RNA Seq DEG Analysis

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```
library(tidyverse)
library(DESeq2)
library(dplyr)
```

Create count matrix

```
# List all rsem count files
files <- list.files(path = "results/counts/rsem/", pattern = "*.genes.results",
                    full.names = T)
head(files)
```

```
## [1] "results/counts/rsem/DRR608910.genes.results"
## [2] "results/counts/rsem/DRR608911.genes.results"
## [3] "results/counts/rsem/DRR608912.genes.results"
## [4] "results/counts/rsem/DRR608913.genes.results"
## [5] "results/counts/rsem/DRR608914.genes.results"
## [6] "results/counts/rsem/DRR608915.genes.results"
```

```
# Extract sample names from filenames
sample_names <- gsub("\\.genes\\.results", "", basename(files))
head(sample_names)
```

```
## [1] "DRR608910" "DRR608911" "DRR608912" "DRR608913" "DRR608914" "DRR608915"
```

```
# Extract gene_id and expected count
count_list <- lapply(files, function(f){
  df <- read.delim(f, stringsAsFactors = F)
  df[, c("gene_id", "expected_count")]
})

#count_list

#str(count_list)

count_matrix <- Reduce(function(x, y) merge(x, y, by = "gene_id"), count_list)
head(count_matrix)
```

```
##    gene_id expected_count.x expected_count.y expected_count.x expected_count.y
```

```
## 1     A1BG             3.00             2.00             3.13             5.07
## 2 A1BG-AS1             7.63             4.87            12.46            38.54
## 3     A1CF             0.00             0.00             0.00             0.00
## 4      A2M          7157.31          6252.89          1872.42          5358.19
## 5  A2M-AS1            13.69             3.11             8.58            13.81
## 6    A2ML1         50819.00         43442.00         60477.00         42791.00
##   expected_count.x expected_count.y expected_count.x expected_count.y
## 1             1.00             8.48            10.26             7.00
## 2            23.31            16.60             3.71            13.99
## 3             0.00             0.00             0.00             0.00
## 4          7791.72         14466.00          1842.00          8931.50
## 5             8.28            20.00             5.00            25.50
## 6         29474.00         16737.00         32336.00         36409.00
##   expected_count.x expected_count.y expected_count.x expected_count.y
## 1            11.00            34.11            17.00            51.00
## 2            20.29            35.31            23.49            19.18
## 3             0.00             0.00             0.00             0.00
## 4         12060.55          5121.00          4124.00          1927.35
## 5            13.45            15.00            11.00             7.65
## 6          4687.00           150.00          2757.00          8513.00
##   expected_count.x expected_count.y expected_count.x expected_count.y
## 1            67.33            44.44             17.0            17.28
## 2            47.05            17.13              0.0            26.97
## 3             0.00             0.00              0.0             0.00
## 4          2503.00           644.20           3165.6          2406.00
## 5             6.00            28.80             17.4            30.00
## 6          1316.00           754.00            344.0          3815.00
```

```
colnames(count_matrix) <- c("gene_id", sample_names)

head(count_matrix)
```

```
##    gene_id DRR608910 DRR608911 DRR608912 DRR608913 DRR608914 DRR608915
## 1     A1BG      3.00      2.00      3.13      5.07      1.00      8.48
## 2 A1BG-AS1      7.63      4.87     12.46     38.54     23.31     16.60
## 3     A1CF      0.00      0.00      0.00      0.00      0.00      0.00
## 4      A2M   7157.31   6252.89   1872.42   5358.19   7791.72  14466.00
## 5  A2M-AS1     13.69      3.11      8.58     13.81      8.28     20.00
## 6    A2ML1  50819.00  43442.00  60477.00  42791.00  29474.00  16737.00
##   DRR608916 DRR608917 DRR608918 DRR608919 DRR608920 DRR608921 DRR608922
## 1     10.26      7.00     11.00     34.11     17.00     51.00     67.33
## 2      3.71     13.99     20.29     35.31     23.49     19.18     47.05
## 3      0.00      0.00      0.00      0.00      0.00      0.00      0.00
## 4   1842.00   8931.50  12060.55   5121.00   4124.00   1927.35   2503.00
## 5      5.00     25.50     13.45     15.00     11.00      7.65      6.00
## 6  32336.00  36409.00   4687.00    150.00   2757.00   8513.00   1316.00
##   DRR608923 DRR608924 DRR608925
## 1     44.44      17.0     17.28
## 2     17.13       0.0     26.97
## 3      0.00       0.0      0.00
## 4    644.20    3165.6   2406.00
## 5     28.80      17.4     30.00
## 6    754.00     344.0   3815.00
```

```r
# Add metadata with the conditions of each sample
metadata <- data.frame(
  row.names = sample_names,
  condition = c("normal", "normal", "normal", "normal", "normal", "normal", "normal", "normal",
                "met_canc", "met_canc", "met_canc", "met_canc", "met_canc", "met_canc", "met_canc",
                "met_canc")
)


metadata
```

```
##           condition
## DRR608910    normal
## DRR608911    normal
## DRR608912    normal
## DRR608913    normal
## DRR608914    normal
## DRR608915    normal
## DRR608916    normal
## DRR608917    normal
## DRR608918  met_canc
## DRR608919  met_canc
## DRR608920  met_canc
## DRR608921  met_canc
## DRR608922  met_canc
## DRR608923  met_canc
## DRR608924  met_canc
## DRR608925  met_canc
```

Create DESeq object

```r
dds <- DESeqDataSetFromMatrix(
  countData = round(as.matrix(count_matrix[, -1])),
  colData = metadata,
  design = ~ condition
)

head(dds)
```

```
## class: DESeqDataSet
## dim: 6 16
## metadata(1): version
## assays(1): counts
## rownames: NULL
## rowData names(0):
## colnames(16): DRR608910 DRR608911 ... DRR608924 DRR608925
## colData names(1): condition
```

```r
dim(dds)
```

```
## [1] 50037    16
```

```r
colnames(dds)
```

```
##  [1] "DRR608910" "DRR608911" "DRR608912" "DRR608913" "DRR608914" "DRR608915"
##  [7] "DRR608916" "DRR608917" "DRR608918" "DRR608919" "DRR608920" "DRR608921"
## [13] "DRR608922" "DRR608923" "DRR608924" "DRR608925"
```

```r
# Test whether there are incorrect metadata sample assignments during submissions to NCBI SRA

# Estimate size factors
dds <- estimateSizeFactors(dds)
sizeFactors(dds)
```

```
## DRR608910 DRR608911 DRR608912 DRR608913 DRR608914 DRR608915 DRR608916 DRR608917
## 0.9634680 0.7605656 0.6679232 0.8841481 0.9894707 1.0890224 0.7960631 0.8602211
## DRR608918 DRR608919 DRR608920 DRR608921 DRR608922 DRR608923 DRR608924 DRR608925
## 1.2825801 1.1538479 0.9634154 1.1519050 1.2546769 1.3179475 1.1808321 1.1651657
```

```r
# counts(dds)
log.norm <- normTransform(dds)
log.norm
```

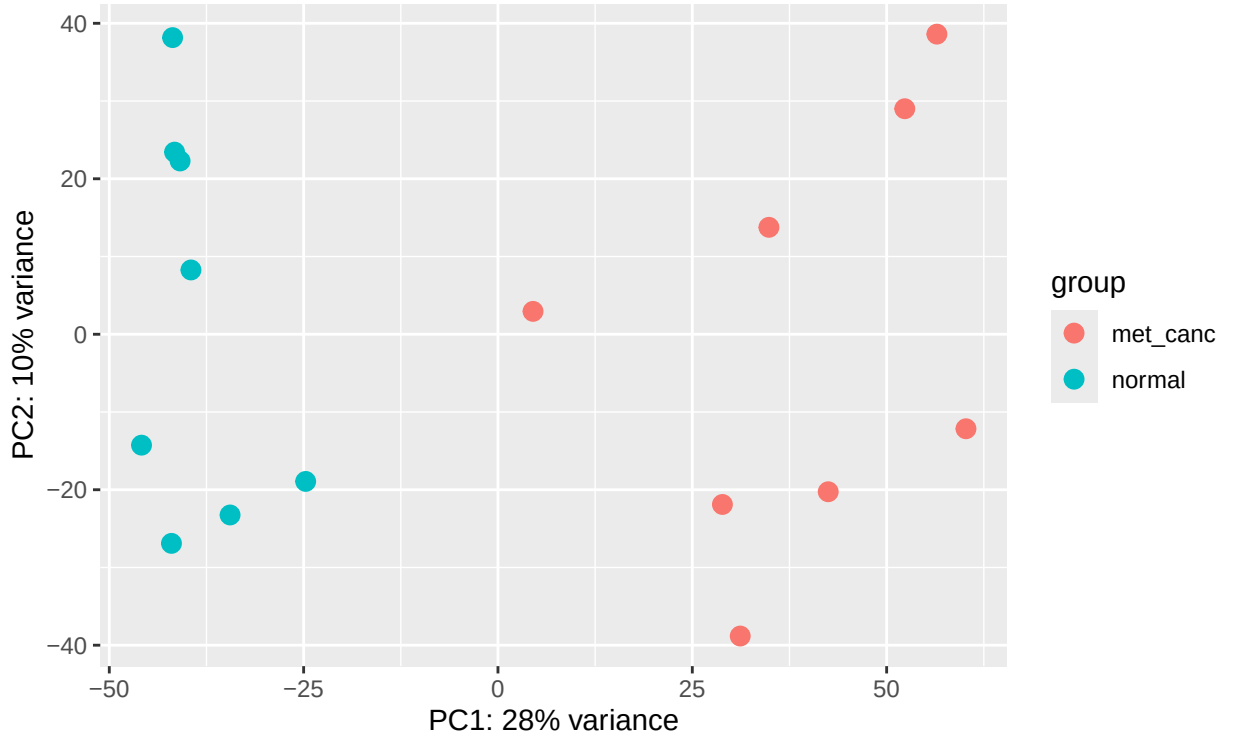
```
## class: DESeqTransform
## dim: 50037 16
## metadata(1): version
## assays(1): ''
## rownames: NULL
## rowData names(0):
## colnames(16): DRR608910 DRR608911 ... DRR608924 DRR608925
## colData names(2): condition sizeFactor
```

```r
log.norm.counts <- log2(counts(dds, normalized = T) + 1)
head(log.norm.counts)
```

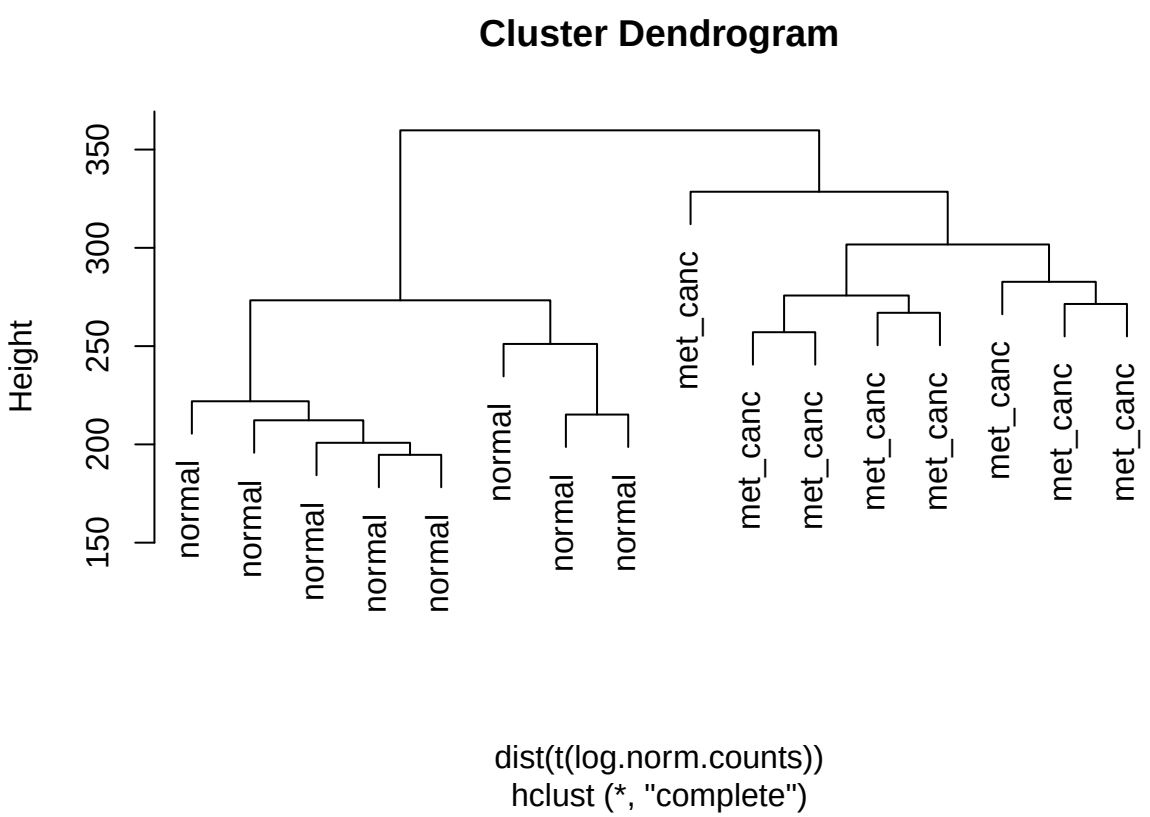
```
##      DRR608910 DRR608911 DRR608912 DRR608913 DRR608914 DRR608915 DRR608916
## [1,]  2.040455  1.859819  2.457209  2.734474  1.007656  3.061092  3.761479
## [2,]  3.217748  2.921066  4.245354  5.495384  4.599600  4.054009  2.590896
## [3,]  0.000000  0.000000  0.000000  0.000000  0.000000  0.000000  0.000000
## [4,] 12.859025 13.005364 11.453125 12.565357 12.943232 13.697453 11.176726
## [5,]  3.957064  2.305805  3.855452  4.073345  3.183507  4.275387  2.864119
## [6,] 15.686799 15.801684 16.466361 15.562690 14.862475 13.907814 15.309934
##      DRR608917 DRR608918 DRR608919 DRR608920 DRR608921 DRR608922 DRR608923
## [1,]  3.191790  3.259493  4.929158  4.220760  5.500626  5.765540  5.103718
## [2,]  4.110604  4.052552  4.969624  4.636532  4.128823  5.265281  3.796893
## [3,]  0.000000  0.000000  0.000000  0.000000  0.000000  0.000000  0.000000
## [4,] 13.342127 13.199166 12.116082 12.063936 10.708981 10.962850  8.935573
## [5,]  4.964620  3.477136  3.807353  3.634328  2.990050  2.531595  4.523807
## [6,] 15.369262 11.835795  7.033421 11.483158 12.851625 10.036003  9.162647
##      DRR608924 DRR608925
## [1,]  3.944542  3.962567
## [2,]  0.000000  4.595305
## [3,]  0.000000  0.000000
```

```
## [4,] 11.389180 11.012584
## [5,]  3.944542  4.741327
## [6,]  8.191405 11.677373
```

```
# Carryout plot PCA and hclust to verify that the samples group into their assigned conditions
plotPCA(log.norm, intgroup = "condition")
```




```
plot(hclust(dist(t(log.norm.counts))), labels = colData(dds)$condition)
```




```
# Add gene_ids to the rownames of dds

# count_matrix$gene_id
rownames(dds) <- count_matrix$gene_id

# rownames(dds)


# Rearrange the levels such that the comparison is done against the non-cancerous
# subjects
levels(dds$condition)
```

```
## [1] "met_canc" "normal"
```

```
dds$condition <- relevel(dds$condition, "normal")
levels(dds$condition)
```

```
## [1] "normal"   "met_canc"
```

```
# Filter out genes that have very low counts in at least 2 samples which don't contribute any significa
filtered <- rowSums(counts(dds) >= 10) > 2
dds <- dds[filtered, ]

# dds
```

```r
# Run DESeq
dds <- DESeq(dds)
```

```r
# Create a dataframe with the gene symbol, p values, adjusted p values and logFC of each DEG
res_lfc <- results(dds, lfcThreshold = 1)
summary(res_lfc)
```

```
##
## out of 20668 with nonzero total read count
## adjusted p-value < 0.1
## LFC > 1.00 (up)    : 813, 3.9%
## LFC < -1.00 (down) : 624, 3%
## outliers [1]       : 0, 0%
## low counts [2]     : 0, 0%
## (mean count < 0)
## [1] see 'cooksCutoff' argument of ?results
## [2] see 'independentFiltering' argument of ?results
```

