protein_coding     chr1 1217670 1217672      -        1
## 1542                    protein_coding     chr1 1231892 1232067      -        1
## 1543                    protein_coding     chr1 1228794 1228946      -        1
## 1544                    protein_coding     chr1 1216909 1217672      -        1
## 1545                    protein_coding     chr1 1216931 1232031      -        1
## 1546                    protein_coding     chr1 1231892 1232031      -        1
## 1547                    protein_coding     chr1 1228468 1228946      -        1
## 1548                    protein_coding     chr1 1228468 1228772      -        1
## 1549                    protein_coding     chr1 1228770 1228772      -        1
## 1550                    protein_coding     chr1 1223832 1223968      -        1
## 1551                    protein_coding     chr1 1223832 1223968      -        1
## 1552                    protein_coding     chr1 1223244 1223357      -        1
## 1553                    protein_coding     chr1 1223244 1223357      -        1
## 1554                    protein_coding     chr1 1218769 1218927      -        1
## 1555                    protein_coding     chr1 1218769 1218927      -        1
```

```
## 1556                    protein_coding     chr1 1218458 1218633      -      1
## 1557                    protein_coding     chr1 1218458 1218633      -      1
## 1558                    protein_coding     chr1 1216931 1217804      -      1
## 1559                    protein_coding     chr1 1217673 1217804      -      1
## 1560                    protein_coding     chr1 1217670 1217672      -      1
## 1561                    protein_coding     chr1 1231892 1232031      -      1
## 1562                    protein_coding     chr1 1228773 1228946      -      1
## 1563                    protein_coding     chr1 1216931 1217672      -      1
## 1564                    protein_coding     chr1 1217512 1228793      -      1
## 1565                    protein_coding     chr1 1228468 1228793      -      1
## 1566                    protein_coding     chr1 1228468 1228793      -      1
## 1567                    protein_coding     chr1 1228791 1228793      -      1
## 1568                    protein_coding     chr1 1223832 1223968      -      1
## 1569                    protein_coding     chr1 1223832 1223968      -      1
## 1570                    protein_coding     chr1 1223244 1223357      -      1
## 1571                    protein_coding     chr1 1223244 1223357      -      1
## 1572                    protein_coding     chr1 1218769 1218927      -      1
## 1573                    protein_coding     chr1 1218769 1218927      -      1
## 1574                    protein_coding     chr1 1218458 1218633      -      1
## 1575                    protein_coding     chr1 1218458 1218633      -      1
## 1576                    protein_coding     chr1 1217512 1217688      -      1
## 1577                    protein_coding     chr1 1217515 1217688      -      1
## 1578                    protein_coding     chr1 1217512 1217514      -      1
## 1579                    protein_coding     chr1 1217512 1217514      -      1
## 1580                    protein_coding     chr1 1232237 1235041      +      1
## 1581                    protein_coding     chr1 1232237 1235041      +      1
## 1582                    protein_coding     chr1 1232237 1235041      +      1
## 1583                    protein_coding     chr1 1232279 1233265      +      1
## 1584                    protein_coding     chr1 1232279 1232281      +      1
## 1585                    protein_coding     chr1 1233266 1233268      +      1
## 1586                    protein_coding     chr1 1232237 1232278      +      1
## 1587                    protein_coding     chr1 1233266 1235041      +      1
## 1588                    protein_coding     chr1 1242446 1246722      -      1
## 1589                    protein_coding     chr1 1242453 1246722      -      1
## 1590                    protein_coding     chr1 1246514 1246722      -      1
## 1591                    protein_coding     chr1 1246514 1246690      -      1
## 1592                    protein_coding     chr1 1246688 1246690      -      1
## 1593                    protein_coding     chr1 1244381 1244497      -      1
## 1594                    protein_coding     chr1 1244381 1244497      -      1
## 1595                    protein_coding     chr1 1244191 1244275      -      1
## 1596                    protein_coding     chr1 1244191 1244275      -      1
## 1597                    protein_coding     chr1 1243954 1244105      -      1
## 1598                    protein_coding     chr1 1243954 1244105      -      1
## 1599                    protein_coding     chr1 1243444 1243552      -      1
## 1600                    protein_coding     chr1 1243444 1243552      -      1
## 1601                    protein_coding     chr1 1243062 1243152      -      1
## 1602                    protein_coding     chr1 1243062 1243152      -      1
## 1603                    protein_coding     chr1 1242835 1242913      -      1
## 1604                    protein_coding     chr1 1242835 1242913      -      1
## 1605                    protein_coding     chr1 1242453 1242646      -      1
## 1606                    protein_coding     chr1 1242551 1242646      -      1
## 1607                    protein_coding     chr1 1242548 1242550      -      1
## 1608                    protein_coding     chr1 1246691 1246722      -      1
## 1609                    protein_coding     chr1 1242453 1242550      -      1
```

```
## 1610                      lncRNA   chr1 1249777 1251334      -      0
## 1611                      lncRNA   chr1 1249777 1251334      -      0
## 1612                      lncRNA   chr1 1249777 1251334      -      0
## 1613              protein_coding   chr1 1253909 1273885      -      1
## 1614              protein_coding   chr1 1253914 1273854      -      1
## 1615              protein_coding   chr1 1273666 1273854      -      1
## 1616              protein_coding   chr1 1267733 1267992      -      1
## 1617              protein_coding   chr1 1263346 1263386      -      1
## 1618              protein_coding   chr1 1263346 1263361      -      1
## 1619              protein_coding   chr1 1263359 1263361      -      1
## 1620              protein_coding   chr1 1257208 1257310      -      1
## 1621              protein_coding   chr1 1257208 1257310      -      1
## 1622              protein_coding   chr1 1256992 1257130      -      1
## 1623              protein_coding   chr1 1256992 1257130      -      1
## 1624              protein_coding   chr1 1256045 1256125      -      1
## 1625              protein_coding   chr1 1256045 1256125      -      1
## 1626              protein_coding   chr1 1253914 1255487      -      1
## 1627              protein_coding   chr1 1255206 1255487      -      1
## 1628              protein_coding   chr1 1255203 1255205      -      1
## 1629              protein_coding   chr1 1273666 1273854      -      1
## 1630              protein_coding   chr1 1267733 1267992      -      1
## 1631              protein_coding   chr1 1263362 1263386      -      1
## 1632              protein_coding   chr1 1253914 1255205      -      1
## 1633              protein_coding   chr1 1254470 1273885      -      1
## 1634              protein_coding   chr1 1273666 1273885      -      1
## 1635              protein_coding   chr1 1267862 1267992      -      1
## 1636              protein_coding   chr1 1267862 1267992      -      1
## 1637              protein_coding   chr1 1267990 1267992      -      1
## 1638              protein_coding   chr1 1263346 1263386      -      1
## 1639              protein_coding   chr1 1263346 1263386      -      1
## 1640              protein_coding   chr1 1257208 1257310      -      1
## 1641              protein_coding   chr1 1257208 1257310      -      1
## 1642              protein_coding   chr1 1256992 1257130      -      1
## 1643              protein_coding   chr1 1256992 1257130      -      1
## 1644              protein_coding   chr1 1256045 1256125      -      1
## 1645              protein_coding   chr1 1256045 1256125      -      1
## 1646              protein_coding   chr1 1254470 1255487      -      1
## 1647              protein_coding   chr1 1255206 1255487      -      1
## 1648              protein_coding   chr1 1255203 1255205      -      1
## 1649              protein_coding   chr1 1273666 1273885      -      1
## 1650              protein_coding   chr1 1254470 1255205      -      1
## 1651              protein_coding   chr1 1254985 1273855      -      1
## 1652              protein_coding   chr1 1273666 1273855      -      1
## 1653              protein_coding   chr1 1263346 1263386      -      1
## 1654              protein_coding   chr1 1263346 1263361      -      1
## 1655              protein_coding   chr1 1263359 1263361      -      1
## 1656              protein_coding   chr1 1257208 1257310      -      1
## 1657              protein_coding   chr1 1257208 1257310      -      1
## 1658              protein_coding   chr1 1256992 1257130      -      1
## 1659              protein_coding   chr1 1256992 1257130      -      1
## 1660              protein_coding   chr1 1256045 1256125      -      1
## 1661              protein_coding   chr1 1256045 1256125      -      1
## 1662              protein_coding   chr1 1254985 1255487      -      1
## 1663              protein_coding   chr1 1255206 1255487      -      1
```

```
## 1664                         protein_coding      chr1 1255203 1255205         -        1
## 1665                         protein_coding      chr1 1273666 1273855         -        1
## 1666                         protein_coding      chr1 1263362 1263386         -        1
## 1667                         protein_coding      chr1 1254985 1255205         -        1
## 1668                         protein_coding      chr1 1255164 1273726         -        1
## 1669                         protein_coding      chr1 1273499 1273726         -        1
## 1670                         protein_coding      chr1 1267862 1267992         -        1
## 1671                         protein_coding      chr1 1267862 1267992         -        1
## 1672                         protein_coding      chr1 1267990 1267992         -        1
## 1673                         protein_coding      chr1 1263346 1263386         -        1
## 1674                         protein_coding      chr1 1263346 1263386         -        1
## 1675                         protein_coding      chr1 1257208 1257310         -        1
## 1676                         protein_coding      chr1 1257208 1257310         -        1
## 1677                         protein_coding      chr1 1256992 1257130         -        1
## 1678                         protein_coding      chr1 1256992 1257130         -        1
## 1679                         protein_coding      chr1 1256045 1256125         -        1
## 1680                         protein_coding      chr1 1256045 1256125         -        1
## 1681                         protein_coding      chr1 1255164 1255487         -        1
## 1682                         protein_coding      chr1 1255206 1255487         -        1
## 1683                         protein_coding      chr1 1255203 1255205         -        1
## 1684                         protein_coding      chr1 1273499 1273726         -        1
## 1685                         protein_coding      chr1 1255164 1255205         -        1
## 1686                         protein_coding      chr1 1255178 1273833         -        1
## 1687                         protein_coding      chr1 1273666 1273833         -        1
## 1688                         protein_coding      chr1 1267862 1267992         -        1
## 1689                         protein_coding      chr1 1267862 1267992         -        1
## 1690                         protein_coding      chr1 1267990 1267992         -        1
## 1691                         protein_coding      chr1 1264783 1264830         -        1
## 1692                         protein_coding      chr1 1264783 1264830         -        1
## 1693                         protein_coding      chr1 1263346 1263386         -        1
## 1694                         protein_coding      chr1 1263346 1263386         -        1
## 1695                         protein_coding      chr1 1257208 1257310         -        1
## 1696                         protein_coding      chr1 1257208 1257310         -        1
## 1697                         protein_coding      chr1 1256992 1257130         -        1
## 1698                         protein_coding      chr1 1256992 1257130         -        1
## 1699                         protein_coding      chr1 1256045 1256125         -        1
## 1700                         protein_coding      chr1 1256045 1256125         -        1
## 1701                         protein_coding      chr1 1255178 1255487         -        1
## 1702                         protein_coding      chr1 1255206 1255487         -        1
## 1703                         protein_coding      chr1 1255203 1255205         -        1
## 1704                         protein_coding      chr1 1273666 1273833         -        1
## 1705                         protein_coding      chr1 1255178 1255205         -        1
## 1706                                lncRNA      chr1 1275223 1280420         +        1
## 1707                                lncRNA      chr1 1275223 1280420         +        1
## 1708                                lncRNA      chr1 1275223 1275299         +        1
## 1709                                lncRNA      chr1 1279068 1279148         +        1
## 1710                                lncRNA      chr1 1280311 1280420         +        1
## 1711                                lncRNA      chr1 1275237 1279393         +        1
## 1712                                lncRNA      chr1 1275237 1275299         +        1
## 1713                                lncRNA      chr1 1279068 1279393         +        1
## 1714                         protein_coding      chr1 1280436 1292029         +        1
## 1715                         protein_coding      chr1 1280436 1292019         +        1
## 1716                         protein_coding      chr1 1280436 1280666         +        1
## 1717                         protein_coding      chr1 1280662 1280666         +        1
```

```
## 1718                    protein_coding      chr1 1280662 1280664    +    1
## 1719                    protein_coding      chr1 1281226 1281297    +    1
## 1720                    protein_coding      chr1 1281226 1281297    +    1
## 1721                    protein_coding      chr1 1281411 1281610    +    1
## 1722                    protein_coding      chr1 1281411 1281610    +    1
## 1723                    protein_coding      chr1 1282242 1282315    +    1
## 1724                    protein_coding      chr1 1282242 1282315    +    1
## 1725                    protein_coding      chr1 1283978 1284090    +    1
## 1726                    protein_coding      chr1 1283978 1284090    +    1
## 1727                    protein_coding      chr1 1285571 1285664    +    1
## 1728                    protein_coding      chr1 1285571 1285664    +    1
## 1729                    protein_coding      chr1 1285926 1286278    +    1
## 1730                    protein_coding      chr1 1285926 1286278    +    1
## 1731                    protein_coding      chr1 1286768 1286975    +    1
## 1732                    protein_coding      chr1 1286768 1286975    +    1
## 1733                    protein_coding      chr1 1287109 1287299    +    1
## 1734                    protein_coding      chr1 1287109 1287299    +    1
## 1735                    protein_coding      chr1 1287508 1287596    +    1
## 1736                    protein_coding      chr1 1287508 1287596    +    1
## 1737                    protein_coding      chr1 1287673 1287836    +    1
## 1738                    protein_coding      chr1 1287673 1287836    +    1
## 1739                    protein_coding      chr1 1287939 1288037    +    1
## 1740                    protein_coding      chr1 1287939 1288037    +    1
## 1741                    protein_coding      chr1 1290271 1290388    +    1
## 1742                    protein_coding      chr1 1290271 1290388    +    1
## 1743                    protein_coding      chr1 1290477 1290555    +    1
## 1744                    protein_coding      chr1 1290477 1290555    +    1
## 1745                    protein_coding      chr1 1290637 1290694    +    1
## 1746                    protein_coding      chr1 1290637 1290694    +    1
## 1747                    protein_coding      chr1 1290895 1290953    +    1
## 1748                    protein_coding      chr1 1290895 1290953    +    1
## 1749                    protein_coding      chr1 1291065 1291140    +    1
## 1750                    protein_coding      chr1 1291065 1291140    +    1
## 1751                    protein_coding      chr1 1291254 1292019    +    1
## 1752                    protein_coding      chr1 1291254 1291607    +    1
## 1753                    protein_coding      chr1 1291608 1291610    +    1
## 1754                    protein_coding      chr1 1280436 1280661    +    1
## 1755                    protein_coding      chr1 1291608 1292019    +    1
## 1756                    protein_coding      chr1 1280588 1292024    +    1
## 1757                    protein_coding      chr1 1280588 1281610    +    1
## 1758                    protein_coding      chr1 1282242 1282315    +    1
## 1759                    protein_coding      chr1 1283978 1284090    +    1
## 1760                    protein_coding      chr1 1284025 1284090    +    1
## 1761                    protein_coding      chr1 1284025 1284027    +    1
## 1762                    protein_coding      chr1 1285926 1286278    +    1
## 1763                    protein_coding      chr1 1285926 1286278    +    1
## 1764                    protein_coding      chr1 1286768 1286975    +    1
## 1765                    protein_coding      chr1 1286768 1286975    +    1
## 1766                    protein_coding      chr1 1287109 1287299    +    1
## 1767                    protein_coding      chr1 1287109 1287299    +    1
## 1768                    protein_coding      chr1 1287508 1287596    +    1
## 1769                    protein_coding      chr1 1287508 1287596    +    1
## 1770                    protein_coding      chr1 1287673 1287836    +    1
## 1771                    protein_coding      chr1 1287673 1287836    +    1
```

```
## 1772                      protein_coding      chr1 1287939 1288037      +      1
## 1773                      protein_coding      chr1 1287939 1288037      +      1
## 1774                      protein_coding      chr1 1290271 1290388      +      1
## 1775                      protein_coding      chr1 1290271 1290388      +      1
## 1776                      protein_coding      chr1 1290477 1290555      +      1
## 1777                      protein_coding      chr1 1290477 1290555      +      1
## 1778                      protein_coding      chr1 1290637 1290694      +      1
## 1779                      protein_coding      chr1 1290637 1290694      +      1
## 1780                      protein_coding      chr1 1290895 1290953      +      1
## 1781                      protein_coding      chr1 1290895 1290953      +      1
## 1782                      protein_coding      chr1 1291065 1291140      +      1
## 1783                      protein_coding      chr1 1291065 1291140      +      1
## 1784                      protein_coding      chr1 1291254 1292024      +      1
## 1785                      protein_coding      chr1 1291254 1291607      +      1
## 1786                      protein_coding      chr1 1291608 1291610      +      1
## 1787                      protein_coding      chr1 1280588 1281610      +      1
## 1788                      protein_coding      chr1 1282242 1282315      +      1
## 1789                      protein_coding      chr1 1283978 1284024      +      1
## 1790                      protein_coding      chr1 1291608 1292024      +      1
## 1791                      protein_coding      chr1 1281224 1292029      +      1
## 1792                      protein_coding      chr1 1281224 1281297      +      1
## 1793                      protein_coding      chr1 1281411 1281610      +      1
## 1794                      protein_coding      chr1 1282242 1282315      +      1
## 1795                      protein_coding      chr1 1283978 1284090      +      1
## 1796                      protein_coding      chr1 1284025 1284090      +      1
## 1797                      protein_coding      chr1 1284025 1284027      +      1
## 1798                      protein_coding      chr1 1285926 1286278      +      1
## 1799                      protein_coding      chr1 1285926 1286278      +      1
## 1800                      protein_coding      chr1 1286768 1286975      +      1
## 1801                      protein_coding      chr1 1286768 1286975      +      1
## 1802                      protein_coding      chr1 1287109 1287299      +      1
## 1803                      protein_coding      chr1 1287109 1287299      +      1
## 1804                      protein_coding      chr1 1287508 1287596      +      1
## 1805                      protein_coding      chr1 1287508 1287596      +      1
## 1806                      protein_coding      chr1 1287673 1287836      +      1
## 1807                      protein_coding      chr1 1287673 1287836      +      1
## 1808                      protein_coding      chr1 1287939 1288037      +      1
## 1809                      protein_coding      chr1 1287939 1288037      +      1
## 1810                      protein_coding      chr1 1290271 1290388      +      1
## 1811                      protein_coding      chr1 1290271 1290388      +      1
## 1812                      protein_coding      chr1 1290477 1290555      +      1
## 1813                      protein_coding      chr1 1290477 1290555      +      1
## 1814                      protein_coding      chr1 1290637 1290694      +      1
## 1815                      protein_coding      chr1 1290637 1290694      +      1
## 1816                      protein_coding      chr1 1290895 1290953      +      1
## 1817                      protein_coding      chr1 1290895 1290953      +      1
## 1818                      protein_coding      chr1 1291065 1291140      +      1
## 1819                      protein_coding      chr1 1291065 1291140      +      1
## 1820                      protein_coding      chr1 1291254 1292029      +      1
## 1821                      protein_coding      chr1 1291254 1291607      +      1
## 1822                      protein_coding      chr1 1291608 1291610      +      1
## 1823                      protein_coding      chr1 1281224 1281297      +      1
## 1824                      protein_coding      chr1 1281411 1281610      +      1
## 1825                      protein_coding      chr1 1282242 1282315      +      1
```

```
## 1826          protein_coding    chr1 1283978 1284024    +      1
## 1827          protein_coding    chr1 1291608 1292029    +      1
## 1828          protein_coding    chr1 1282109 1292024    +      1
## 1829          protein_coding    chr1 1282109 1282315    +      1
## 1830          protein_coding    chr1 1282259 1282315    +      1
## 1831          protein_coding    chr1 1282259 1282261    +      1
## 1832          protein_coding    chr1 1283978 1284090    +      1
## 1833          protein_coding    chr1 1283978 1284090    +      1
## 1834          protein_coding    chr1 1285571 1285664    +      1
## 1835          protein_coding    chr1 1285571 1285664    +      1
## 1836          protein_coding    chr1 1285926 1286278    +      1
## 1837          protein_coding    chr1 1285926 1286278    +      1
## 1838          protein_coding    chr1 1286768 1286975    +      1
## 1839          protein_coding    chr1 1286768 1286975    +      1
## 1840          protein_coding    chr1 1287109 1287299    +      1
## 1841          protein_coding    chr1 1287109 1287299    +      1
## 1842          protein_coding    chr1 1287508 1287596    +      1
## 1843          protein_coding    chr1 1287508 1287596    +      1
## 1844          protein_coding    chr1 1287673 1287836    +      1
## 1845          protein_coding    chr1 1287673 1287836    +      1
## 1846          protein_coding    chr1 1287939 1288037    +      1
## 1847          protein_coding    chr1 1287939 1288037    +      1
## 1848          protein_coding    chr1 1290271 1290388    +      1
## 1849          protein_coding    chr1 1290271 1290388    +      1
## 1850          protein_coding    chr1 1290477 1290555    +      1
## 1851          protein_coding    chr1 1290477 1290555    +      1
## 1852          protein_coding    chr1 1290637 1290694    +      1
## 1853          protein_coding    chr1 1290637 1290694    +      1
## 1854          protein_coding    chr1 1290895 1290953    +      1
## 1855          protein_coding    chr1 1290895 1290953    +      1
## 1856          protein_coding    chr1 1291065 1291140    +      1
## 1857          protein_coding    chr1 1291065 1291140    +      1
## 1858          protein_coding    chr1 1291254 1292024    +      1
## 1859          protein_coding    chr1 1291254 1291607    +      1
## 1860          protein_coding    chr1 1291608 1291610    +      1
## 1861          protein_coding    chr1 1282109 1282258    +      1
## 1862          protein_coding    chr1 1291608 1292024    +      1
## 1863          protein_coding    chr1 1292390 1309609    -      1
## 1864          protein_coding    chr1 1292391 1307930    -      1
## 1865          protein_coding    chr1 1307769 1307930    -      1
## 1866          protein_coding    chr1 1307769 1307815    -      1
## 1867          protein_coding    chr1 1307813 1307815    -      1
## 1868          protein_coding    chr1 1304086 1304143    -      1
## 1869          protein_coding    chr1 1304086 1304143    -      1
## 1870          protein_coding    chr1 1303162 1303281    -      1
## 1871          protein_coding    chr1 1303162 1303281    -      1
## 1872          protein_coding    chr1 1302922 1302975    -      1
## 1873          protein_coding    chr1 1302922 1302975    -      1
## 1874          protein_coding    chr1 1301988 1302046    -      1
## 1875          protein_coding    chr1 1301988 1302046    -      1
## 1876          protein_coding    chr1 1300509 1300692    -      1
## 1877          protein_coding    chr1 1300509 1300692    -      1
## 1878          protein_coding    chr1 1300158 1300202    -      1
## 1879          protein_coding    chr1 1300158 1300202    -      1
```

```
## 1880                    protein_coding    chr1 1299973 1300068    -    1
## 1881                    protein_coding    chr1 1299973 1300068    -    1
## 1882                    protein_coding    chr1 1299831 1299905    -    1
## 1883                    protein_coding    chr1 1299831 1299905    -    1
## 1884                    protein_coding    chr1 1299345 1299356    -    1
## 1885                    protein_coding    chr1 1299345 1299356    -    1
## 1886                    protein_coding    chr1 1298567 1298679    -    1
## 1887                    protein_coding    chr1 1298567 1298679    -    1
## 1888                    protein_coding    chr1 1298370 1298421    -    1
## 1889                    protein_coding    chr1 1298370 1298421    -    1
## 1890                    protein_coding    chr1 1298013 1298113    -    1
## 1891                    protein_coding    chr1 1298013 1298113    -    1
## 1892                    protein_coding    chr1 1297822 1297933    -    1
## 1893                    protein_coding    chr1 1297822 1297933    -    1
## 1894                    protein_coding    chr1 1296425 1296633    -    1
## 1895                    protein_coding    chr1 1296425 1296633    -    1
## 1896                    protein_coding    chr1 1296211 1296280    -    1
## 1897                    protein_coding    chr1 1296211 1296280    -    1
## 1898                    protein_coding    chr1 1296015 1296109    -    1
## 1899                    protein_coding    chr1 1296015 1296109    -    1
## 1900                    protein_coding    chr1 1295736 1295938    -    1
## 1901                    protein_coding    chr1 1295736 1295938    -    1
## 1902                    protein_coding    chr1 1295447 1295554    -    1
## 1903                    protein_coding    chr1 1295447 1295554    -    1
## 1904                    protein_coding    chr1 1294718 1294816    -    1
## 1905                    protein_coding    chr1 1294718 1294816    -    1
## 1906                    protein_coding    chr1 1294402 1294628    -    1
## 1907                    protein_coding    chr1 1294402 1294628    -    1
## 1908                    protein_coding    chr1 1294090 1294199    -    1
## 1909                    protein_coding    chr1 1294090 1294199    -    1
## 1910                    protein_coding    chr1 1293823 1293933    -    1
## 1911                    protein_coding    chr1 1293823 1293933    -    1
## 1912                    protein_coding    chr1 1292391 1293708    -    1
## 1913                    protein_coding    chr1 1293567 1293708    -    1
## 1914                    protein_coding    chr1 1293564 1293566    -    1
## 1915                    protein_coding    chr1 1307816 1307930    -    1
## 1916                    protein_coding    chr1 1292391 1293566    -    1
## 1917                    protein_coding    chr1 1293564 1303260    -    1
## 1918                    protein_coding    chr1 1303162 1303260    -    1
## 1919                    protein_coding    chr1 1303162 1303260    -    1
## 1920                    protein_coding    chr1 1303258 1303260    -    1
## 1921                    protein_coding    chr1 1302922 1302975    -    1
## 1922                    protein_coding    chr1 1302922 1302975    -    1
## 1923                    protein_coding    chr1 1301988 1302046    -    1
## 1924                    protein_coding    chr1 1301988 1302046    -    1
## 1925                    protein_coding    chr1 1300509 1300692    -    1
## 1926                    protein_coding    chr1 1300509 1300692    -    1
## 1927                    protein_coding    chr1 1300158 1300202    -    1
## 1928                    protein_coding    chr1 1300158 1300202    -    1
## 1929                    protein_coding    chr1 1299973 1300068    -    1
## 1930                    protein_coding    chr1 1299973 1300068    -    1
## 1931                    protein_coding    chr1 1299831 1299905    -    1
## 1932                    protein_coding    chr1 1299831 1299905    -    1
## 1933                    protein_coding    chr1 1299345 1299356    -    1
```

```
## 1934                     protein_coding    chr1 1299345 1299356    -    1
## 1935                     protein_coding    chr1 1298567 1298679    -    1
## 1936                     protein_coding    chr1 1298567 1298679    -    1
## 1937                     protein_coding    chr1 1298370 1298421    -    1
## 1938                     protein_coding    chr1 1298370 1298421    -    1
## 1939                     protein_coding    chr1 1298013 1298113    -    1
## 1940                     protein_coding    chr1 1298013 1298113    -    1
## 1941                     protein_coding    chr1 1297822 1297933    -    1
## 1942                     protein_coding    chr1 1297822 1297933    -    1
## 1943                     protein_coding    chr1 1296425 1296633    -    1
## 1944                     protein_coding    chr1 1296425 1296633    -    1
## 1945                     protein_coding    chr1 1296211 1296280    -    1
## 1946                     protein_coding    chr1 1296211 1296280    -    1
## 1947                     protein_coding    chr1 1296015 1296109    -    1
## 1948                     protein_coding    chr1 1296015 1296109    -    1
## 1949                     protein_coding    chr1 1295736 1295938    -    1
## 1950                     protein_coding    chr1 1295736 1295938    -    1
## 1951                     protein_coding    chr1 1295447 1295554    -    1
## 1952                     protein_coding    chr1 1295447 1295554    -    1
## 1953                     protein_coding    chr1 1294402 1294628    -    1
## 1954                     protein_coding    chr1 1294402 1294628    -    1
## 1955                     protein_coding    chr1 1294090 1294199    -    1
## 1956                     protein_coding    chr1 1294090 1294199    -    1
## 1957                     protein_coding    chr1 1293823 1293933    -    1
## 1958                     protein_coding    chr1 1293823 1293933    -    1
## 1959                     protein_coding    chr1 1293564 1293708    -    1
## 1960                     protein_coding    chr1 1293567 1293708    -    1
## 1961                     protein_coding    chr1 1293564 1293566    -    1
## 1962                     protein_coding    chr1 1293564 1293566    -    1
## 1963                              miRNA    chr1 1296110 1296170    -    1
## 1964                              miRNA    chr1 1296110 1296170    -    1
## 1965                              miRNA    chr1 1296110 1296170    -    1
## 1966                     protein_coding    chr1 1308597 1311677    +    1
## 1967                     protein_coding    chr1 1308597 1311677    +    1
## 1968                     protein_coding    chr1 1308597 1308720    +    1
## 1969                     protein_coding    chr1 1308644 1308720    +    1
## 1970                     protein_coding    chr1 1308644 1308646    +    1
## 1971                     protein_coding    chr1 1308915 1308972    +    1
## 1972                     protein_coding    chr1 1308915 1308972    +    1
## 1973                     protein_coding    chr1 1309086 1309273    +    1
## 1974                     protein_coding    chr1 1309086 1309273    +    1
## 1975                     protein_coding    chr1 1309454 1309603    +    1
## 1976                     protein_coding    chr1 1309454 1309603    +    1
## 1977                     protein_coding    chr1 1309681 1309851    +    1
## 1978                     protein_coding    chr1 1309681 1309851    +    1
## 1979                     protein_coding    chr1 1310634 1310688    +    1
## 1980                     protein_coding    chr1 1310634 1310688    +    1
## 1981                     protein_coding    chr1 1310909 1311071    +    1
## 1982                     protein_coding    chr1 1310909 1311071    +    1
## 1983                     protein_coding    chr1 1311330 1311677    +    1
## 1984                     protein_coding    chr1 1311330 1311376    +    1
## 1985                     protein_coding    chr1 1311377 1311379    +    1
## 1986                     protein_coding    chr1 1308597 1308643    +    1
## 1987                     protein_coding    chr1 1311377 1311677    +    1
```

```
## 1988                    protein_coding    chr1 1311585 1324691       -       1
## 1989                    protein_coding    chr1 1311585 1324687       -       1
## 1990                    protein_coding    chr1 1324581 1324687       -       1
## 1991                    protein_coding    chr1 1322892 1323287       -       1
## 1992                    protein_coding    chr1 1321908 1321984       -       1
## 1993                    protein_coding    chr1 1321908 1321953       -       1
## 1994                    protein_coding    chr1 1321951 1321953       -       1
## 1995                    protein_coding    chr1 1320996 1321093       -       1
## 1996                    protein_coding    chr1 1320996 1321093       -       1
## 1997                    protein_coding    chr1 1320456 1320529       -       1
## 1998                    protein_coding    chr1 1320456 1320529       -       1
## 1999                    protein_coding    chr1 1319296 1319524       -       1
## 2000                    protein_coding    chr1 1319296 1319524       -       1
## 2001                    protein_coding    chr1 1315520 1315618       -       1
## 2002                    protein_coding    chr1 1315520 1315618       -       1
## 2003                    protein_coding    chr1 1315404 1315438       -       1
## 2004                    protein_coding    chr1 1315404 1315438       -       1
## 2005                    protein_coding    chr1 1314824 1314962       -       1
## 2006                    protein_coding    chr1 1314824 1314962       -       1
## 2007                    protein_coding    chr1 1314301 1314365       -       1
## 2008                    protein_coding    chr1 1314301 1314365       -       1
## 2009                    protein_coding    chr1 1313732 1313921       -       1
## 2010                    protein_coding    chr1 1313732 1313921       -       1
## 2011                    protein_coding    chr1 1313509 1313592       -       1
## 2012                    protein_coding    chr1 1313509 1313592       -       1
## 2013                    protein_coding    chr1 1313035 1313124       -       1
## 2014                    protein_coding    chr1 1313035 1313124       -       1
## 2015                    protein_coding    chr1 1312787 1312949       -       1
## 2016                    protein_coding    chr1 1312787 1312949       -       1
## 2017                    protein_coding    chr1 1312593 1312700       -       1
## 2018                    protein_coding    chr1 1312593 1312700       -       1
## 2019                    protein_coding    chr1 1312440 1312501       -       1
## 2020                    protein_coding    chr1 1312440 1312501       -       1
## 2021                    protein_coding    chr1 1312226 1312368       -       1
## 2022                    protein_coding    chr1 1312226 1312368       -       1
## 2023                    protein_coding    chr1 1312018 1312147       -       1
## 2024                    protein_coding    chr1 1312018 1312147       -       1
## 2025                    protein_coding    chr1 1311585 1311924       -       1
## 2026                    protein_coding    chr1 1311862 1311924       -       1
## 2027                    protein_coding    chr1 1311859 1311861       -       1
## 2028                    protein_coding    chr1 1324581 1324687       -       1
## 2029                    protein_coding    chr1 1322892 1323287       -       1
## 2030                    protein_coding    chr1 1321954 1321984       -       1
## 2031                    protein_coding    chr1 1311585 1311861       -       1
## 2032                    protein_coding    chr1 1311585 1324687       -       1
## 2033                    protein_coding    chr1 1324581 1324687       -       1
## 2034                    protein_coding    chr1 1323181 1323287       -       1
## 2035                    protein_coding    chr1 1320996 1321093       -       1
## 2036                    protein_coding    chr1 1320996 1321034       -       1
## 2037                    protein_coding    chr1 1321032 1321034       -       1
## 2038                    protein_coding    chr1 1320456 1320529       -       1
## 2039                    protein_coding    chr1 1320456 1320529       -       1
## 2040                    protein_coding    chr1 1319296 1319524       -       1
## 2041                    protein_coding    chr1 1319296 1319524       -       1
```

```
## 2042                protein_coding    chr1 1315520 1315618        -        1
## 2043                protein_coding    chr1 1315520 1315618        -        1
## 2044                protein_coding    chr1 1315404 1315438        -        1
## 2045                protein_coding    chr1 1315404 1315438        -        1
## 2046                protein_coding    chr1 1314824 1314962        -        1
## 2047                protein_coding    chr1 1314824 1314962        -        1
## 2048                protein_coding    chr1 1314301 1314365        -        1
## 2049                protein_coding    chr1 1314301 1314365        -        1
## 2050                protein_coding    chr1 1313732 1313921        -        1
## 2051                protein_coding    chr1 1313732 1313921        -        1
## 2052                protein_coding    chr1 1313509 1313592        -        1
## 2053                protein_coding    chr1 1313509 1313592        -        1
## 2054                protein_coding    chr1 1313035 1313124        -        1
## 2055                protein_coding    chr1 1313035 1313124        -        1
## 2056                protein_coding    chr1 1312787 1312949        -        1
## 2057                protein_coding    chr1 1312787 1312949        -        1
## 2058                protein_coding    chr1 1312593 1312700        -        1
## 2059                protein_coding    chr1 1312593 1312700        -        1
## 2060                protein_coding    chr1 1312440 1312501        -        1
## 2061                protein_coding    chr1 1312440 1312501        -        1
## 2062                protein_coding    chr1 1312226 1312368        -        1
## 2063                protein_coding    chr1 1312226 1312368        -        1
## 2064                protein_coding    chr1 1312018 1312147        -        1
## 2065                protein_coding    chr1 1312018 1312147        -        1
## 2066                protein_coding    chr1 1311585 1311924        -        1
## 2067                protein_coding    chr1 1311862 1311924        -        1
## 2068                protein_coding    chr1 1311859 1311861        -        1
## 2069                protein_coding    chr1 1324581 1324687        -        1
## 2070                protein_coding    chr1 1323181 1323287        -        1
## 2071                protein_coding    chr1 1321035 1321093        -        1
## 2072                protein_coding    chr1 1311585 1311861        -        1
## 2073                protein_coding    chr1 1311585 1324687        -        1
## 2074                protein_coding    chr1 1324581 1324687        -        1
## 2075                protein_coding    chr1 1324581 1324608        -        1
## 2076                protein_coding    chr1 1324606 1324608        -        1
## 2077                protein_coding    chr1 1323177 1323287        -        1
## 2078                protein_coding    chr1 1323177 1323287        -        1
## 2079                protein_coding    chr1 1315520 1315614        -        1
## 2080                protein_coding    chr1 1315520 1315614        -        1
## 2081                protein_coding    chr1 1315404 1315438        -        1
## 2082                protein_coding    chr1 1315404 1315438        -        1
## 2083                protein_coding    chr1 1314824 1314962        -        1
## 2084                protein_coding    chr1 1314824 1314962        -        1
## 2085                protein_coding    chr1 1314301 1314365        -        1
## 2086                protein_coding    chr1 1314301 1314365        -        1
## 2087                protein_coding    chr1 1313732 1313921        -        1
## 2088                protein_coding    chr1 1313732 1313921        -        1
## 2089                protein_coding    chr1 1313509 1313592        -        1
## 2090                protein_coding    chr1 1313509 1313592        -        1
## 2091                protein_coding    chr1 1313035 1313124        -        1
## 2092                protein_coding    chr1 1313035 1313124        -        1
## 2093                protein_coding    chr1 1312787 1312949        -        1
## 2094                protein_coding    chr1 1312787 1312949        -        1
## 2095                protein_coding    chr1 1312593 1312700        -        1
```

```
## 2096                     protein_coding    chr1 1312593 1312700      -        1
## 2097                     protein_coding    chr1 1312440 1312501      -        1
## 2098                     protein_coding    chr1 1312440 1312501      -        1
## 2099                     protein_coding    chr1 1312226 1312368      -        1
## 2100                     protein_coding    chr1 1312226 1312368      -        1
## 2101                     protein_coding    chr1 1312018 1312147      -        1
## 2102                     protein_coding    chr1 1312018 1312147      -        1
## 2103                     protein_coding    chr1 1311585 1311924      -        1
## 2104                     protein_coding    chr1 1311862 1311924      -        1
## 2105                     protein_coding    chr1 1311859 1311861      -        1
## 2106                     protein_coding    chr1 1324609 1324687      -        1
## 2107                     protein_coding    chr1 1311585 1311861      -        1
## 2108                     protein_coding    chr1 1311585 1324687      -        1
## 2109                     protein_coding    chr1 1324581 1324687      -        1
## 2110                     protein_coding    chr1 1324581 1324608      -        1
## 2111                     protein_coding    chr1 1324606 1324608      -        1
## 2112                     protein_coding    chr1 1320996 1321093      -        1
## 2113                     protein_coding    chr1 1320996 1321093      -        1
## 2114                     protein_coding    chr1 1320456 1320529      -        1
## 2115                     protein_coding    chr1 1320456 1320529      -        1
## 2116                     protein_coding    chr1 1319336 1319524      -        1
## 2117                     protein_coding    chr1 1319336 1319524      -        1
## 2118                     protein_coding    chr1 1314301 1314318      -        1
## 2119                     protein_coding    chr1 1314301 1314318      -        1
## 2120                     protein_coding    chr1 1313732 1313921      -        1
## 2121                     protein_coding    chr1 1313732 1313921      -        1
## 2122                     protein_coding    chr1 1313509 1313592      -        1
## 2123                     protein_coding    chr1 1313509 1313592      -        1
## 2124                     protein_coding    chr1 1313035 1313124      -        1
## 2125                     protein_coding    chr1 1313035 1313124      -        1
## 2126                     protein_coding    chr1 1312878 1312949      -        1
## 2127                     protein_coding    chr1 1312878 1312949      -        1
## 2128                     protein_coding    chr1 1312226 1312356      -        1
## 2129                     protein_coding    chr1 1312226 1312356      -        1
## 2130                     protein_coding    chr1 1312018 1312147      -        1
## 2131                     protein_coding    chr1 1312018 1312147      -        1
## 2132                     protein_coding    chr1 1311585 1311924      -        1
## 2133                     protein_coding    chr1 1311862 1311924      -        1
## 2134                     protein_coding    chr1 1311859 1311861      -        1
## 2135                     protein_coding    chr1 1324609 1324687      -        1
## 2136                     protein_coding    chr1 1311585 1311861      -        1
## 2137                     protein_coding    chr1 1311597 1324691      -        1
## 2138                     protein_coding    chr1 1324581 1324691      -        1
## 2139                     protein_coding    chr1 1324581 1324608      -        1
## 2140                     protein_coding    chr1 1324606 1324608      -        1
## 2141                     protein_coding    chr1 1320996 1321093      -        1
## 2142                     protein_coding    chr1 1320996 1321093      -        1
## 2143                     protein_coding    chr1 1320456 1320529      -        1
## 2144                     protein_coding    chr1 1320456 1320529      -        1
## 2145                     protein_coding    chr1 1319296 1319524      -        1
## 2146                     protein_coding    chr1 1319296 1319524      -        1
## 2147                     protein_coding    chr1 1315520 1315618      -        1
## 2148                     protein_coding    chr1 1315520 1315618      -        1
## 2149                     protein_coding    chr1 1315404 1315438      -        1
```

```
## 2150                 protein_coding      chr1 1315404 1315438         -         1
## 2151                 protein_coding      chr1 1314824 1314962         -         1
## 2152                 protein_coding      chr1 1314824 1314962         -         1
## 2153                 protein_coding      chr1 1314301 1314365         -         1
## 2154                 protein_coding      chr1 1314301 1314365         -         1
## 2155                 protein_coding      chr1 1313732 1313921         -         1
## 2156                 protein_coding      chr1 1313732 1313921         -         1
## 2157                 protein_coding      chr1 1313509 1313592         -         1
## 2158                 protein_coding      chr1 1313509 1313592         -         1
## 2159                 protein_coding      chr1 1313035 1313124         -         1
## 2160                 protein_coding      chr1 1313035 1313124         -         1
## 2161                 protein_coding      chr1 1312787 1312949         -         1
## 2162                 protein_coding      chr1 1312787 1312949         -         1
## 2163                 protein_coding      chr1 1312593 1312700         -         1
## 2164                 protein_coding      chr1 1312593 1312700         -         1
## 2165                 protein_coding      chr1 1312440 1312501         -         1
## 2166                 protein_coding      chr1 1312440 1312501         -         1
## 2167                 protein_coding      chr1 1312226 1312368         -         1
## 2168                 protein_coding      chr1 1312226 1312368         -         1
## 2169                 protein_coding      chr1 1312018 1312147         -         1
## 2170                 protein_coding      chr1 1312018 1312147         -         1
## 2171                 protein_coding      chr1 1311597 1311924         -         1
## 2172                 protein_coding      chr1 1311862 1311924         -         1
## 2173                 protein_coding      chr1 1311859 1311861         -         1
## 2174                 protein_coding      chr1 1324609 1324691         -         1
## 2175                 protein_coding      chr1 1311597 1311861         -         1
## 2176                 protein_coding      chr1 1311601 1324673         -         1
## 2177                 protein_coding      chr1 1324581 1324673         -         1
## 2178                 protein_coding      chr1 1324581 1324608         -         1
## 2179                 protein_coding      chr1 1324606 1324608         -         1
## 2180                 protein_coding      chr1 1323181 1323287         -         1
## 2181                 protein_coding      chr1 1323181 1323287         -         1
## 2182                 protein_coding      chr1 1315520 1315618         -         1
## 2183                 protein_coding      chr1 1315520 1315618         -         1
## 2184                 protein_coding      chr1 1315404 1315438         -         1
## 2185                 protein_coding      chr1 1315404 1315438         -         1
## 2186                 protein_coding      chr1 1314824 1314962         -         1
## 2187                 protein_coding      chr1 1314824 1314962         -         1
## 2188                 protein_coding      chr1 1314301 1314365         -         1
## 2189                 protein_coding      chr1 1314301 1314365         -         1
## 2190                 protein_coding      chr1 1313732 1313921         -         1
## 2191                 protein_coding      chr1 1313732 1313921         -         1
## 2192                 protein_coding      chr1 1313509 1313592         -         1
## 2193                 protein_coding      chr1 1313509 1313592         -         1
## 2194                 protein_coding      chr1 1313035 1313124         -         1
## 2195                 protein_coding      chr1 1313035 1313124         -         1
## 2196                 protein_coding      chr1 1312787 1312949         -         1
## 2197                 protein_coding      chr1 1312787 1312949         -         1
## 2198                 protein_coding      chr1 1312593 1312700         -         1
## 2199                 protein_coding      chr1 1312593 1312700         -         1
## 2200                 protein_coding      chr1 1312440 1312501         -         1
## 2201                 protein_coding      chr1 1312440 1312501         -         1
## 2202                 protein_coding      chr1 1312226 1312368         -         1
## 2203                 protein_coding      chr1 1312226 1312368         -         1
```

```
## 2204                    protein_coding      chr1 1312018 1312147        -        1
## 2205                    protein_coding      chr1 1312018 1312147        -        1
## 2206                    protein_coding      chr1 1311601 1311924        -        1
## 2207                    protein_coding      chr1 1311862 1311924        -        1
## 2208                    protein_coding      chr1 1311859 1311861        -        1
## 2209                    protein_coding      chr1 1324609 1324673        -        1
## 2210                    protein_coding      chr1 1311601 1311861        -        1
## 2211                    protein_coding      chr1 1311606 1324637        -        1
## 2212                    protein_coding      chr1 1324581 1324637        -        1
## 2213                    protein_coding      chr1 1315520 1315618        -        1
## 2214                    protein_coding      chr1 1315404 1315438        -        1
## 2215                    protein_coding      chr1 1314824 1314962        -        1
## 2216                    protein_coding      chr1 1314301 1314365        -        1
## 2217                    protein_coding      chr1 1313732 1314105        -        1
## 2218                    protein_coding      chr1 1313732 1313914        -        1
## 2219                    protein_coding      chr1 1313912 1313914        -        1
## 2220                    protein_coding      chr1 1313509 1313592        -        1
## 2221                    protein_coding      chr1 1313509 1313592        -        1
## 2222                    protein_coding      chr1 1313035 1313124        -        1
## 2223                    protein_coding      chr1 1313035 1313124        -        1
## 2224                    protein_coding      chr1 1312787 1312949        -        1
## 2225                    protein_coding      chr1 1312787 1312949        -        1
## 2226                    protein_coding      chr1 1312593 1312700        -        1
## 2227                    protein_coding      chr1 1312593 1312700        -        1
## 2228                    protein_coding      chr1 1312440 1312501        -        1
## 2229                    protein_coding      chr1 1312440 1312501        -        1
## 2230                    protein_coding      chr1 1312226 1312368        -        1
## 2231                    protein_coding      chr1 1312226 1312368        -        1
## 2232                    protein_coding      chr1 1312018 1312147        -        1
## 2233                    protein_coding      chr1 1312018 1312147        -        1
## 2234                    protein_coding      chr1 1311606 1311924        -        1
## 2235                    protein_coding      chr1 1311862 1311924        -        1
## 2236                    protein_coding      chr1 1311859 1311861        -        1
## 2237                    protein_coding      chr1 1324581 1324637        -        1
## 2238                    protein_coding      chr1 1315520 1315618        -        1
## 2239                    protein_coding      chr1 1315404 1315438        -        1
## 2240                    protein_coding      chr1 1314824 1314962        -        1
## 2241                    protein_coding      chr1 1314301 1314365        -        1
## 2242                    protein_coding      chr1 1313915 1314105        -        1
## 2243                    protein_coding      chr1 1311606 1311861        -        1
## 2244                    protein_coding      chr1 1311606 1324653        -        1
## 2245                    protein_coding      chr1 1324581 1324653        -        1
## 2246                    protein_coding      chr1 1324581 1324608        -        1
## 2247                    protein_coding      chr1 1324606 1324608        -        1
## 2248                    protein_coding      chr1 1320996 1321093        -        1
## 2249                    protein_coding      chr1 1320996 1321093        -        1
## 2250                    protein_coding      chr1 1315520 1315618        -        1
## 2251                    protein_coding      chr1 1315520 1315618        -        1
## 2252                    protein_coding      chr1 1315404 1315438        -        1
## 2253                    protein_coding      chr1 1315404 1315438        -        1
## 2254                    protein_coding      chr1 1314824 1314962        -        1
## 2255                    protein_coding      chr1 1314824 1314962        -        1
## 2256                    protein_coding      chr1 1314301 1314365        -        1
## 2257                    protein_coding      chr1 1314301 1314365        -        1
```

```
## 2258            protein_coding   chr1 1313732 1313921      -      1
## 2259            protein_coding   chr1 1313732 1313921      -      1
## 2260            protein_coding   chr1 1313509 1313592      -      1
## 2261            protein_coding   chr1 1313509 1313592      -      1
## 2262            protein_coding   chr1 1313035 1313124      -      1
## 2263            protein_coding   chr1 1313035 1313124      -      1
## 2264            protein_coding   chr1 1312787 1312949      -      1
## 2265            protein_coding   chr1 1312787 1312949      -      1
## 2266            protein_coding   chr1 1312593 1312700      -      1
## 2267            protein_coding   chr1 1312593 1312700      -      1
## 2268            protein_coding   chr1 1312440 1312501      -      1
## 2269            protein_coding   chr1 1312440 1312501      -      1
## 2270            protein_coding   chr1 1312226 1312368      -      1
## 2271            protein_coding   chr1 1312226 1312368      -      1
## 2272            protein_coding   chr1 1312018 1312147      -      1
## 2273            protein_coding   chr1 1312018 1312147      -      1
## 2274            protein_coding   chr1 1311606 1311924      -      1
## 2275            protein_coding   chr1 1311862 1311924      -      1
## 2276            protein_coding   chr1 1311859 1311861      -      1
## 2277            protein_coding   chr1 1324609 1324653      -      1
## 2278            protein_coding   chr1 1311606 1311861      -      1
## 2279            protein_coding   chr1 1311819 1324670      -      1
## 2280            protein_coding   chr1 1324581 1324670      -      1
## 2281            protein_coding   chr1 1324581 1324608      -      1
## 2282            protein_coding   chr1 1324606 1324608      -      1
## 2283            protein_coding   chr1 1320996 1321093      -      1
## 2284            protein_coding   chr1 1320996 1321093      -      1
## 2285            protein_coding   chr1 1320456 1320529      -      1
## 2286            protein_coding   chr1 1320456 1320529      -      1
## 2287            protein_coding   chr1 1319296 1319524      -      1
## 2288            protein_coding   chr1 1319296 1319524      -      1
## 2289            protein_coding   chr1 1315520 1315552      -      1
## 2290            protein_coding   chr1 1315520 1315552      -      1
## 2291            protein_coding   chr1 1315404 1315438      -      1
## 2292            protein_coding   chr1 1315404 1315438      -      1
## 2293            protein_coding   chr1 1314824 1314962      -      1
## 2294            protein_coding   chr1 1314824 1314962      -      1
## 2295            protein_coding   chr1 1314301 1314365      -      1
## 2296            protein_coding   chr1 1314301 1314365      -      1
## 2297            protein_coding   chr1 1313732 1313921      -      1
## 2298            protein_coding   chr1 1313732 1313921      -      1
## 2299            protein_coding   chr1 1313509 1313592      -      1
## 2300            protein_coding   chr1 1313509 1313592      -      1
## 2301            protein_coding   chr1 1313035 1313124      -      1
## 2302            protein_coding   chr1 1313035 1313124      -      1
## 2303            protein_coding   chr1 1312787 1312949      -      1
## 2304            protein_coding   chr1 1312787 1312949      -      1
## 2305            protein_coding   chr1 1312593 1312700      -      1
## 2306            protein_coding   chr1 1312593 1312700      -      1
## 2307            protein_coding   chr1 1312440 1312501      -      1
## 2308            protein_coding   chr1 1312440 1312501      -      1
## 2309            protein_coding   chr1 1312226 1312368      -      1
## 2310            protein_coding   chr1 1312226 1312368      -      1
## 2311            protein_coding   chr1 1312018 1312147      -      1
```

```
## 2312            protein_coding   chr1 1312018 1312147      -        1
## 2313            protein_coding   chr1 1311819 1311924      -        1
## 2314            protein_coding   chr1 1311862 1311924      -        1
## 2315            protein_coding   chr1 1311859 1311861      -        1
## 2316            protein_coding   chr1 1324609 1324670      -        1
## 2317            protein_coding   chr1 1311819 1311861      -        1
## 2318            protein_coding   chr1 1318679 1324666      -        1
## 2319            protein_coding   chr1 1324581 1324666      -        1
## 2320            protein_coding   chr1 1324581 1324608      -        1
## 2321            protein_coding   chr1 1324606 1324608      -        1
## 2322            protein_coding   chr1 1320996 1321093      -        1
## 2323            protein_coding   chr1 1320996 1321093      -        1
## 2324            protein_coding   chr1 1320456 1320529      -        1
## 2325            protein_coding   chr1 1320456 1320529      -        1
## 2326            protein_coding   chr1 1318679 1319524      -        1
## 2327            protein_coding   chr1 1318858 1319524      -        1
## 2328            protein_coding   chr1 1318855 1318857      -        1
## 2329            protein_coding   chr1 1324609 1324666      -        1
## 2330            protein_coding   chr1 1318679 1318857      -        1
## 2331                     miRNA   chr1 1312502 1312566      -        1
## 2332                     miRNA   chr1 1312502 1312566      -        1
## 2333                     miRNA   chr1 1312502 1312566      -        1
## 2334                    lncRNA   chr1 1317581 1318689      -        0
## 2335                    lncRNA   chr1 1317581 1318689      -        0
## 2336                    lncRNA   chr1 1318623 1318689      -        0
## 2337                    lncRNA   chr1 1317581 1317899      -        0
## 2338            protein_coding   chr1 1324756 1328896      +        1
## 2339            protein_coding   chr1 1324802 1328896      +        1
## 2340            protein_coding   chr1 1324802 1325102      +        1
## 2341            protein_coding   chr1 1326836 1327032      +        1
## 2342            protein_coding   chr1 1326911 1327032      +        1
## 2343            protein_coding   chr1 1326911 1326913      +        1
## 2344            protein_coding   chr1 1327241 1328896      +        1
## 2345            protein_coding   chr1 1327241 1327760      +        1
## 2346            protein_coding   chr1 1327761 1327763      +        1
## 2347            protein_coding   chr1 1324802 1325102      +        1
## 2348            protein_coding   chr1 1326836 1326910      +        1
## 2349            protein_coding   chr1 1327761 1328896      +        1
## 2350            protein_coding   chr1 1331280 1335314      +        1
## 2351            protein_coding   chr1 1331280 1335314      +        1
## 2352            protein_coding   chr1 1331280 1331536      +        1
## 2353            protein_coding   chr1 1331346 1331536      +        1
## 2354            protein_coding   chr1 1331346 1331348      +        1
## 2355            protein_coding   chr1 1331638 1331938      +        1
## 2356            protein_coding   chr1 1331638 1331938      +        1
## 2357            protein_coding   chr1 1332024 1332806      +        1
## 2358            protein_coding   chr1 1332024 1332806      +        1
## 2359            protein_coding   chr1 1332921 1333124      +        1
## 2360            protein_coding   chr1 1332921 1333124      +        1
## 2361            protein_coding   chr1 1333259 1333379      +        1
## 2362            protein_coding   chr1 1333259 1333379      +        1
## 2363            protein_coding   chr1 1333506 1335314      +        1
## 2364            protein_coding   chr1 1333506 1334461      +        1
## 2365            protein_coding   chr1 1334462 1334464      +        1
```

```
## 2366                     protein_coding    chr1 1331280 1331345    +       1
## 2367                     protein_coding    chr1 1334462 1335314    +       1
## 2368                     protein_coding    chr1 1335276 1349418    -       1
## 2369                     protein_coding    chr1 1335276 1349112    -       1
## 2370                     protein_coding    chr1 1348896 1349112    -       1
## 2371                     protein_coding    chr1 1348896 1349065    -       1
## 2372                     protein_coding    chr1 1349063 1349065    -       1
## 2373                     protein_coding    chr1 1342689 1342758    -       1
## 2374                     protein_coding    chr1 1342689 1342758    -       1
## 2375                     protein_coding    chr1 1342363 1342484    -       1
## 2376                     protein_coding    chr1 1342363 1342484    -       1
## 2377                     protein_coding    chr1 1342053 1342156    -       1
## 2378                     protein_coding    chr1 1342053 1342156    -       1
## 2379                     protein_coding    chr1 1341667 1341805    -       1
## 2380                     protein_coding    chr1 1341667 1341805    -       1
## 2381                     protein_coding    chr1 1340410 1340503    -       1
## 2382                     protein_coding    chr1 1340410 1340503    -       1
## 2383                     protein_coding    chr1 1340247 1340316    -       1
## 2384                     protein_coding    chr1 1340247 1340316    -       1
## 2385                     protein_coding    chr1 1340038 1340177    -       1
## 2386                     protein_coding    chr1 1340038 1340177    -       1
## 2387                     protein_coding    chr1 1339736 1339812    -       1
## 2388                     protein_coding    chr1 1339736 1339812    -       1
## 2389                     protein_coding    chr1 1339582 1339649    -       1
## 2390                     protein_coding    chr1 1339582 1339649    -       1
## 2391                     protein_coding    chr1 1339362 1339439    -       1
## 2392                     protein_coding    chr1 1339362 1339439    -       1
## 2393                     protein_coding    chr1 1338522 1338653    -       1
## 2394                     protein_coding    chr1 1338522 1338653    -       1
## 2395                     protein_coding    chr1 1338269 1338436    -       1
## 2396                     protein_coding    chr1 1338269 1338436    -       1
## 2397                     protein_coding    chr1 1337977 1338183    -       1
## 2398                     protein_coding    chr1 1337977 1338183    -       1
## 2399                     protein_coding    chr1 1335276 1336515    -       1
## 2400                     protein_coding    chr1 1336145 1336515    -       1
## 2401                     protein_coding    chr1 1336142 1336144    -       1
## 2402                     protein_coding    chr1 1349066 1349112    -       1
## 2403                     protein_coding    chr1 1335276 1336144    -       1
## 2404                     protein_coding    chr1 1335278 1349418    -       1
## 2405                     protein_coding    chr1 1348896 1349418    -       1
## 2406                     protein_coding    chr1 1348896 1349065    -       1
## 2407                     protein_coding    chr1 1349063 1349065    -       1
## 2408                     protein_coding    chr1 1342689 1342758    -       1
## 2409                     protein_coding    chr1 1342689 1342758    -       1
## 2410                     protein_coding    chr1 1342363 1342484    -       1
## 2411                     protein_coding    chr1 1342363 1342484    -       1
## 2412                     protein_coding    chr1 1342053 1342156    -       1
## 2413                     protein_coding    chr1 1342053 1342156    -       1
## 2414                     protein_coding    chr1 1341667 1341805    -       1
## 2415                     protein_coding    chr1 1341667 1341805    -       1
## 2416                     protein_coding    chr1 1340410 1340503    -       1
## 2417                     protein_coding    chr1 1340410 1340503    -       1
## 2418                     protein_coding    chr1 1340247 1340316    -       1
## 2419                     protein_coding    chr1 1340247 1340316    -       1
```

```
## 2420                    protein_coding    chr1 1340038 1340177       -        1
## 2421                    protein_coding    chr1 1340038 1340177       -        1
## 2422                    protein_coding    chr1 1339736 1339812       -        1
## 2423                    protein_coding    chr1 1339736 1339812       -        1
## 2424                    protein_coding    chr1 1339582 1339649       -        1
## 2425                    protein_coding    chr1 1339582 1339649       -        1
## 2426                    protein_coding    chr1 1339287 1339439       -        1
## 2427                    protein_coding    chr1 1339287 1339439       -        1
## 2428                    protein_coding    chr1 1338522 1338653       -        1
## 2429                    protein_coding    chr1 1338522 1338653       -        1
## 2430                    protein_coding    chr1 1338269 1338436       -        1
## 2431                    protein_coding    chr1 1338269 1338436       -        1
## 2432                    protein_coding    chr1 1337977 1338183       -        1
## 2433                    protein_coding    chr1 1337977 1338183       -        1
## 2434                    protein_coding    chr1 1335278 1336515       -        1
## 2435                    protein_coding    chr1 1336145 1336515       -        1
## 2436                    protein_coding    chr1 1336142 1336144       -        1
## 2437                    protein_coding    chr1 1349066 1349418       -        1
## 2438                    protein_coding    chr1 1335278 1336144       -        1
## 2439                    protein_coding    chr1 1335279 1349135       -        1
## 2440                    protein_coding    chr1 1348896 1349135       -        1
## 2441                    protein_coding    chr1 1348896 1349065       -        1
## 2442                    protein_coding    chr1 1349063 1349065       -        1
## 2443                    protein_coding    chr1 1342689 1342758       -        1
## 2444                    protein_coding    chr1 1342689 1342758       -        1
## 2445                    protein_coding    chr1 1342363 1342484       -        1
## 2446                    protein_coding    chr1 1342363 1342484       -        1
## 2447                    protein_coding    chr1 1342053 1342156       -        1
## 2448                    protein_coding    chr1 1342053 1342156       -        1
## 2449                    protein_coding    chr1 1341667 1341805       -        1
## 2450                    protein_coding    chr1 1341667 1341805       -        1
## 2451                    protein_coding    chr1 1340459 1340503       -        1
## 2452                    protein_coding    chr1 1340459 1340503       -        1
## 2453                    protein_coding    chr1 1338269 1338372       -        1
## 2454                    protein_coding    chr1 1338269 1338372       -        1
## 2455                    protein_coding    chr1 1337977 1338183       -        1
## 2456                    protein_coding    chr1 1337977 1338183       -        1
## 2457                    protein_coding    chr1 1335279 1336515       -        1
## 2458                    protein_coding    chr1 1336145 1336515       -        1
## 2459                    protein_coding    chr1 1336142 1336144       -        1
## 2460                    protein_coding    chr1 1349066 1349135       -        1
## 2461                    protein_coding    chr1 1335279 1336144       -        1
## 2462                             miRNA    chr1 1339650 1339708       -        1
## 2463                             miRNA    chr1 1339650 1339708       -        1
## 2464                             miRNA    chr1 1339650 1339708       -        1
## 2465                    protein_coding    chr1 1352689 1361777       -        1
## 2466                    protein_coding    chr1 1352689 1358794       -        1
## 2467                    protein_coding    chr1 1358456 1358794       -        1
## 2468                    protein_coding    chr1 1358456 1358504       -        1
## 2469                    protein_coding    chr1 1358502 1358504       -        1
## 2470                    protein_coding    chr1 1356681 1356704       -        1
## 2471                    protein_coding    chr1 1356681 1356704       -        1
## 2472                    protein_coding    chr1 1355244 1355345       -        1
## 2473                    protein_coding    chr1 1355244 1355345       -        1
```

```
## 2474              protein_coding    chr1 1354682 1355152    -    1
## 2475              protein_coding    chr1 1354682 1355152    -    1
## 2476              protein_coding    chr1 1354354 1354509    -    1
## 2477              protein_coding    chr1 1354354 1354509    -    1
## 2478              protein_coding    chr1 1354193 1354232    -    1
## 2479              protein_coding    chr1 1354193 1354232    -    1
## 2480              protein_coding    chr1 1354030 1354106    -    1
## 2481              protein_coding    chr1 1354030 1354106    -    1
## 2482              protein_coding    chr1 1353848 1353928    -    1
## 2483              protein_coding    chr1 1353848 1353928    -    1
## 2484              protein_coding    chr1 1352689 1353629    -    1
## 2485              protein_coding    chr1 1353607 1353629    -    1
## 2486              protein_coding    chr1 1353604 1353606    -    1
## 2487              protein_coding    chr1 1358505 1358794    -    1
## 2488              protein_coding    chr1 1352689 1353606    -    1
## 2489              protein_coding    chr1 1352691 1358535    -    1
## 2490              protein_coding    chr1 1358456 1358535    -    1
## 2491              protein_coding    chr1 1358456 1358504    -    1
## 2492              protein_coding    chr1 1358502 1358504    -    1
## 2493              protein_coding    chr1 1356681 1356704    -    1
## 2494              protein_coding    chr1 1356681 1356704    -    1
## 2495              protein_coding    chr1 1355450 1355752    -    1
## 2496              protein_coding    chr1 1355450 1355752    -    1
## 2497              protein_coding    chr1 1355244 1355345    -    1
## 2498              protein_coding    chr1 1355244 1355345    -    1
## 2499              protein_coding    chr1 1354682 1355152    -    1
## 2500              protein_coding    chr1 1354682 1355152    -    1
## 2501              protein_coding    chr1 1354354 1354509    -    1
## 2502              protein_coding    chr1 1354354 1354509    -    1
## 2503              protein_coding    chr1 1354193 1354232    -    1
## 2504              protein_coding    chr1 1354193 1354232    -    1
## 2505              protein_coding    chr1 1354030 1354106    -    1
## 2506              protein_coding    chr1 1354030 1354106    -    1
## 2507              protein_coding    chr1 1353848 1353928    -    1
## 2508              protein_coding    chr1 1353848 1353928    -    1
## 2509              protein_coding    chr1 1352691 1353629    -    1
## 2510              protein_coding    chr1 1353607 1353629    -    1
## 2511              protein_coding    chr1 1353604 1353606    -    1
## 2512              protein_coding    chr1 1358505 1358535    -    1
## 2513              protein_coding    chr1 1352691 1353606    -    1
## 2514              protein_coding    chr1 1352692 1358543    -    1
## 2515              protein_coding    chr1 1358456 1358543    -    1
## 2516              protein_coding    chr1 1358456 1358504    -    1
## 2517              protein_coding    chr1 1358502 1358504    -    1
## 2518              protein_coding    chr1 1356681 1356704    -    1
## 2519              protein_coding    chr1 1356681 1356704    -    1
## 2520              protein_coding    chr1 1355450 1355752    -    1
## 2521              protein_coding    chr1 1355450 1355752    -    1
## 2522              protein_coding    chr1 1355244 1355345    -    1
## 2523              protein_coding    chr1 1355244 1355345    -    1
## 2524              protein_coding    chr1 1354682 1355152    -    1
## 2525              protein_coding    chr1 1354682 1355152    -    1
## 2526              protein_coding    chr1 1354354 1354509    -    1
## 2527              protein_coding    chr1 1354354 1354509    -    1
```

```
## 2528                    protein_coding    chr1 1354193 1354232    -    1
## 2529                    protein_coding    chr1 1354193 1354232    -    1
## 2530                    protein_coding    chr1 1354030 1354106    -    1
## 2531                    protein_coding    chr1 1354030 1354106    -    1
## 2532                    protein_coding    chr1 1353848 1353946    -    1
## 2533                    protein_coding    chr1 1353848 1353946    -    1
## 2534                    protein_coding    chr1 1352692 1353332    -    1
## 2535                    protein_coding    chr1 1353304 1353332    -    1
## 2536                    protein_coding    chr1 1353301 1353303    -    1
## 2537                    protein_coding    chr1 1358505 1358543    -    1
## 2538                    protein_coding    chr1 1352692 1353303    -    1
## 2539                    protein_coding    chr1 1352692 1361777    -    1
## 2540                    protein_coding    chr1 1361242 1361777    -    1
## 2541                    protein_coding    chr1 1361242 1361263    -    1
## 2542                    protein_coding    chr1 1361261 1361263    -    1
## 2543                    protein_coding    chr1 1356681 1356704    -    1
## 2544                    protein_coding    chr1 1356681 1356704    -    1
## 2545                    protein_coding    chr1 1355450 1355752    -    1
## 2546                    protein_coding    chr1 1355450 1355752    -    1
## 2547                    protein_coding    chr1 1355244 1355345    -    1
## 2548                    protein_coding    chr1 1355244 1355345    -    1
## 2549                    protein_coding    chr1 1354682 1355152    -    1
## 2550                    protein_coding    chr1 1354682 1355152    -    1
## 2551                    protein_coding    chr1 1354354 1354509    -    1
## 2552                    protein_coding    chr1 1354354 1354509    -    1
## 2553                    protein_coding    chr1 1354193 1354232    -    1
## 2554                    protein_coding    chr1 1354193 1354232    -    1
## 2555                    protein_coding    chr1 1354030 1354106    -    1
## 2556                    protein_coding    chr1 1354030 1354106    -    1
## 2557                    protein_coding    chr1 1353848 1353928    -    1
## 2558                    protein_coding    chr1 1353848 1353928    -    1
## 2559                    protein_coding    chr1 1352692 1353629    -    1
## 2560                    protein_coding    chr1 1353607 1353629    -    1
## 2561                    protein_coding    chr1 1353604 1353606    -    1
## 2562                    protein_coding    chr1 1361264 1361777    -    1
## 2563                    protein_coding    chr1 1352692 1353606    -    1
## 2564                    protein_coding    chr1 1373730 1375495    -    1
## 2565                    protein_coding    chr1 1373730 1375157    -    1
## 2566                    protein_coding    chr1 1374705 1375157    -    1
## 2567                    protein_coding    chr1 1374705 1374756    -    1
## 2568                    protein_coding    chr1 1374754 1374756    -    1
## 2569                    protein_coding    chr1 1374000 1374445    -    1
## 2570                    protein_coding    chr1 1374000 1374445    -    1
## 2571                    protein_coding    chr1 1373730 1373902    -    1
## 2572                    protein_coding    chr1 1373804 1373902    -    1
## 2573                    protein_coding    chr1 1373801 1373803    -    1
## 2574                    protein_coding    chr1 1374757 1375157    -    1
## 2575                    protein_coding    chr1 1373730 1373803    -    1
## 2576                    protein_coding    chr1 1373730 1375495    -    1
## 2577                    protein_coding    chr1 1375154 1375495    -    1
## 2578                    protein_coding    chr1 1374705 1374790    -    1
## 2579                    protein_coding    chr1 1374705 1374756    -    1
## 2580                    protein_coding    chr1 1374754 1374756    -    1
## 2581                    protein_coding    chr1 1374000 1374445    -    1
```

247

```
## 2582                protein_coding        chr1 1374000 1374445        -        1
## 2583                protein_coding        chr1 1373730 1373902        -        1
## 2584                protein_coding        chr1 1373804 1373902        -        1
## 2585                protein_coding        chr1 1373801 1373803        -        1
## 2586                protein_coding        chr1 1375154 1375495        -        1
## 2587                protein_coding        chr1 1374757 1374790        -        1
## 2588                protein_coding        chr1 1373730 1373803        -        1
## 2589                protein_coding        chr1 1373732 1375169        -        1
## 2590                protein_coding        chr1 1375075 1375169        -        1
## 2591                protein_coding        chr1 1374705 1374790        -        1
## 2592                protein_coding        chr1 1374705 1374756        -        1
## 2593                protein_coding        chr1 1374754 1374756        -        1
## 2594                protein_coding        chr1 1374000 1374445        -        1
## 2595                protein_coding        chr1 1374000 1374445        -        1
## 2596                protein_coding        chr1 1373732 1373902        -        1
## 2597                protein_coding        chr1 1373804 1373902        -        1
## 2598                protein_coding        chr1 1373801 1373803        -        1
## 2599                protein_coding        chr1 1375075 1375169        -        1
## 2600                protein_coding        chr1 1374757 1374790        -        1
## 2601                protein_coding        chr1 1373732 1373803        -        1
## 2602                protein_coding        chr1 1373737 1375173        -        1
## 2603                protein_coding        chr1 1374997 1375173        -        1
## 2604                protein_coding        chr1 1374705 1374790        -        1
## 2605                protein_coding        chr1 1374705 1374756        -        1
## 2606                protein_coding        chr1 1374754 1374756        -        1
## 2607                protein_coding        chr1 1374000 1374445        -        1
## 2608                protein_coding        chr1 1374000 1374445        -        1
## 2609                protein_coding        chr1 1373737 1373902        -        1
## 2610                protein_coding        chr1 1373804 1373902        -        1
## 2611                protein_coding        chr1 1373801 1373803        -        1
## 2612                protein_coding        chr1 1374997 1375173        -        1
## 2613                protein_coding        chr1 1374757 1374790        -        1
## 2614                protein_coding        chr1 1373737 1373803        -        1
## 2615          processed_pseudogene        chr1 1378666 1379032        +        1
## 2616          processed_pseudogene        chr1 1378666 1379032        +        1
## 2617          processed_pseudogene        chr1 1378666 1379032        +        1
## 2618                protein_coding        chr1 1385711 1399335        -        1
## 2619                protein_coding        chr1 1385711 1399335        -        1
## 2620                protein_coding        chr1 1399019 1399335        -        1
## 2621                protein_coding        chr1 1399019 1399306        -        1
## 2622                protein_coding        chr1 1399304 1399306        -        1
## 2623                protein_coding        chr1 1398597 1398671        -        1
## 2624                protein_coding        chr1 1398597 1398671        -        1
## 2625                protein_coding        chr1 1398233 1398342        -        1
## 2626                protein_coding        chr1 1398233 1398342        -        1
## 2627                protein_coding        chr1 1395394 1395514        -        1
## 2628                protein_coding        chr1 1395394 1395514        -        1
## 2629                protein_coding        chr1 1393396 1393460        -        1
## 2630                protein_coding        chr1 1393396 1393460        -        1
## 2631                protein_coding        chr1 1390766 1390865        -        1
## 2632                protein_coding        chr1 1390766 1390865        -        1
## 2633                protein_coding        chr1 1390459 1390563        -        1
## 2634                protein_coding        chr1 1390459 1390563        -        1
## 2635                protein_coding        chr1 1390230 1390371        -        1
```

248

```
## 2636                    protein_coding    chr1 1390230 1390371       -        1
## 2637                    protein_coding    chr1 1387954 1388065       -        1
## 2638                    protein_coding    chr1 1387954 1388065       -        1
## 2639                    protein_coding    chr1 1387777 1387869       -        1
## 2640                    protein_coding    chr1 1387777 1387869       -        1
## 2641                    protein_coding    chr1 1385711 1387582       -        1
## 2642                    protein_coding    chr1 1387234 1387582       -        1
## 2643                    protein_coding    chr1 1387231 1387233       -        1
## 2644                    protein_coding    chr1 1399307 1399335       -        1
## 2645                    protein_coding    chr1 1385711 1387233       -        1
## 2646                    protein_coding    chr1 1386503 1390943       -        1
## 2647                    protein_coding    chr1 1390766 1390943       -        1
## 2648                    protein_coding    chr1 1390766 1390858       -        1
## 2649                    protein_coding    chr1 1390856 1390858       -        1
## 2650                    protein_coding    chr1 1390459 1390563       -        1
## 2651                    protein_coding    chr1 1390459 1390563       -        1
## 2652                    protein_coding    chr1 1390315 1390371       -        1
## 2653                    protein_coding    chr1 1390315 1390371       -        1
## 2654                    protein_coding    chr1 1390230 1390309       -        1
## 2655                    protein_coding    chr1 1390230 1390309       -        1
## 2656                    protein_coding    chr1 1388816 1388830       -        1
## 2657                    protein_coding    chr1 1388816 1388830       -        1
## 2658                    protein_coding    chr1 1388626 1388743       -        1
## 2659                    protein_coding    chr1 1388626 1388743       -        1
## 2660                    protein_coding    chr1 1388492 1388510       -        1
## 2661                    protein_coding    chr1 1388492 1388510       -        1
## 2662                    protein_coding    chr1 1387954 1388065       -        1
## 2663                    protein_coding    chr1 1387954 1388065       -        1
## 2664                    protein_coding    chr1 1387777 1387869       -        1
## 2665                    protein_coding    chr1 1387777 1387869       -        1
## 2666                    protein_coding    chr1 1386503 1387582       -        1
## 2667                    protein_coding    chr1 1387234 1387582       -        1
## 2668                    protein_coding    chr1 1387231 1387233       -        1
## 2669                    protein_coding    chr1 1390859 1390943       -        1
## 2670                    protein_coding    chr1 1386503 1387233       -        1
## 2671                    protein_coding    chr1 1392288 1399317       -        1
## 2672                    protein_coding    chr1 1399019 1399317       -        1
## 2673                    protein_coding    chr1 1399019 1399306       -        1
## 2674                    protein_coding    chr1 1399304 1399306       -        1
## 2675                    protein_coding    chr1 1398597 1398671       -        1
## 2676                    protein_coding    chr1 1398597 1398671       -        1
## 2677                    protein_coding    chr1 1398233 1398342       -        1
## 2678                    protein_coding    chr1 1398233 1398342       -        1
## 2679                    protein_coding    chr1 1395394 1395514       -        1
## 2680                    protein_coding    chr1 1395394 1395514       -        1
## 2681                    protein_coding    chr1 1393396 1393460       -        1
## 2682                    protein_coding    chr1 1393396 1393460       -        1
## 2683                    protein_coding    chr1 1392288 1392803       -        1
## 2684                    protein_coding    chr1 1392785 1392803       -        1
## 2685                    protein_coding    chr1 1392782 1392784       -        1
## 2686                    protein_coding    chr1 1399307 1399317       -        1
## 2687                    protein_coding    chr1 1392288 1392784       -        1
## 2688                            lncRNA    chr1 1399520 1402046       +        1
## 2689                            lncRNA    chr1 1399572 1402006       +        1
```

```
## 2690                      lncRNA   chr1 1399572 1399689       +       1
## 2691                      lncRNA   chr1 1399981 1400303       +       1
## 2692                      lncRNA   chr1 1400605 1402006       +       1
## 2693              protein_coding   chr1 1401909 1407293       -       1
## 2694              protein_coding   chr1 1401909 1407293       -       1
## 2695              protein_coding   chr1 1407131 1407293       -       1
## 2696              protein_coding   chr1 1407131 1407217       -       1
## 2697              protein_coding   chr1 1407215 1407217       -       1
## 2698              protein_coding   chr1 1406909 1407019       -       1
## 2699              protein_coding   chr1 1406909 1407019       -       1
## 2700              protein_coding   chr1 1405809 1405886       -       1
## 2701              protein_coding   chr1 1405809 1405886       -       1
## 2702              protein_coding   chr1 1401909 1402256       -       1
## 2703              protein_coding   chr1 1402086 1402256       -       1
## 2704              protein_coding   chr1 1402083 1402085       -       1
## 2705              protein_coding   chr1 1407218 1407293       -       1
## 2706              protein_coding   chr1 1401909 1402085       -       1
## 2707              protein_coding   chr1 1405109 1407290       -       1
## 2708              protein_coding   chr1 1407131 1407290       -       1
## 2709              protein_coding   chr1 1407131 1407217       -       1
## 2710              protein_coding   chr1 1407215 1407217       -       1
## 2711              protein_coding   chr1 1406909 1407019       -       1
## 2712              protein_coding   chr1 1406909 1407019       -       1
## 2713              protein_coding   chr1 1405109 1405886       -       1
## 2714              protein_coding   chr1 1405620 1405886       -       1
## 2715              protein_coding   chr1 1405617 1405619       -       1
## 2716              protein_coding   chr1 1407218 1407290       -       1
## 2717              protein_coding   chr1 1405109 1405619       -       1
## 2718                     misc_RNA   chr1 1405460 1405752       -       1
## 2719                     misc_RNA   chr1 1405460 1405752       -       1
## 2720                     misc_RNA   chr1 1405460 1405752       -       1
## 2721                      lncRNA   chr1 1409096 1410618       +       0
## 2722                      lncRNA   chr1 1409096 1410618       +       0
## 2723                      lncRNA   chr1 1409096 1410618       +       0
## 2724              protein_coding   chr1 1418420 1421769       -       1
## 2725              protein_coding   chr1 1418420 1421444       -       1
## 2726              protein_coding   chr1 1421133 1421444       -       1
## 2727              protein_coding   chr1 1420816 1421005       -       1
## 2728              protein_coding   chr1 1420816 1421005       -       1
## 2729              protein_coding   chr1 1421003 1421005       -       1
## 2730              protein_coding   chr1 1418420 1419549       -       1
## 2731              protein_coding   chr1 1419545 1419549       -       1
## 2732              protein_coding   chr1 1419542 1419544       -       1
## 2733              protein_coding   chr1 1421133 1421444       -       1
## 2734              protein_coding   chr1 1418420 1419544       -       1
## 2735              protein_coding   chr1 1418420 1421769       -       1
## 2736              protein_coding   chr1 1421133 1421769       -       1
## 2737              protein_coding   chr1 1420797 1421005       -       1
## 2738              protein_coding   chr1 1420797 1421005       -       1
## 2739              protein_coding   chr1 1421003 1421005       -       1
## 2740              protein_coding   chr1 1418420 1419549       -       1
## 2741              protein_coding   chr1 1419237 1419549       -       1
## 2742              protein_coding   chr1 1419234 1419236       -       1
## 2743              protein_coding   chr1 1421133 1421769       -       1
```

```
## 2744                 protein_coding    chr1 1418420 1419236    -    1
## 2745                 protein_coding    chr1 1418422 1421444    -    1
## 2746                 protein_coding    chr1 1421133 1421444    -    1
## 2747                 protein_coding    chr1 1420797 1421005    -    1
## 2748                 protein_coding    chr1 1420797 1421005    -    1
## 2749                 protein_coding    chr1 1421003 1421005    -    1
## 2750                 protein_coding    chr1 1420052 1420592    -    1
## 2751                 protein_coding    chr1 1420052 1420592    -    1
## 2752                 protein_coding    chr1 1418422 1419549    -    1
## 2753                 protein_coding    chr1 1419103 1419549    -    1
## 2754                 protein_coding    chr1 1419100 1419102    -    1
## 2755                 protein_coding    chr1 1421133 1421444    -    1
## 2756                 protein_coding    chr1 1418422 1419102    -    1
## 2757                 protein_coding    chr1 1418880 1421091    -    1
## 2758                 protein_coding    chr1 1420797 1421091    -    1
## 2759                 protein_coding    chr1 1420797 1421005    -    1
## 2760                 protein_coding    chr1 1421003 1421005    -    1
## 2761                 protein_coding    chr1 1420052 1420592    -    1
## 2762                 protein_coding    chr1 1420052 1420592    -    1
## 2763                 protein_coding    chr1 1418880 1419549    -    1
## 2764                 protein_coding    chr1 1419103 1419549    -    1
## 2765                 protein_coding    chr1 1419100 1419102    -    1
## 2766                 protein_coding    chr1 1421006 1421091    -    1
## 2767                 protein_coding    chr1 1418880 1419102    -    1
## 2768                 protein_coding    chr1 1419138 1421260    -    1
## 2769                 protein_coding    chr1 1420797 1421260    -    1
## 2770                 protein_coding    chr1 1420797 1421005    -    1
## 2771                 protein_coding    chr1 1421003 1421005    -    1
## 2772                 protein_coding    chr1 1419138 1419549    -    1
## 2773                 protein_coding    chr1 1419237 1419549    -    1
## 2774                 protein_coding    chr1 1419234 1419236    -    1
## 2775                 protein_coding    chr1 1421006 1421260    -    1
## 2776                 protein_coding    chr1 1419138 1419236    -    1
## 2777                         lncRNA    chr1 1420245 1422691    +    0
## 2778                         lncRNA    chr1 1420245 1422691    +    0
## 2779                         lncRNA    chr1 1420245 1420564    +    0
## 2780                         lncRNA    chr1 1422469 1422691    +    0
## 2781                 protein_coding    chr1 1426128 1427787    +    1
## 2782                 protein_coding    chr1 1426128 1427787    +    1
## 2783                 protein_coding    chr1 1426128 1426385    +    1
## 2784                 protein_coding    chr1 1426128 1426385    +    1
## 2785                 protein_coding    chr1 1426128 1426130    +    1
## 2786                 protein_coding    chr1 1427554 1427787    +    1
## 2787                 protein_coding    chr1 1427554 1427784    +    1
## 2788                 protein_coding    chr1 1427785 1427787    +    1
## 2789                 protein_coding    chr1 1427785 1427787    +    1
## 2790                         lncRNA    chr1 1430539 1434573    -    1
## 2791                         lncRNA    chr1 1430539 1434573    -    1
## 2792                         lncRNA    chr1 1434188 1434573    -    1
## 2793                         lncRNA    chr1 1430539 1430662    -    1
## 2794                         lncRNA    chr1 1430664 1434520    -    1
## 2795                         lncRNA    chr1 1434178 1434520    -    1
## 2796                         lncRNA    chr1 1430664 1430954    -    1
## 2797                 protein_coding    chr1 1434861 1442882    +    1
```

```
## 2798                    protein_coding     chr1 1435523 1440765     +      1
## 2799                    protein_coding     chr1 1435523 1435821     +      1
## 2800                    protein_coding     chr1 1435749 1435821     +      1
## 2801                    protein_coding     chr1 1435749 1435751     +      1
## 2802                    protein_coding     chr1 1437322 1437484     +      1
## 2803                    protein_coding     chr1 1437322 1437440     +      1
## 2804                    protein_coding     chr1 1437441 1437443     +      1
## 2805                    protein_coding     chr1 1439081 1440765     +      1
## 2806                    protein_coding     chr1 1435523 1435748     +      1
## 2807                    protein_coding     chr1 1437441 1437484     +      1
## 2808                    protein_coding     chr1 1439081 1440765     +      1
## 2809                    protein_coding     chr1 1435690 1442882     +      1
## 2810                    protein_coding     chr1 1435690 1435821     +      1
## 2811                    protein_coding     chr1 1435749 1435821     +      1
## 2812                    protein_coding     chr1 1435749 1435751     +      1
## 2813                    protein_coding     chr1 1436927 1437484     +      1
## 2814                    protein_coding     chr1 1436927 1437484     +      1
## 2815                    protein_coding     chr1 1439081 1442882     +      1
## 2816                    protein_coding     chr1 1439081 1439784     +      1
## 2817                    protein_coding     chr1 1439785 1439787     +      1
## 2818                    protein_coding     chr1 1435690 1435748     +      1
## 2819                    protein_coding     chr1 1439785 1442882     +      1
## 2820                    protein_coding     chr1 1449689 1470158     +      1
## 2821                    protein_coding     chr1 1449689 1470158     +      1
## 2822                    protein_coding     chr1 1449689 1450758     +      1
## 2823                    protein_coding     chr1 1450684 1450758     +      1
## 2824                    protein_coding     chr1 1450684 1450686     +      1
## 2825                    protein_coding     chr1 1452046 1452122     +      1
## 2826                    protein_coding     chr1 1452046 1452122     +      1
## 2827                    protein_coding     chr1 1452365 1452434     +      1
## 2828                    protein_coding     chr1 1452365 1452434     +      1
## 2829                    protein_coding     chr1 1454345 1454500     +      1
## 2830                    protein_coding     chr1 1454345 1454500     +      1
## 2831                    protein_coding     chr1 1455460 1455519     +      1
## 2832                    protein_coding     chr1 1455460 1455519     +      1
## 2833                    protein_coding     chr1 1455791 1455916     +      1
## 2834                    protein_coding     chr1 1455791 1455916     +      1
## 2835                    protein_coding     chr1 1456225 1456349     +      1
## 2836                    protein_coding     chr1 1456225 1456349     +      1
## 2837                    protein_coding     chr1 1457129 1457180     +      1
## 2838                    protein_coding     chr1 1457129 1457180     +      1
## 2839                    protein_coding     chr1 1459161 1459231     +      1
## 2840                    protein_coding     chr1 1459161 1459231     +      1
## 2841                    protein_coding     chr1 1460750 1460917     +      1
## 2842                    protein_coding     chr1 1460750 1460917     +      1
## 2843                    protein_coding     chr1 1462600 1462708     +      1
## 2844                    protein_coding     chr1 1462600 1462708     +      1
## 2845                    protein_coding     chr1 1468384 1470158     +      1
## 2846                    protein_coding     chr1 1468384 1468527     +      1
## 2847                    protein_coding     chr1 1468528 1468530     +      1
## 2848                    protein_coding     chr1 1449689 1450683     +      1
## 2849                    protein_coding     chr1 1468528 1470158     +      1
## 2850                    protein_coding     chr1 1471769 1497848     +      1
## 2851                    protein_coding     chr1 1471769 1496202     +      1
```

```
## 2852                              protein_coding   chr1 1471769 1472089     +      1
## 2853                              protein_coding   chr1 1471885 1472089     +      1
## 2854                              protein_coding   chr1 1471885 1471887     +      1
## 2855                              protein_coding   chr1 1477274 1477350     +      1
## 2856                              protein_coding   chr1 1477274 1477350     +      1
## 2857                              protein_coding   chr1 1478644 1478745     +      1
## 2858                              protein_coding   chr1 1478644 1478745     +      1
## 2859                              protein_coding   chr1 1479049 1479108     +      1
## 2860                              protein_coding   chr1 1479049 1479108     +      1
## 2861                              protein_coding   chr1 1480867 1480936     +      1
## 2862                              protein_coding   chr1 1480867 1480936     +      1
## 2863                              protein_coding   chr1 1482138 1482303     +      1
## 2864                              protein_coding   chr1 1482138 1482303     +      1
## 2865                              protein_coding   chr1 1482545 1482614     +      1
## 2866                              protein_coding   chr1 1482545 1482614     +      1
## 2867                              protein_coding   chr1 1485016 1485171     +      1
## 2868                              protein_coding   chr1 1485016 1485171     +      1
## 2869                              protein_coding   chr1 1485782 1485838     +      1
## 2870                              protein_coding   chr1 1485782 1485838     +      1
## 2871                              protein_coding   chr1 1486110 1486235     +      1
## 2872                              protein_coding   chr1 1486110 1486235     +      1
## 2873                              protein_coding   chr1 1486544 1486668     +      1
## 2874                              protein_coding   chr1 1486544 1486668     +      1
## 2875                              protein_coding   chr1 1487863 1487914     +      1
## 2876                              protein_coding   chr1 1487863 1487914     +      1
## 2877                              protein_coding   chr1 1489204 1489274     +      1
## 2878                              protein_coding   chr1 1489204 1489274     +      1
## 2879                              protein_coding   chr1 1490257 1490424     +      1
## 2880                              protein_coding   chr1 1490257 1490424     +      1
## 2881                              protein_coding   chr1 1490563 1490671     +      1
## 2882                              protein_coding   chr1 1490563 1490671     +      1
## 2883                              protein_coding   chr1 1495485 1496202     +      1
## 2884                              protein_coding   chr1 1495485 1495814     +      1
## 2885                              protein_coding   chr1 1495815 1495817     +      1
## 2886                              protein_coding   chr1 1471769 1471884     +      1
## 2887                              protein_coding   chr1 1495815 1496202     +      1
## 2888 transcribed_unprocessed_pseudogene   chr1 1503250 1509452     +      0
## 2889 transcribed_unprocessed_pseudogene   chr1 1503250 1509452     +      0
## 2890 transcribed_unprocessed_pseudogene   chr1 1503250 1503661     +      0
## 2891 transcribed_unprocessed_pseudogene   chr1 1509205 1509452     +      0
## 2892 transcribed_unprocessed_pseudogene   chr1 1503582 1509351     +      0
## 2893 transcribed_unprocessed_pseudogene   chr1 1503582 1503661     +      0
## 2894 transcribed_unprocessed_pseudogene   chr1 1509205 1509351     +      0
## 2895                              protein_coding   chr1 1512151 1534687     +      1
## 2896                              protein_coding   chr1 1512151 1534685     +      1
## 2897                              protein_coding   chr1 1512151 1512473     +      1
## 2898                              protein_coding   chr1 1512269 1512473     +      1
## 2899                              protein_coding   chr1 1512269 1512271     +      1
## 2900                              protein_coding   chr1 1516012 1516088     +      1
## 2901                              protein_coding   chr1 1516012 1516088     +      1
## 2902                              protein_coding   chr1 1517311 1517412     +      1
## 2903                              protein_coding   chr1 1517311 1517412     +      1
## 2904                              protein_coding   chr1 1517716 1517775     +      1
## 2905                              protein_coding   chr1 1517716 1517775     +      1
```