```r
str(res_lfc)
```

```
## Formal class 'DESeqResults' [package "DESeq2"] with 7 slots
##   ..@ priorInfo      : list()
##   ..@ rownames       : chr [1:20668] "A1BG" "A1BG-AS1" "A2M" "A2M-AS1" ...
##   ..@ nrows          : int 20668
##   ..@ elementType    : chr "ANY"
##   ..@ elementMetadata:Formal class 'DFrame' [package "S4Vectors"] with 6 slots
##   .. .. ..@ rownames       : NULL
##   .. .. ..@ nrows          : int 6
##   .. .. ..@ elementType    : chr "ANY"
##   .. .. ..@ elementMetadata: NULL
##   .. .. ..@ metadata       : list()
##   .. .. ..@ listData       :List of 2
##   .. .. .. ..$ type       : chr [1:6] "intermediate" "results" "results" "results" ...
##   .. .. .. ..$ description: chr [1:6] "mean of normalized counts for all samples" "log2 fold change
##   ..@ metadata       :List of 6
##   .. ..$ filterThreshold: Named num 0.109
##   .. .. ..- attr(*, "names")= chr "0%"
##   .. ..$ filterTheta    : num 0
##   .. ..$ filterNumRej   :'data.frame':   50 obs. of  2 variables:
##   .. .. ..$ theta : num [1:50] 0 0.0194 0.0388 0.0582 0.0776 ...
##   .. .. ..$ numRej: num [1:50] 1437 1402 1375 1335 1311 ...
##   .. ..$ lo.fit         :List of 2
##   .. .. ..$ x: num [1:50] 0 0.0194 0.0388 0.0582 0.0776 ...
##   .. .. ..$ y: num [1:50] 1436 1404 1372 1341 1309 ...
##   .. ..$ alpha          : num 0.1
##   .. ..$ lfcThreshold   : num 1
##   ..@ listData       :List of 6
##   .. ..$ baseMean      : num [1:20668] 16.3 18.6 5337.1 13.7 24758.2 ...
##   .. ..$ log2FoldChange: num [1:20668] 2.2686 0.218 -1.1109 -0.0352 -4.2933 ...
##   .. ..$ lfcSE         : num [1:20668] 0.514 0.58 0.47 0.461 0.591 ...
##   .. ..$ stat          : num [1:20668] 2.468 0 -0.236 0 -5.568 ...
##   .. ..$ pvalue        : num [1:20668] 1.36e-02 1.00 8.13e-01 1.00 2.57e-08 ...
##   .. ..$ padj          : num [1:20668] 1.70e-01 1.00 1.00 1.00 2.89e-06 ...
```

```r
res_lfc_padj_0.05 <- res_lfc[res_lfc$padj < 0.05, ]
str(res_lfc_padj_0.05)
```

```
## Formal class 'DESeqResults' [package "DESeq2"] with 7 slots
##   ..@ priorInfo      : list()
##   ..@ rownames       : chr [1:1192] "A2ML1" "ABCA13" "ABCC2" "ABCG4" ...
##   ..@ nrows          : int 1192
##   ..@ elementType    : chr "ANY"
##   ..@ elementMetadata:Formal class 'DFrame' [package "S4Vectors"] with 6 slots
##   .. .. ..@ rownames       : NULL
##   .. .. ..@ nrows          : int 6
##   .. .. ..@ elementType    : chr "ANY"
##   .. .. ..@ elementMetadata: NULL
##   .. .. ..@ metadata       : list()
##   .. .. ..@ listData       :List of 2
##   .. .. .. ..$ type       : chr [1:6] "intermediate" "results" "results" "results" ...
##   .. .. .. ..$ description: chr [1:6] "mean of normalized counts for all samples" "log2 fold change
##   ..@ metadata       :List of 6
##   .. ..$ filterThreshold: Named num 0.109
##   .. .. ..- attr(*, "names")= chr "0%"
##   .. ..$ filterTheta    : num 0
##   .. ..$ filterNumRej   :'data.frame':   50 obs. of  2 variables:
##   .. .. ..$ theta : num [1:50] 0 0.0194 0.0388 0.0582 0.0776 ...
##   .. .. ..$ numRej: num [1:50] 1437 1402 1375 1335 1311 ...
##   .. ..$ lo.fit         :List of 2
##   .. .. ..$ x: num [1:50] 0 0.0194 0.0388 0.0582 0.0776 ...
##   .. .. ..$ y: num [1:50] 1436 1404 1372 1341 1309 ...
##   .. ..$ alpha          : num 0.1
##   .. ..$ lfcThreshold   : num 1
##   ..@ listData       :List of 6
##   .. ..$ baseMean      : num [1:1192] 24758 373 132 29 6872 ...
##   .. ..$ log2FoldChange: num [1:1192] -4.29 3.35 4.39 -2.72 -2.43 ...
##   .. ..$ lfcSE         : num [1:1192] 0.591 0.677 0.822 0.5 0.342 ...
##   .. ..$ stat          : num [1:1192] -5.57 3.46 4.13 -3.45 -4.18 ...
##   .. ..$ pvalue        : num [1:1192] 2.57e-08 5.32e-04 3.68e-05 5.56e-04 2.93e-05 ...
##   .. ..$ padj          : num [1:1192] 2.89e-06 1.25e-02 1.38e-03 1.30e-02 1.13e-03 ...
```

```r
deg_list <- rownames(res_lfc_padj_0.05)

degs <- data.frame(
  gene_id = rownames(res_lfc_padj_0.05),
  P.Value = res_lfc_padj_0.05$pvalue,
  adj.P.Val = res_lfc_padj_0.05$padj,
  logFC = res_lfc_padj_0.05$log2FoldChange
)

degs
```

```
##                       gene_id      P.Value    adj.P.Val      logFC
## 1                       A2ML1 2.573314e-08 2.890503e-06  -4.293321
## 2                      ABCA13 5.316538e-04 1.247244e-02   3.345934
## 3                       ABCC2 3.676964e-05 1.384253e-03   4.392891
```

```
## 4                    ABCG4 5.561698e-04 1.297395e-02  -2.724376
## 5                   ABLIM1 2.930047e-05 1.129817e-03  -2.430274
## 6                   ABLIM3 7.328133e-05 2.470764e-03  -3.245304
## 7                    ACER1 1.425965e-08 1.723499e-06  -5.248480
## 8                    ACKR1 4.453428e-05 1.614797e-03  -2.736071
## 9                    ACKR3 2.758081e-03 4.851406e-02   2.305740
## 10                  ACOT11 2.096467e-03 3.882596e-02  -2.159534
## 11                   ACOX1 1.412286e-04 4.256241e-03  -1.731111
## 12                   ACOX2 1.617922e-05 6.908930e-04  -2.729130
## 13                   ACOX3 6.520376e-06 3.352317e-04  -2.288334
## 14                    ACP3 2.678986e-04 7.184753e-03  -2.778791
## 15                   ACTG2 4.499720e-14 2.268298e-11  -4.835173
## 16                  ACVR1C 1.389269e-05 6.180592e-04   3.812397
## 17                  ADAM12 5.332085e-05 1.887047e-03   3.635348
## 18                  ADAM23 6.673881e-08 6.728575e-06   3.126805
## 19                ADAM32_1 2.425635e-03 4.359393e-02   3.392516
## 20                  ADAM33 1.302545e-04 4.000149e-03  -2.710397
## 21                ADAMTS12 1.536425e-07 1.362868e-05   4.218968
## 22                ADAMTS14 1.863847e-04 5.328075e-03   2.976114
## 23                 ADAMTS7 4.132060e-04 1.021548e-02   2.388743
## 24                 ADAMTS8 3.909642e-07 2.938344e-05  -4.018085
## 25              ADAMTS9-AS1 1.300500e-14 7.679641e-12  -6.334097
## 26              ADAMTS9-AS2 5.473167e-04 1.279631e-02  -3.608809
## 27                   ADCY5 6.178884e-07 4.271076e-05  -2.934183
## 28                    ADD2 3.880832e-05 1.455699e-03   3.187843
## 29                 ADGRF2P 1.471048e-03 2.920616e-02  -2.664184
## 30                  ADGRG6 2.802716e-03 4.909029e-02  -1.836851
## 31                   ADH1B 5.770564e-13 2.208630e-10  -5.267329
## 32                    AFDN 2.331455e-04 6.412398e-03  -2.066169
## 33                    AFF3 1.069216e-09 1.753853e-07  -3.039541
## 34                   AGFG2 2.544316e-08 2.873548e-06  -2.589640
## 35                   AGTR1 2.876195e-03 4.987014e-02  -2.970563
## 36                   AIF1L 5.478900e-05 1.922545e-03  -2.870940
## 37                  AKR1B1 1.570847e-03 3.059801e-02   2.135055
## 38                  AKR1C1 4.519830e-04 1.100304e-02   3.726399
## 39                  AKR1C2 5.637977e-05 1.965020e-03   3.385866
## 40                  AKR1C3 6.955118e-04 1.559093e-02   3.769443
## 41                 ALDH9A1 4.083514e-04 1.014400e-02  -1.673958
## 42                 ALG1L1P 4.285828e-10 7.770131e-08   6.114394
## 43                  ALOX12 1.158416e-08 1.442054e-06  -4.441886
## 44                ALOX12P2 1.217839e-08 1.498232e-06   3.406411
## 45                  ALOX15 1.142238e-09 1.830061e-07   6.651260
## 46                    ALX1 6.187678e-06 3.205186e-04   5.859546
## 47                  AMOTL2 5.682106e-04 1.319526e-02  -2.116939
## 48                 ANGPTL1 3.320303e-10 6.182345e-08  -3.884158
## 49                ANKRD19P 6.541929e-04 1.474467e-02   2.808824
## 50              ANKRD20A11P 3.557681e-04 9.044299e-03  -4.221272
## 51               ANKRD20A5P 1.247145e-04 3.852913e-03  -3.993332
## 52               ANKRD20A9P 1.403292e-04 4.246449e-03  -4.154720
## 53             ANKRD20A9P_1 1.403292e-04 4.246449e-03  -4.154720
## 54                ANKRD22 1.012590e-03 2.131182e-02  -2.053582
## 55               ANKRD34B 1.632805e-04 4.807238e-03   5.244232
## 56                   ANO1 4.714316e-04 1.135612e-02   3.208133
## 57                  ANXA10 1.577296e-03 3.066750e-02   5.729620
```

```
## 58                   ANXA9 2.183325e-04 6.073346e-03  -3.105041
## 59                    AOC3 1.518325e-03 2.994346e-02  -2.395572
## 60                    AOX1 3.493113e-11 8.493607e-09  -4.180983
## 61                    APLN 1.894643e-03 3.582660e-02   2.670513
## 62                   APOC1 1.128272e-05 5.244467e-04   3.831572
## 63                    AQP5 1.182394e-03 2.438021e-02  -3.573483
## 64                  AQP7P1 4.849868e-05 1.737356e-03  -4.143373
## 65                ARHGAP10 1.182649e-10 2.468988e-08  -2.823413
## 66                ARHGAP27 3.900443e-04 9.771438e-03  -2.180975
## 67              ARHGAP27_2 1.780591e-03 3.388698e-02  -2.201105
## 68             ARHGEF10L 1.459662e-06 9.197650e-05  -2.623614
## 69                  ARSF 4.766978e-05 1.713459e-03  -3.784077
## 70                  ARTN 3.176918e-07 2.468441e-05   4.082105
## 71                  ASB5 7.125052e-11 1.533964e-08  -6.676772
## 72                 ASCL2 3.084618e-04 8.009157e-03   2.140080
## 73                  ASPA 7.047749e-05 2.403678e-03  -3.541027
## 74                  ASPG 9.079565e-04 1.963244e-02  -2.698803
## 75                ASPN_1 1.383102e-03 2.780591e-02   3.056957
## 76                  ATG9B 1.247374e-03 2.534979e-02  -3.059404
## 77                  ATOH8 2.180972e-03 4.013921e-02  -2.179397
## 78                ATP13A4 2.842360e-03 4.944941e-02  -2.644112
## 79                ATP1A2 1.253333e-27 8.634627e-24  -5.722853
## 80                  AUNIP 7.373391e-04 1.633368e-02   2.291721
## 81                  AURKA 1.131695e-04 3.533435e-03   2.334947
## 82                  AURKB 5.455517e-04 1.276949e-02   2.031322
## 83                 B3GNT8 1.930046e-03 3.639615e-02  -2.470325
## 84               B4GALNT1 1.430662e-17 1.642718e-14   4.803579
## 85               B4GALNT4 6.173947e-04 1.406577e-02   2.480870
## 86                  BAMBI 2.267190e-04 6.264477e-03   3.335898
## 87                  BARX1 5.179918e-11 1.176468e-08   7.907641
## 88                  BARX2 1.119797e-04 3.506662e-03  -3.334623
## 89              BBOX1-AS1 1.693712e-04 4.958306e-03   3.418432
## 90                   BCAN 2.670079e-08 2.982983e-06   4.563505
## 91                  BCAS1 3.397841e-04 8.723799e-03  -2.567226
## 92                  BICD1 1.525518e-03 3.005663e-02   1.915596
## 93                  BIRC5 9.998321e-04 2.112938e-02   2.027227
## 94                   BLNK 1.616126e-03 3.121691e-02  -2.391013
## 95                  BMP8A 2.447328e-03 4.386936e-02   2.355312
## 96                 BMPR1B 1.092653e-03 2.271926e-02   3.272940
## 97                BMS1P14 3.433392e-04 8.788536e-03  -2.667681
## 98                BMS1P23 1.610046e-04 4.746995e-03  -2.611368
## 99                  BNIPL 2.892537e-04 7.625377e-03  -2.758131
## 100                   BOC 1.705687e-04 4.979256e-03  -2.485833
## 101                BPIFB2 2.727619e-03 4.818327e-02  -7.359250
## 102               C15orf40 2.030561e-10 3.959211e-08   3.969106
## 103               C15orf62 1.435834e-05 6.314003e-04  -3.079208
## 104               C16orf74 7.270915e-05 2.463529e-03   2.810195
## 105               C1orf116 2.337206e-11 6.038172e-09  -3.698696
## 106                C1QTNF6 1.727401e-03 3.305734e-02   2.515549
## 107               C3orf70 2.929883e-04 7.679951e-03  -2.720467
## 108               C6orf132 2.440742e-03 4.378929e-02  -2.112112
## 109                C6orf15 7.098018e-04 1.580771e-02   5.588939
## 110              C6orf15_2 7.098018e-04 1.580771e-02   5.588939
## 111              C6orf15_3 7.098018e-04 1.580771e-02   5.588939
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## 112                C6orf15_4 7.098018e-04 1.580771e-02   5.588939
## 113                C6orf15_5 6.402224e-04 1.447101e-02   8.584877
## 114                       C7 6.192494e-21 1.599831e-17  -5.700613
## 115                  C7orf57 2.406772e-03 4.329258e-02  -3.194505
## 116                     CA13 4.409623e-05 1.601724e-03  -2.574776
## 117                      CA9 5.437573e-07 3.902214e-05   7.002867
## 118                   CAB39L 5.270562e-06 2.793128e-04  -2.557420
## 119                    CABYR 4.702806e-07 3.446723e-05   3.815934
## 120                  CACNA1B 2.196744e-14 1.227089e-11   7.311116
## 121                   CACNB2 1.105349e-08 1.393010e-06  -3.233534
## 122                   CACNG4 9.425408e-06 4.478261e-04   4.026712
## 123                    CADM3 1.567751e-06 9.848716e-05  -3.750337
## 124                    CALB1 4.769728e-04 1.144956e-02   4.569876
## 125                  CAMK2N2 2.916652e-04 7.669384e-03   2.880172
## 126                   CAPN14 1.572241e-03 3.059801e-02  -3.417891
## 127                    CASC9 6.248353e-11 1.395881e-08   6.739083
## 128                    CASQ2 4.079049e-09 5.620385e-07  -4.549791
## 129                      CBS 2.357933e-05 9.481277e-04   3.373427
## 130                 CCDC162P 8.330274e-12 2.295601e-09   4.473031
## 131                  CCDC187 2.202148e-03 4.034929e-02   4.401733
## 132                    CCL14 2.594485e-09 3.803037e-07  -3.920689
## 133                  CCL14_1 2.594485e-09 3.803037e-07  -3.920689
## 134                    CCL20 3.797190e-04 9.547485e-03   3.969695
## 135                     CCN4 3.745370e-04 9.463241e-03   3.223451
## 136                     CCN5 7.291776e-07 4.973810e-05  -3.655769
## 137                    CCNA1 9.727653e-07 6.382576e-05   5.177291
## 138                     CCNP 1.802282e-06 1.098807e-04   5.796424
## 139                     CD1E 7.393371e-04 1.634178e-02  -3.201493
## 140                    CD207 1.851222e-05 7.729504e-04  -3.468188
## 141                    CD276 1.382656e-04 4.205689e-03   2.302272
## 142                  CD300LG 8.900422e-09 1.142571e-06  -5.789410
## 143                     CD83 2.299800e-03 4.184178e-02   1.943130
## 144                    CDC45 4.965947e-06 2.650752e-04   2.018231
## 145                     CDC6 2.503944e-06 1.466048e-04   2.646758
## 146                    CDCA3 1.561002e-03 3.052299e-02   2.057956
## 147                    CDCA5 5.011337e-04 1.183706e-02   2.009932
## 148                    CDH11 5.625934e-04 1.309738e-02   2.886782
## 149                    CDH19 1.690302e-04 4.955343e-03  -2.996838
## 150                    CDKN3 7.529065e-06 3.731672e-04   3.185739
## 151                   CDSN_3 9.790002e-04 2.077410e-02   5.565901
## 152                   CDSN_4 9.790002e-04 2.077410e-02   5.565901
## 153                     CDX2 4.993953e-04 1.180950e-02   6.244599
## 154                  CEACAM1 1.336355e-05 6.004299e-04  -3.187936
## 155                  CEACAM7 1.580903e-04 4.687819e-03  -3.955103
## 156                    CECR2 5.511930e-04 1.287238e-02   2.898726
## 157                    CENPA 1.580780e-05 6.816360e-04   2.440273
## 158                    CENPF 1.048784e-04 3.329688e-03   2.116781
## 159                    CENPH 1.474666e-03 2.924990e-02   1.894062
## 160                    CENPM 1.972823e-03 3.689982e-02   2.001024
## 161                    CENPV 2.746832e-03 4.839857e-02   2.332087
## 162                    CEP55 1.507467e-03 2.978616e-02   1.776009
## 163                     CES2 1.042277e-07 9.791722e-06  -2.966992
## 164                  CFAP251 1.145070e-10 2.414930e-08   3.881225
## 165                   CFAP47 1.214480e-05 5.563847e-04   5.487401
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## 166                  CFAP53 1.293823e-04 3.979275e-03   3.909695
## 167                     CFD 2.173576e-07 1.782677e-05  -2.904503
## 168                   CFD_1 2.173576e-07 1.782677e-05  -2.904503
## 169                   CGNL1 2.220889e-05 8.965105e-04  -3.158161
## 170                    CHGB 1.361649e-03 2.745615e-02   4.803079
## 171                   CHODL 1.109903e-03 2.305474e-02   3.226112
## 172                    CHP2 2.878407e-04 7.597818e-03   3.586071
## 173                  CHRDL1 3.648760e-13 1.479285e-10  -5.102809
## 174                  CHRNA1 9.113720e-05 2.968883e-03   5.610142
## 175                   CHST2 8.357707e-05 2.754977e-03   2.965152
## 176                    CILP 4.409699e-11 1.012663e-08  -4.203096
## 177                   CILP2 9.968839e-04 2.111024e-02   2.848603
## 178                  CIMAP2 1.793239e-05 7.533062e-04  -3.154746
## 179                   CIP2A 1.139882e-04 3.553406e-03   2.312590
## 180                  CITED2 4.155031e-04 1.024776e-02  -2.096602
## 181                   CKS1B 1.558834e-04 4.649059e-03   2.558733
## 182                    CKS2 2.142588e-04 5.984191e-03   3.131849
## 183                   CLCA4 4.381302e-07 3.257293e-05  -4.382132
## 184                  CLDN17 1.012485e-04 3.224717e-03  -3.949774
## 185          CLEC12A-AS1 1.044762e-13 4.907531e-11   5.095812
## 186                  CLEC3B 8.441435e-04 1.842319e-02  -2.769500
## 187                   CLIC3 2.924655e-04 7.679951e-03  -3.354401
## 188                   CLSPN 3.832839e-06 2.112456e-04   2.324454
## 189                    CNFN 9.185480e-08 8.748640e-06  -4.096514
## 190                   CNGB1 1.065830e-03 2.220623e-02   4.438166
## 191                   CNIH2 1.347200e-03 2.719134e-02   2.766163
## 192                    CNN1 2.380517e-16 1.892328e-13  -4.508997
## 193                   CNTN5 9.140337e-04 1.974007e-02   4.820636
## 194                 CNTNAP2 4.379297e-04 1.074956e-02   3.855783
## 195               CNTNAP2_1 2.212718e-03 4.047120e-02   3.162057
## 196                    COCH 1.334577e-08 1.622531e-06   4.014747
## 197                  COL10A1 7.151233e-17 6.426160e-14   8.377233
## 198                  COL11A1 6.034145e-15 3.708683e-12   8.011539
## 199                  COL24A1 2.392427e-04 6.557914e-03   3.178407
## 200                  COL27A1 1.563547e-03 3.054385e-02   2.455225
## 201                   COL2A1 1.535421e-05 6.652849e-04   6.912131
## 202                   COL7A1 8.507781e-04 1.854840e-02   2.132210
## 203                   CPEB3 7.424140e-06 3.688944e-04  -2.359492
## 204                   CPLX2 4.959148e-04 1.179467e-02   6.436563
## 205                   CPNE6 8.028517e-05 2.663457e-03  -5.537337
## 206                 CPNE6_1 8.028517e-05 2.663457e-03  -5.537337
## 207                   CPXM1 1.422415e-03 2.851452e-02   2.855149
## 208                  CRABP1 1.054582e-03 2.199405e-02   5.228691
## 209                   CRCT1 4.585677e-07 3.373720e-05  -4.475599
## 210                  CRISP2 2.012905e-05 8.303938e-04  -5.036277
## 211                  CRISP3 3.130142e-11 7.889485e-09  -5.865594
## 212                    CRMA 6.199882e-04 1.406577e-02  -3.599019
## 213                    CRNN 6.126899e-05 2.117571e-03  -5.308179
## 214                  CRTAC1 1.252044e-03 2.541969e-02  -3.497130
## 215                  CRYBG1 1.714009e-06 1.067022e-04  -2.662419
## 216                  CRYBG2 3.205208e-04 8.280655e-03  -2.968805
## 217                 CSAG2_1 5.076371e-07 3.681348e-05   7.902203
## 218                   CSAG3 5.937133e-06 3.090898e-04   7.234290
## 219                 CSAG3_1 3.206431e-05 1.220452e-03   6.647558
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## 220                  CSF2 1.198029e-03 2.463768e-02   5.552246
## 221                 CSRP1 7.114144e-05 2.422325e-03  -2.060090
## 222                  CST1 1.920540e-19 3.312485e-16  11.923317
## 223                  CST2 1.786405e-04 5.149431e-03   5.555372
## 224                  CSTB 3.308605e-07 2.551577e-05  -3.391982
## 225                CT45A5 2.201478e-03 4.034929e-02   5.827646
## 226                CTHRC1 6.071635e-07 4.218224e-05   4.517651
## 227                CTNNA3 2.325376e-04 6.408115e-03  -4.538274
## 228                  CTSC 2.057773e-03 3.828087e-02   2.200636
## 229              CTTN-DT 1.712536e-04 4.985167e-03   3.415402
## 230            CTTN-DT_1 1.712536e-04 4.985167e-03   3.415402
## 231              CTTNBP2 1.784483e-07 1.562784e-05  -3.887677
## 232                CXCL1 2.429952e-05 9.751894e-04   4.126697
## 233               CXCL11 8.413262e-05 2.768874e-03   4.337692
## 234               CXCL12 1.174842e-04 3.645892e-03  -2.788505
## 235               CXCL14 4.873978e-04 1.163404e-02   3.026065
## 236                CXCL5 1.442096e-05 6.328077e-04   3.979228
## 237                CXCL6 9.331315e-05 3.013431e-03   3.963683
## 238                CXCR2 4.741313e-10 8.234745e-08  -4.041847
## 239              CYP11A1 7.321300e-05 2.470764e-03  -3.650514
## 240            CYP11A1_1 7.321300e-05 2.470764e-03  -3.650514
## 241               CYP1A1 4.566759e-06 2.464380e-04  -5.160696
## 242              CYP26A1 3.511465e-09 4.937072e-07   9.428985
## 243              CYP2C18 5.194153e-04 1.221306e-02  -2.844339
## 244               CYP2J2 2.231225e-03 4.073760e-02  -2.511379
## 245               CYP4B1 2.680204e-04 7.184753e-03  -3.010827
## 246              CYP4F12 7.127442e-05 2.422861e-03  -2.717821
## 247              CYP4F22 3.382853e-06 1.894764e-04  -4.389495
## 248             CYP4F29P 2.707595e-04 7.230049e-03  -4.192720
## 249             CYP4F35P 5.144243e-04 1.210948e-02  -4.083722
## 250              CYSRT1 1.583052e-05 6.816360e-04  -3.877197
## 251                DAAM2 1.033146e-05 4.875128e-04  -2.827132
## 252                DAPP1 4.104112e-04 1.015854e-02  -2.358937
## 253             DEFB4B_2 1.225680e-03 2.510640e-02   4.883737
## 254                DEGS2 9.447866e-07 6.258606e-05  -2.898118
## 255              DENND2C 2.949814e-04 7.707555e-03  -2.147567
## 256                  DES 2.200340e-33 2.273832e-29  -5.823757
## 257               DHCR24 7.474934e-04 1.647036e-02  -1.712001
## 258             DHCR7-DT 4.277941e-04 1.051326e-02   3.296091
## 259                DHRS2 1.384746e-10 2.805876e-08   5.897005
## 260            DIP2C-AS1 6.502896e-05 2.240031e-03  -3.469270
## 261                 DKK1 7.400767e-04 1.634178e-02   3.281840
## 262           DLGAP1-AS1 7.635522e-04 1.680628e-02   2.398370
## 263               DLGAP5 1.639670e-04 4.820582e-03   2.312016
## 264                 DLL3 1.707995e-03 3.274660e-02   4.747036
## 265                 DLX1 4.009265e-05 1.488488e-03   5.258218
## 266               DLX1_1 4.009265e-05 1.488488e-03   5.258218
## 267                 DLX2 1.231073e-07 1.125832e-05   6.231012
## 268                 DLX6 1.390444e-12 4.789617e-10   7.220500
## 269             DLX6-AS1 5.351712e-07 3.867454e-05   6.098045
## 270                 DMP1 9.785835e-04 2.077410e-02   4.826783
## 271                DMRT1 1.970297e-03 3.688595e-02   5.252268
## 272               DNAH14 1.742569e-06 1.077101e-04   3.360521
## 273               DNAH17 6.193482e-04 1.406577e-02   3.865795
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## 275                 DNMT3B 3.206351e-11 7.984200e-09   2.935475
## 276                  DOCK9 1.366046e-07 1.227541e-05  -2.201899
## 277                  DOP1B 6.721441e-04 1.508347e-02  -2.007140
## 278                   DPF1 5.549497e-07 3.918363e-05   3.464317
## 279                 DPYSL5 2.323398e-03 4.219683e-02   6.130886
## 280                 DRAXIN 2.148479e-03 3.964712e-02   2.887502
## 281                   DSG3 1.566619e-03 3.057495e-02  -2.296234
## 282                    DTL 1.183150e-03 2.438021e-02   2.162144
## 283                  DUOX1 6.406509e-04 1.447101e-02  -2.576857
## 284                  DUSP9 1.327409e-05 5.977099e-04   4.574561
## 285                DUXAP10 2.740257e-06 1.577846e-04   4.947445
## 286                 DUXAP8 5.937322e-04 1.361960e-02   4.372594
## 287                 DUXAP9 1.172300e-07 1.081656e-05   4.197566
## 288                  DYNAP 2.813829e-03 4.911842e-02  -3.469109
## 289                   E2F1 4.641661e-04 1.120723e-02   2.319064
## 290                   E2F7 1.568869e-03 3.058998e-02   2.096709
## 291                   ECM1 1.926419e-07 1.645257e-05  -3.988249
## 292                  ECRG4 5.931261e-07 4.141463e-05  -4.068215
## 293                   ECT2 3.769425e-05 1.416481e-03   1.963196
## 294                    EGF 1.382770e-04 4.205689e-03   3.352511
## 295                   EHD3 4.886588e-08 5.049800e-06  -3.195210
## 296                    EHF 1.110833e-04 3.504450e-03  -2.245851
## 297                 EIF5A2 1.960032e-03 3.676037e-02   1.952134
## 298                 ELOVL4 1.994715e-07 1.685641e-05  -2.963806
## 299                  EMID1 7.411824e-05 2.486196e-03   3.531609
## 300                   EMP1 6.115482e-13 2.298087e-10  -3.946682
## 301                EMSY-DT 3.507450e-04 8.927584e-03   2.952592
## 302                    EN1 1.474718e-09 2.326678e-07   6.308133
## 303                    EN2 2.437165e-03 4.376311e-02   3.507301
## 304                  ENDOU 3.835217e-12 1.148786e-09  -5.382425
## 305                ENTREP1 3.598046e-06 2.004431e-04  -2.811934
## 306               EPB41L4A 1.575207e-04 4.687819e-03  -1.956706
## 307                  EPCAM 9.787774e-05 3.132637e-03   2.997321
## 308                   EPGN 1.114822e-04 3.504450e-03  -3.633575
## 309                  EPHA1 7.392239e-06 3.688944e-04  -2.597286
## 310                EPHA1_1 7.392239e-06 3.688944e-04  -2.597286
## 311                  EPHB2 9.797420e-08 9.288673e-06   3.774833
## 312                  EPHX2 4.243490e-05 1.557805e-03  -2.691414
## 313                  EPHX3 1.215277e-03 2.491801e-02  -2.764085
## 314                 EPS8L1 1.104730e-04 3.491218e-03  -3.436726
## 315                 EPS8L2 6.798694e-05 2.330272e-03  -2.493373
## 316                   EREG 1.166256e-03 2.412830e-02  -3.501221
## 317                   ERFE 1.199550e-13 5.509399e-11   5.773914
## 318                   ESM1 6.668553e-11 1.450796e-08   4.594029
## 319                ESPL1_1 2.751591e-05 1.077081e-03  -2.679451
## 320                  ETFDH 5.411543e-05 1.908944e-03  -2.196594
## 321                  EVA1A 1.778663e-05 7.487046e-04   3.765410
## 322                   EVPL 2.888457e-05 1.115862e-03  -2.835649
## 323                    F10 1.072602e-03 2.232480e-02  -2.558238
## 324                  FABP4 6.029672e-05 2.090961e-03   6.104357
## 325                   FADD 5.633620e-04 1.309738e-02   2.930394
## 326                  FADS1 3.266785e-08 3.553574e-06   3.344929
## 327                  FADS2 3.254258e-07 2.519064e-05   3.843030
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## 328                  FADS3 1.008979e-03 2.125747e-02   2.100228
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## 330                 FAM107A 2.582856e-05 1.021630e-03  -3.042066
## 331                 FAM135A 8.982869e-04 1.948142e-02  -1.968922
## 332                  FAM25A 1.754910e-03 3.352169e-02  -3.286055
## 333                  FAM3B 3.550996e-07 2.708191e-05  -3.749207
## 334                  FAM3D 8.920157e-06 4.327742e-04  -3.042609
## 335                 FAR2P1 2.785398e-04 7.390066e-03   7.708595
## 336                   FBN2 6.324016e-09 8.432566e-07   4.851673
## 337                 FCER1A 2.135612e-03 3.944488e-02  -3.319893
## 338               FCER1A_1 2.135612e-03 3.944488e-02  -3.319893
## 339                  FCHO2 4.011458e-05 1.488488e-03  -2.262602
## 340                  FEZF1 8.334211e-05 2.751621e-03   6.130205
## 341               FEZF1-AS1 6.082014e-07 4.218224e-05   6.243414
## 342                  FGF12 7.333436e-06 3.688944e-04   3.383388
## 343                  FGF19 1.402323e-13 6.300698e-11   8.974206
## 344                   FGF5 1.151590e-03 2.387269e-02   4.317060
## 345                  FHAD1 9.705554e-04 2.067983e-02   2.983394
## 346                   FHL1 5.736533e-07 4.019074e-05  -3.036548
## 347                 FIBCD1 1.158394e-06 7.435309e-05   5.385084
## 348                  FIRRE 4.827620e-06 2.591617e-04   5.189665
## 349                    FLG 1.044296e-06 6.765987e-05  -5.023499
## 350                   FLNC 3.944896e-04 9.870837e-03  -2.946375
## 351                 FLOT1_1 9.342875e-04 2.007261e-02   2.897490
## 352                  FNDC4 1.916855e-06 1.161805e-04  -3.153353
## 353               FOXD2-AS1 8.972985e-06 4.342276e-04   3.244359
## 354               FOXD3-AS1 1.741751e-03 3.330112e-02   4.171909
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## 356                  FOXI3 1.001781e-06 6.531486e-05   6.510808
## 357                  FOXL1 6.457815e-06 3.328432e-04   4.268553
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## 359                  FOXM1 2.036442e-04 5.726420e-03   2.070474
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## 361                  FREM2 5.320575e-06 2.812420e-04   6.748405
## 362                 FRMD4B 9.178679e-06 4.391318e-04  -2.075524
## 363                 FUT3_1 6.662322e-07 4.574647e-05  -2.948489
## 364                   FUT6 6.100989e-15 3.708683e-12  -5.359433
## 365                  FXYD1 1.960107e-07 1.667140e-05  -3.317661
## 366                   GAB1 6.214155e-04 1.408269e-02  -1.781714
## 367                 GABRA4 7.356076e-05 2.476146e-03  -4.764576
## 368                  GABRP 7.030203e-05 2.401657e-03  -3.348376
## 369                    GAL 1.915175e-03 3.618174e-02   3.822356
## 370                 GALNT17 2.575261e-06 1.490910e-04  -3.219810
## 371                  GAP43 4.814730e-04 1.153080e-02   4.145143
## 372                   GAST 1.383718e-04 4.205689e-03   5.874735
## 373                  GATA4 1.682512e-05 7.150995e-04   6.294877
## 374                   GBP6 1.242332e-07 1.131124e-05  -3.403819
## 375                   GBX2 3.225447e-08 3.527171e-06   6.659396
## 376                   GCKR 1.436394e-03 2.868348e-02  -3.574756
## 377                  GCNT4 8.034691e-07 5.426830e-05  -2.359450
## 378                  GCOM1 5.881366e-06 3.069598e-04  -4.147293
## 379                    GDA 9.138959e-06 4.382460e-04   4.235641
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## 385                  GFRA1 2.979166e-04 7.774420e-03  -3.071485
## 386                   GGT6 2.544546e-06 1.477266e-04  -2.403564
## 387                  GINS1 1.327456e-03 2.684526e-02   1.869682
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## 389                   GJB7 2.436688e-11 6.217464e-09   6.599639
## 390                   GLI1 3.524557e-05 1.329298e-03   4.407792
## 391                   GLI2 1.753106e-04 5.079354e-03   3.164524
## 392                   GLTP 2.859525e-06 1.632615e-04  -2.422314
## 393                   GNG7 9.354642e-04 2.007425e-02  -2.552658
## 394                   GPC2 9.342494e-04 2.007261e-02   3.008774
## 395                  GPD1L 2.698436e-07 2.150220e-05  -2.264351
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## 397                 GPR149 1.511222e-03 2.983185e-02   6.332652
## 398                 GPR158 8.925844e-05 2.923603e-03   6.011792
## 399                  GPR19 8.425959e-04 1.842319e-02   2.810312
## 400                  GPR50 8.588241e-04 1.870409e-02   4.517511
## 401                    GPT 4.861326e-06 2.602950e-04  -3.292211
## 402                   GPT2 7.713634e-04 1.696015e-02  -2.076855
## 403                   GPX3 2.222164e-04 6.156526e-03  -2.664937
## 404                  GREM2 1.916465e-05 7.953716e-04  -3.623787
## 405                  GRHL1 6.196216e-04 1.406577e-02  -2.308948
## 406                  GRHL3 2.740694e-06 1.577846e-04  -2.953343
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## 408                   GRM4 1.228695e-04 3.807297e-03   5.264138
## 409                    GRP 1.902890e-04 5.405488e-03   5.865513
## 410                    GSC 5.397963e-04 1.264910e-02   5.295591
## 411                 GTF2H2 1.424354e-03 2.852573e-02  -6.106284
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## 413                 GUCY1B2 2.812704e-03 4.911842e-02   4.496990
## 414                    GYS2 2.948686e-09 4.211868e-07  -5.079477
## 415                 H2AC19 7.614423e-12 2.147125e-09  21.362969
## 416                  H2BC9 2.194906e-03 4.028803e-02   2.483033
## 417                   H3C8 2.528918e-03 4.501953e-02   4.307085
## 418                  HAGHL 4.481042e-04 1.093438e-02   2.241769
## 419                  HAGLR 9.701335e-04 2.067983e-02   2.430394
## 420                HAGLROS 1.520283e-05 6.601094e-04   4.681027
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## 423                 HCG22_2 2.014483e-07 1.685641e-05  -7.966206
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## 425                 HCG22_6 2.122237e-07 1.754496e-05  -6.765059
## 426                 HCG22_7 3.415320e-04 8.757795e-03 -10.678966
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## 429                    HHIP 4.698340e-05 1.694682e-03   6.137370
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## 439                   HMMR 1.048631e-05 4.925704e-04   2.862831
## 440                   HMX1 1.463395e-03 2.908217e-02   5.532836
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## 443                 HOTAIR 3.980416e-04 9.938781e-03   5.537591
## 444                 HOXA10 6.706960e-16 5.134053e-13   5.884920
## 445               HOXA10-AS 2.192250e-07 1.790886e-05   5.746006
## 446                 HOXA11 1.152148e-08 1.442054e-06   6.793580
## 447                 HOXA13 9.130063e-10 1.546723e-07   7.113792
## 448                  HOXA9 4.982811e-04 1.180950e-02   3.707979
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## 450                  HOXB7 1.646840e-14 9.454691e-12   5.055295
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## 456               HOXC13-AS 1.028874e-06 6.687033e-05   6.632678
## 457                  HOXC9 1.216789e-05 5.563847e-04   3.680899
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## 462                   HPGD 4.751970e-04 1.143141e-02  -3.190964
## 463                  HPSE2 1.067038e-26 5.513385e-23  -5.448579
## 464                 HS3ST5 2.176537e-03 4.009328e-02   6.083482
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## 468                  HTR2C 2.349033e-06 1.387138e-04   6.256706
## 469                  HTR3B 3.182381e-06 1.787322e-04  -3.664048
## 470                   IBSP 3.041223e-09 4.305206e-07   6.860903
## 471                   IFI6 3.046941e-05 1.166188e-03   3.726198
## 472                  IFIT1 1.384376e-03 2.780591e-02   2.932107
## 473                IGF2BP1 2.882556e-07 2.273918e-05   9.126923
## 474                IGF2BP2 4.012507e-08 4.252846e-06   3.861938
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## 477                  IL11 5.421667e-05 1.908944e-03   4.047767
## 478                 IL12A 1.049385e-03 2.192991e-02  -3.182216
## 479               IL12A-AS1 2.916248e-06 1.655852e-04  -5.929746
## 480                IL13RA2 1.239171e-03 2.528251e-02   3.625986
## 481                   IL18 5.898494e-04 1.357573e-02  -2.352964
## 482                  IL1RN 4.763574e-05 1.713459e-03  -3.202644
## 483                   IL24 6.191967e-04 1.406577e-02   3.712402
## 484                 IL31RA 2.217981e-05 8.965105e-04   5.199156
## 485                   IL34 2.575633e-07 2.079421e-05  -3.110092
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## 487                  IL36B 3.668278e-04 9.279800e-03  -3.231847
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## 493                    IVL 2.000339e-04 5.647953e-03  -3.487145
## 494                JAKMIP3 1.462826e-07 1.303176e-05   3.659513
## 495                   JPH2 1.374743e-10 2.805876e-08  -3.604444
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## 497                  KANK1 3.723869e-09 5.200333e-07  -2.869435