```
## 2906                   protein_coding    chr1 1518921 1518990        +        1
## 2907                   protein_coding    chr1 1518921 1518990        +        1
## 2908                   protein_coding    chr1 1520141 1520306        +        1
## 2909                   protein_coding    chr1 1520141 1520306        +        1
## 2910                   protein_coding    chr1 1520548 1520617        +        1
## 2911                   protein_coding    chr1 1520548 1520617        +        1
## 2912                   protein_coding    chr1 1522744 1522899        +        1
## 2913                   protein_coding    chr1 1522744 1522899        +        1
## 2914                   protein_coding    chr1 1523511 1523567        +        1
## 2915                   protein_coding    chr1 1523511 1523567        +        1
## 2916                   protein_coding    chr1 1523839 1523964        +        1
## 2917                   protein_coding    chr1 1523839 1523964        +        1
## 2918                   protein_coding    chr1 1524273 1524397        +        1
## 2919                   protein_coding    chr1 1524273 1524397        +        1
## 2920                   protein_coding    chr1 1525240 1525291        +        1
## 2921                   protein_coding    chr1 1525240 1525291        +        1
## 2922                   protein_coding    chr1 1526461 1526531        +        1
## 2923                   protein_coding    chr1 1526461 1526531        +        1
## 2924                   protein_coding    chr1 1527695 1527862        +        1
## 2925                   protein_coding    chr1 1527695 1527862        +        1
## 2926                   protein_coding    chr1 1529223 1529331        +        1
## 2927                   protein_coding    chr1 1529223 1529331        +        1
## 2928                   protein_coding    chr1 1533926 1534685        +        1
## 2929                   protein_coding    chr1 1533926 1534069        +        1
## 2930                   protein_coding    chr1 1534070 1534072        +        1
## 2931                   protein_coding    chr1 1512151 1512268        +        1
## 2932                   protein_coding    chr1 1534070 1534685        +        1
## 2933                   protein_coding    chr1 1512175 1534685        +        1
## 2934                   protein_coding    chr1 1512175 1512473        +        1
## 2935                   protein_coding    chr1 1512269 1512473        +        1
## 2936                   protein_coding    chr1 1512269 1512271        +        1
## 2937                   protein_coding    chr1 1516012 1516088        +        1
## 2938                   protein_coding    chr1 1516012 1516088        +        1
## 2939                   protein_coding    chr1 1517167 1517412        +        1
## 2940                   protein_coding    chr1 1517167 1517412        +        1
## 2941                   protein_coding    chr1 1517716 1517775        +        1
## 2942                   protein_coding    chr1 1517716 1517775        +        1
## 2943                   protein_coding    chr1 1518921 1518990        +        1
## 2944                   protein_coding    chr1 1518921 1518990        +        1
## 2945                   protein_coding    chr1 1520141 1520306        +        1
## 2946                   protein_coding    chr1 1520141 1520306        +        1
## 2947                   protein_coding    chr1 1520548 1520617        +        1
## 2948                   protein_coding    chr1 1520548 1520617        +        1
## 2949                   protein_coding    chr1 1522744 1522899        +        1
## 2950                   protein_coding    chr1 1522744 1522899        +        1
## 2951                   protein_coding    chr1 1523511 1523567        +        1
## 2952                   protein_coding    chr1 1523511 1523567        +        1
## 2953                   protein_coding    chr1 1523839 1523964        +        1
## 2954                   protein_coding    chr1 1523839 1523964        +        1
## 2955                   protein_coding    chr1 1524273 1524397        +        1
## 2956                   protein_coding    chr1 1524273 1524397        +        1
## 2957                   protein_coding    chr1 1525240 1525291        +        1
## 2958                   protein_coding    chr1 1525240 1525291        +        1
## 2959                   protein_coding    chr1 1526461 1526531        +        1
```

```
## 2960                          protein_coding      chr1 1526461 1526531       +        1
## 2961                          protein_coding      chr1 1527695 1527862       +        1
## 2962                          protein_coding      chr1 1527695 1527862       +        1
## 2963                          protein_coding      chr1 1529223 1529331       +        1
## 2964                          protein_coding      chr1 1529223 1529331       +        1
## 2965                          protein_coding      chr1 1533926 1534685       +        1
## 2966                          protein_coding      chr1 1533926 1534069       +        1
## 2967                          protein_coding      chr1 1534070 1534072       +        1
## 2968                          protein_coding      chr1 1512175 1512268       +        1
## 2969                          protein_coding      chr1 1534070 1534685       +        1
## 2970                          protein_coding      chr1 1512530 1534687       +        1
## 2971                          protein_coding      chr1 1512530 1512690       +        1
## 2972                          protein_coding      chr1 1516012 1516088       +        1
## 2973                          protein_coding      chr1 1516044 1516088       +        1
## 2974                          protein_coding      chr1 1516044 1516046       +        1
## 2975                          protein_coding      chr1 1517311 1517412       +        1
## 2976                          protein_coding      chr1 1517311 1517412       +        1
## 2977                          protein_coding      chr1 1517716 1517775       +        1
## 2978                          protein_coding      chr1 1517716 1517775       +        1
## 2979                          protein_coding      chr1 1518921 1518990       +        1
## 2980                          protein_coding      chr1 1518921 1518990       +        1
## 2981                          protein_coding      chr1 1520141 1520306       +        1
## 2982                          protein_coding      chr1 1520141 1520306       +        1
## 2983                          protein_coding      chr1 1520548 1520617       +        1
## 2984                          protein_coding      chr1 1520548 1520617       +        1
## 2985                          protein_coding      chr1 1522744 1522899       +        1
## 2986                          protein_coding      chr1 1522744 1522899       +        1
## 2987                          protein_coding      chr1 1523511 1523567       +        1
## 2988                          protein_coding      chr1 1523511 1523567       +        1
## 2989                          protein_coding      chr1 1523839 1523964       +        1
## 2990                          protein_coding      chr1 1523839 1523964       +        1
## 2991                          protein_coding      chr1 1524273 1524397       +        1
## 2992                          protein_coding      chr1 1524273 1524397       +        1
## 2993                          protein_coding      chr1 1525240 1525291       +        1
## 2994                          protein_coding      chr1 1525240 1525291       +        1
## 2995                          protein_coding      chr1 1526461 1526531       +        1
## 2996                          protein_coding      chr1 1526461 1526531       +        1
## 2997                          protein_coding      chr1 1527695 1527862       +        1
## 2998                          protein_coding      chr1 1527695 1527862       +        1
## 2999                          protein_coding      chr1 1529223 1529331       +        1
## 3000                          protein_coding      chr1 1529223 1529331       +        1
## 3001                          protein_coding      chr1 1533926 1534687       +        1
## 3002                          protein_coding      chr1 1533926 1534069       +        1
## 3003                          protein_coding      chr1 1534070 1534072       +        1
## 3004                          protein_coding      chr1 1512530 1512690       +        1
## 3005                          protein_coding      chr1 1516012 1516043       +        1
## 3006                          protein_coding      chr1 1534070 1534687       +        1
## 3007                          protein_coding      chr1 1534778 1540624       −        1
## 3008                          protein_coding      chr1 1534778 1540624       −        1
## 3009                          protein_coding      chr1 1540290 1540624       −        1
## 3010                          protein_coding      chr1 1540290 1540346       −        1
## 3011                          protein_coding      chr1 1540344 1540346       −        1
## 3012                          protein_coding      chr1 1539684 1539790       −        1
## 3013                          protein_coding      chr1 1539684 1539790       −        1
```

```
## 3014                    protein_coding  chr1 1535589 1535797  -    1
## 3015                    protein_coding  chr1 1535589 1535797  -    1
## 3016                    protein_coding  chr1 1534778 1535507  -    1
## 3017                    protein_coding  chr1 1535362 1535507  -    1
## 3018                    protein_coding  chr1 1535359 1535361  -    1
## 3019                    protein_coding  chr1 1540347 1540624  -    1
## 3020                    protein_coding  chr1 1534778 1535361  -    1
## 3021                    protein_coding  chr1 1535207 1540453  -    1
## 3022                    protein_coding  chr1 1540420 1540453  -    1
## 3023                    protein_coding  chr1 1540290 1540355  -    1
## 3024                    protein_coding  chr1 1540290 1540346  -    1
## 3025                    protein_coding  chr1 1540344 1540346  -    1
## 3026                    protein_coding  chr1 1539684 1539790  -    1
## 3027                    protein_coding  chr1 1539684 1539790  -    1
## 3028                    protein_coding  chr1 1535589 1535797  -    1
## 3029                    protein_coding  chr1 1535589 1535797  -    1
## 3030                    protein_coding  chr1 1535207 1535507  -    1
## 3031                    protein_coding  chr1 1535362 1535507  -    1
## 3032                    protein_coding  chr1 1535359 1535361  -    1
## 3033                    protein_coding  chr1 1540420 1540453  -    1
## 3034                    protein_coding  chr1 1540347 1540355  -    1
## 3035                    protein_coding  chr1 1535207 1535361  -    1
## 3036                    protein_coding  chr1 1539056 1540350  -    1
## 3037                    protein_coding  chr1 1540290 1540350  -    1
## 3038                    protein_coding  chr1 1540290 1540346  -    1
## 3039                    protein_coding  chr1 1540344 1540346  -    1
## 3040                    protein_coding  chr1 1539056 1539790  -    1
## 3041                    protein_coding  chr1 1539683 1539790  -    1
## 3042                    protein_coding  chr1 1539680 1539682  -    1
## 3043                    protein_coding  chr1 1540347 1540350  -    1
## 3044                    protein_coding  chr1 1539056 1539682  -    1
## 3045                    protein_coding  chr1 1541673 1574863  -    1
## 3046                    protein_coding  chr1 1541673 1574863  -    1
## 3047                    protein_coding  chr1 1574478 1574863  -    1
## 3048                    protein_coding  chr1 1574478 1574557  -    1
## 3049                    protein_coding  chr1 1574555 1574557  -    1
## 3050                    protein_coding  chr1 1564773 1564916  -    1
## 3051                    protein_coding  chr1 1564773 1564916  -    1
## 3052                    protein_coding  chr1 1544863 1545002  -    1
## 3053                    protein_coding  chr1 1544863 1545002  -    1
## 3054                    protein_coding  chr1 1543869 1543987  -    1
## 3055                    protein_coding  chr1 1543869 1543987  -    1
## 3056                    protein_coding  chr1 1541673 1542167  -    1
## 3057                    protein_coding  chr1 1542069 1542167  -    1
## 3058                    protein_coding  chr1 1542066 1542068  -    1
## 3059                    protein_coding  chr1 1574558 1574863  -    1
## 3060                    protein_coding  chr1 1541673 1542068  -    1
## 3061                    protein_coding  chr1 1560848 1574584  -    1
## 3062                    protein_coding  chr1 1574478 1574584  -    1
## 3063                    protein_coding  chr1 1574478 1574557  -    1
## 3064                    protein_coding  chr1 1574555 1574557  -    1
## 3065                    protein_coding  chr1 1560848 1564916  -    1
## 3066                    protein_coding  chr1 1564538 1564916  -    1
## 3067                    protein_coding  chr1 1564535 1564537  -    1
```

```
## 3068              protein_coding  chr1 1574558 1574584      -      1
## 3069              protein_coding  chr1 1560848 1564537      -      1
## 3070                      lncRNA  chr1 1574102 1577075      +      0
## 3071                      lncRNA  chr1 1574102 1575879      +      0
## 3072                      lncRNA  chr1 1574102 1574349      +      0
## 3073                      lncRNA  chr1 1575287 1575879      +      0
## 3074         processed_pseudogene  chr1 1583510 1583909      -      0
## 3075         processed_pseudogene  chr1 1583510 1583909      -      0
## 3076         processed_pseudogene  chr1 1583510 1583909      -      0
## 3077              protein_coding  chr1 1598012 1600135      -      1
## 3078              protein_coding  chr1 1598012 1600135      -      1
## 3079              protein_coding  chr1 1598012 1600135      -      1
## 3080              protein_coding  chr1 1599338 1600015      -      1
## 3081              protein_coding  chr1 1600013 1600015      -      1
## 3082              protein_coding  chr1 1599335 1599337      -      1
## 3083              protein_coding  chr1 1598012 1599337      -      1
## 3084              protein_coding  chr1 1600016 1600135      -      1
## 3085                      lncRNA  chr1 1600314 1602703      +      0
## 3086                      lncRNA  chr1 1600314 1602703      +      0
## 3087                      lncRNA  chr1 1600314 1600582      +      0
## 3088                      lncRNA  chr1 1600657 1600706      +      0
## 3089                      lncRNA  chr1 1601193 1602703      +      0
## 3090                      lncRNA  chr1 1613758 1615795      -      0
## 3091                      lncRNA  chr1 1613758 1615795      -      0
## 3092                      lncRNA  chr1 1613758 1615795      -      0
## 3093              protein_coding  chr1 1615415 1630610      +      1
## 3094              protein_coding  chr1 1615415 1630605      +      1
## 3095              protein_coding  chr1 1615415 1615633      +      1
## 3096              protein_coding  chr1 1615460 1615633      +      1
## 3097              protein_coding  chr1 1615460 1615462      +      1
## 3098              protein_coding  chr1 1616508 1616614      +      1
## 3099              protein_coding  chr1 1616508 1616614      +      1
## 3100              protein_coding  chr1 1623389 1623699      +      1
## 3101              protein_coding  chr1 1623389 1623699      +      1
## 3102              protein_coding  chr1 1623774 1623945      +      1
## 3103              protein_coding  chr1 1623774 1623945      +      1
## 3104              protein_coding  chr1 1624795 1624901      +      1
## 3105              protein_coding  chr1 1624795 1624901      +      1
## 3106              protein_coding  chr1 1624991 1625185      +      1
## 3107              protein_coding  chr1 1624991 1625185      +      1
## 3108              protein_coding  chr1 1625286 1625428      +      1
## 3109              protein_coding  chr1 1625286 1625428      +      1
## 3110              protein_coding  chr1 1625558 1625653      +      1
## 3111              protein_coding  chr1 1625558 1625653      +      1
## 3112              protein_coding  chr1 1626650 1626754      +      1
## 3113              protein_coding  chr1 1626650 1626754      +      1
## 3114              protein_coding  chr1 1626837 1626999      +      1
## 3115              protein_coding  chr1 1626837 1626999      +      1
## 3116              protein_coding  chr1 1627074 1627207      +      1
## 3117              protein_coding  chr1 1627074 1627207      +      1
## 3118              protein_coding  chr1 1627296 1627444      +      1
## 3119              protein_coding  chr1 1627296 1627444      +      1
## 3120              protein_coding  chr1 1627673 1627829      +      1
## 3121              protein_coding  chr1 1627673 1627829      +      1
```

```
## 3122                    protein_coding    chr1 1628019 1628179    +    1
## 3123                    protein_coding    chr1 1628019 1628179    +    1
## 3124                    protein_coding    chr1 1628273 1628399    +    1
## 3125                    protein_coding    chr1 1628273 1628399    +    1
## 3126                    protein_coding    chr1 1628489 1628722    +    1
## 3127                    protein_coding    chr1 1628489 1628722    +    1
## 3128                    protein_coding    chr1 1629133 1629311    +    1
## 3129                    protein_coding    chr1 1629133 1629311    +    1
## 3130                    protein_coding    chr1 1629385 1629566    +    1
## 3131                    protein_coding    chr1 1629385 1629566    +    1
## 3132                    protein_coding    chr1 1629639 1629704    +    1
## 3133                    protein_coding    chr1 1629639 1629704    +    1
## 3134                    protein_coding    chr1 1630292 1630605    +    1
## 3135                    protein_coding    chr1 1630292 1630527    +    1
## 3136                    protein_coding    chr1 1630528 1630530    +    1
## 3137                    protein_coding    chr1 1615415 1615459    +    1
## 3138                    protein_coding    chr1 1630528 1630605    +    1
## 3139                    protein_coding    chr1 1615421 1630610    +    1
## 3140                    protein_coding    chr1 1615421 1615633    +    1
## 3141                    protein_coding    chr1 1615460 1615633    +    1
## 3142                    protein_coding    chr1 1615460 1615462    +    1
## 3143                    protein_coding    chr1 1616508 1616614    +    1
## 3144                    protein_coding    chr1 1616508 1616614    +    1
## 3145                    protein_coding    chr1 1623431 1623699    +    1
## 3146                    protein_coding    chr1 1623431 1623699    +    1
## 3147                    protein_coding    chr1 1623774 1623945    +    1
## 3148                    protein_coding    chr1 1623774 1623945    +    1
## 3149                    protein_coding    chr1 1624795 1624901    +    1
## 3150                    protein_coding    chr1 1624795 1624901    +    1
## 3151                    protein_coding    chr1 1624991 1625185    +    1
## 3152                    protein_coding    chr1 1624991 1625185    +    1
## 3153                    protein_coding    chr1 1625286 1625428    +    1
## 3154                    protein_coding    chr1 1625286 1625428    +    1
## 3155                    protein_coding    chr1 1625546 1625653    +    1
## 3156                    protein_coding    chr1 1625546 1625653    +    1
## 3157                    protein_coding    chr1 1626650 1626754    +    1
## 3158                    protein_coding    chr1 1626650 1626754    +    1
## 3159                    protein_coding    chr1 1626837 1626999    +    1
## 3160                    protein_coding    chr1 1626837 1626999    +    1
## 3161                    protein_coding    chr1 1627074 1627207    +    1
## 3162                    protein_coding    chr1 1627074 1627207    +    1
## 3163                    protein_coding    chr1 1627296 1627444    +    1
## 3164                    protein_coding    chr1 1627296 1627444    +    1
## 3165                    protein_coding    chr1 1627673 1627829    +    1
## 3166                    protein_coding    chr1 1627673 1627829    +    1
## 3167                    protein_coding    chr1 1628019 1628179    +    1
## 3168                    protein_coding    chr1 1628019 1628179    +    1
## 3169                    protein_coding    chr1 1628273 1628399    +    1
## 3170                    protein_coding    chr1 1628273 1628399    +    1
## 3171                    protein_coding    chr1 1628489 1628722    +    1
## 3172                    protein_coding    chr1 1628489 1628722    +    1
## 3173                    protein_coding    chr1 1629133 1629311    +    1
## 3174                    protein_coding    chr1 1629133 1629311    +    1
## 3175                    protein_coding    chr1 1629385 1629566    +    1
```

```
## 3176                      protein_coding     chr1 1629385 1629566      +        1
## 3177                      protein_coding     chr1 1629639 1629704      +        1
## 3178                      protein_coding     chr1 1629639 1629704      +        1
## 3179                      protein_coding     chr1 1630292 1630610      +        1
## 3180                      protein_coding     chr1 1630292 1630527      +        1
## 3181                      protein_coding     chr1 1630528 1630530      +        1
## 3182                      protein_coding     chr1 1615421 1615459      +        1
## 3183                      protein_coding     chr1 1630528 1630610      +        1
## 3184                      protein_coding     chr1 1615437 1630605      +        1
## 3185                      protein_coding     chr1 1615437 1615633      +        1
## 3186                      protein_coding     chr1 1615460 1615633      +        1
## 3187                      protein_coding     chr1 1615460 1615462      +        1
## 3188                      protein_coding     chr1 1616508 1616614      +        1
## 3189                      protein_coding     chr1 1616508 1616614      +        1
## 3190                      protein_coding     chr1 1623389 1623699      +        1
## 3191                      protein_coding     chr1 1623389 1623699      +        1
## 3192                      protein_coding     chr1 1623774 1623945      +        1
## 3193                      protein_coding     chr1 1623774 1623945      +        1
## 3194                      protein_coding     chr1 1624795 1624901      +        1
## 3195                      protein_coding     chr1 1624795 1624901      +        1
## 3196                      protein_coding     chr1 1625286 1625428      +        1
## 3197                      protein_coding     chr1 1625286 1625428      +        1
## 3198                      protein_coding     chr1 1625546 1625653      +        1
## 3199                      protein_coding     chr1 1625546 1625653      +        1
## 3200                      protein_coding     chr1 1626650 1626754      +        1
## 3201                      protein_coding     chr1 1626650 1626754      +        1
## 3202                      protein_coding     chr1 1626837 1626999      +        1
## 3203                      protein_coding     chr1 1626837 1626999      +        1
## 3204                      protein_coding     chr1 1627074 1627207      +        1
## 3205                      protein_coding     chr1 1627074 1627207      +        1
## 3206                      protein_coding     chr1 1627296 1627444      +        1
## 3207                      protein_coding     chr1 1627296 1627444      +        1
## 3208                      protein_coding     chr1 1627673 1627829      +        1
## 3209                      protein_coding     chr1 1627673 1627829      +        1
## 3210                      protein_coding     chr1 1628019 1628179      +        1
## 3211                      protein_coding     chr1 1628019 1628179      +        1
## 3212                      protein_coding     chr1 1628273 1628399      +        1
## 3213                      protein_coding     chr1 1628273 1628399      +        1
## 3214                      protein_coding     chr1 1628489 1628722      +        1
## 3215                      protein_coding     chr1 1628489 1628722      +        1
## 3216                      protein_coding     chr1 1629133 1629311      +        1
## 3217                      protein_coding     chr1 1629133 1629311      +        1
## 3218                      protein_coding     chr1 1629385 1629566      +        1
## 3219                      protein_coding     chr1 1629385 1629566      +        1
## 3220                      protein_coding     chr1 1629639 1629704      +        1
## 3221                      protein_coding     chr1 1629639 1629704      +        1
## 3222                      protein_coding     chr1 1630292 1630605      +        1
## 3223                      protein_coding     chr1 1630292 1630527      +        1
## 3224                      protein_coding     chr1 1630528 1630530      +        1
## 3225                      protein_coding     chr1 1615437 1615459      +        1
## 3226                      protein_coding     chr1 1630528 1630605      +        1
## 3227                      protein_coding     chr1 1615443 1630605      +        1
## 3228                      protein_coding     chr1 1615443 1615633      +        1
## 3229                      protein_coding     chr1 1615460 1615633      +        1
```

```
## 3230                         protein_coding   chr1 1615460 1615462      +        1
## 3231                         protein_coding   chr1 1616508 1616614      +        1
## 3232                         protein_coding   chr1 1616508 1616614      +        1
## 3233                         protein_coding   chr1 1623389 1623699      +        1
## 3234                         protein_coding   chr1 1623389 1623699      +        1
## 3235                         protein_coding   chr1 1623774 1623945      +        1
## 3236                         protein_coding   chr1 1623774 1623945      +        1
## 3237                         protein_coding   chr1 1624795 1624901      +        1
## 3238                         protein_coding   chr1 1624795 1624901      +        1
## 3239                         protein_coding   chr1 1624991 1625185      +        1
## 3240                         protein_coding   chr1 1624991 1625185      +        1
## 3241                         protein_coding   chr1 1625286 1625428      +        1
## 3242                         protein_coding   chr1 1625286 1625428      +        1
## 3243                         protein_coding   chr1 1625546 1625653      +        1
## 3244                         protein_coding   chr1 1625546 1625653      +        1
## 3245                         protein_coding   chr1 1626650 1626754      +        1
## 3246                         protein_coding   chr1 1626650 1626754      +        1
## 3247                         protein_coding   chr1 1626837 1626999      +        1
## 3248                         protein_coding   chr1 1626837 1626999      +        1
## 3249                         protein_coding   chr1 1627074 1627207      +        1
## 3250                         protein_coding   chr1 1627074 1627207      +        1
## 3251                         protein_coding   chr1 1627296 1627444      +        1
## 3252                         protein_coding   chr1 1627296 1627444      +        1
## 3253                         protein_coding   chr1 1627673 1627829      +        1
## 3254                         protein_coding   chr1 1627673 1627829      +        1
## 3255                         protein_coding   chr1 1628019 1628179      +        1
## 3256                         protein_coding   chr1 1628019 1628179      +        1
## 3257                         protein_coding   chr1 1628273 1628399      +        1
## 3258                         protein_coding   chr1 1628273 1628399      +        1
## 3259                         protein_coding   chr1 1628489 1628722      +        1
## 3260                         protein_coding   chr1 1628489 1628722      +        1
## 3261                         protein_coding   chr1 1629133 1629311      +        1
## 3262                         protein_coding   chr1 1629133 1629311      +        1
## 3263                         protein_coding   chr1 1629385 1629566      +        1
## 3264                         protein_coding   chr1 1629385 1629566      +        1
## 3265                         protein_coding   chr1 1629639 1629704      +        1
## 3266                         protein_coding   chr1 1629639 1629704      +        1
## 3267                         protein_coding   chr1 1630292 1630605      +        1
## 3268                         protein_coding   chr1 1630292 1630527      +        1
## 3269                         protein_coding   chr1 1630528 1630530      +        1
## 3270                         protein_coding   chr1 1615443 1615459      +        1
## 3271                         protein_coding   chr1 1630528 1630605      +        1
## 3272                         protein_coding   chr1 1615905 1630604      +        1
## 3273                         protein_coding   chr1 1615905 1616100      +        1
## 3274                         protein_coding   chr1 1616508 1616614      +        1
## 3275                         protein_coding   chr1 1623431 1623699      +        1
## 3276                         protein_coding   chr1 1623453 1623699      +        1
## 3277                         protein_coding   chr1 1623453 1623455      +        1
## 3278                         protein_coding   chr1 1623774 1623945      +        1
## 3279                         protein_coding   chr1 1623774 1623945      +        1
## 3280                         protein_coding   chr1 1624795 1624901      +        1
## 3281                         protein_coding   chr1 1624795 1624901      +        1
## 3282                         protein_coding   chr1 1625286 1625428      +        1
## 3283                         protein_coding   chr1 1625286 1625428      +        1
```

```
## 3284                    protein_coding    chr1 1625546 1625653    +    1
## 3285                    protein_coding    chr1 1625546 1625653    +    1
## 3286                    protein_coding    chr1 1626650 1626754    +    1
## 3287                    protein_coding    chr1 1626650 1626754    +    1
## 3288                    protein_coding    chr1 1626837 1626999    +    1
## 3289                    protein_coding    chr1 1626837 1626999    +    1
## 3290                    protein_coding    chr1 1627074 1627207    +    1
## 3291                    protein_coding    chr1 1627074 1627207    +    1
## 3292                    protein_coding    chr1 1627296 1627444    +    1
## 3293                    protein_coding    chr1 1627296 1627444    +    1
## 3294                    protein_coding    chr1 1627673 1627829    +    1
## 3295                    protein_coding    chr1 1627673 1627829    +    1
## 3296                    protein_coding    chr1 1628019 1628179    +    1
## 3297                    protein_coding    chr1 1628019 1628179    +    1
## 3298                    protein_coding    chr1 1628273 1628399    +    1
## 3299                    protein_coding    chr1 1628273 1628399    +    1
## 3300                    protein_coding    chr1 1628489 1628722    +    1
## 3301                    protein_coding    chr1 1628489 1628722    +    1
## 3302                    protein_coding    chr1 1629133 1629311    +    1
## 3303                    protein_coding    chr1 1629133 1629311    +    1
## 3304                    protein_coding    chr1 1629639 1629704    +    1
## 3305                    protein_coding    chr1 1629639 1629704    +    1
## 3306                    protein_coding    chr1 1630292 1630604    +    1
## 3307                    protein_coding    chr1 1630292 1630298    +    1
## 3308                    protein_coding    chr1 1630299 1630301    +    1
## 3309                    protein_coding    chr1 1615905 1616100    +    1
## 3310                    protein_coding    chr1 1616508 1616614    +    1
## 3311                    protein_coding    chr1 1623431 1623452    +    1
## 3312                    protein_coding    chr1 1630299 1630604    +    1
## 3313                    protein_coding    chr1 1616310 1630604    +    1
## 3314                    protein_coding    chr1 1616310 1616614    +    1
## 3315                    protein_coding    chr1 1623389 1623699    +    1
## 3316                    protein_coding    chr1 1623411 1623699    +    1
## 3317                    protein_coding    chr1 1623411 1623413    +    1
## 3318                    protein_coding    chr1 1623774 1623945    +    1
## 3319                    protein_coding    chr1 1623774 1623945    +    1
## 3320                    protein_coding    chr1 1624795 1624901    +    1
## 3321                    protein_coding    chr1 1624795 1624901    +    1
## 3322                    protein_coding    chr1 1624991 1625185    +    1
## 3323                    protein_coding    chr1 1624991 1625185    +    1
## 3324                    protein_coding    chr1 1625286 1625428    +    1
## 3325                    protein_coding    chr1 1625286 1625428    +    1
## 3326                    protein_coding    chr1 1625546 1625653    +    1
## 3327                    protein_coding    chr1 1625546 1625653    +    1
## 3328                    protein_coding    chr1 1626650 1626754    +    1
## 3329                    protein_coding    chr1 1626650 1626754    +    1
## 3330                    protein_coding    chr1 1626837 1626999    +    1
## 3331                    protein_coding    chr1 1626837 1626999    +    1
## 3332                    protein_coding    chr1 1627074 1627207    +    1
## 3333                    protein_coding    chr1 1627074 1627207    +    1
## 3334                    protein_coding    chr1 1627296 1627444    +    1
## 3335                    protein_coding    chr1 1627296 1627444    +    1
## 3336                    protein_coding    chr1 1627673 1627829    +    1
## 3337                    protein_coding    chr1 1627673 1627829    +    1
```

```
## 3338                    protein_coding    chr1 1628019 1628179    +    1
## 3339                    protein_coding    chr1 1628019 1628179    +    1
## 3340                    protein_coding    chr1 1628273 1628399    +    1
## 3341                    protein_coding    chr1 1628273 1628399    +    1
## 3342                    protein_coding    chr1 1628489 1628722    +    1
## 3343                    protein_coding    chr1 1628489 1628722    +    1
## 3344                    protein_coding    chr1 1629133 1629311    +    1
## 3345                    protein_coding    chr1 1629133 1629311    +    1
## 3346                    protein_coding    chr1 1629385 1629566    +    1
## 3347                    protein_coding    chr1 1629385 1629566    +    1
## 3348                    protein_coding    chr1 1629639 1629704    +    1
## 3349                    protein_coding    chr1 1629639 1629704    +    1
## 3350                    protein_coding    chr1 1630292 1630604    +    1
## 3351                    protein_coding    chr1 1630292 1630527    +    1
## 3352                    protein_coding    chr1 1630528 1630530    +    1
## 3353                    protein_coding    chr1 1616310 1616614    +    1
## 3354                    protein_coding    chr1 1623389 1623410    +    1
## 3355                    protein_coding    chr1 1630528 1630604    +    1
## 3356                    protein_coding    chr1 1617560 1630604    +    1
## 3357                    protein_coding    chr1 1617560 1617715    +    1
## 3358                    protein_coding    chr1 1623431 1623699    +    1
## 3359                    protein_coding    chr1 1623453 1623699    +    1
## 3360                    protein_coding    chr1 1623453 1623455    +    1
## 3361                    protein_coding    chr1 1623774 1623945    +    1
## 3362                    protein_coding    chr1 1623774 1623945    +    1
## 3363                    protein_coding    chr1 1624795 1624901    +    1
## 3364                    protein_coding    chr1 1624795 1624901    +    1
## 3365                    protein_coding    chr1 1624991 1625185    +    1
## 3366                    protein_coding    chr1 1624991 1625185    +    1
## 3367                    protein_coding    chr1 1625286 1625428    +    1
## 3368                    protein_coding    chr1 1625286 1625428    +    1
## 3369                    protein_coding    chr1 1626650 1626754    +    1
## 3370                    protein_coding    chr1 1626650 1626754    +    1
## 3371                    protein_coding    chr1 1626837 1626999    +    1
## 3372                    protein_coding    chr1 1626837 1626999    +    1
## 3373                    protein_coding    chr1 1627074 1627207    +    1
## 3374                    protein_coding    chr1 1627074 1627207    +    1
## 3375                    protein_coding    chr1 1627296 1627444    +    1
## 3376                    protein_coding    chr1 1627296 1627444    +    1
## 3377                    protein_coding    chr1 1627673 1627829    +    1
## 3378                    protein_coding    chr1 1627673 1627829    +    1
## 3379                    protein_coding    chr1 1628019 1628179    +    1
## 3380                    protein_coding    chr1 1628019 1628179    +    1
## 3381                    protein_coding    chr1 1628273 1628399    +    1
## 3382                    protein_coding    chr1 1628273 1628399    +    1
## 3383                    protein_coding    chr1 1628489 1628722    +    1
## 3384                    protein_coding    chr1 1628489 1628722    +    1
## 3385                    protein_coding    chr1 1629133 1629311    +    1
## 3386                    protein_coding    chr1 1629133 1629311    +    1
## 3387                    protein_coding    chr1 1629385 1629566    +    1
## 3388                    protein_coding    chr1 1629385 1629566    +    1
## 3389                    protein_coding    chr1 1629639 1629704    +    1
## 3390                    protein_coding    chr1 1629639 1629704    +    1
## 3391                    protein_coding    chr1 1630292 1630604    +    1
```

```
## 3392                        protein_coding    chr1 1630292 1630527    +    1
## 3393                        protein_coding    chr1 1630528 1630530    +    1
## 3394                        protein_coding    chr1 1617560 1617715    +    1
## 3395                        protein_coding    chr1 1623431 1623452    +    1
## 3396                        protein_coding    chr1 1630528 1630604    +    1
## 3397                        protein_coding    chr1 1632095 1635263    +    1
## 3398                        protein_coding    chr1 1632095 1634654    +    1
## 3399                        protein_coding    chr1 1632095 1632374    +    1
## 3400                        protein_coding    chr1 1632219 1632374    +    1
## 3401                        protein_coding    chr1 1632219 1632221    +    1
## 3402                        protein_coding    chr1 1632783 1632913    +    1
## 3403                        protein_coding    chr1 1632783 1632913    +    1
## 3404                        protein_coding    chr1 1632981 1633120    +    1
## 3405                        protein_coding    chr1 1632981 1633120    +    1
## 3406                        protein_coding    chr1 1633188 1633355    +    1
## 3407                        protein_coding    chr1 1633188 1633355    +    1
## 3408                        protein_coding    chr1 1633748 1633912    +    1
## 3409                        protein_coding    chr1 1633748 1633912    +    1
## 3410                        protein_coding    chr1 1633989 1634099    +    1
## 3411                        protein_coding    chr1 1633989 1634099    +    1
## 3412                        protein_coding    chr1 1634202 1634328    +    1
## 3413                        protein_coding    chr1 1634202 1634328    +    1
## 3414                        protein_coding    chr1 1634451 1634654    +    1
## 3415                        protein_coding    chr1 1634451 1634622    +    1
## 3416                        protein_coding    chr1 1634623 1634625    +    1
## 3417                        protein_coding    chr1 1632095 1632218    +    1
## 3418                        protein_coding    chr1 1634623 1634654    +    1
## 3419                        protein_coding    chr1 1632179 1634654    +    1
## 3420                        protein_coding    chr1 1632179 1632374    +    1
## 3421                        protein_coding    chr1 1632219 1632374    +    1
## 3422                        protein_coding    chr1 1632219 1632221    +    1
## 3423                        protein_coding    chr1 1632783 1632913    +    1
## 3424                        protein_coding    chr1 1632783 1632913    +    1
## 3425                        protein_coding    chr1 1632981 1633355    +    1
## 3426                        protein_coding    chr1 1632981 1633355    +    1
## 3427                        protein_coding    chr1 1633748 1633912    +    1
## 3428                        protein_coding    chr1 1633748 1633912    +    1
## 3429                        protein_coding    chr1 1633989 1634099    +    1
## 3430                        protein_coding    chr1 1633989 1634099    +    1
## 3431                        protein_coding    chr1 1634202 1634328    +    1
## 3432                        protein_coding    chr1 1634202 1634328    +    1
## 3433                        protein_coding    chr1 1634451 1634654    +    1
## 3434                        protein_coding    chr1 1634451 1634543    +    1
## 3435                        protein_coding    chr1 1634544 1634546    +    1
## 3436                        protein_coding    chr1 1632179 1632218    +    1
## 3437                        protein_coding    chr1 1634544 1634654    +    1
## 3438                        protein_coding    chr1 1635227 1659012    -    1
## 3439                        protein_coding    chr1 1635227 1659012    -    1
## 3440                        protein_coding    chr1 1658914 1659012    -    1
## 3441                        protein_coding    chr1 1657375 1657498    -    1
## 3442                        protein_coding    chr1 1657375 1657485    -    1
## 3443                        protein_coding    chr1 1657483 1657485    -    1
## 3444                        protein_coding    chr1 1655369 1655484    -    1
## 3445                        protein_coding    chr1 1655369 1655484    -    1
```

```
## 3446                    protein_coding      chr1 1652439 1652566      -      1
## 3447                    protein_coding      chr1 1652439 1652566      -      1
## 3448                    protein_coding      chr1 1649499 1649637      -      1
## 3449                    protein_coding      chr1 1649499 1649637      -      1
## 3450                    protein_coding      chr1 1645126 1645262      -      1
## 3451                    protein_coding      chr1 1645126 1645262      -      1
## 3452                    protein_coding      chr1 1642386 1642508      -      1
## 3453                    protein_coding      chr1 1642386 1642508      -      1
## 3454                    protein_coding      chr1 1641906 1642001      -      1
## 3455                    protein_coding      chr1 1641906 1642001      -      1
## 3456                    protein_coding      chr1 1641662 1641820      -      1
## 3457                    protein_coding      chr1 1641662 1641820      -      1
## 3458                    protein_coding      chr1 1641048 1641113      -      1
## 3459                    protein_coding      chr1 1641048 1641113      -      1
## 3460                    protein_coding      chr1 1640277 1640452      -      1
## 3461                    protein_coding      chr1 1640277 1640452      -      1
## 3462                    protein_coding      chr1 1638500 1638590      -      1
## 3463                    protein_coding      chr1 1638500 1638590      -      1
## 3464                    protein_coding      chr1 1637762 1637883      -      1
## 3465                    protein_coding      chr1 1637762 1637883      -      1
## 3466                    protein_coding      chr1 1637408 1637513      -      1
## 3467                    protein_coding      chr1 1637408 1637513      -      1
## 3468                    protein_coding      chr1 1637081 1637202      -      1
## 3469                    protein_coding      chr1 1637081 1637202      -      1
## 3470                    protein_coding      chr1 1636897 1637004      -      1
## 3471                    protein_coding      chr1 1636897 1637004      -      1
## 3472                    protein_coding      chr1 1636682 1636798      -      1
## 3473                    protein_coding      chr1 1636682 1636798      -      1
## 3474                    protein_coding      chr1 1636333 1636481      -      1
## 3475                    protein_coding      chr1 1636333 1636481      -      1
## 3476                    protein_coding      chr1 1635937 1636126      -      1
## 3477                    protein_coding      chr1 1635937 1636126      -      1
## 3478                    protein_coding      chr1 1635227 1635856      -      1
## 3479                    protein_coding      chr1 1635767 1635856      -      1
## 3480                    protein_coding      chr1 1635764 1635766      -      1
## 3481                    protein_coding      chr1 1658914 1659012      -      1
## 3482                    protein_coding      chr1 1657486 1657498      -      1
## 3483                    protein_coding      chr1 1635227 1635766      -      1
## 3484                    protein_coding      chr1 1635587 1659012      -      1
## 3485                    protein_coding      chr1 1658914 1659012      -      1
## 3486                    protein_coding      chr1 1657375 1657498      -      1
## 3487                    protein_coding      chr1 1657375 1657485      -      1
## 3488                    protein_coding      chr1 1657483 1657485      -      1
## 3489                    protein_coding      chr1 1655369 1655484      -      1
## 3490                    protein_coding      chr1 1655369 1655484      -      1
## 3491                    protein_coding      chr1 1652439 1652566      -      1
## 3492                    protein_coding      chr1 1652439 1652566      -      1
## 3493                    protein_coding      chr1 1649499 1649637      -      1
## 3494                    protein_coding      chr1 1649499 1649637      -      1
## 3495                    protein_coding      chr1 1645126 1645262      -      1
## 3496                    protein_coding      chr1 1645126 1645262      -      1
## 3497                    protein_coding      chr1 1642347 1642508      -      1
## 3498                    protein_coding      chr1 1642347 1642508      -      1
## 3499                    protein_coding      chr1 1641906 1642001      -      1
```

```
## 3500          protein_coding    chr1 1641906 1642001    -    1
## 3501          protein_coding    chr1 1641662 1641820    -    1
## 3502          protein_coding    chr1 1641662 1641820    -    1
## 3503          protein_coding    chr1 1641048 1641113    -    1
## 3504          protein_coding    chr1 1641048 1641113    -    1
## 3505          protein_coding    chr1 1640277 1640452    -    1
## 3506          protein_coding    chr1 1640277 1640452    -    1
## 3507          protein_coding    chr1 1638500 1638590    -    1
## 3508          protein_coding    chr1 1638500 1638590    -    1
## 3509          protein_coding    chr1 1637762 1637883    -    1
## 3510          protein_coding    chr1 1637762 1637883    -    1
## 3511          protein_coding    chr1 1637408 1637513    -    1
## 3512          protein_coding    chr1 1637408 1637513    -    1
## 3513          protein_coding    chr1 1637081 1637202    -    1
## 3514          protein_coding    chr1 1637081 1637202    -    1
## 3515          protein_coding    chr1 1636897 1637004    -    1
## 3516          protein_coding    chr1 1636897 1637004    -    1
## 3517          protein_coding    chr1 1636682 1636798    -    1
## 3518          protein_coding    chr1 1636682 1636798    -    1
## 3519          protein_coding    chr1 1636333 1636481    -    1
## 3520          protein_coding    chr1 1636333 1636481    -    1
## 3521          protein_coding    chr1 1635937 1636126    -    1
## 3522          protein_coding    chr1 1635937 1636126    -    1
## 3523          protein_coding    chr1 1635587 1635856    -    1
## 3524          protein_coding    chr1 1635767 1635856    -    1
## 3525          protein_coding    chr1 1635764 1635766    -    1
## 3526          protein_coding    chr1 1658914 1659012    -    1
## 3527          protein_coding    chr1 1657486 1657498    -    1
## 3528          protein_coding    chr1 1635587 1635766    -    1
## 3529          protein_coding    chr1 1635738 1659012    -    1
## 3530          protein_coding    chr1 1658914 1659012    -    1
## 3531          protein_coding    chr1 1657375 1657498    -    1
## 3532          protein_coding    chr1 1657256 1657302    -    1
## 3533          protein_coding    chr1 1657256 1657264    -    1
## 3534          protein_coding    chr1 1657262 1657264    -    1
## 3535          protein_coding    chr1 1655369 1655484    -    1
## 3536          protein_coding    chr1 1655369 1655484    -    1
## 3537          protein_coding    chr1 1652439 1652566    -    1
## 3538          protein_coding    chr1 1652439 1652566    -    1
## 3539          protein_coding    chr1 1649499 1649637    -    1
## 3540          protein_coding    chr1 1649499 1649637    -    1
## 3541          protein_coding    chr1 1645126 1645262    -    1
## 3542          protein_coding    chr1 1645126 1645262    -    1
## 3543          protein_coding    chr1 1642386 1642508    -    1
## 3544          protein_coding    chr1 1642386 1642508    -    1
## 3545          protein_coding    chr1 1641906 1642001    -    1
## 3546          protein_coding    chr1 1641906 1642001    -    1
## 3547          protein_coding    chr1 1641662 1641820    -    1
## 3548          protein_coding    chr1 1641662 1641820    -    1
## 3549          protein_coding    chr1 1641048 1641113    -    1
## 3550          protein_coding    chr1 1641048 1641113    -    1
## 3551          protein_coding    chr1 1640277 1640452    -    1
## 3552          protein_coding    chr1 1640277 1640452    -    1
## 3553          protein_coding    chr1 1638500 1638590    -    1
```

```
## 3554               protein_coding    chr1 1638500 1638590    -    1
## 3555               protein_coding    chr1 1637762 1637883    -    1
## 3556               protein_coding    chr1 1637762 1637883    -    1
## 3557               protein_coding    chr1 1637408 1637513    -    1
## 3558               protein_coding    chr1 1637408 1637513    -    1
## 3559               protein_coding    chr1 1637081 1637202    -    1
## 3560               protein_coding    chr1 1637081 1637202    -    1
## 3561               protein_coding    chr1 1636897 1637004    -    1
## 3562               protein_coding    chr1 1636897 1637004    -    1
## 3563               protein_coding    chr1 1636682 1636798    -    1
## 3564               protein_coding    chr1 1636682 1636798    -    1
## 3565               protein_coding    chr1 1636333 1636481    -    1
## 3566               protein_coding    chr1 1636333 1636481    -    1
## 3567               protein_coding    chr1 1635937 1636126    -    1
## 3568               protein_coding    chr1 1635937 1636126    -    1
## 3569               protein_coding    chr1 1635738 1635856    -    1
## 3570               protein_coding    chr1 1635767 1635856    -    1
## 3571               protein_coding    chr1 1635764 1635766    -    1
## 3572               protein_coding    chr1 1658914 1659012    -    1
## 3573               protein_coding    chr1 1657375 1657498    -    1
## 3574               protein_coding    chr1 1657265 1657302    -    1
## 3575               protein_coding    chr1 1635738 1635766    -    1
## 3576               protein_coding    chr1 1635738 1659012    -    1
## 3577               protein_coding    chr1 1658914 1659012    -    1
## 3578               protein_coding    chr1 1657375 1657498    -    1
## 3579               protein_coding    chr1 1657375 1657485    -    1
## 3580               protein_coding    chr1 1657483 1657485    -    1
## 3581               protein_coding    chr1 1655369 1655484    -    1
## 3582               protein_coding    chr1 1655369 1655484    -    1
## 3583               protein_coding    chr1 1646111 1646178    -    1
## 3584               protein_coding    chr1 1646111 1646178    -    1
## 3585               protein_coding    chr1 1645953 1645969    -    1
## 3586               protein_coding    chr1 1645953 1645969    -    1
## 3587               protein_coding    chr1 1645773 1645866    -    1
## 3588               protein_coding    chr1 1645773 1645866    -    1
## 3589               protein_coding    chr1 1645460 1645508    -    1
## 3590               protein_coding    chr1 1645460 1645508    -    1
## 3591               protein_coding    chr1 1645126 1645304    -    1
## 3592               protein_coding    chr1 1645126 1645304    -    1
## 3593               protein_coding    chr1 1642386 1642508    -    1
## 3594               protein_coding    chr1 1642386 1642508    -    1
## 3595               protein_coding    chr1 1641906 1642001    -    1
## 3596               protein_coding    chr1 1641906 1642001    -    1
## 3597               protein_coding    chr1 1641662 1641820    -    1
## 3598               protein_coding    chr1 1641662 1641820    -    1
## 3599               protein_coding    chr1 1641048 1641113    -    1
## 3600               protein_coding    chr1 1641048 1641113    -    1
## 3601               protein_coding    chr1 1640277 1640452    -    1
## 3602               protein_coding    chr1 1640277 1640452    -    1
## 3603               protein_coding    chr1 1638500 1638590    -    1
## 3604               protein_coding    chr1 1638500 1638590    -    1
## 3605               protein_coding    chr1 1637762 1637883    -    1
## 3606               protein_coding    chr1 1637762 1637883    -    1
## 3607               protein_coding    chr1 1637408 1637513    -    1
```

```
## 3608                      protein_coding      chr1 1637408 1637513       -        1
## 3609                      protein_coding      chr1 1637081 1637202       -        1
## 3610                      protein_coding      chr1 1637081 1637202       -        1
## 3611                      protein_coding      chr1 1636897 1637004       -        1
## 3612                      protein_coding      chr1 1636897 1637004       -        1
## 3613                      protein_coding      chr1 1636682 1636798       -        1
## 3614                      protein_coding      chr1 1636682 1636798       -        1
## 3615                      protein_coding      chr1 1636333 1636481       -        1
## 3616                      protein_coding      chr1 1636333 1636481       -        1
## 3617                      protein_coding      chr1 1635937 1636126       -        1
## 3618                      protein_coding      chr1 1635937 1636126       -        1
## 3619                      protein_coding      chr1 1635738 1635856       -        1
## 3620                      protein_coding      chr1 1635767 1635856       -        1
## 3621                      protein_coding      chr1 1635764 1635766       -        1
## 3622                      protein_coding      chr1 1658914 1659012       -        1
## 3623                      protein_coding      chr1 1657486 1657498       -        1
## 3624                      protein_coding      chr1 1635738 1635766       -        1
## 3625                      protein_coding      chr1 1635738 1659012       -        1
## 3626                      protein_coding      chr1 1658914 1659012       -        1
## 3627                      protein_coding      chr1 1657375 1657498       -        1
## 3628                      protein_coding      chr1 1657375 1657485       -        1
## 3629                      protein_coding      chr1 1657483 1657485       -        1
## 3630                      protein_coding      chr1 1655369 1655484       -        1
## 3631                      protein_coding      chr1 1655369 1655484       -        1
## 3632                      protein_coding      chr1 1646126 1646143       -        1
## 3633                      protein_coding      chr1 1646126 1646143       -        1
## 3634                      protein_coding      chr1 1645773 1645884       -        1
## 3635                      protein_coding      chr1 1645773 1645884       -        1
## 3636                      protein_coding      chr1 1645579 1645643       -        1
## 3637                      protein_coding      chr1 1645579 1645643       -        1
## 3638                      protein_coding      chr1 1645126 1645304       -        1
## 3639                      protein_coding      chr1 1645126 1645304       -        1
## 3640                      protein_coding      chr1 1642386 1642508       -        1
## 3641                      protein_coding      chr1 1642386 1642508       -        1
## 3642                      protein_coding      chr1 1641906 1642001       -        1
## 3643                      protein_coding      chr1 1641906 1642001       -        1
## 3644                      protein_coding      chr1 1641662 1641820       -        1
## 3645                      protein_coding      chr1 1641662 1641820       -        1
## 3646                      protein_coding      chr1 1641048 1641113       -        1
## 3647                      protein_coding      chr1 1641048 1641113       -        1
## 3648                      protein_coding      chr1 1640277 1640452       -        1
## 3649                      protein_coding      chr1 1640277 1640452       -        1
## 3650                      protein_coding      chr1 1638500 1638590       -        1
## 3651                      protein_coding      chr1 1638500 1638590       -        1
## 3652                      protein_coding      chr1 1637762 1637883       -        1
## 3653                      protein_coding      chr1 1637762 1637883       -        1
## 3654                      protein_coding      chr1 1637408 1637513       -        1
## 3655                      protein_coding      chr1 1637408 1637513       -        1
## 3656                      protein_coding      chr1 1637081 1637202       -        1
## 3657                      protein_coding      chr1 1637081 1637202       -        1
## 3658                      protein_coding      chr1 1636897 1637004       -        1
## 3659                      protein_coding      chr1 1636897 1637004       -        1
## 3660                      protein_coding      chr1 1636682 1636798       -        1
## 3661                      protein_coding      chr1 1636682 1636798       -        1
```

```
## 3662                    protein_coding   chr1 1636333 1636481        -        1
## 3663                    protein_coding   chr1 1636333 1636481        -        1
## 3664                    protein_coding   chr1 1635937 1636126        -        1
## 3665                    protein_coding   chr1 1635937 1636126        -        1
## 3666                    protein_coding   chr1 1635738 1635856        -        1
## 3667                    protein_coding   chr1 1635767 1635856        -        1
## 3668                    protein_coding   chr1 1635764 1635766        -        1
## 3669                    protein_coding   chr1 1658914 1659012        -        1
## 3670                    protein_coding   chr1 1657486 1657498        -        1
## 3671                    protein_coding   chr1 1635738 1635766        -        1
## 3672                    protein_coding   chr1 1635738 1659012        -        1
## 3673                    protein_coding   chr1 1658914 1659012        -        1
## 3674                    protein_coding   chr1 1657375 1657498        -        1
## 3675                    protein_coding   chr1 1657375 1657485        -        1
## 3676                    protein_coding   chr1 1657483 1657485        -        1
## 3677                    protein_coding   chr1 1655369 1655484        -        1
## 3678                    protein_coding   chr1 1655369 1655484        -        1
## 3679                    protein_coding   chr1 1645998 1646048        -        1
## 3680                    protein_coding   chr1 1645998 1646048        -        1
## 3681                    protein_coding   chr1 1645773 1645884        -        1
## 3682                    protein_coding   chr1 1645773 1645884        -        1
## 3683                    protein_coding   chr1 1645611 1645643        -        1
## 3684                    protein_coding   chr1 1645611 1645643        -        1
## 3685                    protein_coding   chr1 1645460 1645497        -        1
## 3686                    protein_coding   chr1 1645460 1645497        -        1
## 3687                    protein_coding   chr1 1645126 1645304        -        1
## 3688                    protein_coding   chr1 1645126 1645304        -        1
## 3689                    protein_coding   chr1 1642386 1642508        -        1
## 3690                    protein_coding   chr1 1642386 1642508        -        1
## 3691                    protein_coding   chr1 1641906 1642001        -        1
## 3692                    protein_coding   chr1 1641906 1642001        -        1
## 3693                    protein_coding   chr1 1641662 1641820        -        1
## 3694                    protein_coding   chr1 1641662 1641820        -        1
## 3695                    protein_coding   chr1 1641048 1641113        -        1
## 3696                    protein_coding   chr1 1641048 1641113        -        1
## 3697                    protein_coding   chr1 1640277 1640452        -        1
## 3698                    protein_coding   chr1 1640277 1640452        -        1
## 3699                    protein_coding   chr1 1638500 1638590        -        1
## 3700                    protein_coding   chr1 1638500 1638590        -        1
## 3701                    protein_coding   chr1 1637762 1637883        -        1
## 3702                    protein_coding   chr1 1637762 1637883        -        1
## 3703                    protein_coding   chr1 1637408 1637513        -        1
## 3704                    protein_coding   chr1 1637408 1637513        -        1
## 3705                    protein_coding   chr1 1637081 1637202        -        1
## 3706                    protein_coding   chr1 1637081 1637202        -        1
## 3707                    protein_coding   chr1 1636897 1637004        -        1
## 3708                    protein_coding   chr1 1636897 1637004        -        1
## 3709                    protein_coding   chr1 1636682 1636798        -        1
## 3710                    protein_coding   chr1 1636682 1636798        -        1
## 3711                    protein_coding   chr1 1636333 1636481        -        1
## 3712                    protein_coding   chr1 1636333 1636481        -        1
## 3713                    protein_coding   chr1 1635937 1636126        -        1
## 3714                    protein_coding   chr1 1635937 1636126        -        1
## 3715                    protein_coding   chr1 1635738 1635856        -        1
```

```
## 3716                       protein_coding  chr1 1635767 1635856         -        1
## 3717                       protein_coding  chr1 1635764 1635766         -        1
## 3718                       protein_coding  chr1 1658914 1659012         -        1
## 3719                       protein_coding  chr1 1657486 1657498         -        1
## 3720                       protein_coding  chr1 1635738 1635766         -        1
## 3721                               lncRNA  chr1 1659325 1662602         +        0
## 3722                               lncRNA  chr1 1659325 1662602         +        0
## 3723                               lncRNA  chr1 1659325 1659452         +        0
## 3724                               lncRNA  chr1 1662331 1662602         +        0
## 3725                       protein_coding  chr1 1659529 1692728         -        1
## 3726                       protein_coding  chr1 1659529 1692724         -        1
## 3727                       protein_coding  chr1 1692449 1692724         -        1
## 3728                       protein_coding  chr1 1690976 1691393         -        1
## 3729                       protein_coding  chr1 1676378 1676846         -        1
## 3730                       protein_coding  chr1 1676378 1676699         -        1
## 3731                       protein_coding  chr1 1676697 1676699         -        1
## 3732                       protein_coding  chr1 1676064 1676199         -        1
## 3733                       protein_coding  chr1 1676064 1676199         -        1
## 3734                       protein_coding  chr1 1675463 1675590         -        1
## 3735                       protein_coding  chr1 1675463 1675590         -        1
## 3736                       protein_coding  chr1 1668327 1668472         -        1
## 3737                       protein_coding  chr1 1668327 1668472         -        1
## 3738                       protein_coding  chr1 1659529 1660111         -        1
## 3739                       protein_coding  chr1 1660106 1660111         -        1
## 3740                       protein_coding  chr1 1660103 1660105         -        1
## 3741                       protein_coding  chr1 1692449 1692724         -        1
## 3742                       protein_coding  chr1 1690976 1691393         -        1
## 3743                       protein_coding  chr1 1676700 1676846         -        1
## 3744                       protein_coding  chr1 1659529 1660105         -        1
## 3745                       protein_coding  chr1 1661478 1692644         -        1
## 3746                       protein_coding  chr1 1692449 1692644         -        1
## 3747                       protein_coding  chr1 1690976 1691393         -        1
## 3748                       protein_coding  chr1 1676378 1676846         -        1
## 3749                       protein_coding  chr1 1676378 1676699         -        1
## 3750                       protein_coding  chr1 1676697 1676699         -        1
## 3751                       protein_coding  chr1 1676064 1676199         -        1
## 3752                       protein_coding  chr1 1676064 1676199         -        1
## 3753                       protein_coding  chr1 1675463 1675590         -        1
## 3754                       protein_coding  chr1 1675463 1675590         -        1
## 3755                       protein_coding  chr1 1671509 1671629         -        1
## 3756                       protein_coding  chr1 1671509 1671629         -        1
## 3757                       protein_coding  chr1 1670098 1670151         -        1
## 3758                       protein_coding  chr1 1670098 1670151         -        1
## 3759                       protein_coding  chr1 1669664 1669736         -        1
## 3760                       protein_coding  chr1 1669664 1669736         -        1
## 3761                       protein_coding  chr1 1668327 1668472         -        1
## 3762                       protein_coding  chr1 1668327 1668472         -        1
## 3763                       protein_coding  chr1 1661478 1666019         -        1
## 3764                       protein_coding  chr1 1665785 1666019         -        1
## 3765                       protein_coding  chr1 1665782 1665784         -        1
## 3766                       protein_coding  chr1 1692449 1692644         -        1
## 3767                       protein_coding  chr1 1690976 1691393         -        1
## 3768                       protein_coding  chr1 1676700 1676846         -        1
## 3769                       protein_coding  chr1 1661478 1665784         -        1
```

```
## 3770                          protein_coding  chr1 1661479 1692728     -     1
## 3771                          protein_coding  chr1 1692449 1692728     -     1
## 3772                          protein_coding  chr1 1676378 1676846     -     1
## 3773                          protein_coding  chr1 1676378 1676699     -     1
## 3774                          protein_coding  chr1 1676697 1676699     -     1
## 3775                          protein_coding  chr1 1676064 1676199     -     1
## 3776                          protein_coding  chr1 1676064 1676199     -     1
## 3777                          protein_coding  chr1 1675463 1675590     -     1
## 3778                          protein_coding  chr1 1675463 1675590     -     1
## 3779                          protein_coding  chr1 1671509 1671629     -     1
## 3780                          protein_coding  chr1 1671509 1671629     -     1
## 3781                          protein_coding  chr1 1670098 1670151     -     1
## 3782                          protein_coding  chr1 1670098 1670151     -     1
## 3783                          protein_coding  chr1 1669664 1669736     -     1
## 3784                          protein_coding  chr1 1669664 1669736     -     1
## 3785                          protein_coding  chr1 1668327 1668472     -     1
## 3786                          protein_coding  chr1 1668327 1668472     -     1
## 3787                          protein_coding  chr1 1661479 1666019     -     1
## 3788                          protein_coding  chr1 1665785 1666019     -     1
## 3789                          protein_coding  chr1 1665782 1665784     -     1
## 3790                          protein_coding  chr1 1692449 1692728     -     1
## 3791                          protein_coding  chr1 1676700 1676846     -     1
## 3792                          protein_coding  chr1 1661479 1665784     -     1
## 3793  transcribed_processed_pseudogene  chr1 1671990 1674397     +     0
## 3794  transcribed_processed_pseudogene  chr1 1671990 1673411     +     0
## 3795  transcribed_processed_pseudogene  chr1 1671990 1673411     +     0
## 3796  transcribed_processed_pseudogene  chr1 1673275 1674397     +     0
## 3797  transcribed_processed_pseudogene  chr1 1673275 1673379     +     0
## 3798  transcribed_processed_pseudogene  chr1 1674001 1674397     +     0
## 3799          unprocessed_pseudogene  chr1 1699942 1701782     +     1
## 3800          unprocessed_pseudogene  chr1 1699942 1701782     +     1
## 3801          unprocessed_pseudogene  chr1 1699942 1700072     +     1
## 3802          unprocessed_pseudogene  chr1 1700140 1700279     +     1
## 3803          unprocessed_pseudogene  chr1 1700347 1700514     +     1
## 3804          unprocessed_pseudogene  chr1 1700907 1701071     +     1
## 3805          unprocessed_pseudogene  chr1 1701148 1701258     +     1
## 3806          unprocessed_pseudogene  chr1 1701361 1701487     +     1
## 3807          unprocessed_pseudogene  chr1 1701608 1701782     +     1
## 3808                          protein_coding  chr1 1702379 1724357     -     1
## 3809                          protein_coding  chr1 1702379 1724357     -     1
## 3810                          protein_coding  chr1 1724258 1724357     -     1
## 3811                          protein_coding  chr1 1722708 1722831     -     1
## 3812                          protein_coding  chr1 1722708 1722818     -     1
## 3813                          protein_coding  chr1 1722816 1722818     -     1
## 3814                          protein_coding  chr1 1721596 1721711     -     1
## 3815                          protein_coding  chr1 1721596 1721711     -     1
## 3816                          protein_coding  chr1 1719328 1719455     -     1
## 3817                          protein_coding  chr1 1719328 1719455     -     1
## 3818                          protein_coding  chr1 1716346 1716478     -     1
## 3819                          protein_coding  chr1 1716346 1716478     -     1
## 3820                          protein_coding  chr1 1712264 1712400     -     1
## 3821                          protein_coding  chr1 1712264 1712400     -     1
## 3822                          protein_coding  chr1 1709518 1709640     -     1
## 3823                          protein_coding  chr1 1709518 1709640     -     1
```

```
## 3824                 protein_coding      chr1 1709038 1709133        -        1
## 3825                 protein_coding      chr1 1709038 1709133        -        1
## 3826                 protein_coding      chr1 1708794 1708952        -        1
## 3827                 protein_coding      chr1 1708794 1708952        -        1
## 3828                 protein_coding      chr1 1708180 1708245        -        1
## 3829                 protein_coding      chr1 1708180 1708245        -        1
## 3830                 protein_coding      chr1 1707409 1707584        -        1
## 3831                 protein_coding      chr1 1707409 1707584        -        1
## 3832                 protein_coding      chr1 1705642 1705732        -        1
## 3833                 protein_coding      chr1 1705642 1705732        -        1
## 3834                 protein_coding      chr1 1704904 1705025        -        1
## 3835                 protein_coding      chr1 1704904 1705025        -        1
## 3836                 protein_coding      chr1 1704550 1704655        -        1
## 3837                 protein_coding      chr1 1704550 1704655        -        1
## 3838                 protein_coding      chr1 1704223 1704344        -        1
## 3839                 protein_coding      chr1 1704223 1704344        -        1
## 3840                 protein_coding      chr1 1704039 1704146        -        1
## 3841                 protein_coding      chr1 1704039 1704146        -        1
## 3842                 protein_coding      chr1 1703824 1703940        -        1
## 3843                 protein_coding      chr1 1703824 1703940        -        1
## 3844                 protein_coding      chr1 1703476 1703624        -        1
## 3845                 protein_coding      chr1 1703476 1703624        -        1
## 3846                 protein_coding      chr1 1703080 1703269        -        1
## 3847                 protein_coding      chr1 1703080 1703269        -        1
## 3848                 protein_coding      chr1 1702379 1702999        -        1
## 3849                 protein_coding      chr1 1702910 1702999        -        1
## 3850                 protein_coding      chr1 1702907 1702909        -        1
## 3851                 protein_coding      chr1 1724258 1724357        -        1
## 3852                 protein_coding      chr1 1722819 1722831        -        1
## 3853                 protein_coding      chr1 1702379 1702909        -        1
## 3854                 protein_coding      chr1 1702730 1722831        -        1
## 3855                 protein_coding      chr1 1722588 1722831        -        1
## 3856                 protein_coding      chr1 1722588 1722596        -        1
## 3857                 protein_coding      chr1 1722594 1722596        -        1
## 3858                 protein_coding      chr1 1721596 1721711        -        1
## 3859                 protein_coding      chr1 1721596 1721711        -        1
## 3860                 protein_coding      chr1 1719328 1719455        -        1
## 3861                 protein_coding      chr1 1719328 1719455        -        1
## 3862                 protein_coding      chr1 1716346 1716478        -        1
## 3863                 protein_coding      chr1 1716346 1716478        -        1
## 3864                 protein_coding      chr1 1712264 1712400        -        1
## 3865                 protein_coding      chr1 1712264 1712400        -        1
## 3866                 protein_coding      chr1 1709518 1709640        -        1
## 3867                 protein_coding      chr1 1709518 1709640        -        1
## 3868                 protein_coding      chr1 1709038 1709133        -        1
## 3869                 protein_coding      chr1 1709038 1709133        -        1
## 3870                 protein_coding      chr1 1708794 1708952        -        1
## 3871                 protein_coding      chr1 1708794 1708952        -        1
## 3872                 protein_coding      chr1 1708180 1708245        -        1
## 3873                 protein_coding      chr1 1708180 1708245        -        1
## 3874                 protein_coding      chr1 1707409 1707584        -        1
## 3875                 protein_coding      chr1 1707409 1707584        -        1
## 3876                 protein_coding      chr1 1705642 1705732        -        1
## 3877                 protein_coding      chr1 1705642 1705732        -        1
```

```
## 3878                   protein_coding     chr1 1704904 1705025        -          1
## 3879                   protein_coding     chr1 1704904 1705025        -          1
## 3880                   protein_coding     chr1 1704550 1704655        -          1
## 3881                   protein_coding     chr1 1704550 1704655        -          1
## 3882                   protein_coding     chr1 1704223 1704344        -          1
## 3883                   protein_coding     chr1 1704223 1704344        -          1
## 3884                   protein_coding     chr1 1704039 1704146        -          1
## 3885                   protein_coding     chr1 1704039 1704146        -          1
## 3886                   protein_coding     chr1 1703824 1703940        -          1
## 3887                   protein_coding     chr1 1703824 1703940        -          1
## 3888                   protein_coding     chr1 1703476 1703624        -          1
## 3889                   protein_coding     chr1 1703476 1703624        -          1
## 3890                   protein_coding     chr1 1703080 1703269        -          1
## 3891                   protein_coding     chr1 1703080 1703269        -          1
## 3892                   protein_coding     chr1 1702730 1702999        -          1
## 3893                   protein_coding     chr1 1702910 1702999        -          1
## 3894                   protein_coding     chr1 1702907 1702909        -          1
## 3895                   protein_coding     chr1 1722597 1722831        -          1
## 3896                   protein_coding     chr1 1702730 1702909        -          1
## 3897                   protein_coding     chr1 1702881 1722831        -          1
## 3898                   protein_coding     chr1 1722708 1722831        -          1
## 3899                   protein_coding     chr1 1722588 1722634        -          1
## 3900                   protein_coding     chr1 1722588 1722596        -          1
## 3901                   protein_coding     chr1 1722594 1722596        -          1
## 3902                   protein_coding     chr1 1721596 1721711        -          1
## 3903                   protein_coding     chr1 1721596 1721711        -          1
## 3904                   protein_coding     chr1 1719328 1719455        -          1
## 3905                   protein_coding     chr1 1719328 1719455        -          1
## 3906                   protein_coding     chr1 1716346 1716478        -          1
## 3907                   protein_coding     chr1 1716346 1716478        -          1
## 3908                   protein_coding     chr1 1712264 1712400        -          1
## 3909                   protein_coding     chr1 1712264 1712400        -          1
## 3910                   protein_coding     chr1 1709518 1709640        -          1
## 3911                   protein_coding     chr1 1709518 1709640        -          1
## 3912                   protein_coding     chr1 1709038 1709133        -          1
## 3913                   protein_coding     chr1 1709038 1709133        -          1
## 3914                   protein_coding     chr1 1708794 1708952        -          1
## 3915                   protein_coding     chr1 1708794 1708952        -          1
## 3916                   protein_coding     chr1 1708180 1708245        -          1
## 3917                   protein_coding     chr1 1708180 1708245        -          1
## 3918                   protein_coding     chr1 1707409 1707584        -          1
## 3919                   protein_coding     chr1 1707409 1707584        -          1
## 3920                   protein_coding     chr1 1705642 1705732        -          1
## 3921                   protein_coding     chr1 1705642 1705732        -          1
## 3922                   protein_coding     chr1 1704904 1705025        -          1
## 3923                   protein_coding     chr1 1704904 1705025        -          1
## 3924                   protein_coding     chr1 1704550 1704655        -          1
## 3925                   protein_coding     chr1 1704550 1704655        -          1
## 3926                   protein_coding     chr1 1704223 1704344        -          1
## 3927                   protein_coding     chr1 1704223 1704344        -          1
## 3928                   protein_coding     chr1 1704039 1704146        -          1
## 3929                   protein_coding     chr1 1704039 1704146        -          1
## 3930                   protein_coding     chr1 1703824 1703940        -          1
## 3931                   protein_coding     chr1 1703824 1703940        -          1
```

```
## 3932          protein_coding   chr1 1703476 1703624      -       1
## 3933          protein_coding   chr1 1703476 1703624      -       1
## 3934          protein_coding   chr1 1703080 1703269      -       1
## 3935          protein_coding   chr1 1703080 1703269      -       1
## 3936          protein_coding   chr1 1702881 1702999      -       1
## 3937          protein_coding   chr1 1702910 1702999      -       1
## 3938          protein_coding   chr1 1702907 1702909      -       1
## 3939          protein_coding   chr1 1722708 1722831      -       1
## 3940          protein_coding   chr1 1722597 1722634      -       1
## 3941          protein_coding   chr1 1702881 1702909      -       1
## 3942          protein_coding   chr1 1702881 1724324      -       1
## 3943          protein_coding   chr1 1724258 1724324      -       1
## 3944          protein_coding   chr1 1722708 1722831      -       1
## 3945          protein_coding   chr1 1722708 1722818      -       1
## 3946          protein_coding   chr1 1722816 1722818      -       1
## 3947          protein_coding   chr1 1721596 1721711      -       1
## 3948          protein_coding   chr1 1721596 1721711      -       1
## 3949          protein_coding   chr1 1719358 1719455      -       1
## 3950          protein_coding   chr1 1719358 1719455      -       1
## 3951          protein_coding   chr1 1716346 1716478      -       1
## 3952          protein_coding   chr1 1716346 1716478      -       1
## 3953          protein_coding   chr1 1712264 1712427      -       1
## 3954          protein_coding   chr1 1712264 1712427      -       1
## 3955          protein_coding   chr1 1709518 1709640      -       1
## 3956          protein_coding   chr1 1709518 1709640      -       1
## 3957          protein_coding   chr1 1709038 1709133      -       1
## 3958          protein_coding   chr1 1709038 1709133      -       1
## 3959          protein_coding   chr1 1708794 1708952      -       1
## 3960          protein_coding   chr1 1708794 1708952      -       1
## 3961          protein_coding   chr1 1708180 1708245      -       1
## 3962          protein_coding   chr1 1708180 1708245      -       1
## 3963          protein_coding   chr1 1707409 1707584      -       1
## 3964          protein_coding   chr1 1707409 1707584      -       1
## 3965          protein_coding   chr1 1705642 1705732      -       1
## 3966          protein_coding   chr1 1705642 1705732      -       1
## 3967          protein_coding   chr1 1704904 1705025      -       1
## 3968          protein_coding   chr1 1704904 1705025      -       1
## 3969          protein_coding   chr1 1704550 1704655      -       1
## 3970          protein_coding   chr1 1704550 1704655      -       1
## 3971          protein_coding   chr1 1704223 1704344      -       1
## 3972          protein_coding   chr1 1704223 1704344      -       1
## 3973          protein_coding   chr1 1704039 1704146      -       1
## 3974          protein_coding   chr1 1704039 1704146      -       1
## 3975          protein_coding   chr1 1703824 1703940      -       1
## 3976          protein_coding   chr1 1703824 1703940      -       1
## 3977          protein_coding   chr1 1703476 1703624      -       1
## 3978          protein_coding   chr1 1703476 1703624      -       1
## 3979          protein_coding   chr1 1703080 1703269      -       1
## 3980          protein_coding   chr1 1703080 1703269      -       1
## 3981          protein_coding   chr1 1702881 1702999      -       1
## 3982          protein_coding   chr1 1702910 1702999      -       1
## 3983          protein_coding   chr1 1702907 1702909      -       1
## 3984          protein_coding   chr1 1724258 1724324      -       1
## 3985          protein_coding   chr1 1722819 1722831      -       1
```

```
## 3986               protein_coding   chr1 1702881 1702909        -        1
## 3987               protein_coding   chr1 1702881 1724324        -        1
## 3988               protein_coding   chr1 1724258 1724324        -        1
## 3989               protein_coding   chr1 1722708 1722831        -        1
## 3990               protein_coding   chr1 1722708 1722818        -        1
## 3991               protein_coding   chr1 1722816 1722818        -        1
## 3992               protein_coding   chr1 1721596 1721711        -        1
## 3993               protein_coding   chr1 1721596 1721711        -        1
## 3994               protein_coding   chr1 1719358 1719455        -        1
## 3995               protein_coding   chr1 1719358 1719455        -        1
## 3996               protein_coding   chr1 1716346 1716478        -        1
## 3997               protein_coding   chr1 1716346 1716478        -        1
## 3998               protein_coding   chr1 1712264 1712400        -        1
## 3999               protein_coding   chr1 1712264 1712400        -        1
## 4000               protein_coding   chr1 1709518 1709640        -        1
## 4001               protein_coding   chr1 1709518 1709640        -        1
## 4002               protein_coding   chr1 1709038 1709133        -        1
## 4003               protein_coding   chr1 1709038 1709133        -        1
## 4004               protein_coding   chr1 1708794 1708952        -        1
## 4005               protein_coding   chr1 1708794 1708952        -        1
## 4006               protein_coding   chr1 1708180 1708245        -        1
## 4007               protein_coding   chr1 1708180 1708245        -        1
## 4008               protein_coding   chr1 1707409 1707584        -        1
## 4009               protein_coding   chr1 1707409 1707584        -        1
## 4010               protein_coding   chr1 1705642 1705732        -        1
## 4011               protein_coding   chr1 1705642 1705732        -        1
## 4012               protein_coding   chr1 1704904 1705025        -        1
## 4013               protein_coding   chr1 1704904 1705025        -        1
## 4014               protein_coding   chr1 1704550 1704655        -        1
## 4015               protein_coding   chr1 1704550 1704655        -        1
## 4016               protein_coding   chr1 1704223 1704344        -        1
## 4017               protein_coding   chr1 1704223 1704344        -        1
## 4018               protein_coding   chr1 1704039 1704146        -        1
## 4019               protein_coding   chr1 1704039 1704146        -        1
## 4020               protein_coding   chr1 1703824 1703940        -        1
## 4021               protein_coding   chr1 1703824 1703940        -        1
## 4022               protein_coding   chr1 1703476 1703624        -        1
## 4023               protein_coding   chr1 1703476 1703624        -        1
## 4024               protein_coding   chr1 1703080 1703269        -        1
## 4025               protein_coding   chr1 1703080 1703269        -        1
## 4026               protein_coding   chr1 1702881 1702999        -        1
## 4027               protein_coding   chr1 1702910 1702999        -        1
## 4028               protein_coding   chr1 1702907 1702909        -        1
## 4029               protein_coding   chr1 1724258 1724324        -        1
## 4030               protein_coding   chr1 1722819 1722831        -        1
## 4031               protein_coding   chr1 1702881 1702909        -        1
## 4032               protein_coding   chr1 1702881 1724324        -        1
## 4033               protein_coding   chr1 1724258 1724324        -        1
## 4034               protein_coding   chr1 1722708 1722831        -        1
## 4035               protein_coding   chr1 1722708 1722818        -        1
## 4036               protein_coding   chr1 1722816 1722818        -        1
## 4037               protein_coding   chr1 1721596 1721711        -        1
## 4038               protein_coding   chr1 1721596 1721711        -        1
## 4039               protein_coding   chr1 1719358 1719455        -        1
```

```
## 4040                    protein_coding    chr1 1719358 1719455    -    1
## 4041                    protein_coding    chr1 1716346 1716478    -    1
## 4042                    protein_coding    chr1 1716346 1716478    -    1
## 4043                    protein_coding    chr1 1712264 1712400    -    1
## 4044                    protein_coding    chr1 1712264 1712400    -    1
## 4045                    protein_coding    chr1 1709479 1709640    -    1
## 4046                    protein_coding    chr1 1709479 1709640    -    1
## 4047                    protein_coding    chr1 1709038 1709133    -    1
## 4048                    protein_coding    chr1 1709038 1709133    -    1
## 4049                    protein_coding    chr1 1708794 1708952    -    1
## 4050                    protein_coding    chr1 1708794 1708952    -    1
## 4051                    protein_coding    chr1 1708180 1708245    -    1
## 4052                    protein_coding    chr1 1708180 1708245    -    1
## 4053                    protein_coding    chr1 1707409 1707584    -    1
## 4054                    protein_coding    chr1 1707409 1707584    -    1
## 4055                    protein_coding    chr1 1705642 1705732    -    1
## 4056                    protein_coding    chr1 1705642 1705732    -    1
## 4057                    protein_coding    chr1 1704904 1705025    -    1
## 4058                    protein_coding    chr1 1704904 1705025    -    1
## 4059                    protein_coding    chr1 1704550 1704655    -    1
## 4060                    protein_coding    chr1 1704550 1704655    -    1
## 4061                    protein_coding    chr1 1704223 1704344    -    1
## 4062                    protein_coding    chr1 1704223 1704344    -    1
## 4063                    protein_coding    chr1 1704039 1704146    -    1
## 4064                    protein_coding    chr1 1704039 1704146    -    1
## 4065                    protein_coding    chr1 1703824 1703940    -    1
## 4066                    protein_coding    chr1 1703824 1703940    -    1
## 4067                    protein_coding    chr1 1703476 1703624    -    1
## 4068                    protein_coding    chr1 1703476 1703624    -    1
## 4069                    protein_coding    chr1 1703080 1703269    -    1
## 4070                    protein_coding    chr1 1703080 1703269    -    1
## 4071                    protein_coding    chr1 1702881 1702999    -    1
## 4072                    protein_coding    chr1 1702910 1702999    -    1
## 4073                    protein_coding    chr1 1702907 1702909    -    1
## 4074                    protein_coding    chr1 1724258 1724324    -    1
## 4075                    protein_coding    chr1 1722819 1722831    -    1
## 4076                    protein_coding    chr1 1702881 1702909    -    1
## 4077                             lncRNA    chr1 1702736 1737688    -    0
## 4078                             lncRNA    chr1 1702736 1737688    -    0
## 4079                             lncRNA    chr1 1735204 1737688    -    0
## 4080                             lncRNA    chr1 1734690 1734835    -    0
## 4081                             lncRNA    chr1 1722588 1722831    -    0
## 4082                             lncRNA    chr1 1721596 1721711    -    0
## 4083                             lncRNA    chr1 1719358 1719455    -    0
## 4084                             lncRNA    chr1 1716346 1716478    -    0
## 4085                             lncRNA    chr1 1712264 1712400    -    0
## 4086                             lncRNA    chr1 1709518 1709640    -    0
## 4087                             lncRNA    chr1 1709038 1709133    -    0
## 4088                             lncRNA    chr1 1708794 1708952    -    0
## 4089                             lncRNA    chr1 1708180 1708245    -    0
## 4090                             lncRNA    chr1 1707525 1707584    -    0
## 4091                             lncRNA    chr1 1705642 1705732    -    0
## 4092                             lncRNA    chr1 1704904 1705025    -    0
## 4093                             lncRNA    chr1 1704550 1704655    -    0
```

```
## 4094                                  lncRNA      chr1 1704223 1704344     -     0
## 4095                                  lncRNA      chr1 1703824 1703995     -     0
## 4096                                  lncRNA      chr1 1703476 1703624     -     0
## 4097                                  lncRNA      chr1 1703080 1703269     -     0
## 4098                                  lncRNA      chr1 1702736 1702999     -     0
## 4099  transcribed_processed_pseudogene      chr1 1724512 1737251     +     0
## 4100  transcribed_processed_pseudogene      chr1 1724512 1735973     +     0
## 4101  transcribed_processed_pseudogene      chr1 1724512 1724763     +     0
## 4102  transcribed_processed_pseudogene      chr1 1735817 1735973     +     0
## 4103  transcribed_processed_pseudogene      chr1 1735817 1737251     +     0
## 4104  transcribed_processed_pseudogene      chr1 1735817 1735915     +     0
## 4105  transcribed_processed_pseudogene      chr1 1736854 1737251     +     0
## 4106                           protein_coding      chr1 1724838 1745999     -     1
## 4107                           protein_coding      chr1 1724840 1745999     -     1
## 4108                           protein_coding      chr1 1745724 1745999     -     1
## 4109                           protein_coding      chr1 1744251 1744668     -     1
## 4110                           protein_coding      chr1 1739236 1739704     -     1
## 4111                           protein_coding      chr1 1739236 1739557     -     1
## 4112                           protein_coding      chr1 1739555 1739557     -     1
## 4113                           protein_coding      chr1 1738922 1739057     -     1
## 4114                           protein_coding      chr1 1738922 1739057     -     1
## 4115                           protein_coding      chr1 1738321 1738448     -     1
## 4116                           protein_coding      chr1 1738321 1738448     -     1
## 4117                           protein_coding      chr1 1734690 1734835     -     1
## 4118                           protein_coding      chr1 1734690 1734835     -     1
## 4119                           protein_coding      chr1 1724840 1725422     -     1
## 4120                           protein_coding      chr1 1725417 1725422     -     1
## 4121                           protein_coding      chr1 1725414 1725416     -     1
## 4122                           protein_coding      chr1 1745724 1745999     -     1
## 4123                           protein_coding      chr1 1744251 1744668     -     1
## 4124                           protein_coding      chr1 1739558 1739704     -     1
## 4125                           protein_coding      chr1 1724840 1725416     -     1
## 4126                           protein_coding      chr1 1727386 1745999     -     1
## 4127                           protein_coding      chr1 1745724 1745999     -     1
## 4128                           protein_coding      chr1 1739236 1739704     -     1
## 4129                           protein_coding      chr1 1739236 1739557     -     1
## 4130                           protein_coding      chr1 1739555 1739557     -     1
## 4131                           protein_coding      chr1 1738922 1739057     -     1
## 4132                           protein_coding      chr1 1738922 1739057     -     1
## 4133                           protein_coding      chr1 1738321 1738448     -     1
## 4134                           protein_coding      chr1 1738321 1738448     -     1
## 4135                           protein_coding      chr1 1734690 1734835     -     1
## 4136                           protein_coding      chr1 1734690 1734835     -     1
## 4137                           protein_coding      chr1 1727386 1732523     -     1
## 4138                           protein_coding      chr1 1732458 1732523     -     1
## 4139                           protein_coding      chr1 1732455 1732457     -     1
## 4140                           protein_coding      chr1 1745724 1745999     -     1
## 4141                           protein_coding      chr1 1739558 1739704     -     1
## 4142                           protein_coding      chr1 1727386 1732457     -     1
## 4143                           protein_coding      chr1 1751232 1780457     -     1
## 4144                           protein_coding      chr1 1751232 1778470     -     1
## 4145                           protein_coding      chr1 1778289 1778470     -     1
## 4146                           protein_coding      chr1 1765228 1765446     -     1
## 4147                           protein_coding      chr1 1765228 1765406     -     1
```

```
## 4148                  protein_coding   chr1 1765404 1765406      -       1
## 4149                  protein_coding   chr1 1761952 1762035      -       1
## 4150                  protein_coding   chr1 1761952 1762035      -       1
## 4151                  protein_coding   chr1 1757181 1757310      -       1
## 4152                  protein_coding   chr1 1757181 1757310      -       1
## 4153                  protein_coding   chr1 1756503 1756608      -       1
## 4154                  protein_coding   chr1 1756503 1756608      -       1
## 4155                  protein_coding   chr1 1756258 1756343      -       1
## 4156                  protein_coding   chr1 1756258 1756343      -       1
## 4157                  protein_coding   chr1 1755374 1755476      -       1
## 4158                  protein_coding   chr1 1755374 1755476      -       1
## 4159                  protein_coding   chr1 1754544 1754698      -       1
## 4160                  protein_coding   chr1 1754544 1754698      -       1
## 4161                  protein_coding   chr1 1754284 1754383      -       1
## 4162                  protein_coding   chr1 1754284 1754383      -       1
## 4163                  protein_coding   chr1 1754051 1754208      -       1
## 4164                  protein_coding   chr1 1754051 1754208      -       1
## 4165                  protein_coding   chr1 1753567 1753649      -       1
## 4166                  protein_coding   chr1 1753567 1753649      -       1
## 4167                  protein_coding   chr1 1751232 1753060      -       1
## 4168                  protein_coding   chr1 1752907 1753060      -       1
## 4169                  protein_coding   chr1 1752904 1752906      -       1
## 4170                  protein_coding   chr1 1778289 1778470      -       1
## 4171                  protein_coding   chr1 1765407 1765446      -       1
## 4172                  protein_coding   chr1 1751232 1752906      -       1
## 4173                  protein_coding   chr1 1751232 1778790      -       1
## 4174                  protein_coding   chr1 1778746 1778790      -       1
## 4175                  protein_coding   chr1 1765228 1765446      -       1
## 4176                  protein_coding   chr1 1765228 1765406      -       1
## 4177                  protein_coding   chr1 1765404 1765406      -       1
## 4178                  protein_coding   chr1 1761952 1762035      -       1
## 4179                  protein_coding   chr1 1761952 1762035      -       1
## 4180                  protein_coding   chr1 1757181 1757310      -       1
## 4181                  protein_coding   chr1 1757181 1757310      -       1
## 4182                  protein_coding   chr1 1756503 1756608      -       1
## 4183                  protein_coding   chr1 1756503 1756608      -       1
## 4184                  protein_coding   chr1 1756258 1756343      -       1
## 4185                  protein_coding   chr1 1756258 1756343      -       1
## 4186                  protein_coding   chr1 1755374 1755476      -       1
## 4187                  protein_coding   chr1 1755374 1755476      -       1
## 4188                  protein_coding   chr1 1754544 1754698      -       1
## 4189                  protein_coding   chr1 1754544 1754698      -       1
## 4190                  protein_coding   chr1 1754284 1754383      -       1
## 4191                  protein_coding   chr1 1754284 1754383      -       1
## 4192                  protein_coding   chr1 1754051 1754208      -       1
## 4193                  protein_coding   chr1 1754051 1754208      -       1
## 4194                  protein_coding   chr1 1753567 1753649      -       1
## 4195                  protein_coding   chr1 1753567 1753649      -       1
## 4196                  protein_coding   chr1 1751232 1753060      -       1
## 4197                  protein_coding   chr1 1752907 1753060      -       1
## 4198                  protein_coding   chr1 1752904 1752906      -       1
## 4199                  protein_coding   chr1 1778746 1778790      -       1
## 4200                  protein_coding   chr1 1765407 1765446      -       1
## 4201                  protein_coding   chr1 1751232 1752906      -       1
```

```
## 4202                    protein_coding    chr1 1751232 1780069        -        1
## 4203                    protein_coding    chr1 1779905 1780069        -        1
## 4204                    protein_coding    chr1 1765228 1765446        -        1
## 4205                    protein_coding    chr1 1765228 1765406        -        1
## 4206                    protein_coding    chr1 1765404 1765406        -        1
## 4207                    protein_coding    chr1 1761952 1762035        -        1
## 4208                    protein_coding    chr1 1761952 1762035        -        1
## 4209                    protein_coding    chr1 1759734 1759902        -        1
## 4210                    protein_coding    chr1 1759734 1759902        -        1
## 4211                    protein_coding    chr1 1759101 1759243        -        1
## 4212                    protein_coding    chr1 1759101 1759243        -        1
## 4213                    protein_coding    chr1 1757107 1757310        -        1
## 4214                    protein_coding    chr1 1757107 1757310        -        1
## 4215                    protein_coding    chr1 1756503 1756657        -        1
## 4216                    protein_coding    chr1 1756503 1756657        -        1
## 4217                    protein_coding    chr1 1756258 1756343        -        1
## 4218                    protein_coding    chr1 1756258 1756343        -        1
## 4219                    protein_coding    chr1 1755374 1755476        -        1
## 4220                    protein_coding    chr1 1755374 1755476        -        1
## 4221                    protein_coding    chr1 1754544 1754698        -        1
## 4222                    protein_coding    chr1 1754544 1754698        -        1
## 4223                    protein_coding    chr1 1754284 1754383        -        1
## 4224                    protein_coding    chr1 1754284 1754383        -        1
## 4225                    protein_coding    chr1 1754051 1754208        -        1
## 4226                    protein_coding    chr1 1754051 1754208        -        1
## 4227                    protein_coding    chr1 1753567 1753649        -        1
## 4228                    protein_coding    chr1 1753567 1753649        -        1
## 4229                    protein_coding    chr1 1751232 1753060        -        1
## 4230                    protein_coding    chr1 1752907 1753060        -        1
## 4231                    protein_coding    chr1 1752904 1752906        -        1
## 4232                    protein_coding    chr1 1779905 1780069        -        1
## 4233                    protein_coding    chr1 1765407 1765446        -        1
## 4234                    protein_coding    chr1 1751232 1752906        -        1
## 4235                    protein_coding    chr1 1785285 1891117        -        1
## 4236                    protein_coding    chr1 1785285 1891117        -        1
## 4237                    protein_coding    chr1 1890820 1891117        -        1
## 4238                    protein_coding    chr1 1825397 1825499        -        1
## 4239                    protein_coding    chr1 1825397 1825453        -        1
## 4240                    protein_coding    chr1 1825451 1825453        -        1
## 4241                    protein_coding    chr1 1817837 1817875        -        1
## 4242                    protein_coding    chr1 1817837 1817875        -        1
## 4243                    protein_coding    chr1 1815756 1815862        -        1
## 4244                    protein_coding    chr1 1815756 1815862        -        1
## 4245                    protein_coding    chr1 1806475 1806538        -        1
## 4246                    protein_coding    chr1 1806475 1806538        -        1
## 4247                    protein_coding    chr1 1804419 1804581        -        1
## 4248                    protein_coding    chr1 1804419 1804581        -        1
## 4249                    protein_coding    chr1 1793245 1793311        -        1
## 4250                    protein_coding    chr1 1793245 1793311        -        1
## 4251                    protein_coding    chr1 1790395 1790596        -        1
## 4252                    protein_coding    chr1 1790395 1790596        -        1
## 4253                    protein_coding    chr1 1789053 1789269        -        1
## 4254                    protein_coding    chr1 1789053 1789269        -        1
## 4255                    protein_coding    chr1 1787322 1787437        -        1
```

```
## 4256                     protein_coding      chr1 1787334 1787437       -        1
## 4257                     protein_coding      chr1 1787331 1787333       -        1
## 4258                     protein_coding      chr1 1785285 1787053       -        1
## 4259                     protein_coding      chr1 1890820 1891117       -        1
## 4260                     protein_coding      chr1 1825454 1825499       -        1
## 4261                     protein_coding      chr1 1787322 1787333       -        1
## 4262                     protein_coding      chr1 1785285 1787053       -        1
## 4263                     protein_coding      chr1 1785285 1891117       -        1
## 4264                     protein_coding      chr1 1890820 1891117       -        1
## 4265                     protein_coding      chr1 1839190 1839238       -        1
## 4266                     protein_coding      chr1 1825397 1825499       -        1
## 4267                     protein_coding      chr1 1806475 1806538       -        1
## 4268                     protein_coding      chr1 1804419 1804581       -        1
## 4269                     protein_coding      chr1 1804419 1804548       -        1
## 4270                     protein_coding      chr1 1804546 1804548       -        1
## 4271                     protein_coding      chr1 1793245 1793311       -        1
## 4272                     protein_coding      chr1 1793245 1793311       -        1
## 4273                     protein_coding      chr1 1790395 1790596       -        1
## 4274                     protein_coding      chr1 1790395 1790596       -        1
## 4275                     protein_coding      chr1 1789053 1789269       -        1
## 4276                     protein_coding      chr1 1789053 1789269       -        1
## 4277                     protein_coding      chr1 1787322 1787437       -        1
## 4278                     protein_coding      chr1 1787334 1787437       -        1
## 4279                     protein_coding      chr1 1787331 1787333       -        1
## 4280                     protein_coding      chr1 1785285 1787053       -        1
## 4281                     protein_coding      chr1 1890820 1891117       -        1
## 4282                     protein_coding      chr1 1839190 1839238       -        1
## 4283                     protein_coding      chr1 1825397 1825499       -        1
## 4284                     protein_coding      chr1 1806475 1806538       -        1
## 4285                     protein_coding      chr1 1804549 1804581       -        1
## 4286                     protein_coding      chr1 1787322 1787333       -        1
## 4287                     protein_coding      chr1 1785285 1787053       -        1
## 4288                     protein_coding      chr1 1785286 1891087       -        1
## 4289                     protein_coding      chr1 1890820 1891087       -        1
## 4290                     protein_coding      chr1 1839190 1839238       -        1
## 4291                     protein_coding      chr1 1825397 1825499       -        1
## 4292                     protein_coding      chr1 1825397 1825453       -        1
## 4293                     protein_coding      chr1 1825451 1825453       -        1
## 4294                     protein_coding      chr1 1817837 1817875       -        1
## 4295                     protein_coding      chr1 1817837 1817875       -        1
## 4296                     protein_coding      chr1 1815756 1815862       -        1
## 4297                     protein_coding      chr1 1815756 1815862       -        1
## 4298                     protein_coding      chr1 1806475 1806538       -        1
## 4299                     protein_coding      chr1 1806475 1806538       -        1
## 4300                     protein_coding      chr1 1804419 1804581       -        1
## 4301                     protein_coding      chr1 1804419 1804581       -        1
## 4302                     protein_coding      chr1 1793245 1793311       -        1
## 4303                     protein_coding      chr1 1793245 1793311       -        1
## 4304                     protein_coding      chr1 1790395 1790596       -        1
## 4305                     protein_coding      chr1 1790395 1790596       -        1
## 4306                     protein_coding      chr1 1789053 1789269       -        1
## 4307                     protein_coding      chr1 1789053 1789269       -        1
## 4308                     protein_coding      chr1 1787322 1787437       -        1
## 4309                     protein_coding      chr1 1787334 1787437       -        1
```