## 498                  KAT2B 3.957550e-07 2.961585e-05  -2.729732
## 499                   KAZN 2.061132e-03 3.830888e-02  -1.864385
## 500                  KCNA5 1.954340e-06 1.181062e-04  -4.599263
## 501                  KCNB1 4.029968e-14 2.082284e-11  -4.926136
## 502                  KCNC3 2.369560e-04 6.503861e-03   2.279744
## 503                  KCNG3 1.283611e-05 5.817911e-04   4.666543
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## 505                 KCNMA1 2.782414e-05 1.085036e-03  -2.569439
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## 507             KCNMB2-AS1 4.177586e-11 9.811630e-09   6.696176
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## 509                  KCNS3 1.266605e-05 5.753449e-04   2.396974
## 510               KIAA1549 8.698604e-04 1.890460e-02   2.798982
## 511                  KIF14 1.399515e-05 6.180592e-04   2.708076
## 512                  KIF1A 1.005837e-09 1.663091e-07   5.641306
## 513                 KIF26B 6.913291e-05 2.365628e-03   3.476663
## 514                  KIF4A 9.545556e-04 2.042314e-02   1.869158
## 515                   KILH 2.598771e-04 7.002789e-03   5.317647
## 516                KLHDC7B 1.981999e-04 5.611500e-03   3.785920
## 517             KLHDC7B-DT 2.777636e-05 1.085036e-03   4.068822
## 518                KLHDC8A 2.769617e-04 7.367109e-03  -2.763544
## 519                  KLK11 2.025070e-06 1.220238e-04  -2.585626
## 520                  KLK12 7.710714e-05 2.574556e-03  -3.361951
## 521                  KLK13 1.255040e-05 5.713473e-04  -3.670627
## 522                   KPRP 9.081003e-04 1.963244e-02  -4.343011
## 523                KREMEN2 6.302511e-04 1.426728e-02   2.312493
## 524                  KRT13 2.987137e-05 1.147549e-03  -4.108900
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## 526                   KRT3 6.554621e-09 8.684032e-07  -4.407911
## 527                  KRT32 4.063507e-08 4.284927e-06  -3.992439
## 528                   KRT4 3.634926e-11 8.735658e-09  -6.426344
## 529                 KRT42P 2.690451e-04 7.202881e-03   4.645720
## 530                  KRT75 2.954910e-09 4.211868e-07   5.826676
## 531                  KRT78 6.306293e-11 1.395881e-08  -5.568714
## 532                   KRT8 3.044149e-06 1.714345e-04   3.195239
## 533             KRTAP4-1_1 8.992134e-06 4.342276e-04   5.894576
## 534                  LAMA1 5.812414e-06 3.041290e-04   3.906487
## 535                  LAMB4 7.641550e-13 2.820278e-10  -5.023367
## 536                  LAMC2 1.596060e-05 6.858083e-04   2.989928
## 537                  LAMP3 1.370000e-03 2.759763e-02   2.366640
## 538                   LAYN 1.774318e-03 3.386114e-02   2.962694
## 539                  LCAL1 4.076958e-17 4.213129e-14  10.149662
## 540                   LCN1 4.537270e-04 1.101954e-02  -5.664728
## 541                  LCN10 7.436361e-04 1.640285e-02  -2.486435
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## 543                   LGI1 6.931562e-06 3.537322e-04  -3.775251
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## 547                LINC00467 7.618781e-05 2.547977e-03   3.085382
## 548                LINC00491 1.883198e-05 7.831376e-04   4.095510
## 549                LINC00519 1.506185e-04 4.511571e-03   3.945064
## 550                LINC00622 2.739131e-03 4.830407e-02   3.460784
## 551                LINC00649 9.745589e-09 1.243345e-06   2.392794
## 552                LINC00942 4.089453e-12 1.190434e-09   8.723056
## 553                LINC01088 7.194003e-04 1.598771e-02  -3.744425
## 554                LINC01234 1.134370e-07 1.056088e-05   7.488093
## 555                LINC01269 1.118680e-04 3.506662e-03  -3.043004
## 556  LINC01297-DUXAP10-NBEAP6 1.823286e-04 5.233843e-03   2.419749
## 557                LINC01305 7.092271e-04 1.580771e-02   5.128829
## 558                LINC01614 3.392408e-06 1.894981e-04   5.702221
## 559                LINC01615 2.140653e-05 8.742275e-04   4.851814
## 560                LINC01873 1.452399e-03 2.891925e-02   2.275090
## 561              LINC02041_1 2.845073e-03 4.945497e-02   5.340062
## 562                LINC02043 2.385780e-12 7.704577e-10   4.801320
## 563                LINC02086 1.379844e-03 2.776886e-02   4.849915
## 564                LINC02137 1.921574e-03 3.626950e-02   4.677634
## 565                LINC02154 4.991375e-04 1.180950e-02   4.672197
## 566                LINC02159 1.604897e-03 3.105810e-02   4.926052
## 567                LINC02253 7.105362e-04 1.580771e-02   2.732653
## 568                LINC02321 2.257522e-03 4.118134e-02   4.116024
## 569                LINC02457 2.372334e-03 4.285718e-02   4.842186
## 570                LINC02487 3.779649e-04 9.514955e-03  -4.049008
## 571                LINC02538 1.669665e-03 3.212862e-02  -3.823813
## 572                LINC02560 3.967656e-05 1.482885e-03  -2.926668
## 573                LINC02561 4.465861e-04 1.091022e-02   4.875400
## 574                LINC02577 1.560988e-03 3.052299e-02   3.735854
## 575                LINC02609 1.942509e-03 3.653118e-02   3.145915
## 576                LINC02623 1.608860e-05 6.886073e-04  -6.379374
## 577                LINC02636 1.959903e-04 5.556555e-03   2.774930
## 578                LINC02827 8.345892e-07 5.618661e-05   5.902155
## 579                LINC02884 5.961354e-05 2.074230e-03  -3.404353
## 580                LINC02893 2.822798e-06 1.620600e-04   3.617737
## 581                LINC02994 8.261631e-05 2.736401e-03   5.265165
## 582                LINC02999 1.115700e-04 3.504450e-03   5.688034
## 583                LINC03011 1.340531e-03 2.708317e-02   2.982132
## 584                LINC03016 3.818535e-07 2.880346e-05  -5.737787
## 585                LINC03040 1.107416e-05 5.166607e-04   5.496827
## 586                LINC03050 1.904004e-04 5.405488e-03   3.307317
## 587                LINC03057 6.852237e-06 3.505496e-04   6.089477
## 588                     LIPH 4.102884e-04 1.015854e-02  -2.458580
## 589                     LMO7 5.927733e-04 1.361271e-02  -2.460277
## 590                    LMOD1 7.976556e-16 5.684809e-13  -4.246920
## 591                    LMX1B 2.669118e-05 1.050768e-03   4.402419
## 592             LOC100287072 2.679207e-05 1.052735e-03   2.803376
## 593             LOC101927293 4.631992e-04 1.120073e-02   5.282676
## 594             LOC101927469 3.465828e-05 1.309538e-03   4.476802
## 595             LOC101928051 2.045519e-03 3.808719e-02   4.106970
## 596             LOC101928391 3.327469e-05 1.261874e-03   2.788825
## 597             LOC101928844 6.773019e-09 8.859794e-07  -5.006118
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## 600            LOC101929594 1.104988e-05 5.166607e-04   2.914968
## 601            LOC101929748 2.832753e-06 1.621810e-04   6.275617
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## 756               MELTF-AS1 3.535412e-07 2.706292e-05   3.025152
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## 773                   MMP3 7.755367e-24 2.289827e-20  10.391534
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## 798                   MYL9 2.966151e-05 1.141609e-03  -2.933443
## 799                   MYOC 1.923254e-19 3.312485e-16  -9.146094
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## 802                  MYRIP 4.682507e-04 1.129266e-02  -2.687636
## 803                  MYZAP 2.844590e-07 2.252566e-05  -3.899927
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## 805                  NAT14 1.391425e-04 4.222904e-03   2.204311
## 806                  NAT8L 2.228290e-03 4.071998e-02   2.926759
## 807                 NCCRP1 9.035936e-04 1.957597e-02  -3.152976
## 808                NCK1-DT 4.154601e-05 1.530611e-03   3.020302
## 809                  NDC80 7.263707e-04 1.612527e-02   2.354666
## 810                  NDRG2 2.593479e-03 4.612911e-02  -1.874932
## 811                    NEB 1.880655e-05 7.831376e-04   3.423178
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## 831                 NPBWR1 8.613938e-07 5.780288e-05   5.649350
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## 835                   NREP 1.537652e-03 3.026637e-02   2.361352
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## 838                  NTRK3 1.684989e-05 7.150995e-04  -3.142386
## 839                    NTS 5.161906e-05 1.833097e-03   6.147847
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## 844                  OGDHL 1.547121e-05 6.689520e-04   4.916908
## 845                    OGN 2.495605e-04 6.777814e-03  -3.615193
## 846                  OGN_1 2.495605e-04 6.777814e-03  -3.615193
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## 853                  P2RX2 2.085307e-09 3.145921e-07  -6.521712
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## 857                 PABIR3 4.882167e-05 1.743269e-03   2.799606
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## 859                PADI1_1 9.150274e-05 2.968883e-03  -3.890382
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## 862                   PAX6 1.636234e-08 1.932439e-06   6.834757
## 863                   PAX7 4.539370e-10 8.018778e-08   8.914945
## 864                   PAX9 3.969223e-07 2.961585e-05  -2.947128
## 865                    PBK 9.363061e-04 2.007425e-02   2.290988
## 866                 PBX2_2 1.437124e-12 4.869260e-10  22.065777
## 867                  PCAT7 2.614539e-10 4.957551e-08   5.440406
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## 868                  PCDH1 4.295060e-05 1.573941e-03  -2.501683
## 869                PCDHB9_1 9.832457e-04 2.084279e-02   2.413797
## 870                   PCLAF 2.183426e-05 8.883277e-04   2.692258
## 871                    PCP4 1.060519e-12 3.779105e-10  -5.700745
## 872                  PCP4_1 1.060519e-12 3.779105e-10  -5.700745
## 873                  PCSK1N 3.808541e-06 2.104677e-04   3.750836
## 874                   PCSK2 1.539532e-03 3.026637e-02  -3.033709
## 875                  PDE11A 2.829155e-03 4.930268e-02   4.633646
## 876                   PDGFA 4.874722e-04 1.163404e-02   1.875907
## 877                    PDK4 3.987510e-12 1.177341e-09  -4.453273
## 878                  PDLIM2 7.854303e-07 5.339893e-05  -2.656734
## 879                  PDZRN3 8.008219e-04 1.758915e-02  -2.401064
## 880                  PDZRN4 4.744434e-09 6.409017e-07  -4.964039
## 881                    PFN2 7.966882e-08 7.803769e-06   3.263089
## 882                  PGM2L1 6.686159e-06 3.429021e-04   2.712992
## 883                    PGM5 4.475768e-17 4.405008e-14  -4.915019
## 884                PGM5-AS1 1.357958e-11 3.598242e-09  -6.574068
## 885                  PGM5P4 3.151616e-05 1.201801e-03  -5.638823
## 886                 PHACTR2 4.100632e-05 1.513426e-03  -2.293035
## 887                 PHACTR4 2.700326e-04 7.219965e-03  -1.856987
## 888                  PHLDB3 2.186043e-03 4.017200e-02  -2.147347
## 889                  PHYHIP 2.911076e-09 4.207421e-07  -3.863414
## 890                    PI16 1.409410e-05 6.211019e-04  -4.560170
## 891                  PIMREG 3.098055e-08 3.424097e-06   2.547777
## 892                   PITX1 2.381226e-03 4.294518e-02  -2.245791
## 893                  PKD1L1 3.767618e-04 9.496235e-03   2.553979
## 894                 PKHD1L1 5.106729e-05 1.816624e-03  -3.380799
## 895                    PKP3 1.991059e-04 5.629441e-03  -2.008591
## 896                 PLA2G2A 4.277103e-04 1.051326e-02  -4.948860
## 897                 PLA2G2C 2.983984e-06 1.685117e-04  -4.638091
## 898                 PLA2G4B 1.763001e-04 5.096182e-03  -2.261183
## 899                  PLAAT2 1.835967e-04 5.255645e-03   4.522061
## 900                    PLAU 8.924327e-08 8.539259e-06   3.487790
## 901                  PLCXD3 2.340611e-03 4.239768e-02  -3.340030
## 902                   PLD6 5.885721e-04 1.356951e-02   2.224183
## 903                 PLEKHA7 1.745834e-06 1.077101e-04  -2.312360
## 904                PLEKHG4B 9.170681e-05 2.970841e-03   2.862926
## 905                 PLEKHM1 3.976752e-09 5.516209e-07  -2.722018
## 906               PLEKHM1_2 7.409799e-08 7.327547e-06  -2.506878
## 907                  PLIN4 5.420294e-05 1.908944e-03  -2.621748
## 908                    PLN 1.271498e-04 3.922287e-03  -2.997009
## 909                   PLP1 7.572741e-16 5.589764e-13  -4.829035
## 910                  PLPP4 1.949588e-05 8.074965e-04   4.244584
## 911                   PMM1 1.445984e-03 2.884709e-02  -1.981647
## 912                   POMC 1.243270e-03 2.530811e-02   2.856794
## 913                 POPDC3 2.105389e-07 1.747558e-05   5.156923
## 914                  POSTN 2.072991e-03 3.842563e-02   2.994432
## 915                POTEF_1 4.507484e-05 1.631535e-03   7.272708
## 916             POU6F2-AS2 5.564026e-05 1.942742e-03   5.163328
## 917                    PPL 2.151941e-08 2.484711e-06  -3.450053
## 918                PPP1R12B 3.784147e-06 2.096803e-04  -2.239788
## 919                 PPP1R1A 2.827731e-05 1.096502e-03  -3.787235
## 920                 PPP1R1C 2.984095e-06 1.685117e-04   4.671039
## 921                   PRAME 3.203421e-19 4.729165e-16   9.717650
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## 922                PRAME_1 3.203421e-19 4.729165e-16   9.717650
## 923                 PRDM13 2.433312e-04 6.652339e-03   5.158176
## 924               PRELID3A 3.111817e-05 1.188818e-03   2.684926
## 925                  PRELP 1.672549e-03 3.212862e-02  -2.698887
## 926                   PROC 1.663064e-05 7.087052e-04   5.211048
## 927                  PRR15 1.308674e-05 5.905608e-04   4.052911
## 928                PRR15-DT 2.206062e-03 4.038519e-02   3.373034
## 929                 PRR20G 2.673459e-03 4.734795e-02   6.387081
## 930                   PRR4 3.540414e-08 3.771819e-06  -7.109019
## 931                 PRR4_1 3.540414e-08 3.771819e-06  -7.109019
## 932                 PRR4_2 3.540414e-08 3.771819e-06  -7.109019
## 933                  PRR5L 1.551217e-03 3.038915e-02   2.251606
## 934                 PRSS21 2.440401e-06 1.432904e-04   4.829719
## 935                 PRSS27 6.003224e-04 1.375550e-02  -3.582000
## 936                  PRSS3 1.241568e-03 2.530644e-02  -2.889999
## 937                 PRUNE2 2.569293e-09 3.803037e-07  -3.681802
## 938                   PSCA 5.923937e-04 1.361271e-02  -3.259137
## 939                  PTGIS 2.999263e-04 7.816995e-03  -3.399417
## 940                  PTGS2 6.091846e-05 2.108983e-03   4.037431
## 941                  PTH2R 5.982131e-05 2.077961e-03   6.219175
## 942                  PTHLH 6.864420e-09 8.922882e-07   3.980194
## 943                   PTK6 1.754722e-04 5.079354e-03  -2.678348
## 944                  PTPRN 2.374273e-03 4.285718e-02   4.559153
## 945                 PWWP3B 1.800291e-04 5.182231e-03   6.016714
## 946                   PXDN 1.540556e-03 3.026637e-02   2.418928
## 947                   PYGM 1.744267e-06 1.077101e-04  -3.147673
## 948                   PYY2 1.178449e-07 1.082498e-05   6.875747
## 949                  RAB15 1.014687e-03 2.133196e-02   2.093009
## 950                  RAB25 1.599242e-03 3.100669e-02  -1.794638
## 951                  RAB32 4.940038e-04 1.176275e-02   2.280534
## 952                  RAB3B 6.643433e-04 1.494086e-02   3.337368
## 953                 RAB40A 1.427837e-16 1.229606e-13  -5.250004
## 954                  RAB9B 2.807589e-03 4.910256e-02  -2.611853
## 955                RABGGTA 6.763207e-05 2.321960e-03  -2.058172
## 956              RABGGTA_1 6.763207e-05 2.321960e-03  -2.058172
## 957               RAD51AP1 1.063589e-07 9.946724e-06   3.231669
## 958                 RAET1E 1.244099e-03 2.530811e-02  -3.154733
## 959                   RAG1 4.545504e-04 1.102658e-02   3.249189
## 960                 RANBP9 3.137407e-04 8.125804e-03  -2.065572
## 961                   RARG 8.138982e-04 1.783844e-02  -1.750511
## 962                RASL11B 1.510644e-04 4.511850e-03   3.428543
## 963                 RBFOX3 8.175652e-19 1.126496e-15  -5.856158
## 964                  RBM47 1.036379e-03 2.168004e-02  -2.114475
## 965                   RBP1 9.618717e-05 3.091752e-03   3.148141
## 966                   RBP4 5.810675e-04 1.343345e-02   4.120184
## 967                 RBPMS2 4.334408e-05 1.579957e-03  -2.317533
## 968                  RDH12 1.096810e-09 1.784950e-07  -4.161113
## 969                  RELCH 3.830260e-04 9.618934e-03  -1.913041
## 970                   RFC4 1.884428e-09 2.863777e-07   2.888049
## 971                   RHCG 3.213789e-05 1.221004e-03  -3.397654
## 972                 RHEBL1 9.289541e-05 3.004636e-03   3.271270
## 973                  RIMS2 6.223337e-07 4.287464e-05   3.488222
## 974                 RMND5B 4.439403e-04 1.087311e-02  -1.838266
## 975               RNASEH2A 3.049188e-04 7.937104e-03   1.991206
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## 976                  RNF222 1.000872e-06 6.531486e-05  -3.856026
## 977                  RNF224 9.636083e-04 2.057423e-02  -3.310112
## 978                  RNF225 1.362425e-04 4.165473e-03  -3.196677
## 979                   RNFT2 2.564937e-05 1.017910e-03   3.181044
## 980                    ROR1 1.231616e-03 2.520301e-02  -2.688994
## 981                    ROS1 4.186410e-09 5.730114e-07   6.882220
## 982                  RPL39L 5.246402e-08 5.394659e-06   3.476519
## 983                    RRAD 2.474235e-03 4.423658e-02  -2.920293
## 984                   SALL4 2.140600e-13 9.217068e-11   4.122564
## 985                   SAMD5 1.810631e-06 1.100651e-04  -3.227946
## 986                   SASH1 3.540705e-10 6.533864e-08  -3.172226
## 987                  SCARA5 9.760922e-05 3.132589e-03  -3.944008
## 988                   SCAT2 1.141086e-03 2.367869e-02   3.885584
## 989                   SCAT8 1.939462e-03 3.650710e-02   3.737606
## 990                    SCEL 6.072728e-06 3.153546e-04  -3.811042
## 991                    SCG2 1.131766e-04 3.533435e-03   4.312047
## 992                 SCGB1D2 1.779927e-03 3.388698e-02  -4.681143
## 993                 SCGB2A2 1.775094e-06 1.089309e-04  -8.033597
## 994                 SCGB3A1 1.412706e-04 4.256241e-03  -5.443222
## 995                   SCIRT 2.835134e-03 4.936524e-02   3.159560
## 996                   SCN5A 1.711758e-03 3.278833e-02   3.380014
## 997                   SCN7A 5.855129e-17 5.500627e-14  -5.361083
## 998                   SCN8A 9.791385e-05 3.132637e-03   2.934254
## 999                   SCN9A 1.398237e-05 6.180592e-04   4.360995
## 1000                 SCNN1B 2.915825e-08 3.240014e-06  -3.301441
## 1001                 SCUBE3 4.978555e-04 1.180950e-02   3.427316
## 1002                    SCX 2.904901e-04 7.648215e-03   2.411566
## 1003                 SEC14L4 5.436615e-05 1.910952e-03   3.646183
## 1004                SERPINB1 1.608432e-03 3.109735e-02  -2.502206
## 1005               SERPINB11 7.353050e-04 1.630610e-02  -2.673095
## 1006               SERPINB12 1.580054e-04 4.687819e-03  -3.426843
## 1007                SERPINB2 6.979814e-04 1.562934e-02  -3.454279
## 1008                SERPINE1 7.981042e-05 2.656235e-03   3.139149
## 1009                SERPINH1 4.421737e-10 7.878316e-08   2.972488
## 1010                  SEZ6L2 5.889225e-04 1.356951e-02   2.929850
## 1011                SFTA2_2 1.607418e-04 4.746016e-03  -5.290253
## 1012                   SGCA 1.577508e-04 4.687819e-03  -2.942742
## 1013                SH3BGRL2 8.716296e-07 5.811239e-05  -3.267472
## 1014                     SHH 1.027320e-03 2.153538e-02   5.190398
## 1015                  SHISA2 1.230592e-04 3.807466e-03   4.512349
## 1016                   SHOX2 8.540712e-09 1.103247e-06   7.259799
## 1017                    SIM2 5.726257e-04 1.328286e-02  -2.665900
## 1018                    SIX1 4.069584e-20 9.345575e-17   6.588428
## 1019                    SIX2 9.305482e-10 1.563624e-07   3.881640
## 1020                    SIX3 2.556274e-04 6.919379e-03   5.670471
## 1021                    SIX4 1.177853e-05 5.421798e-04   3.375702
## 1022                 SLC13A4 2.697109e-07 2.150220e-05  -3.522330
## 1023                SLC16A10 1.444491e-04 4.339352e-03   2.606154
## 1024                 SLC16A6 4.229268e-06 2.300277e-04  -2.873453
## 1025                 SLC24A2 7.862712e-05 2.621073e-03   4.592379
## 1026                 SLC27A4 2.566104e-04 6.926999e-03  -2.011666
## 1027                 SLC27A6 4.039618e-05 1.496251e-03  -3.382189
## 1028                 SLC29A4 2.610296e-03 4.634846e-02   2.548636
## 1029                  SLC2A4 4.732973e-08 4.915632e-06  -3.884614
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## 1030                SLC2A4_1 4.732973e-08 4.915632e-06  -3.884614
## 1031                 SLC30A3 7.112559e-06 3.611852e-04   4.767068
## 1032                 SLC34A3 1.671779e-04 4.908001e-03  -3.556438
## 1033                 SLC35C1 1.509611e-04 4.511850e-03  -2.074358
## 1034                 SLC46A2 2.098118e-08 2.436174e-06  -4.700783
## 1035                  SLC51A 4.978023e-04 1.180950e-02   4.201332
## 1036                 SLC52A1 2.030464e-04 5.720731e-03   3.394591
## 1037                 SLC5A12 7.059891e-06 3.593937e-04   4.947956
## 1038                  SLC6A1 1.237002e-03 2.526320e-02  -3.261629
## 1039                  SLC6A2 1.148041e-04 3.573450e-03   4.766898
## 1040             SLC7A5P2_1 2.517320e-03 4.489040e-02   3.406795
## 1041             SLC8A1-AS1 3.178601e-08 3.494432e-06  -6.547623
## 1042                SLCO1A2 2.316120e-13 9.769302e-11   7.969568
## 1043             SLCO4A1-AS2 1.585798e-06 9.931900e-05  -3.369559
## 1044                SLITRK3 3.650585e-06 2.028234e-04  -4.058491
## 1045                  SLMAP 1.291355e-03 2.619209e-02  -1.593220
## 1046                 SLURP1 1.030992e-07 9.729929e-06  -4.450451
## 1047                  SMAGP 2.163190e-06 1.288439e-04  -2.251907
## 1048                  SMC1B 1.770828e-04 5.111659e-03   5.405907
## 1049                  SMOC1 3.366306e-04 8.653582e-03   3.624976
## 1050                 SNCAIP 2.277406e-03 4.147086e-02   2.417071
## 1051                   SNCB 9.110349e-05 2.968883e-03   5.623633
## 1052                 SNHG33 2.767984e-03 4.860552e-02   2.623647
## 1053                SNORD3A 1.665177e-07 1.470764e-05   7.666877
## 1054                  SNX10 2.704941e-07 2.150220e-05   2.789280
## 1055                 SORBS1 1.375244e-10 2.805876e-08  -3.447275
## 1056                 SORCS1 9.595141e-04 2.050800e-02  -3.180708
## 1057                  SORT1 1.545014e-03 3.032511e-02  -1.890219
## 1058                   SOST 6.534529e-08 6.642306e-06   7.517938
## 1059                  SOX10 9.061043e-06 4.355201e-04  -3.422805
## 1060                  SOX11 2.826034e-03 4.928985e-02   3.967565
## 1061                   SOX4 1.791994e-03 3.407262e-02   2.103704
## 1062                  SPC24 1.029815e-03 2.156455e-02   2.281515
## 1063                SPC25_1 9.308849e-04 2.004118e-02   2.859116
## 1064                SPINDOC 9.993194e-04 2.112938e-02   1.723117
## 1065                 SPINK5 1.776162e-06 1.089309e-04  -4.404171
## 1066                  SPNS2 1.803677e-07 1.572928e-05  -3.694177
## 1067                 SPOCD1 8.188026e-06 4.019718e-04   3.833984
## 1068                   SPP1 5.752457e-14 2.830757e-11   6.931695
## 1069                 SPRR2G 1.005618e-03 2.120828e-02   3.929969
## 1070                  SPRR3 1.249474e-05 5.700689e-04  -4.119999
## 1071                  SPSB4 4.143043e-04 1.023040e-02   5.065519
## 1072                 SPTLC3 2.384871e-03 4.297342e-02  -2.145970
## 1073                    SRL 9.786618e-04 2.077410e-02  -2.819274
## 1074             ST6GALNAC1 7.400246e-04 1.634178e-02  -2.446651
## 1075                ST8SIA2 4.536053e-04 1.101954e-02   4.729849
## 1076                  STIM1 2.743660e-04 7.307471e-03  -1.659554
## 1077                  STK40 1.947326e-03 3.658849e-02  -2.033342
## 1078                  STMN1 5.364338e-06 2.828320e-04   2.344041
## 1079                  STRA6 2.154674e-04 6.009826e-03   3.321162
## 1080                STRA6_1 2.782547e-04 7.390066e-03   3.266690
## 1081                   STRN 1.827147e-04 5.237654e-03  -1.833324
## 1082                   STUM 3.060956e-07 2.396358e-05  -3.342904
## 1083                  STX1A 2.432045e-04 6.652339e-03   2.560746
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## 1084                SULT2B1 1.194528e-05 5.486333e-04  -3.267047
## 1085                  SYCP2 9.168223e-04 1.977963e-02   3.160839
## 1086                SYNDIG1 5.279756e-04 1.240023e-02   3.745334
## 1087                   SYNM 9.144651e-11 1.948471e-08  -3.533343
## 1088                 SYNPO2 2.933802e-18 3.789739e-15  -4.868168
## 1089               SYNPO2L 3.043494e-07 2.391746e-05  -6.231343
## 1090                  SYT1 4.263939e-12 1.223987e-09   4.128886
## 1091                 SYT14 1.165198e-08 1.442054e-06   7.234694
## 1092                 TACR1 4.883651e-05 1.743269e-03  -2.962693
## 1093                 TACR2 6.451959e-05 2.226195e-03  -3.349569
## 1094                  TAGLN 1.604899e-03 3.105810e-02  -2.189254
## 1095                 TBX15 1.153048e-05 5.343315e-04   3.732520
## 1096                  TBX6 3.674554e-07 2.792121e-05  -2.294096
## 1097                 TCF15 2.703510e-03 4.783917e-02   3.481067
## 1098                  TDO2 2.523041e-06 1.468907e-04   5.301138
## 1099                TDO2_1 2.523041e-06 1.468907e-04   5.301138
## 1100                   TEC 2.763829e-03 4.857383e-02  -2.229229
## 1101                TENT5B 1.856360e-03 3.523162e-02  -2.562881
## 1102                TESMIN 4.562923e-04 1.105586e-02   3.156128
## 1103                TFAP2B 4.044693e-04 1.007177e-02  -4.246749
## 1104                 TGFBI 2.100421e-05 8.613392e-04   3.502259
## 1105                TGFBR3 8.928982e-07 5.933897e-05  -2.745227
## 1106                  TGM1 2.202551e-05 8.925948e-04  -3.507608
## 1107                TGM1_1 2.202551e-05 8.925948e-04  -3.507608
## 1108                  TGM3 5.897911e-09 7.915456e-07  -4.972337
## 1109                 TIAM1 1.079937e-04 3.418092e-03  -2.257659
## 1110                TJP1_1 1.359637e-05 6.069327e-04  -2.338450
## 1111                TJP1_2 1.359637e-05 6.069327e-04  -2.338450
## 1112                  TJP3 5.761943e-04 1.335066e-02  -2.373186
## 1113                   TK1 2.452839e-03 4.393005e-02   1.961834
## 1114               TM4SF19 1.320071e-03 2.672207e-02   3.008430
## 1115                TMEFF1 1.027380e-03 2.153538e-02   4.546940
## 1116              TMEM132C 1.988571e-11 5.202505e-09  -5.480825
## 1117               TMEM154 6.763835e-08 6.786163e-06  -2.908528
## 1118               TMEM35A 2.691721e-07 2.150220e-05  -3.736828
## 1119            TMEM44-AS1 1.203836e-03 2.473248e-02   2.755132
## 1120               TMEM79 4.033289e-04 1.005549e-02  -2.554608
## 1121                TMOD3 2.365252e-03 4.276905e-02  -1.752391
## 1122             TMPRSS11B 1.802152e-03 3.423426e-02  -4.210995
## 1123               TNFAIP6 8.886655e-05 2.915387e-03   3.271895
## 1124              TNFRSF18 1.196969e-06 7.659122e-05   3.158992
## 1125                TNXB_7 1.325575e-11 3.558049e-09  -4.581801
## 1126               TOLLIP 2.015824e-03 3.756813e-02  -1.658110
## 1127             TOLLIP_1 1.870016e-03 3.545825e-02  -1.663323
## 1128                  TOM1 2.812058e-04 7.451232e-03  -1.908411
## 1129                TOM1L2 2.438309e-05 9.766468e-04  -2.036659
## 1130                 TOP2A 1.434798e-03 2.867931e-02   2.071932
## 1131                  TPM2 4.901793e-04 1.168515e-02  -2.361833
## 1132                 TPRG1 1.445363e-05 6.328976e-04  -2.529544
## 1133                  TREH 2.875734e-03 4.987014e-02  -2.396361
## 1134                 TREM1 1.695229e-03 3.253202e-02   2.958320
## 1135                 TREM2 8.676284e-07 5.803283e-05   4.014659
## 1136                TRIM29 2.740877e-04 7.307471e-03  -2.157665
## 1137                TRIM46 2.330362e-03 4.228614e-02   2.647856
```

```
## 1138                 TRIP13 3.112460e-04 8.071308e-03   1.997837
## 1139               TRPM2-AS 2.074563e-06 1.246427e-04   6.184315
## 1140                 TTC39A 9.294553e-06 4.426263e-04  -2.237704
## 1141                   TTC9 1.882027e-04 5.365206e-03  -2.565271
## 1142                  TTYH3 2.285098e-04 6.305528e-03   2.388186
## 1143                  TUBB3 7.645872e-08 7.524994e-06   3.769970
## 1144                  UBE2C 1.443628e-08 1.734703e-06   2.222365
## 1145                  UBE2T 9.242600e-06 4.411687e-04   3.110640
## 1146                   UBL3 9.017130e-06 4.344197e-04  -2.126612
## 1147                  UCHL1 1.003493e-11 2.728973e-09   5.371256
## 1148                 UGT1A8 1.225521e-12 4.293061e-10  -7.320981
## 1149                 UNC13B 2.480866e-03 4.431680e-02  -1.685767
## 1150              UNC5B-AS1 2.803935e-05 1.091369e-03   3.976938
## 1151                 UNC93A 1.700693e-04 4.971700e-03  -3.847726
## 1152                  UPK1A 4.435137e-09 6.030619e-07  -5.137915
## 1153                  UPK3B 2.509729e-04 6.807230e-03  -3.618064
## 1154                UPK3B_1 2.135985e-06 1.275911e-04  -3.658145
## 1155                   USP2 9.263793e-04 1.996497e-02  -2.678990
## 1156                USP32P3 2.064825e-03 3.834303e-02   2.513311
## 1157                 USP6NL 1.371863e-06 8.697441e-05  -2.298400
## 1158                  UTS2R 9.514596e-05 3.067781e-03   3.040311
## 1159                   VAX1 7.412510e-05 2.486196e-03   5.398244
## 1160                    VGF 6.023291e-04 1.377095e-02   2.908115
## 1161                    VIT 3.082910e-07 2.404437e-05  -4.231284
## 1162                 VPS37D 1.816291e-05 7.614423e-04   2.890571
## 1163                  VPS4B 1.605215e-04 4.746016e-03  -2.031815
## 1164                VSIG10L 1.561286e-10 3.132880e-08  -4.112878
## 1165                 VSIG2 1.063380e-04 3.370850e-03  -3.334456
## 1166                 VWA5B2 1.326630e-06 8.462587e-05   6.115367
## 1167                  WDR54 1.173555e-05 5.421798e-04   2.446509
## 1168                  WDR72 3.973141e-10 7.266981e-08   4.036126
## 1169                   WNK4 3.207310e-12 9.758363e-10  -5.772009
## 1170                  WNT11 4.607905e-10 8.070864e-08   5.019165
## 1171                   WNT2 2.528722e-03 4.501953e-02   4.186985
## 1172                   XCL1 4.156820e-06 2.266838e-04   3.932025
## 1173                  XIRP1 2.044729e-07 1.704051e-05   7.117296
## 1174                   XIST 9.408175e-16 6.272521e-13 -24.898870
## 1175                 XPNPEP2 2.837938e-04 7.510180e-03  -3.535088
## 1176                 ZBTB16 5.470011e-07 3.911909e-05  -2.903755
## 1177                ZDHHC15 4.850272e-05 1.737356e-03  -2.477272
## 1178                ZDHHC21 1.449244e-03 2.888425e-02  -1.877833
## 1179                   ZIC1 2.511976e-03 4.483377e-02   5.559280
## 1180                   ZIC2 2.272580e-06 1.349704e-04   4.318575
## 1181                   ZIC5 1.713194e-09 2.657141e-07   7.867597
## 1182                 ZNF114 5.551843e-05 1.942742e-03   3.289053
## 1183                 ZNF185 3.989142e-06 2.192755e-04  -3.092249
## 1184               ZNF185_1 1.828335e-08 2.134917e-06  -3.513000
## 1185                 ZNF365 7.262496e-05 2.463529e-03  -3.589701
## 1186                 ZNF431 1.966448e-03 3.684729e-02  -2.045058
## 1187                 ZNF469 4.976252e-06 2.650752e-04   3.830037
## 1188                 ZNF536 3.270465e-04 8.438698e-03  -3.547536
## 1189              ZNF584-DT 4.081939e-04 1.014400e-02   2.528976
## 1190                 ZNF677 1.159294e-04 3.603050e-03  -2.738006
## 1191                 ZNF750 2.602564e-03 4.625090e-02  -2.333524
```