```
## 4310                    protein_coding     chr1 1787331 1787333      -        1
## 4311                    protein_coding     chr1 1785286 1787053      -        1
## 4312                    protein_coding     chr1 1890820 1891087      -        1
## 4313                    protein_coding     chr1 1839190 1839238      -        1
## 4314                    protein_coding     chr1 1825454 1825499      -        1
## 4315                    protein_coding     chr1 1787322 1787333      -        1
## 4316                    protein_coding     chr1 1785286 1787053      -        1
## 4317                            lncRNA     chr1 1891471 1892658      +        0
## 4318                            lncRNA     chr1 1891471 1892658      +        0
## 4319                            lncRNA     chr1 1891471 1891851      +        0
## 4320                            lncRNA     chr1 1892134 1892658      +        0
## 4321                    protein_coding     chr1 1915108 1917296      +        1
## 4322                    protein_coding     chr1 1915108 1917294      +        1
## 4323                    protein_coding     chr1 1915108 1915307      +        1
## 4324                    protein_coding     chr1 1915281 1915307      +        1
## 4325                    protein_coding     chr1 1915281 1915283      +        1
## 4326                    protein_coding     chr1 1916441 1916615      +        1
## 4327                    protein_coding     chr1 1916441 1916615      +        1
## 4328                    protein_coding     chr1 1916752 1916896      +        1
## 4329                    protein_coding     chr1 1916752 1916896      +        1
## 4330                    protein_coding     chr1 1916974 1917074      +        1
## 4331                    protein_coding     chr1 1916974 1917074      +        1
## 4332                    protein_coding     chr1 1917147 1917294      +        1
## 4333                    protein_coding     chr1 1917147 1917190      +        1
## 4334                    protein_coding     chr1 1917191 1917193      +        1
## 4335                    protein_coding     chr1 1915108 1915280      +        1
## 4336                    protein_coding     chr1 1917191 1917294      +        1
## 4337                    protein_coding     chr1 1917590 1919279      -        1
## 4338                    protein_coding     chr1 1917590 1918797      -        1
## 4339                    protein_coding     chr1 1918253 1918797      -        1
## 4340                    protein_coding     chr1 1918253 1918556      -        1
## 4341                    protein_coding     chr1 1918554 1918556      -        1
## 4342                    protein_coding     chr1 1917590 1918162      -        1
## 4343                    protein_coding     chr1 1917885 1918162      -        1
## 4344                    protein_coding     chr1 1917882 1917884      -        1
## 4345                    protein_coding     chr1 1918557 1918797      -        1
## 4346                    protein_coding     chr1 1917590 1917884      -        1
## 4347                    protein_coding     chr1 1917591 1919279      -        1
## 4348                    protein_coding     chr1 1919182 1919279      -        1
## 4349                    protein_coding     chr1 1919182 1919265      -        1
## 4350                    protein_coding     chr1 1919263 1919265      -        1
## 4351                    protein_coding     chr1 1919045 1919088      -        1
## 4352                    protein_coding     chr1 1919045 1919088      -        1
## 4353                    protein_coding     chr1 1918893 1918934      -        1
## 4354                    protein_coding     chr1 1918893 1918934      -        1
## 4355                    protein_coding     chr1 1918253 1918431      -        1
## 4356                    protein_coding     chr1 1918253 1918431      -        1
## 4357                    protein_coding     chr1 1917591 1918162      -        1
## 4358                    protein_coding     chr1 1917885 1918162      -        1
## 4359                    protein_coding     chr1 1917882 1917884      -        1
## 4360                    protein_coding     chr1 1919266 1919279      -        1
## 4361                    protein_coding     chr1 1917591 1917884      -        1
## 4362                    protein_coding     chr1 1921951 2003837      -        1
## 4363                    protein_coding     chr1 1921951 2003837      -        1
```

```
## 4364                    protein_coding        chr1 2003701 2003837          -         1
## 4365                    protein_coding        chr1 1990890 1990975          -         1
## 4366                    protein_coding        chr1 1990890 1990956          -         1
## 4367                    protein_coding        chr1 1990954 1990956          -         1
## 4368                    protein_coding        chr1 1988889 1988973          -         1
## 4369                    protein_coding        chr1 1988889 1988973          -         1
## 4370                    protein_coding        chr1 1988512 1988655          -         1
## 4371                    protein_coding        chr1 1988512 1988655          -         1
## 4372                    protein_coding        chr1 1986937 1987035          -         1
## 4373                    protein_coding        chr1 1986937 1987035          -         1
## 4374                    protein_coding        chr1 1985386 1985490          -         1
## 4375                    protein_coding        chr1 1985386 1985490          -         1
## 4376                    protein_coding        chr1 1974025 1974198          -         1
## 4377                    protein_coding        chr1 1974025 1974198          -         1
## 4378                    protein_coding        chr1 1972937 1973047          -         1
## 4379                    protein_coding        chr1 1972937 1973047          -         1
## 4380                    protein_coding        chr1 1971980 1972082          -         1
## 4381                    protein_coding        chr1 1971980 1972082          -         1
## 4382                    protein_coding        chr1 1970659 1970816          -         1
## 4383                    protein_coding        chr1 1970659 1970816          -         1
## 4384                    protein_coding        chr1 1968635 1968833          -         1
## 4385                    protein_coding        chr1 1968635 1968833          -         1
## 4386                    protein_coding        chr1 1966371 1966526          -         1
## 4387                    protein_coding        chr1 1966371 1966526          -         1
## 4388                    protein_coding        chr1 1964888 1965061          -         1
## 4389                    protein_coding        chr1 1964888 1965061          -         1
## 4390                    protein_coding        chr1 1963749 1963867          -         1
## 4391                    protein_coding        chr1 1963749 1963867          -         1
## 4392                    protein_coding        chr1 1959964 1960030          -         1
## 4393                    protein_coding        chr1 1959964 1960030          -         1
## 4394                    protein_coding        chr1 1959120 1959209          -         1
## 4395                    protein_coding        chr1 1959120 1959209          -         1
## 4396                    protein_coding        chr1 1956620 1956784          -         1
## 4397                    protein_coding        chr1 1956620 1956784          -         1
## 4398                    protein_coding        chr1 1955691 1955850          -         1
## 4399                    protein_coding        chr1 1955691 1955850          -         1
## 4400                    protein_coding        chr1 1946990 1947054          -         1
## 4401                    protein_coding        chr1 1946990 1947054          -         1
## 4402                    protein_coding        chr1 1946317 1946439          -         1
## 4403                    protein_coding        chr1 1946317 1946439          -         1
## 4404                    protein_coding        chr1 1944331 1944452          -         1
## 4405                    protein_coding        chr1 1944331 1944452          -         1
## 4406                    protein_coding        chr1 1942028 1942156          -         1
## 4407                    protein_coding        chr1 1942028 1942156          -         1
## 4408                    protein_coding        chr1 1940316 1940403          -         1
## 4409                    protein_coding        chr1 1940316 1940403          -         1
## 4410                    protein_coding        chr1 1939594 1939767          -         1
## 4411                    protein_coding        chr1 1939594 1939767          -         1
## 4412                    protein_coding        chr1 1938855 1938988          -         1
## 4413                    protein_coding        chr1 1938855 1938988          -         1
## 4414                    protein_coding        chr1 1930060 1930336          -         1
## 4415                    protein_coding        chr1 1930060 1930336          -         1
## 4416                    protein_coding        chr1 1928784 1928882          -         1
## 4417                    protein_coding        chr1 1928784 1928882          -         1
```

```
## 4418                    protein_coding      chr1 1927607 1927746      -      1
## 4419                    protein_coding      chr1 1927607 1927746      -      1
## 4420                    protein_coding      chr1 1926894 1927028      -      1
## 4421                    protein_coding      chr1 1926894 1927028      -      1
## 4422                    protein_coding      chr1 1926652 1926761      -      1
## 4423                    protein_coding      chr1 1926652 1926761      -      1
## 4424                    protein_coding      chr1 1926457 1926512      -      1
## 4425                    protein_coding      chr1 1926457 1926512      -      1
## 4426                    protein_coding      chr1 1926228 1926347      -      1
## 4427                    protein_coding      chr1 1926228 1926347      -      1
## 4428                    protein_coding      chr1 1925783 1925938      -      1
## 4429                    protein_coding      chr1 1925783 1925938      -      1
## 4430                    protein_coding      chr1 1924391 1924520      -      1
## 4431                    protein_coding      chr1 1924391 1924520      -      1
## 4432                    protein_coding      chr1 1923775 1923929      -      1
## 4433                    protein_coding      chr1 1923775 1923929      -      1
## 4434                    protein_coding      chr1 1923367 1923499      -      1
## 4435                    protein_coding      chr1 1923367 1923499      -      1
## 4436                    protein_coding      chr1 1922985 1923115      -      1
## 4437                    protein_coding      chr1 1922985 1923115      -      1
## 4438                    protein_coding      chr1 1921951 1922388      -      1
## 4439                    protein_coding      chr1 1922290 1922388      -      1
## 4440                    protein_coding      chr1 1922287 1922289      -      1
## 4441                    protein_coding      chr1 2003701 2003837      -      1
## 4442                    protein_coding      chr1 1990957 1990975      -      1
## 4443                    protein_coding      chr1 1921951 1922289      -      1
## 4444                            lncRNA      chr1 2013213 2015639      -      0
## 4445                            lncRNA      chr1 2013213 2015530      -      0
## 4446                            lncRNA      chr1 2015365 2015530      -      0
## 4447                            lncRNA      chr1 2013213 2015000      -      0
## 4448                            lncRNA      chr1 2013569 2015639      -      0
## 4449                            lncRNA      chr1 2015365 2015639      -      0
## 4450                            lncRNA      chr1 2014486 2015000      -      0
## 4451                            lncRNA      chr1 2013569 2013755      -      0
## 4452                    protein_coding      chr1 2019329 2030758      +      1
## 4453                    protein_coding      chr1 2019345 2030758      +      1
## 4454                    protein_coding      chr1 2019345 2019491      +      1
## 4455                    protein_coding      chr1 2019424 2019491      +      1
## 4456                    protein_coding      chr1 2019424 2019426      +      1
## 4457                    protein_coding      chr1 2024942 2025054      +      1
## 4458                    protein_coding      chr1 2024942 2025054      +      1
## 4459                    protein_coding      chr1 2025334 2025401      +      1
## 4460                    protein_coding      chr1 2025334 2025401      +      1
## 4461                    protein_coding      chr1 2025518 2025738      +      1
## 4462                    protein_coding      chr1 2025518 2025738      +      1
## 4463                    protein_coding      chr1 2027577 2027659      +      1
## 4464                    protein_coding      chr1 2027577 2027659      +      1
## 4465                    protein_coding      chr1 2028155 2028292      +      1
## 4466                    protein_coding      chr1 2028155 2028292      +      1
## 4467                    protein_coding      chr1 2029111 2029266      +      1
## 4468                    protein_coding      chr1 2029111 2029266      +      1
## 4469                    protein_coding      chr1 2029551 2029762      +      1
## 4470                    protein_coding      chr1 2029551 2029762      +      1
## 4471                    protein_coding      chr1 2029983 2030758      +      1
```

```
## 4472                    protein_coding    chr1 2029983 2030279    +    1
## 4473                    protein_coding    chr1 2030280 2030282    +    1
## 4474                    protein_coding    chr1 2019345 2019423    +    1
## 4475                    protein_coding    chr1 2030280 2030758    +    1
## 4476                    protein_coding    chr1 2019360 2030407    +    1
## 4477                    protein_coding    chr1 2019360 2019491    +    1
## 4478                    protein_coding    chr1 2019424 2019491    +    1
## 4479                    protein_coding    chr1 2019424 2019426    +    1
## 4480                    protein_coding    chr1 2024942 2025054    +    1
## 4481                    protein_coding    chr1 2024942 2025054    +    1
## 4482                    protein_coding    chr1 2025334 2025401    +    1
## 4483                    protein_coding    chr1 2025334 2025401    +    1
## 4484                    protein_coding    chr1 2025518 2025738    +    1
## 4485                    protein_coding    chr1 2025518 2025738    +    1
## 4486                    protein_coding    chr1 2027577 2027659    +    1
## 4487                    protein_coding    chr1 2027577 2027659    +    1
## 4488                    protein_coding    chr1 2028071 2028292    +    1
## 4489                    protein_coding    chr1 2028071 2028292    +    1
## 4490                    protein_coding    chr1 2029111 2029266    +    1
## 4491                    protein_coding    chr1 2029111 2029266    +    1
## 4492                    protein_coding    chr1 2029551 2029762    +    1
## 4493                    protein_coding    chr1 2029551 2029762    +    1
## 4494                    protein_coding    chr1 2029983 2030407    +    1
## 4495                    protein_coding    chr1 2029983 2030279    +    1
## 4496                    protein_coding    chr1 2030280 2030282    +    1
## 4497                    protein_coding    chr1 2019360 2019423    +    1
## 4498                    protein_coding    chr1 2030280 2030407    +    1
## 4499                    protein_coding    chr1 2019379 2030365    +    1
## 4500                    protein_coding    chr1 2019379 2019491    +    1
## 4501                    protein_coding    chr1 2019424 2019491    +    1
## 4502                    protein_coding    chr1 2019424 2019426    +    1
## 4503                    protein_coding    chr1 2024942 2025054    +    1
## 4504                    protein_coding    chr1 2024942 2025054    +    1
## 4505                    protein_coding    chr1 2025334 2025401    +    1
## 4506                    protein_coding    chr1 2025334 2025401    +    1
## 4507                    protein_coding    chr1 2025518 2025738    +    1
## 4508                    protein_coding    chr1 2025518 2025738    +    1
## 4509                    protein_coding    chr1 2027577 2027659    +    1
## 4510                    protein_coding    chr1 2027577 2027659    +    1
## 4511                    protein_coding    chr1 2028155 2028292    +    1
## 4512                    protein_coding    chr1 2028155 2028292    +    1
## 4513                    protein_coding    chr1 2029111 2029266    +    1
## 4514                    protein_coding    chr1 2029111 2029266    +    1
## 4515                    protein_coding    chr1 2029551 2030365    +    1
## 4516                    protein_coding    chr1 2029551 2030203    +    1
## 4517                    protein_coding    chr1 2030204 2030206    +    1
## 4518                    protein_coding    chr1 2019379 2019423    +    1
## 4519                    protein_coding    chr1 2030204 2030365    +    1
## 4520                    protein_coding    chr1 2019404 2030656    +    1
## 4521                    protein_coding    chr1 2019404 2019491    +    1
## 4522                    protein_coding    chr1 2019424 2019491    +    1
## 4523                    protein_coding    chr1 2019424 2019426    +    1
## 4524                    protein_coding    chr1 2024942 2025054    +    1
## 4525                    protein_coding    chr1 2024942 2025054    +    1
```

```
## 4526                    protein_coding     chr1 2025334 2025401     +     1
## 4527                    protein_coding     chr1 2025334 2025401     +     1
## 4528                    protein_coding     chr1 2025518 2025738     +     1
## 4529                    protein_coding     chr1 2025518 2025738     +     1
## 4530                    protein_coding     chr1 2027577 2027659     +     1
## 4531                    protein_coding     chr1 2027577 2027659     +     1
## 4532                    protein_coding     chr1 2028155 2028292     +     1
## 4533                    protein_coding     chr1 2028155 2028292     +     1
## 4534                    protein_coding     chr1 2029111 2029266     +     1
## 4535                    protein_coding     chr1 2029111 2029266     +     1
## 4536                    protein_coding     chr1 2029620 2029762     +     1
## 4537                    protein_coding     chr1 2029620 2029762     +     1
## 4538                    protein_coding     chr1 2029983 2030656     +     1
## 4539                    protein_coding     chr1 2029983 2030279     +     1
## 4540                    protein_coding     chr1 2030280 2030282     +     1
## 4541                    protein_coding     chr1 2019404 2019423     +     1
## 4542                    protein_coding     chr1 2030280 2030656     +     1
## 4543                             lncRNA     chr1 2049203 2050070     -     0
## 4544                             lncRNA     chr1 2049304 2050070     -     0
## 4545                             lncRNA     chr1 2049868 2050070     -     0
## 4546                             lncRNA     chr1 2049598 2049666     -     0
## 4547                             lncRNA     chr1 2049304 2049468     -     0
## 4548                    protein_coding     chr1 2050411 2185395     +     1
## 4549                    protein_coding     chr1 2073462 2185390     +     1
## 4550                    protein_coding     chr1 2073462 2073929     +     1
## 4551                    protein_coding     chr1 2135262 2135347     +     1
## 4552                    protein_coding     chr1 2144210 2144341     +     1
## 4553                    protein_coding     chr1 2144339 2144341     +     1
## 4554                    protein_coding     chr1 2144339 2144341     +     1
## 4555                    protein_coding     chr1 2146027 2146108     +     1
## 4556                    protein_coding     chr1 2146027 2146108     +     1
## 4557                    protein_coding     chr1 2148872 2148924     +     1
## 4558                    protein_coding     chr1 2148872 2148924     +     1
## 4559                    protein_coding     chr1 2150790 2150978     +     1
## 4560                    protein_coding     chr1 2150790 2150978     +     1
## 4561                    protein_coding     chr1 2155995 2156092     +     1
## 4562                    protein_coding     chr1 2155995 2156092     +     1
## 4563                    protein_coding     chr1 2169518 2169604     +     1
## 4564                    protein_coding     chr1 2169518 2169604     +     1
## 4565                    protein_coding     chr1 2172055 2172190     +     1
## 4566                    protein_coding     chr1 2172055 2172190     +     1
## 4567                    protein_coding     chr1 2172301 2172388     +     1
## 4568                    protein_coding     chr1 2172301 2172388     +     1
## 4569                    protein_coding     chr1 2173897 2174016     +     1
## 4570                    protein_coding     chr1 2173897 2174016     +     1
## 4571                    protein_coding     chr1 2174754 2174833     +     1
## 4572                    protein_coding     chr1 2174754 2174833     +     1
## 4573                    protein_coding     chr1 2175224 2175313     +     1
## 4574                    protein_coding     chr1 2175224 2175313     +     1
## 4575                    protein_coding     chr1 2184583 2184698     +     1
## 4576                    protein_coding     chr1 2184583 2184698     +     1
## 4577                    protein_coding     chr1 2184922 2185390     +     1
## 4578                    protein_coding     chr1 2184922 2185006     +     1
## 4579                    protein_coding     chr1 2185007 2185009     +     1
```

```
## 4580           protein_coding   chr1 2073462 2073929   +   1
## 4581           protein_coding   chr1 2135262 2135347   +   1
## 4582           protein_coding   chr1 2144210 2144338   +   1
## 4583           protein_coding   chr1 2185007 2185390   +   1
## 4584                    lncRNA   chr1 2141084 2145279   -   0
## 4585                    lncRNA   chr1 2141084 2145279   -   0
## 4586                    lncRNA   chr1 2141084 2145279   -   0
## 4587                    lncRNA   chr1 2181794 2184389   -   1
## 4588                    lncRNA   chr1 2181794 2183875   -   1
## 4589                    lncRNA   chr1 2183571 2183875   -   1
## 4590                    lncRNA   chr1 2181794 2182741   -   1
## 4591                    lncRNA   chr1 2182735 2184389   -   1
## 4592                    lncRNA   chr1 2183991 2184389   -   1
## 4593                    lncRNA   chr1 2183571 2183704   -   1
## 4594                    lncRNA   chr1 2182735 2182823   -   1
## 4595           protein_coding   chr1 2184461 2212720   -   1
## 4596           protein_coding   chr1 2184461 2194775   -   1
## 4597           protein_coding   chr1 2194688 2194775   -   1
## 4598           protein_coding   chr1 2194688 2194749   -   1
## 4599           protein_coding   chr1 2194747 2194749   -   1
## 4600           protein_coding   chr1 2193639 2193910   -   1
## 4601           protein_coding   chr1 2193639 2193910   -   1
## 4602           protein_coding   chr1 2184461 2185513   -   1
## 4603           protein_coding   chr1 2185281 2185513   -   1
## 4604           protein_coding   chr1 2185278 2185280   -   1
## 4605           protein_coding   chr1 2194750 2194775   -   1
## 4606           protein_coding   chr1 2184461 2185280   -   1
## 4607           protein_coding   chr1 2189548 2194772   -   1
## 4608           protein_coding   chr1 2194688 2194772   -   1
## 4609           protein_coding   chr1 2194688 2194749   -   1
## 4610           protein_coding   chr1 2194747 2194749   -   1
## 4611           protein_coding   chr1 2193998 2194133   -   1
## 4612           protein_coding   chr1 2193998 2194133   -   1
## 4613           protein_coding   chr1 2193639 2193910   -   1
## 4614           protein_coding   chr1 2193639 2193910   -   1
## 4615           protein_coding   chr1 2189548 2189781   -   1
## 4616           protein_coding   chr1 2189712 2189781   -   1
## 4617           protein_coding   chr1 2189709 2189711   -   1
## 4618           protein_coding   chr1 2194750 2194772   -   1
## 4619           protein_coding   chr1 2189548 2189711   -   1
## 4620                    lncRNA   chr1 2212523 2220738   +   0
## 4621                    lncRNA   chr1 2212523 2220738   +   0
## 4622                    lncRNA   chr1 2212523 2212644   +   0
## 4623                    lncRNA   chr1 2220535 2220738   +   0
## 4624           protein_coding   chr1 2228319 2310213   +   1
## 4625           protein_coding   chr1 2228319 2310213   +   1
## 4626           protein_coding   chr1 2228319 2229735   +   1
## 4627           protein_coding   chr1 2228767 2229735   +   1
## 4628           protein_coding   chr1 2228767 2228769   +   1
## 4629           protein_coding   chr1 2302978 2303103   +   1
## 4630           protein_coding   chr1 2302978 2303103   +   1
## 4631           protein_coding   chr1 2303285 2303400   +   1
## 4632           protein_coding   chr1 2303285 2303400   +   1
## 4633           protein_coding   chr1 2303840 2304102   +   1
```

```
## 4634                    protein_coding   chr1 2303840 2304102    +    1
## 4635                    protein_coding   chr1 2304293 2304585    +    1
## 4636                    protein_coding   chr1 2304293 2304585    +    1
## 4637                    protein_coding   chr1 2306020 2306250    +    1
## 4638                    protein_coding   chr1 2306020 2306250    +    1
## 4639                    protein_coding   chr1 2306577 2310213    +    1
## 4640                    protein_coding   chr1 2306577 2306762    +    1
## 4641                    protein_coding   chr1 2306763 2306765    +    1
## 4642                    protein_coding   chr1 2228319 2228766    +    1
## 4643                    protein_coding   chr1 2306763 2310213    +    1
## 4644                            lncRNA   chr1 2315040 2323085    +    0
## 4645                            lncRNA   chr1 2315040 2321323    +    0
## 4646                            lncRNA   chr1 2315040 2315998    +    0
## 4647                            lncRNA   chr1 2316392 2317011    +    0
## 4648                            lncRNA   chr1 2317611 2317729    +    0
## 4649                            lncRNA   chr1 2318990 2321323    +    0
## 4650                            lncRNA   chr1 2315040 2323085    +    0
## 4651                            lncRNA   chr1 2315040 2315998    +    0
## 4652                            lncRNA   chr1 2316392 2317011    +    0
## 4653                            lncRNA   chr1 2318990 2323085    +    0
## 4654                    protein_coding   chr1 2321253 2391707    -    1
## 4655                    protein_coding   chr1 2321253 2391554    -    1
## 4656                    protein_coding   chr1 2391458 2391554    -    1
## 4657                    protein_coding   chr1 2391458 2391533    -    1
## 4658                    protein_coding   chr1 2391531 2391533    -    1
## 4659                    protein_coding   chr1 2389925 2389996    -    1
## 4660                    protein_coding   chr1 2389925 2389996    -    1
## 4661                    protein_coding   chr1 2388239 2388337    -    1
## 4662                    protein_coding   chr1 2388239 2388337    -    1
## 4663                    protein_coding   chr1 2387419 2387529    -    1
## 4664                    protein_coding   chr1 2387419 2387529    -    1
## 4665                    protein_coding   chr1 2385807 2385897    -    1
## 4666                    protein_coding   chr1 2385807 2385897    -    1
## 4667                    protein_coding   chr1 2384978 2385065    -    1
## 4668                    protein_coding   chr1 2384978 2385065    -    1
## 4669                    protein_coding   chr1 2374461 2374557    -    1
## 4670                    protein_coding   chr1 2374461 2374557    -    1
## 4671                    protein_coding   chr1 2372481 2372591    -    1
## 4672                    protein_coding   chr1 2372481 2372591    -    1
## 4673                    protein_coding   chr1 2358592 2358715    -    1
## 4674                    protein_coding   chr1 2358592 2358715    -    1
## 4675                    protein_coding   chr1 2357432 2357598    -    1
## 4676                    protein_coding   chr1 2357432 2357598    -    1
## 4677                    protein_coding   chr1 2336717 2336850    -    1
## 4678                    protein_coding   chr1 2336717 2336850    -    1
## 4679                    protein_coding   chr1 2336469 2336548    -    1
## 4680                    protein_coding   chr1 2336469 2336548    -    1
## 4681                    protein_coding   chr1 2324097 2324143    -    1
## 4682                    protein_coding   chr1 2324097 2324143    -    1
## 4683                    protein_coding   chr1 2321253 2321579    -    1
## 4684                    protein_coding   chr1 2321386 2321579    -    1
## 4685                    protein_coding   chr1 2321383 2321385    -    1
## 4686                    protein_coding   chr1 2391534 2391554    -    1
## 4687                    protein_coding   chr1 2321253 2321385    -    1
```

```
## 4688              protein_coding  chr1 2355175 2391707    -    1
## 4689              protein_coding  chr1 2391458 2391707    -    1
## 4690              protein_coding  chr1 2391458 2391533    -    1
## 4691              protein_coding  chr1 2391531 2391533    -    1
## 4692              protein_coding  chr1 2389925 2389996    -    1
## 4693              protein_coding  chr1 2389925 2389996    -    1
## 4694              protein_coding  chr1 2388239 2388337    -    1
## 4695              protein_coding  chr1 2388239 2388337    -    1
## 4696              protein_coding  chr1 2387419 2387529    -    1
## 4697              protein_coding  chr1 2387419 2387529    -    1
## 4698              protein_coding  chr1 2385807 2385897    -    1
## 4699              protein_coding  chr1 2385807 2385897    -    1
## 4700              protein_coding  chr1 2384978 2385065    -    1
## 4701              protein_coding  chr1 2384978 2385065    -    1
## 4702              protein_coding  chr1 2374461 2374557    -    1
## 4703              protein_coding  chr1 2374461 2374557    -    1
## 4704              protein_coding  chr1 2372481 2372591    -    1
## 4705              protein_coding  chr1 2372481 2372591    -    1
## 4706              protein_coding  chr1 2358592 2358715    -    1
## 4707              protein_coding  chr1 2358592 2358715    -    1
## 4708              protein_coding  chr1 2357432 2357598    -    1
## 4709              protein_coding  chr1 2357432 2357598    -    1
## 4710              protein_coding  chr1 2355175 2355464    -    1
## 4711              protein_coding  chr1 2355451 2355464    -    1
## 4712              protein_coding  chr1 2355448 2355450    -    1
## 4713              protein_coding  chr1 2391534 2391707    -    1
## 4714              protein_coding  chr1 2355175 2355450    -    1
## 4715                      lncRNA  chr1 2326201 2326693    -    0
## 4716                      lncRNA  chr1 2326201 2326693    -    0
## 4717                      lncRNA  chr1 2326201 2326693    -    0
## 4718 transcribed_processed_pseudogene  chr1 2350414 2352820    -    0
## 4719 transcribed_processed_pseudogene  chr1 2350414 2352820    -    0
## 4720 transcribed_processed_pseudogene  chr1 2350414 2352820    -    0
## 4721 transcribed_processed_pseudogene  chr1 2351644 2351857    -    0
## 4722 transcribed_processed_pseudogene  chr1 2351644 2351857    -    0
## 4723                      lncRNA  chr1 2363061 2363628    -    0
## 4724                      lncRNA  chr1 2363061 2363628    -    0
## 4725                      lncRNA  chr1 2363061 2363628    -    0
## 4726              protein_coding  chr1 2391775 2405442    +    1
## 4727              protein_coding  chr1 2391775 2405442    +    1
## 4728              protein_coding  chr1 2391775 2391958    +    1
## 4729              protein_coding  chr1 2395784 2395871    +    1
## 4730              protein_coding  chr1 2395791 2395871    +    1
## 4731              protein_coding  chr1 2395791 2395793    +    1
## 4732              protein_coding  chr1 2397116 2397220    +    1
## 4733              protein_coding  chr1 2397116 2397220    +    1
## 4734              protein_coding  chr1 2400857 2400935    +    1
## 4735              protein_coding  chr1 2400857 2400935    +    1
## 4736              protein_coding  chr1 2402207 2402342    +    1
## 4737              protein_coding  chr1 2402207 2402292    +    1
## 4738              protein_coding  chr1 2402293 2402295    +    1
## 4739              protein_coding  chr1 2403035 2405442    +    1
## 4740              protein_coding  chr1 2391775 2391958    +    1
## 4741              protein_coding  chr1 2395784 2395790    +    1
```

```
## 4742                    protein_coding      chr1 2402293 2402342       +       1
## 4743                    protein_coding      chr1 2403035 2405442       +       1
## 4744                    protein_coding      chr1 2391828 2402325       +       1
## 4745                    protein_coding      chr1 2391828 2391958       +       1
## 4746                    protein_coding      chr1 2395784 2395871       +       1
## 4747                    protein_coding      chr1 2395791 2395871       +       1
## 4748                    protein_coding      chr1 2395791 2395793       +       1
## 4749                    protein_coding      chr1 2397116 2397220       +       1
## 4750                    protein_coding      chr1 2397116 2397220       +       1
## 4751                    protein_coding      chr1 2400857 2400935       +       1
## 4752                    protein_coding      chr1 2400857 2400935       +       1
## 4753                    protein_coding      chr1 2402207 2402325       +       1
## 4754                    protein_coding      chr1 2402207 2402292       +       1
## 4755                    protein_coding      chr1 2402293 2402295       +       1
## 4756                    protein_coding      chr1 2391828 2391958       +       1
## 4757                    protein_coding      chr1 2395784 2395790       +       1
## 4758                    protein_coding      chr1 2402293 2402325       +       1
## 4759                    protein_coding      chr1 2391841 2405436       +       1
## 4760                    protein_coding      chr1 2391841 2391958       +       1
## 4761                    protein_coding      chr1 2395784 2395871       +       1
## 4762                    protein_coding      chr1 2395791 2395871       +       1
## 4763                    protein_coding      chr1 2395791 2395793       +       1
## 4764                    protein_coding      chr1 2397116 2397220       +       1
## 4765                    protein_coding      chr1 2397116 2397220       +       1
## 4766                    protein_coding      chr1 2399415 2399514       +       1
## 4767                    protein_coding      chr1 2399415 2399514       +       1
## 4768                    protein_coding      chr1 2400857 2400935       +       1
## 4769                    protein_coding      chr1 2400857 2400935       +       1
## 4770                    protein_coding      chr1 2402207 2402342       +       1
## 4771                    protein_coding      chr1 2402207 2402342       +       1
## 4772                    protein_coding      chr1 2403035 2405436       +       1
## 4773                    protein_coding      chr1 2403035 2403121       +       1
## 4774                    protein_coding      chr1 2403122 2403124       +       1
## 4775                    protein_coding      chr1 2391841 2391958       +       1
## 4776                    protein_coding      chr1 2395784 2395790       +       1
## 4777                    protein_coding      chr1 2403122 2405436       +       1
## 4778                    protein_coding      chr1 2391890 2403751       +       1
## 4779                    protein_coding      chr1 2391890 2391958       +       1
## 4780                    protein_coding      chr1 2395784 2395871       +       1
## 4781                    protein_coding      chr1 2395791 2395871       +       1
## 4782                    protein_coding      chr1 2395791 2395793       +       1
## 4783                    protein_coding      chr1 2397116 2397220       +       1
## 4784                    protein_coding      chr1 2397116 2397220       +       1
## 4785                    protein_coding      chr1 2399415 2399514       +       1
## 4786                    protein_coding      chr1 2399415 2399514       +       1
## 4787                    protein_coding      chr1 2400857 2400935       +       1
## 4788                    protein_coding      chr1 2400857 2400935       +       1
## 4789                    protein_coding      chr1 2402097 2402342       +       1
## 4790                    protein_coding      chr1 2402097 2402292       +       1
## 4791                    protein_coding      chr1 2402293 2402295       +       1
## 4792                    protein_coding      chr1 2403035 2403751       +       1
## 4793                    protein_coding      chr1 2391890 2391958       +       1
## 4794                    protein_coding      chr1 2395784 2395790       +       1
## 4795                    protein_coding      chr1 2402293 2402342       +       1
```

```
## 4796                  protein_coding    chr1 2403035 2403751    +    1
## 4797                  protein_coding    chr1 2394005 2403216    +    1
## 4798                  protein_coding    chr1 2394005 2395871    +    1
## 4799                  protein_coding    chr1 2395791 2395871    +    1
## 4800                  protein_coding    chr1 2395791 2395793    +    1
## 4801                  protein_coding    chr1 2397116 2397220    +    1
## 4802                  protein_coding    chr1 2397116 2397220    +    1
## 4803                  protein_coding    chr1 2399415 2399514    +    1
## 4804                  protein_coding    chr1 2399415 2399514    +    1
## 4805                  protein_coding    chr1 2400857 2400935    +    1
## 4806                  protein_coding    chr1 2400857 2400935    +    1
## 4807                  protein_coding    chr1 2402207 2402342    +    1
## 4808                  protein_coding    chr1 2402207 2402342    +    1
## 4809                  protein_coding    chr1 2403035 2403216    +    1
## 4810                  protein_coding    chr1 2403035 2403121    +    1
## 4811                  protein_coding    chr1 2403122 2403124    +    1
## 4812                  protein_coding    chr1 2394005 2395790    +    1
## 4813                  protein_coding    chr1 2403122 2403216    +    1
## 4814                  protein_coding    chr1 2403964 2413797    -    1
## 4815                  protein_coding    chr1 2403964 2412530    -    1
## 4816                  protein_coding    chr1 2412391 2412530    -    1
## 4817                  protein_coding    chr1 2412391 2412502    -    1
## 4818                  protein_coding    chr1 2412500 2412502    -    1
## 4819                  protein_coding    chr1 2410371 2410451    -    1
## 4820                  protein_coding    chr1 2410371 2410451    -    1
## 4821                  protein_coding    chr1 2408452 2408858    -    1
## 4822                  protein_coding    chr1 2408452 2408858    -    1
## 4823                  protein_coding    chr1 2406720 2406955    -    1
## 4824                  protein_coding    chr1 2406720 2406955    -    1
## 4825                  protein_coding    chr1 2406484 2406619    -    1
## 4826                  protein_coding    chr1 2406484 2406619    -    1
## 4827                  protein_coding    chr1 2403964 2405834    -    1
## 4828                  protein_coding    chr1 2405769 2405834    -    1
## 4829                  protein_coding    chr1 2405766 2405768    -    1
## 4830                  protein_coding    chr1 2412503 2412530    -    1
## 4831                  protein_coding    chr1 2403964 2405768    -    1
## 4832                  protein_coding    chr1 2404819 2412571    -    1
## 4833                  protein_coding    chr1 2412391 2412571    -    1
## 4834                  protein_coding    chr1 2412391 2412502    -    1
## 4835                  protein_coding    chr1 2412500 2412502    -    1
## 4836                  protein_coding    chr1 2410371 2410451    -    1
## 4837                  protein_coding    chr1 2410371 2410451    -    1
## 4838                  protein_coding    chr1 2408452 2408858    -    1
## 4839                  protein_coding    chr1 2408452 2408858    -    1
## 4840                  protein_coding    chr1 2406720 2406895    -    1
## 4841                  protein_coding    chr1 2406720 2406895    -    1
## 4842                  protein_coding    chr1 2406484 2406619    -    1
## 4843                  protein_coding    chr1 2406484 2406619    -    1
## 4844                  protein_coding    chr1 2404819 2405834    -    1
## 4845                  protein_coding    chr1 2405769 2405834    -    1
## 4846                  protein_coding    chr1 2405766 2405768    -    1
## 4847                  protein_coding    chr1 2412503 2412571    -    1
## 4848                  protein_coding    chr1 2404819 2405768    -    1
## 4849                  protein_coding    chr1 2404838 2412540    -    1
```

```
## 4850            protein_coding      chr1 2412391 2412540      -      1
## 4851            protein_coding      chr1 2412391 2412502      -      1
## 4852            protein_coding      chr1 2412500 2412502      -      1
## 4853            protein_coding      chr1 2410371 2410451      -      1
## 4854            protein_coding      chr1 2410371 2410451      -      1
## 4855            protein_coding      chr1 2408452 2408858      -      1
## 4856            protein_coding      chr1 2408452 2408858      -      1
## 4857            protein_coding      chr1 2406720 2406895      -      1
## 4858            protein_coding      chr1 2406720 2406895      -      1
## 4859            protein_coding      chr1 2406484 2406619      -      1
## 4860            protein_coding      chr1 2406484 2406619      -      1
## 4861            protein_coding      chr1 2404838 2405828      -      1
## 4862            protein_coding      chr1 2405769 2405828      -      1
## 4863            protein_coding      chr1 2405766 2405768      -      1
## 4864            protein_coding      chr1 2412503 2412540      -      1
## 4865            protein_coding      chr1 2404838 2405768      -      1
## 4866            protein_coding      chr1 2425980 2505532      +      1
## 4867            protein_coding      chr1 2467459 2505526      +      1
## 4868            protein_coding      chr1 2467459 2467662      +      1
## 4869            protein_coding      chr1 2467620 2467662      +      1
## 4870            protein_coding      chr1 2467620 2467622      +      1
## 4871            protein_coding      chr1 2478476 2478622      +      1
## 4872            protein_coding      chr1 2478476 2478622      +      1
## 4873            protein_coding      chr1 2479734 2479978      +      1
## 4874            protein_coding      chr1 2479734 2479978      +      1
## 4875            protein_coding      chr1 2480184 2480312      +      1
## 4876            protein_coding      chr1 2480184 2480312      +      1
## 4877            protein_coding      chr1 2484448 2484618      +      1
## 4878            protein_coding      chr1 2484448 2484618      +      1
## 4879            protein_coding      chr1 2486907 2487000      +      1
## 4880            protein_coding      chr1 2486907 2487000      +      1
## 4881            protein_coding      chr1 2487173 2487376      +      1
## 4882            protein_coding      chr1 2487173 2487376      +      1
## 4883            protein_coding      chr1 2487598 2487718      +      1
## 4884            protein_coding      chr1 2487598 2487718      +      1
## 4885            protein_coding      chr1 2489207 2489378      +      1
## 4886            protein_coding      chr1 2489207 2489378      +      1
## 4887            protein_coding      chr1 2489760 2489867      +      1
## 4888            protein_coding      chr1 2489760 2489867      +      1
## 4889            protein_coding      chr1 2491192 2491335      +      1
## 4890            protein_coding      chr1 2491192 2491335      +      1
## 4891            protein_coding      chr1 2494856 2494948      +      1
## 4892            protein_coding      chr1 2494856 2494948      +      1
## 4893            protein_coding      chr1 2495488 2495570      +      1
## 4894            protein_coding      chr1 2495488 2495570      +      1
## 4895            protein_coding      chr1 2496607 2496704      +      1
## 4896            protein_coding      chr1 2496607 2496704      +      1
## 4897            protein_coding      chr1 2496828 2497010      +      1
## 4898            protein_coding      chr1 2496828 2497010      +      1
## 4899            protein_coding      chr1 2497502 2497609      +      1
## 4900            protein_coding      chr1 2497502 2497609      +      1
## 4901            protein_coding      chr1 2498523 2498647      +      1
## 4902            protein_coding      chr1 2498523 2498647      +      1
## 4903            protein_coding      chr1 2498744 2498828      +      1
```

```
## 4904                     protein_coding    chr1 2498744 2498828       +       1
## 4905                     protein_coding    chr1 2499084 2499230       +       1
## 4906                     protein_coding    chr1 2499084 2499230       +       1
## 4907                     protein_coding    chr1 2499641 2499720       +       1
## 4908                     protein_coding    chr1 2499641 2499720       +       1
## 4909                     protein_coding    chr1 2502112 2502910       +       1
## 4910                     protein_coding    chr1 2502112 2502910       +       1
## 4911                     protein_coding    chr1 2503617 2505526       +       1
## 4912                     protein_coding    chr1 2503617 2503624       +       1
## 4913                     protein_coding    chr1 2503625 2503627       +       1
## 4914                     protein_coding    chr1 2467459 2467619       +       1
## 4915                     protein_coding    chr1 2503625 2505526       +       1
## 4916                     protein_coding    chr1 2476289 2505532       +       1
## 4917                     protein_coding    chr1 2476289 2476712       +       1
## 4918                     protein_coding    chr1 2476589 2476712       +       1
## 4919                     protein_coding    chr1 2476589 2476591       +       1
## 4920                     protein_coding    chr1 2478476 2478622       +       1
## 4921                     protein_coding    chr1 2478476 2478622       +       1
## 4922                     protein_coding    chr1 2479734 2479977       +       1
## 4923                     protein_coding    chr1 2479734 2479977       +       1
## 4924                     protein_coding    chr1 2480183 2480312       +       1
## 4925                     protein_coding    chr1 2480183 2480312       +       1
## 4926                     protein_coding    chr1 2484448 2484618       +       1
## 4927                     protein_coding    chr1 2484448 2484618       +       1
## 4928                     protein_coding    chr1 2486907 2487000       +       1
## 4929                     protein_coding    chr1 2486907 2487000       +       1
## 4930                     protein_coding    chr1 2487173 2487376       +       1
## 4931                     protein_coding    chr1 2487173 2487376       +       1
## 4932                     protein_coding    chr1 2487598 2487718       +       1
## 4933                     protein_coding    chr1 2487598 2487718       +       1
## 4934                     protein_coding    chr1 2489207 2489378       +       1
## 4935                     protein_coding    chr1 2489207 2489378       +       1
## 4936                     protein_coding    chr1 2489760 2489867       +       1
## 4937                     protein_coding    chr1 2489760 2489867       +       1
## 4938                     protein_coding    chr1 2491192 2491335       +       1
## 4939                     protein_coding    chr1 2491192 2491335       +       1
## 4940                     protein_coding    chr1 2494856 2494948       +       1
## 4941                     protein_coding    chr1 2494856 2494948       +       1
## 4942                     protein_coding    chr1 2495488 2495570       +       1
## 4943                     protein_coding    chr1 2495488 2495570       +       1
## 4944                     protein_coding    chr1 2496607 2496704       +       1
## 4945                     protein_coding    chr1 2496607 2496704       +       1
## 4946                     protein_coding    chr1 2496828 2497010       +       1
## 4947                     protein_coding    chr1 2496828 2497010       +       1
## 4948                     protein_coding    chr1 2497502 2497609       +       1
## 4949                     protein_coding    chr1 2497502 2497609       +       1
## 4950                     protein_coding    chr1 2498523 2498647       +       1
## 4951                     protein_coding    chr1 2498523 2498647       +       1
## 4952                     protein_coding    chr1 2498744 2498828       +       1
## 4953                     protein_coding    chr1 2498744 2498828       +       1
## 4954                     protein_coding    chr1 2499084 2499230       +       1
## 4955                     protein_coding    chr1 2499084 2499230       +       1
## 4956                     protein_coding    chr1 2499641 2499720       +       1
## 4957                     protein_coding    chr1 2499641 2499720       +       1
```

```
## 4958                 protein_coding      chr1 2502112 2502409      +      1
## 4959                 protein_coding      chr1 2502112 2502409      +      1
## 4960                 protein_coding      chr1 2503922 2505532      +      1
## 4961                 protein_coding      chr1 2503922 2505210      +      1
## 4962                 protein_coding      chr1 2505211 2505213      +      1
## 4963                 protein_coding      chr1 2476289 2476588      +      1
## 4964                 protein_coding      chr1 2505211 2505532      +      1
## 4965                 protein_coding      chr1 2476315 2505525      +      1
## 4966                 protein_coding      chr1 2476315 2476712      +      1
## 4967                 protein_coding      chr1 2476589 2476712      +      1
## 4968                 protein_coding      chr1 2476589 2476591      +      1
## 4969                 protein_coding      chr1 2478476 2478622      +      1
## 4970                 protein_coding      chr1 2478476 2478622      +      1
## 4971                 protein_coding      chr1 2479734 2479978      +      1
## 4972                 protein_coding      chr1 2479734 2479978      +      1
## 4973                 protein_coding      chr1 2480184 2480312      +      1
## 4974                 protein_coding      chr1 2480184 2480312      +      1
## 4975                 protein_coding      chr1 2484448 2484618      +      1
## 4976                 protein_coding      chr1 2484448 2484618      +      1
## 4977                 protein_coding      chr1 2486907 2487000      +      1
## 4978                 protein_coding      chr1 2486907 2487000      +      1
## 4979                 protein_coding      chr1 2487173 2487376      +      1
## 4980                 protein_coding      chr1 2487173 2487376      +      1
## 4981                 protein_coding      chr1 2487598 2487718      +      1
## 4982                 protein_coding      chr1 2487598 2487718      +      1
## 4983                 protein_coding      chr1 2489207 2489378      +      1
## 4984                 protein_coding      chr1 2489207 2489378      +      1
## 4985                 protein_coding      chr1 2489760 2489867      +      1
## 4986                 protein_coding      chr1 2489760 2489867      +      1
## 4987                 protein_coding      chr1 2491192 2491335      +      1
## 4988                 protein_coding      chr1 2491192 2491335      +      1
## 4989                 protein_coding      chr1 2494856 2494948      +      1
## 4990                 protein_coding      chr1 2494856 2494948      +      1
## 4991                 protein_coding      chr1 2495488 2495570      +      1
## 4992                 protein_coding      chr1 2495488 2495570      +      1
## 4993                 protein_coding      chr1 2496607 2496704      +      1
## 4994                 protein_coding      chr1 2496607 2496704      +      1
## 4995                 protein_coding      chr1 2496828 2497010      +      1
## 4996                 protein_coding      chr1 2496828 2497010      +      1
## 4997                 protein_coding      chr1 2497502 2497609      +      1
## 4998                 protein_coding      chr1 2497502 2497609      +      1
## 4999                 protein_coding      chr1 2498523 2498647      +      1
## 5000                 protein_coding      chr1 2498523 2498647      +      1
## 5001                 protein_coding      chr1 2498744 2498828      +      1
## 5002                 protein_coding      chr1 2498744 2498828      +      1
## 5003                 protein_coding      chr1 2499084 2499230      +      1
## 5004                 protein_coding      chr1 2499084 2499230      +      1
## 5005                 protein_coding      chr1 2499641 2499720      +      1
## 5006                 protein_coding      chr1 2499641 2499720      +      1
## 5007                 protein_coding      chr1 2502112 2502409      +      1
## 5008                 protein_coding      chr1 2502112 2502409      +      1
## 5009                 protein_coding      chr1 2503922 2505525      +      1
## 5010                 protein_coding      chr1 2503922 2505210      +      1
## 5011                 protein_coding      chr1 2505211 2505213      +      1
```

```
## 5012                      protein_coding  chr1 2476315 2476588       +        1
## 5013                      protein_coding  chr1 2505211 2505525       +        1
## 5014                              lncRNA  chr1 2492300 2493258       -        0
## 5015                              lncRNA  chr1 2492300 2493258       -        0
## 5016                              lncRNA  chr1 2493101 2493258       -        0
## 5017                              lncRNA  chr1 2492300 2492596       -        0
## 5018                              lncRNA  chr1 2493437 2494479       -        0
## 5019                              lncRNA  chr1 2493437 2494479       -        0
## 5020                              lncRNA  chr1 2494383 2494479       -        0
## 5021                              lncRNA  chr1 2493437 2493853       -        0
## 5022                      protein_coding  chr1 2508531 2526628       -        1
## 5023                      protein_coding  chr1 2508531 2526628       -        1
## 5024                      protein_coding  chr1 2526464 2526628       -        1
## 5025                      protein_coding  chr1 2526464 2526587       -        1
## 5026                      protein_coding  chr1 2526585 2526587       -        1
## 5027                      protein_coding  chr1 2521718 2521800       -        1
## 5028                      protein_coding  chr1 2521718 2521800       -        1
## 5029                      protein_coding  chr1 2521101 2521315       -        1
## 5030                      protein_coding  chr1 2521101 2521315       -        1
## 5031                      protein_coding  chr1 2520723 2520906       -        1
## 5032                      protein_coding  chr1 2520723 2520906       -        1
## 5033                      protein_coding  chr1 2520322 2520414       -        1
## 5034                      protein_coding  chr1 2520322 2520414       -        1
## 5035                      protein_coding  chr1 2519801 2519954       -        1
## 5036                      protein_coding  chr1 2519801 2519954       -        1
## 5037                      protein_coding  chr1 2519143 2519324       -        1
## 5038                      protein_coding  chr1 2519143 2519324       -        1
## 5039                      protein_coding  chr1 2518516 2518597       -        1
## 5040                      protein_coding  chr1 2518516 2518597       -        1
## 5041                      protein_coding  chr1 2518164 2518264       -        1
## 5042                      protein_coding  chr1 2518164 2518264       -        1
## 5043                      protein_coding  chr1 2515562 2515717       -        1
## 5044                      protein_coding  chr1 2515562 2515717       -        1
## 5045                      protein_coding  chr1 2514354 2514466       -        1
## 5046                      protein_coding  chr1 2514354 2514466       -        1
## 5047                      protein_coding  chr1 2514002 2514089       -        1
## 5048                      protein_coding  chr1 2514002 2514089       -        1
## 5049                      protein_coding  chr1 2512888 2513039       -        1
## 5050                      protein_coding  chr1 2512888 2513039       -        1
## 5051                      protein_coding  chr1 2511628 2511683       -        1
## 5052                      protein_coding  chr1 2511628 2511683       -        1
## 5053                      protein_coding  chr1 2511338 2511387       -        1
## 5054                      protein_coding  chr1 2511338 2511387       -        1
## 5055                      protein_coding  chr1 2510678 2510782       -        1
## 5056                      protein_coding  chr1 2510678 2510782       -        1
## 5057                      protein_coding  chr1 2510057 2510157       -        1
## 5058                      protein_coding  chr1 2510057 2510157       -        1
## 5059                      protein_coding  chr1 2509862 2509930       -        1
## 5060                      protein_coding  chr1 2509862 2509930       -        1
## 5061                      protein_coding  chr1 2508531 2509060       -        1
## 5062                      protein_coding  chr1 2508850 2509060       -        1
## 5063                      protein_coding  chr1 2508847 2508849       -        1
## 5064                      protein_coding  chr1 2526588 2526628       -        1
## 5065                      protein_coding  chr1 2508531 2508849       -        1
```

```
## 5066                     protein_coding       chr1 2508537 2526596      -        1
## 5067                     protein_coding       chr1 2526464 2526596      -        1
## 5068                     protein_coding       chr1 2526464 2526587      -        1
## 5069                     protein_coding       chr1 2526585 2526587      -        1
## 5070                     protein_coding       chr1 2521718 2521800      -        1
## 5071                     protein_coding       chr1 2521718 2521800      -        1
## 5072                     protein_coding       chr1 2521145 2521315      -        1
## 5073                     protein_coding       chr1 2521145 2521315      -        1
## 5074                     protein_coding       chr1 2520723 2520833      -        1
## 5075                     protein_coding       chr1 2520723 2520833      -        1
## 5076                     protein_coding       chr1 2520322 2520414      -        1
## 5077                     protein_coding       chr1 2520322 2520414      -        1
## 5078                     protein_coding       chr1 2519801 2519954      -        1
## 5079                     protein_coding       chr1 2519801 2519954      -        1
## 5080                     protein_coding       chr1 2519143 2519324      -        1
## 5081                     protein_coding       chr1 2519143 2519324      -        1
## 5082                     protein_coding       chr1 2518516 2518597      -        1
## 5083                     protein_coding       chr1 2518516 2518597      -        1
## 5084                     protein_coding       chr1 2518164 2518264      -        1
## 5085                     protein_coding       chr1 2518164 2518264      -        1
## 5086                     protein_coding       chr1 2515562 2515717      -        1
## 5087                     protein_coding       chr1 2515562 2515717      -        1
## 5088                     protein_coding       chr1 2514354 2514466      -        1
## 5089                     protein_coding       chr1 2514354 2514466      -        1
## 5090                     protein_coding       chr1 2514002 2514089      -        1
## 5091                     protein_coding       chr1 2514002 2514089      -        1
## 5092                     protein_coding       chr1 2512888 2513039      -        1
## 5093                     protein_coding       chr1 2512888 2513039      -        1
## 5094                     protein_coding       chr1 2511628 2511683      -        1
## 5095                     protein_coding       chr1 2511628 2511683      -        1
## 5096                     protein_coding       chr1 2511338 2511387      -        1
## 5097                     protein_coding       chr1 2511338 2511387      -        1
## 5098                     protein_coding       chr1 2510678 2510782      -        1
## 5099                     protein_coding       chr1 2510678 2510782      -        1
## 5100                     protein_coding       chr1 2510057 2510157      -        1
## 5101                     protein_coding       chr1 2510057 2510157      -        1
## 5102                     protein_coding       chr1 2509862 2509930      -        1
## 5103                     protein_coding       chr1 2509862 2509930      -        1
## 5104                     protein_coding       chr1 2508537 2509060      -        1
## 5105                     protein_coding       chr1 2508850 2509060      -        1
## 5106                     protein_coding       chr1 2508847 2508849      -        1
## 5107                     protein_coding       chr1 2526588 2526596      -        1
## 5108                     protein_coding       chr1 2508537 2508849      -        1
## 5109                     protein_coding       chr1 2508847 2526611      -        1
## 5110                     protein_coding       chr1 2526464 2526611      -        1
## 5111                     protein_coding       chr1 2526464 2526611      -        1
## 5112                     protein_coding       chr1 2526609 2526611      -        1
## 5113                     protein_coding       chr1 2521718 2521800      -        1
## 5114                     protein_coding       chr1 2521718 2521800      -        1
## 5115                     protein_coding       chr1 2521101 2521315      -        1
## 5116                     protein_coding       chr1 2521101 2521315      -        1
## 5117                     protein_coding       chr1 2520723 2520906      -        1
## 5118                     protein_coding       chr1 2520723 2520906      -        1
## 5119                     protein_coding       chr1 2520322 2520414      -        1
```

```
## 5120                    protein_coding    chr1 2520322 2520414    -    1
## 5121                    protein_coding    chr1 2519801 2519954    -    1
## 5122                    protein_coding    chr1 2519801 2519954    -    1
## 5123                    protein_coding    chr1 2519143 2519324    -    1
## 5124                    protein_coding    chr1 2519143 2519324    -    1
## 5125                    protein_coding    chr1 2518516 2518597    -    1
## 5126                    protein_coding    chr1 2518516 2518597    -    1
## 5127                    protein_coding    chr1 2518164 2518264    -    1
## 5128                    protein_coding    chr1 2518164 2518264    -    1
## 5129                    protein_coding    chr1 2515562 2515717    -    1
## 5130                    protein_coding    chr1 2515562 2515717    -    1
## 5131                    protein_coding    chr1 2514354 2514466    -    1
## 5132                    protein_coding    chr1 2514354 2514466    -    1
## 5133                    protein_coding    chr1 2514002 2514089    -    1
## 5134                    protein_coding    chr1 2514002 2514089    -    1
## 5135                    protein_coding    chr1 2512888 2513039    -    1
## 5136                    protein_coding    chr1 2512888 2513039    -    1
## 5137                    protein_coding    chr1 2511628 2511683    -    1
## 5138                    protein_coding    chr1 2511628 2511683    -    1
## 5139                    protein_coding    chr1 2511338 2511387    -    1
## 5140                    protein_coding    chr1 2511338 2511387    -    1
## 5141                    protein_coding    chr1 2510678 2510782    -    1
## 5142                    protein_coding    chr1 2510678 2510782    -    1
## 5143                    protein_coding    chr1 2510057 2510157    -    1
## 5144                    protein_coding    chr1 2510057 2510157    -    1
## 5145                    protein_coding    chr1 2509862 2509930    -    1
## 5146                    protein_coding    chr1 2509862 2509930    -    1
## 5147                    protein_coding    chr1 2508847 2509060    -    1
## 5148                    protein_coding    chr1 2508850 2509060    -    1
## 5149                    protein_coding    chr1 2508847 2508849    -    1
## 5150                    protein_coding    chr1 2508847 2508849    -    1
## 5151                    protein_coding    chr1 2528745 2530263    -    1
## 5152                    protein_coding    chr1 2528745 2530263    -    1
## 5153                    protein_coding    chr1 2530111 2530263    -    1
## 5154                    protein_coding    chr1 2530111 2530164    -    1
## 5155                    protein_coding    chr1 2530162 2530164    -    1
## 5156                    protein_coding    chr1 2529846 2530011    -    1
## 5157                    protein_coding    chr1 2529846 2530011    -    1
## 5158                    protein_coding    chr1 2528745 2529749    -    1
## 5159                    protein_coding    chr1 2529472 2529749    -    1
## 5160                    protein_coding    chr1 2529469 2529471    -    1
## 5161                    protein_coding    chr1 2530165 2530263    -    1
## 5162                    protein_coding    chr1 2528745 2529471    -    1
## 5163                            lncRNA    chr1 2530064 2547460    +    0
## 5164                            lncRNA    chr1 2530064 2547460    +    0
## 5165                            lncRNA    chr1 2530064 2530102    +    0
## 5166                            lncRNA    chr1 2545969 2547460    +    0
## 5167                            lncRNA    chr1 2549920 2557031    -    1
## 5168                            lncRNA    chr1 2549920 2552106    -    1
## 5169                            lncRNA    chr1 2550992 2552106    -    1
## 5170                            lncRNA    chr1 2550573 2550731    -    1
## 5171                            lncRNA    chr1 2549920 2550274    -    1
## 5172                            lncRNA    chr1 2549920 2557011    -    1
## 5173                            lncRNA    chr1 2556977 2557011    -    1
```

```
## 5174                    lncRNA    chr1 2554724 2556696    -    1
## 5175                    lncRNA    chr1 2554101 2554296    -    1
## 5176                    lncRNA    chr1 2553626 2553814    -    1
## 5177                    lncRNA    chr1 2551775 2552703    -    1
## 5178                    lncRNA    chr1 2549920 2550119    -    1
## 5179                    lncRNA    chr1 2550283 2554150    -    1
## 5180                    lncRNA    chr1 2550992 2554150    -    1
## 5181                    lncRNA    chr1 2550283 2550731    -    1
## 5182                    lncRNA    chr1 2554241 2557031    -    1
## 5183                    lncRNA    chr1 2556977 2557031    -    1
## 5184                    lncRNA    chr1 2556428 2556696    -    1
## 5185                    lncRNA    chr1 2555681 2555869    -    1
## 5186                    lncRNA    chr1 2554241 2554296    -    1
## 5187            protein_coding    chr1 2555639 2565382    +    1
## 5188            protein_coding    chr1 2556222 2561718    +    1
## 5189            protein_coding    chr1 2556222 2556261    +    1
## 5190            protein_coding    chr1 2556585 2556733    +    1
## 5191            protein_coding    chr1 2556665 2556733    +    1
## 5192            protein_coding    chr1 2556665 2556667    +    1
## 5193            protein_coding    chr1 2557726 2557834    +    1
## 5194            protein_coding    chr1 2557726 2557834    +    1
## 5195            protein_coding    chr1 2558343 2558468    +    1
## 5196            protein_coding    chr1 2558343 2558468    +    1
## 5197            protein_coding    chr1 2559823 2559978    +    1
## 5198            protein_coding    chr1 2559823 2559978    +    1
## 5199            protein_coding    chr1 2560624 2560714    +    1
## 5200            protein_coding    chr1 2560624 2560714    +    1
## 5201            protein_coding    chr1 2561494 2561718    +    1
## 5202            protein_coding    chr1 2561494 2561521    +    1
## 5203            protein_coding    chr1 2561522 2561524    +    1
## 5204            protein_coding    chr1 2556222 2556261    +    1
## 5205            protein_coding    chr1 2556585 2556664    +    1
## 5206            protein_coding    chr1 2561522 2561718    +    1
## 5207            protein_coding    chr1 2556366 2563829    +    1
## 5208            protein_coding    chr1 2556366 2556733    +    1
## 5209            protein_coding    chr1 2556665 2556733    +    1
## 5210            protein_coding    chr1 2556665 2556667    +    1
## 5211            protein_coding    chr1 2557726 2557834    +    1
## 5212            protein_coding    chr1 2557726 2557834    +    1
## 5213            protein_coding    chr1 2558343 2558468    +    1
## 5214            protein_coding    chr1 2558343 2558468    +    1
## 5215            protein_coding    chr1 2559823 2559978    +    1
## 5216            protein_coding    chr1 2559823 2559978    +    1
## 5217            protein_coding    chr1 2560624 2560714    +    1
## 5218            protein_coding    chr1 2560624 2560714    +    1
## 5219            protein_coding    chr1 2561673 2561815    +    1
## 5220            protein_coding    chr1 2561673 2561815    +    1
## 5221            protein_coding    chr1 2562865 2562896    +    1
## 5222            protein_coding    chr1 2562865 2562896    +    1
## 5223            protein_coding    chr1 2563148 2563829    +    1
## 5224            protein_coding    chr1 2563148 2563270    +    1
## 5225            protein_coding    chr1 2563271 2563273    +    1
## 5226            protein_coding    chr1 2556366 2556664    +    1
## 5227            protein_coding    chr1 2563271 2563829    +    1
```

```
## 5228                      TEC    chr1 2566410 2569888    +    0
## 5229                      TEC    chr1 2566410 2569888    +    0
## 5230                      TEC    chr1 2566410 2566605    +    0
## 5231                      TEC    chr1 2567866 2568054    +    0
## 5232                      TEC    chr1 2568977 2569888    +    0
## 5233                   lncRNA    chr1 2581560 2584533    +    0
## 5234                   lncRNA    chr1 2581560 2584533    +    0
## 5235                   lncRNA    chr1 2581560 2581650    +    0
## 5236                   lncRNA    chr1 2583370 2583495    +    0
## 5237                   lncRNA    chr1 2584125 2584533    +    0
## 5238           protein_coding    chr1 2586491 2591469    +    1
## 5239           protein_coding    chr1 2586750 2591467    +    1
## 5240           protein_coding    chr1 2586750 2586948    +    1
## 5241           protein_coding    chr1 2586796 2586948    +    1
## 5242           protein_coding    chr1 2586796 2586798    +    1
## 5243           protein_coding    chr1 2587091 2587295    +    1
## 5244           protein_coding    chr1 2587091 2587295    +    1
## 5245           protein_coding    chr1 2587741 2587792    +    1
## 5246           protein_coding    chr1 2587741 2587792    +    1
## 5247           protein_coding    chr1 2588336 2588453    +    1
## 5248           protein_coding    chr1 2588336 2588453    +    1
## 5249           protein_coding    chr1 2588550 2588625    +    1
## 5250           protein_coding    chr1 2588550 2588625    +    1
## 5251           protein_coding    chr1 2588922 2589040    +    1
## 5252           protein_coding    chr1 2588922 2589040    +    1
## 5253           protein_coding    chr1 2589410 2591467    +    1
## 5254           protein_coding    chr1 2589410 2589424    +    1
## 5255           protein_coding    chr1 2589425 2589427    +    1
## 5256           protein_coding    chr1 2586750 2586795    +    1
## 5257           protein_coding    chr1 2589425 2591467    +    1
## 5258           protein_coding    chr1 2586750 2591467    +    1
## 5259           protein_coding    chr1 2586750 2586948    +    1
## 5260           protein_coding    chr1 2586796 2586948    +    1
## 5261           protein_coding    chr1 2586796 2586798    +    1
## 5262           protein_coding    chr1 2587091 2587295    +    1
## 5263           protein_coding    chr1 2587091 2587295    +    1
## 5264           protein_coding    chr1 2587741 2587792    +    1
## 5265           protein_coding    chr1 2587741 2587792    +    1
## 5266           protein_coding    chr1 2588390 2588453    +    1
## 5267           protein_coding    chr1 2588390 2588453    +    1
## 5268           protein_coding    chr1 2588954 2589040    +    1
## 5269           protein_coding    chr1 2588954 2589040    +    1
## 5270           protein_coding    chr1 2589410 2591467    +    1
## 5271           protein_coding    chr1 2589410 2589424    +    1
## 5272           protein_coding    chr1 2589425 2589427    +    1
## 5273           protein_coding    chr1 2586750 2586795    +    1
## 5274           protein_coding    chr1 2589425 2591467    +    1
## 5275           protein_coding    chr1 2586775 2591468    +    1
## 5276           protein_coding    chr1 2586775 2586948    +    1
## 5277           protein_coding    chr1 2586886 2586948    +    1
## 5278           protein_coding    chr1 2586886 2586888    +    1
## 5279           protein_coding    chr1 2587091 2587295    +    1
## 5280           protein_coding    chr1 2587091 2587295    +    1
## 5281           protein_coding    chr1 2587741 2587792    +    1
```

```
## 5282                     protein_coding    chr1 2587741 2587792      +        1
## 5283                     protein_coding    chr1 2588390 2588453      +        1
## 5284                     protein_coding    chr1 2588390 2588453      +        1
## 5285                     protein_coding    chr1 2588550 2588625      +        1
## 5286                     protein_coding    chr1 2588550 2588625      +        1
## 5287                     protein_coding    chr1 2588922 2589040      +        1
## 5288                     protein_coding    chr1 2588922 2589040      +        1
## 5289                     protein_coding    chr1 2589410 2591468      +        1
## 5290                     protein_coding    chr1 2589410 2589424      +        1
## 5291                     protein_coding    chr1 2589425 2589427      +        1
## 5292                     protein_coding    chr1 2586775 2586885      +        1
## 5293                     protein_coding    chr1 2589425 2591468      +        1
## 5294                     protein_coding    chr1 2586780 2591467      +        1
## 5295                     protein_coding    chr1 2586780 2586948      +        1
## 5296                     protein_coding    chr1 2586886 2586948      +        1
## 5297                     protein_coding    chr1 2586886 2586888      +        1
## 5298                     protein_coding    chr1 2587091 2587295      +        1
## 5299                     protein_coding    chr1 2587091 2587295      +        1
## 5300                     protein_coding    chr1 2587741 2587792      +        1
## 5301                     protein_coding    chr1 2587741 2587792      +        1
## 5302                     protein_coding    chr1 2588336 2588453      +        1
## 5303                     protein_coding    chr1 2588336 2588453      +        1
## 5304                     protein_coding    chr1 2588550 2588625      +        1
## 5305                     protein_coding    chr1 2588550 2588625      +        1
## 5306                     protein_coding    chr1 2588954 2589040      +        1
## 5307                     protein_coding    chr1 2588954 2589040      +        1
## 5308                     protein_coding    chr1 2589410 2591467      +        1
## 5309                     protein_coding    chr1 2589410 2589411      +        1
## 5310                     protein_coding    chr1 2589412 2589414      +        1
## 5311                     protein_coding    chr1 2586780 2586885      +        1
## 5312                     protein_coding    chr1 2589412 2591467      +        1
## 5313                     protein_coding    chr1 2586796 2589947      +        1
## 5314                     protein_coding    chr1 2586796 2586948      +        1
## 5315                     protein_coding    chr1 2586886 2586948      +        1
## 5316                     protein_coding    chr1 2586886 2586888      +        1
## 5317                     protein_coding    chr1 2587091 2587295      +        1
## 5318                     protein_coding    chr1 2587091 2587295      +        1
## 5319                     protein_coding    chr1 2587741 2587792      +        1
## 5320                     protein_coding    chr1 2587741 2587792      +        1
## 5321                     protein_coding    chr1 2588390 2588453      +        1
## 5322                     protein_coding    chr1 2588390 2588453      +        1
## 5323                     protein_coding    chr1 2588957 2589040      +        1
## 5324                     protein_coding    chr1 2588957 2589040      +        1
## 5325                     protein_coding    chr1 2589410 2589947      +        1
## 5326                     protein_coding    chr1 2589410 2589424      +        1
## 5327                     protein_coding    chr1 2589425 2589427      +        1
## 5328                     protein_coding    chr1 2586796 2586885      +        1
## 5329                     protein_coding    chr1 2589425 2589947      +        1
## 5330                     protein_coding    chr1 2586798 2591463      +        1
## 5331                     protein_coding    chr1 2586798 2586948      +        1
## 5332                     protein_coding    chr1 2586886 2586948      +        1
## 5333                     protein_coding    chr1 2586886 2586888      +        1
## 5334                     protein_coding    chr1 2587091 2587295      +        1
## 5335                     protein_coding    chr1 2587091 2587295      +        1
```

```
## 5336                    protein_coding    chr1 2587741 2587792    +    1
## 5337                    protein_coding    chr1 2587741 2587792    +    1
## 5338                    protein_coding    chr1 2588390 2588453    +    1
## 5339                    protein_coding    chr1 2588390 2588453    +    1
## 5340                    protein_coding    chr1 2588550 2588625    +    1
## 5341                    protein_coding    chr1 2588550 2588625    +    1
## 5342                    protein_coding    chr1 2588954 2589040    +    1
## 5343                    protein_coding    chr1 2588954 2589040    +    1
## 5344                    protein_coding    chr1 2589410 2591463    +    1
## 5345                    protein_coding    chr1 2589410 2589411    +    1
## 5346                    protein_coding    chr1 2589412 2589414    +    1
## 5347                    protein_coding    chr1 2586798 2586885    +    1
## 5348                    protein_coding    chr1 2589412 2591463    +    1
## 5349                    protein_coding    chr1 2590639 2633016    -    1
## 5350                    protein_coding    chr1 2590639 2633016    -    1
## 5351                    protein_coding    chr1 2632866 2633016    -    1
## 5352                    protein_coding    chr1 2629331 2629521    -    1
## 5353                    protein_coding    chr1 2629331 2629484    -    1
## 5354                    protein_coding    chr1 2629482 2629484    -    1
## 5355                    protein_coding    chr1 2612127 2612204    -    1
## 5356                    protein_coding    chr1 2612127 2612204    -    1
## 5357                    protein_coding    chr1 2611281 2611340    -    1
## 5358                    protein_coding    chr1 2611281 2611340    -    1
## 5359                    protein_coding    chr1 2609670 2609831    -    1
## 5360                    protein_coding    chr1 2609670 2609831    -    1
## 5361                    protein_coding    chr1 2609339 2609419    -    1
## 5362                    protein_coding    chr1 2609339 2609419    -    1
## 5363                    protein_coding    chr1 2606974 2607069    -    1
## 5364                    protein_coding    chr1 2606974 2607069    -    1
## 5365                    protein_coding    chr1 2606248 2606366    -    1
## 5366                    protein_coding    chr1 2606248 2606366    -    1
## 5367                    protein_coding    chr1 2605558 2605623    -    1
## 5368                    protein_coding    chr1 2605558 2605623    -    1
## 5369                    protein_coding    chr1 2604147 2604281    -    1
## 5370                    protein_coding    chr1 2604147 2604281    -    1
## 5371                    protein_coding    chr1 2603884 2603973    -    1
## 5372                    protein_coding    chr1 2603884 2603973    -    1
## 5373                    protein_coding    chr1 2598654 2598790    -    1
## 5374                    protein_coding    chr1 2598654 2598790    -    1
## 5375                    protein_coding    chr1 2598207 2598300    -    1
## 5376                    protein_coding    chr1 2598207 2598300    -    1
## 5377                    protein_coding    chr1 2596561 2596689    -    1
## 5378                    protein_coding    chr1 2596561 2596689    -    1
## 5379                    protein_coding    chr1 2596009 2596107    -    1
## 5380                    protein_coding    chr1 2596009 2596107    -    1
## 5381                    protein_coding    chr1 2595276 2595359    -    1
## 5382                    protein_coding    chr1 2595276 2595359    -    1
## 5383                    protein_coding    chr1 2594790 2594893    -    1
## 5384                    protein_coding    chr1 2594790 2594893    -    1
## 5385                    protein_coding    chr1 2594385 2594443    -    1
## 5386                    protein_coding    chr1 2594385 2594443    -    1
## 5387                    protein_coding    chr1 2593814 2593933    -    1
## 5388                    protein_coding    chr1 2593814 2593933    -    1
## 5389                    protein_coding    chr1 2592833 2592966    -    1
```

```
## 5390                    protein_coding     chr1 2592833 2592966      -        1
## 5391                    protein_coding     chr1 2592655 2592720      -        1
## 5392                    protein_coding     chr1 2592655 2592720      -        1
## 5393                    protein_coding     chr1 2591932 2592027      -        1
## 5394                    protein_coding     chr1 2591932 2592027      -        1
## 5395                    protein_coding     chr1 2591557 2591633      -        1
## 5396                    protein_coding     chr1 2591557 2591633      -        1
## 5397                    protein_coding     chr1 2590639 2591089      -        1
## 5398                    protein_coding     chr1 2590993 2591089      -        1
## 5399                    protein_coding     chr1 2590990 2590992      -        1
## 5400                    protein_coding     chr1 2632866 2633016      -        1
## 5401                    protein_coding     chr1 2629485 2629521      -        1
## 5402                    protein_coding     chr1 2590639 2590992      -        1
## 5403                    protein_coding     chr1 2590926 2629494      -        1
## 5404                    protein_coding     chr1 2629331 2629494      -        1
## 5405                    protein_coding     chr1 2629331 2629484      -        1
## 5406                    protein_coding     chr1 2629482 2629484      -        1
## 5407                    protein_coding     chr1 2612127 2612204      -        1
## 5408                    protein_coding     chr1 2612127 2612204      -        1
## 5409                    protein_coding     chr1 2611281 2611340      -        1
## 5410                    protein_coding     chr1 2611281 2611340      -        1
## 5411                    protein_coding     chr1 2609670 2609831      -        1
## 5412                    protein_coding     chr1 2609670 2609831      -        1
## 5413                    protein_coding     chr1 2609394 2609419      -        1
## 5414                    protein_coding     chr1 2609394 2609419      -        1
## 5415                    protein_coding     chr1 2603884 2603973      -        1
## 5416                    protein_coding     chr1 2603884 2603973      -        1
## 5417                    protein_coding     chr1 2598654 2598790      -        1
## 5418                    protein_coding     chr1 2598654 2598790      -        1
## 5419                    protein_coding     chr1 2598207 2598300      -        1
## 5420                    protein_coding     chr1 2598207 2598300      -        1
## 5421                    protein_coding     chr1 2596561 2596689      -        1
## 5422                    protein_coding     chr1 2596561 2596689      -        1
## 5423                    protein_coding     chr1 2596009 2596107      -        1
## 5424                    protein_coding     chr1 2596009 2596107      -        1
## 5425                    protein_coding     chr1 2595276 2595359      -        1
## 5426                    protein_coding     chr1 2595276 2595359      -        1
## 5427                    protein_coding     chr1 2594790 2594893      -        1
## 5428                    protein_coding     chr1 2594790 2594893      -        1
## 5429                    protein_coding     chr1 2594385 2594443      -        1
## 5430                    protein_coding     chr1 2594385 2594443      -        1
## 5431                    protein_coding     chr1 2593814 2593933      -        1
## 5432                    protein_coding     chr1 2593814 2593933      -        1
## 5433                    protein_coding     chr1 2592833 2592966      -        1
## 5434                    protein_coding     chr1 2592833 2592966      -        1
## 5435                    protein_coding     chr1 2592655 2592720      -        1
## 5436                    protein_coding     chr1 2592655 2592720      -        1
## 5437                    protein_coding     chr1 2591932 2592027      -        1
## 5438                    protein_coding     chr1 2591932 2592027      -        1
## 5439                    protein_coding     chr1 2591557 2591633      -        1
## 5440                    protein_coding     chr1 2591557 2591633      -        1
## 5441                    protein_coding     chr1 2590926 2591089      -        1
## 5442                    protein_coding     chr1 2590993 2591089      -        1
## 5443                    protein_coding     chr1 2590990 2590992      -        1
```

```
## 5444                     protein_coding      chr1 2629485 2629494      -      1
## 5445                     protein_coding      chr1 2590926 2590992      -      1
## 5446                             lncRNA      chr1 2632568 2636620      +      0
## 5447                             lncRNA      chr1 2632568 2636620      +      0
## 5448                             lncRNA      chr1 2632568 2632675      +      0
## 5449                             lncRNA      chr1 2636356 2636620      +      0
## 5450                     protein_coding      chr1 2635976 2801717      -      1
## 5451                     protein_coding      chr1 2635976 2801717      -      1
## 5452                     protein_coding      chr1 2801577 2801717      -      1
## 5453                     protein_coding      chr1 2800044 2800868      -      1
## 5454                     protein_coding      chr1 2800044 2800827      -      1
## 5455                     protein_coding      chr1 2800825 2800827      -      1
## 5456                     protein_coding      chr1 2789503 2790346      -      1
## 5457                     protein_coding      chr1 2789503 2790346      -      1
## 5458                     protein_coding      chr1 2787481 2787706      -      1
## 5459                     protein_coding      chr1 2787481 2787706      -      1
## 5460                     protein_coding      chr1 2785819 2786023      -      1
## 5461                     protein_coding      chr1 2785819 2786023      -      1
## 5462                     protein_coding      chr1 2783609 2783775      -      1
## 5463                     protein_coding      chr1 2783609 2783775      -      1
## 5464                     protein_coding      chr1 2645293 2645563      -      1
## 5465                     protein_coding      chr1 2645293 2645563      -      1
## 5466                     protein_coding      chr1 2644264 2644478      -      1
## 5467                     protein_coding      chr1 2644264 2644478      -      1
## 5468                     protein_coding      chr1 2635976 2641895      -      1
## 5469                     protein_coding      chr1 2641371 2641895      -      1
## 5470                     protein_coding      chr1 2641368 2641370      -      1
## 5471                     protein_coding      chr1 2801577 2801717      -      1
## 5472                     protein_coding      chr1 2800828 2800868      -      1
## 5473                     protein_coding      chr1 2635976 2641370      -      1
## 5474                     protein_coding      chr1 2641368 2789665      -      1
## 5475                     protein_coding      chr1 2789503 2789665      -      1
## 5476                     protein_coding      chr1 2789503 2789591      -      1
## 5477                     protein_coding      chr1 2789589 2789591      -      1
## 5478                     protein_coding      chr1 2787481 2787706      -      1
## 5479                     protein_coding      chr1 2787481 2787706      -      1
## 5480                     protein_coding      chr1 2785819 2786023      -      1
## 5481                     protein_coding      chr1 2785819 2786023      -      1
## 5482                     protein_coding      chr1 2783609 2783775      -      1
## 5483                     protein_coding      chr1 2783609 2783775      -      1
## 5484                     protein_coding      chr1 2645293 2645563      -      1
## 5485                     protein_coding      chr1 2645293 2645563      -      1
## 5486                     protein_coding      chr1 2644264 2644478      -      1
## 5487                     protein_coding      chr1 2644264 2644478      -      1
## 5488                     protein_coding      chr1 2641368 2641895      -      1
## 5489                     protein_coding      chr1 2641371 2641895      -      1
## 5490                     protein_coding      chr1 2641368 2641370      -      1
## 5491                     protein_coding      chr1 2789592 2789665      -      1
## 5492                     protein_coding      chr1 2641368 2641370      -      1
## 5493                             lncRNA      chr1 2768091 2784733      +      0
## 5494                             lncRNA      chr1 2768091 2784733      +      0
## 5495                             lncRNA      chr1 2768091 2768091      +      0
## 5496                             lncRNA      chr1 2777299 2777504      +      0
## 5497                             lncRNA      chr1 2784348 2784733      +      0
```

```
## 5498                    lncRNA        chr1 2773603 2776473       +       0
## 5499                    lncRNA        chr1 2773603 2776473       +       0
## 5500                    lncRNA        chr1 2773603 2773864       +       0
## 5501                    lncRNA        chr1 2773947 2774066       +       0
## 5502                    lncRNA        chr1 2774230 2774709       +       0
## 5503                    lncRNA        chr1 2774790 2774910       +       0
## 5504                    lncRNA        chr1 2774993 2775072       +       0
## 5505                    lncRNA        chr1 2775155 2775274       +       0
## 5506                    lncRNA        chr1 2775357 2775437       +       0
## 5507                    lncRNA        chr1 2775519 2775634       +       0
## 5508                    lncRNA        chr1 2776049 2776129       +       0
## 5509                    lncRNA        chr1 2776370 2776473       +       0
## 5510                    lncRNA        chr1 2811850 2812692       −       0
## 5511                    lncRNA        chr1 2811850 2812692       −       0
## 5512                    lncRNA        chr1 2812235 2812692       −       0
## 5513                    lncRNA        chr1 2811850 2811998       −       0
## 5514                    lncRNA        chr1 2814056 2817767       +       0
## 5515                    lncRNA        chr1 2814056 2817767       +       0
## 5516                    lncRNA        chr1 2814056 2814451       +       0
## 5517                    lncRNA        chr1 2817501 2817767       +       0
## 5518                    lncRNA        chr1 2814432 2814998       −       0
## 5519                    lncRNA        chr1 2814432 2814998       −       0
## 5520                    lncRNA        chr1 2814827 2814998       −       0
## 5521                    lncRNA        chr1 2814432 2814688       −       0
## 5522                    lncRNA        chr1 2960658 2968707       −       0
## 5523                    lncRNA        chr1 2960658 2963415       −       0
## 5524                    lncRNA        chr1 2963264 2963415       −       0
## 5525                    lncRNA        chr1 2961672 2962100       −       0
## 5526                    lncRNA        chr1 2960658 2961585       −       0
## 5527            protein_coding        chr1 3021483 3022903       +       1
## 5528            protein_coding        chr1 3021483 3022903       +       1
## 5529            protein_coding        chr1 3021483 3022903       +       1
## 5530            protein_coding        chr1 3021687 3022817       +       1
## 5531            protein_coding        chr1 3021687 3021689       +       1
## 5532            protein_coding        chr1 3022818 3022820       +       1
## 5533            protein_coding        chr1 3021483 3021686       +       1
## 5534            protein_coding        chr1 3022818 3022903       +       1
## 5535                    lncRNA        chr1 3059615 3068437       −       1
## 5536                    lncRNA        chr1 3061959 3062395       −       1
## 5537                    lncRNA        chr1 3062195 3062395       −       1
## 5538                    lncRNA        chr1 3061959 3062192       −       1
## 5539            protein_coding        chr1 3069168 3438621       +       1
## 5540            protein_coding        chr1 3069168 3434342       +       1
## 5541            protein_coding        chr1 3069168 3069296       +       1
## 5542            protein_coding        chr1 3069260 3069296       +       1
## 5543            protein_coding        chr1 3069260 3069262       +       1
## 5544            protein_coding        chr1 3186125 3186474       +       1
## 5545            protein_coding        chr1 3186125 3186474       +       1
## 5546            protein_coding        chr1 3244087 3244137       +       1
## 5547            protein_coding        chr1 3244087 3244137       +       1
## 5548            protein_coding        chr1 3385149 3385286       +       1
## 5549            protein_coding        chr1 3385149 3385286       +       1
## 5550            protein_coding        chr1 3396491 3396593       +       1
## 5551            protein_coding        chr1 3396491 3396593       +       1
```

```
## 5552                     protein_coding    chr1 3402791 3402998      +        1
## 5553                     protein_coding    chr1 3402791 3402998      +        1
## 5554                     protein_coding    chr1 3404739 3404886      +        1
## 5555                     protein_coding    chr1 3404739 3404886      +        1
## 5556                     protein_coding    chr1 3405495 3405648      +        1
## 5557                     protein_coding    chr1 3405495 3405648      +        1
## 5558                     protein_coding    chr1 3411384 3412800      +        1
## 5559                     protein_coding    chr1 3411384 3412800      +        1
## 5560                     protein_coding    chr1 3414560 3414647      +        1
## 5561                     protein_coding    chr1 3414560 3414647      +        1
## 5562                     protein_coding    chr1 3417828 3417997      +        1
## 5563                     protein_coding    chr1 3417828 3417997      +        1
## 5564                     protein_coding    chr1 3418667 3418744      +        1
## 5565                     protein_coding    chr1 3418667 3418744      +        1
## 5566                     protein_coding    chr1 3425581 3425750      +        1
## 5567                     protein_coding    chr1 3425581 3425750      +        1
## 5568                     protein_coding    chr1 3426051 3426225      +        1
## 5569                     protein_coding    chr1 3426051 3426225      +        1
## 5570                     protein_coding    chr1 3430872 3431108      +        1
## 5571                     protein_coding    chr1 3430872 3431108      +        1
## 5572                     protein_coding    chr1 3433677 3434342      +        1
## 5573                     protein_coding    chr1 3433677 3433686      +        1
## 5574                     protein_coding    chr1 3433687 3433689      +        1
## 5575                     protein_coding    chr1 3069168 3069259      +        1
## 5576                     protein_coding    chr1 3433687 3434342      +        1
## 5577                     protein_coding    chr1 3069197 3435421      +        1
## 5578                     protein_coding    chr1 3069197 3069296      +        1
## 5579                     protein_coding    chr1 3069260 3069296      +        1
## 5580                     protein_coding    chr1 3069260 3069262      +        1
## 5581                     protein_coding    chr1 3186125 3186474      +        1
## 5582                     protein_coding    chr1 3186125 3186474      +        1
## 5583                     protein_coding    chr1 3244087 3244137      +        1
## 5584                     protein_coding    chr1 3244087 3244137      +        1
## 5585                     protein_coding    chr1 3385152 3385286      +        1
## 5586                     protein_coding    chr1 3385152 3385286      +        1
## 5587                     protein_coding    chr1 3396491 3396593      +        1
## 5588                     protein_coding    chr1 3396491 3396593      +        1
## 5589                     protein_coding    chr1 3402791 3402998      +        1
## 5590                     protein_coding    chr1 3402791 3402998      +        1
## 5591                     protein_coding    chr1 3404739 3404886      +        1
## 5592                     protein_coding    chr1 3404739 3404886      +        1
## 5593                     protein_coding    chr1 3405495 3405648      +        1
## 5594                     protein_coding    chr1 3405495 3405648      +        1
## 5595                     protein_coding    chr1 3411384 3412800      +        1
## 5596                     protein_coding    chr1 3411384 3412800      +        1
## 5597                     protein_coding    chr1 3414560 3414647      +        1
## 5598                     protein_coding    chr1 3414560 3414647      +        1
## 5599                     protein_coding    chr1 3417828 3417997      +        1
## 5600                     protein_coding    chr1 3417828 3417997      +        1
## 5601                     protein_coding    chr1 3418667 3418744      +        1
## 5602                     protein_coding    chr1 3418667 3418744      +        1
## 5603                     protein_coding    chr1 3425581 3425750      +        1
## 5604                     protein_coding    chr1 3425581 3425750      +        1
## 5605                     protein_coding    chr1 3426051 3426225      +        1
```

```
## 5606                    protein_coding   chr1 3426051 3426225    +    1
## 5607                    protein_coding   chr1 3430872 3431108    +    1
## 5608                    protein_coding   chr1 3430872 3431108    +    1
## 5609                    protein_coding   chr1 3431966 3432140    +    1
## 5610                    protein_coding   chr1 3431966 3432140    +    1
## 5611                    protein_coding   chr1 3433734 3435421    +    1
## 5612                    protein_coding   chr1 3433734 3433808    +    1
## 5613                    protein_coding   chr1 3433809 3433811    +    1
## 5614                    protein_coding   chr1 3069197 3069259    +    1
## 5615                    protein_coding   chr1 3433809 3435421    +    1
## 5616                    protein_coding   chr1 3069203 3438621    +    1
## 5617                    protein_coding   chr1 3069203 3069296    +    1
## 5618                    protein_coding   chr1 3069260 3069296    +    1
## 5619                    protein_coding   chr1 3069260 3069262    +    1
## 5620                    protein_coding   chr1 3186125 3186474    +    1
## 5621                    protein_coding   chr1 3186125 3186474    +    1
## 5622                    protein_coding   chr1 3244087 3244137    +    1
## 5623                    protein_coding   chr1 3244087 3244137    +    1
## 5624                    protein_coding   chr1 3385152 3385286    +    1
## 5625                    protein_coding   chr1 3385152 3385286    +    1
## 5626                    protein_coding   chr1 3396491 3396593    +    1
## 5627                    protein_coding   chr1 3396491 3396593    +    1
## 5628                    protein_coding   chr1 3402791 3402998    +    1
## 5629                    protein_coding   chr1 3402791 3402998    +    1
## 5630                    protein_coding   chr1 3404739 3404886    +    1
## 5631                    protein_coding   chr1 3404739 3404886    +    1
## 5632                    protein_coding   chr1 3405495 3405648    +    1
## 5633                    protein_coding   chr1 3405495 3405648    +    1
## 5634                    protein_coding   chr1 3411384 3412800    +    1
## 5635                    protein_coding   chr1 3411384 3412800    +    1
## 5636                    protein_coding   chr1 3414560 3414647    +    1
## 5637                    protein_coding   chr1 3414560 3414647    +    1
## 5638                    protein_coding   chr1 3417828 3417997    +    1
## 5639                    protein_coding   chr1 3417828 3417997    +    1
## 5640                    protein_coding   chr1 3418667 3418744    +    1
## 5641                    protein_coding   chr1 3418667 3418744    +    1
## 5642                    protein_coding   chr1 3425581 3425750    +    1
## 5643                    protein_coding   chr1 3425581 3425750    +    1
## 5644                    protein_coding   chr1 3426051 3426225    +    1
## 5645                    protein_coding   chr1 3426051 3426225    +    1
## 5646                    protein_coding   chr1 3430872 3431108    +    1
## 5647                    protein_coding   chr1 3430872 3431108    +    1
## 5648                    protein_coding   chr1 3431966 3432140    +    1
## 5649                    protein_coding   chr1 3431966 3432140    +    1
## 5650                    protein_coding   chr1 3433677 3438621    +    1
## 5651                    protein_coding   chr1 3433677 3433808    +    1
## 5652                    protein_coding   chr1 3433809 3433811    +    1
## 5653                    protein_coding   chr1 3069203 3069259    +    1
## 5654                    protein_coding   chr1 3433809 3438621    +    1
## 5655                    protein_coding   chr1 3069211 3434342    +    1
## 5656                    protein_coding   chr1 3069211 3069296    +    1
## 5657                    protein_coding   chr1 3069260 3069296    +    1
## 5658                    protein_coding   chr1 3069260 3069262    +    1
## 5659                    protein_coding   chr1 3186125 3186474    +    1
```