```
## 1192                  ZNF823 2.401370e-03 4.323302e-02  -1.767326
```

```
# Get the entrez ids for the genes in degs df
library(AnnotationDbi)
library(org.Hs.eg.db)
```

```
annot <- select(
  org.Hs.eg.db,
  keys = degs$gene_id,
  columns = "ENTREZID",
  keytype = "SYMBOL"
)

annot
```

```
##                       SYMBOL  ENTREZID
## 1                      A2ML1    144568
## 2                     ABCA13    154664
## 3                      ABCC2      1244
## 4                      ABCG4     64137
## 5                     ABLIM1      3983
## 6                     ABLIM3     22885
## 7                      ACER1    125981
## 8                      ACKR1      2532
## 9                      ACKR3     57007
## 10                    ACOT11     26027
## 11                     ACOX1        51
## 12                     ACOX2      8309
## 13                     ACOX3      8310
## 14                      ACP3        55
## 15                     ACTG2        72
## 16                    ACVR1C    130399
## 17                    ADAM12      8038
## 18                    ADAM23      8745
## 19                  ADAM32_1      <NA>
## 20                    ADAM33     80332
## 21                   ADAMTS12     81792
## 22                   ADAMTS14    140766
## 23                    ADAMTS7     11173
## 24                    ADAMTS8     11095
## 25                ADAMTS9-AS1 101929335
## 26                ADAMTS9-AS2 100507098
## 27                      ADCY5       111
## 28                       ADD2       119
## 29                    ADGRF2P      <NA>
## 30                     ADGRG6     57211
## 31                      ADH1B       125
## 32                       AFDN      4301
## 33                       AFF3      3899
## 34                      AGFG2      3268
## 35                      AGTR1       185
## 36                      AIF1L     83543
## 37                     AKR1B1       231
```

```
## 38                   AKR1C1      1645
## 39                   AKR1C2      1646
## 40                   AKR1C3      8644
## 41                  ALDH9A1       223
## 42                  ALG1L1P    200810
## 43                   ALOX12       239
## 44                 ALOX12P2       245
## 45                   ALOX15       246
## 46                     ALX1      8092
## 47                   AMOTL2     51421
## 48                  ANGPTL1      9068
## 49                  ANKRD19P    138649
## 50                ANKRD20A11P    391267
## 51                 ANKRD20A5P    440482
## 52                 ANKRD20A9P    284232
## 53               ANKRD20A9P_1      <NA>
## 54                  ANKRD22    118932
## 55                 ANKRD34B    340120
## 56                     ANO1     55107
## 57                   ANXA10     11199
## 58                    ANXA9      8416
## 59                     AOC3      8639
## 60                     AOX1       316
## 61                     APLN      8862
## 62                    APOC1       341
## 63                     AQP5       362
## 64                   AQP7P1    375719
## 65                  ARHGAP10     79658
## 66                  ARHGAP27    201176
## 67                ARHGAP27_2      <NA>
## 68                ARHGEF10L     55160
## 69                     ARSF       416
## 70                     ARTN      9048
## 71                     ASB5    140458
## 72                    ASCL2       430
## 73                     ASPA       443
## 74                     ASPG    374569
## 75                   ASPN_1      <NA>
## 76                     ATG9B    285973
## 77                     ATOH8     84913
## 78                   ATP13A4     84239
## 79                    ATP1A2       477
## 80                     AUNIP     79000
## 81                     AURKA      6790
## 82                     AURKB      9212
## 83                    B3GNT8    374907
## 84                  B4GALNT1      2583
## 85                  B4GALNT4    338707
## 86                     BAMBI     25805
## 87                     BARX1     56033
## 88                     BARX2      8538
## 89                 BBOX1-AS1 103695435
## 90                      BCAN     63827
## 91                     BCAS1      8537
```

```
## 92                    BICD1       636
## 93                    BIRC5       332
## 94                     BLNK     29760
## 95                    BMP8A    353500
## 96                   BMPR1B       658
## 97                  BMS1P14 101929959
## 98                  BMS1P23    728034
## 99                    BNIPL    149428
## 100                     BOC     91653
## 101                  BPIFB2     80341
## 102                 C15orf40    123207
## 103                 C15orf62    643338
## 104                 C16orf74    404550
## 105                 C1orf116     79098
## 106                  C1QTNF6    114904
## 107                  C3orf70    285382
## 108                 C6orf132    647024
## 109                  C6orf15     29113
## 110                C6orf15_2      <NA>
## 111                C6orf15_3      <NA>
## 112                C6orf15_4      <NA>
## 113                C6orf15_5      <NA>
## 114                       C7       730
## 115                  C7orf57    136288
## 116                     CA13    377677
## 117                      CA9       768
## 118                   CAB39L     81617
## 119                    CABYR     26256
## 120                  CACNA1B       774
## 121                   CACNB2       783
## 122                   CACNG4     27092
## 123                    CADM3     57863
## 124                    CALB1       793
## 125                   CAMK2N2     94032
## 126                    CAPN14    440854
## 127                     CASC9 101805492
## 128                    CASQ2       845
## 129                      CBS       875
## 130                 CCDC162P    221262
## 131                  CCDC187    399693
## 132                    CCL14      6358
## 133                  CCL14_1      <NA>
## 134                    CCL20      6364
## 135                     CCN4      8840
## 136                     CCN5      8839
## 137                    CCNA1      8900
## 138                     CCNP     79935
## 139                     CD1E       913
## 140                    CD207     50489
## 141                    CD276     80381
## 142                  CD300LG    146894
## 143                     CD83      9308
## 144                    CDC45      8318
## 145                     CDC6       990
```

```
## 146                  CDCA3     83461
## 147                  CDCA5    113130
## 148                  CDH11      1009
## 149                  CDH19     28513
## 150                  CDKN3      1033
## 151                 CDSN_3      <NA>
## 152                 CDSN_4      <NA>
## 153                   CDX2      1045
## 154                CEACAM1       634
## 155                CEACAM7      1087
## 156                  CECR2     27443
## 157                  CENPA      1058
## 158                  CENPF      1063
## 159                  CENPH     64946
## 160                  CENPM     79019
## 161                  CENPV    201161
## 162                  CEP55     55165
## 163                   CES2      8824
## 164                CFAP251    144406
## 165                 CFAP47    286464
## 166                 CFAP53    220136
## 167                    CFD      1675
## 168                  CFD_1      <NA>
## 169                  CGNL1     84952
## 170                   CHGB      1114
## 171                  CHODL    140578
## 172                   CHP2     63928
## 173                 CHRDL1     91851
## 174                 CHRNA1      1134
## 175                  CHST2      9435
## 176                   CILP      8483
## 177                  CILP2    148113
## 178                 CIMAP2    163747
## 179                  CIP2A     57650
## 180                 CITED2     10370
## 181                  CKS1B      1163
## 182                   CKS2      1164
## 183                  CLCA4     22802
## 184                 CLDN17     26285
## 185           CLEC12A-AS1    400002
## 186                CLEC3B      7123
## 187                 CLIC3      9022
## 188                 CLSPN     63967
## 189                  CNFN     84518
## 190                 CNGB1      1258
## 191                 CNIH2    254263
## 192                  CNN1      1264
## 193                 CNTN5     53942
## 194               CNTNAP2     26047
## 195             CNTNAP2_1      <NA>
## 196                  COCH      1690
## 197               COL10A1      1300
## 198               COL11A1      1301
## 199               COL24A1    255631
```