```
## 5660                    protein_coding   chr1 3186125 3186474     +     1
## 5661                    protein_coding   chr1 3244087 3244137     +     1
## 5662                    protein_coding   chr1 3244087 3244137     +     1
## 5663                    protein_coding   chr1 3385149 3385286     +     1
## 5664                    protein_coding   chr1 3385149 3385286     +     1
## 5665                    protein_coding   chr1 3396491 3396593     +     1
## 5666                    protein_coding   chr1 3396491 3396593     +     1
## 5667                    protein_coding   chr1 3402791 3402998     +     1
## 5668                    protein_coding   chr1 3402791 3402998     +     1
## 5669                    protein_coding   chr1 3404739 3404886     +     1
## 5670                    protein_coding   chr1 3404739 3404886     +     1
## 5671                    protein_coding   chr1 3405495 3405648     +     1
## 5672                    protein_coding   chr1 3405495 3405648     +     1
## 5673                    protein_coding   chr1 3411384 3412800     +     1
## 5674                    protein_coding   chr1 3411384 3412800     +     1
## 5675                    protein_coding   chr1 3414563 3414647     +     1
## 5676                    protein_coding   chr1 3414563 3414647     +     1
## 5677                    protein_coding   chr1 3417828 3417997     +     1
## 5678                    protein_coding   chr1 3417828 3417997     +     1
## 5679                    protein_coding   chr1 3418667 3418744     +     1
## 5680                    protein_coding   chr1 3418667 3418744     +     1
## 5681                    protein_coding   chr1 3425581 3425750     +     1
## 5682                    protein_coding   chr1 3425581 3425750     +     1
## 5683                    protein_coding   chr1 3426051 3426225     +     1
## 5684                    protein_coding   chr1 3426051 3426225     +     1
## 5685                    protein_coding   chr1 3430872 3431108     +     1
## 5686                    protein_coding   chr1 3430872 3431108     +     1
## 5687                    protein_coding   chr1 3433677 3434342     +     1
## 5688                    protein_coding   chr1 3433677 3433686     +     1
## 5689                    protein_coding   chr1 3433687 3433689     +     1
## 5690                    protein_coding   chr1 3069211 3069259     +     1
## 5691                    protein_coding   chr1 3433687 3434342     +     1
## 5692                             miRNA   chr1 3127975 3128035     +     1
## 5693                             miRNA   chr1 3127975 3128035     +     1
## 5694                             miRNA   chr1 3127975 3128035     +     1
## 5695                            lncRNA   chr1 3132927 3133709     -     0
## 5696                            lncRNA   chr1 3132927 3133709     -     0
## 5697                            lncRNA   chr1 3133573 3133709     -     0
## 5698                            lncRNA   chr1 3132927 3133258     -     0
## 5699                               TEC   chr1 3205988 3208664     +     0
## 5700                               TEC   chr1 3205988 3208664     +     0
## 5701                               TEC   chr1 3205988 3208664     +     0
## 5702                            lncRNA   chr1 3306636 3310096     -     0
## 5703                            lncRNA   chr1 3306636 3310096     -     0
## 5704                            lncRNA   chr1 3306636 3310096     -     0
## 5705                            lncRNA   chr1 3313052 3323149     -     0
## 5706                            lncRNA   chr1 3313052 3323149     -     0
## 5707                            lncRNA   chr1 3322884 3323149     -     0
## 5708                            lncRNA   chr1 3313052 3313513     -     0
## 5709                            lncRNA   chr1 3367815 3373928     -     0
## 5710                            lncRNA   chr1 3367815 3373928     -     0
## 5711                            lncRNA   chr1 3372952 3373928     -     0
## 5712                            lncRNA   chr1 3367815 3369621     -     0
## 5713                    protein_coding   chr1 3454665 3481113     +     1
```

```
## 5714                 protein_coding    chr1 3454665 3481113    +    1
## 5715                 protein_coding    chr1 3454665 3454811    +    1
## 5716                 protein_coding    chr1 3463066 3463672    +    1
## 5717                 protein_coding    chr1 3463085 3463672    +    1
## 5718                 protein_coding    chr1 3463085 3463087    +    1
## 5719                 protein_coding    chr1 3466148 3466193    +    1
## 5720                 protein_coding    chr1 3466148 3466193    +    1
## 5721                 protein_coding    chr1 3467168 3467337    +    1
## 5722                 protein_coding    chr1 3467168 3467337    +    1
## 5723                 protein_coding    chr1 3468880 3468936    +    1
## 5724                 protein_coding    chr1 3468880 3468936    +    1
## 5725                 protein_coding    chr1 3469433 3469593    +    1
## 5726                 protein_coding    chr1 3469433 3469593    +    1
## 5727                 protein_coding    chr1 3473078 3473230    +    1
## 5728                 protein_coding    chr1 3473078 3473230    +    1
## 5729                 protein_coding    chr1 3473393 3473522    +    1
## 5730                 protein_coding    chr1 3473393 3473522    +    1
## 5731                 protein_coding    chr1 3474708 3474782    +    1
## 5732                 protein_coding    chr1 3474708 3474782    +    1
## 5733                 protein_coding    chr1 3475970 3476062    +    1
## 5734                 protein_coding    chr1 3475970 3476062    +    1
## 5735                 protein_coding    chr1 3477875 3478026    +    1
## 5736                 protein_coding    chr1 3477875 3478026    +    1
## 5737                 protein_coding    chr1 3478424 3478612    +    1
## 5738                 protein_coding    chr1 3478424 3478612    +    1
## 5739                 protein_coding    chr1 3479517 3479590    +    1
## 5740                 protein_coding    chr1 3479517 3479590    +    1
## 5741                 protein_coding    chr1 3479812 3479913    +    1
## 5742                 protein_coding    chr1 3479812 3479913    +    1
## 5743                 protein_coding    chr1 3480448 3481113    +    1
## 5744                 protein_coding    chr1 3480448 3480584    +    1
## 5745                 protein_coding    chr1 3480585 3480587    +    1
## 5746                 protein_coding    chr1 3454665 3454811    +    1
## 5747                 protein_coding    chr1 3463066 3463084    +    1
## 5748                 protein_coding    chr1 3480585 3481113    +    1
## 5749                 protein_coding    chr1 3466005 3481113    +    1
## 5750                 protein_coding    chr1 3466005 3466193    +    1
## 5751                 protein_coding    chr1 3467168 3467337    +    1
## 5752                 protein_coding    chr1 3468880 3468936    +    1
## 5753                 protein_coding    chr1 3469433 3469593    +    1
## 5754                 protein_coding    chr1 3469436 3469593    +    1
## 5755                 protein_coding    chr1 3469436 3469438    +    1
## 5756                 protein_coding    chr1 3473078 3473230    +    1
## 5757                 protein_coding    chr1 3473078 3473230    +    1
## 5758                 protein_coding    chr1 3473393 3473522    +    1
## 5759                 protein_coding    chr1 3473393 3473522    +    1
## 5760                 protein_coding    chr1 3474708 3474782    +    1
## 5761                 protein_coding    chr1 3474708 3474782    +    1
## 5762                 protein_coding    chr1 3475970 3476062    +    1
## 5763                 protein_coding    chr1 3475970 3476062    +    1
## 5764                 protein_coding    chr1 3477875 3478026    +    1
## 5765                 protein_coding    chr1 3477875 3478026    +    1
## 5766                 protein_coding    chr1 3478424 3478612    +    1
## 5767                 protein_coding    chr1 3478424 3478612    +    1
```

```
## 5768            protein_coding    chr1 3479517 3479590     +      1
## 5769            protein_coding    chr1 3479517 3479590     +      1
## 5770            protein_coding    chr1 3479812 3479913     +      1
## 5771            protein_coding    chr1 3479812 3479913     +      1
## 5772            protein_coding    chr1 3480448 3481113     +      1
## 5773            protein_coding    chr1 3480448 3480584     +      1
## 5774            protein_coding    chr1 3480585 3480587     +      1
## 5775            protein_coding    chr1 3466005 3466193     +      1
## 5776            protein_coding    chr1 3467168 3467337     +      1
## 5777            protein_coding    chr1 3468880 3468936     +      1
## 5778            protein_coding    chr1 3469433 3469435     +      1
## 5779            protein_coding    chr1 3480585 3481113     +      1
## 5780            protein_coding    chr1 3466971 3481113     +      1
## 5781            protein_coding    chr1 3466971 3467337     +      1
## 5782            protein_coding    chr1 3468880 3468936     +      1
## 5783            protein_coding    chr1 3469433 3469593     +      1
## 5784            protein_coding    chr1 3469436 3469593     +      1
## 5785            protein_coding    chr1 3469436 3469438     +      1
## 5786            protein_coding    chr1 3473078 3473230     +      1
## 5787            protein_coding    chr1 3473078 3473230     +      1
## 5788            protein_coding    chr1 3473393 3473522     +      1
## 5789            protein_coding    chr1 3473393 3473522     +      1
## 5790            protein_coding    chr1 3474708 3474782     +      1
## 5791            protein_coding    chr1 3474708 3474782     +      1
## 5792            protein_coding    chr1 3475970 3476062     +      1
## 5793            protein_coding    chr1 3475970 3476062     +      1
## 5794            protein_coding    chr1 3477875 3478026     +      1
## 5795            protein_coding    chr1 3477875 3478026     +      1
## 5796            protein_coding    chr1 3478424 3478612     +      1
## 5797            protein_coding    chr1 3478424 3478612     +      1
## 5798            protein_coding    chr1 3479517 3479590     +      1
## 5799            protein_coding    chr1 3479517 3479590     +      1
## 5800            protein_coding    chr1 3479812 3479913     +      1
## 5801            protein_coding    chr1 3479812 3479913     +      1
## 5802            protein_coding    chr1 3480448 3481113     +      1
## 5803            protein_coding    chr1 3480448 3480584     +      1
## 5804            protein_coding    chr1 3480585 3480587     +      1
## 5805            protein_coding    chr1 3466971 3467337     +      1
## 5806            protein_coding    chr1 3468880 3468936     +      1
## 5807            protein_coding    chr1 3469433 3469435     +      1
## 5808            protein_coding    chr1 3480585 3481113     +      1
## 5809                   lncRNA    chr1 3487246 3487627     +      0
## 5810                   lncRNA    chr1 3487246 3487627     +      0
## 5811                   lncRNA    chr1 3487246 3487627     +      0
## 5812            protein_coding    chr1 3487951 3611508     -      1
## 5813            protein_coding    chr1 3487951 3611508     -      1
## 5814            protein_coding    chr1 3611138 3611508     -      1
## 5815            protein_coding    chr1 3611138 3611268     -      1
## 5816            protein_coding    chr1 3611266 3611268     -      1
## 5817            protein_coding    chr1 3602466 3602600     -      1
## 5818            protein_coding    chr1 3602466 3602600     -      1
## 5819            protein_coding    chr1 3595338 3595447     -      1
## 5820            protein_coding    chr1 3595338 3595447     -      1
## 5821            protein_coding    chr1 3579825 3579929     -      1
```

```
## 5822                    protein_coding    chr1 3579825 3579929    -    1
## 5823                    protein_coding    chr1 3524124 3524246    -    1
## 5824                    protein_coding    chr1 3524124 3524246    -    1
## 5825                    protein_coding    chr1 3515402 3515527    -    1
## 5826                    protein_coding    chr1 3515402 3515527    -    1
## 5827                    protein_coding    chr1 3514550 3514672    -    1
## 5828                    protein_coding    chr1 3514550 3514672    -    1
## 5829                    protein_coding    chr1 3512006 3512128    -    1
## 5830                    protein_coding    chr1 3512006 3512128    -    1
## 5831                    protein_coding    chr1 3511550 3511687    -    1
## 5832                    protein_coding    chr1 3511550 3511687    -    1
## 5833                    protein_coding    chr1 3510783 3510902    -    1
## 5834                    protein_coding    chr1 3510783 3510902    -    1
## 5835                    protein_coding    chr1 3509870 3509992    -    1
## 5836                    protein_coding    chr1 3509870 3509992    -    1
## 5837                    protein_coding    chr1 3509075 3509245    -    1
## 5838                    protein_coding    chr1 3509075 3509245    -    1
## 5839                    protein_coding    chr1 3508558 3508689    -    1
## 5840                    protein_coding    chr1 3508558 3508689    -    1
## 5841                    protein_coding    chr1 3507795 3507923    -    1
## 5842                    protein_coding    chr1 3507795 3507923    -    1
## 5843                    protein_coding    chr1 3506108 3506236    -    1
## 5844                    protein_coding    chr1 3506108 3506236    -    1
## 5845                    protein_coding    chr1 3505422 3505556    -    1
## 5846                    protein_coding    chr1 3505422 3505556    -    1
## 5847                    protein_coding    chr1 3505208 3505342    -    1
## 5848                    protein_coding    chr1 3505208 3505342    -    1
## 5849                    protein_coding    chr1 3501796 3501921    -    1
## 5850                    protein_coding    chr1 3501796 3501921    -    1
## 5851                    protein_coding    chr1 3501177 3501308    -    1
## 5852                    protein_coding    chr1 3501177 3501308    -    1
## 5853                    protein_coding    chr1 3500966 3501094    -    1
## 5854                    protein_coding    chr1 3500966 3501094    -    1
## 5855                    protein_coding    chr1 3500633 3500764    -    1
## 5856                    protein_coding    chr1 3500633 3500764    -    1
## 5857                    protein_coding    chr1 3499796 3499924    -    1
## 5858                    protein_coding    chr1 3499796 3499924    -    1
## 5859                    protein_coding    chr1 3499588 3499716    -    1
## 5860                    protein_coding    chr1 3499588 3499716    -    1
## 5861                    protein_coding    chr1 3499138 3499266    -    1
## 5862                    protein_coding    chr1 3499138 3499266    -    1
## 5863                    protein_coding    chr1 3498698 3498826    -    1
## 5864                    protein_coding    chr1 3498698 3498826    -    1
## 5865                    protein_coding    chr1 3498371 3498499    -    1
## 5866                    protein_coding    chr1 3498371 3498499    -    1
## 5867                    protein_coding    chr1 3497233 3497361    -    1
## 5868                    protein_coding    chr1 3497233 3497361    -    1
## 5869                    protein_coding    chr1 3496988 3497119    -    1
## 5870                    protein_coding    chr1 3496988 3497119    -    1
## 5871                    protein_coding    chr1 3496655 3496783    -    1
## 5872                    protein_coding    chr1 3496655 3496783    -    1
## 5873                    protein_coding    chr1 3495890 3496018    -    1
## 5874                    protein_coding    chr1 3495890 3496018    -    1
## 5875                    protein_coding    chr1 3494613 3494741    -    1
```

```
## 5876                     protein_coding     chr1 3494613 3494741        -        1
## 5877                     protein_coding     chr1 3494371 3494499        -        1
## 5878                     protein_coding     chr1 3494371 3494499        -        1
## 5879                     protein_coding     chr1 3493996 3494124        -        1
## 5880                     protein_coding     chr1 3493996 3494124        -        1
## 5881                     protein_coding     chr1 3493771 3493899        -        1
## 5882                     protein_coding     chr1 3493771 3493899        -        1
## 5883                     protein_coding     chr1 3492639 3492767        -        1
## 5884                     protein_coding     chr1 3492639 3492767        -        1
## 5885                     protein_coding     chr1 3490912 3490959        -        1
## 5886                     protein_coding     chr1 3490912 3490959        -        1
## 5887                     protein_coding     chr1 3487951 3490589        -        1
## 5888                     protein_coding     chr1 3490531 3490589        -        1
## 5889                     protein_coding     chr1 3490528 3490530        -        1
## 5890                     protein_coding     chr1 3611269 3611508        -        1
## 5891                     protein_coding     chr1 3487951 3490530        -        1
## 5892                     protein_coding     chr1 3489920 3531448        -        1
## 5893                     protein_coding     chr1 3531080 3531448        -        1
## 5894                     protein_coding     chr1 3531080 3531245        -        1
## 5895                     protein_coding     chr1 3531243 3531245        -        1
## 5896                     protein_coding     chr1 3524124 3524246        -        1
## 5897                     protein_coding     chr1 3524124 3524246        -        1
## 5898                     protein_coding     chr1 3515402 3515527        -        1
## 5899                     protein_coding     chr1 3515402 3515527        -        1
## 5900                     protein_coding     chr1 3514550 3514672        -        1
## 5901                     protein_coding     chr1 3514550 3514672        -        1
## 5902                     protein_coding     chr1 3512006 3512128        -        1
## 5903                     protein_coding     chr1 3512006 3512128        -        1
## 5904                     protein_coding     chr1 3511550 3511687        -        1
## 5905                     protein_coding     chr1 3511550 3511687        -        1
## 5906                     protein_coding     chr1 3510783 3510902        -        1
## 5907                     protein_coding     chr1 3510783 3510902        -        1
## 5908                     protein_coding     chr1 3509870 3509992        -        1
## 5909                     protein_coding     chr1 3509870 3509992        -        1
## 5910                     protein_coding     chr1 3509075 3509245        -        1
## 5911                     protein_coding     chr1 3509075 3509245        -        1
## 5912                     protein_coding     chr1 3508558 3508689        -        1
## 5913                     protein_coding     chr1 3508558 3508689        -        1
## 5914                     protein_coding     chr1 3507795 3507923        -        1
## 5915                     protein_coding     chr1 3507795 3507923        -        1
## 5916                     protein_coding     chr1 3506108 3506236        -        1
## 5917                     protein_coding     chr1 3506108 3506236        -        1
## 5918                     protein_coding     chr1 3505422 3505556        -        1
## 5919                     protein_coding     chr1 3505422 3505556        -        1
## 5920                     protein_coding     chr1 3505208 3505342        -        1
## 5921                     protein_coding     chr1 3505208 3505342        -        1
## 5922                     protein_coding     chr1 3501796 3501921        -        1
## 5923                     protein_coding     chr1 3501796 3501921        -        1
## 5924                     protein_coding     chr1 3501177 3501308        -        1
## 5925                     protein_coding     chr1 3501177 3501308        -        1
## 5926                     protein_coding     chr1 3500966 3501094        -        1
## 5927                     protein_coding     chr1 3500966 3501094        -        1
## 5928                     protein_coding     chr1 3500633 3500764        -        1
## 5929                     protein_coding     chr1 3500633 3500764        -        1
```

```
## 5930                  protein_coding    chr1 3499796 3499924    -    1
## 5931                  protein_coding    chr1 3499796 3499924    -    1
## 5932                  protein_coding    chr1 3499588 3499716    -    1
## 5933                  protein_coding    chr1 3499588 3499716    -    1
## 5934                  protein_coding    chr1 3498371 3498499    -    1
## 5935                  protein_coding    chr1 3498371 3498499    -    1
## 5936                  protein_coding    chr1 3497233 3497361    -    1
## 5937                  protein_coding    chr1 3497233 3497361    -    1
## 5938                  protein_coding    chr1 3496655 3496783    -    1
## 5939                  protein_coding    chr1 3496655 3496783    -    1
## 5940                  protein_coding    chr1 3495890 3496018    -    1
## 5941                  protein_coding    chr1 3495890 3496018    -    1
## 5942                  protein_coding    chr1 3494613 3494741    -    1
## 5943                  protein_coding    chr1 3494613 3494741    -    1
## 5944                  protein_coding    chr1 3494371 3494499    -    1
## 5945                  protein_coding    chr1 3494371 3494499    -    1
## 5946                  protein_coding    chr1 3493771 3493797    -    1
## 5947                  protein_coding    chr1 3493771 3493797    -    1
## 5948                  protein_coding    chr1 3492639 3492767    -    1
## 5949                  protein_coding    chr1 3492639 3492767    -    1
## 5950                  protein_coding    chr1 3490912 3490959    -    1
## 5951                  protein_coding    chr1 3490912 3490959    -    1
## 5952                  protein_coding    chr1 3489920 3490589    -    1
## 5953                  protein_coding    chr1 3490531 3490589    -    1
## 5954                  protein_coding    chr1 3490528 3490530    -    1
## 5955                  protein_coding    chr1 3531246 3531448    -    1
## 5956                  protein_coding    chr1 3489920 3490530    -    1
## 5957                           miRNA    chr1 3560695 3560790    -    1
## 5958                           miRNA    chr1 3560695 3560790    -    1
## 5959                           miRNA    chr1 3560695 3560790    -    1
## 5960                          lncRNA    chr1 3623190 3624743    -    0
## 5961                          lncRNA    chr1 3623190 3624743    -    0
## 5962                          lncRNA    chr1 3624632 3624743    -    0
## 5963                          lncRNA    chr1 3624308 3624450    -    0
## 5964                          lncRNA    chr1 3623190 3623556    -    0
## 5965                  protein_coding    chr1 3625015 3630127    +    1
## 5966                  protein_coding    chr1 3625015 3630127    +    1
## 5967                  protein_coding    chr1 3625015 3625273    +    1
## 5968                  protein_coding    chr1 3625073 3625273    +    1
## 5969                  protein_coding    chr1 3625073 3625075    +    1
## 5970                  protein_coding    chr1 3625424 3625515    +    1
## 5971                  protein_coding    chr1 3625424 3625515    +    1
## 5972                  protein_coding    chr1 3625713 3625889    +    1
## 5973                  protein_coding    chr1 3625713 3625889    +    1
## 5974                  protein_coding    chr1 3627500 3627653    +    1
## 5975                  protein_coding    chr1 3627500 3627653    +    1
## 5976                  protein_coding    chr1 3628409 3630127    +    1
## 5977                  protein_coding    chr1 3628409 3628600    +    1
## 5978                  protein_coding    chr1 3628601 3628603    +    1
## 5979                  protein_coding    chr1 3625015 3625072    +    1
## 5980                  protein_coding    chr1 3628601 3630127    +    1
## 5981                  protein_coding    chr1 3625050 3630127    +    1
## 5982                  protein_coding    chr1 3625050 3625273    +    1
## 5983                  protein_coding    chr1 3625073 3625273    +    1
```

```
## 5984                     protein_coding    chr1 3625073 3625075     +      1
## 5985                     protein_coding    chr1 3625424 3625515     +      1
## 5986                     protein_coding    chr1 3625424 3625515     +      1
## 5987                     protein_coding    chr1 3627500 3627653     +      1
## 5988                     protein_coding    chr1 3627500 3627653     +      1
## 5989                     protein_coding    chr1 3628409 3630127     +      1
## 5990                     protein_coding    chr1 3628409 3628600     +      1
## 5991                     protein_coding    chr1 3628601 3628603     +      1
## 5992                     protein_coding    chr1 3625050 3625072     +      1
## 5993                     protein_coding    chr1 3628601 3630127     +      1
## 5994                     protein_coding    chr1 3630767 3652761     -      1
## 5995                     protein_coding    chr1 3630767 3650058     -      1
## 5996                     protein_coding    chr1 3649931 3650058     -      1
## 5997                     protein_coding    chr1 3649931 3649999     -      1
## 5998                     protein_coding    chr1 3649997 3649999     -      1
## 5999                     protein_coding    chr1 3647408 3647560     -      1
## 6000                     protein_coding    chr1 3647408 3647560     -      1
## 6001                     protein_coding    chr1 3646666 3646782     -      1
## 6002                     protein_coding    chr1 3646666 3646782     -      1
## 6003                     protein_coding    chr1 3638750 3638822     -      1
## 6004                     protein_coding    chr1 3638750 3638822     -      1
## 6005                     protein_coding    chr1 3636995 3637098     -      1
## 6006                     protein_coding    chr1 3636995 3637098     -      1
## 6007                     protein_coding    chr1 3635944 3636030     -      1
## 6008                     protein_coding    chr1 3635944 3636030     -      1
## 6009                     protein_coding    chr1 3635160 3635294     -      1
## 6010                     protein_coding    chr1 3635160 3635294     -      1
## 6011                     protein_coding    chr1 3634997 3635074     -      1
## 6012                     protein_coding    chr1 3634997 3635074     -      1
## 6013                     protein_coding    chr1 3633398 3633503     -      1
## 6014                     protein_coding    chr1 3633398 3633503     -      1
## 6015                     protein_coding    chr1 3632213 3632338     -      1
## 6016                     protein_coding    chr1 3632213 3632338     -      1
## 6017                     protein_coding    chr1 3630767 3631657     -      1
## 6018                     protein_coding    chr1 3631401 3631657     -      1
## 6019                     protein_coding    chr1 3631398 3631400     -      1
## 6020                     protein_coding    chr1 3650000 3650058     -      1
## 6021                     protein_coding    chr1 3630767 3631400     -      1
## 6022                     protein_coding    chr1 3630770 3650103     -      1
## 6023                     protein_coding    chr1 3649931 3650103     -      1
## 6024                     protein_coding    chr1 3649931 3649999     -      1
## 6025                     protein_coding    chr1 3649997 3649999     -      1
## 6026                     protein_coding    chr1 3647408 3647560     -      1
## 6027                     protein_coding    chr1 3647408 3647560     -      1
## 6028                     protein_coding    chr1 3646666 3646782     -      1
## 6029                     protein_coding    chr1 3646666 3646782     -      1
## 6030                     protein_coding    chr1 3638750 3638822     -      1
## 6031                     protein_coding    chr1 3638750 3638822     -      1
## 6032                     protein_coding    chr1 3636995 3637098     -      1
## 6033                     protein_coding    chr1 3636995 3637098     -      1
## 6034                     protein_coding    chr1 3635944 3636030     -      1
## 6035                     protein_coding    chr1 3635944 3636030     -      1
## 6036                     protein_coding    chr1 3635160 3635294     -      1
## 6037                     protein_coding    chr1 3635160 3635294     -      1
```

```
## 6038                    protein_coding    chr1 3634997 3635074      -      1
## 6039                    protein_coding    chr1 3634997 3635074      -      1
## 6040                    protein_coding    chr1 3633398 3633503      -      1
## 6041                    protein_coding    chr1 3633398 3633503      -      1
## 6042                    protein_coding    chr1 3632213 3632338      -      1
## 6043                    protein_coding    chr1 3632213 3632338      -      1
## 6044                    protein_coding    chr1 3631466 3631657      -      1
## 6045                    protein_coding    chr1 3631466 3631657      -      1
## 6046                    protein_coding    chr1 3630770 3631117      -      1
## 6047                    protein_coding    chr1 3630978 3631117      -      1
## 6048                    protein_coding    chr1 3630975 3630977      -      1
## 6049                    protein_coding    chr1 3650000 3650103      -      1
## 6050                    protein_coding    chr1 3630770 3630977      -      1
## 6051                    protein_coding    chr1 3652516 3736201      +      1
## 6052                    protein_coding    chr1 3652516 3736201      +      1
## 6053                    protein_coding    chr1 3652516 3652641      +      1
## 6054                    protein_coding    chr1 3682333 3682430      +      1
## 6055                    protein_coding    chr1 3682366 3682430      +      1
## 6056                    protein_coding    chr1 3682366 3682368      +      1
## 6057                    protein_coding    chr1 3683060 3683180      +      1
## 6058                    protein_coding    chr1 3683060 3683180      +      1
## 6059                    protein_coding    chr1 3707549 3707791      +      1
## 6060                    protein_coding    chr1 3707549 3707791      +      1
## 6061                    protein_coding    chr1 3722021 3722207      +      1
## 6062                    protein_coding    chr1 3722021 3722207      +      1
## 6063                    protein_coding    chr1 3723354 3723469      +      1
## 6064                    protein_coding    chr1 3723354 3723469      +      1
## 6065                    protein_coding    chr1 3727115 3727224      +      1
## 6066                    protein_coding    chr1 3727115 3727224      +      1
## 6067                    protein_coding    chr1 3727628 3727770      +      1
## 6068                    protein_coding    chr1 3727628 3727770      +      1
## 6069                    protein_coding    chr1 3728129 3728217      +      1
## 6070                    protein_coding    chr1 3728129 3728217      +      1
## 6071                    protein_coding    chr1 3729327 3729448      +      1
## 6072                    protein_coding    chr1 3729327 3729448      +      1
## 6073                    protein_coding    chr1 3730000 3730148      +      1
## 6074                    protein_coding    chr1 3730000 3730148      +      1
## 6075                    protein_coding    chr1 3730927 3731065      +      1
## 6076                    protein_coding    chr1 3730927 3731065      +      1
## 6077                    protein_coding    chr1 3731463 3731556      +      1
## 6078                    protein_coding    chr1 3731463 3731556      +      1
## 6079                    protein_coding    chr1 3732747 3736201      +      1
## 6080                    protein_coding    chr1 3732747 3733076      +      1
## 6081                    protein_coding    chr1 3733077 3733079      +      1
## 6082                    protein_coding    chr1 3652516 3652641      +      1
## 6083                    protein_coding    chr1 3682333 3682365      +      1
## 6084                    protein_coding    chr1 3733077 3736201      +      1
## 6085                    protein_coding    chr1 3652520 3736201      +      1
## 6086                    protein_coding    chr1 3652520 3652641      +      1
## 6087                    protein_coding    chr1 3682333 3682430      +      1
## 6088                    protein_coding    chr1 3682366 3682430      +      1
## 6089                    protein_coding    chr1 3682366 3682368      +      1
## 6090                    protein_coding    chr1 3683060 3683180      +      1
## 6091                    protein_coding    chr1 3683060 3683180      +      1
```

```
## 6092                    protein_coding    chr1 3707549 3707791      +        1
## 6093                    protein_coding    chr1 3707549 3707791      +        1
## 6094                    protein_coding    chr1 3722021 3722207      +        1
## 6095                    protein_coding    chr1 3722021 3722207      +        1
## 6096                    protein_coding    chr1 3723354 3723469      +        1
## 6097                    protein_coding    chr1 3723354 3723469      +        1
## 6098                    protein_coding    chr1 3727115 3727224      +        1
## 6099                    protein_coding    chr1 3727115 3727224      +        1
## 6100                    protein_coding    chr1 3727628 3727770      +        1
## 6101                    protein_coding    chr1 3727628 3727770      +        1
## 6102                    protein_coding    chr1 3728129 3728217      +        1
## 6103                    protein_coding    chr1 3728129 3728217      +        1
## 6104                    protein_coding    chr1 3729327 3729448      +        1
## 6105                    protein_coding    chr1 3729327 3729448      +        1
## 6106                    protein_coding    chr1 3732747 3736201      +        1
## 6107                    protein_coding    chr1 3732747 3732759      +        1
## 6108                    protein_coding    chr1 3732760 3732762      +        1
## 6109                    protein_coding    chr1 3652520 3652641      +        1
## 6110                    protein_coding    chr1 3682333 3682365      +        1
## 6111                    protein_coding    chr1 3732760 3736201      +        1
## 6112                    protein_coding    chr1 3652565 3733292      +        1
## 6113                    protein_coding    chr1 3652565 3652641      +        1
## 6114                    protein_coding    chr1 3682333 3682430      +        1
## 6115                    protein_coding    chr1 3682366 3682430      +        1
## 6116                    protein_coding    chr1 3682366 3682368      +        1
## 6117                    protein_coding    chr1 3683060 3683180      +        1
## 6118                    protein_coding    chr1 3683060 3683180      +        1
## 6119                    protein_coding    chr1 3707549 3707791      +        1
## 6120                    protein_coding    chr1 3707549 3707791      +        1
## 6121                    protein_coding    chr1 3722021 3722207      +        1
## 6122                    protein_coding    chr1 3722021 3722207      +        1
## 6123                    protein_coding    chr1 3723354 3723469      +        1
## 6124                    protein_coding    chr1 3723354 3723469      +        1
## 6125                    protein_coding    chr1 3727115 3727224      +        1
## 6126                    protein_coding    chr1 3727115 3727224      +        1
## 6127                    protein_coding    chr1 3727628 3727770      +        1
## 6128                    protein_coding    chr1 3727628 3727770      +        1
## 6129                    protein_coding    chr1 3728129 3728217      +        1
## 6130                    protein_coding    chr1 3728129 3728217      +        1
## 6131                    protein_coding    chr1 3729327 3729448      +        1
## 6132                    protein_coding    chr1 3729327 3729448      +        1
## 6133                    protein_coding    chr1 3730000 3730148      +        1
## 6134                    protein_coding    chr1 3730000 3730148      +        1
## 6135                    protein_coding    chr1 3730927 3731065      +        1
## 6136                    protein_coding    chr1 3730927 3731065      +        1
## 6137                    protein_coding    chr1 3732747 3733292      +        1
## 6138                    protein_coding    chr1 3732747 3732759      +        1
## 6139                    protein_coding    chr1 3732760 3732762      +        1
## 6140                    protein_coding    chr1 3652565 3652641      +        1
## 6141                    protein_coding    chr1 3682333 3682365      +        1
## 6142                    protein_coding    chr1 3732760 3733292      +        1
## 6143                    protein_coding    chr1 3652565 3736200      +        1
## 6144                    protein_coding    chr1 3652565 3652641      +        1
## 6145                    protein_coding    chr1 3682333 3682430      +        1
```

```
## 6146             protein_coding    chr1 3682366 3682430    +    1
## 6147             protein_coding    chr1 3682366 3682368    +    1
## 6148             protein_coding    chr1 3683060 3683180    +    1
## 6149             protein_coding    chr1 3683060 3683180    +    1
## 6150             protein_coding    chr1 3707549 3707791    +    1
## 6151             protein_coding    chr1 3707549 3707791    +    1
## 6152             protein_coding    chr1 3722021 3722207    +    1
## 6153             protein_coding    chr1 3722021 3722207    +    1
## 6154             protein_coding    chr1 3723354 3723469    +    1
## 6155             protein_coding    chr1 3723354 3723469    +    1
## 6156             protein_coding    chr1 3727115 3727224    +    1
## 6157             protein_coding    chr1 3727115 3727224    +    1
## 6158             protein_coding    chr1 3727628 3727770    +    1
## 6159             protein_coding    chr1 3727628 3727770    +    1
## 6160             protein_coding    chr1 3728129 3728217    +    1
## 6161             protein_coding    chr1 3728129 3728217    +    1
## 6162             protein_coding    chr1 3729327 3729448    +    1
## 6163             protein_coding    chr1 3729327 3729448    +    1
## 6164             protein_coding    chr1 3730927 3731065    +    1
## 6165             protein_coding    chr1 3730927 3731065    +    1
## 6166             protein_coding    chr1 3732747 3736200    +    1
## 6167             protein_coding    chr1 3732747 3733076    +    1
## 6168             protein_coding    chr1 3733077 3733079    +    1
## 6169             protein_coding    chr1 3652565 3652641    +    1
## 6170             protein_coding    chr1 3682333 3682365    +    1
## 6171             protein_coding    chr1 3733077 3736200    +    1
## 6172             protein_coding    chr1 3652565 3736200    +    1
## 6173             protein_coding    chr1 3652565 3652641    +    1
## 6174             protein_coding    chr1 3682333 3682430    +    1
## 6175             protein_coding    chr1 3682366 3682430    +    1
## 6176             protein_coding    chr1 3682366 3682368    +    1
## 6177             protein_coding    chr1 3683060 3683180    +    1
## 6178             protein_coding    chr1 3683060 3683180    +    1
## 6179             protein_coding    chr1 3707549 3707791    +    1
## 6180             protein_coding    chr1 3707549 3707791    +    1
## 6181             protein_coding    chr1 3722021 3722207    +    1
## 6182             protein_coding    chr1 3722021 3722207    +    1
## 6183             protein_coding    chr1 3723354 3723469    +    1
## 6184             protein_coding    chr1 3723354 3723469    +    1
## 6185             protein_coding    chr1 3727115 3727224    +    1
## 6186             protein_coding    chr1 3727115 3727224    +    1
## 6187             protein_coding    chr1 3727628 3727770    +    1
## 6188             protein_coding    chr1 3727628 3727770    +    1
## 6189             protein_coding    chr1 3728129 3728217    +    1
## 6190             protein_coding    chr1 3728129 3728217    +    1
## 6191             protein_coding    chr1 3729327 3729448    +    1
## 6192             protein_coding    chr1 3729327 3729448    +    1
## 6193             protein_coding    chr1 3731463 3731556    +    1
## 6194             protein_coding    chr1 3731463 3731556    +    1
## 6195             protein_coding    chr1 3732747 3736200    +    1
## 6196             protein_coding    chr1 3732747 3733076    +    1
## 6197             protein_coding    chr1 3733077 3733079    +    1
## 6198             protein_coding    chr1 3652565 3652641    +    1
## 6199             protein_coding    chr1 3682333 3682365    +    1
```

```
## 6200                    protein_coding       chr1 3733077 3736200       +       1
## 6201                    protein_coding       chr1 3682366 3733079       +       1
## 6202                    protein_coding       chr1 3682366 3682430       +       1
## 6203                    protein_coding       chr1 3682366 3682430       +       1
## 6204                    protein_coding       chr1 3682366 3682368       +       1
## 6205                    protein_coding       chr1 3683060 3683180       +       1
## 6206                    protein_coding       chr1 3683060 3683180       +       1
## 6207                    protein_coding       chr1 3707549 3707791       +       1
## 6208                    protein_coding       chr1 3707549 3707791       +       1
## 6209                    protein_coding       chr1 3722021 3722207       +       1
## 6210                    protein_coding       chr1 3722021 3722207       +       1
## 6211                    protein_coding       chr1 3723354 3723469       +       1
## 6212                    protein_coding       chr1 3723354 3723469       +       1
## 6213                    protein_coding       chr1 3727115 3727224       +       1
## 6214                    protein_coding       chr1 3727115 3727224       +       1
## 6215                    protein_coding       chr1 3727628 3727770       +       1
## 6216                    protein_coding       chr1 3727628 3727770       +       1
## 6217                    protein_coding       chr1 3728129 3728217       +       1
## 6218                    protein_coding       chr1 3728129 3728217       +       1
## 6219                    protein_coding       chr1 3729327 3729448       +       1
## 6220                    protein_coding       chr1 3729327 3729448       +       1
## 6221                    protein_coding       chr1 3730927 3731065       +       1
## 6222                    protein_coding       chr1 3730927 3731065       +       1
## 6223                    protein_coding       chr1 3732747 3733079       +       1
## 6224                    protein_coding       chr1 3732747 3733076       +       1
## 6225                    protein_coding       chr1 3733077 3733079       +       1
## 6226                    protein_coding       chr1 3733077 3733079       +       1
## 6227                    protein_coding       chr1 3682366 3733079       +       1
## 6228                    protein_coding       chr1 3682366 3682430       +       1
## 6229                    protein_coding       chr1 3682366 3682430       +       1
## 6230                    protein_coding       chr1 3682366 3682368       +       1
## 6231                    protein_coding       chr1 3683060 3683180       +       1
## 6232                    protein_coding       chr1 3683060 3683180       +       1
## 6233                    protein_coding       chr1 3707549 3707791       +       1
## 6234                    protein_coding       chr1 3707549 3707791       +       1
## 6235                    protein_coding       chr1 3722021 3722207       +       1
## 6236                    protein_coding       chr1 3722021 3722207       +       1
## 6237                    protein_coding       chr1 3723354 3723469       +       1
## 6238                    protein_coding       chr1 3723354 3723469       +       1
## 6239                    protein_coding       chr1 3727115 3727224       +       1
## 6240                    protein_coding       chr1 3727115 3727224       +       1
## 6241                    protein_coding       chr1 3727628 3727770       +       1
## 6242                    protein_coding       chr1 3727628 3727770       +       1
## 6243                    protein_coding       chr1 3728129 3728217       +       1
## 6244                    protein_coding       chr1 3728129 3728217       +       1
## 6245                    protein_coding       chr1 3729327 3729448       +       1
## 6246                    protein_coding       chr1 3729327 3729448       +       1
## 6247                    protein_coding       chr1 3731463 3731556       +       1
## 6248                    protein_coding       chr1 3731463 3731556       +       1
## 6249                    protein_coding       chr1 3732747 3733079       +       1
## 6250                    protein_coding       chr1 3732747 3733076       +       1
## 6251                    protein_coding       chr1 3733077 3733079       +       1
## 6252                    protein_coding       chr1 3733077 3733079       +       1
## 6253                    protein_coding       chr1 3690672 3733292       +       1
```

```
## 6254                    protein_coding    chr1 3690672 3690944    +    1
## 6255                    protein_coding    chr1 3690906 3690944    +    1
## 6256                    protein_coding    chr1 3690906 3690908    +    1
## 6257                    protein_coding    chr1 3707549 3707791    +    1
## 6258                    protein_coding    chr1 3707549 3707791    +    1
## 6259                    protein_coding    chr1 3722021 3722207    +    1
## 6260                    protein_coding    chr1 3722021 3722207    +    1
## 6261                    protein_coding    chr1 3723354 3723469    +    1
## 6262                    protein_coding    chr1 3723354 3723469    +    1
## 6263                    protein_coding    chr1 3727115 3727224    +    1
## 6264                    protein_coding    chr1 3727115 3727224    +    1
## 6265                    protein_coding    chr1 3727628 3727770    +    1
## 6266                    protein_coding    chr1 3727628 3727770    +    1
## 6267                    protein_coding    chr1 3728129 3728217    +    1
## 6268                    protein_coding    chr1 3728129 3728217    +    1
## 6269                    protein_coding    chr1 3729327 3729448    +    1
## 6270                    protein_coding    chr1 3729327 3729448    +    1
## 6271                    protein_coding    chr1 3730000 3730148    +    1
## 6272                    protein_coding    chr1 3730000 3730148    +    1
## 6273                    protein_coding    chr1 3730927 3731065    +    1
## 6274                    protein_coding    chr1 3730927 3731065    +    1
## 6275                    protein_coding    chr1 3732747 3733292    +    1
## 6276                    protein_coding    chr1 3732747 3732759    +    1
## 6277                    protein_coding    chr1 3732760 3732762    +    1
## 6278                    protein_coding    chr1 3690672 3690905    +    1
## 6279                    protein_coding    chr1 3732760 3733292    +    1
## 6280                    protein_coding    chr1 3690672 3733292    +    1
## 6281                    protein_coding    chr1 3690672 3690944    +    1
## 6282                    protein_coding    chr1 3690906 3690944    +    1
## 6283                    protein_coding    chr1 3690906 3690908    +    1
## 6284                    protein_coding    chr1 3707549 3707791    +    1
## 6285                    protein_coding    chr1 3707549 3707791    +    1
## 6286                    protein_coding    chr1 3722021 3722207    +    1
## 6287                    protein_coding    chr1 3722021 3722207    +    1
## 6288                    protein_coding    chr1 3723354 3723469    +    1
## 6289                    protein_coding    chr1 3723354 3723469    +    1
## 6290                    protein_coding    chr1 3727115 3727224    +    1
## 6291                    protein_coding    chr1 3727115 3727224    +    1
## 6292                    protein_coding    chr1 3727628 3727770    +    1
## 6293                    protein_coding    chr1 3727628 3727770    +    1
## 6294                    protein_coding    chr1 3728129 3728217    +    1
## 6295                    protein_coding    chr1 3728129 3728217    +    1
## 6296                    protein_coding    chr1 3729327 3729448    +    1
## 6297                    protein_coding    chr1 3729327 3729448    +    1
## 6298                    protein_coding    chr1 3730927 3731065    +    1
## 6299                    protein_coding    chr1 3730927 3731065    +    1
## 6300                    protein_coding    chr1 3731463 3731556    +    1
## 6301                    protein_coding    chr1 3731463 3731552    +    1
## 6302                    protein_coding    chr1 3731553 3731555    +    1
## 6303                    protein_coding    chr1 3732747 3733292    +    1
## 6304                    protein_coding    chr1 3690672 3690905    +    1
## 6305                    protein_coding    chr1 3731553 3731556    +    1
## 6306                    protein_coding    chr1 3732747 3733292    +    1
## 6307                    protein_coding    chr1 3690672 3736201    +    1
```

```
## 6308                    protein_coding      chr1 3690672 3690944      +      1
## 6309                    protein_coding      chr1 3690906 3690944      +      1
## 6310                    protein_coding      chr1 3690906 3690908      +      1
## 6311                    protein_coding      chr1 3707549 3707791      +      1
## 6312                    protein_coding      chr1 3707549 3707791      +      1
## 6313                    protein_coding      chr1 3722021 3722207      +      1
## 6314                    protein_coding      chr1 3722021 3722207      +      1
## 6315                    protein_coding      chr1 3723354 3723469      +      1
## 6316                    protein_coding      chr1 3723354 3723469      +      1
## 6317                    protein_coding      chr1 3727115 3727224      +      1
## 6318                    protein_coding      chr1 3727115 3727224      +      1
## 6319                    protein_coding      chr1 3727628 3727770      +      1
## 6320                    protein_coding      chr1 3727628 3727770      +      1
## 6321                    protein_coding      chr1 3728129 3728217      +      1
## 6322                    protein_coding      chr1 3728129 3728217      +      1
## 6323                    protein_coding      chr1 3729327 3729448      +      1
## 6324                    protein_coding      chr1 3729327 3729448      +      1
## 6325                    protein_coding      chr1 3730000 3730148      +      1
## 6326                    protein_coding      chr1 3730000 3730148      +      1
## 6327                    protein_coding      chr1 3730927 3731065      +      1
## 6328                    protein_coding      chr1 3730927 3731065      +      1
## 6329                    protein_coding      chr1 3731463 3731556      +      1
## 6330                    protein_coding      chr1 3731463 3731556      +      1
## 6331                    protein_coding      chr1 3732747 3736201      +      1
## 6332                    protein_coding      chr1 3732747 3733076      +      1
## 6333                    protein_coding      chr1 3733077 3733079      +      1
## 6334                    protein_coding      chr1 3690672 3690905      +      1
## 6335                    protein_coding      chr1 3733077 3736201      +      1
## 6336                    protein_coding      chr1 3698058 3733091      +      1
## 6337                    protein_coding      chr1 3698058 3698151      +      1
## 6338                    protein_coding      chr1 3707549 3707791      +      1
## 6339                    protein_coding      chr1 3707576 3707791      +      1
## 6340                    protein_coding      chr1 3707576 3707578      +      1
## 6341                    protein_coding      chr1 3722021 3722207      +      1
## 6342                    protein_coding      chr1 3722021 3722207      +      1
## 6343                    protein_coding      chr1 3723354 3723469      +      1
## 6344                    protein_coding      chr1 3723354 3723469      +      1
## 6345                    protein_coding      chr1 3727115 3727224      +      1
## 6346                    protein_coding      chr1 3727115 3727224      +      1
## 6347                    protein_coding      chr1 3727628 3727770      +      1
## 6348                    protein_coding      chr1 3727628 3727770      +      1
## 6349                    protein_coding      chr1 3728129 3728217      +      1
## 6350                    protein_coding      chr1 3728129 3728217      +      1
## 6351                    protein_coding      chr1 3729327 3729448      +      1
## 6352                    protein_coding      chr1 3729327 3729448      +      1
## 6353                    protein_coding      chr1 3730000 3730148      +      1
## 6354                    protein_coding      chr1 3730000 3730148      +      1
## 6355                    protein_coding      chr1 3730927 3731065      +      1
## 6356                    protein_coding      chr1 3730927 3731065      +      1
## 6357                    protein_coding      chr1 3731463 3731556      +      1
## 6358                    protein_coding      chr1 3731463 3731556      +      1
## 6359                    protein_coding      chr1 3732747 3733091      +      1
## 6360                    protein_coding      chr1 3732747 3733076      +      1
## 6361                    protein_coding      chr1 3733077 3733079      +      1
```

```
## 6362                                  protein_coding    chr1 3698058 3698151      +       1
## 6363                                  protein_coding    chr1 3707549 3707575      +       1
## 6364                                  protein_coding    chr1 3733077 3733091      +       1
## 6365                                           lncRNA    chr1 3658938 3668772      -       0
## 6366                                           lncRNA    chr1 3658938 3668772      -       0
## 6367                                           lncRNA    chr1 3668625 3668772      -       0
## 6368                                           lncRNA    chr1 3662153 3662265      -       0
## 6369                                           lncRNA    chr1 3658938 3659430      -       0
## 6370                                           lncRNA    chr1 3712200 3714298      -       0
## 6371                                           lncRNA    chr1 3712200 3714298      -       0
## 6372                                           lncRNA    chr1 3714187 3714298      -       0
## 6373                                           lncRNA    chr1 3712200 3712438      -       0
## 6374    transcribed_unitary_pseudogene    chr1 3735511 3747373      -       1
## 6375    transcribed_unitary_pseudogene    chr1 3735511 3745905      -       1
## 6376    transcribed_unitary_pseudogene    chr1 3745607 3745905      -       1
## 6377    transcribed_unitary_pseudogene    chr1 3743061 3743190      -       1
## 6378    transcribed_unitary_pseudogene    chr1 3742804 3742911      -       1
## 6379    transcribed_unitary_pseudogene    chr1 3740233 3740387      -       1
## 6380    transcribed_unitary_pseudogene    chr1 3738223 3738513      -       1
## 6381    transcribed_unitary_pseudogene    chr1 3736926 3737103      -       1
## 6382    transcribed_unitary_pseudogene    chr1 3735511 3735542      -       1
## 6383    transcribed_unitary_pseudogene    chr1 3737149 3747373      -       1
## 6384    transcribed_unitary_pseudogene    chr1 3745607 3747373      -       1
## 6385    transcribed_unitary_pseudogene    chr1 3743061 3743190      -       1
## 6386    transcribed_unitary_pseudogene    chr1 3742804 3742911      -       1
## 6387    transcribed_unitary_pseudogene    chr1 3740233 3740387      -       1
## 6388    transcribed_unitary_pseudogene    chr1 3737149 3738513      -       1
## 6389    transcribed_unitary_pseudogene    chr1 3738434 3746742      -       1
## 6390    transcribed_unitary_pseudogene    chr1 3746528 3746742      -       1
## 6391    transcribed_unitary_pseudogene    chr1 3745607 3746186      -       1
## 6392    transcribed_unitary_pseudogene    chr1 3743301 3743371      -       1
## 6393    transcribed_unitary_pseudogene    chr1 3743061 3743190      -       1
## 6394    transcribed_unitary_pseudogene    chr1 3742804 3742911      -       1
## 6395    transcribed_unitary_pseudogene    chr1 3740275 3740387      -       1
## 6396    transcribed_unitary_pseudogene    chr1 3739059 3739216      -       1
## 6397    transcribed_unitary_pseudogene    chr1 3738434 3738513      -       1
## 6398                                         misc_RNA    chr1 3736943 3737103      +       0
## 6399                                         misc_RNA    chr1 3736943 3737103      +       0
## 6400                                         misc_RNA    chr1 3736943 3737103      +       0
## 6401                                  protein_coding    chr1 3746460 3771645      +       1
## 6402                                  protein_coding    chr1 3752450 3771645      +       1
## 6403                                  protein_coding    chr1 3752450 3752799      +       1
## 6404                                  protein_coding    chr1 3752482 3752799      +       1
## 6405                                  protein_coding    chr1 3752482 3752484      +       1
## 6406                                  protein_coding    chr1 3754118 3754241      +       1
## 6407                                  protein_coding    chr1 3754118 3754241      +       1
## 6408                                  protein_coding    chr1 3755457 3755567      +       1
## 6409                                  protein_coding    chr1 3755457 3755567      +       1
## 6410                                  protein_coding    chr1 3756733 3756890      +       1
## 6411                                  protein_coding    chr1 3756733 3756890      +       1
## 6412                                  protein_coding    chr1 3761281 3761430      +       1
## 6413                                  protein_coding    chr1 3761281 3761430      +       1
## 6414                                  protein_coding    chr1 3762620 3762712      +       1
## 6415                                  protein_coding    chr1 3762620 3762712      +       1
```

```
## 6416                 protein_coding      chr1 3763108 3763474       +        1
## 6417                 protein_coding      chr1 3763108 3763474       +        1
## 6418                 protein_coding      chr1 3763706 3763836       +        1
## 6419                 protein_coding      chr1 3763706 3763836       +        1
## 6420                 protein_coding      chr1 3766535 3766612       +        1
## 6421                 protein_coding      chr1 3766535 3766612       +        1
## 6422                 protein_coding      chr1 3767233 3767445       +        1
## 6423                 protein_coding      chr1 3767233 3767445       +        1
## 6424                 protein_coding      chr1 3769783 3769887       +        1
## 6425                 protein_coding      chr1 3769783 3769887       +        1
## 6426                 protein_coding      chr1 3771401 3771645       +        1
## 6427                 protein_coding      chr1 3771401 3771520       +        1
## 6428                 protein_coding      chr1 3771521 3771523       +        1
## 6429                 protein_coding      chr1 3752450 3752481       +        1
## 6430                 protein_coding      chr1 3771521 3771645       +        1
## 6431                 protein_coding      chr1 3772761 3775982       +        1
## 6432                 protein_coding      chr1 3772771 3775670       +        1
## 6433                 protein_coding      chr1 3772771 3772788       +        1
## 6434                 protein_coding      chr1 3773063 3773181       +        1
## 6435                 protein_coding      chr1 3775299 3775670       +        1
## 6436                 protein_coding      chr1 3775374 3775484       +        1
## 6437                 protein_coding      chr1 3775374 3775376       +        1
## 6438                 protein_coding      chr1 3775485 3775487       +        1
## 6439                 protein_coding      chr1 3772771 3772788       +        1
## 6440                 protein_coding      chr1 3773063 3773181       +        1
## 6441                 protein_coding      chr1 3775299 3775373       +        1
## 6442                 protein_coding      chr1 3775485 3775670       +        1
## 6443                 protein_coding      chr1 3772787 3775982       +        1
## 6444                 protein_coding      chr1 3772787 3772841       +        1
## 6445                 protein_coding      chr1 3773063 3773181       +        1
## 6446                 protein_coding      chr1 3775299 3775483       +        1
## 6447                 protein_coding      chr1 3775374 3775483       +        1
## 6448                 protein_coding      chr1 3775374 3775376       +        1
## 6449                 protein_coding      chr1 3775795 3775982       +        1
## 6450                 protein_coding      chr1 3775795 3775918       +        1
## 6451                 protein_coding      chr1 3775919 3775921       +        1
## 6452                 protein_coding      chr1 3772787 3772841       +        1
## 6453                 protein_coding      chr1 3773063 3773181       +        1
## 6454                 protein_coding      chr1 3775299 3775373       +        1
## 6455                 protein_coding      chr1 3775919 3775982       +        1
## 6456                 protein_coding      chr1 3778559 3796498       -        1
## 6457                 protein_coding      chr1 3778559 3796498       -        1
## 6458                 protein_coding      chr1 3795862 3796498       -        1
## 6459                 protein_coding      chr1 3795862 3796476       -        1
## 6460                 protein_coding      chr1 3796474 3796476       -        1
## 6461                 protein_coding      chr1 3786849 3787310       -        1
## 6462                 protein_coding      chr1 3786849 3787310       -        1
## 6463                 protein_coding      chr1 3785087 3785203       -        1
## 6464                 protein_coding      chr1 3785087 3785203       -        1
## 6465                 protein_coding      chr1 3783996 3784111       -        1
## 6466                 protein_coding      chr1 3783996 3784111       -        1
## 6467                 protein_coding      chr1 3782661 3782763       -        1
## 6468                 protein_coding      chr1 3782661 3782763       -        1
## 6469                 protein_coding      chr1 3781512 3781601       -        1
```

```
## 6470                     protein_coding  chr1 3781512 3781601      -     1
## 6471                     protein_coding  chr1 3778559 3781336      -     1
## 6472                     protein_coding  chr1 3781091 3781336      -     1
## 6473                     protein_coding  chr1 3781088 3781090      -     1
## 6474                     protein_coding  chr1 3796477 3796498      -     1
## 6475                     protein_coding  chr1 3778559 3781090      -     1
## 6476                          misc_RNA   chr1 3782815 3783111      +     1
## 6477                          misc_RNA   chr1 3782815 3783111      +     1
## 6478                          misc_RNA   chr1 3782815 3783111      +     1
## 6479                            lncRNA   chr1 3785008 3785538      +     0
## 6480                            lncRNA   chr1 3785008 3785538      +     0
## 6481                            lncRNA   chr1 3785008 3785538      +     0
## 6482                     protein_coding  chr1 3812086 3857214      -     1
## 6483                     protein_coding  chr1 3812086 3857211      -     1
## 6484                     protein_coding  chr1 3856889 3857211      -     1
## 6485                     protein_coding  chr1 3852295 3852421      -     1
## 6486                     protein_coding  chr1 3852295 3852407      -     1
## 6487                     protein_coding  chr1 3852405 3852407      -     1
## 6488                     protein_coding  chr1 3848608 3848781      -     1
## 6489                     protein_coding  chr1 3848608 3848781      -     1
## 6490                     protein_coding  chr1 3847475 3847613      -     1
## 6491                     protein_coding  chr1 3847475 3847613      -     1
## 6492                     protein_coding  chr1 3845289 3845351      -     1
## 6493                     protein_coding  chr1 3845289 3845351      -     1
## 6494                     protein_coding  chr1 3844907 3844983      -     1
## 6495                     protein_coding  chr1 3844907 3844983      -     1
## 6496                     protein_coding  chr1 3839608 3839776      -     1
## 6497                     protein_coding  chr1 3839608 3839776      -     1
## 6498                     protein_coding  chr1 3838964 3839119      -     1
## 6499                     protein_coding  chr1 3838964 3839119      -     1
## 6500                     protein_coding  chr1 3837292 3837519      -     1
## 6501                     protein_coding  chr1 3837292 3837519      -     1
## 6502                     protein_coding  chr1 3836495 3836692      -     1
## 6503                     protein_coding  chr1 3836495 3836692      -     1
## 6504                     protein_coding  chr1 3834925 3835092      -     1
## 6505                     protein_coding  chr1 3834925 3835092      -     1
## 6506                     protein_coding  chr1 3833862 3834035      -     1
## 6507                     protein_coding  chr1 3833862 3834035      -     1
## 6508                     protein_coding  chr1 3831046 3831222      -     1
## 6509                     protein_coding  chr1 3831046 3831222      -     1
## 6510                     protein_coding  chr1 3829791 3829997      -     1
## 6511                     protein_coding  chr1 3829791 3829997      -     1
## 6512                     protein_coding  chr1 3829266 3829373      -     1
## 6513                     protein_coding  chr1 3829266 3829373      -     1
## 6514                     protein_coding  chr1 3826708 3826744      -     1
## 6515                     protein_coding  chr1 3826708 3826744      -     1
## 6516                     protein_coding  chr1 3826370 3826436      -     1
## 6517                     protein_coding  chr1 3826370 3826436      -     1
## 6518                     protein_coding  chr1 3825758 3825866      -     1
## 6519                     protein_coding  chr1 3825758 3825866      -     1
## 6520                     protein_coding  chr1 3823424 3823562      -     1
## 6521                     protein_coding  chr1 3823424 3823562      -     1
## 6522                     protein_coding  chr1 3823174 3823241      -     1
## 6523                     protein_coding  chr1 3823174 3823241      -     1
```

```
## 6524               protein_coding    chr1 3816280 3816370    -    1
## 6525               protein_coding    chr1 3816280 3816370    -    1
## 6526               protein_coding    chr1 3812086 3815517    -    1
## 6527               protein_coding    chr1 3815405 3815517    -    1
## 6528               protein_coding    chr1 3815402 3815404    -    1
## 6529               protein_coding    chr1 3856889 3857211    -    1
## 6530               protein_coding    chr1 3852408 3852421    -    1
## 6531               protein_coding    chr1 3812086 3815404    -    1
## 6532               protein_coding    chr1 3843109 3857214    -    1
## 6533               protein_coding    chr1 3856889 3857214    -    1
## 6534               protein_coding    chr1 3852295 3852421    -    1
## 6535               protein_coding    chr1 3852295 3852407    -    1
## 6536               protein_coding    chr1 3852405 3852407    -    1
## 6537               protein_coding    chr1 3848608 3848781    -    1
## 6538               protein_coding    chr1 3848608 3848781    -    1
## 6539               protein_coding    chr1 3847475 3847613    -    1
## 6540               protein_coding    chr1 3847475 3847613    -    1
## 6541               protein_coding    chr1 3845289 3845351    -    1
## 6542               protein_coding    chr1 3845289 3845351    -    1
## 6543               protein_coding    chr1 3844907 3844983    -    1
## 6544               protein_coding    chr1 3844907 3844983    -    1
## 6545               protein_coding    chr1 3843109 3843323    -    1
## 6546               protein_coding    chr1 3843158 3843323    -    1
## 6547               protein_coding    chr1 3843155 3843157    -    1
## 6548               protein_coding    chr1 3856889 3857214    -    1
## 6549               protein_coding    chr1 3852408 3852421    -    1
## 6550               protein_coding    chr1 3843109 3843157    -    1
## 6551               protein_coding    chr1 3857267 3885429    +    1
## 6552               protein_coding    chr1 3857267 3860490    +    1
## 6553               protein_coding    chr1 3857267 3857717    +    1
## 6554               protein_coding    chr1 3857604 3857717    +    1
## 6555               protein_coding    chr1 3857604 3857606    +    1
## 6556               protein_coding    chr1 3858718 3858844    +    1
## 6557               protein_coding    chr1 3858718 3858844    +    1
## 6558               protein_coding    chr1 3860420 3860490    +    1
## 6559               protein_coding    chr1 3860420 3860487    +    1
## 6560               protein_coding    chr1 3860488 3860490    +    1
## 6561               protein_coding    chr1 3857267 3857603    +    1
## 6562               protein_coding    chr1 3860488 3860490    +    1
## 6563               protein_coding    chr1 3857267 3885420    +    1
## 6564               protein_coding    chr1 3857267 3857717    +    1
## 6565               protein_coding    chr1 3857604 3857717    +    1
## 6566               protein_coding    chr1 3857604 3857606    +    1
## 6567               protein_coding    chr1 3858718 3858866    +    1
## 6568               protein_coding    chr1 3858718 3858866    +    1
## 6569               protein_coding    chr1 3865762 3866000    +    1
## 6570               protein_coding    chr1 3865762 3866000    +    1
## 6571               protein_coding    chr1 3867974 3868053    +    1
## 6572               protein_coding    chr1 3867974 3868053    +    1
## 6573               protein_coding    chr1 3869605 3869775    +    1
## 6574               protein_coding    chr1 3869605 3869775    +    1
## 6575               protein_coding    chr1 3872472 3872572    +    1
## 6576               protein_coding    chr1 3872472 3872572    +    1
## 6577               protein_coding    chr1 3883507 3885420    +    1
```

```
## 6578               protein_coding   chr1 3883507 3883738      +     1
## 6579               protein_coding   chr1 3883739 3883741      +     1
## 6580               protein_coding   chr1 3857267 3857603      +     1
## 6581               protein_coding   chr1 3883739 3885420      +     1
## 6582               protein_coding   chr1 3857281 3885429      +     1
## 6583               protein_coding   chr1 3857281 3857717      +     1
## 6584               protein_coding   chr1 3857604 3857717      +     1
## 6585               protein_coding   chr1 3857604 3857606      +     1
## 6586               protein_coding   chr1 3858718 3858844      +     1
## 6587               protein_coding   chr1 3858718 3858844      +     1
## 6588               protein_coding   chr1 3865812 3866000      +     1
## 6589               protein_coding   chr1 3865812 3866000      +     1
## 6590               protein_coding   chr1 3867974 3868053      +     1
## 6591               protein_coding   chr1 3867974 3868053      +     1
## 6592               protein_coding   chr1 3869605 3869775      +     1
## 6593               protein_coding   chr1 3869605 3869775      +     1
## 6594               protein_coding   chr1 3872472 3872572      +     1
## 6595               protein_coding   chr1 3872472 3872572      +     1
## 6596               protein_coding   chr1 3883507 3885429      +     1
## 6597               protein_coding   chr1 3883507 3883738      +     1
## 6598               protein_coding   chr1 3883739 3883741      +     1
## 6599               protein_coding   chr1 3857281 3857603      +     1
## 6600               protein_coding   chr1 3883739 3885429      +     1
## 6601               protein_coding   chr1 3857604 3883741      +     1
## 6602               protein_coding   chr1 3857604 3857717      +     1
## 6603               protein_coding   chr1 3857604 3857717      +     1
## 6604               protein_coding   chr1 3857604 3857606      +     1
## 6605               protein_coding   chr1 3858718 3858851      +     1
## 6606               protein_coding   chr1 3858718 3858849      +     1
## 6607               protein_coding   chr1 3872484 3872572      +     1
## 6608               protein_coding   chr1 3858850 3858851      +     1
## 6609               protein_coding   chr1 3872484 3872484      +     1
## 6610               protein_coding   chr1 3883507 3883741      +     1
## 6611               protein_coding   chr1 3858850 3858851      +     1
## 6612               protein_coding   chr1 3872484 3872572      +     1
## 6613               protein_coding   chr1 3883507 3883741      +     1
## 6614               protein_coding   chr1 3889125 3900293      −     1
## 6615               protein_coding   chr1 3889133 3900272      −     1
## 6616               protein_coding   chr1 3900172 3900272      −     1
## 6617               protein_coding   chr1 3900172 3900186      −     1
## 6618               protein_coding   chr1 3900184 3900186      −     1
## 6619               protein_coding   chr1 3892883 3892996      −     1
## 6620               protein_coding   chr1 3892883 3892996      −     1
## 6621               protein_coding   chr1 3890569 3891057      −     1
## 6622               protein_coding   chr1 3890569 3891057      −     1
## 6623               protein_coding   chr1 3889133 3890073      −     1
## 6624               protein_coding   chr1 3889963 3890073      −     1
## 6625               protein_coding   chr1 3889960 3889962      −     1
## 6626               protein_coding   chr1 3900187 3900272      −     1
## 6627               protein_coding   chr1 3889133 3889962      −     1
## 6628                        lncRNA   chr1 3900352 3917225      +     1
## 6629                        lncRNA   chr1 3900404 3917225      +     1
## 6630                        lncRNA   chr1 3900404 3900631      +     1
## 6631                        lncRNA   chr1 3914395 3917225      +     1
```

```
## 6632                         lncRNA      chr1 3900416 3915447      +      1
## 6633                         lncRNA      chr1 3900416 3900631      +      1
## 6634                         lncRNA      chr1 3903965 3904036      +      1
## 6635                         lncRNA      chr1 3913692 3914290      +      1
## 6636                         lncRNA      chr1 3914395 3915447      +      1
## 6637                         lncRNA      chr1 3940486 3955262      +      1
## 6638                         lncRNA      chr1 3940617 3955262      +      1
## 6639                         lncRNA      chr1 3940617 3940698      +      1
## 6640                         lncRNA      chr1 3940994 3941143      +      1
## 6641                         lncRNA      chr1 3952253 3955262      +      1
## 6642                         lncRNA      chr1 3947756 3949866      +      1
## 6643                         lncRNA      chr1 3947756 3948321      +      1
## 6644                         lncRNA      chr1 3949027 3949866      +      1
## 6645                         lncRNA      chr1 3944547 3949024      -      1
## 6646                         lncRNA      chr1 3944547 3948900      -      1
## 6647                         lncRNA      chr1 3948863 3948900      -      1
## 6648                         lncRNA      chr1 3947957 3948595      -      1
## 6649                         lncRNA      chr1 3947275 3947328      -      1
## 6650                         lncRNA      chr1 3946320 3946463      -      1
## 6651                         lncRNA      chr1 3945494 3945669      -      1
## 6652                         lncRNA      chr1 3944547 3945141      -      1
## 6653                         lncRNA      chr1 3976133 4012704      +      0
## 6654                         lncRNA      chr1 3976133 4012704      +      0
## 6655                         lncRNA      chr1 3976133 3976195      +      0
## 6656                         lncRNA      chr1 3976882 3977102      +      0
## 6657                         lncRNA      chr1 4012231 4012704      +      0
## 6658                         lncRNA      chr1 3976140 3998058      +      0
## 6659                         lncRNA      chr1 3976140 3976195      +      0
## 6660                         lncRNA      chr1 3976882 3977157      +      0
## 6661                         lncRNA      chr1 3995642 3995691      +      0
## 6662                         lncRNA      chr1 3995785 3995830      +      0
## 6663                         lncRNA      chr1 3996824 3996932      +      0
## 6664                         lncRNA      chr1 3998056 3998058      +      0
## 6665                         lncRNA      chr1 3976140 3998855      +      0
## 6666                         lncRNA      chr1 3976140 3976195      +      0
## 6667                         lncRNA      chr1 3976882 3977157      +      0
## 6668                         lncRNA      chr1 3996807 3996932      +      0
## 6669                         lncRNA      chr1 3998056 3998855      +      0
## 6670                         lncRNA      chr1 4012921 4019508      -      0
## 6671                         lncRNA      chr1 4012921 4019508      -      0
## 6672                         lncRNA      chr1 4018478 4019508      -      0
## 6673                         lncRNA      chr1 4012921 4016706      -      0
## 6674          processed_pseudogene      chr1 4175528 4175899      -      1
## 6675          processed_pseudogene      chr1 4175528 4175899      -      1
## 6676          processed_pseudogene      chr1 4175528 4175899      -      1
## 6677                         lncRNA      chr1 4412027 4424689      +      1
## 6678                         lncRNA      chr1 4412051 4424687      +      1
## 6679                         lncRNA      chr1 4412051 4412632      +      1
## 6680                         lncRNA      chr1 4415553 4415587      +      1
## 6681                         lncRNA      chr1 4416312 4416548      +      1
## 6682                         lncRNA      chr1 4422760 4423187      +      1
## 6683                         lncRNA      chr1 4423348 4423448      +      1
## 6684                         lncRNA      chr1 4423994 4424687      +      1
## 6685                         lncRNA      chr1 4479131 4484375      -      0
```

```
## 6686                        lncRNA        chr1 4479131 4484375        -        0
## 6687                        lncRNA        chr1 4484194 4484375        -        0
## 6688                        lncRNA        chr1 4479131 4482350        -        0
## 6689                        lncRNA        chr1 4551735 4552145        -        0
## 6690                        lncRNA        chr1 4551735 4552145        -        0
## 6691                        lncRNA        chr1 4552105 4552145        -        0
## 6692                        lncRNA        chr1 4551735 4552049        -        0
## 6693                        lncRNA        chr1 4571481 4594016        +        1
## 6694                        lncRNA        chr1 4571489 4594009        +        1
## 6695                        lncRNA        chr1 4571489 4571629        +        1
## 6696                        lncRNA        chr1 4572470 4572592        +        1
## 6697                        lncRNA        chr1 4593052 4593190        +        1
## 6698                        lncRNA        chr1 4593700 4594009        +        1
## 6699                        lncRNA        chr1 4571504 4594009        +        1
## 6700                        lncRNA        chr1 4571504 4571629        +        1
## 6701                        lncRNA        chr1 4575322 4575450        +        1
## 6702                        lncRNA        chr1 4593052 4594009        +        1
## 6703                        lncRNA        chr1 4571516 4585094        +        1
## 6704                        lncRNA        chr1 4571516 4571629        +        1
## 6705                        lncRNA        chr1 4572470 4572592        +        1
## 6706                        lncRNA        chr1 4583083 4583178        +        1
## 6707                        lncRNA        chr1 4583897 4585094        +        1
## 6708                        lncRNA        chr1 4571548 4583421        +        1
## 6709                        lncRNA        chr1 4571548 4571629        +        1
## 6710                        lncRNA        chr1 4572470 4572592        +        1
## 6711                        lncRNA        chr1 4582277 4582574        +        1
## 6712                        lncRNA        chr1 4583083 4583178        +        1
## 6713                        lncRNA        chr1 4583339 4583421        +        1
## 6714                 protein_coding        chr1 4654732 4792534        +        1
## 6715                 protein_coding        chr1 4654732 4777794        +        1
## 6716                 protein_coding        chr1 4654732 4655454        +        1
## 6717                 protein_coding        chr1 4655426 4655454        +        1
## 6718                 protein_coding        chr1 4655426 4655428        +        1
## 6719                 protein_coding        chr1 4711900 4712699        +        1
## 6720                 protein_coding        chr1 4711900 4712699        +        1
## 6721                 protein_coding        chr1 4769853 4769940        +        1
## 6722                 protein_coding        chr1 4769853 4769940        +        1
## 6723                 protein_coding        chr1 4772280 4772525        +        1
## 6724                 protein_coding        chr1 4772280 4772525        +        1
## 6725                 protein_coding        chr1 4774427 4774558        +        1
## 6726                 protein_coding        chr1 4774427 4774496        +        1
## 6727                 protein_coding        chr1 4774497 4774499        +        1
## 6728                 protein_coding        chr1 4777401 4777794        +        1
## 6729                 protein_coding        chr1 4654732 4655425        +        1
## 6730                 protein_coding        chr1 4774497 4774558        +        1
## 6731                 protein_coding        chr1 4777401 4777794        +        1
## 6732                 protein_coding        chr1 4655045 4792534        +        1
## 6733                 protein_coding        chr1 4655045 4655454        +        1
## 6734                 protein_coding        chr1 4655426 4655454        +        1
## 6735                 protein_coding        chr1 4655426 4655428        +        1
## 6736                 protein_coding        chr1 4711900 4712699        +        1
## 6737                 protein_coding        chr1 4711900 4712699        +        1
## 6738                 protein_coding        chr1 4769853 4769940        +        1
## 6739                 protein_coding        chr1 4769853 4769940        +        1
```

```
## 6740                      protein_coding    chr1 4772280 4772525       +       1
## 6741                      protein_coding    chr1 4772280 4772525       +       1
## 6742                      protein_coding    chr1 4774427 4774558       +       1
## 6743                      protein_coding    chr1 4774427 4774496       +       1
## 6744                      protein_coding    chr1 4774497 4774499       +       1
## 6745                      protein_coding    chr1 4782545 4792534       +       1
## 6746                      protein_coding    chr1 4655045 4655425       +       1
## 6747                      protein_coding    chr1 4774497 4774558       +       1
## 6748                      protein_coding    chr1 4782545 4792534       +       1
## 6749                              lncRNA    chr1 4730211 4734992       -       0
## 6750                              lncRNA    chr1 4730211 4733745       -       0
## 6751                              lncRNA    chr1 4733536 4733745       -       0
## 6752                              lncRNA    chr1 4730211 4733030       -       0
## 6753                              lncRNA    chr1 4963954 4973298       -       0
## 6754                              lncRNA    chr1 4963954 4973298       -       0
## 6755                              lncRNA    chr1 4973107 4973298       -       0
## 6756                              lncRNA    chr1 4964418 4964553       -       0
## 6757                              lncRNA    chr1 4963954 4964089       -       0
## 6758                              lncRNA    chr1 4973381 4981568       +       0
## 6759                              lncRNA    chr1 4973381 4981568       +       0
## 6760                              lncRNA    chr1 4973381 4973547       +       0
## 6761                              lncRNA    chr1 4974295 4974381       +       0
## 6762                              lncRNA    chr1 4974838 4974945       +       0
## 6763                              lncRNA    chr1 4976962 4977091       +       0
## 6764                              lncRNA    chr1 4980481 4981568       +       0
## 6765                              lncRNA    chr1 5086459 5090899       -       0
## 6766                              lncRNA    chr1 5086459 5090899       -       0
## 6767                              lncRNA    chr1 5090733 5090899       -       0
## 6768                              lncRNA    chr1 5090580 5090627       -       0
## 6769                              lncRNA    chr1 5088251 5088373       -       0
## 6770                              lncRNA    chr1 5086459 5086569       -       0
## 6771                              lncRNA    chr1 5301928 5307394       -       0
## 6772                              lncRNA    chr1 5301928 5307394       -       0
## 6773                              lncRNA    chr1 5306942 5307394       -       0
## 6774                              lncRNA    chr1 5304401 5305029       -       0
## 6775                              lncRNA    chr1 5303328 5303393       -       0
## 6776                              lncRNA    chr1 5301928 5302004       -       0
## 6777                              lncRNA    chr1 5478736 5493057       -       0
## 6778                              lncRNA    chr1 5489795 5493057       -       0
## 6779                              lncRNA    chr1 5492755 5493057       -       0
## 6780                              lncRNA    chr1 5492488 5492607       -       0
## 6781                              lncRNA    chr1 5489795 5491581       -       0
## 6782                              lncRNA    chr1 5490829 5492804       -       0
## 6783                              lncRNA    chr1 5492755 5492804       -       0
## 6784                              lncRNA    chr1 5492488 5492607       -       0
## 6785                              lncRNA    chr1 5491144 5491581       -       0
## 6786                              lncRNA    chr1 5490829 5491050       -       0
## 6787                              lncRNA    chr1 5480787 5482028       -       0
## 6788                              lncRNA    chr1 5480787 5482028       -       0
## 6789                              lncRNA    chr1 5481956 5482028       -       0
## 6790                              lncRNA    chr1 5480787 5481322       -       0
## 6791                              lncRNA    chr1 5492978 5494674       +       0
## 6792                              lncRNA    chr1 5492978 5494674       +       0
## 6793                              lncRNA    chr1 5492978 5494674       +       0
```

```
## 6794          unprocessed_pseudogene    chr1 5554747 5554881    +    0
## 6795          unprocessed_pseudogene    chr1 5554747 5554881    +    0
## 6796          unprocessed_pseudogene    chr1 5554747 5554881    +    0
## 6797                          lncRNA    chr1 5561709 5668295    -    0
## 6798                          lncRNA    chr1 5561709 5668255    -    0
## 6799                          lncRNA    chr1 5668141 5668255    -    0
## 6800                          lncRNA    chr1 5563170 5563355    -    0
## 6801                          lncRNA    chr1 5561709 5562254    -    0
## 6802                          lncRNA    chr1 5587368 5668295    -    0
## 6803                          lncRNA    chr1 5668141 5668295    -    0
## 6804                          lncRNA    chr1 5587368 5587575    -    0
## 6805                           miRNA    chr1 5564071 5564143    +    0
## 6806                           miRNA    chr1 5564071 5564143    +    0
## 6807                           miRNA    chr1 5564071 5564143    +    0
## 6808                           miRNA    chr1 5862672 5862741    -    1
## 6809                           miRNA    chr1 5862672 5862741    -    1
## 6810                           miRNA    chr1 5862672 5862741    -    1
## 6811                   protein_coding    chr1 5862811 5992473    -    1
## 6812                   protein_coding    chr1 5862811 5992425    -    1
## 6813                   protein_coding    chr1 5992244 5992425    -    1
## 6814                   protein_coding    chr1 5986155 5986327    -    1
## 6815                   protein_coding    chr1 5986155 5986289    -    1
## 6816                   protein_coding    chr1 5986287 5986289    -    1
## 6817                   protein_coding    chr1 5978270 5978413    -    1
## 6818                   protein_coding    chr1 5978270 5978413    -    1
## 6819                   protein_coding    chr1 5969087 5969259    -    1
## 6820                   protein_coding    chr1 5969087 5969259    -    1
## 6821                   protein_coding    chr1 5967299 5967363    -    1
## 6822                   protein_coding    chr1 5967299 5967363    -    1
## 6823                   protein_coding    chr1 5961794 5961949    -    1
## 6824                   protein_coding    chr1 5961794 5961949    -    1
## 6825                   protein_coding    chr1 5952700 5952836    -    1
## 6826                   protein_coding    chr1 5952700 5952836    -    1
## 6827                   protein_coding    chr1 5948070 5948251    -    1
## 6828                   protein_coding    chr1 5948070 5948251    -    1
## 6829                   protein_coding    chr1 5947104 5947230    -    1
## 6830                   protein_coding    chr1 5947104 5947230    -    1
## 6831                   protein_coding    chr1 5933147 5933329    -    1
## 6832                   protein_coding    chr1 5933147 5933329    -    1
## 6833                   protein_coding    chr1 5927649 5927787    -    1
## 6834                   protein_coding    chr1 5927649 5927787    -    1
## 6835                   protein_coding    chr1 5909152 5909213    -    1
## 6836                   protein_coding    chr1 5909152 5909213    -    1
## 6837                   protein_coding    chr1 5907115 5907222    -    1
## 6838                   protein_coding    chr1 5907115 5907222    -    1
## 6839                   protein_coding    chr1 5905632 5905783    -    1
## 6840                   protein_coding    chr1 5905632 5905783    -    1
## 6841                   protein_coding    chr1 5905292 5905483    -    1
## 6842                   protein_coding    chr1 5905292 5905483    -    1
## 6843                   protein_coding    chr1 5904617 5904804    -    1
## 6844                   protein_coding    chr1 5904617 5904804    -    1
## 6845                   protein_coding    chr1 5890868 5891028    -    1
## 6846                   protein_coding    chr1 5890868 5891028    -    1
## 6847                   protein_coding    chr1 5887286 5887466    -    1
```

326

```
## 6848                    protein_coding    chr1 5887286 5887466    -    1
## 6849                    protein_coding    chr1 5880114 5880239    -    1
## 6850                    protein_coding    chr1 5880114 5880239    -    1
## 6851                    protein_coding    chr1 5877093 5877298    -    1
## 6852                    protein_coding    chr1 5877093 5877298    -    1
## 6853                    protein_coding    chr1 5874874 5875100    -    1
## 6854                    protein_coding    chr1 5874874 5875100    -    1
## 6855                    protein_coding    chr1 5874471 5874657    -    1
## 6856                    protein_coding    chr1 5874471 5874657    -    1
## 6857                    protein_coding    chr1 5873252 5873335    -    1
## 6858                    protein_coding    chr1 5873252 5873335    -    1
## 6859                    protein_coding    chr1 5867740 5867896    -    1
## 6860                    protein_coding    chr1 5867740 5867896    -    1
## 6861                    protein_coding    chr1 5867030 5867115    -    1
## 6862                    protein_coding    chr1 5867030 5867115    -    1
## 6863                    protein_coding    chr1 5866373 5866458    -    1
## 6864                    protein_coding    chr1 5866373 5866458    -    1
## 6865                    protein_coding    chr1 5865102 5865273    -    1
## 6866                    protein_coding    chr1 5865102 5865273    -    1
## 6867                    protein_coding    chr1 5864338 5864517    -    1
## 6868                    protein_coding    chr1 5864338 5864517    -    1
## 6869                    protein_coding    chr1 5863890 5864033    -    1
## 6870                    protein_coding    chr1 5863890 5864033    -    1
## 6871                    protein_coding    chr1 5862811 5863405    -    1
## 6872                    protein_coding    chr1 5863268 5863405    -    1
## 6873                    protein_coding    chr1 5863265 5863267    -    1
## 6874                    protein_coding    chr1 5992244 5992425    -    1
## 6875                    protein_coding    chr1 5986290 5986327    -    1
## 6876                    protein_coding    chr1 5862811 5863267    -    1
## 6877                    protein_coding    chr1 5879505 5992473    -    1
## 6878                    protein_coding    chr1 5992244 5992473    -    1
## 6879                    protein_coding    chr1 5986155 5986327    -    1
## 6880                    protein_coding    chr1 5986155 5986289    -    1
## 6881                    protein_coding    chr1 5986287 5986289    -    1
## 6882                    protein_coding    chr1 5978270 5978413    -    1
## 6883                    protein_coding    chr1 5978270 5978413    -    1
## 6884                    protein_coding    chr1 5969087 5969259    -    1
## 6885                    protein_coding    chr1 5969087 5969259    -    1
## 6886                    protein_coding    chr1 5967299 5967363    -    1
## 6887                    protein_coding    chr1 5967299 5967363    -    1
## 6888                    protein_coding    chr1 5961794 5961949    -    1
## 6889                    protein_coding    chr1 5961794 5961949    -    1
## 6890                    protein_coding    chr1 5952700 5952836    -    1
## 6891                    protein_coding    chr1 5952700 5952836    -    1
## 6892                    protein_coding    chr1 5948070 5948251    -    1
## 6893                    protein_coding    chr1 5948070 5948251    -    1
## 6894                    protein_coding    chr1 5947104 5947230    -    1
## 6895                    protein_coding    chr1 5947104 5947230    -    1
## 6896                    protein_coding    chr1 5933147 5933329    -    1
## 6897                    protein_coding    chr1 5933147 5933329    -    1
## 6898                    protein_coding    chr1 5927649 5927787    -    1
## 6899                    protein_coding    chr1 5927649 5927787    -    1
## 6900                    protein_coding    chr1 5909152 5909213    -    1
## 6901                    protein_coding    chr1 5909152 5909213    -    1
```

```
## 6902          protein_coding    chr1 5907115 5907222    -    1
## 6903          protein_coding    chr1 5907115 5907222    -    1
## 6904          protein_coding    chr1 5905632 5905780    -    1
## 6905          protein_coding    chr1 5905632 5905780    -    1
## 6906          protein_coding    chr1 5905292 5905483    -    1
## 6907          protein_coding    chr1 5905292 5905483    -    1
## 6908          protein_coding    chr1 5904617 5904804    -    1
## 6909          protein_coding    chr1 5904617 5904804    -    1
## 6910          protein_coding    chr1 5890868 5891028    -    1
## 6911          protein_coding    chr1 5890868 5891028    -    1
## 6912          protein_coding    chr1 5887286 5887466    -    1
## 6913          protein_coding    chr1 5887286 5887466    -    1
## 6914          protein_coding    chr1 5880114 5880239    -    1
## 6915          protein_coding    chr1 5880114 5880239    -    1
## 6916          protein_coding    chr1 5879505 5879632    -    1
## 6917          protein_coding    chr1 5879508 5879632    -    1
## 6918          protein_coding    chr1 5879505 5879507    -    1
## 6919          protein_coding    chr1 5992244 5992473    -    1
## 6920          protein_coding    chr1 5986290 5986327    -    1
## 6921          protein_coding    chr1 5879505 5879507    -    1
## 6922          protein_coding    chr1 5990927 6101193    +    1
## 6923          protein_coding    chr1 5992262 6101193    +    1
## 6924          protein_coding    chr1 5992262 5992788    +    1
## 6925          protein_coding    chr1 6040517 6040645    +    1
## 6926          protein_coding    chr1 6040569 6040645    +    1
## 6927          protein_coding    chr1 6040569 6040571    +    1
## 6928          protein_coding    chr1 6041831 6041872    +    1
## 6929          protein_coding    chr1 6041831 6041872    +    1
## 6930          protein_coding    chr1 6072755 6072798    +    1
## 6931          protein_coding    chr1 6072755 6072798    +    1
## 6932          protein_coding    chr1 6073733 6073770    +    1
## 6933          protein_coding    chr1 6073733 6073770    +    1
## 6934          protein_coding    chr1 6082195 6082274    +    1
## 6935          protein_coding    chr1 6082195 6082274    +    1
## 6936          protein_coding    chr1 6085204 6085248    +    1
## 6937          protein_coding    chr1 6085204 6085248    +    1
## 6938          protein_coding    chr1 6087467 6087511    +    1
## 6939          protein_coding    chr1 6087467 6087511    +    1
## 6940          protein_coding    chr1 6089008 6089051    +    1
## 6941          protein_coding    chr1 6089008 6089051    +    1
## 6942          protein_coding    chr1 6090389 6090475    +    1
## 6943          protein_coding    chr1 6090389 6090475    +    1
## 6944          protein_coding    chr1 6094400 6094485    +    1
## 6945          protein_coding    chr1 6094400 6094485    +    1
## 6946          protein_coding    chr1 6095323 6095443    +    1
## 6947          protein_coding    chr1 6095323 6095443    +    1
## 6948          protein_coding    chr1 6095530 6095624    +    1
## 6949          protein_coding    chr1 6095530 6095624    +    1
## 6950          protein_coding    chr1 6096636 6096756    +    1
## 6951          protein_coding    chr1 6096636 6096756    +    1
## 6952          protein_coding    chr1 6097269 6097357    +    1
## 6953          protein_coding    chr1 6097269 6097357    +    1
## 6954          protein_coding    chr1 6098485 6101193    +    1
## 6955          protein_coding    chr1 6098485 6098571    +    1
```

```
## 6956                     protein_coding    chr1 6098572 6098574    +    1
## 6957                     protein_coding    chr1 5992262 5992788    +    1
## 6958                     protein_coding    chr1 6040517 6040568    +    1
## 6959                     protein_coding    chr1 6098572 6101193    +    1
## 6960                     protein_coding    chr1 5992639 6101188    +    1
## 6961                     protein_coding    chr1 5992639 5992788    +    1
## 6962                     protein_coding    chr1 6040517 6040645    +    1
## 6963                     protein_coding    chr1 6040569 6040645    +    1
## 6964                     protein_coding    chr1 6040569 6040571    +    1
## 6965                     protein_coding    chr1 6072755 6072798    +    1
## 6966                     protein_coding    chr1 6072755 6072798    +    1
## 6967                     protein_coding    chr1 6073733 6073770    +    1
## 6968                     protein_coding    chr1 6073733 6073770    +    1
## 6969                     protein_coding    chr1 6082195 6082274    +    1
## 6970                     protein_coding    chr1 6082195 6082274    +    1
## 6971                     protein_coding    chr1 6085204 6085248    +    1
## 6972                     protein_coding    chr1 6085204 6085248    +    1
## 6973                     protein_coding    chr1 6087467 6087511    +    1
## 6974                     protein_coding    chr1 6087467 6087511    +    1
## 6975                     protein_coding    chr1 6089008 6089051    +    1
## 6976                     protein_coding    chr1 6089008 6089051    +    1
## 6977                     protein_coding    chr1 6090389 6090475    +    1
## 6978                     protein_coding    chr1 6090389 6090475    +    1
## 6979                     protein_coding    chr1 6094400 6094485    +    1
## 6980                     protein_coding    chr1 6094400 6094485    +    1
## 6981                     protein_coding    chr1 6095323 6095443    +    1
## 6982                     protein_coding    chr1 6095323 6095443    +    1
## 6983                     protein_coding    chr1 6095530 6095624    +    1
## 6984                     protein_coding    chr1 6095530 6095624    +    1
## 6985                     protein_coding    chr1 6096636 6096756    +    1
## 6986                     protein_coding    chr1 6096636 6096756    +    1
## 6987                     protein_coding    chr1 6097269 6097357    +    1
## 6988                     protein_coding    chr1 6097269 6097357    +    1
## 6989                     protein_coding    chr1 6098485 6101188    +    1
## 6990                     protein_coding    chr1 6098485 6098571    +    1
## 6991                     protein_coding    chr1 6098572 6098574    +    1
## 6992                     protein_coding    chr1 5992639 5992788    +    1
## 6993                     protein_coding    chr1 6040517 6040568    +    1
## 6994                     protein_coding    chr1 6098572 6101188    +    1
## 6995                     protein_coding    chr1 5992666 6101178    +    1
## 6996                     protein_coding    chr1 5992666 5992788    +    1
## 6997                     protein_coding    chr1 6018635 6018835    +    1
## 6998                     protein_coding    chr1 6040517 6040645    +    1
## 6999                     protein_coding    chr1 6040569 6040645    +    1
## 7000                     protein_coding    chr1 6040569 6040571    +    1
## 7001                     protein_coding    chr1 6041831 6041872    +    1
## 7002                     protein_coding    chr1 6041831 6041872    +    1
## 7003                     protein_coding    chr1 6072755 6072798    +    1
## 7004                     protein_coding    chr1 6072755 6072798    +    1
## 7005                     protein_coding    chr1 6073733 6073770    +    1
## 7006                     protein_coding    chr1 6073733 6073770    +    1
## 7007                     protein_coding    chr1 6082195 6082274    +    1
## 7008                     protein_coding    chr1 6082195 6082274    +    1
## 7009                     protein_coding    chr1 6085204 6085248    +    1
```

```
## 7010                    protein_coding   chr1 6085204 6085248     +       1
## 7011                    protein_coding   chr1 6087467 6087511     +       1
## 7012                    protein_coding   chr1 6087467 6087511     +       1
## 7013                    protein_coding   chr1 6089008 6089051     +       1
## 7014                    protein_coding   chr1 6089008 6089051     +       1
## 7015                    protein_coding   chr1 6090389 6090475     +       1
## 7016                    protein_coding   chr1 6090389 6090475     +       1
## 7017                    protein_coding   chr1 6094400 6094485     +       1
## 7018                    protein_coding   chr1 6094400 6094485     +       1
## 7019                    protein_coding   chr1 6095323 6095443     +       1
## 7020                    protein_coding   chr1 6095323 6095443     +       1
## 7021                    protein_coding   chr1 6095530 6095624     +       1
## 7022                    protein_coding   chr1 6095530 6095624     +       1
## 7023                    protein_coding   chr1 6096636 6096756     +       1
## 7024                    protein_coding   chr1 6096636 6096756     +       1
## 7025                    protein_coding   chr1 6097269 6097357     +       1
## 7026                    protein_coding   chr1 6097269 6097357     +       1
## 7027                    protein_coding   chr1 6098485 6101178     +       1
## 7028                    protein_coding   chr1 6098485 6098571     +       1
## 7029                    protein_coding   chr1 6098572 6098574     +       1
## 7030                    protein_coding   chr1 5992666 5992788     +       1
## 7031                    protein_coding   chr1 6018635 6018835     +       1
## 7032                    protein_coding   chr1 6040517 6040568     +       1
## 7033                    protein_coding   chr1 6098572 6101178     +       1
## 7034                    protein_coding   chr1 5992711 6101178     +       1
## 7035                    protein_coding   chr1 5992711 5992788     +       1
## 7036                    protein_coding   chr1 6040517 6040645     +       1
## 7037                    protein_coding   chr1 6040569 6040645     +       1
## 7038                    protein_coding   chr1 6040569 6040571     +       1
## 7039                    protein_coding   chr1 6072755 6072798     +       1
## 7040                    protein_coding   chr1 6072755 6072798     +       1
## 7041                    protein_coding   chr1 6073733 6073770     +       1
## 7042                    protein_coding   chr1 6073733 6073770     +       1
## 7043                    protein_coding   chr1 6082195 6082274     +       1
## 7044                    protein_coding   chr1 6082195 6082274     +       1
## 7045                    protein_coding   chr1 6085204 6085248     +       1
## 7046                    protein_coding   chr1 6085204 6085248     +       1
## 7047                    protein_coding   chr1 6087467 6087511     +       1
## 7048                    protein_coding   chr1 6087467 6087511     +       1
## 7049                    protein_coding   chr1 6089008 6089051     +       1
## 7050                    protein_coding   chr1 6089008 6089051     +       1
## 7051                    protein_coding   chr1 6090389 6090475     +       1
## 7052                    protein_coding   chr1 6090389 6090475     +       1
## 7053                    protein_coding   chr1 6094400 6094485     +       1
## 7054                    protein_coding   chr1 6094400 6094485     +       1
## 7055                    protein_coding   chr1 6095323 6095443     +       1
## 7056                    protein_coding   chr1 6095323 6095443     +       1
## 7057                    protein_coding   chr1 6095530 6095624     +       1
## 7058                    protein_coding   chr1 6095530 6095624     +       1
## 7059                    protein_coding   chr1 6096636 6096756     +       1
## 7060                    protein_coding   chr1 6096636 6096756     +       1
## 7061                    protein_coding   chr1 6097269 6097357     +       1
## 7062                    protein_coding   chr1 6097269 6097357     +       1
## 7063                    protein_coding   chr1 6097517 6097555     +       1
```

```
## 7064                protein_coding      chr1 6097517 6097528        +        1
## 7065                protein_coding      chr1 6097529 6097531        +        1
## 7066                protein_coding      chr1 6098485 6101178        +        1
## 7067                protein_coding      chr1 5992711 5992788        +        1
## 7068                protein_coding      chr1 6040517 6040568        +        1
## 7069                protein_coding      chr1 6097529 6097555        +        1
## 7070                protein_coding      chr1 6098485 6101178        +        1
## 7071                protein_coding      chr1 5992753 6101190        +        1
## 7072                protein_coding      chr1 5992753 5992788        +        1
## 7073                protein_coding      chr1 6040517 6040645        +        1
## 7074                protein_coding      chr1 6040569 6040645        +        1
## 7075                protein_coding      chr1 6040569 6040571        +        1
## 7076                protein_coding      chr1 6041831 6041872        +        1
## 7077                protein_coding      chr1 6041831 6041872        +        1
## 7078                protein_coding      chr1 6072755 6072798        +        1
## 7079                protein_coding      chr1 6072755 6072798        +        1
## 7080                protein_coding      chr1 6073733 6073770        +        1
## 7081                protein_coding      chr1 6073733 6073770        +        1
## 7082                protein_coding      chr1 6082195 6082274        +        1
## 7083                protein_coding      chr1 6082195 6082274        +        1
## 7084                protein_coding      chr1 6085204 6085248        +        1
## 7085                protein_coding      chr1 6085204 6085248        +        1
## 7086                protein_coding      chr1 6087467 6087511        +        1
## 7087                protein_coding      chr1 6087467 6087511        +        1
## 7088                protein_coding      chr1 6089008 6089051        +        1
## 7089                protein_coding      chr1 6089008 6089051        +        1
## 7090                protein_coding      chr1 6090389 6090475        +        1
## 7091                protein_coding      chr1 6090389 6090475        +        1
## 7092                protein_coding      chr1 6091263 6091307        +        1
## 7093                protein_coding      chr1 6091263 6091307        +        1
## 7094                protein_coding      chr1 6094400 6094485        +        1
## 7095                protein_coding      chr1 6094400 6094485        +        1
## 7096                protein_coding      chr1 6095323 6095443        +        1
## 7097                protein_coding      chr1 6095323 6095443        +        1
## 7098                protein_coding      chr1 6095530 6095624        +        1
## 7099                protein_coding      chr1 6095530 6095624        +        1
## 7100                protein_coding      chr1 6096636 6096756        +        1
## 7101                protein_coding      chr1 6096636 6096756        +        1
## 7102                protein_coding      chr1 6097269 6097357        +        1
## 7103                protein_coding      chr1 6097269 6097357        +        1
## 7104                protein_coding      chr1 6098485 6101190        +        1
## 7105                protein_coding      chr1 6098485 6098571        +        1
## 7106                protein_coding      chr1 6098572 6098574        +        1
## 7107                protein_coding      chr1 5992753 5992788        +        1
## 7108                protein_coding      chr1 6040517 6040568        +        1
## 7109                protein_coding      chr1 6098572 6101190        +        1
## 7110                protein_coding      chr1 5992760 6086371        +        1
## 7111                protein_coding      chr1 5992760 5992788        +        1
## 7112                protein_coding      chr1 6040517 6040645        +        1
## 7113                protein_coding      chr1 6040569 6040645        +        1
## 7114                protein_coding      chr1 6040569 6040571        +        1
## 7115                protein_coding      chr1 6072755 6072798        +        1
## 7116                protein_coding      chr1 6072755 6072798        +        1
## 7117                protein_coding      chr1 6073733 6073770        +        1
```

```
## 7118                    protein_coding     chr1 6073733 6073770      +       1
## 7119                    protein_coding     chr1 6082195 6082274      +       1
## 7120                    protein_coding     chr1 6082195 6082274      +       1
## 7121                    protein_coding     chr1 6085204 6085248      +       1
## 7122                    protein_coding     chr1 6085204 6085248      +       1
## 7123                    protein_coding     chr1 6085740 6086371      +       1
## 7124                    protein_coding     chr1 6085740 6086046      +       1
## 7125                    protein_coding     chr1 6086047 6086049      +       1
## 7126                    protein_coding     chr1 5992760 5992788      +       1
## 7127                    protein_coding     chr1 6040517 6040568      +       1
## 7128                    protein_coding     chr1 6086047 6086371      +       1
## 7129                    protein_coding     chr1 6026013 6099119      +       1
## 7130                    protein_coding     chr1 6026013 6026445      +       1
## 7131                    protein_coding     chr1 6040517 6040645      +       1
## 7132                    protein_coding     chr1 6040569 6040645      +       1
## 7133                    protein_coding     chr1 6040569 6040571      +       1
## 7134                    protein_coding     chr1 6041831 6041872      +       1
## 7135                    protein_coding     chr1 6041831 6041872      +       1
## 7136                    protein_coding     chr1 6072755 6072798      +       1
## 7137                    protein_coding     chr1 6072755 6072798      +       1
## 7138                    protein_coding     chr1 6073733 6073770      +       1
## 7139                    protein_coding     chr1 6073733 6073770      +       1
## 7140                    protein_coding     chr1 6082195 6082274      +       1
## 7141                    protein_coding     chr1 6082195 6082274      +       1
## 7142                    protein_coding     chr1 6085204 6085248      +       1
## 7143                    protein_coding     chr1 6085204 6085248      +       1
## 7144                    protein_coding     chr1 6087467 6087511      +       1
## 7145                    protein_coding     chr1 6087467 6087511      +       1
## 7146                    protein_coding     chr1 6089008 6089051      +       1
## 7147                    protein_coding     chr1 6089008 6089051      +       1
## 7148                    protein_coding     chr1 6090389 6090475      +       1
## 7149                    protein_coding     chr1 6090389 6090475      +       1
## 7150                    protein_coding     chr1 6094400 6094485      +       1
## 7151                    protein_coding     chr1 6094400 6094485      +       1
## 7152                    protein_coding     chr1 6095323 6095443      +       1
## 7153                    protein_coding     chr1 6095323 6095443      +       1
## 7154                    protein_coding     chr1 6095530 6095624      +       1
## 7155                    protein_coding     chr1 6095530 6095624      +       1
## 7156                    protein_coding     chr1 6096636 6096756      +       1
## 7157                    protein_coding     chr1 6096636 6096756      +       1
## 7158                    protein_coding     chr1 6097269 6097357      +       1
## 7159                    protein_coding     chr1 6097269 6097357      +       1
## 7160                    protein_coding     chr1 6098485 6099119      +       1
## 7161                    protein_coding     chr1 6098485 6098571      +       1
## 7162                    protein_coding     chr1 6098572 6098574      +       1
## 7163                    protein_coding     chr1 6026013 6026445      +       1
## 7164                    protein_coding     chr1 6040517 6040568      +       1
## 7165                    protein_coding     chr1 6098572 6099119      +       1
## 7166                    protein_coding     chr1 6026163 6101178      +       1
## 7167                    protein_coding     chr1 6026163 6026445      +       1
## 7168                    protein_coding     chr1 6040517 6040645      +       1
## 7169                    protein_coding     chr1 6040569 6040645      +       1
## 7170                    protein_coding     chr1 6040569 6040571      +       1
## 7171                    protein_coding     chr1 6072755 6072798      +       1
```

```
## 7172                protein_coding     chr1 6072755 6072798        +        1
## 7173                protein_coding     chr1 6073733 6073770        +        1
## 7174                protein_coding     chr1 6073733 6073770        +        1
## 7175                protein_coding     chr1 6082195 6082274        +        1
## 7176                protein_coding     chr1 6082195 6082274        +        1
## 7177                protein_coding     chr1 6085204 6085248        +        1
## 7178                protein_coding     chr1 6085204 6085248        +        1
## 7179                protein_coding     chr1 6087467 6087511        +        1
## 7180                protein_coding     chr1 6087467 6087511        +        1
## 7181                protein_coding     chr1 6089008 6089051        +        1
## 7182                protein_coding     chr1 6089008 6089051        +        1
## 7183                protein_coding     chr1 6090389 6090475        +        1
## 7184                protein_coding     chr1 6090389 6090475        +        1
## 7185                protein_coding     chr1 6094400 6094485        +        1
## 7186                protein_coding     chr1 6094400 6094485        +        1
## 7187                protein_coding     chr1 6095323 6095443        +        1
## 7188                protein_coding     chr1 6095323 6095443        +        1
## 7189                protein_coding     chr1 6095530 6095624        +        1
## 7190                protein_coding     chr1 6095530 6095624        +        1
## 7191                protein_coding     chr1 6096636 6096756        +        1
## 7192                protein_coding     chr1 6096636 6096756        +        1
## 7193                protein_coding     chr1 6097269 6097357        +        1
## 7194                protein_coding     chr1 6097269 6097357        +        1
## 7195                protein_coding     chr1 6098485 6101178        +        1
## 7196                protein_coding     chr1 6098485 6098571        +        1
## 7197                protein_coding     chr1 6098572 6098574        +        1
## 7198                protein_coding     chr1 6026163 6026445        +        1
## 7199                protein_coding     chr1 6040517 6040568        +        1
## 7200                protein_coding     chr1 6098572 6101178        +        1
## 7201                protein_coding     chr1 6026272 6086366        +        1
## 7202                protein_coding     chr1 6026272 6026445        +        1
## 7203                protein_coding     chr1 6040517 6040645        +        1
## 7204                protein_coding     chr1 6040569 6040645        +        1
## 7205                protein_coding     chr1 6040569 6040571        +        1
## 7206                protein_coding     chr1 6072755 6072798        +        1
## 7207                protein_coding     chr1 6072755 6072798        +        1
## 7208                protein_coding     chr1 6073733 6073770        +        1
## 7209                protein_coding     chr1 6073733 6073770        +        1
## 7210                protein_coding     chr1 6082195 6082274        +        1
## 7211                protein_coding     chr1 6082195 6082274        +        1
## 7212                protein_coding     chr1 6085204 6085248        +        1
## 7213                protein_coding     chr1 6085204 6085248        +        1
## 7214                protein_coding     chr1 6086158 6086366        +        1
## 7215                protein_coding     chr1 6086158 6086311        +        1
## 7216                protein_coding     chr1 6086312 6086314        +        1
## 7217                protein_coding     chr1 6026272 6026445        +        1
## 7218                protein_coding     chr1 6040517 6040568        +        1
## 7219                protein_coding     chr1 6086312 6086366        +        1
## 7220                protein_coding     chr1 6026294 6086363        +        1
## 7221                protein_coding     chr1 6026294 6026445        +        1
## 7222                protein_coding     chr1 6040517 6040645        +        1
## 7223                protein_coding     chr1 6040569 6040645        +        1
## 7224                protein_coding     chr1 6040569 6040571        +        1
## 7225                protein_coding     chr1 6041831 6041872        +        1
```

```
## 7226              protein_coding    chr1 6041831 6041872    +    1
## 7227              protein_coding    chr1 6072755 6072798    +    1
## 7228              protein_coding    chr1 6072755 6072798    +    1
## 7229              protein_coding    chr1 6073733 6073770    +    1
## 7230              protein_coding    chr1 6073733 6073770    +    1
## 7231              protein_coding    chr1 6082195 6082274    +    1
## 7232              protein_coding    chr1 6082195 6082274    +    1
## 7233              protein_coding    chr1 6085204 6085248    +    1
## 7234              protein_coding    chr1 6085204 6085248    +    1
## 7235              protein_coding    chr1 6086158 6086363    +    1
## 7236              protein_coding    chr1 6086158 6086311    +    1
## 7237              protein_coding    chr1 6086312 6086314    +    1
## 7238              protein_coding    chr1 6026294 6026445    +    1
## 7239              protein_coding    chr1 6040517 6040568    +    1
## 7240              protein_coding    chr1 6086312 6086363    +    1
## 7241              protein_coding    chr1 6026320 6098561    +    1
## 7242              protein_coding    chr1 6026320 6026445    +    1
## 7243              protein_coding    chr1 6040517 6040645    +    1
## 7244              protein_coding    chr1 6040569 6040645    +    1
## 7245              protein_coding    chr1 6040569 6040571    +    1
## 7246              protein_coding    chr1 6041831 6041872    +    1
## 7247              protein_coding    chr1 6041831 6041872    +    1
## 7248              protein_coding    chr1 6072755 6072798    +    1
## 7249              protein_coding    chr1 6072755 6072798    +    1
## 7250              protein_coding    chr1 6073733 6073770    +    1
## 7251              protein_coding    chr1 6073733 6073770    +    1
## 7252              protein_coding    chr1 6082195 6082274    +    1
## 7253              protein_coding    chr1 6082195 6082274    +    1
## 7254              protein_coding    chr1 6085204 6085248    +    1
## 7255              protein_coding    chr1 6085204 6085248    +    1
## 7256              protein_coding    chr1 6087467 6087511    +    1
## 7257              protein_coding    chr1 6087467 6087511    +    1
## 7258              protein_coding    chr1 6089008 6089051    +    1
## 7259              protein_coding    chr1 6089008 6089051    +    1
## 7260              protein_coding    chr1 6090389 6090475    +    1
## 7261              protein_coding    chr1 6090389 6090475    +    1
## 7262              protein_coding    chr1 6094400 6094485    +    1
## 7263              protein_coding    chr1 6094400 6094485    +    1
## 7264              protein_coding    chr1 6095323 6095443    +    1
## 7265              protein_coding    chr1 6095323 6095443    +    1
## 7266              protein_coding    chr1 6095530 6095624    +    1
## 7267              protein_coding    chr1 6095530 6095624    +    1
## 7268              protein_coding    chr1 6096636 6096756    +    1
## 7269              protein_coding    chr1 6096636 6096756    +    1
## 7270              protein_coding    chr1 6097269 6098561    +    1
## 7271              protein_coding    chr1 6097269 6097528    +    1
## 7272              protein_coding    chr1 6097529 6097531    +    1
## 7273              protein_coding    chr1 6026320 6026445    +    1
## 7274              protein_coding    chr1 6040517 6040568    +    1
## 7275              protein_coding    chr1 6097529 6098561    +    1
## 7276              protein_coding    chr1 6026345 6086363    +    1
## 7277              protein_coding    chr1 6026345 6026445    +    1
## 7278              protein_coding    chr1 6040517 6040645    +    1
## 7279              protein_coding    chr1 6040569 6040645    +    1
```

334

```
## 7280          protein_coding     chr1 6040569 6040571     +     1
## 7281          protein_coding     chr1 6072755 6072798     +     1
## 7282          protein_coding     chr1 6072755 6072798     +     1
## 7283          protein_coding     chr1 6073733 6073770     +     1
## 7284          protein_coding     chr1 6073733 6073770     +     1
## 7285          protein_coding     chr1 6082195 6082274     +     1
## 7286          protein_coding     chr1 6082195 6082274     +     1
## 7287          protein_coding     chr1 6085204 6086363     +     1
## 7288          protein_coding     chr1 6085204 6085249     +     1
## 7289          protein_coding     chr1 6085250 6085252     +     1
## 7290          protein_coding     chr1 6026345 6026445     +     1
## 7291          protein_coding     chr1 6040517 6040568     +     1
## 7292          protein_coding     chr1 6085250 6086363     +     1
## 7293          protein_coding     chr1 6026347 6082816     +     1
## 7294          protein_coding     chr1 6026347 6026445     +     1
## 7295          protein_coding     chr1 6040517 6040645     +     1
## 7296          protein_coding     chr1 6040569 6040645     +     1
## 7297          protein_coding     chr1 6040569 6040571     +     1
## 7298          protein_coding     chr1 6072755 6072798     +     1
## 7299          protein_coding     chr1 6072755 6072798     +     1
## 7300          protein_coding     chr1 6073733 6073770     +     1
## 7301          protein_coding     chr1 6073733 6073770     +     1
## 7302          protein_coding     chr1 6082195 6082816     +     1
## 7303          protein_coding     chr1 6082195 6082407     +     1
## 7304          protein_coding     chr1 6082408 6082410     +     1
## 7305          protein_coding     chr1 6026347 6026445     +     1
## 7306          protein_coding     chr1 6040517 6040568     +     1
## 7307          protein_coding     chr1 6082408 6082816     +     1
## 7308          protein_coding     chr1 6027297 6101180     +     1
## 7309          protein_coding     chr1 6027297 6027459     +     1
## 7310          protein_coding     chr1 6040517 6040645     +     1
## 7311          protein_coding     chr1 6040569 6040645     +     1
## 7312          protein_coding     chr1 6040569 6040571     +     1
## 7313          protein_coding     chr1 6072755 6072798     +     1
## 7314          protein_coding     chr1 6072755 6072798     +     1
## 7315          protein_coding     chr1 6073733 6073770     +     1
## 7316          protein_coding     chr1 6073733 6073770     +     1
## 7317          protein_coding     chr1 6082195 6082274     +     1
## 7318          protein_coding     chr1 6082195 6082274     +     1
## 7319          protein_coding     chr1 6085204 6085248     +     1
## 7320          protein_coding     chr1 6085204 6085248     +     1
## 7321          protein_coding     chr1 6087467 6087511     +     1
## 7322          protein_coding     chr1 6087467 6087511     +     1
## 7323          protein_coding     chr1 6089008 6089051     +     1
## 7324          protein_coding     chr1 6089008 6089051     +     1
## 7325          protein_coding     chr1 6090389 6090475     +     1
## 7326          protein_coding     chr1 6090389 6090475     +     1
## 7327          protein_coding     chr1 6094400 6094485     +     1
## 7328          protein_coding     chr1 6094400 6094485     +     1
## 7329          protein_coding     chr1 6095323 6095443     +     1
## 7330          protein_coding     chr1 6095323 6095443     +     1
## 7331          protein_coding     chr1 6095530 6095624     +     1
## 7332          protein_coding     chr1 6095530 6095624     +     1
## 7333          protein_coding     chr1 6096636 6096756     +     1
```

```
## 7334                    protein_coding      chr1 6096636 6096756      +       1
## 7335                    protein_coding      chr1 6097269 6097357      +       1
## 7336                    protein_coding      chr1 6097269 6097357      +       1
## 7337                    protein_coding      chr1 6098485 6101180      +       1
## 7338                    protein_coding      chr1 6098485 6098571      +       1
## 7339                    protein_coding      chr1 6098572 6098574      +       1
## 7340                    protein_coding      chr1 6027297 6027459      +       1
## 7341                    protein_coding      chr1 6040517 6040568      +       1
## 7342                    protein_coding      chr1 6098572 6101180      +       1
## 7343                    protein_coding      chr1 6034283 6101179      +       1
## 7344                    protein_coding      chr1 6034283 6034794      +       1
## 7345                    protein_coding      chr1 6040517 6040645      +       1
## 7346                    protein_coding      chr1 6040569 6040645      +       1
## 7347                    protein_coding      chr1 6040569 6040571      +       1
## 7348                    protein_coding      chr1 6041831 6041872      +       1
## 7349                    protein_coding      chr1 6041831 6041872      +       1
## 7350                    protein_coding      chr1 6072755 6072798      +       1
## 7351                    protein_coding      chr1 6072755 6072798      +       1
## 7352                    protein_coding      chr1 6073733 6073770      +       1
## 7353                    protein_coding      chr1 6073733 6073770      +       1
## 7354                    protein_coding      chr1 6082195 6082274      +       1
## 7355                    protein_coding      chr1 6082195 6082274      +       1
## 7356                    protein_coding      chr1 6085204 6085248      +       1
## 7357                    protein_coding      chr1 6085204 6085248      +       1
## 7358                    protein_coding      chr1 6087467 6087511      +       1
## 7359                    protein_coding      chr1 6087467 6087511      +       1
## 7360                    protein_coding      chr1 6089008 6089051      +       1
## 7361                    protein_coding      chr1 6089008 6089051      +       1
## 7362                    protein_coding      chr1 6090389 6090475      +       1
## 7363                    protein_coding      chr1 6090389 6090475      +       1
## 7364                    protein_coding      chr1 6094400 6094485      +       1
## 7365                    protein_coding      chr1 6094400 6094485      +       1
## 7366                    protein_coding      chr1 6095323 6095443      +       1
## 7367                    protein_coding      chr1 6095323 6095443      +       1
## 7368                    protein_coding      chr1 6095530 6095624      +       1
## 7369                    protein_coding      chr1 6095530 6095624      +       1
## 7370                    protein_coding      chr1 6096636 6096756      +       1
## 7371                    protein_coding      chr1 6096636 6096756      +       1
## 7372                    protein_coding      chr1 6097269 6097357      +       1
## 7373                    protein_coding      chr1 6097269 6097357      +       1
## 7374                    protein_coding      chr1 6098485 6101179      +       1
## 7375                    protein_coding      chr1 6098485 6098571      +       1
## 7376                    protein_coding      chr1 6098572 6098574      +       1
## 7377                    protein_coding      chr1 6034283 6034794      +       1
## 7378                    protein_coding      chr1 6040517 6040568      +       1
## 7379                    protein_coding      chr1 6098572 6101179      +       1
## 7380                    protein_coding      chr1 6034677 6098213      +       1
## 7381                    protein_coding      chr1 6034677 6034963      +       1
## 7382                    protein_coding      chr1 6040517 6040645      +       1
## 7383                    protein_coding      chr1 6040569 6040645      +       1
## 7384                    protein_coding      chr1 6040569 6040571      +       1
## 7385                    protein_coding      chr1 6041831 6041872      +       1
## 7386                    protein_coding      chr1 6041831 6041872      +       1
## 7387                    protein_coding      chr1 6072755 6072798      +       1
```

```
## 7388                       protein_coding   chr1 6072755 6072798      +      1
## 7389                       protein_coding   chr1 6073733 6073770      +      1
## 7390                       protein_coding   chr1 6073733 6073770      +      1
## 7391                       protein_coding   chr1 6082195 6082274      +      1
## 7392                       protein_coding   chr1 6082195 6082274      +      1
## 7393                       protein_coding   chr1 6085204 6085248      +      1
## 7394                       protein_coding   chr1 6085204 6085248      +      1
## 7395                       protein_coding   chr1 6087467 6087511      +      1
## 7396                       protein_coding   chr1 6087467 6087511      +      1
## 7397                       protein_coding   chr1 6089008 6089051      +      1
## 7398                       protein_coding   chr1 6089008 6089051      +      1
## 7399                       protein_coding   chr1 6090389 6090475      +      1
## 7400                       protein_coding   chr1 6090389 6090475      +      1
## 7401                       protein_coding   chr1 6094400 6094485      +      1
## 7402                       protein_coding   chr1 6094400 6094485      +      1
## 7403                       protein_coding   chr1 6095323 6095443      +      1
## 7404                       protein_coding   chr1 6095323 6095443      +      1
## 7405                       protein_coding   chr1 6095530 6095624      +      1
## 7406                       protein_coding   chr1 6095530 6095624      +      1
## 7407                       protein_coding   chr1 6096636 6096756      +      1
## 7408                       protein_coding   chr1 6096636 6096756      +      1
## 7409                       protein_coding   chr1 6097269 6098213      +      1
## 7410                       protein_coding   chr1 6097269 6097528      +      1
## 7411                       protein_coding   chr1 6097529 6097531      +      1
## 7412                       protein_coding   chr1 6034677 6034963      +      1
## 7413                       protein_coding   chr1 6040517 6040568      +      1
## 7414                       protein_coding   chr1 6097529 6098213      +      1
## 7415                       protein_coding   chr1 6034980 6098723      +      1
## 7416                       protein_coding   chr1 6034980 6035172      +      1
## 7417                       protein_coding   chr1 6040517 6040645      +      1
## 7418                       protein_coding   chr1 6040569 6040645      +      1
## 7419                       protein_coding   chr1 6040569 6040571      +      1
## 7420                       protein_coding   chr1 6041831 6041872      +      1
## 7421                       protein_coding   chr1 6041831 6041872      +      1
## 7422                       protein_coding   chr1 6072755 6072798      +      1
## 7423                       protein_coding   chr1 6072755 6072798      +      1
## 7424                       protein_coding   chr1 6073733 6073770      +      1
## 7425                       protein_coding   chr1 6073733 6073770      +      1
## 7426                       protein_coding   chr1 6082195 6082274      +      1
## 7427                       protein_coding   chr1 6082195 6082274      +      1
## 7428                       protein_coding   chr1 6085204 6085248      +      1
## 7429                       protein_coding   chr1 6085204 6085248      +      1
## 7430                       protein_coding   chr1 6087467 6087511      +      1
## 7431                       protein_coding   chr1 6087467 6087511      +      1
## 7432                       protein_coding   chr1 6089008 6089051      +      1
## 7433                       protein_coding   chr1 6089008 6089051      +      1
## 7434                       protein_coding   chr1 6090389 6090475      +      1
## 7435                       protein_coding   chr1 6090389 6090475      +      1
## 7436                       protein_coding   chr1 6094400 6094485      +      1
## 7437                       protein_coding   chr1 6094400 6094485      +      1
## 7438                       protein_coding   chr1 6095323 6095443      +      1
## 7439                       protein_coding   chr1 6095323 6095443      +      1
## 7440                       protein_coding   chr1 6095530 6095624      +      1
## 7441                       protein_coding   chr1 6095530 6095624      +      1
```

```
## 7442             protein_coding     chr1 6096636 6096756        +       1
## 7443             protein_coding     chr1 6096636 6096756        +       1
## 7444             protein_coding     chr1 6097269 6097357        +       1
## 7445             protein_coding     chr1 6097269 6097357        +       1
## 7446             protein_coding     chr1 6098485 6098723        +       1
## 7447             protein_coding     chr1 6098485 6098571        +       1
## 7448             protein_coding     chr1 6098572 6098574        +       1
## 7449             protein_coding     chr1 6034980 6035172        +       1
## 7450             protein_coding     chr1 6040517 6040568        +       1
## 7451             protein_coding     chr1 6098572 6098723        +       1
## 7452             protein_coding     chr1 6035090 6086362        +       1
## 7453             protein_coding     chr1 6035090 6035172        +       1
## 7454             protein_coding     chr1 6040517 6040645        +       1
## 7455             protein_coding     chr1 6040569 6040645        +       1
## 7456             protein_coding     chr1 6040569 6040571        +       1
## 7457             protein_coding     chr1 6041831 6041872        +       1
## 7458             protein_coding     chr1 6041831 6041872        +       1
## 7459             protein_coding     chr1 6072755 6072798        +       1
## 7460             protein_coding     chr1 6072755 6072798        +       1
## 7461             protein_coding     chr1 6073733 6073770        +       1
## 7462             protein_coding     chr1 6073733 6073770        +       1
## 7463             protein_coding     chr1 6082195 6082274        +       1
## 7464             protein_coding     chr1 6082195 6082274        +       1
## 7465             protein_coding     chr1 6085204 6085248        +       1
## 7466             protein_coding     chr1 6085204 6085248        +       1
## 7467             protein_coding     chr1 6085740 6085793        +       1
## 7468             protein_coding     chr1 6085740 6085793        +       1
## 7469             protein_coding     chr1 6086158 6086362        +       1
## 7470             protein_coding     chr1 6086158 6086311        +       1
## 7471             protein_coding     chr1 6086312 6086314        +       1
## 7472             protein_coding     chr1 6035090 6035172        +       1
## 7473             protein_coding     chr1 6040517 6040568        +       1
## 7474             protein_coding     chr1 6086312 6086362        +       1
## 7475             protein_coding     chr1 6045921 6101179        +       1
## 7476             protein_coding     chr1 6045921 6046183        +       1
## 7477             protein_coding     chr1 6051511 6051754        +       1
## 7478             protein_coding     chr1 6051537 6051754        +       1
## 7479             protein_coding     chr1 6051537 6051539        +       1
## 7480             protein_coding     chr1 6072755 6072798        +       1
## 7481             protein_coding     chr1 6072755 6072798        +       1
## 7482             protein_coding     chr1 6073733 6073770        +       1
## 7483             protein_coding     chr1 6073733 6073770        +       1
## 7484             protein_coding     chr1 6082195 6082274        +       1
## 7485             protein_coding     chr1 6082195 6082274        +       1
## 7486             protein_coding     chr1 6085204 6085248        +       1
## 7487             protein_coding     chr1 6085204 6085248        +       1
## 7488             protein_coding     chr1 6087467 6087511        +       1
## 7489             protein_coding     chr1 6087467 6087511        +       1
## 7490             protein_coding     chr1 6089008 6089051        +       1
## 7491             protein_coding     chr1 6089008 6089051        +       1
## 7492             protein_coding     chr1 6090389 6090475        +       1
## 7493             protein_coding     chr1 6090389 6090475        +       1
## 7494             protein_coding     chr1 6091263 6091307        +       1
## 7495             protein_coding     chr1 6091263 6091307        +       1
```

```
## 7496                     protein_coding      chr1 6094400 6094485      +      1
## 7497                     protein_coding      chr1 6094400 6094485      +      1
## 7498                     protein_coding      chr1 6095323 6095443      +      1
## 7499                     protein_coding      chr1 6095323 6095443      +      1
## 7500                     protein_coding      chr1 6095530 6095624      +      1
## 7501                     protein_coding      chr1 6095530 6095624      +      1
## 7502                     protein_coding      chr1 6096636 6096756      +      1
## 7503                     protein_coding      chr1 6096636 6096756      +      1
## 7504                     protein_coding      chr1 6097269 6097357      +      1
## 7505                     protein_coding      chr1 6097269 6097357      +      1
## 7506                     protein_coding      chr1 6098485 6101179      +      1
## 7507                     protein_coding      chr1 6098485 6098571      +      1
## 7508                     protein_coding      chr1 6098572 6098574      +      1
## 7509                     protein_coding      chr1 6045921 6046183      +      1
## 7510                     protein_coding      chr1 6051511 6051536      +      1
## 7511                     protein_coding      chr1 6098572 6101179      +      1
## 7512                     protein_coding      chr1 6046114 6098855      +      1
## 7513                     protein_coding      chr1 6046114 6046183      +      1
## 7514                     protein_coding      chr1 6072755 6072798      +      1
## 7515                     protein_coding      chr1 6073733 6073770      +      1
## 7516                     protein_coding      chr1 6082195 6082274      +      1
## 7517                     protein_coding      chr1 6082195 6082274      +      1
## 7518                     protein_coding      chr1 6082195 6082197      +      1
## 7519                     protein_coding      chr1 6085204 6085248      +      1
## 7520                     protein_coding      chr1 6085204 6085248      +      1
## 7521                     protein_coding      chr1 6087467 6087511      +      1
## 7522                     protein_coding      chr1 6087467 6087511      +      1
## 7523                     protein_coding      chr1 6089008 6089051      +      1
## 7524                     protein_coding      chr1 6089008 6089051      +      1
## 7525                     protein_coding      chr1 6090389 6090475      +      1
## 7526                     protein_coding      chr1 6090389 6090475      +      1
## 7527                     protein_coding      chr1 6094400 6094485      +      1
## 7528                     protein_coding      chr1 6094400 6094485      +      1
## 7529                     protein_coding      chr1 6095323 6095443      +      1
## 7530                     protein_coding      chr1 6095323 6095443      +      1
## 7531                     protein_coding      chr1 6095530 6095624      +      1
## 7532                     protein_coding      chr1 6095530 6095624      +      1
## 7533                     protein_coding      chr1 6096636 6096756      +      1
## 7534                     protein_coding      chr1 6096636 6096756      +      1
## 7535                     protein_coding      chr1 6097269 6097357      +      1
## 7536                     protein_coding      chr1 6097269 6097357      +      1
## 7537                     protein_coding      chr1 6098485 6098855      +      1
## 7538                     protein_coding      chr1 6098485 6098571      +      1
## 7539                     protein_coding      chr1 6098572 6098574      +      1
## 7540                     protein_coding      chr1 6046114 6046183      +      1
## 7541                     protein_coding      chr1 6072755 6072798      +      1
## 7542                     protein_coding      chr1 6073733 6073770      +      1
## 7543                     protein_coding      chr1 6098572 6098855      +      1
## 7544                     protein_coding      chr1 6065753 6100023      +      1
## 7545                     protein_coding      chr1 6065753 6066276      +      1
## 7546                     protein_coding      chr1 6066065 6066276      +      1
## 7547                     protein_coding      chr1 6066065 6066067      +      1
## 7548                     protein_coding      chr1 6072755 6072798      +      1
## 7549                     protein_coding      chr1 6072755 6072798      +      1
```

```
## 7550                    protein_coding       chr1 6073733 6073770       +        1
## 7551                    protein_coding       chr1 6073733 6073770       +        1
## 7552                    protein_coding       chr1 6082195 6082274       +        1
## 7553                    protein_coding       chr1 6082195 6082274       +        1
## 7554                    protein_coding       chr1 6085204 6085248       +        1
## 7555                    protein_coding       chr1 6085204 6085248       +        1
## 7556                    protein_coding       chr1 6087467 6087511       +        1
## 7557                    protein_coding       chr1 6087467 6087511       +        1
## 7558                    protein_coding       chr1 6089008 6089051       +        1
## 7559                    protein_coding       chr1 6089008 6089051       +        1
## 7560                    protein_coding       chr1 6090389 6090475       +        1
## 7561                    protein_coding       chr1 6090389 6090475       +        1
## 7562                    protein_coding       chr1 6094400 6094485       +        1
## 7563                    protein_coding       chr1 6094400 6094485       +        1
## 7564                    protein_coding       chr1 6095323 6095443       +        1
## 7565                    protein_coding       chr1 6095323 6095443       +        1
## 7566                    protein_coding       chr1 6095530 6095624       +        1
## 7567                    protein_coding       chr1 6095530 6095624       +        1
## 7568                    protein_coding       chr1 6096636 6096756       +        1
## 7569                    protein_coding       chr1 6096636 6096756       +        1
## 7570                    protein_coding       chr1 6097269 6097357       +        1
## 7571                    protein_coding       chr1 6097269 6097357       +        1
## 7572                    protein_coding       chr1 6098485 6100023       +        1
## 7573                    protein_coding       chr1 6098485 6098571       +        1
## 7574                    protein_coding       chr1 6098572 6098574       +        1
## 7575                    protein_coding       chr1 6065753 6066064       +        1
## 7576                    protein_coding       chr1 6098572 6100023       +        1
## 7577                    protein_coding       chr1 6101787 6180321       -        1
## 7578                    protein_coding       chr1 6101787 6180321       -        1
## 7579                    protein_coding       chr1 6179945 6180321       -        1
## 7580                    protein_coding       chr1 6179945 6180023       -        1
## 7581                    protein_coding       chr1 6180021 6180023       -        1
## 7582                    protein_coding       chr1 6168150 6168277       -        1
## 7583                    protein_coding       chr1 6168150 6168277       -        1
## 7584                    protein_coding       chr1 6159336 6159515       -        1
## 7585                    protein_coding       chr1 6159336 6159515       -        1
## 7586                    protein_coding       chr1 6155599 6155717       -        1
## 7587                    protein_coding       chr1 6155599 6155717       -        1
## 7588                    protein_coding       chr1 6154660 6154898       -        1
## 7589                    protein_coding       chr1 6154660 6154898       -        1
## 7590                    protein_coding       chr1 6152412 6152536       -        1
## 7591                    protein_coding       chr1 6152412 6152536       -        1
## 7592                    protein_coding       chr1 6151032 6151155       -        1
## 7593                    protein_coding       chr1 6151032 6151155       -        1
## 7594                    protein_coding       chr1 6149246 6149412       -        1
## 7595                    protein_coding       chr1 6149246 6149412       -        1
## 7596                    protein_coding       chr1 6148854 6149075       -        1
## 7597                    protein_coding       chr1 6148854 6149075       -        1
## 7598                    protein_coding       chr1 6146665 6146871       -        1
## 7599                    protein_coding       chr1 6146665 6146871       -        1
## 7600                    protein_coding       chr1 6146212 6146423       -        1
## 7601                    protein_coding       chr1 6146212 6146423       -        1
## 7602                    protein_coding       chr1 6144024 6144155       -        1
## 7603                    protein_coding       chr1 6144024 6144155       -        1
```

```
## 7604                        protein_coding     chr1 6143823 6143931        -        1
## 7605                        protein_coding     chr1 6143823 6143931        -        1
## 7606                        protein_coding     chr1 6142414 6142605        -        1
## 7607                        protein_coding     chr1 6142414 6142605        -        1
## 7608                        protein_coding     chr1 6142128 6142328        -        1
## 7609                        protein_coding     chr1 6142128 6142328        -        1
## 7610                        protein_coding     chr1 6136728 6136865        -        1
## 7611                        protein_coding     chr1 6136728 6136865        -        1
## 7612                        protein_coding     chr1 6136517 6136638        -        1
## 7613                        protein_coding     chr1 6136517 6136638        -        1
## 7614                        protein_coding     chr1 6135230 6135403        -        1
## 7615                        protein_coding     chr1 6135230 6135403        -        1
## 7616                        protein_coding     chr1 6134718 6134859        -        1
## 7617                        protein_coding     chr1 6134718 6134859        -        1
## 7618                        protein_coding     chr1 6134128 6134259        -        1
## 7619                        protein_coding     chr1 6134128 6134259        -        1
## 7620                        protein_coding     chr1 6131631 6131748        -        1
## 7621                        protein_coding     chr1 6131631 6131748        -        1
## 7622                        protein_coding     chr1 6130204 6130328        -        1
## 7623                        protein_coding     chr1 6130204 6130328        -        1
## 7624                        protein_coding     chr1 6128838 6129069        -        1
## 7625                        protein_coding     chr1 6128838 6129069        -        1
## 7626                        protein_coding     chr1 6128499 6128609        -        1
## 7627                        protein_coding     chr1 6128499 6128609        -        1
## 7628                        protein_coding     chr1 6128046 6128218        -        1
## 7629                        protein_coding     chr1 6128046 6128218        -        1
## 7630                        protein_coding     chr1 6126572 6126746        -        1
## 7631                        protein_coding     chr1 6126572 6126746        -        1
## 7632                        protein_coding     chr1 6125766 6125858        -        1
## 7633                        protein_coding     chr1 6125766 6125858        -        1
## 7634                        protein_coding     chr1 6125524 6125612        -        1
## 7635                        protein_coding     chr1 6125524 6125612        -        1
## 7636                        protein_coding     chr1 6125100 6125233        -        1
## 7637                        protein_coding     chr1 6125100 6125233        -        1
## 7638                        protein_coding     chr1 6124517 6124661        -        1
## 7639                        protein_coding     chr1 6124517 6124661        -        1
## 7640                        protein_coding     chr1 6123948 6124107        -        1
## 7641                        protein_coding     chr1 6123948 6124107        -        1
## 7642                        protein_coding     chr1 6121494 6121573        -        1
## 7643                        protein_coding     chr1 6121494 6121573        -        1
## 7644                        protein_coding     chr1 6121105 6121237        -        1
## 7645                        protein_coding     chr1 6121105 6121237        -        1
## 7646                        protein_coding     chr1 6112909 6112998        -        1
## 7647                        protein_coding     chr1 6112909 6112998        -        1
## 7648                        protein_coding     chr1 6112140 6112277        -        1
## 7649                        protein_coding     chr1 6112140 6112277        -        1
## 7650                        protein_coding     chr1 6111775 6111883        -        1
## 7651                        protein_coding     chr1 6111775 6111883        -        1
## 7652                        protein_coding     chr1 6110394 6110526        -        1
## 7653                        protein_coding     chr1 6110394 6110526        -        1
## 7654                        protein_coding     chr1 6109795 6109990        -        1
## 7655                        protein_coding     chr1 6109795 6109990        -        1
## 7656                        protein_coding     chr1 6106616 6106779        -        1
## 7657                        protein_coding     chr1 6106616 6106779        -        1
```

```
## 7658                  protein_coding   chr1 6106395 6106509    -    1
## 7659                  protein_coding   chr1 6106395 6106509    -    1
## 7660                  protein_coding   chr1 6106234 6106287    -    1
## 7661                  protein_coding   chr1 6106283 6106287    -    1
## 7662                  protein_coding   chr1 6106280 6106282    -    1
## 7663                  protein_coding   chr1 6101787 6105427    -    1
## 7664                  protein_coding   chr1 6180024 6180321    -    1
## 7665                  protein_coding   chr1 6106234 6106282    -    1
## 7666                  protein_coding   chr1 6101787 6105427    -    1
## 7667                  protein_coding   chr1 6159430 6197757    -    0
## 7668                  protein_coding   chr1 6159430 6197757    -    0
## 7669                  protein_coding   chr1 6197652 6197757    -    0
## 7670                  protein_coding   chr1 6197652 6197669    -    0
## 7671                  protein_coding   chr1 6197667 6197669    -    0
## 7672                  protein_coding   chr1 6192930 6193054    -    0
## 7673                  protein_coding   chr1 6192930 6193054    -    0
## 7674                  protein_coding   chr1 6181269 6181486    -    0
## 7675                  protein_coding   chr1 6181471 6181486    -    0
## 7676                  protein_coding   chr1 6181468 6181470    -    0
## 7677                  protein_coding   chr1 6168150 6168277    -    0
## 7678                  protein_coding   chr1 6159430 6159515    -    0
## 7679                  protein_coding   chr1 6197670 6197757    -    0
## 7680                  protein_coding   chr1 6181269 6181470    -    0
## 7681                  protein_coding   chr1 6168150 6168277    -    0
## 7682                  protein_coding   chr1 6159430 6159515    -    0
## 7683                  protein_coding   chr1 6185020 6209389    -    1
## 7684                  protein_coding   chr1 6185020 6199595    -    1
## 7685                  protein_coding   chr1 6199562 6199595    -    1
## 7686                  protein_coding   chr1 6199562 6199573    -    1
## 7687                  protein_coding   chr1 6199571 6199573    -    1
## 7688                  protein_coding   chr1 6197652 6197756    -    1
## 7689                  protein_coding   chr1 6197652 6197756    -    1
## 7690                  protein_coding   chr1 6192930 6193054    -    1
## 7691                  protein_coding   chr1 6192930 6193054    -    1
## 7692                  protein_coding   chr1 6185020 6186816    -    1
## 7693                  protein_coding   chr1 6186675 6186816    -    1
## 7694                  protein_coding   chr1 6186672 6186674    -    1
## 7695                  protein_coding   chr1 6199574 6199595    -    1
## 7696                  protein_coding   chr1 6185020 6186674    -    1
## 7697                  protein_coding   chr1 6186615 6200842    -    1
## 7698                  protein_coding   chr1 6200489 6200842    -    1
## 7699                  protein_coding   chr1 6197652 6197756    -    1
## 7700                  protein_coding   chr1 6197652 6197669    -    1
## 7701                  protein_coding   chr1 6197667 6197669    -    1
## 7702                  protein_coding   chr1 6192930 6193054    -    1
## 7703                  protein_coding   chr1 6192930 6193054    -    1
## 7704                  protein_coding   chr1 6186615 6186816    -    1
## 7705                  protein_coding   chr1 6186675 6186816    -    1
## 7706                  protein_coding   chr1 6186672 6186674    -    1
## 7707                  protein_coding   chr1 6200489 6200842    -    1
## 7708                  protein_coding   chr1 6197670 6197756    -    1
## 7709                  protein_coding   chr1 6186615 6186674    -    1
## 7710                          lncRNA   chr1 6204840 6205780    -    0
## 7711                          lncRNA   chr1 6204840 6205780    -    0
```

```
## 7712                       lncRNA chr1 6205754 6205780      -      0
## 7713                       lncRNA chr1 6205206 6205413      -      0
## 7714                       lncRNA chr1 6204840 6204982      -      0
## 7715               protein_coding chr1 6205475 6221299      +      1
## 7716               protein_coding chr1 6206119 6221299      +      1
## 7717               protein_coding chr1 6206119 6206302      +      1
## 7718               protein_coding chr1 6206536 6206726      +      1
## 7719               protein_coding chr1 6206536 6206726      +      1
## 7720               protein_coding chr1 6206536 6206538      +      1
## 7721               protein_coding chr1 6207379 6207511      +      1
## 7722               protein_coding chr1 6207379 6207511      +      1
## 7723               protein_coding chr1 6208881 6209025      +      1
## 7724               protein_coding chr1 6208881 6209025      +      1
## 7725               protein_coding chr1 6209115 6209196      +      1
## 7726               protein_coding chr1 6209115 6209196      +      1
## 7727               protein_coding chr1 6209268 6209343      +      1
## 7728               protein_coding chr1 6209268 6209343      +      1
## 7729               protein_coding chr1 6209414 6209539      +      1
## 7730               protein_coding chr1 6209414 6209539      +      1
## 7731               protein_coding chr1 6209924 6209970      +      1
## 7732               protein_coding chr1 6209924 6209970      +      1
## 7733               protein_coding chr1 6210223 6210295      +      1
## 7734               protein_coding chr1 6210223 6210295      +      1
## 7735               protein_coding chr1 6210370 6210438      +      1
## 7736               protein_coding chr1 6210370 6210438      +      1
## 7737               protein_coding chr1 6210870 6210938      +      1
## 7738               protein_coding chr1 6210870 6210938      +      1
## 7739               protein_coding chr1 6211021 6211118      +      1
## 7740               protein_coding chr1 6211021 6211118      +      1
## 7741               protein_coding chr1 6211867 6212053      +      1
## 7742               protein_coding chr1 6211867 6212053      +      1
## 7743               protein_coding chr1 6212231 6212416      +      1
## 7744               protein_coding chr1 6212231 6212416      +      1
## 7745               protein_coding chr1 6212682 6212733      +      1
## 7746               protein_coding chr1 6212682 6212733      +      1
## 7747               protein_coding chr1 6213066 6213183      +      1
## 7748               protein_coding chr1 6213066 6213183      +      1
## 7749               protein_coding chr1 6218289 6218369      +      1
## 7750               protein_coding chr1 6218289 6218369      +      1
## 7751               protein_coding chr1 6219236 6221299      +      1
## 7752               protein_coding chr1 6219236 6219404      +      1
## 7753               protein_coding chr1 6219405 6219407      +      1
## 7754               protein_coding chr1 6206119 6206302      +      1
## 7755               protein_coding chr1 6219405 6221299      +      1
## 7756               protein_coding chr1 6221193 6235972      -      1
## 7757               protein_coding chr1 6221193 6235964      -      1
## 7758               protein_coding chr1 6235717 6235964      -      1
## 7759               protein_coding chr1 6235717 6235911      -      1
## 7760               protein_coding chr1 6235909 6235911      -      1
## 7761               protein_coding chr1 6234886 6234974      -      1
## 7762               protein_coding chr1 6234886 6234974      -      1
## 7763               protein_coding chr1 6233474 6233643      -      1
## 7764               protein_coding chr1 6233474 6233643      -      1
## 7765               protein_coding chr1 6231902 6232119      -      1
```

```
## 7766                   protein_coding     chr1 6231902 6232119      -        1
## 7767                   protein_coding     chr1 6221193 6225262      -        1
## 7768                   protein_coding     chr1 6225083 6225262      -        1
## 7769                   protein_coding     chr1 6225080 6225082      -        1
## 7770                   protein_coding     chr1 6235912 6235964      -        1
## 7771                   protein_coding     chr1 6221193 6225082      -        1
## 7772                           lncRNA     chr1 6234692 6239444      +        1
## 7773                           lncRNA     chr1 6234692 6239408      +        1
## 7774                           lncRNA     chr1 6234692 6235063      +        1
## 7775                           lncRNA     chr1 6237245 6237345      +        1
## 7776                           lncRNA     chr1 6237470 6237848      +        1
## 7777                           lncRNA     chr1 6238221 6239408      +        1
## 7778                           lncRNA     chr1 6236240 6238940      +        1
## 7779                           lncRNA     chr1 6236240 6236336      +        1
## 7780                           lncRNA     chr1 6236966 6237150      +        1
## 7781                           lncRNA     chr1 6237245 6237345      +        1
## 7782                           lncRNA     chr1 6237814 6237848      +        1
## 7783                           lncRNA     chr1 6238221 6238940      +        1
## 7784                   protein_coding     chr1 6244192 6245578      +        1
## 7785                   protein_coding     chr1 6244192 6245578      +        1
## 7786                   protein_coding     chr1 6244192 6244241      +        1
## 7787                   protein_coding     chr1 6244351 6244446      +        1
## 7788                   protein_coding     chr1 6244366 6244446      +        1
## 7789                   protein_coding     chr1 6244366 6244368      +        1
## 7790                   protein_coding     chr1 6244548 6244629      +        1
## 7791                   protein_coding     chr1 6244548 6244629      +        1
## 7792                   protein_coding     chr1 6245110 6245578      +        1
## 7793                   protein_coding     chr1 6245110 6245504      +        1
## 7794                   protein_coding     chr1 6245505 6245507      +        1
## 7795                   protein_coding     chr1 6244192 6244241      +        1
## 7796                   protein_coding     chr1 6244351 6244365      +        1
## 7797                   protein_coding     chr1 6245505 6245578      +        1
## 7798                   protein_coding     chr1 6247353 6261098      -        1
## 7799                   protein_coding     chr1 6247353 6261098      -        1
## 7800                   protein_coding     chr1 6260825 6261098      -        1
## 7801                   protein_coding     chr1 6254550 6255014      -        1
## 7802                   protein_coding     chr1 6254550 6254905      -        1
## 7803                   protein_coding     chr1 6254903 6254905      -        1
## 7804                   protein_coding     chr1 6253718 6254147      -        1
## 7805                   protein_coding     chr1 6253718 6254147      -        1
## 7806                   protein_coding     chr1 6251338 6251530      -        1
## 7807                   protein_coding     chr1 6251338 6251530      -        1
## 7808                   protein_coding     chr1 6250440 6250624      -        1
## 7809                   protein_coding     chr1 6250440 6250624      -        1
## 7810                   protein_coding     chr1 6247353 6250003      -        1
## 7811                   protein_coding     chr1 6249341 6250003      -        1
## 7812                   protein_coding     chr1 6249338 6249340      -        1
## 7813                   protein_coding     chr1 6260825 6261098      -        1
## 7814                   protein_coding     chr1 6254906 6255014      -        1
## 7815                   protein_coding     chr1 6247353 6249340      -        1
## 7816                   protein_coding     chr1 6264269 6394391      -        1
## 7817                   protein_coding     chr1 6264269 6393361      -        1
## 7818                   protein_coding     chr1 6393257 6393361      -        1
## 7819                   protein_coding     chr1 6393257 6393303      -        1
```

```
## 7820                protein_coding       chr1 6393301 6393303        -        1
## 7821                protein_coding       chr1 6349749 6349866        -        1
## 7822                protein_coding       chr1 6349749 6349866        -        1
## 7823                protein_coding       chr1 6339433 6339589        -        1
## 7824                protein_coding       chr1 6339433 6339589        -        1
## 7825                protein_coding       chr1 6333477 6333568        -        1
## 7826                protein_coding       chr1 6333477 6333568        -        1
## 7827                protein_coding       chr1 6327299 6327413        -        1
## 7828                protein_coding       chr1 6327299 6327413        -        1
## 7829                protein_coding       chr1 6318492 6318578        -        1
## 7830                protein_coding       chr1 6318492 6318578        -        1
## 7831                protein_coding       chr1 6294864 6294980        -        1
## 7832                protein_coding       chr1 6294864 6294980        -        1
## 7833                protein_coding       chr1 6281102 6281286        -        1
## 7834                protein_coding       chr1 6281102 6281286        -        1
## 7835                protein_coding       chr1 6264269 6264695        -        1
## 7836                protein_coding       chr1 6264600 6264695        -        1
## 7837                protein_coding       chr1 6264597 6264599        -        1
## 7838                protein_coding       chr1 6393304 6393361        -        1
## 7839                protein_coding       chr1 6264269 6264599        -        1
## 7840                protein_coding       chr1 6264273 6359344        -        1
## 7841                protein_coding       chr1 6358826 6359344        -        1
## 7842                protein_coding       chr1 6358826 6358845        -        1
## 7843                protein_coding       chr1 6358843 6358845        -        1
## 7844                protein_coding       chr1 6349749 6349866        -        1
## 7845                protein_coding       chr1 6349749 6349866        -        1
## 7846                protein_coding       chr1 6339433 6339589        -        1
## 7847                protein_coding       chr1 6339433 6339589        -        1
## 7848                protein_coding       chr1 6333477 6333568        -        1
## 7849                protein_coding       chr1 6333477 6333568        -        1
## 7850                protein_coding       chr1 6327299 6327413        -        1
## 7851                protein_coding       chr1 6327299 6327413        -        1
## 7852                protein_coding       chr1 6318492 6318578        -        1
## 7853                protein_coding       chr1 6318492 6318578        -        1
## 7854                protein_coding       chr1 6294864 6294980        -        1
## 7855                protein_coding       chr1 6294864 6294980        -        1
## 7856                protein_coding       chr1 6281102 6281286        -        1
## 7857                protein_coding       chr1 6281102 6281286        -        1
## 7858                protein_coding       chr1 6264273 6264695        -        1
## 7859                protein_coding       chr1 6264600 6264695        -        1
## 7860                protein_coding       chr1 6264597 6264599        -        1
## 7861                protein_coding       chr1 6358846 6359344        -        1
## 7862                protein_coding       chr1 6264273 6264599        -        1
## 7863                protein_coding       chr1 6264273 6360707        -        1
## 7864                protein_coding       chr1 6360570 6360707        -        1
## 7865                protein_coding       chr1 6360570 6360652        -        1
## 7866                protein_coding       chr1 6360650 6360652        -        1
## 7867                protein_coding       chr1 6349749 6349866        -        1
## 7868                protein_coding       chr1 6349749 6349866        -        1
## 7869                protein_coding       chr1 6339433 6339589        -        1
## 7870                protein_coding       chr1 6339433 6339589        -        1
## 7871                protein_coding       chr1 6333477 6333568        -        1
## 7872                protein_coding       chr1 6333477 6333568        -        1
## 7873                protein_coding       chr1 6327299 6327413        -        1
```

```
## 7874                 protein_coding    chr1 6327299 6327413      -        1
## 7875                 protein_coding    chr1 6318492 6318578      -        1
## 7876                 protein_coding    chr1 6318492 6318578      -        1
## 7877                 protein_coding    chr1 6294864 6294980      -        1
## 7878                 protein_coding    chr1 6294864 6294980      -        1
## 7879                 protein_coding    chr1 6281102 6281286      -        1
## 7880                 protein_coding    chr1 6281102 6281286      -        1
## 7881                 protein_coding    chr1 6264273 6264695      -        1
## 7882                 protein_coding    chr1 6264600 6264695      -        1
## 7883                 protein_coding    chr1 6264597 6264599      -        1
## 7884                 protein_coding    chr1 6360653 6360707      -        1
## 7885                 protein_coding    chr1 6264273 6264599      -        1
## 7886                 protein_coding    chr1 6264273 6385813      -        1
## 7887                 protein_coding    chr1 6385494 6385813      -        1
## 7888                 protein_coding    chr1 6385494 6385666      -        1
## 7889                 protein_coding    chr1 6385664 6385666      -        1
## 7890                 protein_coding    chr1 6349749 6349866      -        1
## 7891                 protein_coding    chr1 6349749 6349866      -        1
## 7892                 protein_coding    chr1 6339433 6339589      -        1
## 7893                 protein_coding    chr1 6339433 6339589      -        1
## 7894                 protein_coding    chr1 6333477 6333568      -        1
## 7895                 protein_coding    chr1 6333477 6333568      -        1
## 7896                 protein_coding    chr1 6327299 6327413      -        1
## 7897                 protein_coding    chr1 6327299 6327413      -        1
## 7898                 protein_coding    chr1 6318492 6318578      -        1
## 7899                 protein_coding    chr1 6318492 6318578      -        1
## 7900                 protein_coding    chr1 6294864 6294980      -        1
## 7901                 protein_coding    chr1 6294864 6294980      -        1
## 7902                 protein_coding    chr1 6281102 6281286      -        1
## 7903                 protein_coding    chr1 6281102 6281286      -        1
## 7904                 protein_coding    chr1 6264273 6264695      -        1
## 7905                 protein_coding    chr1 6264600 6264695      -        1
## 7906                 protein_coding    chr1 6264597 6264599      -        1
## 7907                 protein_coding    chr1 6385667 6385813      -        1
## 7908                 protein_coding    chr1 6264273 6264599      -        1
## 7909                 protein_coding    chr1 6264273 6393766      -        1
## 7910                 protein_coding    chr1 6393257 6393766      -        1
## 7911                 protein_coding    chr1 6393257 6393399      -        1
## 7912                 protein_coding    chr1 6393397 6393399      -        1
## 7913                 protein_coding    chr1 6349749 6349866      -        1
## 7914                 protein_coding    chr1 6349749 6349866      -        1
## 7915                 protein_coding    chr1 6339433 6339589      -        1
## 7916                 protein_coding    chr1 6339433 6339589      -        1
## 7917                 protein_coding    chr1 6333477 6333568      -        1
## 7918                 protein_coding    chr1 6333477 6333568      -        1
## 7919                 protein_coding    chr1 6327299 6327413      -        1
## 7920                 protein_coding    chr1 6327299 6327413      -        1
## 7921                 protein_coding    chr1 6318492 6318578      -        1
## 7922                 protein_coding    chr1 6318492 6318578      -        1
## 7923                 protein_coding    chr1 6294864 6294980      -        1
## 7924                 protein_coding    chr1 6294864 6294980      -        1
## 7925                 protein_coding    chr1 6281102 6281286      -        1
## 7926                 protein_coding    chr1 6281102 6281286      -        1
## 7927                 protein_coding    chr1 6264273 6264695      -        1
```

```
## 7928              protein_coding   chr1 6264600 6264695    -    1
## 7929              protein_coding   chr1 6264597 6264599    -    1
## 7930              protein_coding   chr1 6393400 6393766    -    1
## 7931              protein_coding   chr1 6264273 6264599    -    1
## 7932              protein_coding   chr1 6264273 6394391    -    1
## 7933              protein_coding   chr1 6393257 6394391    -    1
## 7934              protein_coding   chr1 6393257 6393399    -    1
## 7935              protein_coding   chr1 6393397 6393399    -    1
## 7936              protein_coding   chr1 6349749 6349866    -    1
## 7937              protein_coding   chr1 6349749 6349866    -    1
## 7938              protein_coding   chr1 6339433 6339589    -    1
## 7939              protein_coding   chr1 6339433 6339589    -    1
## 7940              protein_coding   chr1 6333477 6333568    -    1
## 7941              protein_coding   chr1 6333477 6333568    -    1
## 7942              protein_coding   chr1 6327299 6327413    -    1
## 7943              protein_coding   chr1 6327299 6327413    -    1
## 7944              protein_coding   chr1 6318492 6318578    -    1
## 7945              protein_coding   chr1 6318492 6318578    -    1
## 7946              protein_coding   chr1 6294864 6294980    -    1
## 7947              protein_coding   chr1 6294864 6294980    -    1
## 7948              protein_coding   chr1 6281102 6281286    -    1
## 7949              protein_coding   chr1 6281102 6281286    -    1
## 7950              protein_coding   chr1 6264273 6264695    -    1
## 7951              protein_coding   chr1 6264600 6264695    -    1
## 7952              protein_coding   chr1 6264597 6264599    -    1
## 7953              protein_coding   chr1 6393400 6394391    -    1
## 7954              protein_coding   chr1 6264273 6264599    -    1
## 7955                      lncRNA   chr1 6393555 6394391    +    0
## 7956                      lncRNA   chr1 6393555 6394391    +    0
## 7957                      lncRNA   chr1 6393555 6394391    +    0
## 7958              protein_coding   chr1 6412418 6424670    -    1
## 7959              protein_coding   chr1 6412418 6424670    -    1
## 7960              protein_coding   chr1 6424478 6424670    -    1
## 7961              protein_coding   chr1 6419776 6419843    -    1
## 7962              protein_coding   chr1 6419776 6419820    -    1
## 7963              protein_coding   chr1 6419818 6419820    -    1
## 7964              protein_coding   chr1 6419607 6419702    -    1
## 7965              protein_coding   chr1 6419607 6419702    -    1
## 7966              protein_coding   chr1 6412418 6413282    -    1
## 7967              protein_coding   chr1 6413196 6413282    -    1
## 7968              protein_coding   chr1 6413193 6413195    -    1
## 7969              protein_coding   chr1 6424478 6424670    -    1
## 7970              protein_coding   chr1 6419821 6419843    -    1
## 7971              protein_coding   chr1 6412418 6413195    -    1
## 7972              protein_coding   chr1 6413000 6419903    -    1
## 7973              protein_coding   chr1 6419776 6419903    -    1
## 7974              protein_coding   chr1 6419776 6419820    -    1
## 7975              protein_coding   chr1 6419818 6419820    -    1
## 7976              protein_coding   chr1 6419607 6419702    -    1
## 7977              protein_coding   chr1 6419607 6419702    -    1
## 7978              protein_coding   chr1 6413000 6413282    -    1
## 7979              protein_coding   chr1 6413196 6413282    -    1
## 7980              protein_coding   chr1 6413193 6413195    -    1
## 7981              protein_coding   chr1 6419821 6419903    -    1
```

```
## 7982             protein_coding     chr1 6413000 6413195      -      1
## 7983             protein_coding     chr1 6415232 6419919      -      1
## 7984             protein_coding     chr1 6419776 6419919      -      1
## 7985             protein_coding     chr1 6419776 6419820      -      1
## 7986             protein_coding     chr1 6419818 6419820      -      1
## 7987             protein_coding     chr1 6419607 6419702      -      1
## 7988             protein_coding     chr1 6419607 6419702      -      1
## 7989             protein_coding     chr1 6419241 6419340      -      1
## 7990             protein_coding     chr1 6419241 6419340      -      1
## 7991             protein_coding     chr1 6415232 6419153      -      1
## 7992             protein_coding     chr1 6418876 6419153      -      1
## 7993             protein_coding     chr1 6418873 6418875      -      1
## 7994             protein_coding     chr1 6419821 6419919      -      1
## 7995             protein_coding     chr1 6415232 6418875      -      1
## 7996             protein_coding     chr1 6418414 6419907      -      1
## 7997             protein_coding     chr1 6419776 6419907      -      1
## 7998             protein_coding     chr1 6419776 6419820      -      1
## 7999             protein_coding     chr1 6419818 6419820      -      1
## 8000             protein_coding     chr1 6419607 6419702      -      1
## 8001             protein_coding     chr1 6419607 6419702      -      1
## 8002             protein_coding     chr1 6418414 6419153      -      1
## 8003             protein_coding     chr1 6419064 6419153      -      1
## 8004             protein_coding     chr1 6419061 6419063      -      1
## 8005             protein_coding     chr1 6419821 6419907      -      1
## 8006             protein_coding     chr1 6418414 6419063      -      1
## 8007             protein_coding     chr1 6418849 6419917      -      1
## 8008             protein_coding     chr1 6419776 6419917      -      1
## 8009             protein_coding     chr1 6419776 6419820      -      1
## 8010             protein_coding     chr1 6419818 6419820      -      1
## 8011             protein_coding     chr1 6419607 6419702      -      1
## 8012             protein_coding     chr1 6419607 6419702      -      1
## 8013             protein_coding     chr1 6418849 6419340      -      1
## 8014             protein_coding     chr1 6419236 6419340      -      1
## 8015             protein_coding     chr1 6419233 6419235      -      1
## 8016             protein_coding     chr1 6419821 6419917      -      1
## 8017             protein_coding     chr1 6418849 6419235      -      1
## 8018             protein_coding     chr1 6424776 6461367      +      1
## 8019             protein_coding     chr1 6424776 6460944      +      1
## 8020             protein_coding     chr1 6424776 6425249      +      1
## 8021             protein_coding     chr1 6424956 6425249      +      1
## 8022             protein_coding     chr1 6424956 6424958      +      1
## 8023             protein_coding     chr1 6428226 6428419      +      1
## 8024             protein_coding     chr1 6428226 6428419      +      1
## 8025             protein_coding     chr1 6440254 6440440      +      1
## 8026             protein_coding     chr1 6440254 6440440      +      1
## 8027             protein_coding     chr1 6440626 6440808      +      1
## 8028             protein_coding     chr1 6440626 6440808      +      1
## 8029             protein_coding     chr1 6440934 6441065      +      1
## 8030             protein_coding     chr1 6440934 6441065      +      1
## 8031             protein_coding     chr1 6444481 6444682      +      1
## 8032             protein_coding     chr1 6444481 6444682      +      1
## 8033             protein_coding     chr1 6445664 6445935      +      1
## 8034             protein_coding     chr1 6445664 6445935      +      1
## 8035             protein_coding     chr1 6448641 6449091      +      1
```

348

```
## 8036          protein_coding     chr1 6448641 6449091     +      1
## 8037          protein_coding     chr1 6451603 6451748     +      1
## 8038          protein_coding     chr1 6451603 6451748     +      1
## 8039          protein_coding     chr1 6451833 6452096     +      1
## 8040          protein_coding     chr1 6451833 6452096     +      1
## 8041          protein_coding     chr1 6457184 6457263     +      1
## 8042          protein_coding     chr1 6457184 6457263     +      1
## 8043          protein_coding     chr1 6457361 6457372     +      1
## 8044          protein_coding     chr1 6457361 6457372     +      1
## 8045          protein_coding     chr1 6459999 6460944     +      1
## 8046          protein_coding     chr1 6459999 6460143     +      1
## 8047          protein_coding     chr1 6460144 6460146     +      1
## 8048          protein_coding     chr1 6424776 6424955     +      1
## 8049          protein_coding     chr1 6460144 6460944     +      1
## 8050          protein_coding     chr1 6424788 6456671     +      1
## 8051          protein_coding     chr1 6424788 6425249     +      1
## 8052          protein_coding     chr1 6424956 6425249     +      1
## 8053          protein_coding     chr1 6424956 6424958     +      1
## 8054          protein_coding     chr1 6428226 6428419     +      1
## 8055          protein_coding     chr1 6428226 6428419     +      1
## 8056          protein_coding     chr1 6440254 6440440     +      1
## 8057          protein_coding     chr1 6440254 6440440     +      1
## 8058          protein_coding     chr1 6440626 6440808     +      1
## 8059          protein_coding     chr1 6440626 6440808     +      1
## 8060          protein_coding     chr1 6440934 6441065     +      1
## 8061          protein_coding     chr1 6440934 6441065     +      1
## 8062          protein_coding     chr1 6444481 6444682     +      1
## 8063          protein_coding     chr1 6444481 6444682     +      1
## 8064          protein_coding     chr1 6445664 6445935     +      1
## 8065          protein_coding     chr1 6445664 6445935     +      1
## 8066          protein_coding     chr1 6448641 6449091     +      1
## 8067          protein_coding     chr1 6448641 6449091     +      1
## 8068          protein_coding     chr1 6451603 6451748     +      1
## 8069          protein_coding     chr1 6451603 6451748     +      1
## 8070          protein_coding     chr1 6451833 6452096     +      1
## 8071          protein_coding     chr1 6451833 6452096     +      1
## 8072          protein_coding     chr1 6454434 6456671     +      1
## 8073          protein_coding     chr1 6454434 6456194     +      1
## 8074          protein_coding     chr1 6456195 6456197     +      1
## 8075          protein_coding     chr1 6424788 6424955     +      1
## 8076          protein_coding     chr1 6456195 6456671     +      1
## 8077          protein_coding     chr1 6448043 6460398     +      1
## 8078          protein_coding     chr1 6448043 6448117     +      1
## 8079          protein_coding     chr1 6448641 6448802     +      1
## 8080          protein_coding     chr1 6448785 6448802     +      1
## 8081          protein_coding     chr1 6448785 6448787     +      1
## 8082          protein_coding     chr1 6448893 6449091     +      1
## 8083          protein_coding     chr1 6448893 6449091     +      1
## 8084          protein_coding     chr1 6451603 6451748     +      1
## 8085          protein_coding     chr1 6451603 6451748     +      1
## 8086          protein_coding     chr1 6451833 6452096     +      1
## 8087          protein_coding     chr1 6451833 6452096     +      1
## 8088          protein_coding     chr1 6457184 6457264     +      1
## 8089          protein_coding     chr1 6457184 6457264     +      1
```

```
## 8090                   protein_coding   chr1 6457266 6457274      +        1
## 8091                   protein_coding   chr1 6457266 6457274      +        1
## 8092                   protein_coding   chr1 6459997 6460398      +        1
## 8093                   protein_coding   chr1 6459997 6460143      +        1
## 8094                   protein_coding   chr1 6460144 6460146      +        1
## 8095                   protein_coding   chr1 6448043 6448117      +        1
## 8096                   protein_coding   chr1 6448641 6448784      +        1
## 8097                   protein_coding   chr1 6460144 6460398      +        1
## 8098                   protein_coding   chr1 6448043 6460399      +        1
## 8099                   protein_coding   chr1 6448043 6448117      +        1
## 8100                   protein_coding   chr1 6448641 6448802      +        1
## 8101                   protein_coding   chr1 6448785 6448802      +        1
## 8102                   protein_coding   chr1 6448785 6448787      +        1
## 8103                   protein_coding   chr1 6448893 6449091      +        1
## 8104                   protein_coding   chr1 6448893 6449091      +        1
## 8105                   protein_coding   chr1 6451603 6451748      +        1
## 8106                   protein_coding   chr1 6451603 6451748      +        1
## 8107                   protein_coding   chr1 6451833 6452096      +        1
## 8108                   protein_coding   chr1 6451833 6452096      +        1
## 8109                   protein_coding   chr1 6457184 6457263      +        1
## 8110                   protein_coding   chr1 6457184 6457263      +        1
## 8111                   protein_coding   chr1 6457361 6457372      +        1
## 8112                   protein_coding   chr1 6457361 6457372      +        1
## 8113                   protein_coding   chr1 6459999 6460399      +        1
## 8114                   protein_coding   chr1 6459999 6460143      +        1
## 8115                   protein_coding   chr1 6460144 6460146      +        1
## 8116                   protein_coding   chr1 6448043 6448117      +        1
## 8117                   protein_coding   chr1 6448641 6448784      +        1
## 8118                   protein_coding   chr1 6460144 6460399      +        1
## 8119                            miRNA   chr1 6429834 6429896      -        1
## 8120                            miRNA   chr1 6429834 6429896      -        1
## 8121                            miRNA   chr1 6429834 6429896      -        1
## 8122                           lncRNA   chr1 6443034 6447006      -        0
## 8123                           lncRNA   chr1 6443034 6447006      -        0
## 8124                           lncRNA   chr1 6446912 6447006      -        0
## 8125                           lncRNA   chr1 6445562 6445681      -        0
## 8126                           lncRNA   chr1 6443034 6443169      -        0
## 8127                   protein_coding   chr1 6460786 6466195      -        1
## 8128                   protein_coding   chr1 6461151 6466175      -        1
## 8129                   protein_coding   chr1 6466069 6466175      -        1
## 8130                   protein_coding   chr1 6466069 6466107      -        1
## 8131                   protein_coding   chr1 6466105 6466107      -        1
## 8132                   protein_coding   chr1 6465440 6465560      -        1
## 8133                   protein_coding   chr1 6465440 6465560      -        1
## 8134                   protein_coding   chr1 6465088 6465222      -        1
## 8135                   protein_coding   chr1 6465088 6465222      -        1
## 8136                   protein_coding   chr1 6464552 6464719      -        1
## 8137                   protein_coding   chr1 6464552 6464719      -        1
## 8138                   protein_coding   chr1 6464375 6464453      -        1
## 8139                   protein_coding   chr1 6464375 6464453      -        1
## 8140                   protein_coding   chr1 6463065 6463147      -        1
## 8141                   protein_coding   chr1 6463065 6463147      -        1
## 8142                   protein_coding   chr1 6462863 6462970      -        1
## 8143                   protein_coding   chr1 6462863 6462970      -        1
```

```
## 8144          protein_coding     chr1 6462629 6462666        -        1
## 8145          protein_coding     chr1 6462629 6462666        -        1
## 8146          protein_coding     chr1 6461994 6462174        -        1
## 8147          protein_coding     chr1 6461994 6462174        -        1
## 8148          protein_coding     chr1 6461151 6461762        -        1
## 8149          protein_coding     chr1 6461437 6461762        -        1
## 8150          protein_coding     chr1 6461434 6461436        -        1
## 8151          protein_coding     chr1 6466108 6466175        -        1
## 8152          protein_coding     chr1 6461151 6461436        -        1
## 8153          protein_coding     chr1 6461151 6466195        -        1
## 8154          protein_coding     chr1 6466069 6466195        -        1
## 8155          protein_coding     chr1 6466069 6466107        -        1
## 8156          protein_coding     chr1 6466105 6466107        -        1
## 8157          protein_coding     chr1 6465440 6465560        -        1
## 8158          protein_coding     chr1 6465440 6465560        -        1
## 8159          protein_coding     chr1 6465088 6465222        -        1
## 8160          protein_coding     chr1 6465088 6465222        -        1
## 8161          protein_coding     chr1 6464552 6464719        -        1
## 8162          protein_coding     chr1 6464552 6464719        -        1
## 8163          protein_coding     chr1 6464375 6464453        -        1
## 8164          protein_coding     chr1 6464375 6464453        -        1
## 8165          protein_coding     chr1 6463072 6463127        -        1
## 8166          protein_coding     chr1 6463072 6463127        -        1
## 8167          protein_coding     chr1 6462863 6462970        -        1
## 8168          protein_coding     chr1 6462863 6462970        -        1
## 8169          protein_coding     chr1 6462629 6462666        -        1
## 8170          protein_coding     chr1 6462629 6462666        -        1
## 8171          protein_coding     chr1 6461994 6462174        -        1
## 8172          protein_coding     chr1 6461994 6462174        -        1
## 8173          protein_coding     chr1 6461151 6461762        -        1
## 8174          protein_coding     chr1 6461437 6461762        -        1
## 8175          protein_coding     chr1 6461434 6461436        -        1
## 8176          protein_coding     chr1 6466108 6466195        -        1
## 8177          protein_coding     chr1 6461151 6461436        -        1
## 8178          protein_coding     chr1 6461204 6466175        -        1
## 8179          protein_coding     chr1 6466069 6466175        -        1
## 8180          protein_coding     chr1 6466069 6466107        -        1
## 8181          protein_coding     chr1 6466105 6466107        -        1
## 8182          protein_coding     chr1 6465440 6465560        -        1
## 8183          protein_coding     chr1 6465440 6465560        -        1
## 8184          protein_coding     chr1 6465088 6465222        -        1
## 8185          protein_coding     chr1 6465088 6465222        -        1
## 8186          protein_coding     chr1 6464552 6464719        -        1
## 8187          protein_coding     chr1 6464552 6464719        -        1
## 8188          protein_coding     chr1 6464375 6464453        -        1
## 8189          protein_coding     chr1 6464375 6464453        -        1
## 8190          protein_coding     chr1 6463072 6463127        -        1
## 8191          protein_coding     chr1 6463072 6463127        -        1
## 8192          protein_coding     chr1 6462629 6462663        -        1
## 8193          protein_coding     chr1 6462629 6462663        -        1
## 8194          protein_coding     chr1 6461994 6462174        -        1
## 8195          protein_coding     chr1 6461994 6462174        -        1
## 8196          protein_coding     chr1 6461204 6461762        -        1
## 8197          protein_coding     chr1 6461437 6461762        -        1
```

```
## 8198                      protein_coding    chr1 6461434 6461436       -        1
## 8199                      protein_coding    chr1 6466108 6466175       -        1
## 8200                      protein_coding    chr1 6461204 6461436       -        1
## 8201                      protein_coding    chr1 6461434 6466107       -        1
## 8202                      protein_coding    chr1 6466069 6466107       -        1
## 8203                      protein_coding    chr1 6466069 6466107       -        1
## 8204                      protein_coding    chr1 6466105 6466107       -        1
## 8205                      protein_coding    chr1 6465440 6465560       -        1
## 8206                      protein_coding    chr1 6465440 6465560       -        1
## 8207                      protein_coding    chr1 6462629 6462663       -        1
## 8208                      protein_coding    chr1 6462629 6462663       -        1
## 8209                      protein_coding    chr1 6461994 6462174       -        1
## 8210                      protein_coding    chr1 6461994 6462174       -        1
## 8211                      protein_coding    chr1 6461434 6461762       -        1
## 8212                      protein_coding    chr1 6461437 6461762       -        1
## 8213                      protein_coding    chr1 6461434 6461436       -        1
## 8214                      protein_coding    chr1 6461434 6461436       -        1
## 8215                      protein_coding    chr1 6461434 6466107       -        1
## 8216                      protein_coding    chr1 6466069 6466107       -        1
## 8217                      protein_coding    chr1 6466069 6466107       -        1
## 8218                      protein_coding    chr1 6466105 6466107       -        1
## 8219                      protein_coding    chr1 6465440 6465560       -        1
## 8220                      protein_coding    chr1 6465440 6465560       -        1
## 8221                      protein_coding    chr1 6464552 6464719       -        1
## 8222                      protein_coding    chr1 6464552 6464719       -        1
## 8223                      protein_coding    chr1 6464375 6464453       -        1
## 8224                      protein_coding    chr1 6464375 6464453       -        1
## 8225                      protein_coding    chr1 6463072 6463127       -        1
## 8226                      protein_coding    chr1 6463072 6463127       -        1
## 8227                      protein_coding    chr1 6462863 6462970       -        1
## 8228                      protein_coding    chr1 6462863 6462970       -        1
## 8229                      protein_coding    chr1 6462629 6462666       -        1
## 8230                      protein_coding    chr1 6462629 6462666       -        1
## 8231                      protein_coding    chr1 6461994 6462174       -        1
## 8232                      protein_coding    chr1 6461994 6462174       -        1
## 8233                      protein_coding    chr1 6461434 6461762       -        1
## 8234                      protein_coding    chr1 6461437 6461762       -        1
## 8235                      protein_coding    chr1 6461434 6461436       -        1
## 8236                      protein_coding    chr1 6461434 6461436       -        1
## 8237                      protein_coding    chr1 6466092 6520061       -        1
## 8238                      protein_coding    chr1 6466092 6485469       -        1
## 8239                      protein_coding    chr1 6485324 6485469       -        1
## 8240                      protein_coding    chr1 6485324 6485443       -        1
## 8241                      protein_coding    chr1 6485441 6485443       -        1
## 8242                      protein_coding    chr1 6477529 6477658       -        1
## 8243                      protein_coding    chr1 6477529 6477658       -        1
## 8244                      protein_coding    chr1 6475931 6476036       -        1
## 8245                      protein_coding    chr1 6475931 6476036       -        1
## 8246                      protein_coding    chr1 6475462 6475522       -        1
## 8247                      protein_coding    chr1 6475462 6475522       -        1
## 8248                      protein_coding    chr1 6475047 6475138       -        1
## 8249                      protein_coding    chr1 6475047 6475138       -        1
## 8250                      protein_coding    chr1 6474451 6474587       -        1
## 8251                      protein_coding    chr1 6474451 6474587       -        1
```

```
## 8252                    protein_coding    chr1 6474013 6474164      -      1
## 8253                    protein_coding    chr1 6474013 6474164      -      1
## 8254                    protein_coding    chr1 6473251 6473454      -      1
## 8255                    protein_coding    chr1 6473251 6473454      -      1
## 8256                    protein_coding    chr1 6472986 6473174      -      1
## 8257                    protein_coding    chr1 6472986 6473174      -      1
## 8258                    protein_coding    chr1 6472527 6472622      -      1
## 8259                    protein_coding    chr1 6472527 6472622      -      1
## 8260                    protein_coding    chr1 6471758 6471808      -      1
## 8261                    protein_coding    chr1 6471758 6471808      -      1
## 8262                    protein_coding    chr1 6471488 6471637      -      1
## 8263                    protein_coding    chr1 6471488 6471637      -      1
## 8264                    protein_coding    chr1 6470990 6471100      -      1
## 8265                    protein_coding    chr1 6470990 6471100      -      1
## 8266                    protein_coding    chr1 6470735 6470884      -      1
## 8267                    protein_coding    chr1 6470735 6470884      -      1
## 8268                    protein_coding    chr1 6470506 6470643      -      1
## 8269                    protein_coding    chr1 6470506 6470643      -      1
## 8270                    protein_coding    chr1 6470236 6470355      -      1
## 8271                    protein_coding    chr1 6470236 6470355      -      1
## 8272                    protein_coding    chr1 6469544 6469676      -      1
## 8273                    protein_coding    chr1 6469544 6469676      -      1
## 8274                    protein_coding    chr1 6469335 6469450      -      1
## 8275                    protein_coding    chr1 6469335 6469450      -      1
## 8276                    protein_coding    chr1 6469042 6469241      -      1
## 8277                    protein_coding    chr1 6469042 6469241      -      1
## 8278                    protein_coding    chr1 6467825 6468586      -      1
## 8279                    protein_coding    chr1 6467825 6468586      -      1
## 8280                    protein_coding    chr1 6466092 6467572      -      1
## 8281                    protein_coding    chr1 6467566 6467572      -      1
## 8282                    protein_coding    chr1 6467563 6467565      -      1
## 8283                    protein_coding    chr1 6485444 6485469      -      1
## 8284                    protein_coding    chr1 6466092 6467565      -      1
## 8285                    protein_coding    chr1 6466092 6485954      -      1
## 8286                    protein_coding    chr1 6485836 6485954      -      1
## 8287                    protein_coding    chr1 6477529 6477658      -      1
## 8288                    protein_coding    chr1 6477529 6477571      -      1
## 8289                    protein_coding    chr1 6477569 6477571      -      1
## 8290                    protein_coding    chr1 6475931 6476036      -      1
## 8291                    protein_coding    chr1 6475931 6476036      -      1
## 8292                    protein_coding    chr1 6475462 6475522      -      1
## 8293                    protein_coding    chr1 6475462 6475522      -      1
## 8294                    protein_coding    chr1 6475047 6475138      -      1
## 8295                    protein_coding    chr1 6475047 6475138      -      1
## 8296                    protein_coding    chr1 6474451 6474587      -      1
## 8297                    protein_coding    chr1 6474451 6474587      -      1
## 8298                    protein_coding    chr1 6474013 6474164      -      1
## 8299                    protein_coding    chr1 6474013 6474164      -      1
## 8300                    protein_coding    chr1 6473251 6473454      -      1
## 8301                    protein_coding    chr1 6473251 6473454      -      1
## 8302                    protein_coding    chr1 6472986 6473174      -      1
## 8303                    protein_coding    chr1 6472986 6473174      -      1
## 8304                    protein_coding    chr1 6472527 6472622      -      1
## 8305                    protein_coding    chr1 6472527 6472622      -      1
```

```
## 8306                    protein_coding    chr1 6471758 6471808     -        1
## 8307                    protein_coding    chr1 6471758 6471808     -        1
## 8308                    protein_coding    chr1 6471488 6471637     -        1
## 8309                    protein_coding    chr1 6471488 6471637     -        1
## 8310                    protein_coding    chr1 6470990 6471100     -        1
## 8311                    protein_coding    chr1 6470990 6471100     -        1
## 8312                    protein_coding    chr1 6470735 6470884     -        1
## 8313                    protein_coding    chr1 6470735 6470884     -        1
## 8314                    protein_coding    chr1 6470506 6470643     -        1
## 8315                    protein_coding    chr1 6470506 6470643     -        1
## 8316                    protein_coding    chr1 6470236 6470355     -        1
## 8317                    protein_coding    chr1 6470236 6470355     -        1
## 8318                    protein_coding    chr1 6469544 6469676     -        1
## 8319                    protein_coding    chr1 6469544 6469676     -        1
## 8320                    protein_coding    chr1 6469335 6469450     -        1
## 8321                    protein_coding    chr1 6469335 6469450     -        1
## 8322                    protein_coding    chr1 6469042 6469241     -        1
## 8323                    protein_coding    chr1 6469042 6469241     -        1
## 8324                    protein_coding    chr1 6467825 6468586     -        1
## 8325                    protein_coding    chr1 6467825 6468586     -        1
## 8326                    protein_coding    chr1 6466092 6467572     -        1
## 8327                    protein_coding    chr1 6467566 6467572     -        1
## 8328                    protein_coding    chr1 6467563 6467565     -        1
## 8329                    protein_coding    chr1 6485836 6485954     -        1
## 8330                    protein_coding    chr1 6477572 6477658     -        1
## 8331                    protein_coding    chr1 6466092 6467565     -        1
## 8332                    protein_coding    chr1 6466092 6490580     -        1
## 8333                    protein_coding    chr1 6490445 6490580     -        1
## 8334                    protein_coding    chr1 6477529 6477658     -        1
## 8335                    protein_coding    chr1 6477529 6477571     -        1
## 8336                    protein_coding    chr1 6477569 6477571     -        1
## 8337                    protein_coding    chr1 6475931 6476036     -        1
## 8338                    protein_coding    chr1 6475931 6476036     -        1
## 8339                    protein_coding    chr1 6475462 6475522     -        1
## 8340                    protein_coding    chr1 6475462 6475522     -        1
## 8341                    protein_coding    chr1 6475047 6475138     -        1
## 8342                    protein_coding    chr1 6475047 6475138     -        1
## 8343                    protein_coding    chr1 6474451 6474587     -        1
## 8344                    protein_coding    chr1 6474451 6474587     -        1
## 8345                    protein_coding    chr1 6474013 6474164     -        1
## 8346                    protein_coding    chr1 6474013 6474164     -        1
## 8347                    protein_coding    chr1 6473251 6473454     -        1
## 8348                    protein_coding    chr1 6473251 6473454     -        1
## 8349                    protein_coding    chr1 6472986 6473174     -        1
## 8350                    protein_coding    chr1 6472986 6473174     -        1
## 8351                    protein_coding    chr1 6472527 6472622     -        1
## 8352                    protein_coding    chr1 6472527 6472622     -        1
## 8353                    protein_coding    chr1 6471758 6471808     -        1
## 8354                    protein_coding    chr1 6471758 6471808     -        1
## 8355                    protein_coding    chr1 6471488 6471637     -        1
## 8356                    protein_coding    chr1 6471488 6471637     -        1
## 8357                    protein_coding    chr1 6470990 6471100     -        1
## 8358                    protein_coding    chr1 6470990 6471100     -        1
## 8359                    protein_coding    chr1 6470735 6470884     -        1
```

```
## 8360                    protein_coding    chr1 6470735 6470884      -        1
## 8361                    protein_coding    chr1 6470506 6470643      -        1
## 8362                    protein_coding    chr1 6470506 6470643      -        1
## 8363                    protein_coding    chr1 6470236 6470355      -        1
## 8364                    protein_coding    chr1 6470236 6470355      -        1
## 8365                    protein_coding    chr1 6469544 6469676      -        1
## 8366                    protein_coding    chr1 6469544 6469676      -        1
## 8367                    protein_coding    chr1 6469335 6469450      -        1
## 8368                    protein_coding    chr1 6469335 6469450      -        1
## 8369                    protein_coding    chr1 6469042 6469241      -        1
## 8370                    protein_coding    chr1 6469042 6469241      -        1
## 8371                    protein_coding    chr1 6467825 6468586      -        1
## 8372                    protein_coding    chr1 6467825 6468586      -        1
## 8373                    protein_coding    chr1 6466092 6467572      -        1
## 8374                    protein_coding    chr1 6467566 6467572      -        1
## 8375                    protein_coding    chr1 6467563 6467565      -        1
## 8376                    protein_coding    chr1 6490445 6490580      -        1
## 8377                    protein_coding    chr1 6477572 6477658      -        1
## 8378                    protein_coding    chr1 6466092 6467565      -        1
## 8379                    protein_coding    chr1 6466092 6497096      -        1
## 8380                    protein_coding    chr1 6496959 6497096      -        1
## 8381                    protein_coding    chr1 6496959 6497031      -        1
## 8382                    protein_coding    chr1 6497029 6497031      -        1
## 8383                    protein_coding    chr1 6496493 6496569      -        1
## 8384                    protein_coding    chr1 6496493 6496569      -        1
## 8385                    protein_coding    chr1 6477529 6477658      -        1
## 8386                    protein_coding    chr1 6477529 6477658      -        1
## 8387                    protein_coding    chr1 6475931 6476036      -        1
## 8388                    protein_coding    chr1 6475931 6476036      -        1
## 8389                    protein_coding    chr1 6475462 6475522      -        1
## 8390                    protein_coding    chr1 6475462 6475522      -        1
## 8391                    protein_coding    chr1 6475047 6475138      -        1
## 8392                    protein_coding    chr1 6475047 6475138      -        1
## 8393                    protein_coding    chr1 6474451 6474587      -        1
## 8394                    protein_coding    chr1 6474451 6474587      -        1
## 8395                    protein_coding    chr1 6474013 6474164      -        1
## 8396                    protein_coding    chr1 6474013 6474164      -        1
## 8397                    protein_coding    chr1 6473251 6473454      -        1
## 8398                    protein_coding    chr1 6473251 6473454      -        1
## 8399                    protein_coding    chr1 6472986 6473174      -        1
## 8400                    protein_coding    chr1 6472986 6473174      -        1
## 8401                    protein_coding    chr1 6472527 6472622      -        1
## 8402                    protein_coding    chr1 6472527 6472622      -        1
## 8403                    protein_coding    chr1 6471758 6471808      -        1
## 8404                    protein_coding    chr1 6471758 6471808      -        1
## 8405                    protein_coding    chr1 6471488 6471637      -        1
## 8406                    protein_coding    chr1 6471488 6471637      -        1
## 8407                    protein_coding    chr1 6470990 6471100      -        1
## 8408                    protein_coding    chr1 6470990 6471100      -        1
## 8409                    protein_coding    chr1 6470735 6470884      -        1
## 8410                    protein_coding    chr1 6470735 6470884      -        1
## 8411                    protein_coding    chr1 6470506 6470643      -        1
## 8412                    protein_coding    chr1 6470506 6470643      -        1
## 8413                    protein_coding    chr1 6470236 6470355      -        1
```