```
## 200                 COL27A1     85301
## 201                  COL2A1      1280
## 202                  COL7A1      1294
## 203                   CPEB3     22849
## 204                   CPLX2     10814
## 205                   CPNE6      9362
## 206                 CPNE6_1      <NA>
## 207                   CPXM1     56265
## 208                  CRABP1      1381
## 209                   CRCT1     54544
## 210                  CRISP2      7180
## 211                  CRISP3     10321
## 212                    CRMA    253868
## 213                    CRNN     49860
## 214                  CRTAC1     55118
## 215                  CRYBG1       202
## 216                  CRYBG2     55057
## 217                CSAG2_1      <NA>
## 218                  CSAG3    389903
## 219                CSAG3_1      <NA>
## 220                   CSF2      1437
## 221                  CSRP1      1465
## 222                   CST1      1469
## 223                   CST2      1470
## 224                   CSTB      1476
## 225                  CT45A5    441521
## 226                  CTHRC1    115908
## 227                  CTNNA3     29119
## 228                    CTSC      1075
## 229                 CTTN-DT 121233926
## 230               CTTN-DT_1      <NA>
## 231                 CTTNBP2     83992
## 232                   CXCL1      2919
## 233                  CXCL11      6373
## 234                  CXCL12      6387
## 235                  CXCL14      9547
## 236                   CXCL5      6374
## 237                   CXCL6      6372
## 238                   CXCR2      3579
## 239                 CYP11A1      1583
## 240               CYP11A1_1      <NA>
## 241                  CYP1A1      1543
## 242                 CYP26A1      1592
## 243                 CYP2C18      1562
## 244                  CYP2J2      1573
## 245                  CYP4B1      1580
## 246                 CYP4F12     66002
## 247                 CYP4F22    126410
## 248                CYP4F29P     54055
## 249                CYP4F35P    284233
## 250                  CYSRT1    375791
## 251                   DAAM2     23500
## 252                   DAPP1     27071
## 253                DEFB4B_2      <NA>
```

```
## 254                  DEGS2    123099
## 255                DENND2C    163259
## 256                    DES      1674
## 257                 DHCR24      1718
## 258              DHCR7-DT 129810502
## 259                 DHRS2     10202
## 260              DIP2C-AS1    414235
## 261                   DKK1     22943
## 262             DLGAP1-AS1    649446
## 263                 DLGAP5      9787
## 264                   DLL3     10683
## 265                   DLX1      1745
## 266                 DLX1_1      <NA>
## 267                   DLX2      1746
## 268                   DLX6      1750
## 269              DLX6-AS1    285987
## 270                   DMP1      1758
## 271                 DMRT1      1761
## 272                DNAH14    127602
## 273                DNAH17      8632
## 274                 DNAH5      1767
## 275                DNMT3B      1789
## 276                 DOCK9     23348
## 277                 DOP1B      9980
## 278                  DPF1      8193
## 279                DPYSL5     56896
## 280                DRAXIN    374946
## 281                  DSG3      1830
## 282                   DTL     51514
## 283                 DUOX1     53905
## 284                 DUSP9      1852
## 285               DUXAP10    503639
## 286                DUXAP8    503637
## 287                DUXAP9    503638
## 288                 DYNAP    284254
## 289                  E2F1      1869
## 290                  E2F7    144455
## 291                  ECM1      1893
## 292                 ECRG4     84417
## 293                  ECT2      1894
## 294                   EGF      1950
## 295                  EHD3     30845
## 296                   EHF     26298
## 297                EIF5A2     56648
## 298                ELOVL4      6785
## 299                 EMID1    129080
## 300                  EMP1      2012
## 301              EMSY-DT 124902718
## 302                   EN1      2019
## 303                   EN2      2020
## 304                 ENDOU      8909
## 305               ENTREP1      9413
## 306              EPB41L4A     64097
## 307                 EPCAM      4072
```

```
## 308                   EPGN    255324
## 309                  EPHA1      2041
## 310                EPHA1_1      <NA>
## 311                  EPHB2      2048
## 312                  EPHX2      2053
## 313                  EPHX3     79852
## 314                 EPS8L1     54869
## 315                 EPS8L2     64787
## 316                   EREG      2069
## 317                   ERFE    151176
## 318                   ESM1     11082
## 319                ESPL1_1      <NA>
## 320                  ETFDH      2110
## 321                  EVA1A     84141
## 322                   EVPL      2125
## 323                    F10      2159
## 324                  FABP4      2167
## 325                   FADD      8772
## 326                  FADS1      3992
## 327                  FADS2      9415
## 328                  FADS3      3995
## 329                  FALEC 100874054
## 330                FAM107A     11170
## 331                FAM135A     57579
## 332                 FAM25A    643161
## 333                  FAM3B     54097
## 334                  FAM3D    131177
## 335                 FAR2P1    440905
## 336                   FBN2      2201
## 337                 FCER1A      2205
## 338               FCER1A_1      <NA>
## 339                  FCHO2    115548
## 340                  FEZF1    389549
## 341              FEZF1-AS1    154860
## 342                  FGF12      2257
## 343                  FGF19      9965
## 344                   FGF5      2250
## 345                  FHAD1    114827
## 346                   FHL1      2273
## 347                 FIBCD1     84929
## 348                  FIRRE    286467
## 349                    FLG      2312
## 350                   FLNC      2318
## 351                FLOT1_1      <NA>
## 352                  FNDC4     64838
## 353               FOXD2-AS1     84793
## 354               FOXD3-AS1 100996301
## 355                  FOXI2    399823
## 356                  FOXI3    344167
## 357                  FOXL1      2300
## 358                  FOXL2       668
## 359                  FOXM1      2305
## 360                FOXO6_1      <NA>
## 361                  FREM2    341640
```

```
## 362                  FRMD4B     23150
## 363                  FUT3_1      <NA>
## 364                    FUT6      2528
## 365                   FXYD1      5348
## 366                    GAB1      2549
## 367                  GABRA4      2557
## 368                   GABRP      2568
## 369                     GAL     51083
## 370                  GALNT17     64409
## 371                    GAP43      2596
## 372                    GAST      2520
## 373                   GATA4      2626
## 374                    GBP6    163351
## 375                    GBX2      2637
## 376                    GCKR      2646
## 377                   GCNT4     51301
## 378                   GCOM1    145781
## 379                     GDA      9615
## 380                   GDF15      9518
## 381                    GDF7    151449
## 382                   GDPD2     54857
## 383                   GDPD3     79153
## 384                   GFOD2     81577
## 385                   GFRA1      2674
## 386                    GGT6    124975
## 387                   GINS1      9837
## 388                   GINS2     51659
## 389                    GJB7    375519
## 390                    GLI1      2735
## 391                    GLI2      2736
## 392                    GLTP     51228
## 393                    GNG7      2788
## 394                    GPC2    221914
## 395                   GPD1L     23171
## 396                 GPIHBP1    338328
## 397                  GPR149    344758
## 398                  GPR158     57512
## 399                   GPR19      2842
## 400                   GPR50      9248
## 401                     GPT      2875
## 402                    GPT2     84706
## 403                    GPX3      2878
## 404                   GREM2     64388
## 405                   GRHL1     29841
## 406                   GRHL3     57822
## 407                  GRIN2D      2906
## 408                    GRM4      2914
## 409                     GRP      2922
## 410                     GSC    145258
## 411                  GTF2H2      2966
## 412              GTF3C2-AS2 105374363
## 413                 GUCY1B2      2974
## 414                    GYS2      2998
## 415                  H2AC19    723790
```

```
## 416                   H2BC9      8345
## 417                    H3C8      8355
## 418                   HAGHL     84264
## 419                   HAGLR    401022
## 420                 HAGLROS 102800310
## 421                    HAP1      9001
## 422                  HCG22_1      <NA>
## 423                  HCG22_2      <NA>
## 424                  HCG22_3      <NA>
## 425                  HCG22_6      <NA>
## 426                  HCG22_7      <NA>
## 427                    HES6     55502
## 428                    HEY1     23462
## 429                    HHIP     64399
## 430                  HHIPL2     79802
## 431                   HJURP     55355
## 432               HLA-DOA_5      <NA>
## 433               HLA-DQB2_3      <NA>
## 434               HLA-DQB2_5      <NA>
## 435                   HMCN2    256158
## 436                   HMGA2      8091
## 437                   HMGB3      3149
## 438                  HMGCS2      3158
## 439                    HMMR      3161
## 440                    HMX1      3166
## 441                  HMX1_1      <NA>
## 442                  HOMER3      9454
## 443                  HOTAIR 100124700
## 444                  HOXA10      3206
## 445               HOXA10-AS 100874323
## 446                  HOXA11      3207
## 447                  HOXA13      3209
## 448                   HOXA9      3205
## 449                   HOXB6      3216
## 450                   HOXB7      3217
## 451                   HOXB8      3218
## 452                   HOXB9      3219
## 453                  HOXC10      3226
## 454                  HOXC11      3227
## 455                  HOXC13      3229
## 456               HOXC13-AS 100874366
## 457                   HOXC9      3225
## 458                  HOXD10      3236
## 459                  HOXD11      3237
## 460                  HOXD13      3239
## 461                   HOXD8      3234
## 462                    HPGD      3248
## 463                   HPSE2     60495
## 464                  HS3ST5    222537
## 465                   HSPA6      3310
## 466                   HSPB6    126393
## 467                   HSPB7     27129
## 468                   HTR2C      3358
## 469                   HTR3B      9177
```

```
## 470                   IBSP      3381
## 471                   IFI6      2537
## 472                  IFIT1      3434
## 473                IGF2BP1     10642
## 474                IGF2BP2     10644
## 475                 IGFBP3      3486
## 476                  IGFL1    374918
## 477                   IL11      3589
## 478                   IL12A     3592
## 479              IL12A-AS1 101928376
## 480                IL13RA2      3598
## 481                   IL18      3606
## 482                  IL1RN      3557
## 483                   IL24     11009
## 484                 IL31RA    133396
## 485                   IL34    146433
## 486                  IL36A     27179
## 487                  IL36B     27177
## 488                  IL36G     56300
## 489                  INHBA      3624
## 490                  IP6K3    117283
## 491                   IRS4      8471
## 492                  ISG15      9636
## 493                    IVL      3713
## 494                JAKMIP3    282973
## 495                   JPH2     57158
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## 497                  KANK1     23189
## 498                  KAT2B      8850
## 499                   KAZN     23254
## 500                  KCNA5      3741
## 501                  KCNB1      3745
## 502                  KCNC3      3748
## 503                  KCNG3    170850
## 504                  KCNK3      3777
## 505                 KCNMA1      3778
## 506                 KCNMB1      3779
## 507              KCNMB2-AS1 104797538
## 508                 KCNMB3     27094
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## 510                KIAA1549     57670
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## 512                   KIF1A       547
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## 514                   KIF4A     24137
## 515                    KILH 101927136
## 516                 KLHDC7B    113730
## 517              KLHDC7B-DT 105373098
## 518                 KLHDC8A     55220
## 519                   KLK11     11012
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## 521                   KLK13     26085
## 522                    KPRP    448834
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## 527                    KRT32      3882
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## 529                   KRT42P    284116
## 530                    KRT75      9119
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## 532                     KRT8      3856
## 533              KRTAP4-1_1       <NA>
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## 535                    LAMB4     22798
## 536                    LAMC2      3918
## 537                    LAMP3     27074
## 538                     LAYN    143903
## 539                    LCAL1     80078
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## 541                    LCN10    414332
## 542                     LDB3     11155
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## 723                    LRP12     29967
## 724                   LRRC15    131578
## 725                    LYPD1    116372
## 726                    LYPD2    137797
## 727                    LYPD3     27076
## 728                    LYVE1     10894
## 729                  MAB21L2     10586
## 730                  MAB21L4     79919
## 731                    MACC1    346389
## 732                     MAFA    389692
## 733                   MAGEA1      4100
## 734                  MAGEA11      4110
## 735                   MAGEA3      4102
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## 743                   MAPT      4137
## 744                 MAPT_1      <NA>
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## 747                   MC1R      4157
## 748                MCCC2_1      <NA>
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## 750                   MCM2      4171
## 751                 MCOLN3     55283
## 752                    MDK      4192
## 753              MECOM-AS1 105374205
## 754                 MEGF10     84466
## 755                  MELTF      4241
## 756              MELTF-AS1 100507057
## 757                   MEST      4232
## 758                METTL21A    151194
## 759                   MFAP2      4237
## 760                 MFAP2_1      <NA>
## 761                   MGLL     11343
## 762                 MINDY1     55793
## 763                MIR9-3HG    254559
## 764                   MISP    126353
## 765                 MLLT11     10962
## 766                    MME      4311
## 767                   MMP1      4312
## 768                  MMP10      4319
## 769                  MMP11      4320
## 770                MMP11_1      <NA>
## 771                  MMP12      4321
## 772                  MMP13      4322
## 773                   MMP3      4314
## 774                   MND1     84057
## 775                  MPZL3    196264
## 776                 MS4A4E    643680
## 777                MSANTD3     91283
## 778                    MSC      9242
## 779                   MSI1      4440
## 780                   MSX2      4488
## 781                  MUC21    394263
## 782                MUC21_1      <NA>
## 783                MUC21_2      <NA>
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## 785                  MUC22 100507679
## 786                MUC22_1      <NA>
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## 792                MUCL3_1      <NA>
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## 795                   MYBL2      4605
## 796                   MYH11      4629
## 797                 MYH11_1      <NA>
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## 799                    MYOC      4653
## 800                   MYOCD     93649
## 801                   MYOZ1     58529
## 802                   MYRIP     25924
## 803                   MYZAP 100820829
## 804                   N4BP3     23138
## 805                   NAT14     57106
## 806                   NAT8L    339983
## 807                  NCCRP1    342897
## 808                NCK1-DT 101927597
## 809                   NDC80     10403
## 810                   NDRG2     57447
## 811                     NEB      4703
## 812                  NECAB2     54550
## 813                   NEK10    152110
## 814                    NEK2      4751
## 815                   NELL2      4753
## 816                  NEURL3     93082
## 817                    NEXN     91624
## 818                     NGB     58157
## 819                  NIBAN2     64855
## 820                  NICOL1    401115
## 821                  NIPAL1    152519
## 822                  NKAIN2    154215
## 823                  NKX2-1      7080
## 824                   NLRX1     79671
## 825                     NMB      4828
## 826                   NMB_1      <NA>
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## 828                    NOS2      4843
## 829                   NOTUM    147111
## 830                   NPAS2      4862
## 831                  NPBWR1      2831
## 832                   NPY1R      4886
## 833                   NROB1       190
## 834                   NRCAM      4897
## 835                    NREP      9315
## 836                   NRIP3     56675
## 837                   NT5C2     22978
## 838                   NTRK3      4916
## 839                     NTS      4922
## 840                    NUF2     83540
## 841                   NXPH4     11247
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## 844                   OGDHL     55753
## 845                     OGN      4969
## 846                   OGN_1      <NA>
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## 849                    ORC6     23594
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## 851                    OTX1      5013
## 852                   P2RX1      5023
## 853                   P2RX2     22953
## 854                  P2RY14      9934
## 855                    P3H4     10609
## 856                   P4HA3    283208
## 857                  PABIR3    159091
## 858                   PADI1     29943
## 859                 PADI1_1      <NA>
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## 861                    PAX3      5077
## 862                    PAX6      5080
## 863                    PAX7      5081
## 864                    PAX9      5083
## 865                     PBK     55872
## 866                  PBX2_2      <NA>
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## 868                   PCDH1      5097
## 869                 PCDHB9_1      <NA>
## 870                   PCLAF      9768
## 871                    PCP4      5121
## 872                  PCP4_1      <NA>
## 873                  PCSK1N     27344
## 874                   PCSK2      5126
## 875                  PDE11A     50940
## 876                   PDGFA      5154
## 877                    PDK4      5166
## 878                  PDLIM2     64236
## 879                  PDZRN3     23024
## 880                  PDZRN4     29951
## 881                    PFN2      5217
## 882                  PGM2L1    283209
## 883                    PGM5      5239
## 884                 PGM5-AS1    572558
## 885                  PGM5P4    729468
## 886                 PHACTR2      9749
## 887                 PHACTR4     65979
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## 889                  PHYHIP      9796
## 890                    PI16    221476
## 891                  PIMREG     54478
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## 897                 PLA2G2C    391013
## 898                 PLA2G4B 100137049
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## 901                  PLCXD3    345557
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## 903                PLEKHA7    144100
## 904               PLEKHG4B    153478
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## 907                  PLIN4    729359
## 908                    PLN      5350
## 909                   PLP1      5354
## 910                  PLPP4    196051
## 911                   PMM1      5372
## 912                   POMC      5443
## 913                 POPDC3     64208
## 914                  POSTN     10631
## 915                POTEF_1      <NA>
## 916             POU6F2-AS2 100689074
## 917                    PPL      5493
## 918               PPP1R12B      4660
## 919                PPP1R1A      5502
## 920                PPP1R1C    151242
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## 922                PRAME_1      <NA>
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## 924               PRELID3A     10650
## 925                  PRELP      5549
## 926                   PROC      5624
## 927                  PRR15    222171
## 928               PRR15-DT 107986700
## 929                 PRR20G 100419008
## 930                   PRR4     11272
## 931                 PRR4_1      <NA>
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## 933                  PRR5L     79899
## 934                 PRSS21     10942
## 935                 PRSS27     83886
## 936                  PRSS3      5646
## 937                 PRUNE2    158471
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## 939                  PTGIS      5740
## 940                  PTGS2      5743
## 941                  PTH2R      5746
## 942                  PTHLH      5744
## 943                   PTK6      5753
## 944                  PTPRN      5798
## 945                 PWWP3B    139221
## 946                   PXDN      7837
## 947                   PYGM      5837
## 948                   PYY2     23615
## 949                  RAB15    376267
## 950                  RAB25     57111
## 951                  RAB32     10981
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## 953                 RAB40A    142684
## 954                  RAB9B     51209
## 955                RABGGTA      5875
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## 956                RABGGTA_1      <NA>
## 957                 RAD51AP1     10635
## 958                   RAET1E    135250
## 959                     RAG1      5896
## 960                   RANBP9     10048
## 961                     RARG      5916
## 962                  RASL11B     65997
## 963                   RBFOX3    146713
## 964                    RBM47     54502
## 965                     RBP1      5947
## 966                     RBP4      5950
## 967                   RBPMS2    348093
## 968                    RDH12    145226
## 969                    RELCH     57614
## 970                     RFC4      5984
## 971                     RHCG     51458
## 972                   RHEBL1    121268
## 973                    RIMS2      9699
## 974                   RMND5B     64777
## 975                 RNASEH2A     10535
## 976                   RNF222    643904
## 977                   RNF224    643596
## 978                   RNF225    646862
## 979                    RNFT2     84900
## 980                     ROR1      4919
## 981                     ROS1      6098
## 982                   RPL39L    116832
## 983                     RRAD      6236
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## 995                    SCIRT 101929705
## 996                    SCN5A      6331
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## 998                    SCN8A      6334
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## 1002                     SCX    642658
## 1003                SEC14L4    284904
## 1004               SERPINB1      1992
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## 1014                  SHH      6469
## 1015               SHISA2    387914
## 1016                SHOX2      6474
## 1017                 SIM2      6493
## 1018                 SIX1      6495
## 1019                 SIX2     10736
## 1020                 SIX3      6496
## 1021                 SIX4     51804
## 1022               SLC13A4     26266
## 1023              SLC16A10    117247
## 1024               SLC16A6      9120
## 1025               SLC24A2     25769
## 1026               SLC27A4     10999
## 1027               SLC27A6     28965
## 1028               SLC29A4    222962
## 1029                SLC2A4      6517
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## 1032               SLC34A3    142680
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## 1034               SLC46A2     57864
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## 1036               SLC52A1     55065
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## 1039                SLC6A2      6530
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## 1047                SMAGP     57228
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## 1051                 SNCB      6620
## 1052               SNHG33 100505687
## 1053              SNORD3A    780851
## 1054                SNX10     29887
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## 1056               SORCS1    114815
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## 1059                SOX10      6663
## 1060                SOX11      6664
## 1061                 SOX4      6659
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## 1066                  SPNS2    124976
## 1067                 SPOCD1     90853
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## 1069                 SPRR2G      6706
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## 1073                    SRL      6345
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## 1075                ST8SIA2      8128
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## 1077                  STK40     83931
## 1078                  STMN1      3925
## 1079                  STRA6     64220
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## 1082                   STUM    375057
## 1083                  STX1A      6804
## 1084                SULT2B1      6820
## 1085                  SYCP2     10388
## 1086                SYNDIG1     79953
## 1087                   SYNM     23336
## 1088                 SYNPO2    171024
## 1089                SYNPO2L     79933
## 1090                   SYT1      6857
## 1091                  SYT14    255928
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## 1093                  TACR2      6865
## 1094                  TAGLN      6876
## 1095                  TBX15      6913
## 1096                   TBX6      6911
## 1097                  TCF15      6939
## 1098                   TDO2      6999
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## 1103                 TESMIN      9633
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## 1105                  TGFBI      7045
## 1106                 TGFBR3      7049
## 1107                   TGM1      7051
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## 1112                 TJP1_2      <NA>
## 1113                   TJP3     27134
## 1114                    TK1      7083
## 1115                 TM4SF19    116211
## 1116                  TMEFF1      8577
## 1117                TMEM132C     92293
```