```
## 8414                    protein_coding    chr1 6470236 6470355    -    1
## 8415                    protein_coding    chr1 6469544 6469676    -    1
## 8416                    protein_coding    chr1 6469544 6469676    -    1
## 8417                    protein_coding    chr1 6469335 6469450    -    1
## 8418                    protein_coding    chr1 6469335 6469450    -    1
## 8419                    protein_coding    chr1 6469042 6469241    -    1
## 8420                    protein_coding    chr1 6469042 6469241    -    1
## 8421                    protein_coding    chr1 6467825 6468586    -    1
## 8422                    protein_coding    chr1 6467825 6468586    -    1
## 8423                    protein_coding    chr1 6466092 6467572    -    1
## 8424                    protein_coding    chr1 6467566 6467572    -    1
## 8425                    protein_coding    chr1 6467563 6467565    -    1
## 8426                    protein_coding    chr1 6497032 6497096    -    1
## 8427                    protein_coding    chr1 6466092 6467565    -    1
## 8428                    protein_coding    chr1 6466092 6520009    -    1
## 8429                    protein_coding    chr1 6519445 6520009    -    1
## 8430                    protein_coding    chr1 6519445 6519511    -    1
## 8431                    protein_coding    chr1 6519509 6519511    -    1
## 8432                    protein_coding    chr1 6496493 6496569    -    1
## 8433                    protein_coding    chr1 6496493 6496569    -    1
## 8434                    protein_coding    chr1 6477529 6477658    -    1
## 8435                    protein_coding    chr1 6477529 6477658    -    1
## 8436                    protein_coding    chr1 6475931 6476036    -    1
## 8437                    protein_coding    chr1 6475931 6476036    -    1
## 8438                    protein_coding    chr1 6475462 6475522    -    1
## 8439                    protein_coding    chr1 6475462 6475522    -    1
## 8440                    protein_coding    chr1 6475047 6475138    -    1
## 8441                    protein_coding    chr1 6475047 6475138    -    1
## 8442                    protein_coding    chr1 6474451 6474587    -    1
## 8443                    protein_coding    chr1 6474451 6474587    -    1
## 8444                    protein_coding    chr1 6474013 6474164    -    1
## 8445                    protein_coding    chr1 6474013 6474164    -    1
## 8446                    protein_coding    chr1 6473251 6473454    -    1
## 8447                    protein_coding    chr1 6473251 6473454    -    1
## 8448                    protein_coding    chr1 6472986 6473174    -    1
## 8449                    protein_coding    chr1 6472986 6473174    -    1
## 8450                    protein_coding    chr1 6472527 6472622    -    1
## 8451                    protein_coding    chr1 6472527 6472622    -    1
## 8452                    protein_coding    chr1 6471758 6471808    -    1
## 8453                    protein_coding    chr1 6471758 6471808    -    1
## 8454                    protein_coding    chr1 6471488 6471637    -    1
## 8455                    protein_coding    chr1 6471488 6471637    -    1
## 8456                    protein_coding    chr1 6470990 6471100    -    1
## 8457                    protein_coding    chr1 6470990 6471100    -    1
## 8458                    protein_coding    chr1 6470735 6470884    -    1
## 8459                    protein_coding    chr1 6470735 6470884    -    1
## 8460                    protein_coding    chr1 6470506 6470643    -    1
## 8461                    protein_coding    chr1 6470506 6470643    -    1
## 8462                    protein_coding    chr1 6470236 6470355    -    1
## 8463                    protein_coding    chr1 6470236 6470355    -    1
## 8464                    protein_coding    chr1 6469544 6469676    -    1
## 8465                    protein_coding    chr1 6469544 6469676    -    1
## 8466                    protein_coding    chr1 6469335 6469450    -    1
## 8467                    protein_coding    chr1 6469335 6469450    -    1
```

```
## 8468                     protein_coding      chr1 6469042 6469241        -        1
## 8469                     protein_coding      chr1 6469042 6469241        -        1
## 8470                     protein_coding      chr1 6467825 6468586        -        1
## 8471                     protein_coding      chr1 6467825 6468586        -        1
## 8472                     protein_coding      chr1 6466092 6467572        -        1
## 8473                     protein_coding      chr1 6467566 6467572        -        1
## 8474                     protein_coding      chr1 6467563 6467565        -        1
## 8475                     protein_coding      chr1 6519512 6520009        -        1
## 8476                     protein_coding      chr1 6466092 6467565        -        1
## 8477                     protein_coding      chr1 6467122 6490570        -        1
## 8478                     protein_coding      chr1 6490445 6490570        -        1
## 8479                     protein_coding      chr1 6477529 6477658        -        1
## 8480                     protein_coding      chr1 6477529 6477571        -        1
## 8481                     protein_coding      chr1 6477569 6477571        -        1
## 8482                     protein_coding      chr1 6475931 6476036        -        1
## 8483                     protein_coding      chr1 6475931 6476036        -        1
## 8484                     protein_coding      chr1 6475462 6475522        -        1
## 8485                     protein_coding      chr1 6475462 6475522        -        1
## 8486                     protein_coding      chr1 6475047 6475138        -        1
## 8487                     protein_coding      chr1 6475047 6475138        -        1
## 8488                     protein_coding      chr1 6474451 6474587        -        1
## 8489                     protein_coding      chr1 6474451 6474587        -        1
## 8490                     protein_coding      chr1 6474013 6474164        -        1
## 8491                     protein_coding      chr1 6474013 6474164        -        1
## 8492                     protein_coding      chr1 6473251 6473454        -        1
## 8493                     protein_coding      chr1 6473251 6473454        -        1
## 8494                     protein_coding      chr1 6472986 6473174        -        1
## 8495                     protein_coding      chr1 6472986 6473174        -        1
## 8496                     protein_coding      chr1 6472527 6472622        -        1
## 8497                     protein_coding      chr1 6472527 6472622        -        1
## 8498                     protein_coding      chr1 6471758 6471808        -        1
## 8499                     protein_coding      chr1 6471758 6471808        -        1
## 8500                     protein_coding      chr1 6471488 6471637        -        1
## 8501                     protein_coding      chr1 6471488 6471637        -        1
## 8502                     protein_coding      chr1 6470990 6471100        -        1
## 8503                     protein_coding      chr1 6470990 6471100        -        1
## 8504                     protein_coding      chr1 6470735 6470884        -        1
## 8505                     protein_coding      chr1 6470735 6470884        -        1
## 8506                     protein_coding      chr1 6470506 6470643        -        1
## 8507                     protein_coding      chr1 6470506 6470643        -        1
## 8508                     protein_coding      chr1 6470236 6470355        -        1
## 8509                     protein_coding      chr1 6470236 6470355        -        1
## 8510                     protein_coding      chr1 6469544 6469676        -        1
## 8511                     protein_coding      chr1 6469544 6469676        -        1
## 8512                     protein_coding      chr1 6469335 6469450        -        1
## 8513                     protein_coding      chr1 6469335 6469450        -        1
## 8514                     protein_coding      chr1 6469042 6469241        -        1
## 8515                     protein_coding      chr1 6469042 6469241        -        1
## 8516                     protein_coding      chr1 6468099 6468586        -        1
## 8517                     protein_coding      chr1 6468099 6468586        -        1
## 8518                     protein_coding      chr1 6467825 6467898        -        1
## 8519                     protein_coding      chr1 6467846 6467898        -        1
## 8520                     protein_coding      chr1 6467843 6467845        -        1
## 8521                     protein_coding      chr1 6467122 6467572        -        1
```

```
## 8522                    protein_coding    chr1 6490445 6490570    -    1
## 8523                    protein_coding    chr1 6477572 6477658    -    1
## 8524                    protein_coding    chr1 6467825 6467845    -    1
## 8525                    protein_coding    chr1 6467122 6467572    -    1
## 8526                    protein_coding    chr1 6467122 6491700    -    1
## 8527                    protein_coding    chr1 6491637 6491700    -    1
## 8528                    protein_coding    chr1 6477529 6477658    -    1
## 8529                    protein_coding    chr1 6477529 6477571    -    1
## 8530                    protein_coding    chr1 6477569 6477571    -    1
## 8531                    protein_coding    chr1 6475931 6476036    -    1
## 8532                    protein_coding    chr1 6475931 6476036    -    1
## 8533                    protein_coding    chr1 6475462 6475522    -    1
## 8534                    protein_coding    chr1 6475462 6475522    -    1
## 8535                    protein_coding    chr1 6475047 6475138    -    1
## 8536                    protein_coding    chr1 6475047 6475138    -    1
## 8537                    protein_coding    chr1 6474451 6474587    -    1
## 8538                    protein_coding    chr1 6474451 6474587    -    1
## 8539                    protein_coding    chr1 6474013 6474164    -    1
## 8540                    protein_coding    chr1 6474013 6474164    -    1
## 8541                    protein_coding    chr1 6473251 6473454    -    1
## 8542                    protein_coding    chr1 6473251 6473454    -    1
## 8543                    protein_coding    chr1 6472986 6473174    -    1
## 8544                    protein_coding    chr1 6472986 6473174    -    1
## 8545                    protein_coding    chr1 6472527 6472622    -    1
## 8546                    protein_coding    chr1 6472527 6472622    -    1
## 8547                    protein_coding    chr1 6471758 6471808    -    1
## 8548                    protein_coding    chr1 6471758 6471808    -    1
## 8549                    protein_coding    chr1 6471488 6471637    -    1
## 8550                    protein_coding    chr1 6471488 6471637    -    1
## 8551                    protein_coding    chr1 6470990 6471100    -    1
## 8552                    protein_coding    chr1 6470990 6471100    -    1
## 8553                    protein_coding    chr1 6470735 6470884    -    1
## 8554                    protein_coding    chr1 6470735 6470884    -    1
## 8555                    protein_coding    chr1 6470506 6470643    -    1
## 8556                    protein_coding    chr1 6470506 6470643    -    1
## 8557                    protein_coding    chr1 6470236 6470355    -    1
## 8558                    protein_coding    chr1 6470236 6470355    -    1
## 8559                    protein_coding    chr1 6469544 6469676    -    1
## 8560                    protein_coding    chr1 6469544 6469676    -    1
## 8561                    protein_coding    chr1 6469335 6469450    -    1
## 8562                    protein_coding    chr1 6469335 6469450    -    1
## 8563                    protein_coding    chr1 6469042 6469241    -    1
## 8564                    protein_coding    chr1 6469042 6469241    -    1
## 8565                    protein_coding    chr1 6467825 6468586    -    1
## 8566                    protein_coding    chr1 6467825 6468586    -    1
## 8567                    protein_coding    chr1 6467122 6467572    -    1
## 8568                    protein_coding    chr1 6467566 6467572    -    1
## 8569                    protein_coding    chr1 6467563 6467565    -    1
## 8570                    protein_coding    chr1 6491637 6491700    -    1
## 8571                    protein_coding    chr1 6477572 6477658    -    1
## 8572                    protein_coding    chr1 6467122 6467565    -    1
## 8573                    protein_coding    chr1 6467122 6496696    -    1
## 8574                    protein_coding    chr1 6496493 6496696    -    1
## 8575                    protein_coding    chr1 6496493 6496516    -    1
```

```
## 8576                    protein_coding    chr1 6496514 6496516    -    1
## 8577                    protein_coding    chr1 6477529 6477658    -    1
## 8578                    protein_coding    chr1 6477529 6477658    -    1
## 8579                    protein_coding    chr1 6475931 6476036    -    1
## 8580                    protein_coding    chr1 6475931 6476036    -    1
## 8581                    protein_coding    chr1 6475462 6475522    -    1
## 8582                    protein_coding    chr1 6475462 6475522    -    1
## 8583                    protein_coding    chr1 6475047 6475138    -    1
## 8584                    protein_coding    chr1 6475047 6475138    -    1
## 8585                    protein_coding    chr1 6474451 6474587    -    1
## 8586                    protein_coding    chr1 6474451 6474587    -    1
## 8587                    protein_coding    chr1 6474013 6474164    -    1
## 8588                    protein_coding    chr1 6474013 6474164    -    1
## 8589                    protein_coding    chr1 6473251 6473454    -    1
## 8590                    protein_coding    chr1 6473251 6473454    -    1
## 8591                    protein_coding    chr1 6472986 6473174    -    1
## 8592                    protein_coding    chr1 6472986 6473174    -    1
## 8593                    protein_coding    chr1 6472527 6472622    -    1
## 8594                    protein_coding    chr1 6472527 6472622    -    1
## 8595                    protein_coding    chr1 6471758 6471808    -    1
## 8596                    protein_coding    chr1 6471758 6471808    -    1
## 8597                    protein_coding    chr1 6471488 6471637    -    1
## 8598                    protein_coding    chr1 6471488 6471637    -    1
## 8599                    protein_coding    chr1 6470990 6471100    -    1
## 8600                    protein_coding    chr1 6470990 6471100    -    1
## 8601                    protein_coding    chr1 6470735 6470884    -    1
## 8602                    protein_coding    chr1 6470735 6470884    -    1
## 8603                    protein_coding    chr1 6470506 6470643    -    1
## 8604                    protein_coding    chr1 6470506 6470643    -    1
## 8605                    protein_coding    chr1 6470236 6470355    -    1
## 8606                    protein_coding    chr1 6470236 6470355    -    1
## 8607                    protein_coding    chr1 6469544 6469676    -    1
## 8608                    protein_coding    chr1 6469544 6469676    -    1
## 8609                    protein_coding    chr1 6469335 6469450    -    1
## 8610                    protein_coding    chr1 6469335 6469450    -    1
## 8611                    protein_coding    chr1 6469042 6469241    -    1
## 8612                    protein_coding    chr1 6469042 6469241    -    1
## 8613                    protein_coding    chr1 6467825 6468586    -    1
## 8614                    protein_coding    chr1 6467825 6468586    -    1
## 8615                    protein_coding    chr1 6467122 6467572    -    1
## 8616                    protein_coding    chr1 6467566 6467572    -    1
## 8617                    protein_coding    chr1 6467563 6467565    -    1
## 8618                    protein_coding    chr1 6496517 6496696    -    1
## 8619                    protein_coding    chr1 6467122 6467565    -    1
## 8620                    protein_coding    chr1 6467122 6497390    -    1
## 8621                    protein_coding    chr1 6497320 6497390    -    1
## 8622                    protein_coding    chr1 6497320 6497323    -    1
## 8623                    protein_coding    chr1 6497321 6497323    -    1
## 8624                    protein_coding    chr1 6496493 6496569    -    1
## 8625                    protein_coding    chr1 6496493 6496569    -    1
## 8626                    protein_coding    chr1 6477529 6477658    -    1
## 8627                    protein_coding    chr1 6477529 6477658    -    1
## 8628                    protein_coding    chr1 6475931 6476036    -    1
## 8629                    protein_coding    chr1 6475931 6476036    -    1
```

```
## 8630                    protein_coding    chr1 6475462 6475522    -    1
## 8631                    protein_coding    chr1 6475462 6475522    -    1
## 8632                    protein_coding    chr1 6475047 6475138    -    1
## 8633                    protein_coding    chr1 6475047 6475138    -    1
## 8634                    protein_coding    chr1 6474451 6474587    -    1
## 8635                    protein_coding    chr1 6474451 6474587    -    1
## 8636                    protein_coding    chr1 6474013 6474164    -    1
## 8637                    protein_coding    chr1 6474013 6474164    -    1
## 8638                    protein_coding    chr1 6473251 6473454    -    1
## 8639                    protein_coding    chr1 6473251 6473454    -    1
## 8640                    protein_coding    chr1 6472986 6473174    -    1
## 8641                    protein_coding    chr1 6472986 6473174    -    1
## 8642                    protein_coding    chr1 6472527 6472622    -    1
## 8643                    protein_coding    chr1 6472527 6472622    -    1
## 8644                    protein_coding    chr1 6471758 6471808    -    1
## 8645                    protein_coding    chr1 6471758 6471808    -    1
## 8646                    protein_coding    chr1 6471488 6471637    -    1
## 8647                    protein_coding    chr1 6471488 6471637    -    1
## 8648                    protein_coding    chr1 6470990 6471100    -    1
## 8649                    protein_coding    chr1 6470990 6471100    -    1
## 8650                    protein_coding    chr1 6470735 6470884    -    1
## 8651                    protein_coding    chr1 6470735 6470884    -    1
## 8652                    protein_coding    chr1 6470506 6470643    -    1
## 8653                    protein_coding    chr1 6470506 6470643    -    1
## 8654                    protein_coding    chr1 6470236 6470355    -    1
## 8655                    protein_coding    chr1 6470236 6470355    -    1
## 8656                    protein_coding    chr1 6469544 6469676    -    1
## 8657                    protein_coding    chr1 6469544 6469676    -    1
## 8658                    protein_coding    chr1 6469335 6469450    -    1
## 8659                    protein_coding    chr1 6469335 6469450    -    1
## 8660                    protein_coding    chr1 6469042 6469241    -    1
## 8661                    protein_coding    chr1 6469042 6469241    -    1
## 8662                    protein_coding    chr1 6467825 6468586    -    1
## 8663                    protein_coding    chr1 6467825 6468586    -    1
## 8664                    protein_coding    chr1 6467122 6467572    -    1
## 8665                    protein_coding    chr1 6467566 6467572    -    1
## 8666                    protein_coding    chr1 6467563 6467565    -    1
## 8667                    protein_coding    chr1 6497324 6497390    -    1
## 8668                    protein_coding    chr1 6467122 6467565    -    1
## 8669                    protein_coding    chr1 6467122 6520061    -    1
## 8670                    protein_coding    chr1 6519445 6520061    -    1
## 8671                    protein_coding    chr1 6519445 6519511    -    1
## 8672                    protein_coding    chr1 6519509 6519511    -    1
## 8673                    protein_coding    chr1 6496493 6496569    -    1
## 8674                    protein_coding    chr1 6496493 6496569    -    1
## 8675                    protein_coding    chr1 6477529 6477658    -    1
## 8676                    protein_coding    chr1 6477529 6477658    -    1
## 8677                    protein_coding    chr1 6475931 6476036    -    1
## 8678                    protein_coding    chr1 6475931 6476036    -    1
## 8679                    protein_coding    chr1 6475462 6475522    -    1
## 8680                    protein_coding    chr1 6475462 6475522    -    1
## 8681                    protein_coding    chr1 6475047 6475138    -    1
## 8682                    protein_coding    chr1 6475047 6475138    -    1
## 8683                    protein_coding    chr1 6474451 6474587    -    1
```

```
## 8684          protein_coding      chr1 6474451 6474587      -      1
## 8685          protein_coding      chr1 6474013 6474164      -      1
## 8686          protein_coding      chr1 6474013 6474164      -      1
## 8687          protein_coding      chr1 6473251 6473454      -      1
## 8688          protein_coding      chr1 6473251 6473454      -      1
## 8689          protein_coding      chr1 6472986 6473174      -      1
## 8690          protein_coding      chr1 6472986 6473174      -      1
## 8691          protein_coding      chr1 6472527 6472622      -      1
## 8692          protein_coding      chr1 6472527 6472622      -      1
## 8693          protein_coding      chr1 6471758 6471808      -      1
## 8694          protein_coding      chr1 6471758 6471808      -      1
## 8695          protein_coding      chr1 6471488 6471637      -      1
## 8696          protein_coding      chr1 6471488 6471637      -      1
## 8697          protein_coding      chr1 6470990 6471100      -      1
## 8698          protein_coding      chr1 6470990 6471100      -      1
## 8699          protein_coding      chr1 6470735 6470884      -      1
## 8700          protein_coding      chr1 6470735 6470884      -      1
## 8701          protein_coding      chr1 6470506 6470643      -      1
## 8702          protein_coding      chr1 6470506 6470643      -      1
## 8703          protein_coding      chr1 6470236 6470355      -      1
## 8704          protein_coding      chr1 6470236 6470355      -      1
## 8705          protein_coding      chr1 6469544 6469676      -      1
## 8706          protein_coding      chr1 6469544 6469676      -      1
## 8707          protein_coding      chr1 6469335 6469450      -      1
## 8708          protein_coding      chr1 6469335 6469450      -      1
## 8709          protein_coding      chr1 6469042 6469241      -      1
## 8710          protein_coding      chr1 6469042 6469241      -      1
## 8711          protein_coding      chr1 6467825 6467893      -      1
## 8712          protein_coding      chr1 6467825 6467893      -      1
## 8713          protein_coding      chr1 6467122 6467572      -      1
## 8714          protein_coding      chr1 6467566 6467572      -      1
## 8715          protein_coding      chr1 6467563 6467565      -      1
## 8716          protein_coding      chr1 6519512 6520061      -      1
## 8717          protein_coding      chr1 6467122 6467565      -      1
## 8718          protein_coding      chr1 6521347 6554513      -      1
## 8719          protein_coding      chr1 6521347 6554513      -      1
## 8720          protein_coding      chr1 6554107 6554513      -      1
## 8721          protein_coding      chr1 6554107 6554502      -      1
## 8722          protein_coding      chr1 6554500 6554502      -      1
## 8723          protein_coding      chr1 6550396 6550615      -      1
## 8724          protein_coding      chr1 6550396 6550615      -      1
## 8725          protein_coding      chr1 6549571 6549698      -      1
## 8726          protein_coding      chr1 6549571 6549698      -      1
## 8727          protein_coding      chr1 6545045 6545180      -      1
## 8728          protein_coding      chr1 6545045 6545180      -      1
## 8729          protein_coding      chr1 6544826 6544922      -      1
## 8730          protein_coding      chr1 6544826 6544922      -      1
## 8731          protein_coding      chr1 6541830 6541927      -      1
## 8732          protein_coding      chr1 6541830 6541927      -      1
## 8733          protein_coding      chr1 6533280 6533441      -      1
## 8734          protein_coding      chr1 6533280 6533441      -      1
## 8735          protein_coding      chr1 6532463 6532760      -      1
## 8736          protein_coding      chr1 6532463 6532760      -      1
## 8737          protein_coding      chr1 6531968 6532079      -      1
```

```
## 8738               protein_coding  chr1 6531968 6532079   -   1
## 8739               protein_coding  chr1 6528994 6529171   -   1
## 8740               protein_coding  chr1 6528994 6529171   -   1
## 8741               protein_coding  chr1 6526696 6526829   -   1
## 8742               protein_coding  chr1 6526696 6526829   -   1
## 8743               protein_coding  chr1 6521347 6526003   -   1
## 8744               protein_coding  chr1 6525857 6526003   -   1
## 8745               protein_coding  chr1 6525854 6525856   -   1
## 8746               protein_coding  chr1 6554503 6554513   -   1
## 8747               protein_coding  chr1 6521347 6525856   -   1
## 8748                        snRNA  chr1 6540854 6540964   +   1
## 8749                        snRNA  chr1 6540854 6540964   +   1
## 8750                        snRNA  chr1 6540854 6540964   +   1
## 8751         processed_pseudogene  chr1 6547905 6548619   +   0
## 8752         processed_pseudogene  chr1 6547905 6548619   +   0
## 8753         processed_pseudogene  chr1 6547905 6548133   +   0
## 8754         processed_pseudogene  chr1 6548448 6548619   +   0
## 8755               protein_coding  chr1 6555307 6579755   +   1
## 8756               protein_coding  chr1 6555307 6579755   +   1
## 8757               protein_coding  chr1 6555307 6555564   +   1
## 8758               protein_coding  chr1 6555374 6555564   +   1
## 8759               protein_coding  chr1 6555374 6555376   +   1
## 8760               protein_coding  chr1 6570909 6571215   +   1
## 8761               protein_coding  chr1 6570909 6571215   +   1
## 8762               protein_coding  chr1 6574631 6575392   +   1
## 8763               protein_coding  chr1 6574631 6575392   +   1
## 8764               protein_coding  chr1 6576415 6576627   +   1
## 8765               protein_coding  chr1 6576415 6576627   +   1
## 8766               protein_coding  chr1 6576950 6577070   +   1
## 8767               protein_coding  chr1 6576950 6577070   +   1
## 8768               protein_coding  chr1 6578653 6579755   +   1
## 8769               protein_coding  chr1 6578653 6579581   +   1
## 8770               protein_coding  chr1 6579582 6579584   +   1
## 8771               protein_coding  chr1 6555307 6555373   +   1
## 8772               protein_coding  chr1 6579582 6579755   +   1
## 8773               protein_coding  chr1 6555309 6579626   +   1
## 8774               protein_coding  chr1 6555309 6555564   +   1
## 8775               protein_coding  chr1 6555374 6555564   +   1
## 8776               protein_coding  chr1 6555374 6555376   +   1
## 8777               protein_coding  chr1 6570909 6571215   +   1
## 8778               protein_coding  chr1 6570909 6571215   +   1
## 8779               protein_coding  chr1 6576415 6576627   +   1
## 8780               protein_coding  chr1 6576415 6576627   +   1
## 8781               protein_coding  chr1 6576950 6577070   +   1
## 8782               protein_coding  chr1 6576950 6577070   +   1
## 8783               protein_coding  chr1 6578653 6579626   +   1
## 8784               protein_coding  chr1 6578653 6579581   +   1
## 8785               protein_coding  chr1 6579582 6579584   +   1
## 8786               protein_coding  chr1 6555309 6555373   +   1
## 8787               protein_coding  chr1 6579582 6579626   +   1
## 8788               protein_coding  chr1 6579994 6589280   +   1
## 8789               protein_coding  chr1 6579994 6589280   +   1
## 8790               protein_coding  chr1 6579994 6580136   +   1
## 8791               protein_coding  chr1 6580541 6581299   +   1
```

```
## 8792                    protein_coding     chr1 6580610 6581299        +        1
## 8793                    protein_coding     chr1 6580610 6580612        +        1
## 8794                    protein_coding     chr1 6582058 6582299        +        1
## 8795                    protein_coding     chr1 6582058 6582299        +        1
## 8796                    protein_coding     chr1 6585919 6586030        +        1
## 8797                    protein_coding     chr1 6585919 6586030        +        1
## 8798                    protein_coding     chr1 6586695 6586787        +        1
## 8799                    protein_coding     chr1 6586695 6586787        +        1
## 8800                    protein_coding     chr1 6587205 6587291        +        1
## 8801                    protein_coding     chr1 6587205 6587291        +        1
## 8802                    protein_coding     chr1 6587478 6587632        +        1
## 8803                    protein_coding     chr1 6587478 6587632        +        1
## 8804                    protein_coding     chr1 6588060 6588196        +        1
## 8805                    protein_coding     chr1 6588060 6588196        +        1
## 8806                    protein_coding     chr1 6588278 6588442        +        1
## 8807                    protein_coding     chr1 6588278 6588442        +        1
## 8808                    protein_coding     chr1 6588756 6588844        +        1
## 8809                    protein_coding     chr1 6588756 6588844        +        1
## 8810                    protein_coding     chr1 6588916 6589280        +        1
## 8811                    protein_coding     chr1 6588916 6589209        +        1
## 8812                    protein_coding     chr1 6589210 6589212        +        1
## 8813                    protein_coding     chr1 6579994 6580136        +        1
## 8814                    protein_coding     chr1 6580541 6580609        +        1
## 8815                    protein_coding     chr1 6589210 6589280        +        1
## 8816                    protein_coding     chr1 6590724 6614607        -        1
## 8817                    protein_coding     chr1 6590724 6602869        -        1
## 8818                    protein_coding     chr1 6601797 6602869        -        1
## 8819                    protein_coding     chr1 6601797 6602817        -        1
## 8820                    protein_coding     chr1 6602815 6602817        -        1
## 8821                    protein_coding     chr1 6599047 6599452        -        1
## 8822                    protein_coding     chr1 6599047 6599452        -        1
## 8823                    protein_coding     chr1 6595485 6595557        -        1
## 8824                    protein_coding     chr1 6595485 6595557        -        1
## 8825                    protein_coding     chr1 6590724 6593658        -        1
## 8826                    protein_coding     chr1 6593368 6593658        -        1
## 8827                    protein_coding     chr1 6593365 6593367        -        1
## 8828                    protein_coding     chr1 6602818 6602869        -        1
## 8829                    protein_coding     chr1 6590724 6593367        -        1
## 8830                    protein_coding     chr1 6590724 6603001        -        1
## 8831                    protein_coding     chr1 6601797 6603001        -        1
## 8832                    protein_coding     chr1 6601797 6602817        -        1
## 8833                    protein_coding     chr1 6602815 6602817        -        1
## 8834                    protein_coding     chr1 6599047 6599452        -        1
## 8835                    protein_coding     chr1 6599047 6599452        -        1
## 8836                    protein_coding     chr1 6590724 6595557        -        1
## 8837                    protein_coding     chr1 6595368 6595557        -        1
## 8838                    protein_coding     chr1 6595365 6595367        -        1
## 8839                    protein_coding     chr1 6602818 6603001        -        1
## 8840                    protein_coding     chr1 6590724 6595367        -        1
## 8841                    protein_coding     chr1 6593193 6614560        -        1
## 8842                    protein_coding     chr1 6614450 6614560        -        1
## 8843                    protein_coding     chr1 6599047 6599452        -        1
## 8844                    protein_coding     chr1 6599047 6599372        -        1
## 8845                    protein_coding     chr1 6599370 6599372        -        1
```

```
## 8846          protein_coding   chr1 6595485 6595557      -      1
## 8847          protein_coding   chr1 6595485 6595557      -      1
## 8848          protein_coding   chr1 6593193 6593658      -      1
## 8849          protein_coding   chr1 6593368 6593658      -      1
## 8850          protein_coding   chr1 6593365 6593367      -      1
## 8851          protein_coding   chr1 6614450 6614560      -      1
## 8852          protein_coding   chr1 6599373 6599452      -      1
## 8853          protein_coding   chr1 6593193 6593367      -      1
## 8854          protein_coding   chr1 6593205 6603684      -      1
## 8855          protein_coding   chr1 6603454 6603684      -      1
## 8856          protein_coding   chr1 6593205 6594918      -      1
## 8857          protein_coding   chr1 6593368 6593472      -      1
## 8858          protein_coding   chr1 6593470 6593472      -      1
## 8859          protein_coding   chr1 6593365 6593367      -      1
## 8860          protein_coding   chr1 6603454 6603684      -      1
## 8861          protein_coding   chr1 6593205 6593367      -      1
## 8862          protein_coding   chr1 6593473 6594918      -      1
## 8863          protein_coding   chr1 6594081 6614607      -      1
## 8864          protein_coding   chr1 6614450 6614607      -      1
## 8865          protein_coding   chr1 6599047 6599452      -      1
## 8866          protein_coding   chr1 6599047 6599372      -      1
## 8867          protein_coding   chr1 6599370 6599372      -      1
## 8868          protein_coding   chr1 6595485 6595557      -      1
## 8869          protein_coding   chr1 6595485 6595557      -      1
## 8870          protein_coding   chr1 6594081 6594110      -      1
## 8871          protein_coding   chr1 6594108 6594110      -      1
## 8872          protein_coding   chr1 6614450 6614607      -      1
## 8873          protein_coding   chr1 6599373 6599452      -      1
## 8874          protein_coding   chr1 6594081 6594110      -      1
## 8875          protein_coding   chr1 6613731 6624030      +      1
## 8876          protein_coding   chr1 6613731 6624030      +      1
## 8877          protein_coding   chr1 6613731 6614105      +      1
## 8878          protein_coding   chr1 6614067 6614105      +      1
## 8879          protein_coding   chr1 6614067 6614069      +      1
## 8880          protein_coding   chr1 6616757 6616858      +      1
## 8881          protein_coding   chr1 6616757 6616858      +      1
## 8882          protein_coding   chr1 6619803 6620337      +      1
## 8883          protein_coding   chr1 6619803 6620337      +      1
## 8884          protein_coding   chr1 6621411 6624030      +      1
## 8885          protein_coding   chr1 6621411 6621634      +      1
## 8886          protein_coding   chr1 6621635 6621637      +      1
## 8887          protein_coding   chr1 6613731 6614066      +      1
## 8888          protein_coding   chr1 6621635 6624030      +      1
## 8889          protein_coding   chr1 6624866 6635586      +      1
## 8890          protein_coding   chr1 6624866 6633565      +      1
## 8891          protein_coding   chr1 6624866 6624954      +      1
## 8892          protein_coding   chr1 6625150 6625292      +      1
## 8893          protein_coding   chr1 6625219 6625292      +      1
## 8894          protein_coding   chr1 6625219 6625221      +      1
## 8895          protein_coding   chr1 6628499 6628691      +      1
## 8896          protein_coding   chr1 6628499 6628691      +      1
## 8897          protein_coding   chr1 6630288 6630353      +      1
## 8898          protein_coding   chr1 6630288 6630353      +      1
## 8899          protein_coding   chr1 6632391 6632495      +      1
```

```
## 8900               protein_coding      chr1 6632391 6632495      +       1
## 8901               protein_coding      chr1 6632796 6633565      +       1
## 8902               protein_coding      chr1 6632796 6633074      +       1
## 8903               protein_coding      chr1 6633075 6633077      +       1
## 8904               protein_coding      chr1 6624866 6624954      +       1
## 8905               protein_coding      chr1 6625150 6625218      +       1
## 8906               protein_coding      chr1 6633075 6633565      +       1
## 8907               protein_coding      chr1 6625181 6633368      +       1
## 8908               protein_coding      chr1 6625181 6625292      +       1
## 8909               protein_coding      chr1 6625219 6625292      +       1
## 8910               protein_coding      chr1 6625219 6625221      +       1
## 8911               protein_coding      chr1 6628499 6628691      +       1
## 8912               protein_coding      chr1 6628499 6628691      +       1
## 8913               protein_coding      chr1 6630291 6630353      +       1
## 8914               protein_coding      chr1 6630291 6630353      +       1
## 8915               protein_coding      chr1 6632391 6632495      +       1
## 8916               protein_coding      chr1 6632391 6632495      +       1
## 8917               protein_coding      chr1 6632796 6633368      +       1
## 8918               protein_coding      chr1 6632796 6633074      +       1
## 8919               protein_coding      chr1 6633075 6633077      +       1
## 8920               protein_coding      chr1 6625181 6625218      +       1
## 8921               protein_coding      chr1 6633075 6633368      +       1
## 8922               protein_coding      chr1 6625192 6635586      +       1
## 8923               protein_coding      chr1 6625192 6625292      +       1
## 8924               protein_coding      chr1 6625219 6625292      +       1
## 8925               protein_coding      chr1 6625219 6625221      +       1
## 8926               protein_coding      chr1 6628499 6628691      +       1
## 8927               protein_coding      chr1 6628499 6628691      +       1
## 8928               protein_coding      chr1 6630288 6630353      +       1
## 8929               protein_coding      chr1 6630288 6630353      +       1
## 8930               protein_coding      chr1 6632370 6632495      +       1
## 8931               protein_coding      chr1 6632370 6632495      +       1
## 8932               protein_coding      chr1 6634020 6635586      +       1
## 8933               protein_coding      chr1 6634020 6634085      +       1
## 8934               protein_coding      chr1 6634086 6634088      +       1
## 8935               protein_coding      chr1 6625192 6625218      +       1
## 8936               protein_coding      chr1 6634086 6635586      +       1
## 8937               protein_coding      chr1 6634168 6701924      −       1
## 8938               protein_coding      chr1 6634170 6701816      −       1
## 8939               protein_coding      chr1 6701729 6701816      −       1
## 8940               protein_coding      chr1 6701729 6701800      −       1
## 8941               protein_coding      chr1 6701798 6701800      −       1
## 8942               protein_coding      chr1 6680908 6681037      −       1
## 8943               protein_coding      chr1 6680908 6681037      −       1
## 8944               protein_coding      chr1 6678394 6678467      −       1
## 8945               protein_coding      chr1 6678394 6678467      −       1
## 8946               protein_coding      chr1 6667709 6667810      −       1
## 8947               protein_coding      chr1 6667709 6667810      −       1
## 8948               protein_coding      chr1 6653911 6654039      −       1
## 8949               protein_coding      chr1 6653911 6654039      −       1
## 8950               protein_coding      chr1 6652829 6652951      −       1
## 8951               protein_coding      chr1 6652829 6652951      −       1
## 8952               protein_coding      chr1 6651529 6651602      −       1
## 8953               protein_coding      chr1 6651529 6651602      −       1
```

```
## 8954           protein_coding      chr1 6645789 6645978       -       1
## 8955           protein_coding      chr1 6645789 6645978       -       1
## 8956           protein_coding      chr1 6645041 6645126       -       1
## 8957           protein_coding      chr1 6645041 6645126       -       1
## 8958           protein_coding      chr1 6644558 6644674       -       1
## 8959           protein_coding      chr1 6644558 6644674       -       1
## 8960           protein_coding      chr1 6639902 6640057       -       1
## 8961           protein_coding      chr1 6639902 6640057       -       1
## 8962           protein_coding      chr1 6638295 6638364       -       1
## 8963           protein_coding      chr1 6638295 6638364       -       1
## 8964           protein_coding      chr1 6637447 6637504       -       1
## 8965           protein_coding      chr1 6637447 6637504       -       1
## 8966           protein_coding      chr1 6637198 6637340       -       1
## 8967           protein_coding      chr1 6637198 6637340       -       1
## 8968           protein_coding      chr1 6636117 6636246       -       1
## 8969           protein_coding      chr1 6636117 6636246       -       1
## 8970           protein_coding      chr1 6634170 6635700       -       1
## 8971           protein_coding      chr1 6635678 6635700       -       1
## 8972           protein_coding      chr1 6635675 6635677       -       1
## 8973           protein_coding      chr1 6701801 6701816       -       1
## 8974           protein_coding      chr1 6634170 6635677       -       1
## 8975           protein_coding      chr1 6635113 6701924       -       1
## 8976           protein_coding      chr1 6701729 6701924       -       1
## 8977           protein_coding      chr1 6701729 6701800       -       1
## 8978           protein_coding      chr1 6701798 6701800       -       1
## 8979           protein_coding      chr1 6680908 6681037       -       1
## 8980           protein_coding      chr1 6680908 6681037       -       1
## 8981           protein_coding      chr1 6678394 6678467       -       1
## 8982           protein_coding      chr1 6678394 6678467       -       1
## 8983           protein_coding      chr1 6667709 6667810       -       1
## 8984           protein_coding      chr1 6667709 6667810       -       1
## 8985           protein_coding      chr1 6653911 6654039       -       1
## 8986           protein_coding      chr1 6653911 6654039       -       1
## 8987           protein_coding      chr1 6652829 6652951       -       1
## 8988           protein_coding      chr1 6652829 6652951       -       1
## 8989           protein_coding      chr1 6651529 6651602       -       1
## 8990           protein_coding      chr1 6651529 6651602       -       1
## 8991           protein_coding      chr1 6645789 6645978       -       1
## 8992           protein_coding      chr1 6645789 6645978       -       1
## 8993           protein_coding      chr1 6645041 6645126       -       1
## 8994           protein_coding      chr1 6645041 6645126       -       1
## 8995           protein_coding      chr1 6644558 6644674       -       1
## 8996           protein_coding      chr1 6644558 6644674       -       1
## 8997           protein_coding      chr1 6638295 6638364       -       1
## 8998           protein_coding      chr1 6638295 6638364       -       1
## 8999           protein_coding      chr1 6637447 6637504       -       1
## 9000           protein_coding      chr1 6637447 6637504       -       1
## 9001           protein_coding      chr1 6637198 6637340       -       1
## 9002           protein_coding      chr1 6637198 6637340       -       1
## 9003           protein_coding      chr1 6636117 6636246       -       1
## 9004           protein_coding      chr1 6636117 6636246       -       1
## 9005           protein_coding      chr1 6635113 6635700       -       1
## 9006           protein_coding      chr1 6635678 6635700       -       1
## 9007           protein_coding      chr1 6635675 6635677       -       1
```

```
## 9008             protein_coding   chr1 6701801 6701924   -   1
## 9009             protein_coding   chr1 6635113 6635677   -   1
## 9010                     lncRNA   chr1 6724637 6730012   +   1
## 9011                     lncRNA   chr1 6724637 6727408   +   1
## 9012                     lncRNA   chr1 6724637 6724850   +   1
## 9013                     lncRNA   chr1 6725937 6727408   +   1
## 9014                     lncRNA   chr1 6724643 6730012   +   1
## 9015                     lncRNA   chr1 6724643 6724850   +   1
## 9016                     lncRNA   chr1 6727433 6727612   +   1
## 9017                     lncRNA   chr1 6729720 6730012   +   1
## 9018                     lncRNA   chr1 6767954 6770038   +   0
## 9019                     lncRNA   chr1 6767954 6770038   +   0
## 9020                     lncRNA   chr1 6767954 6768762   +   0
## 9021                     lncRNA   chr1 6769727 6769776   +   0
## 9022                     lncRNA   chr1 6769911 6770038   +   0
## 9023                     lncRNA   chr1 6783892 6784843   -   1
## 9024                     lncRNA   chr1 6783892 6784843   -   1
## 9025                     lncRNA   chr1 6784658 6784843   -   1
## 9026                     lncRNA   chr1 6784149 6784223   -   1
## 9027                     lncRNA   chr1 6783892 6784045   -   1
## 9028             protein_coding   chr1 6785454 7769706   +   1
## 9029             protein_coding   chr1 6785454 7769706   +   1
## 9030             protein_coding   chr1 6785454 6785575   +   1
## 9031             protein_coding   chr1 6785531 6785575   +   1
## 9032             protein_coding   chr1 6785531 6785533   +   1
## 9033             protein_coding   chr1 6820181 6820250   +   1
## 9034             protein_coding   chr1 6820181 6820250   +   1
## 9035             protein_coding   chr1 6825092 6825210   +   1
## 9036             protein_coding   chr1 6825092 6825210   +   1
## 9037             protein_coding   chr1 7091304 7091371   +   1
## 9038             protein_coding   chr1 7091304 7091371   +   1
## 9039             protein_coding   chr1 7249491 7249626   +   1
## 9040             protein_coding   chr1 7249491 7249626   +   1
## 9041             protein_coding   chr1 7467830 7467901   +   1
## 9042             protein_coding   chr1 7467830 7467901   +   1
## 9043             protein_coding   chr1 7640400 7640553   +   1
## 9044             protein_coding   chr1 7640400 7640553   +   1
## 9045             protein_coding   chr1 7661726 7661866   +   1
## 9046             protein_coding   chr1 7661726 7661866   +   1
## 9047             protein_coding   chr1 7663353 7665199   +   1
## 9048             protein_coding   chr1 7663353 7665199   +   1
## 9049             protein_coding   chr1 7670911 7671037   +   1
## 9050             protein_coding   chr1 7670911 7671037   +   1
## 9051             protein_coding   chr1 7677599 7677733   +   1
## 9052             protein_coding   chr1 7677599 7677733   +   1
## 9053             protein_coding   chr1 7732448 7732599   +   1
## 9054             protein_coding   chr1 7732448 7732599   +   1
## 9055             protein_coding   chr1 7736344 7736540   +   1
## 9056             protein_coding   chr1 7736344 7736540   +   1
## 9057             protein_coding   chr1 7736931 7737009   +   1
## 9058             protein_coding   chr1 7736931 7737009   +   1
## 9059             protein_coding   chr1 7737255 7737570   +   1
## 9060             protein_coding   chr1 7737255 7737570   +   1
## 9061             protein_coding   chr1 7737959 7738482   +   1
```

```
## 9062            protein_coding   chr1 7737959 7738482   +   1
## 9063            protein_coding   chr1 7744835 7745022   +   1
## 9064            protein_coding   chr1 7744835 7745022   +   1
## 9065            protein_coding   chr1 7745845 7746091   +   1
## 9066            protein_coding   chr1 7745845 7746091   +   1
## 9067            protein_coding   chr1 7747710 7747781   +   1
## 9068            protein_coding   chr1 7747710 7747781   +   1
## 9069            protein_coding   chr1 7751199 7751392   +   1
## 9070            protein_coding   chr1 7751199 7751392   +   1
## 9071            protein_coding   chr1 7752459 7752533   +   1
## 9072            protein_coding   chr1 7752459 7752533   +   1
## 9073            protein_coding   chr1 7755638 7755668   +   1
## 9074            protein_coding   chr1 7755638 7755668   +   1
## 9075            protein_coding   chr1 7766459 7769706   +   1
## 9076            protein_coding   chr1 7766459 7766488   +   1
## 9077            protein_coding   chr1 7766489 7766491   +   1
## 9078            protein_coding   chr1 6785454 6785530   +   1
## 9079            protein_coding   chr1 7766489 7769706   +   1
## 9080            protein_coding   chr1 6785480 6872038   +   1
## 9081            protein_coding   chr1 6785480 6785575   +   1
## 9082            protein_coding   chr1 6785531 6785575   +   1
## 9083            protein_coding   chr1 6785531 6785533   +   1
## 9084            protein_coding   chr1 6820181 6820250   +   1
## 9085            protein_coding   chr1 6820181 6820250   +   1
## 9086            protein_coding   chr1 6825092 6825210   +   1
## 9087            protein_coding   chr1 6825092 6825210   +   1
## 9088            protein_coding   chr1 6871757 6872038   +   1
## 9089            protein_coding   chr1 6871757 6871762   +   1
## 9090            protein_coding   chr1 6871763 6871765   +   1
## 9091            protein_coding   chr1 6785480 6785530   +   1
## 9092            protein_coding   chr1 6871763 6872038   +   1
## 9093            protein_coding   chr1 6785491 6887865   +   1
## 9094            protein_coding   chr1 6785491 6785575   +   1
## 9095            protein_coding   chr1 6785531 6785575   +   1
## 9096            protein_coding   chr1 6785531 6785533   +   1
## 9097            protein_coding   chr1 6820181 6820250   +   1
## 9098            protein_coding   chr1 6820181 6820250   +   1
## 9099            protein_coding   chr1 6825092 6825210   +   1
## 9100            protein_coding   chr1 6825092 6825210   +   1
## 9101            protein_coding   chr1 6887654 6887865   +   1
## 9102            protein_coding   chr1 6887654 6887722   +   1
## 9103            protein_coding   chr1 6887723 6887725   +   1
## 9104            protein_coding   chr1 6785491 6785530   +   1
## 9105            protein_coding   chr1 6887723 6887865   +   1
## 9106            protein_coding   chr1 6785518 6872019   +   1
## 9107            protein_coding   chr1 6785518 6785575   +   1
## 9108            protein_coding   chr1 6785531 6785575   +   1
## 9109            protein_coding   chr1 6785531 6785533   +   1
## 9110            protein_coding   chr1 6806983 6807088   +   1
## 9111            protein_coding   chr1 6806983 6807088   +   1
## 9112            protein_coding   chr1 6825092 6825210   +   1
## 9113            protein_coding   chr1 6825092 6825210   +   1
## 9114            protein_coding   chr1 6871757 6872019   +   1
## 9115            protein_coding   chr1 6871757 6871762   +   1
```

```
## 9116             protein_coding  chr1 6871763 6871765    +       1
## 9117             protein_coding  chr1 6785518 6785530    +       1
## 9118             protein_coding  chr1 6871763 6872019    +       1
## 9119             protein_coding  chr1 7744961 7766522    +       1
## 9120             protein_coding  chr1 7744961 7745022    +       1
## 9121             protein_coding  chr1 7744961 7745022    +       1
## 9122             protein_coding  chr1 7744961 7744963    +       1
## 9123             protein_coding  chr1 7745845 7746091    +       1
## 9124             protein_coding  chr1 7745845 7746091    +       1
## 9125             protein_coding  chr1 7747710 7747781    +       1
## 9126             protein_coding  chr1 7747710 7747781    +       1
## 9127             protein_coding  chr1 7751199 7751392    +       1
## 9128             protein_coding  chr1 7751199 7751392    +       1
## 9129             protein_coding  chr1 7752459 7752533    +       1
## 9130             protein_coding  chr1 7752459 7752533    +       1
## 9131             protein_coding  chr1 7766459 7766522    +       1
## 9132             protein_coding  chr1 7766459 7766519    +       1
## 9133             protein_coding  chr1 7766520 7766522    +       1
## 9134             protein_coding  chr1 7766520 7766522    +       1
## 9135      processed_pseudogene  chr1 6834333 6834618    -       0
## 9136      processed_pseudogene  chr1 6834333 6834618    -       0
## 9137      processed_pseudogene  chr1 6834333 6834618    -       0
## 9138                    lncRNA  chr1 7008376 7014279    -       0
## 9139                    lncRNA  chr1 7008376 7014279    -       0
## 9140                    lncRNA  chr1 7014251 7014279    -       0
## 9141                    lncRNA  chr1 7008376 7008695    -       0
## 9142                     snRNA  chr1 7219360 7219524    +       1
## 9143                     snRNA  chr1 7219360 7219524    +       1
## 9144                     snRNA  chr1 7219360 7219524    +       1
## 9145                    lncRNA  chr1 7368942 7370270    +       1
## 9146                    lncRNA  chr1 7368942 7370270    +       1
## 9147                    lncRNA  chr1 7368942 7369116    +       1
## 9148                    lncRNA  chr1 7370081 7370270    +       1
## 9149                    lncRNA  chr1 7382487 7389754    -       0
## 9150                    lncRNA  chr1 7382487 7389754    -       0
## 9151                    lncRNA  chr1 7389659 7389754    -       0
## 9152                    lncRNA  chr1 7389340 7389439    -       0
## 9153                    lncRNA  chr1 7382487 7382723    -       0
## 9154                    lncRNA  chr1 7388183 7389419    -       0
## 9155                    lncRNA  chr1 7389340 7389419    -       0
## 9156                    lncRNA  chr1 7388183 7388493    -       0
## 9157                    lncRNA  chr1 7441096 7441554    -       0
## 9158                    lncRNA  chr1 7441096 7441554    -       0
## 9159                    lncRNA  chr1 7441280 7441554    -       0
## 9160                    lncRNA  chr1 7441096 7441181    -       0
## 9161                    lncRNA  chr1 7693124 7694844    -       0
## 9162                    lncRNA  chr1 7693124 7694844    -       0
## 9163                    lncRNA  chr1 7693124 7694844    -       0
## 9164                    lncRNA  chr1 7698303 7698872    -       0
## 9165                    lncRNA  chr1 7698303 7698872    -       0
## 9166                    lncRNA  chr1 7698303 7698872    -       0
## 9167                    lncRNA  chr1 7700704 7700970    -       0
## 9168                    lncRNA  chr1 7700704 7700970    -       0
## 9169                    lncRNA  chr1 7700704 7700970    -       0
```

```
## 9170                protein_coding    chr1 7771296 7781432    +    1
## 9171                protein_coding    chr1 7771296 7781432    +    1
## 9172                protein_coding    chr1 7771296 7771385    +    1
## 9173                protein_coding    chr1 7771384 7771385    +    1
## 9174                protein_coding    chr1 7771384 7771385    +    1
## 9175                protein_coding    chr1 7773442 7773442    +    1
## 9176                protein_coding    chr1 7773442 7773511    +    1
## 9177                protein_coding    chr1 7773442 7773511    +    1
## 9178                protein_coding    chr1 7777160 7777318    +    1
## 9179                protein_coding    chr1 7777160 7777318    +    1
## 9180                protein_coding    chr1 7778118 7778169    +    1
## 9181                protein_coding    chr1 7778118 7778169    +    1
## 9182                protein_coding    chr1 7779626 7781432    +    1
## 9183                protein_coding    chr1 7779626 7779642    +    1
## 9184                protein_coding    chr1 7779643 7779645    +    1
## 9185                protein_coding    chr1 7771296 7771383    +    1
## 9186                protein_coding    chr1 7779643 7781432    +    1
## 9187                protein_coding    chr1 7772707 7779806    +    1
## 9188                protein_coding    chr1 7772707 7773198    +    1
## 9189                protein_coding    chr1 7773442 7773511    +    1
## 9190                protein_coding    chr1 7777160 7777318    +    1
## 9191                protein_coding    chr1 7777172 7777318    +    1
## 9192                protein_coding    chr1 7777172 7777174    +    1
## 9193                protein_coding    chr1 7778118 7778169    +    1
## 9194                protein_coding    chr1 7778118 7778169    +    1
## 9195                protein_coding    chr1 7779626 7779806    +    1
## 9196                protein_coding    chr1 7779626 7779642    +    1
## 9197                protein_coding    chr1 7779643 7779645    +    1
## 9198                protein_coding    chr1 7772707 7773198    +    1
## 9199                protein_coding    chr1 7773442 7773511    +    1
## 9200                protein_coding    chr1 7777160 7777171    +    1
## 9201                protein_coding    chr1 7779643 7779806    +    1
## 9202                       lncRNA    chr1 7776383 7776775    +    0
## 9203                       lncRNA    chr1 7776383 7776775    +    0
## 9204                       lncRNA    chr1 7776383 7776775    +    0
## 9205                protein_coding    chr1 7784320 7845177    +    1
## 9206                protein_coding    chr1 7784320 7803958    +    1
## 9207                protein_coding    chr1 7784320 7784376    +    1
## 9208                protein_coding    chr1 7784654 7785005    +    1
## 9209                protein_coding    chr1 7784878 7785005    +    1
## 9210                protein_coding    chr1 7784878 7784880    +    1
## 9211                protein_coding    chr1 7785441 7785586    +    1
## 9212                protein_coding    chr1 7785441 7785586    +    1
## 9213                protein_coding    chr1 7786721 7786836    +    1
## 9214                protein_coding    chr1 7786721 7786836    +    1
## 9215                protein_coding    chr1 7788045 7788246    +    1
## 9216                protein_coding    chr1 7788045 7788246    +    1
## 9217                protein_coding    chr1 7793960 7794008    +    1
## 9218                protein_coding    chr1 7793960 7794008    +    1
## 9219                protein_coding    chr1 7798525 7798673    +    1
## 9220                protein_coding    chr1 7798525 7798673    +    1
## 9221                protein_coding    chr1 7801113 7801191    +    1
## 9222                protein_coding    chr1 7801113 7801191    +    1
## 9223                protein_coding    chr1 7803047 7803153    +    1
```

```
## 9224                        protein_coding    chr1 7803047 7803153    +    1
## 9225                        protein_coding    chr1 7803692 7803958    +    1
## 9226                        protein_coding    chr1 7803692 7803849    +    1
## 9227                        protein_coding    chr1 7803850 7803852    +    1
## 9228                        protein_coding    chr1 7784320 7784376    +    1
## 9229                        protein_coding    chr1 7784654 7784877    +    1
## 9230                        protein_coding    chr1 7803850 7803958    +    1
## 9231                        protein_coding    chr1 7784429 7845176    +    1
## 9232                        protein_coding    chr1 7784429 7784468    +    1
## 9233                        protein_coding    chr1 7784654 7785005    +    1
## 9234                        protein_coding    chr1 7784878 7785005    +    1
## 9235                        protein_coding    chr1 7784878 7784880    +    1
## 9236                        protein_coding    chr1 7785441 7785586    +    1
## 9237                        protein_coding    chr1 7785441 7785586    +    1
## 9238                        protein_coding    chr1 7786721 7786836    +    1
## 9239                        protein_coding    chr1 7786721 7786836    +    1
## 9240                        protein_coding    chr1 7788045 7788246    +    1
## 9241                        protein_coding    chr1 7788045 7788246    +    1
## 9242                        protein_coding    chr1 7793957 7794008    +    1
## 9243                        protein_coding    chr1 7793957 7794008    +    1
## 9244                        protein_coding    chr1 7798525 7798673    +    1
## 9245                        protein_coding    chr1 7798525 7798673    +    1
## 9246                        protein_coding    chr1 7801113 7801191    +    1
## 9247                        protein_coding    chr1 7801113 7801191    +    1
## 9248                        protein_coding    chr1 7803047 7803153    +    1
## 9249                        protein_coding    chr1 7803047 7803153    +    1
## 9250                        protein_coding    chr1 7803692 7803848    +    1
## 9251                        protein_coding    chr1 7803692 7803848    +    1
## 9252                        protein_coding    chr1 7808893 7808998    +    1
## 9253                        protein_coding    chr1 7808893 7808998    +    1
## 9254                        protein_coding    chr1 7809893 7810021    +    1
## 9255                        protein_coding    chr1 7809893 7810021    +    1
## 9256                        protein_coding    chr1 7810438 7810588    +    1
## 9257                        protein_coding    chr1 7810438 7810588    +    1
## 9258                        protein_coding    chr1 7819285 7819420    +    1
## 9259                        protein_coding    chr1 7819285 7819420    +    1
## 9260                        protein_coding    chr1 7820115 7820239    +    1
## 9261                        protein_coding    chr1 7820115 7820239    +    1
## 9262                        protein_coding    chr1 7820467 7820640    +    1
## 9263                        protein_coding    chr1 7820467 7820640    +    1
## 9264                        protein_coding    chr1 7826480 7826710    +    1
## 9265                        protein_coding    chr1 7826480 7826710    +    1
## 9266                        protein_coding    chr1 7827118 7827815    +    1
## 9267                        protein_coding    chr1 7827118 7827815    +    1
## 9268                        protein_coding    chr1 7829834 7830161    +    1
## 9269                        protein_coding    chr1 7829834 7830161    +    1
## 9270                        protein_coding    chr1 7835762 7835945    +    1
## 9271                        protein_coding    chr1 7835762 7835945    +    1
## 9272                        protein_coding    chr1 7836999 7837149    +    1
## 9273                        protein_coding    chr1 7836999 7837149    +    1
## 9274                        protein_coding    chr1 7842672 7845176    +    1
## 9275                        protein_coding    chr1 7842672 7842752    +    1
## 9276                        protein_coding    chr1 7842753 7842755    +    1
## 9277                        protein_coding    chr1 7784429 7784468    +    1
```

```
## 9278                   protein_coding      chr1 7784654 7784877      +      1
## 9279                   protein_coding      chr1 7842753 7845176      +      1
## 9280                   protein_coding      chr1 7784429 7845176      +      1
## 9281                   protein_coding      chr1 7784429 7784468      +      1
## 9282                   protein_coding      chr1 7784654 7785005      +      1
## 9283                   protein_coding      chr1 7784878 7785005      +      1
## 9284                   protein_coding      chr1 7784878 7784880      +      1
## 9285                   protein_coding      chr1 7785441 7785586      +      1
## 9286                   protein_coding      chr1 7785441 7785586      +      1
## 9287                   protein_coding      chr1 7786721 7786836      +      1
## 9288                   protein_coding      chr1 7786721 7786836      +      1
## 9289                   protein_coding      chr1 7788045 7788246      +      1
## 9290                   protein_coding      chr1 7788045 7788246      +      1
## 9291                   protein_coding      chr1 7793957 7794008      +      1
## 9292                   protein_coding      chr1 7793957 7794008      +      1
## 9293                   protein_coding      chr1 7798525 7798673      +      1
## 9294                   protein_coding      chr1 7798525 7798673      +      1
## 9295                   protein_coding      chr1 7801113 7801191      +      1
## 9296                   protein_coding      chr1 7801113 7801191      +      1
## 9297                   protein_coding      chr1 7803047 7803153      +      1
## 9298                   protein_coding      chr1 7803047 7803153      +      1
## 9299                   protein_coding      chr1 7803692 7803848      +      1
## 9300                   protein_coding      chr1 7803692 7803848      +      1
## 9301                   protein_coding      chr1 7808893 7808998      +      1
## 9302                   protein_coding      chr1 7808893 7808998      +      1
## 9303                   protein_coding      chr1 7809893 7810021      +      1
## 9304                   protein_coding      chr1 7809893 7810021      +      1
## 9305                   protein_coding      chr1 7810438 7810588      +      1
## 9306                   protein_coding      chr1 7810438 7810588      +      1
## 9307                   protein_coding      chr1 7819285 7819420      +      1
## 9308                   protein_coding      chr1 7819285 7819420      +      1
## 9309                   protein_coding      chr1 7820115 7820239      +      1
## 9310                   protein_coding      chr1 7820115 7820239      +      1
## 9311                   protein_coding      chr1 7820467 7820640      +      1
## 9312                   protein_coding      chr1 7820467 7820640      +      1
## 9313                   protein_coding      chr1 7826480 7826710      +      1
## 9314                   protein_coding      chr1 7826480 7826710      +      1
## 9315                   protein_coding      chr1 7827118 7827815      +      1
## 9316                   protein_coding      chr1 7827118 7827815      +      1
## 9317                   protein_coding      chr1 7829837 7829951      +      1
## 9318                   protein_coding      chr1 7829837 7829951      +      1
## 9319                   protein_coding      chr1 7830006 7830161      +      1
## 9320                   protein_coding      chr1 7830006 7830161      +      1
## 9321                   protein_coding      chr1 7835762 7835945      +      1
## 9322                   protein_coding      chr1 7835762 7835945      +      1
## 9323                   protein_coding      chr1 7836999 7837149      +      1
## 9324                   protein_coding      chr1 7836999 7837149      +      1
## 9325                   protein_coding      chr1 7842672 7845176      +      1
## 9326                   protein_coding      chr1 7842672 7842752      +      1
## 9327                   protein_coding      chr1 7842753 7842755      +      1
## 9328                   protein_coding      chr1 7784429 7784468      +      1
## 9329                   protein_coding      chr1 7784654 7784877      +      1
## 9330                   protein_coding      chr1 7842753 7845176      +      1
## 9331                   protein_coding      chr1 7784654 7845177      +      1
```

```
## 9332               protein_coding      chr1 7784654 7785005      +      1
## 9333               protein_coding      chr1 7784878 7785005      +      1
## 9334               protein_coding      chr1 7784878 7784880      +      1
## 9335               protein_coding      chr1 7785441 7785586      +      1
## 9336               protein_coding      chr1 7785441 7785586      +      1
## 9337               protein_coding      chr1 7786721 7786836      +      1
## 9338               protein_coding      chr1 7786721 7786836      +      1
## 9339               protein_coding      chr1 7788045 7788246      +      1
## 9340               protein_coding      chr1 7788045 7788246      +      1
## 9341               protein_coding      chr1 7793957 7794008      +      1
## 9342               protein_coding      chr1 7793957 7794008      +      1
## 9343               protein_coding      chr1 7798525 7798673      +      1
## 9344               protein_coding      chr1 7798525 7798673      +      1
## 9345               protein_coding      chr1 7801113 7801191      +      1
## 9346               protein_coding      chr1 7801113 7801191      +      1
## 9347               protein_coding      chr1 7803047 7803153      +      1
## 9348               protein_coding      chr1 7803047 7803153      +      1
## 9349               protein_coding      chr1 7803692 7803848      +      1
## 9350               protein_coding      chr1 7803692 7803848      +      1
## 9351               protein_coding      chr1 7808893 7808998      +      1
## 9352               protein_coding      chr1 7808893 7808998      +      1
## 9353               protein_coding      chr1 7809893 7810021      +      1
## 9354               protein_coding      chr1 7809893 7810021      +      1
## 9355               protein_coding      chr1 7810438 7810588      +      1
## 9356               protein_coding      chr1 7810438 7810588      +      1
## 9357               protein_coding      chr1 7819285 7819420      +      1
## 9358               protein_coding      chr1 7819285 7819420      +      1
## 9359               protein_coding      chr1 7820115 7820239      +      1
## 9360               protein_coding      chr1 7820115 7820239      +      1
## 9361               protein_coding      chr1 7820467 7820640      +      1
## 9362               protein_coding      chr1 7820467 7820640      +      1
## 9363               protein_coding      chr1 7826480 7826710      +      1
## 9364               protein_coding      chr1 7826480 7826710      +      1
## 9365               protein_coding      chr1 7827118 7827815      +      1
## 9366               protein_coding      chr1 7827118 7827815      +      1
## 9367               protein_coding      chr1 7829834 7830161      +      1
## 9368               protein_coding      chr1 7829834 7830161      +      1
## 9369               protein_coding      chr1 7835762 7835945      +      1
## 9370               protein_coding      chr1 7835762 7835945      +      1
## 9371               protein_coding      chr1 7836999 7837149      +      1
## 9372               protein_coding      chr1 7836999 7837149      +      1
## 9373               protein_coding      chr1 7842672 7845177      +      1
## 9374               protein_coding      chr1 7842672 7842752      +      1
## 9375               protein_coding      chr1 7842753 7842755      +      1
## 9376               protein_coding      chr1 7784654 7784877      +      1
## 9377               protein_coding      chr1 7842753 7845177      +      1
## 9378               protein_coding      chr1 7784703 7845177      +      1
## 9379               protein_coding      chr1 7784703 7785005      +      1
## 9380               protein_coding      chr1 7784878 7785005      +      1
## 9381               protein_coding      chr1 7784878 7784880      +      1
## 9382               protein_coding      chr1 7785441 7785586      +      1
## 9383               protein_coding      chr1 7785441 7785586      +      1
## 9384               protein_coding      chr1 7786721 7786836      +      1
## 9385               protein_coding      chr1 7786721 7786836      +      1
```

```
## 9386                    protein_coding      chr1 7788045 7788246      +      1
## 9387                    protein_coding      chr1 7788045 7788246      +      1
## 9388                    protein_coding      chr1 7793960 7794008      +      1
## 9389                    protein_coding      chr1 7793960 7794008      +      1
## 9390                    protein_coding      chr1 7798525 7798673      +      1
## 9391                    protein_coding      chr1 7798525 7798673      +      1
## 9392                    protein_coding      chr1 7801113 7801191      +      1
## 9393                    protein_coding      chr1 7801113 7801191      +      1
## 9394                    protein_coding      chr1 7803047 7803153      +      1
## 9395                    protein_coding      chr1 7803047 7803153      +      1
## 9396                    protein_coding      chr1 7803692 7803848      +      1
## 9397                    protein_coding      chr1 7803692 7803848      +      1
## 9398                    protein_coding      chr1 7808893 7808998      +      1
## 9399                    protein_coding      chr1 7808893 7808998      +      1
## 9400                    protein_coding      chr1 7809893 7810021      +      1
## 9401                    protein_coding      chr1 7809893 7810021      +      1
## 9402                    protein_coding      chr1 7810438 7810567      +      1
## 9403                    protein_coding      chr1 7810438 7810567      +      1
## 9404                    protein_coding      chr1 7819285 7819420      +      1
## 9405                    protein_coding      chr1 7819285 7819420      +      1
## 9406                    protein_coding      chr1 7820115 7820239      +      1
## 9407                    protein_coding      chr1 7820115 7820239      +      1
## 9408                    protein_coding      chr1 7820467 7820640      +      1
## 9409                    protein_coding      chr1 7820467 7820640      +      1
## 9410                    protein_coding      chr1 7826480 7826710      +      1
## 9411                    protein_coding      chr1 7826480 7826710      +      1
## 9412                    protein_coding      chr1 7827118 7827815      +      1
## 9413                    protein_coding      chr1 7827118 7827815      +      1
## 9414                    protein_coding      chr1 7829837 7830161      +      1
## 9415                    protein_coding      chr1 7829837 7830161      +      1
## 9416                    protein_coding      chr1 7835762 7835945      +      1
## 9417                    protein_coding      chr1 7835762 7835945      +      1
## 9418                    protein_coding      chr1 7836999 7837149      +      1
## 9419                    protein_coding      chr1 7836999 7837149      +      1
## 9420                    protein_coding      chr1 7842672 7845177      +      1
## 9421                    protein_coding      chr1 7842672 7842752      +      1
## 9422                    protein_coding      chr1 7842753 7842755      +      1
## 9423                    protein_coding      chr1 7784703 7784877      +      1
## 9424                    protein_coding      chr1 7842753 7845177      +      1
## 9425                             lncRNA      chr1 7810242 7827342      -      0
## 9426                             lncRNA      chr1 7810242 7827342      -      0
## 9427                             lncRNA      chr1 7827104 7827342      -      0
## 9428                             lncRNA      chr1 7811489 7811604      -      0
## 9429                             lncRNA      chr1 7810242 7810716      -      0
## 9430                    protein_coding      chr1 7843083 7853512      -      1
## 9431                    protein_coding      chr1 7843083 7853512      -      1
## 9432                    protein_coding      chr1 7853307 7853512      -      1
## 9433                    protein_coding      chr1 7852901 7853118      -      1
## 9434                    protein_coding      chr1 7852901 7853003      -      1
## 9435                    protein_coding      chr1 7853001 7853003      -      1
## 9436                    protein_coding      chr1 7850812 7850922      -      1
## 9437                    protein_coding      chr1 7850812 7850922      -      1
## 9438                    protein_coding      chr1 7849640 7849683      -      1
## 9439                    protein_coding      chr1 7849640 7849683      -      1
```

```
## 9440              protein_coding   chr1 7847804 7847882        -        1
## 9441              protein_coding   chr1 7847804 7847882        -        1
## 9442              protein_coding   chr1 7846692 7846766        -        1
## 9443              protein_coding   chr1 7846692 7846766        -        1
## 9444              protein_coding   chr1 7843083 7843950        -        1
## 9445              protein_coding   chr1 7843946 7843950        -        1
## 9446              protein_coding   chr1 7843943 7843945        -        1
## 9447              protein_coding   chr1 7853307 7853512        -        1
## 9448              protein_coding   chr1 7853004 7853118        -        1
## 9449              protein_coding   chr1 7843083 7843945        -        1
## 9450              protein_coding   chr1 7847614 7853035        -        1
## 9451              protein_coding   chr1 7852901 7853035        -        1
## 9452              protein_coding   chr1 7852901 7853003        -        1
## 9453              protein_coding   chr1 7853001 7853003        -        1
## 9454              protein_coding   chr1 7850812 7850922        -        1
## 9455              protein_coding   chr1 7850812 7850922        -        1
## 9456              protein_coding   chr1 7849640 7849683        -        1
## 9457              protein_coding   chr1 7849640 7849683        -        1
## 9458              protein_coding   chr1 7847614 7847882        -        1
## 9459              protein_coding   chr1 7847769 7847882        -        1
## 9460              protein_coding   chr1 7847766 7847768        -        1
## 9461              protein_coding   chr1 7853004 7853035        -        1
## 9462              protein_coding   chr1 7847614 7847768        -        1
## 9463              protein_coding   chr1 7847766 7853431        -        1
## 9464              protein_coding   chr1 7853307 7853431        -        1
## 9465              protein_coding   chr1 7853307 7853431        -        1
## 9466              protein_coding   chr1 7853429 7853431        -        1
## 9467              protein_coding   chr1 7852901 7852923        -        1
## 9468              protein_coding   chr1 7852901 7852923        -        1
## 9469              protein_coding   chr1 7850812 7850922        -        1
## 9470              protein_coding   chr1 7850812 7850922        -        1
## 9471              protein_coding   chr1 7849640 7849683        -        1
## 9472              protein_coding   chr1 7849640 7849683        -        1
## 9473              protein_coding   chr1 7847766 7847882        -        1
## 9474              protein_coding   chr1 7847769 7847882        -        1
## 9475              protein_coding   chr1 7847766 7847768        -        1
## 9476              protein_coding   chr1 7847766 7847768        -        1
## 9477              protein_coding   chr1 7915894 7943165        -        1
## 9478              protein_coding   chr1 7915894 7943165        -        1
## 9479              protein_coding   chr1 7943139 7943165        -        1
## 9480              protein_coding   chr1 7940784 7940933        -        1
## 9481              protein_coding   chr1 7939895 7940078        -        1
## 9482              protein_coding   chr1 7939895 7939994        -        1
## 9483              protein_coding   chr1 7939992 7939994        -        1
## 9484              protein_coding   chr1 7938721 7938828        -        1
## 9485              protein_coding   chr1 7938721 7938828        -        1
## 9486              protein_coding   chr1 7938193 7938330        -        1
## 9487              protein_coding   chr1 7938193 7938330        -        1
## 9488              protein_coding   chr1 7937690 7937756        -        1
## 9489              protein_coding   chr1 7937690 7937756        -        1
## 9490              protein_coding   chr1 7935013 7935143        -        1
## 9491              protein_coding   chr1 7935013 7935143        -        1
## 9492              protein_coding   chr1 7933162 7933296        -        1
## 9493              protein_coding   chr1 7933162 7933296        -        1
```

```
## 9494            protein_coding  chr1 7915894 7920923     -       1
## 9495            protein_coding  chr1 7920838 7920923     -       1
## 9496            protein_coding  chr1 7920835 7920837     -       1
## 9497            protein_coding  chr1 7943139 7943165     -       1
## 9498            protein_coding  chr1 7940784 7940933     -       1
## 9499            protein_coding  chr1 7939995 7940078     -       1
## 9500            protein_coding  chr1 7915894 7920837     -       1
## 9501            protein_coding  chr1 7919847 7940866     -       1
## 9502            protein_coding  chr1 7940784 7940866     -       1
## 9503            protein_coding  chr1 7939895 7940078     -       1
## 9504            protein_coding  chr1 7939895 7939994     -       1
## 9505            protein_coding  chr1 7939992 7939994     -       1
## 9506            protein_coding  chr1 7938721 7938828     -       1
## 9507            protein_coding  chr1 7938721 7938828     -       1
## 9508            protein_coding  chr1 7938193 7938330     -       1
## 9509            protein_coding  chr1 7938193 7938330     -       1
## 9510            protein_coding  chr1 7937690 7937756     -       1
## 9511            protein_coding  chr1 7937690 7937756     -       1
## 9512            protein_coding  chr1 7935013 7935143     -       1
## 9513            protein_coding  chr1 7935013 7935143     -       1
## 9514            protein_coding  chr1 7933162 7933296     -       1
## 9515            protein_coding  chr1 7933162 7933296     -       1
## 9516            protein_coding  chr1 7919847 7920923     -       1
## 9517            protein_coding  chr1 7920838 7920923     -       1
## 9518            protein_coding  chr1 7920835 7920837     -       1
## 9519            protein_coding  chr1 7940784 7940866     -       1
## 9520            protein_coding  chr1 7939995 7940078     -       1
## 9521            protein_coding  chr1 7919847 7920837     -       1
## 9522       processed_pseudogene chr1 7942372 7942726     +       0
## 9523       processed_pseudogene chr1 7942372 7942726     +       0
## 9524       processed_pseudogene chr1 7942372 7942726     +       0
## 9525            protein_coding  chr1 7954291 7985505     +       1
## 9526            protein_coding  chr1 7961692 7985505     +       1
## 9527            protein_coding  chr1 7961692 7961735     +       1
## 9528            protein_coding  chr1 7962763 7962875     +       1
## 9529            protein_coding  chr1 7962786 7962875     +       1
## 9530            protein_coding  chr1 7962786 7962788     +       1
## 9531            protein_coding  chr1 7965324 7965425     +       1
## 9532            protein_coding  chr1 7965324 7965425     +       1
## 9533            protein_coding  chr1 7969345 7969404     +       1
## 9534            protein_coding  chr1 7969345 7969404     +       1
## 9535            protein_coding  chr1 7970894 7970963     +       1
## 9536            protein_coding  chr1 7970894 7970963     +       1
## 9537            protein_coding  chr1 7977652 7977738     +       1
## 9538            protein_coding  chr1 7977652 7977738     +       1
## 9539            protein_coding  chr1 7984894 7985505     +       1
## 9540            protein_coding  chr1 7984894 7985051     +       1
## 9541            protein_coding  chr1 7985052 7985054     +       1
## 9542            protein_coding  chr1 7961692 7961735     +       1
## 9543            protein_coding  chr1 7962763 7962785     +       1
## 9544            protein_coding  chr1 7985052 7985505     +       1
## 9545            protein_coding  chr1 7961701 7985281     +       1
## 9546            protein_coding  chr1 7961701 7961735     +       1
## 9547            protein_coding  chr1 7962763 7962875     +       1
```

```
## 9548                       protein_coding     chr1 7962786 7962875      +        1
## 9549                       protein_coding     chr1 7962786 7962788      +        1
## 9550                       protein_coding     chr1 7965324 7965425      +        1
## 9551                       protein_coding     chr1 7965324 7965425      +        1
## 9552                       protein_coding     chr1 7970894 7970963      +        1
## 9553                       protein_coding     chr1 7970894 7970963      +        1
## 9554                       protein_coding     chr1 7977652 7977738      +        1
## 9555                       protein_coding     chr1 7977652 7977738      +        1
## 9556                       protein_coding     chr1 7984894 7985281      +        1
## 9557                       protein_coding     chr1 7984894 7985051      +        1
## 9558                       protein_coding     chr1 7985052 7985054      +        1
## 9559                       protein_coding     chr1 7961701 7961735      +        1
## 9560                       protein_coding     chr1 7962763 7962785      +        1
## 9561                       protein_coding     chr1 7985052 7985281      +        1
## 9562                       protein_coding     chr1 7961711 7985505      +        1
## 9563                       protein_coding     chr1 7961711 7961793      +        1
## 9564                       protein_coding     chr1 7962763 7962875      +        1
## 9565                       protein_coding     chr1 7962786 7962875      +        1
## 9566                       protein_coding     chr1 7962786 7962788      +        1
## 9567                       protein_coding     chr1 7965324 7965425      +        1
## 9568                       protein_coding     chr1 7965324 7965425      +        1
## 9569                       protein_coding     chr1 7969345 7969404      +        1
## 9570                       protein_coding     chr1 7969345 7969404      +        1
## 9571                       protein_coding     chr1 7970894 7970963      +        1
## 9572                       protein_coding     chr1 7970894 7970963      +        1
## 9573                       protein_coding     chr1 7977652 7977738      +        1
## 9574                       protein_coding     chr1 7977652 7977738      +        1
## 9575                       protein_coding     chr1 7984894 7985505      +        1
## 9576                       protein_coding     chr1 7984894 7985051      +        1
## 9577                       protein_coding     chr1 7985052 7985054      +        1
## 9578                       protein_coding     chr1 7961711 7961793      +        1
## 9579                       protein_coding     chr1 7962763 7962785      +        1
## 9580                       protein_coding     chr1 7985052 7985505      +        1
## 9581                       protein_coding     chr1 7961894 7985250      +        1
## 9582                       protein_coding     chr1 7961894 7962081      +        1
## 9583                       protein_coding     chr1 7962763 7962875      +        1
## 9584                       protein_coding     chr1 7962786 7962875      +        1
## 9585                       protein_coding     chr1 7962786 7962788      +        1
## 9586                       protein_coding     chr1 7965324 7965425      +        1
## 9587                       protein_coding     chr1 7965324 7965425      +        1
## 9588                       protein_coding     chr1 7969345 7969404      +        1
## 9589                       protein_coding     chr1 7969345 7969404      +        1
## 9590                       protein_coding     chr1 7970894 7970963      +        1
## 9591                       protein_coding     chr1 7970894 7970963      +        1
## 9592                       protein_coding     chr1 7977652 7977738      +        1
## 9593                       protein_coding     chr1 7977652 7977738      +        1
## 9594                       protein_coding     chr1 7984894 7985250      +        1
## 9595                       protein_coding     chr1 7984894 7985051      +        1
## 9596                       protein_coding     chr1 7985052 7985054      +        1
## 9597                       protein_coding     chr1 7961894 7962081      +        1
## 9598                       protein_coding     chr1 7962763 7962785      +        1
## 9599                       protein_coding     chr1 7985052 7985250      +        1
## 9600                       protein_coding     chr1 7961969 7985111      +        1
## 9601                       protein_coding     chr1 7961969 7962101      +        1
```

```
## 9602               protein_coding    chr1 7962763 7962875    +    1
## 9603               protein_coding    chr1 7962786 7962875    +    1
## 9604               protein_coding    chr1 7962786 7962788    +    1
## 9605               protein_coding    chr1 7965324 7965425    +    1
## 9606               protein_coding    chr1 7965324 7965425    +    1
## 9607               protein_coding    chr1 7969345 7969404    +    1
## 9608               protein_coding    chr1 7969345 7969404    +    1
## 9609               protein_coding    chr1 7970894 7970963    +    1
## 9610               protein_coding    chr1 7970894 7970963    +    1
## 9611               protein_coding    chr1 7977652 7977738    +    1
## 9612               protein_coding    chr1 7977652 7977738    +    1
## 9613               protein_coding    chr1 7984894 7985111    +    1
## 9614               protein_coding    chr1 7984894 7985051    +    1
## 9615               protein_coding    chr1 7985052 7985054    +    1
## 9616               protein_coding    chr1 7961969 7962101    +    1
## 9617               protein_coding    chr1 7962763 7962785    +    1
## 9618               protein_coding    chr1 7985052 7985111    +    1
## 9619                     misc_RNA    chr1 7982881 7982983    -    0
## 9620                     misc_RNA    chr1 7982881 7982983    -    0
## 9621                     misc_RNA    chr1 7982881 7982983    -    0
## 9622                       lncRNA    chr1 7991134 8005312    +    0
## 9623                       lncRNA    chr1 7991134 8005312    +    0
## 9624                       lncRNA    chr1 7991134 7991447    +    0
## 9625                       lncRNA    chr1 7994547 7994664    +    0
## 9626                       lncRNA    chr1 7996321 7996443    +    0
## 9627                       lncRNA    chr1 8000088 8000185    +    0
## 9628                       lncRNA    chr1 8000606 8000728    +    0
## 9629                       lncRNA    chr1 8003988 8005312    +    0
## 9630                       lncRNA    chr1 7999540 8002961    +    0
## 9631                       lncRNA    chr1 7999540 8000728    +    0
## 9632                       lncRNA    chr1 8001915 8002961    +    0
## 9633                       lncRNA    chr1 7998187 7999934    -    0
## 9634                       lncRNA    chr1 7998187 7999934    -    0
## 9635                       lncRNA    chr1 7999073 7999934    -    0
## 9636                       lncRNA    chr1 7998187 7998367    -    0
## 9637               protein_coding    chr1 8004404 8026309    -    1
## 9638               protein_coding    chr1 8004404 8026283    -    1
## 9639               protein_coding    chr1 8026158 8026283    -    1
## 9640               protein_coding    chr1 8015495 8015692    -    1
## 9641               protein_coding    chr1 8015495 8015619    -    1
## 9642               protein_coding    chr1 8015617 8015619    -    1
## 9643               protein_coding    chr1 8004404 8004558    -    1
## 9644               protein_coding    chr1 8004525 8004558    -    1
## 9645               protein_coding    chr1 8004522 8004524    -    1
## 9646               protein_coding    chr1 8026158 8026283    -    1
## 9647               protein_coding    chr1 8015620 8015692    -    1
## 9648               protein_coding    chr1 8004404 8004524    -    1
## 9649               protein_coding    chr1 8011727 8026309    -    1
## 9650               protein_coding    chr1 8026158 8026309    -    1
## 9651               protein_coding    chr1 8015495 8015692    -    1
## 9652               protein_coding    chr1 8015495 8015619    -    1
## 9653               protein_coding    chr1 8015617 8015619    -    1
## 9654               protein_coding    chr1 8015308 8015384    -    1
## 9655               protein_coding    chr1 8015308 8015384    -    1
```

```
## 9656             protein_coding   chr1 8011727 8014396      -      1
## 9657             protein_coding   chr1 8013213 8014396      -      1
## 9658             protein_coding   chr1 8013210 8013212      -      1
## 9659             protein_coding   chr1 8026158 8026309      -      1
## 9660             protein_coding   chr1 8015620 8015692      -      1
## 9661             protein_coding   chr1 8011727 8013212      -      1
## 9662             protein_coding   chr1 8013427 8015633      -      1
## 9663             protein_coding   chr1 8015495 8015633      -      1
## 9664             protein_coding   chr1 8015495 8015619      -      1
## 9665             protein_coding   chr1 8015617 8015619      -      1
## 9666             protein_coding   chr1 8013427 8015384      -      1
## 9667             protein_coding   chr1 8015273 8015384      -      1
## 9668             protein_coding   chr1 8015270 8015272      -      1
## 9669             protein_coding   chr1 8015620 8015633      -      1
## 9670             protein_coding   chr1 8013427 8015272      -      1
## 9671             protein_coding   chr1 8013739 8026296      -      1
## 9672             protein_coding   chr1 8026158 8026296      -      1
## 9673             protein_coding   chr1 8015495 8015692      -      1
## 9674             protein_coding   chr1 8015495 8015619      -      1
## 9675             protein_coding   chr1 8015617 8015619      -      1
## 9676             protein_coding   chr1 8013739 8014396      -      1
## 9677             protein_coding   chr1 8014300 8014396      -      1
## 9678             protein_coding   chr1 8014297 8014299      -      1
## 9679             protein_coding   chr1 8026158 8026296      -      1
## 9680             protein_coding   chr1 8015620 8015692      -      1
## 9681             protein_coding   chr1 8013739 8014299      -      1
## 9682                     lncRNA   chr1 8026738 8122702      +      0
## 9683                     lncRNA   chr1 8026738 8122702      +      0
## 9684                     lncRNA   chr1 8026738 8027421      +      0
## 9685                     lncRNA   chr1 8029227 8029357      +      0
## 9686                     lncRNA   chr1 8121474 8122702      +      0
## 9687        processed_pseudogene   chr1 8057245 8058463      -      0
## 9688        processed_pseudogene   chr1 8057245 8058463      -      0
## 9689        processed_pseudogene   chr1 8058361 8058463      -      0
## 9690        processed_pseudogene   chr1 8057245 8057941      -      0
## 9691        processed_pseudogene   chr1 8189824 8192770      +      0
## 9692        processed_pseudogene   chr1 8189824 8192770      +      0
## 9693        processed_pseudogene   chr1 8189824 8190331      +      0
## 9694        processed_pseudogene   chr1 8191216 8191495      +      0
## 9695        processed_pseudogene   chr1 8192182 8192254      +      0
## 9696        processed_pseudogene   chr1 8192557 8192770      +      0
## 9697                     lncRNA   chr1 8201518 8215210      +      1
## 9698                     lncRNA   chr1 8201518 8215207      +      1
## 9699                     lncRNA   chr1 8201518 8201568      +      1
## 9700                     lncRNA   chr1 8202690 8202876      +      1
## 9701                     lncRNA   chr1 8208667 8208873      +      1
## 9702                     lncRNA   chr1 8210487 8210595      +      1
## 9703                     lncRNA   chr1 8215079 8215207      +      1
## 9704                     lncRNA   chr1 8208672 8215210      +      1
## 9705                     lncRNA   chr1 8208672 8208873      +      1
## 9706                     lncRNA   chr1 8210487 8210595      +      1
## 9707                     lncRNA   chr1 8214625 8214678      +      1
## 9708                     lncRNA   chr1 8215079 8215210      +      1
## 9709                      snRNA   chr1 8206434 8206597      -      1
```

```
## 9710                  snRNA chr1 8206434 8206597       -       1
## 9711                  snRNA chr1 8206434 8206597       -       1
## 9712                 lncRNA chr1 8218190 8220529       -       0
## 9713                 lncRNA chr1 8218190 8220529       -       0
## 9714                 lncRNA chr1 8220397 8220529       -       0
## 9715                 lncRNA chr1 8218190 8218533       -       0
## 9716                  snRNA chr1 8292157 8292263       -       1
## 9717                  snRNA chr1 8292157 8292263       -       1
## 9718                  snRNA chr1 8292157 8292263       -       1
## 9719         protein_coding chr1 8317826 8344167       +       1
## 9720         protein_coding chr1 8317826 8344165       +       1
## 9721         protein_coding chr1 8317826 8318186       +       1
## 9722         protein_coding chr1 8318109 8318186       +       1
## 9723         protein_coding chr1 8318109 8318111       +       1
## 9724         protein_coding chr1 8324306 8324726       +       1
## 9725         protein_coding chr1 8324306 8324726       +       1
## 9726         protein_coding chr1 8325298 8325390       +       1
## 9727         protein_coding chr1 8325298 8325390       +       1
## 9728         protein_coding chr1 8325818 8326042       +       1
## 9729         protein_coding chr1 8325818 8326042       +       1
## 9730         protein_coding chr1 8330209 8330936       +       1
## 9731         protein_coding chr1 8330209 8330936       +       1
## 9732         protein_coding chr1 8335437 8335590       +       1
## 9733         protein_coding chr1 8335437 8335590       +       1
## 9734         protein_coding chr1 8337816 8337992       +       1
## 9735         protein_coding chr1 8337816 8337992       +       1
## 9736         protein_coding chr1 8339493 8339698       +       1
## 9737         protein_coding chr1 8339493 8339698       +       1
## 9738         protein_coding chr1 8343747 8344165       +       1
## 9739         protein_coding chr1 8343747 8344010       +       1
## 9740         protein_coding chr1 8344011 8344013       +       1
## 9741         protein_coding chr1 8317826 8318108       +       1
## 9742         protein_coding chr1 8344011 8344165       +       1
## 9743         protein_coding chr1 8324330 8344167       +       1
## 9744         protein_coding chr1 8324330 8324726       +       1
## 9745         protein_coding chr1 8324330 8324726       +       1
## 9746         protein_coding chr1 8324330 8324332       +       1
## 9747         protein_coding chr1 8325298 8325390       +       1
## 9748         protein_coding chr1 8325298 8325390       +       1
## 9749         protein_coding chr1 8325818 8326042       +       1
## 9750         protein_coding chr1 8325818 8326042       +       1
## 9751         protein_coding chr1 8330209 8330936       +       1
## 9752         protein_coding chr1 8330209 8330936       +       1
## 9753         protein_coding chr1 8335437 8335590       +       1
## 9754         protein_coding chr1 8335437 8335590       +       1
## 9755         protein_coding chr1 8337816 8337992       +       1
## 9756         protein_coding chr1 8337816 8337992       +       1
## 9757         protein_coding chr1 8339493 8339698       +       1
## 9758         protein_coding chr1 8339493 8339698       +       1
## 9759         protein_coding chr1 8343747 8344167       +       1
## 9760         protein_coding chr1 8343747 8344010       +       1
## 9761         protein_coding chr1 8344011 8344013       +       1
## 9762         protein_coding chr1 8344011 8344167       +       1
## 9763               misc_RNA chr1 8328067 8328179       +       0
```

```
## 9764                   misc_RNA  chr1 8328067 8328179    +    0
## 9765                   misc_RNA  chr1 8328067 8328179    +    0
## 9766             protein_coding  chr1 8352397 8848921    -    1
## 9767             protein_coding  chr1 8352397 8817465    -    1
## 9768             protein_coding  chr1 8817160 8817465    -    1
## 9769             protein_coding  chr1 8792404 8792588    -    1
## 9770             protein_coding  chr1 8655973 8656441    -    1
## 9771             protein_coding  chr1 8655973 8656297    -    1
## 9772             protein_coding  chr1 8656295 8656297    -    1
## 9773             protein_coding  chr1 8624310 8624380    -    1
## 9774             protein_coding  chr1 8624310 8624380    -    1
## 9775             protein_coding  chr1 8614561 8614686    -    1
## 9776             protein_coding  chr1 8614561 8614686    -    1
## 9777             protein_coding  chr1 8557418 8557523    +    1
## 9778             protein_coding  chr1 8557418 8557523    -    1
## 9779             protein_coding  chr1 8556475 8556571    -    1
## 9780             protein_coding  chr1 8556475 8556571    -    1
## 9781             protein_coding  chr1 8541214 8541318    -    1
## 9782             protein_coding  chr1 8541214 8541318    -    1
## 9783             protein_coding  chr1 8508627 8508675    -    1
## 9784             protein_coding  chr1 8508627 8508675    -    1
## 9785             protein_coding  chr1 8497405 8497529    -    1
## 9786             protein_coding  chr1 8497405 8497529    -    1
## 9787             protein_coding  chr1 8495063 8495162    -    1
## 9788             protein_coding  chr1 8495063 8495162    -    1
## 9789             protein_coding  chr1 8465925 8466023    -    1
## 9790             protein_coding  chr1 8465925 8466023    -    1
## 9791             protein_coding  chr1 8422727 8422807    -    1
## 9792             protein_coding  chr1 8422727 8422807    -    1
## 9793             protein_coding  chr1 8365812 8365974    -    1
## 9794             protein_coding  chr1 8365812 8365974    -    1
## 9795             protein_coding  chr1 8364746 8364838    -    1
## 9796             protein_coding  chr1 8364746 8364838    -    1
## 9797             protein_coding  chr1 8364056 8364255    -    1
## 9798             protein_coding  chr1 8364056 8364255    -    1
## 9799             protein_coding  chr1 8362683 8362844    -    1
## 9800             protein_coding  chr1 8362683 8362844    -    1
## 9801             protein_coding  chr1 8361763 8361876    -    1
## 9802             protein_coding  chr1 8361763 8361876    -    1
## 9803             protein_coding  chr1 8360112 8361490    -    1
## 9804             protein_coding  chr1 8360112 8361490    -    1
## 9805             protein_coding  chr1 8359764 8359986    -    1
## 9806             protein_coding  chr1 8359764 8359986    -    1
## 9807             protein_coding  chr1 8358196 8358916    -    1
## 9808             protein_coding  chr1 8358196 8358916    -    1
## 9809             protein_coding  chr1 8356100 8356246    -    1
## 9810             protein_coding  chr1 8356100 8356246    -    1
## 9811             protein_coding  chr1 8355419 8355599    -    1
## 9812             protein_coding  chr1 8355419 8355599    -    1
## 9813             protein_coding  chr1 8352397 8355120    -    1
## 9814             protein_coding  chr1 8355090 8355120    -    1
## 9815             protein_coding  chr1 8355087 8355089    -    1
## 9816             protein_coding  chr1 8817160 8817465    -    1
## 9817             protein_coding  chr1 8792404 8792588    -    1
```

```
## 9818                protein_coding    chr1 8656298 8656441    -    1
## 9819                protein_coding    chr1 8352397 8355089    -    1
## 9820                protein_coding    chr1 8352404 8817640    -    1
## 9821                protein_coding    chr1 8817160 8817640    -    1
## 9822                protein_coding    chr1 8655973 8656441    -    1
## 9823                protein_coding    chr1 8655973 8656297    -    1
## 9824                protein_coding    chr1 8656295 8656297    -    1
## 9825                protein_coding    chr1 8624310 8624380    -    1
## 9826                protein_coding    chr1 8624310 8624380    -    1
## 9827                protein_coding    chr1 8614561 8614686    -    1
## 9828                protein_coding    chr1 8614561 8614686    -    1
## 9829                protein_coding    chr1 8557418 8557523    -    1
## 9830                protein_coding    chr1 8557418 8557523    -    1
## 9831                protein_coding    chr1 8556475 8556571    -    1
## 9832                protein_coding    chr1 8556475 8556571    -    1
## 9833                protein_coding    chr1 8541214 8541318    -    1
## 9834                protein_coding    chr1 8541214 8541318    -    1
## 9835                protein_coding    chr1 8508627 8508675    -    1
## 9836                protein_coding    chr1 8508627 8508675    -    1
## 9837                protein_coding    chr1 8497405 8497529    -    1
## 9838                protein_coding    chr1 8497405 8497529    -    1
## 9839                protein_coding    chr1 8495063 8495162    -    1
## 9840                protein_coding    chr1 8495063 8495162    -    1
## 9841                protein_coding    chr1 8465925 8466023    -    1
## 9842                protein_coding    chr1 8465925 8466023    -    1
## 9843                protein_coding    chr1 8422727 8422807    -    1
## 9844                protein_coding    chr1 8422727 8422807    -    1
## 9845                protein_coding    chr1 8365812 8365974    -    1
## 9846                protein_coding    chr1 8365812 8365974    -    1
## 9847                protein_coding    chr1 8364746 8364838    -    1
## 9848                protein_coding    chr1 8364746 8364838    -    1
## 9849                protein_coding    chr1 8364056 8364255    -    1
## 9850                protein_coding    chr1 8364056 8364255    -    1
## 9851                protein_coding    chr1 8362683 8362844    -    1
## 9852                protein_coding    chr1 8362683 8362844    -    1
## 9853                protein_coding    chr1 8361763 8361876    -    1
## 9854                protein_coding    chr1 8361763 8361876    -    1
## 9855                protein_coding    chr1 8360112 8361490    -    1
## 9856                protein_coding    chr1 8360112 8361490    -    1
## 9857                protein_coding    chr1 8359764 8359986    -    1
## 9858                protein_coding    chr1 8359764 8359986    -    1
## 9859                protein_coding    chr1 8358196 8358916    -    1
## 9860                protein_coding    chr1 8358196 8358916    -    1
## 9861                protein_coding    chr1 8356100 8356246    -    1
## 9862                protein_coding    chr1 8356100 8356246    -    1
## 9863                protein_coding    chr1 8355419 8355599    -    1
## 9864                protein_coding    chr1 8355419 8355599    -    1
## 9865                protein_coding    chr1 8352404 8355120    -    1
## 9866                protein_coding    chr1 8355090 8355120    -    1
## 9867                protein_coding    chr1 8355087 8355089    -    1
## 9868                protein_coding    chr1 8817160 8817640    -    1
## 9869                protein_coding    chr1 8656298 8656441    -    1
## 9870                protein_coding    chr1 8352404 8355089    -    1
## 9871                protein_coding    chr1 8352406 8525939    -    1
```

```
## 9872                      protein_coding    chr1 8525759 8525939      -      1
## 9873                      protein_coding    chr1 8525759 8525784      -      1
## 9874                      protein_coding    chr1 8525782 8525784      -      1
## 9875                      protein_coding    chr1 8508627 8508675      -      1
## 9876                      protein_coding    chr1 8508627 8508675      -      1
## 9877                      protein_coding    chr1 8497405 8497529      -      1
## 9878                      protein_coding    chr1 8497405 8497529      -      1
## 9879                      protein_coding    chr1 8495063 8495162      -      1
## 9880                      protein_coding    chr1 8495063 8495162      -      1
## 9881                      protein_coding    chr1 8465925 8466023      -      1
## 9882                      protein_coding    chr1 8465925 8466023      -      1
## 9883                      protein_coding    chr1 8422727 8422807      -      1
## 9884                      protein_coding    chr1 8422727 8422807      -      1
## 9885                      protein_coding    chr1 8365812 8365974      -      1
## 9886                      protein_coding    chr1 8365812 8365974      -      1
## 9887                      protein_coding    chr1 8364746 8364838      -      1
## 9888                      protein_coding    chr1 8364746 8364838      -      1
## 9889                      protein_coding    chr1 8364056 8364255      -      1
## 9890                      protein_coding    chr1 8364056 8364255      -      1
## 9891                      protein_coding    chr1 8362683 8362844      -      1
## 9892                      protein_coding    chr1 8362683 8362844      -      1
## 9893                      protein_coding    chr1 8361763 8361876      -      1
## 9894                      protein_coding    chr1 8361763 8361876      -      1
## 9895                      protein_coding    chr1 8360112 8361490      -      1
## 9896                      protein_coding    chr1 8360112 8361490      -      1
## 9897                      protein_coding    chr1 8359764 8359986      -      1
## 9898                      protein_coding    chr1 8359764 8359986      -      1
## 9899                      protein_coding    chr1 8358196 8358916      -      1
## 9900                      protein_coding    chr1 8358196 8358916      -      1
## 9901                      protein_coding    chr1 8356100 8356246      -      1
## 9902                      protein_coding    chr1 8356100 8356246      -      1
## 9903                      protein_coding    chr1 8355419 8355599      -      1
## 9904                      protein_coding    chr1 8355419 8355599      -      1
## 9905                      protein_coding    chr1 8352406 8355120      -      1
## 9906                      protein_coding    chr1 8355090 8355120      -      1
## 9907                      protein_coding    chr1 8355087 8355089      -      1
## 9908                      protein_coding    chr1 8525785 8525939      -      1
## 9909                      protein_coding    chr1 8352406 8355089      -      1
## 9910                      protein_coding    chr1 8353943 8656371      -      1
## 9911                      protein_coding    chr1 8655973 8656371      -      1
## 9912                      protein_coding    chr1 8655973 8656297      -      1
## 9913                      protein_coding    chr1 8656295 8656297      -      1
## 9914                      protein_coding    chr1 8624310 8624380      -      1
## 9915                      protein_coding    chr1 8624310 8624380      -      1
## 9916                      protein_coding    chr1 8614561 8614686      -      1
## 9917                      protein_coding    chr1 8614561 8614686      -      1
## 9918                      protein_coding    chr1 8557418 8557523      -      1
## 9919                      protein_coding    chr1 8557418 8557523      -      1
## 9920                      protein_coding    chr1 8556475 8556571      -      1
## 9921                      protein_coding    chr1 8556475 8556571      -      1
## 9922                      protein_coding    chr1 8541214 8541318      -      1
## 9923                      protein_coding    chr1 8541214 8541318      -      1
## 9924                      protein_coding    chr1 8508627 8508675      -      1
## 9925                      protein_coding    chr1 8508627 8508675      -      1
```

```
## 9926                    protein_coding     chr1 8497405 8497529     -      1
## 9927                    protein_coding     chr1 8497405 8497529     -      1
## 9928                    protein_coding     chr1 8495063 8495162     -      1
## 9929                    protein_coding     chr1 8495063 8495162     -      1
## 9930                    protein_coding     chr1 8465925 8466023     -      1
## 9931                    protein_coding     chr1 8465925 8466023     -      1
## 9932                    protein_coding     chr1 8422727 8422807     -      1
## 9933                    protein_coding     chr1 8422727 8422807     -      1
## 9934                    protein_coding     chr1 8365812 8365974     -      1
## 9935                    protein_coding     chr1 8365812 8365974     -      1
## 9936                    protein_coding     chr1 8364746 8364838     -      1
## 9937                    protein_coding     chr1 8364746 8364838     -      1
## 9938                    protein_coding     chr1 8355419 8355599     -      1
## 9939                    protein_coding     chr1 8355419 8355599     -      1
## 9940                    protein_coding     chr1 8353943 8355120     -      1
## 9941                    protein_coding     chr1 8355090 8355120     -      1
## 9942                    protein_coding     chr1 8355087 8355089     -      1
## 9943                    protein_coding     chr1 8656298 8656371     -      1
## 9944                    protein_coding     chr1 8353943 8355089     -      1
## 9945                    protein_coding     chr1 8354093 8423666     -      1
## 9946                    protein_coding     chr1 8423561 8423666     -      1
## 9947                    protein_coding     chr1 8422727 8422807     -      1
## 9948                    protein_coding     chr1 8365812 8365974     -      1
## 9949                    protein_coding     chr1 8364746 8364838     -      1
## 9950                    protein_coding     chr1 8364056 8364255     -      1
## 9951                    protein_coding     chr1 8364056 8364133     -      1
## 9952                    protein_coding     chr1 8364131 8364133     -      1
## 9953                    protein_coding     chr1 8362683 8362844     -      1
## 9954                    protein_coding     chr1 8362683 8362844     -      1
## 9955                    protein_coding     chr1 8361763 8361876     -      1
## 9956                    protein_coding     chr1 8361763 8361876     -      1
## 9957                    protein_coding     chr1 8360112 8361490     -      1
## 9958                    protein_coding     chr1 8360112 8361490     -      1
## 9959                    protein_coding     chr1 8359764 8359986     -      1
## 9960                    protein_coding     chr1 8359764 8359986     -      1
## 9961                    protein_coding     chr1 8358196 8358916     -      1
## 9962                    protein_coding     chr1 8358196 8358916     -      1
## 9963                    protein_coding     chr1 8356100 8356246     -      1
## 9964                    protein_coding     chr1 8356100 8356246     -      1
## 9965                    protein_coding     chr1 8355419 8355599     -      1
## 9966                    protein_coding     chr1 8355419 8355599     -      1
## 9967                    protein_coding     chr1 8354093 8355120     -      1
## 9968                    protein_coding     chr1 8355090 8355120     -      1
## 9969                    protein_coding     chr1 8355087 8355089     -      1
## 9970                    protein_coding     chr1 8423561 8423666     -      1
## 9971                    protein_coding     chr1 8422727 8422807     -      1
## 9972                    protein_coding     chr1 8365812 8365974     -      1
## 9973                    protein_coding     chr1 8364746 8364838     -      1
## 9974                    protein_coding     chr1 8364134 8364255     -      1
## 9975                    protein_coding     chr1 8354093 8355089     -      1
## 9976                    protein_coding     chr1 8436770 8817271     -      1
## 9977                    protein_coding     chr1 8817160 8817271     -      1
## 9978                    protein_coding     chr1 8655973 8656441     -      1
## 9979                    protein_coding     chr1 8655973 8656297     -      1
```

```
## 9980                          protein_coding   chr1 8656295 8656297      -      1
## 9981                          protein_coding   chr1 8624310 8624380      -      1
## 9982                          protein_coding   chr1 8624310 8624380      -      1
## 9983                          protein_coding   chr1 8614561 8614686      -      1
## 9984                          protein_coding   chr1 8614561 8614686      -      1
## 9985                          protein_coding   chr1 8557418 8557523      -      1
## 9986                          protein_coding   chr1 8557418 8557523      -      1
## 9987                          protein_coding   chr1 8556475 8556571      -      1
## 9988                          protein_coding   chr1 8556475 8556571      -      1
## 9989                          protein_coding   chr1 8541214 8541318      -      1
## 9990                          protein_coding   chr1 8541214 8541318      -      1
## 9991                          protein_coding   chr1 8508627 8508675      -      1
## 9992                          protein_coding   chr1 8508627 8508675      -      1
## 9993                          protein_coding   chr1 8497405 8497529      -      1
## 9994                          protein_coding   chr1 8497405 8497529      -      1
## 9995                          protein_coding   chr1 8495063 8495162      -      1
## 9996                          protein_coding   chr1 8495063 8495162      -      1
## 9997                          protein_coding   chr1 8465925 8466023      -      1
## 9998                          protein_coding   chr1 8465925 8466023      -      1
## 9999                          protein_coding   chr1 8436770 8438300      -      1
##      isCCDS
## 1         0
## 2         0
## 3         0
## 4         0
## 5         0
## 6         0
## 7         0
## 8         0
## 9         0
## 10        0
## 11        0
## 12        0
## 13        0
## 14        0
## 15        0
## 16        0
## 17        0
## 18        0
## 19        0
## 20        0
## 21        0
## 22        0
## 23        0
## 24        0
## 25        0
## 26        0
## 27        0
## 28        0
## 29        0
## 30        0
## 31        0
## 32        0
## 33        0
```

```
## 34          0
## 35          0
## 36          0
## 37          0
## 38          0
## 39          0
## 40          0
## 41          0
## 42          0
## 43          0
## 44          0
## 45          0
## 46          0
## 47          0
## 48          0
## 49          0
## 50          0
## 51          0
## 52          0
## 53          0
## 54          0
## 55          0
## 56          0
## 57          0
## 58          0
## 59          0
## 60          0
## 61          0
## 62          0
## 63          0
## 64          0
## 65          0
## 66          0
## 67          1
## 68          1
## 69          1
## 70          1
## 71          1
## 72          1
## 73          1
## 74          0
## 75          0
## 76          0
## 77          0
## 78          0
## 79          0
## 80          0
## 81          0
## 82          0
## 83          0
## 84          0
## 85          0
## 86          0
## 87          0
```

```
## 88           0
## 89           0
## 90           0
## 91           0
## 92           0
## 93           0
## 94           0
## 95           0
## 96           0
## 97           0
## 98           0
## 99           0
## 100          0
## 101          0
## 102          0
## 103          0
## 104          0
## 105          0
## 106          0
## 107          0
## 108          0
## 109          0
## 110          0
## 111          0
## 112          0
## 113          0
## 114          0
## 115          0
## 116          0
## 117          0
## 118          0
## 119          0
## 120          0
## 121          0
## 122          0
## 123          0
## 124          0
## 125          0
## 126          0
## 127          0
## 128          0
## 129          0
## 130          0
## 131          0
## 132          0
## 133          0
## 134          0
## 135          0
## 136          0
## 137          0
## 138          0
## 139          0
## 140          0
## 141          0
```

```
## 142          0
## 143          0
## 144          0
## 145          0
## 146          0
## 147          0
## 148          0
## 149          0
## 150          0
## 151          0
## 152          0
## 153          0
## 154          0
## 155          0
## 156          0
## 157          0
## 158          0
## 159          0
## 160          0
## 161          0
## 162          0
## 163          0
## 164          0
## 165          0
## 166          0
## 167          0
## 168          0
## 169          0
## 170          0
## 171          0
## 172          0
## 173          0
## 174          0
## 175          0
## 176          0
## 177          0
## 178          0
## 179          0
## 180          0
## 181          0
## 182          0
## 183          0
## 184          0
## 185          1
## 186          1
## 187          1
## 188          1
## 189          1
## 190          1
## 191          1
## 192          0
## 193          0
## 194          0
## 195          0
```

```
## 196          0
## 197          0
## 198          0
## 199          0
## 200          0
## 201          0
## 202          0
## 203          0
## 204          0
## 205          0
## 206          0
## 207          0
## 208          0
## 209          0
## 210          0
## 211          0
## 212          0
## 213          0
## 214          0
## 215          0
## 216          0
## 217          0
## 218          0
## 219          0
## 220          0
## 221          0
## 222          0
## 223          0
## 224          0
## 225          0
## 226          0
## 227          0
## 228          0
## 229          0
## 230          0
## 231          0
## 232          0
## 233          0
## 234          0
## 235          0
## 236          0
## 237          0
## 238          0
## 239          0
## 240          0
## 241          0
## 242          0
## 243          0
## 244          0
## 245          0
## 246          0
## 247          0
## 248          0
## 249          0
```

```
## 250          0
## 251          1
## 252          1
## 253          1
## 254          1
## 255          1
## 256          1
## 257          1
## 258          0
## 259          0
## 260          0
## 261          0
## 262          0
## 263          0
## 264          0
## 265          0
## 266          0
## 267          0
## 268          0
## 269          0
## 270          0
## 271          0
## 272          0
## 273          0
## 274          0
## 275          0
## 276          0
## 277          0
## 278          0
## 279          0
## 280          0
## 281          0
## 282          0
## 283          0
## 284          0
## 285          0
## 286          0
## 287          0
## 288          0
## 289          0
## 290          0
## 291          0
## 292          0
## 293          0
## 294          0
## 295          0
## 296          0
## 297          0
## 298          0
## 299          0
## 300          0
## 301          0
## 302          0
## 303          0
```

```
## 304          0
## 305          0
## 306          0
## 307          0
## 308          0
## 309          0
## 310          0
## 311          0
## 312          0
## 313          0
## 314          0
## 315          0
## 316          0
## 317          0
## 318          0
## 319          0
## 320          0
## 321          0
## 322          0
## 323          0
## 324          0
## 325          0
## 326          0
## 327          0
## 328          0
## 329          0
## 330          0
## 331          0
## 332          0
## 333          0
## 334          0
## 335          0
## 336          0
## 337          0
## 338          0
## 339          0
## 340          0
## 341          0
## 342          0
## 343          0
## 344          0
## 345          0
## 346          0
## 347          0
## 348          0
## 349          0
## 350          0
## 351          0
## 352          0
## 353          0
## 354          0
## 355          0
## 356          0
## 357          0
```

```
## 358          0
## 359          0
## 360          0
## 361          0
## 362          0
## 363          0
## 364          0
## 365          0
## 366          0
## 367          0
## 368          0
## 369          0
## 370          0
## 371          0
## 372          0
## 373          0
## 374          0
## 375          0
## 376          0
## 377          0
## 378          0
## 379          0
## 380          0
## 381          0
## 382          0
## 383          0
## 384          0
## 385          0
## 386          0
## 387          0
## 388          0
## 389          0
## 390          0
## 391          0
## 392          0
## 393          0
## 394          0
## 395          0
## 396          0
## 397          0
## 398          0
## 399          0
## 400          0
## 401          0
## 402          0
## 403          0
## 404          0
## 405          0
## 406          0
## 407          0
## 408          0
## 409          0
## 410          0
## 411          0
```

```
## 412        0
## 413        0
## 414        0
## 415        0
## 416        0
## 417        0
## 418        0
## 419        0
## 420        0
## 421        0
## 422        0
## 423        0
## 424        0
## 425        0
## 426        0
## 427        0
## 428        0
## 429        0
## 430        0
## 431        0
## 432        0
## 433        0
## 434        0
## 435        0
## 436        0
## 437        0
## 438        0
## 439        0
## 440        0
## 441        0
## 442        0
## 443        0
## 444        0
## 445        1
## 446        1
## 447        1
## 448        1
## 449        1
## 450        1
## 451        1
## 452        1
## 453        1
## 454        1
## 455        1
## 456        1
## 457        1
## 458        1
## 459        1
## 460        1
## 461        1
## 462        1
## 463        1
## 464        1
## 465        1
```

```
## 466          1
## 467          1
## 468          1
## 469          1
## 470          1
## 471          1
## 472          1
## 473          1
## 474          1
## 475          1
## 476          1
## 477          1
## 478          0
## 479          0
## 480          0
## 481          0
## 482          0
## 483          0
## 484          0
## 485          0
## 486          0
## 487          0
## 488          0
## 489          0
## 490          0
## 491          0
## 492          0
## 493          0
## 494          0
## 495          0
## 496          0
## 497          0
## 498          0
## 499          0
## 500          0
## 501          0
## 502          0
## 503          0
## 504          0
## 505          0
## 506          0
## 507          0
## 508          0
## 509          0
## 510          0
## 511          0
## 512          0
## 513          0
## 514          0
## 515          0
## 516          0
## 517          0
## 518          0
## 519          0
```

```
## 520          0
## 521          0
## 522          0
## 523          0
## 524          0
## 525          0
## 526          0
## 527          0
## 528          0
## 529          0
## 530          0
## 531          0
## 532          0
## 533          0
## 534          0
## 535          0
## 536          0
## 537          0
## 538          0
## 539          0
## 540          0
## 541          0
## 542          0
## 543          0
## 544          0
## 545          0
## 546          0
## 547          0
## 548          0
## 549          0
## 550          0
## 551          0
## 552          0
## 553          0
## 554          0
## 555          0
## 556          0
## 557          0
## 558          0
## 559          0
## 560          0
## 561          0
## 562          0
## 563          0
## 564          0
## 565          0
## 566          0
## 567          0
## 568          0
## 569          0
## 570          0
## 571          0
## 572          0
## 573          0
```

```
## 574          0
## 575          0
## 576          0
## 577          0
## 578          0
## 579          0
## 580          0
## 581          0
## 582          0
## 583          0
## 584          0
## 585          0
## 586          0
## 587          0
## 588          0
## 589          0
## 590          0
## 591          0
## 592          0
## 593          0
## 594          0
## 595          0
## 596          0
## 597          0
## 598          0
## 599          0
## 600          0
## 601          0
## 602          0
## 603          0
## 604          0
## 605          0
## 606          0
## 607          0
## 608          0
## 609          0
## 610          0
## 611          0
## 612          0
## 613          0
## 614          0
## 615          0
## 616          0
## 617          0
## 618          0
## 619          0
## 620          0
## 621          0
## 622          0
## 623          0
## 624          0
## 625          0
## 626          0
## 627          0
```

```
## 628          0
## 629          0
## 630          0
## 631          0
## 632          0
## 633          0
## 634          0
## 635          0
## 636          0
## 637          0
## 638          0
## 639          0
## 640          0
## 641          0
## 642          0
## 643          0
## 644          0
## 645          0
## 646          0
## 647          0
## 648          0
## 649          0
## 650          0
## 651          0
## 652          0
## 653          0
## 654          0
## 655          0
## 656          0
## 657          0
## 658          0
## 659          0
## 660          0
## 661          0
## 662          0
## 663          0
## 664          0
## 665          0
## 666          0
## 667          0
## 668          0
## 669          0
## 670          0
## 671          0
## 672          0
## 673          0
## 674          0
## 675          0
## 676          0
## 677          0
## 678          0
## 679          0
## 680          0
## 681          0
```

```
## 682         0
## 683         0
## 684         0
## 685         0
## 686         0
## 687         0
## 688         0
## 689         0
## 690         0
## 691         0
## 692         0
## 693         0
## 694         0
## 695         0
## 696         0
## 697         0
## 698         0
## 699         0
## 700         0
## 701         0
## 702         0
## 703         0
## 704         0
## 705         0
## 706         0
## 707         0
## 708         0
## 709         0
## 710         0
## 711         0
## 712         0
## 713         1
## 714         1
## 715         1
## 716         1
## 717         1
## 718         1
## 719         1
## 720         1
## 721         1
## 722         1
## 723         1
## 724         1
## 725         1
## 726         1
## 727         1
## 728         1
## 729         1
## 730         1
## 731         1
## 732         1
## 733         1
## 734         1
## 735         1
```

```
## 736          1
## 737          1
## 738          1
## 739          1
## 740          1
## 741          1
## 742          1
## 743          1
## 744          1
## 745          1
## 746          1
## 747          1
## 748          1
## 749          1
## 750          1
## 751          1
## 752          1
## 753          1
## 754          1
## 755          1
## 756          0
## 757          1
## 758          1
## 759          1
## 760          1
## 761          1
## 762          1
## 763          1
## 764          1
## 765          1
## 766          1
## 767          1
## 768          1
## 769          1
## 770          1
## 771          1
## 772          1
## 773          1
## 774          1
## 775          1
## 776          1
## 777          1
## 778          1
## 779          1
## 780          1
## 781          1
## 782          1
## 783          1
## 784          1
## 785          1
## 786          0
## 787          0
## 788          0
## 789          0
```

```
## 790          0
## 791          0
## 792          0
## 793          0
## 794          0
## 795          0
## 796          0
## 797          0
## 798          0
## 799          0
## 800          0
## 801          0
## 802          0
## 803          0
## 804          0
## 805          0
## 806          0
## 807          0
## 808          0
## 809          0
## 810          1
## 811          1
## 812          1
## 813          1
## 814          1
## 815          1
## 816          1
## 817          1
## 818          1
## 819          1
## 820          1
## 821          1
## 822          1
## 823          1
## 824          1
## 825          1
## 826          1
## 827          1
## 828          1
## 829          1
## 830          1
## 831          1
## 832          1
## 833          1
## 834          1
## 835          1
## 836          1
## 837          1
## 838          1
## 839          1
## 840          1
## 841          1
## 842          1
## 843          1
```

```
## 844          1
## 845          1
## 846          1
## 847          0
## 848          0
## 849          0
## 850          0
## 851          0
## 852          0
## 853          0
## 854          0
## 855          0
## 856          0
## 857          0
## 858          0
## 859          0
## 860          0
## 861          0
## 862          0
## 863          0
## 864          0
## 865          0
## 866          0
## 867          0
## 868          0
## 869          0
## 870          0
## 871          0
## 872          0
## 873          0
## 874          0
## 875          0
## 876          0
## 877          0
## 878          0
## 879          0
## 880          0
## 881          0
## 882          1
## 883          1
## 884          1
## 885          1
## 886          1
## 887          1
## 888          1
## 889          1
## 890          1
## 891          1
## 892          1
## 893          1
## 894          1
## 895          1
## 896          1
## 897          1
```

```
## 898         1
## 899         1
## 900         1
## 901         1
## 902         1
## 903         1
## 904         1
## 905         1
## 906         1
## 907         1
## 908         1
## 909         1
## 910         1
## 911         1
## 912         1
## 913         1
## 914         1
## 915         1
## 916         1
## 917         0
## 918         0
## 919         0
## 920         0
## 921         0
## 922         0
## 923         0
## 924         0
## 925         0
## 926         0
## 927         0
## 928         0
## 929         0
## 930         0
## 931         0
## 932         0
## 933         1
## 934         1
## 935         1
## 936         1
## 937         1
## 938         1
## 939         1
## 940         1
## 941         1
## 942         1
## 943         0
## 944         0
## 945         0
## 946         0
## 947         1
## 948         1
## 949         1
## 950         1
## 951         1
```

```
## 952     1
## 953     1
## 954     1
## 955     1
## 956     1
## 957     1
## 958     1
## 959     1
## 960     1
## 961     1
## 962     1
## 963     1
## 964     1
## 965     1
## 966     1
## 967     1
## 968     1
## 969     1
## 970     1
## 971     0
## 972     0
## 973     0
## 974     0
## 975     0
## 976     0
## 977     0
## 978     0
## 979     0
## 980     0
## 981     0
## 982     0
## 983     0
## 984     0
## 985     0
## 986     0
## 987     0
## 988     0
## 989     0
## 990     0
## 991     0
## 992     0
## 993     0
## 994     1
## 995     1
## 996     1
## 997     1
## 998     1
## 999     1
## 1000    1
## 1001    1
## 1002    1
## 1003    0
## 1004    0
## 1005    0
```

```
## 1006      0
## 1007      0
## 1008      0
## 1009      0
## 1010      0
## 1011      1
## 1012      1
## 1013      1
## 1014      1
## 1015      1
## 1016      1
## 1017      1
## 1018      1
## 1019      1
## 1020      1
## 1021      1
## 1022      1
## 1023      1
## 1024      1
## 1025      1
## 1026      1
## 1027      1
## 1028      1
## 1029      1
## 1030      1
## 1031      1
## 1032      1
## 1033      1
## 1034      1
## 1035      1
## 1036      1
## 1037      1
## 1038      1
## 1039      1
## 1040      1
## 1041      1
## 1042      1
## 1043      1
## 1044      1
## 1045      1
## 1046      1
## 1047      1
## 1048      1
## 1049      1
## 1050      1
## 1051      1
## 1052      1
## 1053      1
## 1054      1
## 1055      1
## 1056      1
## 1057      1
## 1058      1
## 1059      1
```

```
## 1060          1
## 1061          1
## 1062          1
## 1063          1
## 1064          1
## 1065          1
## 1066          1
## 1067          1
## 1068          1
## 1069          1
## 1070          1
## 1071          1
## 1072          1
## 1073          1
## 1074          1
## 1075          1
## 1076          1
## 1077          1
## 1078          1
## 1079          1
## 1080          1
## 1081          1
## 1082          1
## 1083          1
## 1084          1
## 1085          1
## 1086          1
## 1087          1
## 1088          0
## 1089          0
## 1090          0
## 1091          0
## 1092          0
## 1093          0
## 1094          0
## 1095          0
## 1096          0
## 1097          0
## 1098          0
## 1099          0
## 1100          0
## 1101          0
## 1102          0
## 1103          0
## 1104          0
## 1105          0
## 1106          0
## 1107          0
## 1108          0
## 1109          0
## 1110          0
## 1111          0
## 1112          0
## 1113          0
```

```
## 1114           0
## 1115           0
## 1116           0
## 1117           0
## 1118           0
## 1119           0
## 1120           0
## 1121           0
## 1122           0
## 1123           0
## 1124           0
## 1125           0
## 1126           0
## 1127           0
## 1128           0
## 1129           0
## 1130           0
## 1131           0
## 1132           0
## 1133           0
## 1134           0
## 1135           0
## 1136           0
## 1137           0
## 1138           0
## 1139           0
## 1140           0
## 1141           0
## 1142           0
## 1143           0
## 1144           0
## 1145           0
## 1146           0
## 1147           0
## 1148           0
## 1149           0
## 1150           0
## 1151           0
## 1152           0
## 1153           0
## 1154           0
## 1155           0
## 1156           0
## 1157           0
## 1158           0
## 1159           0
## 1160           0
## 1161           0
## 1162           0
## 1163           0
## 1164           0
## 1165           0
## 1166           0
## 1167           0
```

```
## 1168      0
## 1169      0
## 1170      0
## 1171      0
## 1172      0
## 1173      0
## 1174      0
## 1175      0
## 1176      0
## 1177      0
## 1178      0
## 1179      0
## 1180      0
## 1181      0
## 1182      0
## 1183      0
## 1184      0
## 1185      0
## 1186      0
## 1187      0
## 1188      0
## 1189      0
## 1190      0
## 1191      0
## 1192      0
## 1193      0
## 1194      0
## 1195      0
## 1196      0
## 1197      0
## 1198      1
## 1199      1
## 1200      1
## 1201      1
## 1202      1
## 1203      1
## 1204      1
## 1205      1
## 1206      1
## 1207      0
## 1208      1
## 1209      1
## 1210      1
## 1211      1
## 1212      1
## 1213      1
## 1214      1
## 1215      1
## 1216      1
## 1217      1
## 1218      1
## 1219      1
## 1220      1
## 1221      1
```

```
## 1222          1
## 1223          1
## 1224          1
## 1225          1
## 1226          1
## 1227          1
## 1228          1
## 1229          1
## 1230          1
## 1231          1
## 1232          1
## 1233          1
## 1234          1
## 1235          1
## 1236          1
## 1237          1
## 1238          1
## 1239          1
## 1240          1
## 1241          1
## 1242          1
## 1243          1
## 1244          1
## 1245          1
## 1246          1
## 1247          1
## 1248          1
## 1249          1
## 1250          1
## 1251          1
## 1252          1
## 1253          1
## 1254          1
## 1255          1
## 1256          1
## 1257          1
## 1258          1
## 1259          1
## 1260          1
## 1261          1
## 1262          1
## 1263          1
## 1264          1
## 1265          1
## 1266          1
## 1267          1
## 1268          1
## 1269          1
## 1270          1
## 1271          1
## 1272          1
## 1273          1
## 1274          1
## 1275          1
```

```
## 1276      1
## 1277      1
## 1278      1
## 1279      1
## 1280      1
## 1281      1
## 1282      1
## 1283      1
## 1284      1
## 1285      1
## 1286      1
## 1287      1
## 1288      1
## 1289      1
## 1290      1
## 1291      1
## 1292      1
## 1293      1
## 1294      1
## 1295      1
## 1296      1
## 1297      1
## 1298      1
## 1299      1
## 1300      1
## 1301      1
## 1302      1
## 1303      1
## 1304      1
## 1305      1
## 1306      1
## 1307      1
## 1308      0
## 1309      0
## 1310      0
## 1311      0
## 1312      0
## 1313      0
## 1314      0
## 1315      0
## 1316      0
## 1317      0
## 1318      0
## 1319      0
## 1320      0
## 1321      0
## 1322      0
## 1323      0
## 1324      0
## 1325      0
## 1326      0
## 1327      0
## 1328      0
## 1329      0
```

```
## 1330       0
## 1331       0
## 1332       0
## 1333       0
## 1334       1
## 1335       1
## 1336       1
## 1337       1
## 1338       1
## 1339       1
## 1340       1
## 1341       1
## 1342       1
## 1343       1
## 1344       1
## 1345       1
## 1346       1
## 1347       1
## 1348       1
## 1349       1
## 1350       1
## 1351       1
## 1352       1
## 1353       1
## 1354       1
## 1355       1
## 1356       1
## 1357       1
## 1358       1
## 1359       1
## 1360       1
## 1361       1
## 1362       1
## 1363       1
## 1364       1
## 1365       1
## 1366       1
## 1367       1
## 1368       1
## 1369       1
## 1370       1
## 1371       1
## 1372       1
## 1373       1
## 1374       1
## 1375       1
## 1376       1
## 1377       1
## 1378       1
## 1379       1
## 1380       1
## 1381       1
## 1382       1
## 1383       1
```

```
## 1384          1
## 1385          1
## 1386          1
## 1387          1
## 1388          1
## 1389          1
## 1390          1
## 1391          1
## 1392          1
## 1393          1
## 1394          1
## 1395          1
## 1396          1
## 1397          1
## 1398          1
## 1399          1
## 1400          1
## 1401          1
## 1402          1
## 1403          1
## 1404          1
## 1405          1
## 1406          1
## 1407          1
## 1408          1
## 1409          1
## 1410          1
## 1411          1
## 1412          1
## 1413          1
## 1414          1
## 1415          1
## 1416          1
## 1417          1
## 1418          1
## 1419          1
## 1420          1
## 1421          1
## 1422          1
## 1423          1
## 1424          1
## 1425          1
## 1426          1
## 1427          1
## 1428          1
## 1429          1
## 1430          1
## 1431          0
## 1432          1
## 1433          1
## 1434          1
## 1435          1
## 1436          1
## 1437          1
```

```
## 1438          1
## 1439          1
## 1440          1
## 1441          1
## 1442          1
## 1443          1
## 1444          1
## 1445          1
## 1446          1
## 1447          1
## 1448          1
## 1449          1
## 1450          1
## 1451          1
## 1452          1
## 1453          1
## 1454          1
## 1455          1
## 1456          1
## 1457          1
## 1458          1
## 1459          0
## 1460          0
## 1461          0
## 1462          0
## 1463          0
## 1464          0
## 1465          0
## 1466          0
## 1467          0
## 1468          0
## 1469          0
## 1470          0
## 1471          0
## 1472          1
## 1473          1
## 1474          1
## 1475          1
## 1476          1
## 1477          1
## 1478          1
## 1479          1
## 1480          1
## 1481          1
## 1482          1
## 1483          1
## 1484          1
## 1485          1
## 1486          0
## 1487          1
## 1488          1
## 1489          1
## 1490          1
## 1491          1
```

```
## 1492          1
## 1493          1
## 1494          1
## 1495          1
## 1496          1
## 1497          1
## 1498          1
## 1499          1
## 1500          1
## 1501          1
## 1502          1
## 1503          1
## 1504          1
## 1505          1
## 1506          0
## 1507          0
## 1508          0
## 1509          0
## 1510          0
## 1511          0
## 1512          0
## 1513          0
## 1514          0
## 1515          0
## 1516          0
## 1517          0
## 1518          0
## 1519          0
## 1520          0
## 1521          0
## 1522          0
## 1523          0
## 1524          0
## 1525          0
## 1526          1
## 1527          1
## 1528          1
## 1529          1
## 1530          1
## 1531          1
## 1532          1
## 1533          1
## 1534          1
## 1535          1
## 1536          1
## 1537          1
## 1538          1
## 1539          1
## 1540          1
## 1541          1
## 1542          1
## 1543          1
## 1544          1
## 1545          0
```

```
## 1546       0
## 1547       0
## 1548       0
## 1549       0
## 1550       0
## 1551       0
## 1552       0
## 1553       0
## 1554       0
## 1555       0
## 1556       0
## 1557       0
## 1558       0
## 1559       0
## 1560       0
## 1561       0
## 1562       0
## 1563       0
## 1564       1
## 1565       1
## 1566       1
## 1567       1
## 1568       1
## 1569       1
## 1570       1
## 1571       1
## 1572       1
## 1573       1
## 1574       1
## 1575       1
## 1576       1
## 1577       1
## 1578       1
## 1579       1
## 1580       0
## 1581       1
## 1582       1
## 1583       1
## 1584       1
## 1585       1
## 1586       1
## 1587       1
## 1588       0
## 1589       1
## 1590       1
## 1591       1
## 1592       1
## 1593       1
## 1594       1
## 1595       1
## 1596       1
## 1597       1
## 1598       1
## 1599       1
```

```
## 1600       1
## 1601       1
## 1602       1
## 1603       1
## 1604       1
## 1605       1
## 1606       1
## 1607       1
## 1608       1
## 1609       1
## 1610       0
## 1611       0
## 1612       0
## 1613       0
## 1614       1
## 1615       1
## 1616       1
## 1617       1
## 1618       1
## 1619       1
## 1620       1
## 1621       1
## 1622       1
## 1623       1
## 1624       1
## 1625       1
## 1626       1
## 1627       1
## 1628       1
## 1629       1
## 1630       1
## 1631       1
## 1632       1
## 1633       1
## 1634       1
## 1635       1
## 1636       1
## 1637       1
## 1638       1
## 1639       1
## 1640       1
## 1641       1
## 1642       1
## 1643       1
## 1644       1
## 1645       1
## 1646       1
## 1647       1
## 1648       1
## 1649       1
## 1650       1
## 1651       1
## 1652       1
## 1653       1
```

```
## 1654          1
## 1655          1
## 1656          1
## 1657          1
## 1658          1
## 1659          1
## 1660          1
## 1661          1
## 1662          1
## 1663          1
## 1664          1
## 1665          1
## 1666          1
## 1667          1
## 1668          1
## 1669          1
## 1670          1
## 1671          1
## 1672          1
## 1673          1
## 1674          1
## 1675          1
## 1676          1
## 1677          1
## 1678          1
## 1679          1
## 1680          1
## 1681          1
## 1682          1
## 1683          1
## 1684          1
## 1685          1
## 1686          1
## 1687          1
## 1688          1
## 1689          1
## 1690          1
## 1691          1
## 1692          1
## 1693          1
## 1694          1
## 1695          1
## 1696          1
## 1697          1
## 1698          1
## 1699          1
## 1700          1
## 1701          1
## 1702          1
## 1703          1
## 1704          1
## 1705          1
## 1706          0
## 1707          0
```

```
## 1708        0
## 1709        0
## 1710        0
## 1711        0
## 1712        0
## 1713        0
## 1714        0
## 1715        1
## 1716        1
## 1717        1
## 1718        1
## 1719        1
## 1720        1
## 1721        1
## 1722        1
## 1723        1
## 1724        1
## 1725        1
## 1726        1
## 1727        1
## 1728        1
## 1729        1
## 1730        1
## 1731        1
## 1732        1
## 1733        1
## 1734        1
## 1735        1
## 1736        1
## 1737        1
## 1738        1
## 1739        1
## 1740        1
## 1741        1
## 1742        1
## 1743        1
## 1744        1
## 1745        1
## 1746        1
## 1747        1
## 1748        1
## 1749        1
## 1750        1
## 1751        1
## 1752        1
## 1753        1
## 1754        1
## 1755        1
## 1756        0
## 1757        0
## 1758        0
## 1759        0
## 1760        0
## 1761        0
```

```
## 1762          0
## 1763          0
## 1764          0
## 1765          0
## 1766          0
## 1767          0
## 1768          0
## 1769          0
## 1770          0
## 1771          0
## 1772          0
## 1773          0
## 1774          0
## 1775          0
## 1776          0
## 1777          0
## 1778          0
## 1779          0
## 1780          0
## 1781          0
## 1782          0
## 1783          0
## 1784          0
## 1785          0
## 1786          0
## 1787          0
## 1788          0
## 1789          0
## 1790          0
## 1791          0
## 1792          0
## 1793          0
## 1794          0
## 1795          0
## 1796          0
## 1797          0
## 1798          0
## 1799          0
## 1800          0
## 1801          0
## 1802          0
## 1803          0
## 1804          0
## 1805          0
## 1806          0
## 1807          0
## 1808          0
## 1809          0
## 1810          0
## 1811          0
## 1812          0
## 1813          0
## 1814          0
## 1815          0
```

```
## 1816          0
## 1817          0
## 1818          0
## 1819          0
## 1820          0
## 1821          0
## 1822          0
## 1823          0
## 1824          0
## 1825          0
## 1826          0
## 1827          0
## 1828          0
## 1829          0
## 1830          0
## 1831          0
## 1832          0
## 1833          0
## 1834          0
## 1835          0
## 1836          0
## 1837          0
## 1838          0
## 1839          0
## 1840          0
## 1841          0
## 1842          0
## 1843          0
## 1844          0
## 1845          0
## 1846          0
## 1847          0
## 1848          0
## 1849          0
## 1850          0
## 1851          0
## 1852          0
## 1853          0
## 1854          0
## 1855          0
## 1856          0
## 1857          0
## 1858          0
## 1859          0
## 1860          0
## 1861          0
## 1862          0
## 1863          0
## 1864          1
## 1865          1
## 1866          1
## 1867          1
## 1868          1
## 1869          1
```

```
## 1870          1
## 1871          1
## 1872          1
## 1873          1
## 1874          1
## 1875          1
## 1876          1
## 1877          1
## 1878          1
## 1879          1
## 1880          1
## 1881          1
## 1882          1
## 1883          1
## 1884          1
## 1885          1
## 1886          1
## 1887          1
## 1888          1
## 1889          1
## 1890          1
## 1891          1
## 1892          1
## 1893          1
## 1894          1
## 1895          1
## 1896          1
## 1897          1
## 1898          1
## 1899          1
## 1900          1
## 1901          1
## 1902          1
## 1903          1
## 1904          1
## 1905          1
## 1906          1
## 1907          1
## 1908          1
## 1909          1
## 1910          1
## 1911          1
## 1912          1
## 1913          1
## 1914          1
## 1915          1
## 1916          1
## 1917          0
## 1918          0
## 1919          0
## 1920          0
## 1921          0
## 1922          0
## 1923          0
```

```
## 1924      0
## 1925      0
## 1926      0
## 1927      0
## 1928      0
## 1929      0
## 1930      0
## 1931      0
## 1932      0
## 1933      0
## 1934      0
## 1935      0
## 1936      0
## 1937      0
## 1938      0
## 1939      0
## 1940      0
## 1941      0
## 1942      0
## 1943      0
## 1944      0
## 1945      0
## 1946      0
## 1947      0
## 1948      0
## 1949      0
## 1950      0
## 1951      0
## 1952      0
## 1953      0
## 1954      0
## 1955      0
## 1956      0
## 1957      0
## 1958      0
## 1959      0
## 1960      0
## 1961      0
## 1962      0
## 1963      0
## 1964      0
## 1965      0
## 1966      0
## 1967      1
## 1968      1
## 1969      1
## 1970      1
## 1971      1
## 1972      1
## 1973      1
## 1974      1
## 1975      1
## 1976      1
## 1977      1
```

```
## 1978       1
## 1979       1
## 1980       1
## 1981       1
## 1982       1
## 1983       1
## 1984       1
## 1985       1
## 1986       1
## 1987       1
## 1988       0
## 1989       1
## 1990       1
## 1991       1
## 1992       1
## 1993       1
## 1994       1
## 1995       1
## 1996       1
## 1997       1
## 1998       1
## 1999       1
## 2000       1
## 2001       1
## 2002       1
## 2003       1
## 2004       1
## 2005       1
## 2006       1
## 2007       1
## 2008       1
## 2009       1
## 2010       1
## 2011       1
## 2012       1
## 2013       1
## 2014       1
## 2015       1
## 2016       1
## 2017       1
## 2018       1
## 2019       1
## 2020       1
## 2021       1
## 2022       1
## 2023       1
## 2024       1
## 2025       1
## 2026       1
## 2027       1
## 2028       1
## 2029       1
## 2030       1
## 2031       1
```

```
## 2032          1
## 2033          1
## 2034          1
## 2035          1
## 2036          1
## 2037          1
## 2038          1
## 2039          1
## 2040          1
## 2041          1
## 2042          1
## 2043          1
## 2044          1
## 2045          1
## 2046          1
## 2047          1
## 2048          1
## 2049          1
## 2050          1
## 2051          1
## 2052          1
## 2053          1
## 2054          1
## 2055          1
## 2056          1
## 2057          1
## 2058          1
## 2059          1
## 2060          1
## 2061          1
## 2062          1
## 2063          1
## 2064          1
## 2065          1
## 2066          1
## 2067          1
## 2068          1
## 2069          1
## 2070          1
## 2071          1
## 2072          1
## 2073          1
## 2074          1
## 2075          1
## 2076          1
## 2077          1
## 2078          1
## 2079          1
## 2080          1
## 2081          1
## 2082          1
## 2083          1
## 2084          1
## 2085          1
```

```
## 2086          1
## 2087          1
## 2088          1
## 2089          1
## 2090          1
## 2091          1
## 2092          1
## 2093          1
## 2094          1
## 2095          1
## 2096          1
## 2097          1
## 2098          1
## 2099          1
## 2100          1
## 2101          1
## 2102          1
## 2103          1
## 2104          1
## 2105          1
## 2106          1
## 2107          1
## 2108          0
## 2109          0
## 2110          0
## 2111          0
## 2112          0
## 2113          0
## 2114          0
## 2115          0
## 2116          0
## 2117          0
## 2118          0
## 2119          0
## 2120          0
## 2121          0
## 2122          0
## 2123          0
## 2124          0
## 2125          0
## 2126          0
## 2127          0
## 2128          0
## 2129          0
## 2130          0
## 2131          0
## 2132          0
## 2133          0
## 2134          0
## 2135          0
## 2136          0
## 2137          1
## 2138          1
## 2139          1
```

```
## 2140         1
## 2141         1
## 2142         1
## 2143         1
## 2144         1
## 2145         1
## 2146         1
## 2147         1
## 2148         1
## 2149         1
## 2150         1
## 2151         1
## 2152         1
## 2153         1
## 2154         1
## 2155         1
## 2156         1
## 2157         1
## 2158         1
## 2159         1
## 2160         1
## 2161         1
## 2162         1
## 2163         1
## 2164         1
## 2165         1
## 2166         1
## 2167         1
## 2168         1
## 2169         1
## 2170         1
## 2171         1
## 2172         1
## 2173         1
## 2174         1
## 2175         1
## 2176         0
## 2177         0
## 2178         0
## 2179         0
## 2180         0
## 2181         0
## 2182         0
## 2183         0
## 2184         0
## 2185         0
## 2186         0
## 2187         0
## 2188         0
## 2189         0
## 2190         0
## 2191         0
## 2192         0
## 2193         0
```

```
## 2194       0
## 2195       0
## 2196       0
## 2197       0
## 2198       0
## 2199       0
## 2200       0
## 2201       0
## 2202       0
## 2203       0
## 2204       0
## 2205       0
## 2206       0
## 2207       0
## 2208       0
## 2209       0
## 2210       0
## 2211       0
## 2212       0
## 2213       0
## 2214       0
## 2215       0
## 2216       0
## 2217       0
## 2218       0
## 2219       0
## 2220       0
## 2221       0
## 2222       0
## 2223       0
## 2224       0
## 2225       0
## 2226       0
## 2227       0
## 2228       0
## 2229       0
## 2230       0
## 2231       0
## 2232       0
## 2233       0
## 2234       0
## 2235       0
## 2236       0
## 2237       0
## 2238       0
## 2239       0
## 2240       0
## 2241       0
## 2242       0
## 2243       0
## 2244       1
## 2245       1
## 2246       1
## 2247       1
```

```
## 2248     1
## 2249     1
## 2250     1
## 2251     1
## 2252     1
## 2253     1
## 2254     1
## 2255     1
## 2256     1
## 2257     1
## 2258     1
## 2259     1
## 2260     1
## 2261     1
## 2262     1
## 2263     1
## 2264     1
## 2265     1
## 2266     1
## 2267     1
## 2268     1
## 2269     1
## 2270     1
## 2271     1
## 2272     1
## 2273     1
## 2274     1
## 2275     1
## 2276     1
## 2277     1
## 2278     1
## 2279     0
## 2280     0
## 2281     0
## 2282     0
## 2283     0
## 2284     0
## 2285     0
## 2286     0
## 2287     0
## 2288     0
## 2289     0
## 2290     0
## 2291     0
## 2292     0
## 2293     0
## 2294     0
## 2295     0
## 2296     0
## 2297     0
## 2298     0
## 2299     0
## 2300     0
## 2301     0
```

```
## 2302        0
## 2303        0
## 2304        0
## 2305        0
## 2306        0
## 2307        0
## 2308        0
## 2309        0
## 2310        0
## 2311        0
## 2312        0
## 2313        0
## 2314        0
## 2315        0
## 2316        0
## 2317        0
## 2318        0
## 2319        0
## 2320        0
## 2321        0
## 2322        0
## 2323        0
## 2324        0
## 2325        0
## 2326        0
## 2327        0
## 2328        0
## 2329        0
## 2330        0
## 2331        0
## 2332        0
## 2333        0
## 2334        0
## 2335        0
## 2336        0
## 2337        0
## 2338        0
## 2339        1
## 2340        1
## 2341        1
## 2342        1
## 2343        1
## 2344        1
## 2345        1
## 2346        1
## 2347        1
## 2348        1
## 2349        1
## 2350        0
## 2351        1
## 2352        1
## 2353        1
## 2354        1
## 2355        1
```

```
## 2356      1
## 2357      1
## 2358      1
## 2359      1
## 2360      1
## 2361      1
## 2362      1
## 2363      1
## 2364      1
## 2365      1
## 2366      1
## 2367      1
## 2368      0
## 2369      1
## 2370      1
## 2371      1
## 2372      1
## 2373      1
## 2374      1
## 2375      1
## 2376      1
## 2377      1
## 2378      1
## 2379      1
## 2380      1
## 2381      1
## 2382      1
## 2383      1
## 2384      1
## 2385      1
## 2386      1
## 2387      1
## 2388      1
## 2389      1
## 2390      1
## 2391      1
## 2392      1
## 2393      1
## 2394      1
## 2395      1
## 2396      1
## 2397      1
## 2398      1
## 2399      1
## 2400      1
## 2401      1
## 2402      1
## 2403      1
## 2404      1
## 2405      1
## 2406      1
## 2407      1
## 2408      1
## 2409      1
```

```
## 2410          1
## 2411          1
## 2412          1
## 2413          1
## 2414          1
## 2415          1
## 2416          1
## 2417          1
## 2418          1
## 2419          1
## 2420          1
## 2421          1
## 2422          1
## 2423          1
## 2424          1
## 2425          1
## 2426          1
## 2427          1
## 2428          1
## 2429          1
## 2430          1
## 2431          1
## 2432          1
## 2433          1
## 2434          1
## 2435          1
## 2436          1
## 2437          1
## 2438          1
## 2439          0
## 2440          0
## 2441          0
## 2442          0
## 2443          0
## 2444          0
## 2445          0
## 2446          0
## 2447          0
## 2448          0
## 2449          0
## 2450          0
## 2451          0
## 2452          0
## 2453          0
## 2454          0
## 2455          0
## 2456          0
## 2457          0
## 2458          0
## 2459          0
## 2460          0
## 2461          0
## 2462          0
## 2463          0
```

```
## 2464       0
## 2465       0
## 2466       1
## 2467       1
## 2468       1
## 2469       1
## 2470       1
## 2471       1
## 2472       1
## 2473       1
## 2474       1
## 2475       1
## 2476       1
## 2477       1
## 2478       1
## 2479       1
## 2480       1
## 2481       1
## 2482       1
## 2483       1
## 2484       1
## 2485       1
## 2486       1
## 2487       1
## 2488       1
## 2489       1
## 2490       1
## 2491       1
## 2492       1
## 2493       1
## 2494       1
## 2495       1
## 2496       1
## 2497       1
## 2498       1
## 2499       1
## 2500       1
## 2501       1
## 2502       1
## 2503       1
## 2504       1
## 2505       1
## 2506       1
## 2507       1
## 2508       1
## 2509       1
## 2510       1
## 2511       1
## 2512       1
## 2513       1
## 2514       1
## 2515       1
## 2516       1
## 2517       1
```

```
## 2518          1
## 2519          1
## 2520          1
## 2521          1
## 2522          1
## 2523          1
## 2524          1
## 2525          1
## 2526          1
## 2527          1
## 2528          1
## 2529          1
## 2530          1
## 2531          1
## 2532          1
## 2533          1
## 2534          1
## 2535          1
## 2536          1
## 2537          1
## 2538          1
## 2539          1
## 2540          1
## 2541          1
## 2542          1
## 2543          1
## 2544          1
## 2545          1
## 2546          1
## 2547          1
## 2548          1
## 2549          1
## 2550          1
## 2551          1
## 2552          1
## 2553          1
## 2554          1
## 2555          1
## 2556          1
## 2557          1
## 2558          1
## 2559          1
## 2560          1
## 2561          1
## 2562          1
## 2563          1
## 2564          0
## 2565          1
## 2566          1
## 2567          1
## 2568          1
## 2569          1
## 2570          1
## 2571          1
```

```
## 2572          1
## 2573          1
## 2574          1
## 2575          1
## 2576          1
## 2577          1
## 2578          1
## 2579          1
## 2580          1
## 2581          1
## 2582          1
## 2583          1
## 2584          1
## 2585          1
## 2586          1
## 2587          1
## 2588          1
## 2589          1
## 2590          1
## 2591          1
## 2592          1
## 2593          1
## 2594          1
## 2595          1
## 2596          1
## 2597          1
## 2598          1
## 2599          1
## 2600          1
## 2601          1
## 2602          1
## 2603          1
## 2604          1
## 2605          1
## 2606          1
## 2607          1
## 2608          1
## 2609          1
## 2610          1
## 2611          1
## 2612          1
## 2613          1
## 2614          1
## 2615          0
## 2616          0
## 2617          0
## 2618          0
## 2619          1
## 2620          1
## 2621          1
## 2622          1
## 2623          1
## 2624          1
## 2625          1
```

```
## 2626         1
## 2627         1
## 2628         1
## 2629         1
## 2630         1
## 2631         1
## 2632         1
## 2633         1
## 2634         1
## 2635         1
## 2636         1
## 2637         1
## 2638         1
## 2639         1
## 2640         1
## 2641         1
## 2642         1
## 2643         1
## 2644         1
## 2645         1
## 2646         0
## 2647         0
## 2648         0
## 2649         0
## 2650         0
## 2651         0
## 2652         0
## 2653         0
## 2654         0
## 2655         0
## 2656         0
## 2657         0
## 2658         0
## 2659         0
## 2660         0
## 2661         0
## 2662         0
## 2663         0
## 2664         0
## 2665         0
## 2666         0
## 2667         0
## 2668         0
## 2669         0
## 2670         0
## 2671         1
## 2672         1
## 2673         1
## 2674         1
## 2675         1
## 2676         1
## 2677         1
## 2678         1
## 2679         1
```

```
## 2680          1
## 2681          1
## 2682          1
## 2683          1
## 2684          1
## 2685          1
## 2686          1
## 2687          1
## 2688          0
## 2689          0
## 2690          0
## 2691          0
## 2692          0
## 2693          0
## 2694          1
## 2695          1
## 2696          1
## 2697          1
## 2698          1
## 2699          1
## 2700          1
## 2701          1
## 2702          1
## 2703          1
## 2704          1
## 2705          1
## 2706          1
## 2707          0
## 2708          0
## 2709          0
## 2710          0
## 2711          0
## 2712          0
## 2713          0
## 2714          0
## 2715          0
## 2716          0
## 2717          0
## 2718          0
## 2719          0
## 2720          0
## 2721          0
## 2722          0
## 2723          0
## 2724          0
## 2725          1
## 2726          1
## 2727          1
## 2728          1
## 2729          1
## 2730          1
## 2731          1
## 2732          1
## 2733          1
```

```
## 2734          1
## 2735          1
## 2736          1
## 2737          1
## 2738          1
## 2739          1
## 2740          1
## 2741          1
## 2742          1
## 2743          1
## 2744          1
## 2745          1
## 2746          1
## 2747          1
## 2748          1
## 2749          1
## 2750          1
## 2751          1
## 2752          1
## 2753          1
## 2754          1
## 2755          1
## 2756          1
## 2757          1
## 2758          1
## 2759          1
## 2760          1
## 2761          1
## 2762          1
## 2763          1
## 2764          1
## 2765          1
## 2766          1
## 2767          1
## 2768          1
## 2769          1
## 2770          1
## 2771          1
## 2772          1
## 2773          1
## 2774          1
## 2775          1
## 2776          1
## 2777          0
## 2778          0
## 2779          0
## 2780          0
## 2781          0
## 2782          1
## 2783          1
## 2784          1
## 2785          1
## 2786          1
## 2787          1
```

```
## 2788    1
## 2789    1
## 2790    0
## 2791    0
## 2792    0
## 2793    0
## 2794    0
## 2795    0
## 2796    0
## 2797    0
## 2798    1
## 2799    1
## 2800    1
## 2801    1
## 2802    1
## 2803    1
## 2804    1
## 2805    1
## 2806    1
## 2807    1
## 2808    1
## 2809    1
## 2810    1
## 2811    1
## 2812    1
## 2813    1
## 2814    1
## 2815    1
## 2816    1
## 2817    1
## 2818    1
## 2819    1
## 2820    0
## 2821    1
## 2822    1
## 2823    1
## 2824    1
## 2825    1
## 2826    1
## 2827    1
## 2828    1
## 2829    1
## 2830    1
## 2831    1
## 2832    1
## 2833    1
## 2834    1
## 2835    1
## 2836    1
## 2837    1
## 2838    1
## 2839    1
## 2840    1
## 2841    1
```

```
## 2842          1
## 2843          1
## 2844          1
## 2845          1
## 2846          1
## 2847          1
## 2848          1
## 2849          1
## 2850          0
## 2851          1
## 2852          1
## 2853          1
## 2854          1
## 2855          1
## 2856          1
## 2857          1
## 2858          1
## 2859          1
## 2860          1
## 2861          1
## 2862          1
## 2863          1
## 2864          1
## 2865          1
## 2866          1
## 2867          1
## 2868          1
## 2869          1
## 2870          1
## 2871          1
## 2872          1
## 2873          1
## 2874          1
## 2875          1
## 2876          1
## 2877          1
## 2878          1
## 2879          1
## 2880          1
## 2881          1
## 2882          1
## 2883          1
## 2884          1
## 2885          1
## 2886          1
## 2887          1
## 2888          0
## 2889          0
## 2890          0
## 2891          0
## 2892          0
## 2893          0
## 2894          0
## 2895          0
```

```
## 2896          1
## 2897          1
## 2898          1
## 2899          1
## 2900          1
## 2901          1
## 2902          1
## 2903          1
## 2904          1
## 2905          1
## 2906          1
## 2907          1
## 2908          1
## 2909          1
## 2910          1
## 2911          1
## 2912          1
## 2913          1
## 2914          1
## 2915          1
## 2916          1
## 2917          1
## 2918          1
## 2919          1
## 2920          1
## 2921          1
## 2922          1
## 2923          1
## 2924          1
## 2925          1
## 2926          1
## 2927          1
## 2928          1
## 2929          1
## 2930          1
## 2931          1
## 2932          1
## 2933          1
## 2934          1
## 2935          1
## 2936          1
## 2937          1
## 2938          1
## 2939          1
## 2940          1
## 2941          1
## 2942          1
## 2943          1
## 2944          1
## 2945          1
## 2946          1
## 2947          1
## 2948          1
## 2949          1
```

```
## 2950          1
## 2951          1
## 2952          1
## 2953          1
## 2954          1
## 2955          1
## 2956          1
## 2957          1
## 2958          1
## 2959          1
## 2960          1
## 2961          1
## 2962          1
## 2963          1
## 2964          1
## 2965          1
## 2966          1
## 2967          1
## 2968          1
## 2969          1
## 2970          1
## 2971          1
## 2972          1
## 2973          1
## 2974          1
## 2975          1
## 2976          1
## 2977          1
## 2978          1
## 2979          1
## 2980          1
## 2981          1
## 2982          1
## 2983          1
## 2984          1
## 2985          1
## 2986          1
## 2987          1
## 2988          1
## 2989          1
## 2990          1
## 2991          1
## 2992          1
## 2993          1
## 2994          1
## 2995          1
## 2996          1
## 2997          1
## 2998          1
## 2999          1
## 3000          1
## 3001          1
## 3002          1
## 3003          1
```

```
## 3004          1
## 3005          1
## 3006          1
## 3007          0
## 3008          1
## 3009          1
## 3010          1
## 3011          1
## 3012          1
## 3013          1
## 3014          1
## 3015          1
## 3016          1
## 3017          1
## 3018          1
## 3019          1
## 3020          1
## 3021          1
## 3022          1
## 3023          1
## 3024          1
## 3025          1
## 3026          1
## 3027          1
## 3028          1
## 3029          1
## 3030          1
## 3031          1
## 3032          1
## 3033          1
## 3034          1
## 3035          1
## 3036          0
## 3037          0
## 3038          0
## 3039          0
## 3040          0
## 3041          0
## 3042          0
## 3043          0
## 3044          0
## 3045          0
## 3046          1
## 3047          1
## 3048          1
## 3049          1
## 3050          1
## 3051          1
## 3052          1
## 3053          1
## 3054          1
## 3055          1
## 3056          1
## 3057          1
```

```
## 3058          1
## 3059          1
## 3060          1
## 3061          0
## 3062          0
## 3063          0
## 3064          0
## 3065          0
## 3066          0
## 3067          0
## 3068          0
## 3069          0
## 3070          0
## 3071          0
## 3072          0
## 3073          0
## 3074          0
## 3075          0
## 3076          0
## 3077          0
## 3078          1
## 3079          1
## 3080          1
## 3081          1
## 3082          1
## 3083          1
## 3084          1
## 3085          0
## 3086          0
## 3087          0
## 3088          0
## 3089          0
## 3090          0
## 3091          0
## 3092          0
## 3093          0
## 3094          1
## 3095          1
## 3096          1
## 3097          1
## 3098          1
## 3099          1
## 3100          1
## 3101          1
## 3102          1
## 3103          1
## 3104          1
## 3105          1
## 3106          1
## 3107          1
## 3108          1
## 3109          1
## 3110          1
## 3111          1
```

```
## 3112       1
## 3113       1
## 3114       1
## 3115       1
## 3116       1
## 3117       1
## 3118       1
## 3119       1
## 3120       1
## 3121       1
## 3122       1
## 3123       1
## 3124       1
## 3125       1
## 3126       1
## 3127       1
## 3128       1
## 3129       1
## 3130       1
## 3131       1
## 3132       1
## 3133       1
## 3134       1
## 3135       1
## 3136       1
## 3137       1
## 3138       1
## 3139       1
## 3140       1
## 3141       1
## 3142       1
## 3143       1
## 3144       1
## 3145       1
## 3146       1
## 3147       1
## 3148       1
## 3149       1
## 3150       1
## 3151       1
## 3152       1
## 3153       1
## 3154       1
## 3155       1
## 3156       1
## 3157       1
## 3158       1
## 3159       1
## 3160       1
## 3161       1
## 3162       1
## 3163       1
## 3164       1
## 3165       1
```

```
## 3166      1
## 3167      1
## 3168      1
## 3169      1
## 3170      1
## 3171      1
## 3172      1
## 3173      1
## 3174      1
## 3175      1
## 3176      1
## 3177      1
## 3178      1
## 3179      1
## 3180      1
## 3181      1
## 3182      1
## 3183      1
## 3184      1
## 3185      1
## 3186      1
## 3187      1
## 3188      1
## 3189      1
## 3190      1
## 3191      1
## 3192      1
## 3193      1
## 3194      1
## 3195      1
## 3196      1
## 3197      1
## 3198      1
## 3199      1
## 3200      1
## 3201      1
## 3202      1
## 3203      1
## 3204      1
## 3205      1
## 3206      1
## 3207      1
## 3208      1
## 3209      1
## 3210      1
## 3211      1
## 3212      1
## 3213      1
## 3214      1
## 3215      1
## 3216      1
## 3217      1
## 3218      1
## 3219      1
```

```
## 3220         1
## 3221         1
## 3222         1
## 3223         1
## 3224         1
## 3225         1
## 3226         1
## 3227         1
## 3228         1
## 3229         1
## 3230         1
## 3231         1
## 3232         1
## 3233         1
## 3234         1
## 3235         1
## 3236         1
## 3237         1
## 3238         1
## 3239         1
## 3240         1
## 3241         1
## 3242         1
## 3243         1
## 3244         1
## 3245         1
## 3246         1
## 3247         1
## 3248         1
## 3249         1
## 3250         1
## 3251         1
## 3252         1
## 3253         1
## 3254         1
## 3255         1
## 3256         1
## 3257         1
## 3258         1
## 3259         1
## 3260         1
## 3261         1
## 3262         1
## 3263         1
## 3264         1
## 3265         1
## 3266         1
## 3267         1
## 3268         1
## 3269         1
## 3270         1
## 3271         1
## 3272         1
## 3273         1
```

```
## 3274          1
## 3275          1
## 3276          1
## 3277          1
## 3278          1
## 3279          1
## 3280          1
## 3281          1
## 3282          1
## 3283          1
## 3284          1
## 3285          1
## 3286          1
## 3287          1
## 3288          1
## 3289          1
## 3290          1
## 3291          1
## 3292          1
## 3293          1
## 3294          1
## 3295          1
## 3296          1
## 3297          1
## 3298          1
## 3299          1
## 3300          1
## 3301          1
## 3302          1
## 3303          1
## 3304          1
## 3305          1
## 3306          1
## 3307          1
## 3308          1
## 3309          1
## 3310          1
## 3311          1
## 3312          1
## 3313          0
## 3314          0
## 3315          0
## 3316          0
## 3317          0
## 3318          0
## 3319          0
## 3320          0
## 3321          0
## 3322          0
## 3323          0
## 3324          0
## 3325          0
## 3326          0
## 3327          0
```

```
## 3328          0
## 3329          0
## 3330          0
## 3331          0
## 3332          0
## 3333          0
## 3334          0
## 3335          0
## 3336          0
## 3337          0
## 3338          0
## 3339          0
## 3340          0
## 3341          0
## 3342          0
## 3343          0
## 3344          0
## 3345          0
## 3346          0
## 3347          0
## 3348          0
## 3349          0
## 3350          0
## 3351          0
## 3352          0
## 3353          0
## 3354          0
## 3355          0
## 3356          0
## 3357          0
## 3358          0
## 3359          0
## 3360          0
## 3361          0
## 3362          0
## 3363          0
## 3364          0
## 3365          0
## 3366          0
## 3367          0
## 3368          0
## 3369          0
## 3370          0
## 3371          0
## 3372          0
## 3373          0
## 3374          0
## 3375          0
## 3376          0
## 3377          0
## 3378          0
## 3379          0
## 3380          0
## 3381          0
```

```
## 3382          0
## 3383          0
## 3384          0
## 3385          0
## 3386          0
## 3387          0
## 3388          0
## 3389          0
## 3390          0
## 3391          0
## 3392          0
## 3393          0
## 3394          0
## 3395          0
## 3396          0
## 3397          0
## 3398          1
## 3399          1
## 3400          1
## 3401          1
## 3402          1
## 3403          1
## 3404          1
## 3405          1
## 3406          1
## 3407          1
## 3408          1
## 3409          1
## 3410          1
## 3411          1
## 3412          1
## 3413          1
## 3414          1
## 3415          1
## 3416          1
## 3417          1
## 3418          1
## 3419          0
## 3420          0
## 3421          0
## 3422          0
## 3423          0
## 3424          0
## 3425          0
## 3426          0
## 3427          0
## 3428          0
## 3429          0
## 3430          0
## 3431          0
## 3432          0
## 3433          0
## 3434          0
## 3435          0
```

```
## 3436      0
## 3437      0
## 3438      0
## 3439      1
## 3440      1
## 3441      1
## 3442      1
## 3443      1
## 3444      1
## 3445      1
## 3446      1
## 3447      1
## 3448      1
## 3449      1
## 3450      1
## 3451      1
## 3452      1
## 3453      1
## 3454      1
## 3455      1
## 3456      1
## 3457      1
## 3458      1
## 3459      1
## 3460      1
## 3461      1
## 3462      1
## 3463      1
## 3464      1
## 3465      1
## 3466      1
## 3467      1
## 3468      1
## 3469      1
## 3470      1
## 3471      1
## 3472      1
## 3473      1
## 3474      1
## 3475      1
## 3476      1
## 3477      1
## 3478      1
## 3479      1
## 3480      1
## 3481      1
## 3482      1
## 3483      1
## 3484      1
## 3485      1
## 3486      1
## 3487      1
## 3488      1
## 3489      1
```

```
## 3490          1
## 3491          1
## 3492          1
## 3493          1
## 3494          1
## 3495          1
## 3496          1
## 3497          1
## 3498          1
## 3499          1
## 3500          1
## 3501          1
## 3502          1
## 3503          1
## 3504          1
## 3505          1
## 3506          1
## 3507          1
## 3508          1
## 3509          1
## 3510          1
## 3511          1
## 3512          1
## 3513          1
## 3514          1
## 3515          1
## 3516          1
## 3517          1
## 3518          1
## 3519          1
## 3520          1
## 3521          1
## 3522          1
## 3523          1
## 3524          1
## 3525          1
## 3526          1
## 3527          1
## 3528          1
## 3529          1
## 3530          1
## 3531          1
## 3532          1
## 3533          1
## 3534          1
## 3535          1
## 3536          1
## 3537          1
## 3538          1
## 3539          1
## 3540          1
## 3541          1
## 3542          1
## 3543          1
```

```
## 3544        1
## 3545        1
## 3546        1
## 3547        1
## 3548        1
## 3549        1
## 3550        1
## 3551        1
## 3552        1
## 3553        1
## 3554        1
## 3555        1
## 3556        1
## 3557        1
## 3558        1
## 3559        1
## 3560        1
## 3561        1
## 3562        1
## 3563        1
## 3564        1
## 3565        1
## 3566        1
## 3567        1
## 3568        1
## 3569        1
## 3570        1
## 3571        1
## 3572        1
## 3573        1
## 3574        1
## 3575        1
## 3576        0
## 3577        0
## 3578        0
## 3579        0
## 3580        0
## 3581        0
## 3582        0
## 3583        0
## 3584        0
## 3585        0
## 3586        0
## 3587        0
## 3588        0
## 3589        0
## 3590        0
## 3591        0
## 3592        0
## 3593        0
## 3594        0
## 3595        0
## 3596        0
## 3597        0
```

```
## 3598        0
## 3599        0
## 3600        0
## 3601        0
## 3602        0
## 3603        0
## 3604        0
## 3605        0
## 3606        0
## 3607        0
## 3608        0
## 3609        0
## 3610        0
## 3611        0
## 3612        0
## 3613        0
## 3614        0
## 3615        0
## 3616        0
## 3617        0
## 3618        0
## 3619        0
## 3620        0
## 3621        0
## 3622        0
## 3623        0
## 3624        0
## 3625        0
## 3626        0
## 3627        0
## 3628        0
## 3629        0
## 3630        0
## 3631        0
## 3632        0
## 3633        0
## 3634        0
## 3635        0
## 3636        0
## 3637        0
## 3638        0
## 3639        0
## 3640        0
## 3641        0
## 3642        0
## 3643        0
## 3644        0
## 3645        0
## 3646        0
## 3647        0
## 3648        0
## 3649        0
## 3650        0
## 3651        0
```

```
## 3652          0
## 3653          0
## 3654          0
## 3655          0
## 3656          0
## 3657          0
## 3658          0
## 3659          0
## 3660          0
## 3661          0
## 3662          0
## 3663          0
## 3664          0
## 3665          0
## 3666          0
## 3667          0
## 3668          0
## 3669          0
## 3670          0
## 3671          0
## 3672          0
## 3673          0
## 3674          0
## 3675          0
## 3676          0
## 3677          0
## 3678          0
## 3679          0
## 3680          0
## 3681          0
## 3682          0
## 3683          0
## 3684          0
## 3685          0
## 3686          0
## 3687          0
## 3688          0
## 3689          0
## 3690          0
## 3691          0
## 3692          0
## 3693          0
## 3694          0
## 3695          0
## 3696          0
## 3697          0
## 3698          0
## 3699          0
## 3700          0
## 3701          0
## 3702          0
## 3703          0
## 3704          0
## 3705          0
```

```
## 3706       0
## 3707       0
## 3708       0
## 3709       0
## 3710       0
## 3711       0
## 3712       0
## 3713       0
## 3714       0
## 3715       0
## 3716       0
## 3717       0
## 3718       0
## 3719       0
## 3720       0
## 3721       0
## 3722       0
## 3723       0
## 3724       0
## 3725       0
## 3726       0
## 3727       0
## 3728       0
## 3729       0
## 3730       0
## 3731       0
## 3732       0
## 3733       0
## 3734       0
## 3735       0
## 3736       0
## 3737       0
## 3738       0
## 3739       0
## 3740       0
## 3741       0
## 3742       0
## 3743       0
## 3744       0
## 3745       1
## 3746       1
## 3747       1
## 3748       1
## 3749       1
## 3750       1
## 3751       1
## 3752       1
## 3753       1
## 3754       1
## 3755       1
## 3756       1
## 3757       1
## 3758       1
## 3759       1
```

```
## 3760         1
## 3761         1
## 3762         1
## 3763         1
## 3764         1
## 3765         1
## 3766         1
## 3767         1
## 3768         1
## 3769         1
## 3770         1
## 3771         1
## 3772         1
## 3773         1
## 3774         1
## 3775         1
## 3776         1
## 3777         1
## 3778         1
## 3779         1
## 3780         1
## 3781         1
## 3782         1
## 3783         1
## 3784         1
## 3785         1
## 3786         1
## 3787         1
## 3788         1
## 3789         1
## 3790         1
## 3791         1
## 3792         1
## 3793         0
## 3794         0
## 3795         0
## 3796         0
## 3797         0
## 3798         0
## 3799         0
## 3800         0
## 3801         0
## 3802         0
## 3803         0
## 3804         0
## 3805         0
## 3806         0
## 3807         0
## 3808         0
## 3809         1
## 3810         1
## 3811         1
## 3812         1
## 3813         1
```

```
## 3814          1
## 3815          1
## 3816          1
## 3817          1
## 3818          1
## 3819          1
## 3820          1
## 3821          1
## 3822          1
## 3823          1
## 3824          1
## 3825          1
## 3826          1
## 3827          1
## 3828          1
## 3829          1
## 3830          1
## 3831          1
## 3832          1
## 3833          1
## 3834          1
## 3835          1
## 3836          1
## 3837          1
## 3838          1
## 3839          1
## 3840          1
## 3841          1
## 3842          1
## 3843          1
## 3844          1
## 3845          1
## 3846          1
## 3847          1
## 3848          1
## 3849          1
## 3850          1
## 3851          1
## 3852          1
## 3853          1
## 3854          0
## 3855          0
## 3856          0
## 3857          0
## 3858          0
## 3859          0
## 3860          0
## 3861          0
## 3862          0
## 3863          0
## 3864          0
## 3865          0
## 3866          0
## 3867          0
```

```
## 3868      0
## 3869      0
## 3870      0
## 3871      0
## 3872      0
## 3873      0
## 3874      0
## 3875      0
## 3876      0
## 3877      0
## 3878      0
## 3879      0
## 3880      0
## 3881      0
## 3882      0
## 3883      0
## 3884      0
## 3885      0
## 3886      0
## 3887      0
## 3888      0
## 3889      0
## 3890      0
## 3891      0
## 3892      0
## 3893      0
## 3894      0
## 3895      0
## 3896      0
## 3897      0
## 3898      0
## 3899      0
## 3900      0
## 3901      0
## 3902      0
## 3903      0
## 3904      0
## 3905      0
## 3906      0
## 3907      0
## 3908      0
## 3909      0
## 3910      0
## 3911      0
## 3912      0
## 3913      0
## 3914      0
## 3915      0
## 3916      0
## 3917      0
## 3918      0
## 3919      0
## 3920      0
## 3921      0
```

```
## 3922          0
## 3923          0
## 3924          0
## 3925          0
## 3926          0
## 3927          0
## 3928          0
## 3929          0
## 3930          0
## 3931          0
## 3932          0
## 3933          0
## 3934          0
## 3935          0
## 3936          0
## 3937          0
## 3938          0
## 3939          0
## 3940          0
## 3941          0
## 3942          1
## 3943          1
## 3944          1
## 3945          1
## 3946          1
## 3947          1
## 3948          1
## 3949          1
## 3950          1
## 3951          1
## 3952          1
## 3953          1
## 3954          1
## 3955          1
## 3956          1
## 3957          1
## 3958          1
## 3959          1
## 3960          1
## 3961          1
## 3962          1
## 3963          1
## 3964          1
## 3965          1
## 3966          1
## 3967          1
## 3968          1
## 3969          1
## 3970          1
## 3971          1
## 3972          1
## 3973          1
## 3974          1
## 3975          1
```

```
## 3976          1
## 3977          1
## 3978          1
## 3979          1
## 3980          1
## 3981          1
## 3982          1
## 3983          1
## 3984          1
## 3985          1
## 3986          1
## 3987          1
## 3988          1
## 3989          1
## 3990          1
## 3991          1
## 3992          1
## 3993          1
## 3994          1
## 3995          1
## 3996          1
## 3997          1
## 3998          1
## 3999          1
## 4000          1
## 4001          1
## 4002          1
## 4003          1
## 4004          1
## 4005          1
## 4006          1
## 4007          1
## 4008          1
## 4009          1
## 4010          1
## 4011          1
## 4012          1
## 4013          1
## 4014          1
## 4015          1
## 4016          1
## 4017          1
## 4018          1
## 4019          1
## 4020          1
## 4021          1
## 4022          1
## 4023          1
## 4024          1
## 4025          1
## 4026          1
## 4027          1
## 4028          1
## 4029          1
```

```
## 4030      1
## 4031      1
## 4032      1
## 4033      1
## 4034      1
## 4035      1
## 4036      1
## 4037      1
## 4038      1
## 4039      1
## 4040      1
## 4041      1
## 4042      1
## 4043      1
## 4044      1
## 4045      1
## 4046      1
## 4047      1
## 4048      1
## 4049      1
## 4050      1
## 4051      1
## 4052      1
## 4053      1
## 4054      1
## 4055      1
## 4056      1
## 4057      1
## 4058      1
## 4059      1
## 4060      1
## 4061      1
## 4062      1
## 4063      1
## 4064      1
## 4065      1
## 4066      1
## 4067      1
## 4068      1
## 4069      1
## 4070      1
## 4071      1
## 4072      1
## 4073      1
## 4074      1
## 4075      1
## 4076      1
## 4077      0
## 4078      0
## 4079      0
## 4080      0
## 4081      0
## 4082      0
## 4083      0
```

```
## 4084      0
## 4085      0
## 4086      0
## 4087      0
## 4088      0
## 4089      0
## 4090      0
## 4091      0
## 4092      0
## 4093      0
## 4094      0
## 4095      0
## 4096      0
## 4097      0
## 4098      0
## 4099      0
## 4100      0
## 4101      0
## 4102      0
## 4103      0
## 4104      0
## 4105      0
## 4106      0
## 4107      1
## 4108      1
## 4109      1
## 4110      1
## 4111      1
## 4112      1
## 4113      1
## 4114      1
## 4115      1
## 4116      1
## 4117      1
## 4118      1
## 4119      1
## 4120      1
## 4121      1
## 4122      1
## 4123      1
## 4124      1
## 4125      1
## 4126      1
## 4127      1
## 4128      1
## 4129      1
## 4130      1
## 4131      1
## 4132      1
## 4133      1
## 4134      1
## 4135      1
## 4136      1
## 4137      1
```

```
## 4138        1
## 4139        1
## 4140        1
## 4141        1
## 4142        1
## 4143        0
## 4144        1
## 4145        1
## 4146        1
## 4147        1
## 4148        1
## 4149        1
## 4150        1
## 4151        1
## 4152        1
## 4153        1
## 4154        1
## 4155        1
## 4156        1
## 4157        1
## 4158        1
## 4159        1
## 4160        1
## 4161        1
## 4162        1
## 4163        1
## 4164        1
## 4165        1
## 4166        1
## 4167        1
## 4168        1
## 4169        1
## 4170        1
## 4171        1
## 4172        1
## 4173        1
## 4174        1
## 4175        1
## 4176        1
## 4177        1
## 4178        1
## 4179        1
## 4180        1
## 4181        1
## 4182        1
## 4183        1
## 4184        1
## 4185        1
## 4186        1
## 4187        1
## 4188        1
## 4189        1
## 4190        1
## 4191        1
```

```
## 4192      1
## 4193      1
## 4194      1
## 4195      1
## 4196      1
## 4197      1
## 4198      1
## 4199      1
## 4200      1
## 4201      1
## 4202      1
## 4203      1
## 4204      1
## 4205      1
## 4206      1
## 4207      1
## 4208      1
## 4209      1
## 4210      1
## 4211      1
## 4212      1
## 4213      1
## 4214      1
## 4215      1
## 4216      1
## 4217      1
## 4218      1
## 4219      1
## 4220      1
## 4221      1
## 4222      1
## 4223      1
## 4224      1
## 4225      1
## 4226      1
## 4227      1
## 4228      1
## 4229      1
## 4230      1
## 4231      1
## 4232      1
## 4233      1
## 4234      1
## 4235      0
## 4236      1
## 4237      1
## 4238      1
## 4239      1
## 4240      1
## 4241      1
## 4242      1
## 4243      1
## 4244      1
## 4245      1
```

```
## 4246           1
## 4247           1
## 4248           1
## 4249           1
## 4250           1
## 4251           1
## 4252           1
## 4253           1
## 4254           1
## 4255           1
## 4256           1
## 4257           1
## 4258           1
## 4259           1
## 4260           1
## 4261           1
## 4262           1
## 4263           1
## 4264           1
## 4265           1
## 4266           1
## 4267           1
## 4268           1
## 4269           1
## 4270           1
## 4271           1
## 4272           1
## 4273           1
## 4274           1
## 4275           1
## 4276           1
## 4277           1
## 4278           1
## 4279           1
## 4280           1
## 4281           1
## 4282           1
## 4283           1
## 4284           1
## 4285           1
## 4286           1
## 4287           1
## 4288           1
## 4289           1
## 4290           1
## 4291           1
## 4292           1
## 4293           1
## 4294           1
## 4295           1
## 4296           1
## 4297           1
## 4298           1
## 4299           1
```

```
## 4300          1
## 4301          1
## 4302          1
## 4303          1
## 4304          1
## 4305          1
## 4306          1
## 4307          1
## 4308          1
## 4309          1
## 4310          1
## 4311          1
## 4312          1
## 4313          1
## 4314          1
## 4315          1
## 4316          1
## 4317          0
## 4318          0
## 4319          0
## 4320          0
## 4321          0
## 4322          1
## 4323          1
## 4324          1
## 4325          1
## 4326          1
## 4327          1
## 4328          1
## 4329          1
## 4330          1
## 4331          1
## 4332          1
## 4333          1
## 4334          1
## 4335          1
## 4336          1
## 4337          0
## 4338          0
## 4339          0
## 4340          0
## 4341          0
## 4342          0
## 4343          0
## 4344          0
## 4345          0
## 4346          0
## 4347          1
## 4348          1
## 4349          1
## 4350          1
## 4351          1
## 4352          1
## 4353          1
```

```
## 4354      1
## 4355      1
## 4356      1
## 4357      1
## 4358      1
## 4359      1
## 4360      1
## 4361      1
## 4362      0
## 4363      0
## 4364      0
## 4365      0
## 4366      0
## 4367      0
## 4368      0
## 4369      0
## 4370      0
## 4371      0
## 4372      0
## 4373      0
## 4374      0
## 4375      0
## 4376      0
## 4377      0
## 4378      0
## 4379      0
## 4380      0
## 4381      0
## 4382      0
## 4383      0
## 4384      0
## 4385      0
## 4386      0
## 4387      0
## 4388      0
## 4389      0
## 4390      0
## 4391      0
## 4392      0
## 4393      0
## 4394      0
## 4395      0
## 4396      0
## 4397      0
## 4398      0
## 4399      0
## 4400      0
## 4401      0
## 4402      0
## 4403      0
## 4404      0
## 4405      0
## 4406      0
## 4407      0
```

```
## 4408      0
## 4409      0
## 4410      0
## 4411      0
## 4412      0
## 4413      0
## 4414      0
## 4415      0
## 4416      0
## 4417      0
## 4418      0
## 4419      0
## 4420      0
## 4421      0
## 4422      0
## 4423      0
## 4424      0
## 4425      0
## 4426      0
## 4427      0
## 4428      0
## 4429      0
## 4430      0
## 4431      0
## 4432      0
## 4433      0
## 4434      0
## 4435      0
## 4436      0
## 4437      0
## 4438      0
## 4439      0
## 4440      0
## 4441      0
## 4442      0
## 4443      0
## 4444      0
## 4445      0
## 4446      0
## 4447      0
## 4448      0
## 4449      0
## 4450      0
## 4451      0
## 4452      0
## 4453      1
## 4454      1
## 4455      1
## 4456      1
## 4457      1
## 4458      1
## 4459      1
## 4460      1
## 4461      1
```

```
## 4462          1
## 4463          1
## 4464          1
## 4465          1
## 4466          1
## 4467          1
## 4468          1
## 4469          1
## 4470          1
## 4471          1
## 4472          1
## 4473          1
## 4474          1
## 4475          1
## 4476          0
## 4477          0
## 4478          0
## 4479          0
## 4480          0
## 4481          0
## 4482          0
## 4483          0
## 4484          0
## 4485          0
## 4486          0
## 4487          0
## 4488          0
## 4489          0
## 4490          0
## 4491          0
## 4492          0
## 4493          0
## 4494          0
## 4495          0
## 4496          0
## 4497          0
## 4498          0
## 4499          0
## 4500          0
## 4501          0
## 4502          0
## 4503          0
## 4504          0
## 4505          0
## 4506          0
## 4507          0
## 4508          0
## 4509          0
## 4510          0
## 4511          0
## 4512          0
## 4513          0
## 4514          0
## 4515          0
```

```
## 4516    0
## 4517    0
## 4518    0
## 4519    0
## 4520    0
## 4521    0
## 4522    0
## 4523    0
## 4524    0
## 4525    0
## 4526    0
## 4527    0
## 4528    0
## 4529    0
## 4530    0
## 4531    0
## 4532    0
## 4533    0
## 4534    0
## 4535    0
## 4536    0
## 4537    0
## 4538    0
## 4539    0
## 4540    0
## 4541    0
## 4542    0
## 4543    0
## 4544    0
## 4545    0
## 4546    0
## 4547    0
## 4548    0
## 4549    1
## 4550    1
## 4551    1
## 4552    1
## 4553    1
## 4554    1
## 4555    1
## 4556    1
## 4557    1
## 4558    1
## 4559    1
## 4560    1
## 4561    1
## 4562    1
## 4563    1
## 4564    1
## 4565    1
## 4566    1
## 4567    1
## 4568    1
## 4569    1
```

```
## 4570      1
## 4571      1
## 4572      1
## 4573      1
## 4574      1
## 4575      1
## 4576      1
## 4577      1
## 4578      1
## 4579      1
## 4580      1
## 4581      1
## 4582      1
## 4583      1
## 4584      0
## 4585      0
## 4586      0
## 4587      0
## 4588      0
## 4589      0
## 4590      0
## 4591      0
## 4592      0
## 4593      0
## 4594      0
## 4595      0
## 4596      1
## 4597      1
## 4598      1
## 4599      1
## 4600      1
## 4601      1
## 4602      1
## 4603      1
## 4604      1
## 4605      1
## 4606      1
## 4607      1
## 4608      1
## 4609      1
## 4610      1
## 4611      1
## 4612      1
## 4613      1
## 4614      1
## 4615      1
## 4616      1
## 4617      1
## 4618      1
## 4619      1
## 4620      0
## 4621      0
## 4622      0
## 4623      0
```

```
## 4624          0
## 4625          1
## 4626          1
## 4627          1
## 4628          1
## 4629          1
## 4630          1
## 4631          1
## 4632          1
## 4633          1
## 4634          1
## 4635          1
## 4636          1
## 4637          1
## 4638          1
## 4639          1
## 4640          1
## 4641          1
## 4642          1
## 4643          1
## 4644          0
## 4645          0
## 4646          0
## 4647          0
## 4648          0
## 4649          0
## 4650          0
## 4651          0
## 4652          0
## 4653          0
## 4654          0
## 4655          1
## 4656          1
## 4657          1
## 4658          1
## 4659          1
## 4660          1
## 4661          1
## 4662          1
## 4663          1
## 4664          1
## 4665          1
## 4666          1
## 4667          1
## 4668          1
## 4669          1
## 4670          1
## 4671          1
## 4672          1
## 4673          1
## 4674          1
## 4675          1
## 4676          1
## 4677          1
```

```
## 4678          1
## 4679          1
## 4680          1
## 4681          1
## 4682          1
## 4683          1
## 4684          1
## 4685          1
## 4686          1
## 4687          1
## 4688          1
## 4689          1
## 4690          1
## 4691          1
## 4692          1
## 4693          1
## 4694          1
## 4695          1
## 4696          1
## 4697          1
## 4698          1
## 4699          1
## 4700          1
## 4701          1
## 4702          1
## 4703          1
## 4704          1
## 4705          1
## 4706          1
## 4707          1
## 4708          1
## 4709          1
## 4710          1
## 4711          1
## 4712          1
## 4713          1
## 4714          1
## 4715          0
## 4716          0
## 4717          0
## 4718          0
## 4719          0
## 4720          0
## 4721          0
## 4722          0
## 4723          0
## 4724          0
## 4725          0
## 4726          0
## 4727          0
## 4728          0
## 4729          0
## 4730          0
## 4731          0
```

```
## 4732          0
## 4733          0
## 4734          0
## 4735          0
## 4736          0
## 4737          0
## 4738          0
## 4739          0
## 4740          0
## 4741          0
## 4742          0
## 4743          0
## 4744          0
## 4745          0
## 4746          0
## 4747          0
## 4748          0
## 4749          0
## 4750          0
## 4751          0
## 4752          0
## 4753          0
## 4754          0
## 4755          0
## 4756          0
## 4757          0
## 4758          0
## 4759          1
## 4760          1
## 4761          1
## 4762          1
## 4763          1
## 4764          1
## 4765          1
## 4766          1
## 4767          1
## 4768          1
## 4769          1
## 4770          1
## 4771          1
## 4772          1
## 4773          1
## 4774          1
## 4775          1
## 4776          1
## 4777          1
## 4778          0
## 4779          0
## 4780          0
## 4781          0
## 4782          0
## 4783          0
## 4784          0
## 4785          0
```

```
## 4786        0
## 4787        0
## 4788        0
## 4789        0
## 4790        0
## 4791        0
## 4792        0
## 4793        0
## 4794        0
## 4795        0
## 4796        0
## 4797        1
## 4798        1
## 4799        1
## 4800        1
## 4801        1
## 4802        1
## 4803        1
## 4804        1
## 4805        1
## 4806        1
## 4807        1
## 4808        1
## 4809        1
## 4810        1
## 4811        1
## 4812        1
## 4813        1
## 4814        0
## 4815        1
## 4816        1
## 4817        1
## 4818        1
## 4819        1
## 4820        1
## 4821        1
## 4822        1
## 4823        1
## 4824        1
## 4825        1
## 4826        1
## 4827        1
## 4828        1
## 4829        1
## 4830        1
## 4831        1
## 4832        1
## 4833        1
## 4834        1
## 4835        1
## 4836        1
## 4837        1
## 4838        1
## 4839        1
```

```
## 4840          1
## 4841          1
## 4842          1
## 4843          1
## 4844          1
## 4845          1
## 4846          1
## 4847          1
## 4848          1
## 4849          0
## 4850          0
## 4851          0
## 4852          0
## 4853          0
## 4854          0
## 4855          0
## 4856          0
## 4857          0
## 4858          0
## 4859          0
## 4860          0
## 4861          0
## 4862          0
## 4863          0
## 4864          0
## 4865          0
## 4866          0
## 4867          0
## 4868          0
## 4869          0
## 4870          0
## 4871          0
## 4872          0
## 4873          0
## 4874          0
## 4875          0
## 4876          0
## 4877          0
## 4878          0
## 4879          0
## 4880          0
## 4881          0
## 4882          0
## 4883          0
## 4884          0
## 4885          0
## 4886          0
## 4887          0
## 4888          0
## 4889          0
## 4890          0
## 4891          0
## 4892          0
## 4893          0
```

```
## 4894          0
## 4895          0
## 4896          0
## 4897          0
## 4898          0
## 4899          0
## 4900          0
## 4901          0
## 4902          0
## 4903          0
## 4904          0
## 4905          0
## 4906          0
## 4907          0
## 4908          0
## 4909          0
## 4910          0
## 4911          0
## 4912          0
## 4913          0
## 4914          0
## 4915          0
## 4916          1
## 4917          1
## 4918          1
## 4919          1
## 4920          1
## 4921          1
## 4922          1
## 4923          1
## 4924          1
## 4925          1
## 4926          1
## 4927          1
## 4928          1
## 4929          1
## 4930          1
## 4931          1
## 4932          1
## 4933          1
## 4934          1
## 4935          1
## 4936          1
## 4937          1
## 4938          1
## 4939          1
## 4940          1
## 4941          1
## 4942          1
## 4943          1
## 4944          1
## 4945          1
## 4946          1
## 4947          1
```

```
## 4948          1
## 4949          1
## 4950          1
## 4951          1
## 4952          1
## 4953          1
## 4954          1
## 4955          1
## 4956          1
## 4957          1
## 4958          1
## 4959          1
## 4960          1
## 4961          1
## 4962          1
## 4963          1
## 4964          1
## 4965          0
## 4966          0
## 4967          0
## 4968          0
## 4969          0
## 4970          0
## 4971          0
## 4972          0
## 4973          0
## 4974          0
## 4975          0
## 4976          0
## 4977          0
## 4978          0
## 4979          0
## 4980          0
## 4981          0
## 4982          0
## 4983          0
## 4984          0
## 4985          0
## 4986          0
## 4987          0
## 4988          0
## 4989          0
## 4990          0
## 4991          0
## 4992          0
## 4993          0
## 4994          0
## 4995          0
## 4996          0
## 4997          0
## 4998          0
## 4999          0
## 5000          0
## 5001          0
```

```
## 5002       0
## 5003       0
## 5004       0
## 5005       0
## 5006       0
## 5007       0
## 5008       0
## 5009       0
## 5010       0
## 5011       0
## 5012       0
## 5013       0
## 5014       0
## 5015       0
## 5016       0
## 5017       0
## 5018       0
## 5019       0
## 5020       0
## 5021       0
## 5022       0
## 5023       0
## 5024       0
## 5025       0
## 5026       0
## 5027       0
## 5028       0
## 5029       0
## 5030       0
## 5031       0
## 5032       0
## 5033       0
## 5034       0
## 5035       0
## 5036       0
## 5037       0
## 5038       0
## 5039       0
## 5040       0
## 5041       0
## 5042       0
## 5043       0
## 5044       0
## 5045       0
## 5046       0
## 5047       0
## 5048       0
## 5049       0
## 5050       0
## 5051       0
## 5052       0
## 5053       0
## 5054       0
## 5055       0
```

```
## 5056       0
## 5057       0
## 5058       0
## 5059       0
## 5060       0
## 5061       0
## 5062       0
## 5063       0
## 5064       0
## 5065       0
## 5066       0
## 5067       0
## 5068       0
## 5069       0
## 5070       0
## 5071       0
## 5072       0
## 5073       0
## 5074       0
## 5075       0
## 5076       0
## 5077       0
## 5078       0
## 5079       0
## 5080       0
## 5081       0
## 5082       0
## 5083       0
## 5084       0
## 5085       0
## 5086       0
## 5087       0
## 5088       0
## 5089       0
## 5090       0
## 5091       0
## 5092       0
## 5093       0
## 5094       0
## 5095       0
## 5096       0
## 5097       0
## 5098       0
## 5099       0
## 5100       0
## 5101       0
## 5102       0
## 5103       0
## 5104       0
## 5105       0
## 5106       0
## 5107       0
## 5108       0
## 5109       1
```

```
## 5110       1
## 5111       1
## 5112       1
## 5113       1
## 5114       1
## 5115       1
## 5116       1
## 5117       1
## 5118       1
## 5119       1
## 5120       1
## 5121       1
## 5122       1
## 5123       1
## 5124       1
## 5125       1
## 5126       1
## 5127       1
## 5128       1
## 5129       1
## 5130       1
## 5131       1
## 5132       1
## 5133       1
## 5134       1
## 5135       1
## 5136       1
## 5137       1
## 5138       1
## 5139       1
## 5140       1
## 5141       1
## 5142       1
## 5143       1
## 5144       1
## 5145       1
## 5146       1
## 5147       1
## 5148       1
## 5149       1
## 5150       1
## 5151       0
## 5152       1
## 5153       1
## 5154       1
## 5155       1
## 5156       1
## 5157       1
## 5158       1
## 5159       1
## 5160       1
## 5161       1
## 5162       1
## 5163       0
```

```
## 5164      0
## 5165      0
## 5166      0
## 5167      0
## 5168      0
## 5169      0
## 5170      0
## 5171      0
## 5172      0
## 5173      0
## 5174      0
## 5175      0
## 5176      0
## 5177      0
## 5178      0
## 5179      0
## 5180      0
## 5181      0
## 5182      0
## 5183      0
## 5184      0
## 5185      0
## 5186      0
## 5187      0
## 5188      0
## 5189      0
## 5190      0
## 5191      0
## 5192      0
## 5193      0
## 5194      0
## 5195      0
## 5196      0
## 5197      0
## 5198      0
## 5199      0
## 5200      0
## 5201      0
## 5202      0
## 5203      0
## 5204      0
## 5205      0
## 5206      0
## 5207      1
## 5208      1
## 5209      1
## 5210      1
## 5211      1
## 5212      1
## 5213      1
## 5214      1
## 5215      1
## 5216      1
## 5217      1
```

```
## 5218         1
## 5219         1
## 5220         1
## 5221         1
## 5222         1
## 5223         1
## 5224         1
## 5225         1
## 5226         1
## 5227         1
## 5228         0
## 5229         0
## 5230         0
## 5231         0
## 5232         0
## 5233         0
## 5234         0
## 5235         0
## 5236         0
## 5237         0
## 5238         0
## 5239         0
## 5240         0
## 5241         0
## 5242         0
## 5243         0
## 5244         0
## 5245         0
## 5246         0
## 5247         0
## 5248         0
## 5249         0
## 5250         0
## 5251         0
## 5252         0
## 5253         0
## 5254         0
## 5255         0
## 5256         0
## 5257         0
## 5258         0
## 5259         0
## 5260         0
## 5261         0
## 5262         0
## 5263         0
## 5264         0
## 5265         0
## 5266         0
## 5267         0
## 5268         0
## 5269         0
## 5270         0
## 5271         0
```

```
## 5272      0
## 5273      0
## 5274      0
## 5275      0
## 5276      0
## 5277      0
## 5278      0
## 5279      0
## 5280      0
## 5281      0
## 5282      0
## 5283      0
## 5284      0
## 5285      0
## 5286      0
## 5287      0
## 5288      0
## 5289      0
## 5290      0
## 5291      0
## 5292      0
## 5293      0
## 5294      0
## 5295      0
## 5296      0
## 5297      0
## 5298      0
## 5299      0
## 5300      0
## 5301      0
## 5302      0
## 5303      0
## 5304      0
## 5305      0
## 5306      0
## 5307      0
## 5308      0
## 5309      0
## 5310      0
## 5311      0
## 5312      0
## 5313      0
## 5314      0
## 5315      0
## 5316      0
## 5317      0
## 5318      0
## 5319      0
## 5320      0
## 5321      0
## 5322      0
## 5323      0
## 5324      0
## 5325      0
```

```
## 5326        0
## 5327        0
## 5328        0
## 5329        0
## 5330        0
## 5331        0
## 5332        0
## 5333        0
## 5334        0
## 5335        0
## 5336        0
## 5337        0
## 5338        0
## 5339        0
## 5340        0
## 5341        0
## 5342        0
## 5343        0
## 5344        0
## 5345        0
## 5346        0
## 5347        0
## 5348        0
## 5349        0
## 5350        1
## 5351        1
## 5352        1
## 5353        1
## 5354        1
## 5355        1
## 5356        1
## 5357        1
## 5358        1
## 5359        1
## 5360        1
## 5361        1
## 5362        1
## 5363        1
## 5364        1
## 5365        1
## 5366        1
## 5367        1
## 5368        1
## 5369        1
## 5370        1
## 5371        1
## 5372        1
## 5373        1
## 5374        1
## 5375        1
## 5376        1
## 5377        1
## 5378        1
## 5379        1
```

```
## 5380       1
## 5381       1
## 5382       1
## 5383       1
## 5384       1
## 5385       1
## 5386       1
## 5387       1
## 5388       1
## 5389       1
## 5390       1
## 5391       1
## 5392       1
## 5393       1
## 5394       1
## 5395       1
## 5396       1
## 5397       1
## 5398       1
## 5399       1
## 5400       1
## 5401       1
## 5402       1
## 5403       0
## 5404       0
## 5405       0
## 5406       0
## 5407       0
## 5408       0
## 5409       0
## 5410       0
## 5411       0
## 5412       0
## 5413       0
## 5414       0
## 5415       0
## 5416       0
## 5417       0
## 5418       0
## 5419       0
## 5420       0
## 5421       0
## 5422       0
## 5423       0
## 5424       0
## 5425       0
## 5426       0
## 5427       0
## 5428       0
## 5429       0
## 5430       0
## 5431       0
## 5432       0
## 5433       0
```

```
## 5434        0
## 5435        0
## 5436        0
## 5437        0
## 5438        0
## 5439        0
## 5440        0
## 5441        0
## 5442        0
## 5443        0
## 5444        0
## 5445        0
## 5446        0
## 5447        0
## 5448        0
## 5449        0
## 5450        0
## 5451        0
## 5452        0
## 5453        0
## 5454        0
## 5455        0
## 5456        0
## 5457        0
## 5458        0
## 5459        0
## 5460        0
## 5461        0
## 5462        0
## 5463        0
## 5464        0
## 5465        0
## 5466        0
## 5467        0
## 5468        0
## 5469        0
## 5470        0
## 5471        0
## 5472        0
## 5473        0
## 5474        1
## 5475        1
## 5476        1
## 5477        1
## 5478        1
## 5479        1
## 5480        1
## 5481        1
## 5482        1
## 5483        1
## 5484        1
## 5485        1
## 5486        1
## 5487        1
```

```
## 5488          1
## 5489          1
## 5490          1
## 5491          1
## 5492          1
## 5493          0
## 5494          0
## 5495          0
## 5496          0
## 5497          0
## 5498          0
## 5499          0
## 5500          0
## 5501          0
## 5502          0
## 5503          0
## 5504          0
## 5505          0
## 5506          0
## 5507          0
## 5508          0
## 5509          0
## 5510          0
## 5511          0
## 5512          0
## 5513          0
## 5514          0
## 5515          0
## 5516          0
## 5517          0
## 5518          0
## 5519          0
## 5520          0
## 5521          0
## 5522          0
## 5523          0
## 5524          0
## 5525          0
## 5526          0
## 5527          0
## 5528          1
## 5529          1
## 5530          1
## 5531          1
## 5532          1
## 5533          1
## 5534          1
## 5535          0
## 5536          0
## 5537          0
## 5538          0
## 5539          0
## 5540          0
## 5541          0
```

```
## 5542      0
## 5543      0
## 5544      0
## 5545      0
## 5546      0
## 5547      0
## 5548      0
## 5549      0
## 5550      0
## 5551      0
## 5552      0
## 5553      0
## 5554      0
## 5555      0
## 5556      0
## 5557      0
## 5558      0
## 5559      0
## 5560      0
## 5561      0
## 5562      0
## 5563      0
## 5564      0
## 5565      0
## 5566      0
## 5567      0
## 5568      0
## 5569      0
## 5570      0
## 5571      0
## 5572      0
## 5573      0
## 5574      0
## 5575      0
## 5576      0
## 5577      1
## 5578      1
## 5579      1
## 5580      1
## 5581      1
## 5582      1
## 5583      1
## 5584      1
## 5585      1
## 5586      1
## 5587      1
## 5588      1
## 5589      1
## 5590      1
## 5591      1
## 5592      1
## 5593      1
## 5594      1
## 5595      1
```

```
## 5596       1
## 5597       1
## 5598       1
## 5599       1
## 5600       1
## 5601       1
## 5602       1
## 5603       1
## 5604       1
## 5605       1
## 5606       1
## 5607       1
## 5608       1
## 5609       1
## 5610       1
## 5611       1
## 5612       1
## 5613       1
## 5614       1
## 5615       1
## 5616       1
## 5617       1
## 5618       1
## 5619       1
## 5620       1
## 5621       1
## 5622       1
## 5623       1
## 5624       1
## 5625       1
## 5626       1
## 5627       1
## 5628       1
## 5629       1
## 5630       1
## 5631       1
## 5632       1
## 5633       1
## 5634       1
## 5635       1
## 5636       1
## 5637       1
## 5638       1
## 5639       1
## 5640       1
## 5641       1
## 5642       1
## 5643       1
## 5644       1
## 5645       1
## 5646       1
## 5647       1
## 5648       1
## 5649       1
```

```
## 5650          1
## 5651          1
## 5652          1
## 5653          1
## 5654          1
## 5655          0
## 5656          0
## 5657          0
## 5658          0
## 5659          0
## 5660          0
## 5661          0
## 5662          0
## 5663          0
## 5664          0
## 5665          0
## 5666          0
## 5667          0
## 5668          0
## 5669          0
## 5670          0
## 5671          0
## 5672          0
## 5673          0
## 5674          0
## 5675          0
## 5676          0
## 5677          0
## 5678          0
## 5679          0
## 5680          0
## 5681          0
## 5682          0
## 5683          0
## 5684          0
## 5685          0
## 5686          0
## 5687          0
## 5688          0
## 5689          0
## 5690          0
## 5691          0
## 5692          0
## 5693          0
## 5694          0
## 5695          0
## 5696          0
## 5697          0
## 5698          0
## 5699          0
## 5700          0
## 5701          0
## 5702          0
## 5703          0
```

```
## 5704    0
## 5705    0
## 5706    0
## 5707    0
## 5708    0
## 5709    0
## 5710    0
## 5711    0
## 5712    0
## 5713    0
## 5714    1
## 5715    1
## 5716    1
## 5717    1
## 5718    1
## 5719    1
## 5720    1
## 5721    1
## 5722    1
## 5723    1
## 5724    1
## 5725    1
## 5726    1
## 5727    1
## 5728    1
## 5729    1
## 5730    1
## 5731    1
## 5732    1
## 5733    1
## 5734    1
## 5735    1
## 5736    1
## 5737    1
## 5738    1
## 5739    1
## 5740    1
## 5741    1
## 5742    1
## 5743    1
## 5744    1
## 5745    1
## 5746    1
## 5747    1
## 5748    1
## 5749    0
## 5750    0
## 5751    0
## 5752    0
## 5753    0
## 5754    0
## 5755    0
## 5756    0
## 5757    0
```

```
## 5758      0
## 5759      0
## 5760      0
## 5761      0
## 5762      0
## 5763      0
## 5764      0
## 5765      0
## 5766      0
## 5767      0
## 5768      0
## 5769      0
## 5770      0
## 5771      0
## 5772      0
## 5773      0
## 5774      0
## 5775      0
## 5776      0
## 5777      0
## 5778      0
## 5779      0
## 5780      0
## 5781      0
## 5782      0
## 5783      0
## 5784      0
## 5785      0
## 5786      0
## 5787      0
## 5788      0
## 5789      0
## 5790      0
## 5791      0
## 5792      0
## 5793      0
## 5794      0
## 5795      0
## 5796      0
## 5797      0
## 5798      0
## 5799      0
## 5800      0
## 5801      0
## 5802      0
## 5803      0
## 5804      0
## 5805      0
## 5806      0
## 5807      0
## 5808      0
## 5809      0
## 5810      0
## 5811      0
```

```
## 5812          0
## 5813          1
## 5814          1
## 5815          1
## 5816          1
## 5817          1
## 5818          1
## 5819          1
## 5820          1
## 5821          1
## 5822          1
## 5823          1
## 5824          1
## 5825          1
## 5826          1
## 5827          1
## 5828          1
## 5829          1
## 5830          1
## 5831          1
## 5832          1
## 5833          1
## 5834          1
## 5835          1
## 5836          1
## 5837          1
## 5838          1
## 5839          1
## 5840          1
## 5841          1
## 5842          1
## 5843          1
## 5844          1
## 5845          1
## 5846          1
## 5847          1
## 5848          1
## 5849          1
## 5850          1
## 5851          1
## 5852          1
## 5853          1
## 5854          1
## 5855          1
## 5856          1
## 5857          1
## 5858          1
## 5859          1
## 5860          1
## 5861          1
## 5862          1
## 5863          1
## 5864          1
## 5865          1
```

```
## 5866      1
## 5867      1
## 5868      1
## 5869      1
## 5870      1
## 5871      1
## 5872      1
## 5873      1
## 5874      1
## 5875      1
## 5876      1
## 5877      1
## 5878      1
## 5879      1
## 5880      1
## 5881      1
## 5882      1
## 5883      1
## 5884      1
## 5885      1
## 5886      1
## 5887      1
## 5888      1
## 5889      1
## 5890      1
## 5891      1
## 5892      0
## 5893      0
## 5894      0
## 5895      0
## 5896      0
## 5897      0
## 5898      0
## 5899      0
## 5900      0
## 5901      0
## 5902      0
## 5903      0
## 5904      0
## 5905      0
## 5906      0
## 5907      0
## 5908      0
## 5909      0
## 5910      0
## 5911      0
## 5912      0
## 5913      0
## 5914      0
## 5915      0
## 5916      0
## 5917      0
## 5918      0
## 5919      0
```

```
## 5920          0
## 5921          0
## 5922          0
## 5923          0
## 5924          0
## 5925          0
## 5926          0
## 5927          0
## 5928          0
## 5929          0
## 5930          0
## 5931          0
## 5932          0
## 5933          0
## 5934          0
## 5935          0
## 5936          0
## 5937          0
## 5938          0
## 5939          0
## 5940          0
## 5941          0
## 5942          0
## 5943          0
## 5944          0
## 5945          0
## 5946          0
## 5947          0
## 5948          0
## 5949          0
## 5950          0
## 5951          0
## 5952          0
## 5953          0
## 5954          0
## 5955          0
## 5956          0
## 5957          0
## 5958          0
## 5959          0
## 5960          0
## 5961          0
## 5962          0
## 5963          0
## 5964          0
## 5965          0
## 5966          1
## 5967          1
## 5968          1
## 5969          1
## 5970          1
## 5971          1
## 5972          1
## 5973          1
```

```
## 5974       1
## 5975       1
## 5976       1
## 5977       1
## 5978       1
## 5979       1
## 5980       1
## 5981       0
## 5982       0
## 5983       0
## 5984       0
## 5985       0
## 5986       0
## 5987       0
## 5988       0
## 5989       0
## 5990       0
## 5991       0
## 5992       0
## 5993       0
## 5994       0
## 5995       0
## 5996       0
## 5997       0
## 5998       0
## 5999       0
## 6000       0
## 6001       0
## 6002       0
## 6003       0
## 6004       0
## 6005       0
## 6006       0
## 6007       0
## 6008       0
## 6009       0
## 6010       0
## 6011       0
## 6012       0
## 6013       0
## 6014       0
## 6015       0
## 6016       0
## 6017       0
## 6018       0
## 6019       0
## 6020       0
## 6021       0
## 6022       1
## 6023       1
## 6024       1
## 6025       1
## 6026       1
## 6027       1
```

```
## 6028          1
## 6029          1
## 6030          1
## 6031          1
## 6032          1
## 6033          1
## 6034          1
## 6035          1
## 6036          1
## 6037          1
## 6038          1
## 6039          1
## 6040          1
## 6041          1
## 6042          1
## 6043          1
## 6044          1
## 6045          1
## 6046          1
## 6047          1
## 6048          1
## 6049          1
## 6050          1
## 6051          0
## 6052          1
## 6053          1
## 6054          1
## 6055          1
## 6056          1
## 6057          1
## 6058          1
## 6059          1
## 6060          1
## 6061          1
## 6062          1
## 6063          1
## 6064          1
## 6065          1
## 6066          1
## 6067          1
## 6068          1
## 6069          1
## 6070          1
## 6071          1
## 6072          1
## 6073          1
## 6074          1
## 6075          1
## 6076          1
## 6077          1
## 6078          1
## 6079          1
## 6080          1
## 6081          1
```

```
## 6082          1
## 6083          1
## 6084          1
## 6085          1
## 6086          1
## 6087          1
## 6088          1
## 6089          1
## 6090          1
## 6091          1
## 6092          1
## 6093          1
## 6094          1
## 6095          1
## 6096          1
## 6097          1
## 6098          1
## 6099          1
## 6100          1
## 6101          1
## 6102          1
## 6103          1
## 6104          1
## 6105          1
## 6106          1
## 6107          1
## 6108          1
## 6109          1
## 6110          1
## 6111          1
## 6112          1
## 6113          1
## 6114          1
## 6115          1
## 6116          1
## 6117          1
## 6118          1
## 6119          1
## 6120          1
## 6121          1
## 6122          1
## 6123          1
## 6124          1
## 6125          1
## 6126          1
## 6127          1
## 6128          1
## 6129          1
## 6130          1
## 6131          1
## 6132          1
## 6133          1
## 6134          1
## 6135          1
```

```
## 6136          1
## 6137          1
## 6138          1
## 6139          1
## 6140          1
## 6141          1
## 6142          1
## 6143          1
## 6144          1
## 6145          1
## 6146          1
## 6147          1
## 6148          1
## 6149          1
## 6150          1
## 6151          1
## 6152          1
## 6153          1
## 6154          1
## 6155          1
## 6156          1
## 6157          1
## 6158          1
## 6159          1
## 6160          1
## 6161          1
## 6162          1
## 6163          1
## 6164          1
## 6165          1
## 6166          1
## 6167          1
## 6168          1
## 6169          1
## 6170          1
## 6171          1
## 6172          1
## 6173          1
## 6174          1
## 6175          1
## 6176          1
## 6177          1
## 6178          1
## 6179          1
## 6180          1
## 6181          1
## 6182          1
## 6183          1
## 6184          1
## 6185          1
## 6186          1
## 6187          1
## 6188          1
## 6189          1
```

```
## 6190        1
## 6191        1
## 6192        1
## 6193        1
## 6194        1
## 6195        1
## 6196        1
## 6197        1
## 6198        1
## 6199        1
## 6200        1
## 6201        1
## 6202        1
## 6203        1
## 6204        1
## 6205        1
## 6206        1
## 6207        1
## 6208        1
## 6209        1
## 6210        1
## 6211        1
## 6212        1
## 6213        1
## 6214        1
## 6215        1
## 6216        1
## 6217        1
## 6218        1
## 6219        1
## 6220        1
## 6221        1
## 6222        1
## 6223        1
## 6224        1
## 6225        1
## 6226        1
## 6227        1
## 6228        1
## 6229        1
## 6230        1
## 6231        1
## 6232        1
## 6233        1
## 6234        1
## 6235        1
## 6236        1
## 6237        1
## 6238        1
## 6239        1
## 6240        1
## 6241        1
## 6242        1
## 6243        1
```

```
## 6244       1
## 6245       1
## 6246       1
## 6247       1
## 6248       1
## 6249       1
## 6250       1
## 6251       1
## 6252       1
## 6253       1
## 6254       1
## 6255       1
## 6256       1
## 6257       1
## 6258       1
## 6259       1
## 6260       1
## 6261       1
## 6262       1
## 6263       1
## 6264       1
## 6265       1
## 6266       1
## 6267       1
## 6268       1
## 6269       1
## 6270       1
## 6271       1
## 6272       1
## 6273       1
## 6274       1
## 6275       1
## 6276       1
## 6277       1
## 6278       1
## 6279       1
## 6280       1
## 6281       1
## 6282       1
## 6283       1
## 6284       1
## 6285       1
## 6286       1
## 6287       1
## 6288       1
## 6289       1
## 6290       1
## 6291       1
## 6292       1
## 6293       1
## 6294       1
## 6295       1
## 6296       1
## 6297       1
```

```
## 6298          1
## 6299          1
## 6300          1
## 6301          1
## 6302          1
## 6303          1
## 6304          1
## 6305          1
## 6306          1
## 6307          1
## 6308          1
## 6309          1
## 6310          1
## 6311          1
## 6312          1
## 6313          1
## 6314          1
## 6315          1
## 6316          1
## 6317          1
## 6318          1
## 6319          1
## 6320          1
## 6321          1
## 6322          1
## 6323          1
## 6324          1
## 6325          1
## 6326          1
## 6327          1
## 6328          1
## 6329          1
## 6330          1
## 6331          1
## 6332          1
## 6333          1
## 6334          1
## 6335          1
## 6336          1
## 6337          1
## 6338          1
## 6339          1
## 6340          1
## 6341          1
## 6342          1
## 6343          1
## 6344          1
## 6345          1
## 6346          1
## 6347          1
## 6348          1
## 6349          1
## 6350          1
## 6351          1
```

```
## 6352    1
## 6353    1
## 6354    1
## 6355    1
## 6356    1
## 6357    1
## 6358    1
## 6359    1
## 6360    1
## 6361    1
## 6362    1
## 6363    1
## 6364    1
## 6365    0
## 6366    0
## 6367    0
## 6368    0
## 6369    0
## 6370    0
## 6371    0
## 6372    0
## 6373    0
## 6374    0
## 6375    0
## 6376    0
## 6377    0
## 6378    0
## 6379    0
## 6380    0
## 6381    0
## 6382    0
## 6383    0
## 6384    0
## 6385    0
## 6386    0
## 6387    0
## 6388    0
## 6389    0
## 6390    0
## 6391    0
## 6392    0
## 6393    0
## 6394    0
## 6395    0
## 6396    0
## 6397    0
## 6398    0
## 6399    0
## 6400    0
## 6401    0
## 6402    1
## 6403    1
## 6404    1
## 6405    1
```

```
## 6406          1
## 6407          1
## 6408          1
## 6409          1
## 6410          1
## 6411          1
## 6412          1
## 6413          1
## 6414          1
## 6415          1
## 6416          1
## 6417          1
## 6418          1
## 6419          1
## 6420          1
## 6421          1
## 6422          1
## 6423          1
## 6424          1
## 6425          1
## 6426          1
## 6427          1
## 6428          1
## 6429          1
## 6430          1
## 6431          0
## 6432          0
## 6433          0
## 6434          0
## 6435          0
## 6436          0
## 6437          0
## 6438          0
## 6439          0
## 6440          0
## 6441          0
## 6442          0
## 6443          1
## 6444          1
## 6445          1
## 6446          1
## 6447          1
## 6448          1
## 6449          1
## 6450          1
## 6451          1
## 6452          1
## 6453          1
## 6454          1
## 6455          1
## 6456          0
## 6457          1
## 6458          1
## 6459          1
```

```
## 6460      1
## 6461      1
## 6462      1
## 6463      1
## 6464      1
## 6465      1
## 6466      1
## 6467      1
## 6468      1
## 6469      1
## 6470      1
## 6471      1
## 6472      1
## 6473      1
## 6474      1
## 6475      1
## 6476      0
## 6477      0
## 6478      0
## 6479      0
## 6480      0
## 6481      0
## 6482      0
## 6483      1
## 6484      1
## 6485      1
## 6486      1
## 6487      1
## 6488      1
## 6489      1
## 6490      1
## 6491      1
## 6492      1
## 6493      1
## 6494      1
## 6495      1
## 6496      1
## 6497      1
## 6498      1
## 6499      1
## 6500      1
## 6501      1
## 6502      1
## 6503      1
## 6504      1
## 6505      1
## 6506      1
## 6507      1
## 6508      1
## 6509      1
## 6510      1
## 6511      1
## 6512      1
## 6513      1
```

```
## 6514          1
## 6515          1
## 6516          1
## 6517          1
## 6518          1
## 6519          1
## 6520          1
## 6521          1
## 6522          1
## 6523          1
## 6524          1
## 6525          1
## 6526          1
## 6527          1
## 6528          1
## 6529          1
## 6530          1
## 6531          1
## 6532          0
## 6533          0
## 6534          0
## 6535          0
## 6536          0
## 6537          0
## 6538          0
## 6539          0
## 6540          0
## 6541          0
## 6542          0
## 6543          0
## 6544          0
## 6545          0
## 6546          0
## 6547          0
## 6548          0
## 6549          0
## 6550          0
## 6551          0
## 6552          0
## 6553          0
## 6554          0
## 6555          0
## 6556          0
## 6557          0
## 6558          0
## 6559          0
## 6560          0
## 6561          0
## 6562          0
## 6563          1
## 6564          1
## 6565          1
## 6566          1
## 6567          1
```

```
## 6568          1
## 6569          1
## 6570          1
## 6571          1
## 6572          1
## 6573          1
## 6574          1
## 6575          1
## 6576          1
## 6577          1
## 6578          1
## 6579          1
## 6580          1
## 6581          1
## 6582          1
## 6583          1
## 6584          1
## 6585          1
## 6586          1
## 6587          1
## 6588          1
## 6589          1
## 6590          1
## 6591          1
## 6592          1
## 6593          1
## 6594          1
## 6595          1
## 6596          1
## 6597          1
## 6598          1
## 6599          1
## 6600          1
## 6601          0
## 6602          0
## 6603          0
## 6604          0
## 6605          0
## 6606          0
## 6607          0
## 6608          0
## 6609          0
## 6610          0
## 6611          0
## 6612          0
## 6613          0
## 6614          0
## 6615          1
## 6616          1
## 6617          1
## 6618          1
## 6619          1
## 6620          1
## 6621          1
```

```
## 6622          1
## 6623          1
## 6624          1
## 6625          1
## 6626          1
## 6627          1
## 6628          0
## 6629          0
## 6630          0
## 6631          0
## 6632          0
## 6633          0
## 6634          0
## 6635          0
## 6636          0
## 6637          0
## 6638          0
## 6639          0
## 6640          0
## 6641          0
## 6642          0
## 6643          0
## 6644          0
## 6645          0
## 6646          0
## 6647          0
## 6648          0
## 6649          0
## 6650          0
## 6651          0
## 6652          0
## 6653          0
## 6654          0
## 6655          0
## 6656          0
## 6657          0
## 6658          0
## 6659          0
## 6660          0
## 6661          0
## 6662          0
## 6663          0
## 6664          0
## 6665          0
## 6666          0
## 6667          0
## 6668          0
## 6669          0
## 6670          0
## 6671          0
## 6672          0
## 6673          0
## 6674          0
## 6675          0
```

```
## 6676        0
## 6677        0
## 6678        0
## 6679        0
## 6680        0
## 6681        0
## 6682        0
## 6683        0
## 6684        0
## 6685        0
## 6686        0
## 6687        0
## 6688        0
## 6689        0
## 6690        0
## 6691        0
## 6692        0
## 6693        0
## 6694        0
## 6695        0
## 6696        0
## 6697        0
## 6698        0
## 6699        0
## 6700        0
## 6701        0
## 6702        0
## 6703        0
## 6704        0
## 6705        0
## 6706        0
## 6707        0
## 6708        0
## 6709        0
## 6710        0
## 6711        0
## 6712        0
## 6713        0
## 6714        0
## 6715        1
## 6716        1
## 6717        1
## 6718        1
## 6719        1
## 6720        1
## 6721        1
## 6722        1
## 6723        1
## 6724        1
## 6725        1
## 6726        1
## 6727        1
## 6728        1
## 6729        1
```

```
## 6730          1
## 6731          1
## 6732          1
## 6733          1
## 6734          1
## 6735          1
## 6736          1
## 6737          1
## 6738          1
## 6739          1
## 6740          1
## 6741          1
## 6742          1
## 6743          1
## 6744          1
## 6745          1
## 6746          1
## 6747          1
## 6748          1
## 6749          0
## 6750          0
## 6751          0
## 6752          0
## 6753          0
## 6754          0
## 6755          0
## 6756          0
## 6757          0
## 6758          0
## 6759          0
## 6760          0
## 6761          0
## 6762          0
## 6763          0
## 6764          0
## 6765          0
## 6766          0
## 6767          0
## 6768          0
## 6769          0
## 6770          0
## 6771          0
## 6772          0
## 6773          0
## 6774          0
## 6775          0
## 6776          0
## 6777          0
## 6778          0
## 6779          0
## 6780          0
## 6781          0
## 6782          0
## 6783          0
```

```
## 6784    0
## 6785    0
## 6786    0
## 6787    0
## 6788    0
## 6789    0
## 6790    0
## 6791    0
## 6792    0
## 6793    0
## 6794    0
## 6795    0
## 6796    0
## 6797    0
## 6798    0
## 6799    0
## 6800    0
## 6801    0
## 6802    0
## 6803    0
## 6804    0
## 6805    0
## 6806    0
## 6807    0
## 6808    0
## 6809    0
## 6810    0
## 6811    0
## 6812    1
## 6813    1
## 6814    1
## 6815    1
## 6816    1
## 6817    1
## 6818    1
## 6819    1
## 6820    1
## 6821    1
## 6822    1
## 6823    1
## 6824    1
## 6825    1
## 6826    1
## 6827    1
## 6828    1
## 6829    1
## 6830    1
## 6831    1
## 6832    1
## 6833    1
## 6834    1
## 6835    1
## 6836    1
## 6837    1
```

```
## 6838          1
## 6839          1
## 6840          1
## 6841          1
## 6842          1
## 6843          1
## 6844          1
## 6845          1
## 6846          1
## 6847          1
## 6848          1
## 6849          1
## 6850          1
## 6851          1
## 6852          1
## 6853          1
## 6854          1
## 6855          1
## 6856          1
## 6857          1
## 6858          1
## 6859          1
## 6860          1
## 6861          1
## 6862          1
## 6863          1
## 6864          1
## 6865          1
## 6866          1
## 6867          1
## 6868          1
## 6869          1
## 6870          1
## 6871          1
## 6872          1
## 6873          1
## 6874          1
## 6875          1
## 6876          1
## 6877          0
## 6878          0
## 6879          0
## 6880          0
## 6881          0
## 6882          0
## 6883          0
## 6884          0
## 6885          0
## 6886          0
## 6887          0
## 6888          0
## 6889          0
## 6890          0
## 6891          0
```

```
## 6892     0
## 6893     0
## 6894     0
## 6895     0
## 6896     0
## 6897     0
## 6898     0
## 6899     0
## 6900     0
## 6901     0
## 6902     0
## 6903     0
## 6904     0
## 6905     0
## 6906     0
## 6907     0
## 6908     0
## 6909     0
## 6910     0
## 6911     0
## 6912     0
## 6913     0
## 6914     0
## 6915     0
## 6916     0
## 6917     0
## 6918     0
## 6919     0
## 6920     0
## 6921     0
## 6922     0
## 6923     1
## 6924     1
## 6925     1
## 6926     1
## 6927     1
## 6928     1
## 6929     1
## 6930     1
## 6931     1
## 6932     1
## 6933     1
## 6934     1
## 6935     1
## 6936     1
## 6937     1
## 6938     1
## 6939     1
## 6940     1
## 6941     1
## 6942     1
## 6943     1
## 6944     1
## 6945     1
```

```
## 6946          1
## 6947          1
## 6948          1
## 6949          1
## 6950          1
## 6951          1
## 6952          1
## 6953          1
## 6954          1
## 6955          1
## 6956          1
## 6957          1
## 6958          1
## 6959          1
## 6960          1
## 6961          1
## 6962          1
## 6963          1
## 6964          1
## 6965          1
## 6966          1
## 6967          1
## 6968          1
## 6969          1
## 6970          1
## 6971          1
## 6972          1
## 6973          1
## 6974          1
## 6975          1
## 6976          1
## 6977          1
## 6978          1
## 6979          1
## 6980          1
## 6981          1
## 6982          1
## 6983          1
## 6984          1
## 6985          1
## 6986          1
## 6987          1
## 6988          1
## 6989          1
## 6990          1
## 6991          1
## 6992          1
## 6993          1
## 6994          1
## 6995          1
## 6996          1
## 6997          1
## 6998          1
## 6999          1
```

```
## 7000      1
## 7001      1
## 7002      1
## 7003      1
## 7004      1
## 7005      1
## 7006      1
## 7007      1
## 7008      1
## 7009      1
## 7010      1
## 7011      1
## 7012      1
## 7013      1
## 7014      1
## 7015      1
## 7016      1
## 7017      1
## 7018      1
## 7019      1
## 7020      1
## 7021      1
## 7022      1
## 7023      1
## 7024      1
## 7025      1
## 7026      1
## 7027      1
## 7028      1
## 7029      1
## 7030      1
## 7031      1
## 7032      1
## 7033      1
## 7034      0
## 7035      0
## 7036      0
## 7037      0
## 7038      0
## 7039      0
## 7040      0
## 7041      0
## 7042      0
## 7043      0
## 7044      0
## 7045      0
## 7046      0
## 7047      0
## 7048      0
## 7049      0
## 7050      0
## 7051      0
## 7052      0
## 7053      0
```

```
## 7054          0
## 7055          0
## 7056          0
## 7057          0
## 7058          0
## 7059          0
## 7060          0
## 7061          0
## 7062          0
## 7063          0
## 7064          0
## 7065          0
## 7066          0
## 7067          0
## 7068          0
## 7069          0
## 7070          0
## 7071          0
## 7072          0
## 7073          0
## 7074          0
## 7075          0
## 7076          0
## 7077          0
## 7078          0
## 7079          0
## 7080          0
## 7081          0
## 7082          0
## 7083          0
## 7084          0
## 7085          0
## 7086          0
## 7087          0
## 7088          0
## 7089          0
## 7090          0
## 7091          0
## 7092          0
## 7093          0
## 7094          0
## 7095          0
## 7096          0
## 7097          0
## 7098          0
## 7099          0
## 7100          0
## 7101          0
## 7102          0
## 7103          0
## 7104          0
## 7105          0
## 7106          0
## 7107          0
```

```
## 7108       0
## 7109       0
## 7110       0
## 7111       0
## 7112       0
## 7113       0
## 7114       0
## 7115       0
## 7116       0
## 7117       0
## 7118       0
## 7119       0
## 7120       0
## 7121       0
## 7122       0
## 7123       0
## 7124       0
## 7125       0
## 7126       0
## 7127       0
## 7128       0
## 7129       1
## 7130       1
## 7131       1
## 7132       1
## 7133       1
## 7134       1
## 7135       1
## 7136       1
## 7137       1
## 7138       1
## 7139       1
## 7140       1
## 7141       1
## 7142       1
## 7143       1
## 7144       1
## 7145       1
## 7146       1
## 7147       1
## 7148       1
## 7149       1
## 7150       1
## 7151       1
## 7152       1
## 7153       1
## 7154       1
## 7155       1
## 7156       1
## 7157       1
## 7158       1
## 7159       1
## 7160       1
## 7161       1
```

```
## 7162        1
## 7163        1
## 7164        1
## 7165        1
## 7166        1
## 7167        1
## 7168        1
## 7169        1
## 7170        1
## 7171        1
## 7172        1
## 7173        1
## 7174        1
## 7175        1
## 7176        1
## 7177        1
## 7178        1
## 7179        1
## 7180        1
## 7181        1
## 7182        1
## 7183        1
## 7184        1
## 7185        1
## 7186        1
## 7187        1
## 7188        1
## 7189        1
## 7190        1
## 7191        1
## 7192        1
## 7193        1
## 7194        1
## 7195        1
## 7196        1
## 7197        1
## 7198        1
## 7199        1
## 7200        1
## 7201        0
## 7202        0
## 7203        0
## 7204        0
## 7205        0
## 7206        0
## 7207        0
## 7208        0
## 7209        0
## 7210        0
## 7211        0
## 7212        0
## 7213        0
## 7214        0
## 7215        0
```

```
## 7216      0
## 7217      0
## 7218      0
## 7219      0
## 7220      0
## 7221      0
## 7222      0
## 7223      0
## 7224      0
## 7225      0
## 7226      0
## 7227      0
## 7228      0
## 7229      0
## 7230      0
## 7231      0
## 7232      0
## 7233      0
## 7234      0
## 7235      0
## 7236      0
## 7237      0
## 7238      0
## 7239      0
## 7240      0
## 7241      0
## 7242      0
## 7243      0
## 7244      0
## 7245      0
## 7246      0
## 7247      0
## 7248      0
## 7249      0
## 7250      0
## 7251      0
## 7252      0
## 7253      0
## 7254      0
## 7255      0
## 7256      0
## 7257      0
## 7258      0
## 7259      0
## 7260      0
## 7261      0
## 7262      0
## 7263      0
## 7264      0
## 7265      0
## 7266      0
## 7267      0
## 7268      0
## 7269      0
```

```
## 7270      0
## 7271      0
## 7272      0
## 7273      0
## 7274      0
## 7275      0
## 7276      0
## 7277      0
## 7278      0
## 7279      0
## 7280      0
## 7281      0
## 7282      0
## 7283      0
## 7284      0
## 7285      0
## 7286      0
## 7287      0
## 7288      0
## 7289      0
## 7290      0
## 7291      0
## 7292      0
## 7293      0
## 7294      0
## 7295      0
## 7296      0
## 7297      0
## 7298      0
## 7299      0
## 7300      0
## 7301      0
## 7302      0
## 7303      0
## 7304      0
## 7305      0
## 7306      0
## 7307      0
## 7308      1
## 7309      1
## 7310      1
## 7311      1
## 7312      1
## 7313      1
## 7314      1
## 7315      1
## 7316      1
## 7317      1
## 7318      1
## 7319      1
## 7320      1
## 7321      1
## 7322      1
## 7323      1
```

```
## 7324          1
## 7325          1
## 7326          1
## 7327          1
## 7328          1
## 7329          1
## 7330          1
## 7331          1
## 7332          1
## 7333          1
## 7334          1
## 7335          1
## 7336          1
## 7337          1
## 7338          1
## 7339          1
## 7340          1
## 7341          1
## 7342          1
## 7343          1
## 7344          1
## 7345          1
## 7346          1
## 7347          1
## 7348          1
## 7349          1
## 7350          1
## 7351          1
## 7352          1
## 7353          1
## 7354          1
## 7355          1
## 7356          1
## 7357          1
## 7358          1
## 7359          1
## 7360          1
## 7361          1
## 7362          1
## 7363          1
## 7364          1
## 7365          1
## 7366          1
## 7367          1
## 7368          1
## 7369          1
## 7370          1
## 7371          1
## 7372          1
## 7373          1
## 7374          1
## 7375          1
## 7376          1
## 7377          1
```

```
## 7378      1
## 7379      1
## 7380      0
## 7381      0
## 7382      0
## 7383      0
## 7384      0
## 7385      0
## 7386      0
## 7387      0
## 7388      0
## 7389      0
## 7390      0
## 7391      0
## 7392      0
## 7393      0
## 7394      0
## 7395      0
## 7396      0
## 7397      0
## 7398      0
## 7399      0
## 7400      0
## 7401      0
## 7402      0
## 7403      0
## 7404      0
## 7405      0
## 7406      0
## 7407      0
## 7408      0
## 7409      0
## 7410      0
## 7411      0
## 7412      0
## 7413      0
## 7414      0
## 7415      1
## 7416      1
## 7417      1
## 7418      1
## 7419      1
## 7420      1
## 7421      1
## 7422      1
## 7423      1
## 7424      1
## 7425      1
## 7426      1
## 7427      1
## 7428      1
## 7429      1
## 7430      1
## 7431      1
```

```
## 7432          1
## 7433          1
## 7434          1
## 7435          1
## 7436          1
## 7437          1
## 7438          1
## 7439          1
## 7440          1
## 7441          1
## 7442          1
## 7443          1
## 7444          1
## 7445          1
## 7446          1
## 7447          1
## 7448          1
## 7449          1
## 7450          1
## 7451          1
## 7452          0
## 7453          0
## 7454          0
## 7455          0
## 7456          0
## 7457          0
## 7458          0
## 7459          0
## 7460          0
## 7461          0
## 7462          0
## 7463          0
## 7464          0
## 7465          0
## 7466          0
## 7467          0
## 7468          0
## 7469          0
## 7470          0
## 7471          0
## 7472          0
## 7473          0
## 7474          0
## 7475          1
## 7476          1
## 7477          1
## 7478          1
## 7479          1
## 7480          1
## 7481          1
## 7482          1
## 7483          1
## 7484          1
## 7485          1
```

```
## 7486          1
## 7487          1
## 7488          1
## 7489          1
## 7490          1
## 7491          1
## 7492          1
## 7493          1
## 7494          1
## 7495          1
## 7496          1
## 7497          1
## 7498          1
## 7499          1
## 7500          1
## 7501          1
## 7502          1
## 7503          1
## 7504          1
## 7505          1
## 7506          1
## 7507          1
## 7508          1
## 7509          1
## 7510          1
## 7511          1
## 7512          1
## 7513          1
## 7514          1
## 7515          1
## 7516          1
## 7517          1
## 7518          1
## 7519          1
## 7520          1
## 7521          1
## 7522          1
## 7523          1
## 7524          1
## 7525          1
## 7526          1
## 7527          1
## 7528          1
## 7529          1
## 7530          1
## 7531          1
## 7532          1
## 7533          1
## 7534          1
## 7535          1
## 7536          1
## 7537          1
## 7538          1
## 7539          1
```

```
## 7540          1
## 7541          1
## 7542          1
## 7543          1
## 7544          0
## 7545          0
## 7546          0
## 7547          0
## 7548          0
## 7549          0
## 7550          0
## 7551          0
## 7552          0
## 7553          0
## 7554          0
## 7555          0
## 7556          0
## 7557          0
## 7558          0
## 7559          0
## 7560          0
## 7561          0
## 7562          0
## 7563          0
## 7564          0
## 7565          0
## 7566          0
## 7567          0
## 7568          0
## 7569          0
## 7570          0
## 7571          0
## 7572          0
## 7573          0
## 7574          0
## 7575          0
## 7576          0
## 7577          0
## 7578          1
## 7579          1
## 7580          1
## 7581          1
## 7582          1
## 7583          1
## 7584          1
## 7585          1
## 7586          1
## 7587          1
## 7588          1
## 7589          1
## 7590          1
## 7591          1
## 7592          1
## 7593          1
```

```
## 7594      1
## 7595      1
## 7596      1
## 7597      1
## 7598      1
## 7599      1
## 7600      1
## 7601      1
## 7602      1
## 7603      1
## 7604      1
## 7605      1
## 7606      1
## 7607      1
## 7608      1
## 7609      1
## 7610      1
## 7611      1
## 7612      1
## 7613      1
## 7614      1
## 7615      1
## 7616      1
## 7617      1
## 7618      1
## 7619      1
## 7620      1
## 7621      1
## 7622      1
## 7623      1
## 7624      1
## 7625      1
## 7626      1
## 7627      1
## 7628      1
## 7629      1
## 7630      1
## 7631      1
## 7632      1
## 7633      1
## 7634      1
## 7635      1
## 7636      1
## 7637      1
## 7638      1
## 7639      1
## 7640      1
## 7641      1
## 7642      1
## 7643      1
## 7644      1
## 7645      1
## 7646      1
## 7647      1
```

```
## 7648        1
## 7649        1
## 7650        1
## 7651        1
## 7652        1
## 7653        1
## 7654        1
## 7655        1
## 7656        1
## 7657        1
## 7658        1
## 7659        1
## 7660        1
## 7661        1
## 7662        1
## 7663        1
## 7664        1
## 7665        1
## 7666        1
## 7667        0
## 7668        0
## 7669        0
## 7670        0
## 7671        0
## 7672        0
## 7673        0
## 7674        0
## 7675        0
## 7676        0
## 7677        0
## 7678        0
## 7679        0
## 7680        0
## 7681        0
## 7682        0
## 7683        0
## 7684        1
## 7685        1
## 7686        1
## 7687        1
## 7688        1
## 7689        1
## 7690        1
## 7691        1
## 7692        1
## 7693        1
## 7694        1
## 7695        1
## 7696        1
## 7697        0
## 7698        0
## 7699        0
## 7700        0
## 7701        0
```

```
## 7702        0
## 7703        0
## 7704        0
## 7705        0
## 7706        0
## 7707        0
## 7708        0
## 7709        0
## 7710        0
## 7711        0
## 7712        0
## 7713        0
## 7714        0
## 7715        0
## 7716        1
## 7717        1
## 7718        1
## 7719        1
## 7720        1
## 7721        1
## 7722        1
## 7723        1
## 7724        1
## 7725        1
## 7726        1
## 7727        1
## 7728        1
## 7729        1
## 7730        1
## 7731        1
## 7732        1
## 7733        1
## 7734        1
## 7735        1
## 7736        1
## 7737        1
## 7738        1
## 7739        1
## 7740        1
## 7741        1
## 7742        1
## 7743        1
## 7744        1
## 7745        1
## 7746        1
## 7747        1
## 7748        1
## 7749        1
## 7750        1
## 7751        1
## 7752        1
## 7753        1
## 7754        1
## 7755        1
```

```
## 7756        0
## 7757        1
## 7758        1
## 7759        1
## 7760        1
## 7761        1
## 7762        1
## 7763        1
## 7764        1
## 7765        1
## 7766        1
## 7767        1
## 7768        1
## 7769        1
## 7770        1
## 7771        1
## 7772        0
## 7773        0
## 7774        0
## 7775        0
## 7776        0
## 7777        0
## 7778        0
## 7779        0
## 7780        0
## 7781        0
## 7782        0
## 7783        0
## 7784        0
## 7785        1
## 7786        1
## 7787        1
## 7788        1
## 7789        1
## 7790        1
## 7791        1
## 7792        1
## 7793        1
## 7794        1
## 7795        1
## 7796        1
## 7797        1
## 7798        0
## 7799        1
## 7800        1
## 7801        1
## 7802        1
## 7803        1
## 7804        1
## 7805        1
## 7806        1
## 7807        1
## 7808        1
## 7809        1
```

```
## 7810          1
## 7811          1
## 7812          1
## 7813          1
## 7814          1
## 7815          1
## 7816          0
## 7817          0
## 7818          0
## 7819          0
## 7820          0
## 7821          0
## 7822          0
## 7823          0
## 7824          0
## 7825          0
## 7826          0
## 7827          0
## 7828          0
## 7829          0
## 7830          0
## 7831          0
## 7832          0
## 7833          0
## 7834          0
## 7835          0
## 7836          0
## 7837          0
## 7838          0
## 7839          0
## 7840          1
## 7841          1
## 7842          1
## 7843          1
## 7844          1
## 7845          1
## 7846          1
## 7847          1
## 7848          1
## 7849          1
## 7850          1
## 7851          1
## 7852          1
## 7853          1
## 7854          1
## 7855          1
## 7856          1
## 7857          1
## 7858          1
## 7859          1
## 7860          1
## 7861          1
## 7862          1
## 7863          1
```

```
## 7864        1
## 7865        1
## 7866        1
## 7867        1
## 7868        1
## 7869        1
## 7870        1
## 7871        1
## 7872        1
## 7873        1
## 7874        1
## 7875        1
## 7876        1
## 7877        1
## 7878        1
## 7879        1
## 7880        1
## 7881        1
## 7882        1
## 7883        1
## 7884        1
## 7885        1
## 7886        1
## 7887        1
## 7888        1
## 7889        1
## 7890        1
## 7891        1
## 7892        1
## 7893        1
## 7894        1
## 7895        1
## 7896        1
## 7897        1
## 7898        1
## 7899        1
## 7900        1
## 7901        1
## 7902        1
## 7903        1
## 7904        1
## 7905        1
## 7906        1
## 7907        1
## 7908        1
## 7909        1
## 7910        1
## 7911        1
## 7912        1
## 7913        1
## 7914        1
## 7915        1
## 7916        1
## 7917        1
```

```
## 7918      1
## 7919      1
## 7920      1
## 7921      1
## 7922      1
## 7923      1
## 7924      1
## 7925      1
## 7926      1
## 7927      1
## 7928      1
## 7929      1
## 7930      1
## 7931      1
## 7932      1
## 7933      1
## 7934      1
## 7935      1
## 7936      1
## 7937      1
## 7938      1
## 7939      1
## 7940      1
## 7941      1
## 7942      1
## 7943      1
## 7944      1
## 7945      1
## 7946      1
## 7947      1
## 7948      1
## 7949      1
## 7950      1
## 7951      1
## 7952      1
## 7953      1
## 7954      1
## 7955      0
## 7956      0
## 7957      0
## 7958      0
## 7959      0
## 7960      0
## 7961      0
## 7962      0
## 7963      0
## 7964      0
## 7965      0
## 7966      0
## 7967      0
## 7968      0
## 7969      0
## 7970      0
## 7971      0
```

```
## 7972         0
## 7973         0
## 7974         0
## 7975         0
## 7976         0
## 7977         0
## 7978         0
## 7979         0
## 7980         0
## 7981         0
## 7982         0
## 7983         1
## 7984         1
## 7985         1
## 7986         1
## 7987         1
## 7988         1
## 7989         1
## 7990         1
## 7991         1
## 7992         1
## 7993         1
## 7994         1
## 7995         1
## 7996         0
## 7997         0
## 7998         0
## 7999         0
## 8000         0
## 8001         0
## 8002         0
## 8003         0
## 8004         0
## 8005         0
## 8006         0
## 8007         0
## 8008         0
## 8009         0
## 8010         0
## 8011         0
## 8012         0
## 8013         0
## 8014         0
## 8015         0
## 8016         0
## 8017         0
## 8018         0
## 8019         1
## 8020         1
## 8021         1
## 8022         1
## 8023         1
## 8024         1
## 8025         1
```

```
## 8026      1
## 8027      1
## 8028      1
## 8029      1
## 8030      1
## 8031      1
## 8032      1
## 8033      1
## 8034      1
## 8035      1
## 8036      1
## 8037      1
## 8038      1
## 8039      1
## 8040      1
## 8041      1
## 8042      1
## 8043      1
## 8044      1
## 8045      1
## 8046      1
## 8047      1
## 8048      1
## 8049      1
## 8050      0
## 8051      0
## 8052      0
## 8053      0
## 8054      0
## 8055      0
## 8056      0
## 8057      0
## 8058      0
## 8059      0
## 8060      0
## 8061      0
## 8062      0
## 8063      0
## 8064      0
## 8065      0
## 8066      0
## 8067      0
## 8068      0
## 8069      0
## 8070      0
## 8071      0
## 8072      0
## 8073      0
## 8074      0
## 8075      0
## 8076      0
## 8077      0
## 8078      0
## 8079      0
```

```
## 8080      0
## 8081      0
## 8082      0
## 8083      0
## 8084      0
## 8085      0
## 8086      0
## 8087      0
## 8088      0
## 8089      0
## 8090      0
## 8091      0
## 8092      0
## 8093      0
## 8094      0
## 8095      0
## 8096      0
## 8097      0
## 8098      0
## 8099      0
## 8100      0
## 8101      0
## 8102      0
## 8103      0
## 8104      0
## 8105      0
## 8106      0
## 8107      0
## 8108      0
## 8109      0
## 8110      0
## 8111      0
## 8112      0
## 8113      0
## 8114      0
## 8115      0
## 8116      0
## 8117      0
## 8118      0
## 8119      0
## 8120      0
## 8121      0
## 8122      0
## 8123      0
## 8124      0
## 8125      0
## 8126      0
## 8127      0
## 8128      1
## 8129      1
## 8130      1
## 8131      1
## 8132      1
## 8133      1
```

```
## 8134       1
## 8135       1
## 8136       1
## 8137       1
## 8138       1
## 8139       1
## 8140       1
## 8141       1
## 8142       1
## 8143       1
## 8144       1
## 8145       1
## 8146       1
## 8147       1
## 8148       1
## 8149       1
## 8150       1
## 8151       1
## 8152       1
## 8153       1
## 8154       1
## 8155       1
## 8156       1
## 8157       1
## 8158       1
## 8159       1
## 8160       1
## 8161       1
## 8162       1
## 8163       1
## 8164       1
## 8165       1
## 8166       1
## 8167       1
## 8168       1
## 8169       1
## 8170       1
## 8171       1
## 8172       1
## 8173       1
## 8174       1
## 8175       1
## 8176       1
## 8177       1
## 8178       1
## 8179       1
## 8180       1
## 8181       1
## 8182       1
## 8183       1
## 8184       1
## 8185       1
## 8186       1
## 8187       1
```

```
## 8188          1
## 8189          1
## 8190          1
## 8191          1
## 8192          1
## 8193          1
## 8194          1
## 8195          1
## 8196          1
## 8197          1
## 8198          1
## 8199          1
## 8200          1
## 8201          1
## 8202          1
## 8203          1
## 8204          1
## 8205          1
## 8206          1
## 8207          1
## 8208          1
## 8209          1
## 8210          1
## 8211          1
## 8212          1
## 8213          1
## 8214          1
## 8215          1
## 8216          1
## 8217          1
## 8218          1
## 8219          1
## 8220          1
## 8221          1
## 8222          1
## 8223          1
## 8224          1
## 8225          1
## 8226          1
## 8227          1
## 8228          1
## 8229          1
## 8230          1
## 8231          1
## 8232          1
## 8233          1
## 8234          1
## 8235          1
## 8236          1
## 8237          0
## 8238          1
## 8239          1
## 8240          1
## 8241          1
```

```
## 8242          1
## 8243          1
## 8244          1
## 8245          1
## 8246          1
## 8247          1
## 8248          1
## 8249          1
## 8250          1
## 8251          1
## 8252          1
## 8253          1
## 8254          1
## 8255          1
## 8256          1
## 8257          1
## 8258          1
## 8259          1
## 8260          1
## 8261          1
## 8262          1
## 8263          1
## 8264          1
## 8265          1
## 8266          1
## 8267          1
## 8268          1
## 8269          1
## 8270          1
## 8271          1
## 8272          1
## 8273          1
## 8274          1
## 8275          1
## 8276          1
## 8277          1
## 8278          1
## 8279          1
## 8280          1
## 8281          1
## 8282          1
## 8283          1
## 8284          1
## 8285          1
## 8286          1
## 8287          1
## 8288          1
## 8289          1
## 8290          1
## 8291          1
## 8292          1
## 8293          1
## 8294          1
## 8295          1
```

```
## 8296      1
## 8297      1
## 8298      1
## 8299      1
## 8300      1
## 8301      1
## 8302      1
## 8303      1
## 8304      1
## 8305      1
## 8306      1
## 8307      1
## 8308      1
## 8309      1
## 8310      1
## 8311      1
## 8312      1
## 8313      1
## 8314      1
## 8315      1
## 8316      1
## 8317      1
## 8318      1
## 8319      1
## 8320      1
## 8321      1
## 8322      1
## 8323      1
## 8324      1
## 8325      1
## 8326      1
## 8327      1
## 8328      1
## 8329      1
## 8330      1
## 8331      1
## 8332      1
## 8333      1
## 8334      1
## 8335      1
## 8336      1
## 8337      1
## 8338      1
## 8339      1
## 8340      1
## 8341      1
## 8342      1
## 8343      1
## 8344      1
## 8345      1
## 8346      1
## 8347      1
## 8348      1
## 8349      1
```

```
## 8350         1
## 8351         1
## 8352         1
## 8353         1
## 8354         1
## 8355         1
## 8356         1
## 8357         1
## 8358         1
## 8359         1
## 8360         1
## 8361         1
## 8362         1
## 8363         1
## 8364         1
## 8365         1
## 8366         1
## 8367         1
## 8368         1
## 8369         1
## 8370         1
## 8371         1
## 8372         1
## 8373         1
## 8374         1
## 8375         1
## 8376         1
## 8377         1
## 8378         1
## 8379         1
## 8380         1
## 8381         1
## 8382         1
## 8383         1
## 8384         1
## 8385         1
## 8386         1
## 8387         1
## 8388         1
## 8389         1
## 8390         1
## 8391         1
## 8392         1
## 8393         1
## 8394         1
## 8395         1
## 8396         1
## 8397         1
## 8398         1
## 8399         1
## 8400         1
## 8401         1
## 8402         1
## 8403         1
```

```
## 8404          1
## 8405          1
## 8406          1
## 8407          1
## 8408          1
## 8409          1
## 8410          1
## 8411          1
## 8412          1
## 8413          1
## 8414          1
## 8415          1
## 8416          1
## 8417          1
## 8418          1
## 8419          1
## 8420          1
## 8421          1
## 8422          1
## 8423          1
## 8424          1
## 8425          1
## 8426          1
## 8427          1
## 8428          1
## 8429          1
## 8430          1
## 8431          1
## 8432          1
## 8433          1
## 8434          1
## 8435          1
## 8436          1
## 8437          1
## 8438          1
## 8439          1
## 8440          1
## 8441          1
## 8442          1
## 8443          1
## 8444          1
## 8445          1
## 8446          1
## 8447          1
## 8448          1
## 8449          1
## 8450          1
## 8451          1
## 8452          1
## 8453          1
## 8454          1
## 8455          1
## 8456          1
## 8457          1
```

```
## 8458          1
## 8459          1
## 8460          1
## 8461          1
## 8462          1
## 8463          1
## 8464          1
## 8465          1
## 8466          1
## 8467          1
## 8468          1
## 8469          1
## 8470          1
## 8471          1
## 8472          1
## 8473          1
## 8474          1
## 8475          1
## 8476          1
## 8477          1
## 8478          1
## 8479          1
## 8480          1
## 8481          1
## 8482          1
## 8483          1
## 8484          1
## 8485          1
## 8486          1
## 8487          1
## 8488          1
## 8489          1
## 8490          1
## 8491          1
## 8492          1
## 8493          1
## 8494          1
## 8495          1
## 8496          1
## 8497          1
## 8498          1
## 8499          1
## 8500          1
## 8501          1
## 8502          1
## 8503          1
## 8504          1
## 8505          1
## 8506          1
## 8507          1
## 8508          1
## 8509          1
## 8510          1
## 8511          1
```

```
## 8512          1
## 8513          1
## 8514          1
## 8515          1
## 8516          1
## 8517          1
## 8518          1
## 8519          1
## 8520          1
## 8521          1
## 8522          1
## 8523          1
## 8524          1
## 8525          1
## 8526          1
## 8527          1
## 8528          1
## 8529          1
## 8530          1
## 8531          1
## 8532          1
## 8533          1
## 8534          1
## 8535          1
## 8536          1
## 8537          1
## 8538          1
## 8539          1
## 8540          1
## 8541          1
## 8542          1
## 8543          1
## 8544          1
## 8545          1
## 8546          1
## 8547          1
## 8548          1
## 8549          1
## 8550          1
## 8551          1
## 8552          1
## 8553          1
## 8554          1
## 8555          1
## 8556          1
## 8557          1
## 8558          1
## 8559          1
## 8560          1
## 8561          1
## 8562          1
## 8563          1
## 8564          1
## 8565          1
```

```
## 8566          1
## 8567          1
## 8568          1
## 8569          1
## 8570          1
## 8571          1
## 8572          1
## 8573          0
## 8574          0
## 8575          0
## 8576          0
## 8577          0
## 8578          0
## 8579          0
## 8580          0
## 8581          0
## 8582          0
## 8583          0
## 8584          0
## 8585          0
## 8586          0
## 8587          0
## 8588          0
## 8589          0
## 8590          0
## 8591          0
## 8592          0
## 8593          0
## 8594          0
## 8595          0
## 8596          0
## 8597          0
## 8598          0
## 8599          0
## 8600          0
## 8601          0
## 8602          0
## 8603          0
## 8604          0
## 8605          0
## 8606          0
## 8607          0
## 8608          0
## 8609          0
## 8610          0
## 8611          0
## 8612          0
## 8613          0
## 8614          0
## 8615          0
## 8616          0
## 8617          0
## 8618          0
## 8619          0
```

```
## 8620      1
## 8621      1
## 8622      1
## 8623      1
## 8624      1
## 8625      1
## 8626      1
## 8627      1
## 8628      1
## 8629      1
## 8630      1
## 8631      1
## 8632      1
## 8633      1
## 8634      1
## 8635      1
## 8636      1
## 8637      1
## 8638      1
## 8639      1
## 8640      1
## 8641      1
## 8642      1
## 8643      1
## 8644      1
## 8645      1
## 8646      1
## 8647      1
## 8648      1
## 8649      1
## 8650      1
## 8651      1
## 8652      1
## 8653      1
## 8654      1
## 8655      1
## 8656      1
## 8657      1
## 8658      1
## 8659      1
## 8660      1
## 8661      1
## 8662      1
## 8663      1
## 8664      1
## 8665      1
## 8666      1
## 8667      1
## 8668      1
## 8669      0
## 8670      0
## 8671      0
## 8672      0
## 8673      0
```

```
## 8674      0
## 8675      0
## 8676      0
## 8677      0
## 8678      0
## 8679      0
## 8680      0
## 8681      0
## 8682      0
## 8683      0
## 8684      0
## 8685      0
## 8686      0
## 8687      0
## 8688      0
## 8689      0
## 8690      0
## 8691      0
## 8692      0
## 8693      0
## 8694      0
## 8695      0
## 8696      0
## 8697      0
## 8698      0
## 8699      0
## 8700      0
## 8701      0
## 8702      0
## 8703      0
## 8704      0
## 8705      0
## 8706      0
## 8707      0
## 8708      0
## 8709      0
## 8710      0
## 8711      0
## 8712      0
## 8713      0
## 8714      0
## 8715      0
## 8716      0
## 8717      0
## 8718      0
## 8719      1
## 8720      1
## 8721      1
## 8722      1
## 8723      1
## 8724      1
## 8725      1
## 8726      1
## 8727      1
```

```
## 8728        1
## 8729        1
## 8730        1
## 8731        1
## 8732        1
## 8733        1
## 8734        1
## 8735        1
## 8736        1
## 8737        1
## 8738        1
## 8739        1
## 8740        1
## 8741        1
## 8742        1
## 8743        1
## 8744        1
## 8745        1
## 8746        1
## 8747        1
## 8748        0
## 8749        0
## 8750        0
## 8751        0
## 8752        0
## 8753        0
## 8754        0
## 8755        0
## 8756        1
## 8757        1
## 8758        1
## 8759        1
## 8760        1
## 8761        1
## 8762        1
## 8763        1
## 8764        1
## 8765        1
## 8766        1
## 8767        1
## 8768        1
## 8769        1
## 8770        1
## 8771        1
## 8772        1
## 8773        1
## 8774        1
## 8775        1
## 8776        1
## 8777        1
## 8778        1
## 8779        1
## 8780        1
## 8781        1
```

```
## 8782        1
## 8783        1
## 8784        1
## 8785        1
## 8786        1
## 8787        1
## 8788        0
## 8789        1
## 8790        1
## 8791        1
## 8792        1
## 8793        1
## 8794        1
## 8795        1
## 8796        1
## 8797        1
## 8798        1
## 8799        1
## 8800        1
## 8801        1
## 8802        1
## 8803        1
## 8804        1
## 8805        1
## 8806        1
## 8807        1
## 8808        1
## 8809        1
## 8810        1
## 8811        1
## 8812        1
## 8813        1
## 8814        1
## 8815        1
## 8816        0
## 8817        1
## 8818        1
## 8819        1
## 8820        1
## 8821        1
## 8822        1
## 8823        1
## 8824        1
## 8825        1
## 8826        1
## 8827        1
## 8828        1
## 8829        1
## 8830        0
## 8831        0
## 8832        0
## 8833        0
## 8834        0
## 8835        0
```

```
## 8836     0
## 8837     0
## 8838     0
## 8839     0
## 8840     0
## 8841     0
## 8842     0
## 8843     0
## 8844     0
## 8845     0
## 8846     0
## 8847     0
## 8848     0
## 8849     0
## 8850     0
## 8851     0
## 8852     0
## 8853     0
## 8854     0
## 8855     0
## 8856     0
## 8857     0
## 8858     0
## 8859     0
## 8860     0
## 8861     0
## 8862     0
## 8863     0
## 8864     0
## 8865     0
## 8866     0
## 8867     0
## 8868     0
## 8869     0
## 8870     0
## 8871     0
## 8872     0
## 8873     0
## 8874     0
## 8875     0
## 8876     1
## 8877     1
## 8878     1
## 8879     1
## 8880     1
## 8881     1
## 8882     1
## 8883     1
## 8884     1
## 8885     1
## 8886     1
## 8887     1
## 8888     1
## 8889     0
```

```
## 8890      1
## 8891      1
## 8892      1
## 8893      1
## 8894      1
## 8895      1
## 8896      1
## 8897      1
## 8898      1
## 8899      1
## 8900      1
## 8901      1
## 8902      1
## 8903      1
## 8904      1
## 8905      1
## 8906      1
## 8907      1
## 8908      1
## 8909      1
## 8910      1
## 8911      1
## 8912      1
## 8913      1
## 8914      1
## 8915      1
## 8916      1
## 8917      1
## 8918      1
## 8919      1
## 8920      1
## 8921      1
## 8922      1
## 8923      1
## 8924      1
## 8925      1
## 8926      1
## 8927      1
## 8928      1
## 8929      1
## 8930      1
## 8931      1
## 8932      1
## 8933      1
## 8934      1
## 8935      1
## 8936      1
## 8937      0
## 8938      1
## 8939      1
## 8940      1
## 8941      1
## 8942      1
## 8943      1
```

```
## 8944        1
## 8945        1
## 8946        1
## 8947        1
## 8948        1
## 8949        1
## 8950        1
## 8951        1
## 8952        1
## 8953        1
## 8954        1
## 8955        1
## 8956        1
## 8957        1
## 8958        1
## 8959        1
## 8960        1
## 8961        1
## 8962        1
## 8963        1
## 8964        1
## 8965        1
## 8966        1
## 8967        1
## 8968        1
## 8969        1
## 8970        1
## 8971        1
## 8972        1
## 8973        1
## 8974        1
## 8975        0
## 8976        0
## 8977        0
## 8978        0
## 8979        0
## 8980        0
## 8981        0
## 8982        0
## 8983        0
## 8984        0
## 8985        0
## 8986        0
## 8987        0
## 8988        0
## 8989        0
## 8990        0
## 8991        0
## 8992        0
## 8993        0
## 8994        0
## 8995        0
## 8996        0
## 8997        0
```

```
## 8998      0
## 8999      0
## 9000      0
## 9001      0
## 9002      0
## 9003      0
## 9004      0
## 9005      0
## 9006      0
## 9007      0
## 9008      0
## 9009      0
## 9010      0
## 9011      0
## 9012      0
## 9013      0
## 9014      0
## 9015      0
## 9016      0
## 9017      0
## 9018      0
## 9019      0
## 9020      0
## 9021      0
## 9022      0
## 9023      0
## 9024      0
## 9025      0
## 9026      0
## 9027      0
## 9028      0
## 9029      1
## 9030      1
## 9031      1
## 9032      1
## 9033      1
## 9034      1
## 9035      1
## 9036      1
## 9037      1
## 9038      1
## 9039      1
## 9040      1
## 9041      1
## 9042      1
## 9043      1
## 9044      1
## 9045      1
## 9046      1
## 9047      1
## 9048      1
## 9049      1
## 9050      1
## 9051      1
```

```
## 9052      1
## 9053      1
## 9054      1
## 9055      1
## 9056      1
## 9057      1
## 9058      1
## 9059      1
## 9060      1
## 9061      1
## 9062      1
## 9063      1
## 9064      1
## 9065      1
## 9066      1
## 9067      1
## 9068      1
## 9069      1
## 9070      1
## 9071      1
## 9072      1
## 9073      1
## 9074      1
## 9075      1
## 9076      1
## 9077      1
## 9078      1
## 9079      1
## 9080      1
## 9081      1
## 9082      1
## 9083      1
## 9084      1
## 9085      1
## 9086      1
## 9087      1
## 9088      1
## 9089      1
## 9090      1
## 9091      1
## 9092      1
## 9093      1
## 9094      1
## 9095      1
## 9096      1
## 9097      1
## 9098      1
## 9099      1
## 9100      1
## 9101      1
## 9102      1
## 9103      1
## 9104      1
## 9105      1
```

```
## 9106          1
## 9107          1
## 9108          1
## 9109          1
## 9110          1
## 9111          1
## 9112          1
## 9113          1
## 9114          1
## 9115          1
## 9116          1
## 9117          1
## 9118          1
## 9119          0
## 9120          0
## 9121          0
## 9122          0
## 9123          0
## 9124          0
## 9125          0
## 9126          0
## 9127          0
## 9128          0
## 9129          0
## 9130          0
## 9131          0
## 9132          0
## 9133          0
## 9134          0
## 9135          0
## 9136          0
## 9137          0
## 9138          0
## 9139          0
## 9140          0
## 9141          0
## 9142          0
## 9143          0
## 9144          0
## 9145          0
## 9146          0
## 9147          0
## 9148          0
## 9149          0
## 9150          0
## 9151          0
## 9152          0
## 9153          0
## 9154          0
## 9155          0
## 9156          0
## 9157          0
## 9158          0
## 9159          0
```

```
## 9160      0
## 9161      0
## 9162      0
## 9163      0
## 9164      0
## 9165      0
## 9166      0
## 9167      0
## 9168      0
## 9169      0
## 9170      0
## 9171      1
## 9172      1
## 9173      1
## 9174      1
## 9175      1
## 9176      1
## 9177      1
## 9178      1
## 9179      1
## 9180      1
## 9181      1
## 9182      1
## 9183      1
## 9184      1
## 9185      1
## 9186      1
## 9187      0
## 9188      0
## 9189      0
## 9190      0
## 9191      0
## 9192      0
## 9193      0
## 9194      0
## 9195      0
## 9196      0
## 9197      0
## 9198      0
## 9199      0
## 9200      0
## 9201      0
## 9202      0
## 9203      0
## 9204      0
## 9205      0
## 9206      0
## 9207      0
## 9208      0
## 9209      0
## 9210      0
## 9211      0
## 9212      0
## 9213      0
```

```
## 9214       0
## 9215       0
## 9216       0
## 9217       0
## 9218       0
## 9219       0
## 9220       0
## 9221       0
## 9222       0
## 9223       0
## 9224       0
## 9225       0
## 9226       0
## 9227       0
## 9228       0
## 9229       0
## 9230       0
## 9231       1
## 9232       1
## 9233       1
## 9234       1
## 9235       1
## 9236       1
## 9237       1
## 9238       1
## 9239       1
## 9240       1
## 9241       1
## 9242       1
## 9243       1
## 9244       1
## 9245       1
## 9246       1
## 9247       1
## 9248       1
## 9249       1
## 9250       1
## 9251       1
## 9252       1
## 9253       1
## 9254       1
## 9255       1
## 9256       1
## 9257       1
## 9258       1
## 9259       1
## 9260       1
## 9261       1
## 9262       1
## 9263       1
## 9264       1
## 9265       1
## 9266       1
## 9267       1
```

```
## 9268          1
## 9269          1
## 9270          1
## 9271          1
## 9272          1
## 9273          1
## 9274          1
## 9275          1
## 9276          1
## 9277          1
## 9278          1
## 9279          1
## 9280          1
## 9281          1
## 9282          1
## 9283          1
## 9284          1
## 9285          1
## 9286          1
## 9287          1
## 9288          1
## 9289          1
## 9290          1
## 9291          1
## 9292          1
## 9293          1
## 9294          1
## 9295          1
## 9296          1
## 9297          1
## 9298          1
## 9299          1
## 9300          1
## 9301          1
## 9302          1
## 9303          1
## 9304          1
## 9305          1
## 9306          1
## 9307          1
## 9308          1
## 9309          1
## 9310          1
## 9311          1
## 9312          1
## 9313          1
## 9314          1
## 9315          1
## 9316          1
## 9317          1
## 9318          1
## 9319          1
## 9320          1
## 9321          1
```

```
## 9322          1
## 9323          1
## 9324          1
## 9325          1
## 9326          1
## 9327          1
## 9328          1
## 9329          1
## 9330          1
## 9331          1
## 9332          1
## 9333          1
## 9334          1
## 9335          1
## 9336          1
## 9337          1
## 9338          1
## 9339          1
## 9340          1
## 9341          1
## 9342          1
## 9343          1
## 9344          1
## 9345          1
## 9346          1
## 9347          1
## 9348          1
## 9349          1
## 9350          1
## 9351          1
## 9352          1
## 9353          1
## 9354          1
## 9355          1
## 9356          1
## 9357          1
## 9358          1
## 9359          1
## 9360          1
## 9361          1
## 9362          1
## 9363          1
## 9364          1
## 9365          1
## 9366          1
## 9367          1
## 9368          1
## 9369          1
## 9370          1
## 9371          1
## 9372          1
## 9373          1
## 9374          1
## 9375          1
```

```
## 9376          1
## 9377          1
## 9378          1
## 9379          1
## 9380          1
## 9381          1
## 9382          1
## 9383          1
## 9384          1
## 9385          1
## 9386          1
## 9387          1
## 9388          1
## 9389          1
## 9390          1
## 9391          1
## 9392          1
## 9393          1
## 9394          1
## 9395          1
## 9396          1
## 9397          1
## 9398          1
## 9399          1
## 9400          1
## 9401          1
## 9402          1
## 9403          1
## 9404          1
## 9405          1
## 9406          1
## 9407          1
## 9408          1
## 9409          1
## 9410          1
## 9411          1
## 9412          1
## 9413          1
## 9414          1
## 9415          1
## 9416          1
## 9417          1
## 9418          1
## 9419          1
## 9420          1
## 9421          1
## 9422          1
## 9423          1
## 9424          1
## 9425          0
## 9426          0
## 9427          0
## 9428          0
## 9429          0
```

```
## 9430       0
## 9431       0
## 9432       0
## 9433       0
## 9434       0
## 9435       0
## 9436       0
## 9437       0
## 9438       0
## 9439       0
## 9440       0
## 9441       0
## 9442       0
## 9443       0
## 9444       0
## 9445       0
## 9446       0
## 9447       0
## 9448       0
## 9449       0
## 9450       1
## 9451       1
## 9452       1
## 9453       1
## 9454       1
## 9455       1
## 9456       1
## 9457       1
## 9458       1
## 9459       1
## 9460       1
## 9461       1
## 9462       1
## 9463       1
## 9464       1
## 9465       1
## 9466       1
## 9467       1
## 9468       1
## 9469       1
## 9470       1
## 9471       1
## 9472       1
## 9473       1
## 9474       1
## 9475       1
## 9476       1
## 9477       0
## 9478       1
## 9479       1
## 9480       1
## 9481       1
## 9482       1
## 9483       1
```

```
## 9484          1
## 9485          1
## 9486          1
## 9487          1
## 9488          1
## 9489          1
## 9490          1
## 9491          1
## 9492          1
## 9493          1
## 9494          1
## 9495          1
## 9496          1
## 9497          1
## 9498          1
## 9499          1
## 9500          1
## 9501          1
## 9502          1
## 9503          1
## 9504          1
## 9505          1
## 9506          1
## 9507          1
## 9508          1
## 9509          1
## 9510          1
## 9511          1
## 9512          1
## 9513          1
## 9514          1
## 9515          1
## 9516          1
## 9517          1
## 9518          1
## 9519          1
## 9520          1
## 9521          1
## 9522          0
## 9523          0
## 9524          0
## 9525          0
## 9526          1
## 9527          1
## 9528          1
## 9529          1
## 9530          1
## 9531          1
## 9532          1
## 9533          1
## 9534          1
## 9535          1
## 9536          1
## 9537          1
```

```
## 9538       1
## 9539       1
## 9540       1
## 9541       1
## 9542       1
## 9543       1
## 9544       1
## 9545       0
## 9546       0
## 9547       0
## 9548       0
## 9549       0
## 9550       0
## 9551       0
## 9552       0
## 9553       0
## 9554       0
## 9555       0
## 9556       0
## 9557       0
## 9558       0
## 9559       0
## 9560       0
## 9561       0
## 9562       1
## 9563       1
## 9564       1
## 9565       1
## 9566       1
## 9567       1
## 9568       1
## 9569       1
## 9570       1
## 9571       1
## 9572       1
## 9573       1
## 9574       1
## 9575       1
## 9576       1
## 9577       1
## 9578       1
## 9579       1
## 9580       1
## 9581       1
## 9582       1
## 9583       1
## 9584       1
## 9585       1
## 9586       1
## 9587       1
## 9588       1
## 9589       1
## 9590       1
## 9591       1
```

```
## 9592       1
## 9593       1
## 9594       1
## 9595       1
## 9596       1
## 9597       1
## 9598       1
## 9599       1
## 9600       1
## 9601       1
## 9602       1
## 9603       1
## 9604       1
## 9605       1
## 9606       1
## 9607       1
## 9608       1
## 9609       1
## 9610       1
## 9611       1
## 9612       1
## 9613       1
## 9614       1
## 9615       1
## 9616       1
## 9617       1
## 9618       1
## 9619       0
## 9620       0
## 9621       0
## 9622       0
## 9623       0
## 9624       0
## 9625       0
## 9626       0
## 9627       0
## 9628       0
## 9629       0
## 9630       0
## 9631       0
## 9632       0
## 9633       0
## 9634       0
## 9635       0
## 9636       0
## 9637       0
## 9638       0
## 9639       0
## 9640       0
## 9641       0
## 9642       0
## 9643       0
## 9644       0
## 9645       0
```

```
## 9646    0
## 9647    0
## 9648    0
## 9649    1
## 9650    1
## 9651    1
## 9652    1
## 9653    1
## 9654    1
## 9655    1
## 9656    1
## 9657    1
## 9658    1
## 9659    1
## 9660    1
## 9661    1
## 9662    0
## 9663    0
## 9664    0
## 9665    0
## 9666    0
## 9667    0
## 9668    0
## 9669    0
## 9670    0
## 9671    0
## 9672    0
## 9673    0
## 9674    0
## 9675    0
## 9676    0
## 9677    0
## 9678    0
## 9679    0
## 9680    0
## 9681    0
## 9682    0
## 9683    0
## 9684    0
## 9685    0
## 9686    0
## 9687    0
## 9688    0
## 9689    0
## 9690    0
## 9691    0
## 9692    0
## 9693    0
## 9694    0
## 9695    0
## 9696    0
## 9697    0
## 9698    0
## 9699    0
```

```
## 9700       0
## 9701       0
## 9702       0
## 9703       0
## 9704       0
## 9705       0
## 9706       0
## 9707       0
## 9708       0
## 9709       0
## 9710       0
## 9711       0
## 9712       0
## 9713       0
## 9714       0
## 9715       0
## 9716       0
## 9717       0
## 9718       0
## 9719       0
## 9720       1
## 9721       1
## 9722       1
## 9723       1
## 9724       1
## 9725       1
## 9726       1
## 9727       1
## 9728       1
## 9729       1
## 9730       1
## 9731       1
## 9732       1
## 9733       1
## 9734       1
## 9735       1
## 9736       1
## 9737       1
## 9738       1
## 9739       1
## 9740       1
## 9741       1
## 9742       1
## 9743       0
## 9744       0
## 9745       0
## 9746       0
## 9747       0
## 9748       0
## 9749       0
## 9750       0
## 9751       0
## 9752       0
## 9753       0
```

```
## 9754      0
## 9755      0
## 9756      0
## 9757      0
## 9758      0
## 9759      0
## 9760      0
## 9761      0
## 9762      0
## 9763      0
## 9764      0
## 9765      0
## 9766      0
## 9767      1
## 9768      1
## 9769      1
## 9770      1
## 9771      1
## 9772      1
## 9773      1
## 9774      1
## 9775      1
## 9776      1
## 9777      1
## 9778      1
## 9779      1
## 9780      1
## 9781      1
## 9782      1
## 9783      1
## 9784      1
## 9785      1
## 9786      1
## 9787      1
## 9788      1
## 9789      1
## 9790      1
## 9791      1
## 9792      1
## 9793      1
## 9794      1
## 9795      1
## 9796      1
## 9797      1
## 9798      1
## 9799      1
## 9800      1
## 9801      1
## 9802      1
## 9803      1
## 9804      1
## 9805      1
## 9806      1
## 9807      1
```

```
## 9808      1
## 9809      1
## 9810      1
## 9811      1
## 9812      1
## 9813      1
## 9814      1
## 9815      1
## 9816      1
## 9817      1
## 9818      1
## 9819      1
## 9820      1
## 9821      1
## 9822      1
## 9823      1
## 9824      1
## 9825      1
## 9826      1
## 9827      1
## 9828      1
## 9829      1
## 9830      1
## 9831      1
## 9832      1
## 9833      1
## 9834      1
## 9835      1
## 9836      1
## 9837      1
## 9838      1
## 9839      1
## 9840      1
## 9841      1
## 9842      1
## 9843      1
## 9844      1
## 9845      1
## 9846      1
## 9847      1
## 9848      1
## 9849      1
## 9850      1
## 9851      1
## 9852      1
## 9853      1
## 9854      1
## 9855      1
## 9856      1
## 9857      1
## 9858      1
## 9859      1
## 9860      1
## 9861      1
```

```
## 9862          1
## 9863          1
## 9864          1
## 9865          1
## 9866          1
## 9867          1
## 9868          1
## 9869          1
## 9870          1
## 9871          0
## 9872          0
## 9873          0
## 9874          0
## 9875          0
## 9876          0
## 9877          0
## 9878          0
## 9879          0
## 9880          0
## 9881          0
## 9882          0
## 9883          0
## 9884          0
## 9885          0
## 9886          0
## 9887          0
## 9888          0
## 9889          0
## 9890          0
## 9891          0
## 9892          0
## 9893          0
## 9894          0
## 9895          0
## 9896          0
## 9897          0
## 9898          0
## 9899          0
## 9900          0
## 9901          0
## 9902          0
## 9903          0
## 9904          0
## 9905          0
## 9906          0
## 9907          0
## 9908          0
## 9909          0
## 9910          0
## 9911          0
## 9912          0
## 9913          0
## 9914          0
## 9915          0
```

```
## 9916        0
## 9917        0
## 9918        0
## 9919        0
## 9920        0
## 9921        0
## 9922        0
## 9923        0
## 9924        0
## 9925        0
## 9926        0
## 9927        0
## 9928        0
## 9929        0
## 9930        0
## 9931        0
## 9932        0
## 9933        0
## 9934        0
## 9935        0
## 9936        0
## 9937        0
## 9938        0
## 9939        0
## 9940        0
## 9941        0
## 9942        0
## 9943        0
## 9944        0
## 9945        1
## 9946        1
## 9947        1
## 9948        1
## 9949        1
## 9950        1
## 9951        1
## 9952        1
## 9953        1
## 9954        1
## 9955        1
## 9956        1
## 9957        1
## 9958        1
## 9959        1
## 9960        1
## 9961        1
## 9962        1
## 9963        1
## 9964        1
## 9965        1
## 9966        1
## 9967        1
## 9968        1
## 9969        1
```

```
## 9970       1
## 9971       1
## 9972       1
## 9973       1
## 9974       1
## 9975       1
## 9976       0
## 9977       0
## 9978       0
## 9979       0
## 9980       0
## 9981       0
## 9982       0
## 9983       0
## 9984       0
## 9985       0
## 9986       0
## 9987       0
## 9988       0
## 9989       0
## 9990       0
## 9991       0
## 9992       0
## 9993       0
## 9994       0
## 9995       0
## 9996       0
## 9997       0
## 9998       0
## 9999       0
##  [ reached 'max' / getOption("max.print") -- omitted 1746503 rows ]
```

2. Please count the number of hgnc by gene biotypes.

```
my_4%>%
  group_by(gene_type)%>%
  filter(isHgnc==1)%>%
  count()
```

```
## # A tibble: 36 x 2
## # Groups:   gene_type [36]
##     gene_type            n
##     <chr>            <int>
##  1 IG_C_gene          176
##  2 IG_C_pseudogene     33
##  3 IG_D_gene          152
##  4 IG_J_gene           76
##  5 IG_J_pseudogene      9
##  6 IG_V_gene         1101
##  7 IG_V_pseudogene    653
##  8 lncRNA           51105
##  9 miRNA             5568
## 10 misc_RNA          3099
## # ... with 26 more rows
```

3. Please count the number of hgnc by level. Please note that level in this question is not TSL. Please find information in this link: 1 (verified loci), 2 (manually annotated loci), 3 (automatically annotated loci).

```
my_4%>%
  group_by(d_r$level)%>%
  filter(isHgnc==1)%>%
  count
```

```
## # A tibble: 3 x 2
## # Groups:   d_r$level [3]
##   'd_r$level'       n
##   <chr>         <int>
## 1 1            107054
## 2 2           1279964
## 3 3            237265
```

3.5. Transcripts in the GENCODE

1. Which gene has the largest number of transcripts?

```
my_1%>%
  ungroup()%>%
  summarise(max=gene_id[which.max(n)])
```

```
## # A tibble: 1 x 1
##   max
##   <chr>
## 1 ENSG00000109339.22
```

2. Please calculate the quantiles (0%, 25%, 50%, 75%, 100%) of the gene length for protein coding genes and long noncoding genes.

```
d_r%>%
  filter(gene_type=="lncRNA")%>%
  summarise(quantile(width,seq(0,1,0.25)))
```

```
##   quantile(width, seq(0, 1, 0.25))
## 1                                1
## 2                              126
## 3                              339
## 4                             2658
## 5                          1375317
```

```
d_r%>%
  filter(gene_type=="protein_coding")%>%
  summarise(quantile(width,seq(0,1,0.25)))
```

```
##   quantile(width, seq(0, 1, 0.25))
## 1                                1
```

571

```
## 2                               76
## 3                              123
## 4                              193
## 5                          2473537
```

3. Please count the number of transcripts by chromosomes.

```
d_r%>%
  filter(type=="transcript")%>%
  group_by(seqnames)%>%
  count
```

```
## # A tibble: 25 x 2
## # Groups:   seqnames [25]
##    seqnames     n
##    <fct>    <int>
##  1 chr1      9827
##  2 chr2      7432
##  3 chr3      6157
##  4 chr4      4662
##  5 chr5      5203
##  6 chr6      5455
##  7 chr7      5292
##  8 chr8      4350
##  9 chr9      3949
## 10 chr10     4157
## # ... with 15 more rows
```

3.6. Autosomal vs. Sex chromosomes.

1.Please calculate the number of genes per chromosome.

```
d_r%>%
  filter(type=="gene")%>%
  group_by(seqnames)%>%
  count
```

```
## # A tibble: 25 x 2
## # Groups:   seqnames [25]
##    seqnames     n
##    <fct>    <int>
##  1 chr1      5471
##  2 chr2      4196
##  3 chr3      3185
##  4 chr4      2651
##  5 chr5      2983
##  6 chr6      3059
##  7 chr7      3014
##  8 chr8      2482
##  9 chr9      2327
## 10 chr10     2332
## # ... with 15 more rows
```

2. Please compare the number of genes between autosomal and sex chromosome (Mean, Median).

```
d_r%>%
  filter(seqnames%in%c("chrX","chrY","chrM")==FALSE&type=="gene")%>%
  group_by(seqnames)%>%
  count()%>%
  ungroup%>%
  summarise(Mean=mean(n),Median=median(n))
```

```
## # A tibble: 1 x 2
##     Mean Median
##    <dbl>  <dbl>
## 1 2617.   2604.
```

```
d_r%>%
  filter(seqnames%in%c("chrX","chrY")&type=="gene")%>%
  group_by(seqnames)%>%
  count()%>%
  ungroup%>%
  summarise(Mean=mean(n),Median=median(n))
```

```
## # A tibble: 1 x 2
##     Mean Median
##    <dbl>  <dbl>
## 1 1494.   1494.
```

3. Please divide the genes into groups 'protein coding' and 'long noncoding', and then compare the number of genes in each chromosomes within groups.

```
d_r%>%
  filter(gene_type%in%c("protein_coding","lncRNA") & type=="gene")%>%
  group_by(gene_type,seqnames)%>%
  count
```

```
## # A tibble: 49 x 3
## # Groups:   gene_type, seqnames [49]
##    gene_type seqnames     n
##    <chr>      <fct>    <int>
##  1 lncRNA     chr1      1416
##  2 lncRNA     chr2      1241
##  3 lncRNA     chr3       861
##  4 lncRNA     chr4       790
##  5 lncRNA     chr5       950
##  6 lncRNA     chr6       826
##  7 lncRNA     chr7       720
##  8 lncRNA     chr8       831
##  9 lncRNA     chr9       555
## 10 lncRNA     chr10      695
## # ... with 39 more rows
```