```
## 1118                TMEM154    201799
## 1119                TMEM35A     59353
## 1120            TMEM44-AS1 100507297
## 1121                TMEM79     84283
## 1122                 TMOD3     29766
## 1123             TMPRSS11B    132724
## 1124               TNFAIP6      7130
## 1125              TNFRSF18      8784
## 1126                 TNXB_7      <NA>
## 1127                TOLLIP     54472
## 1128              TOLLIP_1      <NA>
## 1129                  TOM1     10043
## 1130                TOM1L2    146691
## 1131                 TOP2A      7153
## 1132                  TPM2      7169
## 1133                 TPRG1    285386
## 1134                  TREH     11181
## 1135                 TREM1     54210
## 1136                 TREM2     54209
## 1137                TRIM29     23650
## 1138                TRIM46     80128
## 1139                TRIP13      9319
## 1140             TRPM2-AS 101928607
## 1141                TTC39A     22996
## 1142                  TTC9     23508
## 1143                 TTYH3     80727
## 1144                 TUBB3     10381
## 1145                 UBE2C     11065
## 1146                 UBE2T     29089
## 1147                  UBL3      5412
## 1148                 UCHL1      7345
## 1149                UGT1A8     54576
## 1150                UNC13B     10497
## 1151             UNC5B-AS1    728978
## 1152                UNC93A     54346
## 1153                 UPK1A     11045
## 1154                 UPK3B 105375355
## 1155               UPK3B_1      <NA>
## 1156                  USP2      9099
## 1157               USP32P3    347716
## 1158                USP6NL      9712
## 1159                 UTS2R      2837
## 1160                  VAX1     11023
## 1161                   VGF      7425
## 1162                   VIT      5212
## 1163                VPS37D    155382
## 1164                 VPS4B      9525
## 1165               VSIG10L    147645
## 1166                 VSIG2     23584
## 1167                VWA5B2     90113
## 1168                 WDR54     84058
## 1169                 WDR72    256764
## 1170                  WNK4     65266
## 1171                 WNT11      7481
```

```
## 1172                    WNT2      7472
## 1173                    XCL1      6375
## 1174                   XIRP1    165904
## 1175                    XIST      7503
## 1176                  XPNPEP2      7512
## 1177                   ZBTB16      7704
## 1178                  ZDHHC15    158866
## 1179                  ZDHHC21    340481
## 1180                     ZIC1      7545
## 1181                     ZIC2      7546
## 1182                     ZIC5     85416
## 1183                   ZNF114    163071
## 1184                   ZNF185      7739
## 1185                 ZNF185_1      <NA>
## 1186                   ZNF365     22891
## 1187                   ZNF431    170959
## 1188                   ZNF469     84627
## 1189                   ZNF536      9745
## 1190                ZNF584-DT 123706526
## 1191                   ZNF677    342926
## 1192                   ZNF750     79755
## 1193                   ZNF823     55552
```

```
# Check whether there are more than one entrez id mapped to a gene
annot$n <- sapply(strsplit(as.character(annot$ENTREZID), ","), length)
idx <- which(annot$n > 2)
annot[idx, ] # Output: 0 rows
```

```
## [1] SYMBOL   ENTREZID n
## <0 rows> (or 0-length row.names)
```

```
# Merge annot$ENTREZID with degs

degs <- degs %>%
  left_join(
    annot %>% dplyr::select(SYMBOL, ENTREZID),
    by = c("gene_id" = "SYMBOL")
  )

degs
```

```
##                       gene_id      P.Value    adj.P.Val      logFC  ENTREZID
## 1                       A2ML1 2.573314e-08 2.890503e-06  -4.293321    144568
## 2                      ABCA13 5.316538e-04 1.247244e-02   3.345934    154664
## 3                       ABCC2 3.676964e-05 1.384253e-03   4.392891      1244
## 4                       ABCG4 5.561698e-04 1.297395e-02  -2.724376     64137
## 5                      ABLIM1 2.930047e-05 1.129817e-03  -2.430274      3983
## 6                      ABLIM3 7.328133e-05 2.470764e-03  -3.245304     22885
## 7                       ACER1 1.425965e-08 1.723499e-06  -5.248480    125981
## 8                       ACKR1 4.453428e-05 1.614797e-03  -2.736071      2532
## 9                       ACKR3 2.758081e-03 4.851406e-02   2.305740     57007
## 10                     ACOT11 2.096467e-03 3.882596e-02  -2.159534     26027
## 11                      ACOX1 1.412286e-04 4.256241e-03  -1.731111        51
```

```
## 12                  ACOX2 1.617922e-05 6.908930e-04  -2.729130      8309
## 13                  ACOX3 6.520376e-06 3.352317e-04  -2.288334      8310
## 14                   ACP3 2.678986e-04 7.184753e-03  -2.778791        55
## 15                  ACTG2 4.499720e-14 2.268298e-11  -4.835173        72
## 16                 ACVR1C 1.389269e-05 6.180592e-04   3.812397    130399
## 17                 ADAM12 5.332085e-05 1.887047e-03   3.635348      8038
## 18                 ADAM23 6.673881e-08 6.728575e-06   3.126805      8745
## 19               ADAM32_1 2.425635e-03 4.359393e-02   3.392516      <NA>
## 20                 ADAM33 1.302545e-04 4.000149e-03  -2.710397     80332
## 21                ADAMTS12 1.536425e-07 1.362868e-05   4.218968     81792
## 22                ADAMTS14 1.863847e-04 5.328075e-03   2.976114    140766
## 23                 ADAMTS7 4.132060e-04 1.021548e-02   2.388743     11173
## 24                 ADAMTS8 3.909642e-07 2.938344e-05  -4.018085     11095
## 25             ADAMTS9-AS1 1.300500e-14 7.679641e-12  -6.334097 101929335
## 26             ADAMTS9-AS2 5.473167e-04 1.279631e-02  -3.608809 100507098
## 27                  ADCY5 6.178884e-07 4.271076e-05  -2.934183       111
## 28                   ADD2 3.880832e-05 1.455699e-03   3.187843       119
## 29                ADGRF2P 1.471048e-03 2.920616e-02  -2.664184      <NA>
## 30                 ADGRG6 2.802716e-03 4.909029e-02  -1.836851     57211
## 31                  ADH1B 5.770564e-13 2.208630e-10  -5.267329       125
## 32                   AFDN 2.331455e-04 6.412398e-03  -2.066169      4301
## 33                   AFF3 1.069216e-09 1.753853e-07  -3.039541      3899
## 34                  AGFG2 2.544316e-08 2.873548e-06  -2.589640      3268
## 35                  AGTR1 2.876195e-03 4.987014e-02  -2.970563       185
## 36                  AIF1L 5.478900e-05 1.922545e-03  -2.870940     83543
## 37                 AKR1B1 1.570847e-03 3.059801e-02   2.135055       231
## 38                 AKR1C1 4.519830e-04 1.100304e-02   3.726399      1645
## 39                 AKR1C2 5.637977e-05 1.965020e-03   3.385866      1646
## 40                 AKR1C3 6.955118e-04 1.559093e-02   3.769443      8644
## 41                ALDH9A1 4.083514e-04 1.014400e-02  -1.673958       223
## 42                ALG1L1P 4.285828e-10 7.770131e-08   6.114394    200810
## 43                 ALOX12 1.158416e-08 1.442054e-06  -4.441886       239
## 44               ALOX12P2 1.217839e-08 1.498232e-06   3.406411       245
## 45                 ALOX15 1.142238e-09 1.830061e-07   6.651260       246
## 46                   ALX1 6.187678e-06 3.205186e-04   5.859546      8092
## 47                 AMOTL2 5.682106e-04 1.319526e-02  -2.116939     51421
## 48                ANGPTL1 3.320303e-10 6.182345e-08  -3.884158      9068
## 49              ANKRD19P 6.541929e-04 1.474467e-02   2.808824    138649
## 50           ANKRD20A11P 3.557681e-04 9.044299e-03  -4.221272    391267
## 51            ANKRD20A5P 1.247145e-04 3.852913e-03  -3.993332    440482
## 52            ANKRD20A9P 1.403292e-04 4.246449e-03  -4.154720    284232
## 53          ANKRD20A9P_1 1.403292e-04 4.246449e-03  -4.154720      <NA>
## 54             ANKRD22 1.012590e-03 2.131182e-02  -2.053582    118932
## 55            ANKRD34B 1.632805e-04 4.807238e-03   5.244232    340120
## 56                ANO1 4.714316e-04 1.135612e-02   3.208133     55107
## 57              ANXA10 1.577296e-03 3.066750e-02   5.729620     11199
## 58               ANXA9 2.183325e-04 6.073346e-03  -3.105041      8416
## 59                AOC3 1.518325e-03 2.994346e-02  -2.395572      8639
## 60                AOX1 3.493113e-11 8.493607e-09  -4.180983       316
## 61                APLN 1.894643e-03 3.582660e-02   2.670513      8862
## 62               APOC1 1.128272e-05 5.244467e-04   3.831572       341
## 63                AQP5 1.182394e-03 2.438021e-02  -3.573483       362
## 64              AQP7P1 4.849868e-05 1.737356e-03  -4.143373    375719
## 65            ARHGAP10 1.182649e-10 2.468988e-08  -2.823413     79658
```

```
## 66                ARHGAP27 3.900443e-04 9.771438e-03 -2.180975    201176
## 67              ARHGAP27_2 1.780591e-03 3.388698e-02 -2.201105      <NA>
## 68             ARHGEF10L 1.459662e-06 9.197650e-05 -2.623614     55160
## 69                  ARSF 4.766978e-05 1.713459e-03 -3.784077       416
## 70                  ARTN 3.176918e-07 2.468441e-05  4.082105      9048
## 71                  ASB5 7.125052e-11 1.533964e-08 -6.676772    140458
## 72                 ASCL2 3.084618e-04 8.009157e-03  2.140080       430
## 73                  ASPA 7.047749e-05 2.403678e-03 -3.541027       443
## 74                  ASPG 9.079565e-04 1.963244e-02 -2.698803    374569
## 75                ASPN_1 1.383102e-03 2.780591e-02  3.056957      <NA>
## 76                 ATG9B 1.247374e-03 2.534979e-02 -3.059404    285973
## 77                 ATOH8 2.180972e-03 4.013921e-02 -2.179397     84913
## 78               ATP13A4 2.842360e-03 4.944941e-02 -2.644112     84239
## 79                ATP1A2 1.253333e-27 8.634627e-24 -5.722853       477
## 80                 AUNIP 7.373391e-04 1.633368e-02  2.291721     79000
## 81                 AURKA 1.131695e-04 3.533435e-03  2.334947      6790
## 82                 AURKB 5.455517e-04 1.276949e-02  2.031322      9212
## 83                B3GNT8 1.930046e-03 3.639615e-02 -2.470325    374907
## 84              B4GALNT1 1.430662e-17 1.642718e-14  4.803579      2583
## 85              B4GALNT4 6.173947e-04 1.406577e-02  2.480870    338707
## 86                 BAMBI 2.267190e-04 6.264477e-03  3.335898     25805
## 87                 BARX1 5.179918e-11 1.176468e-08  7.907641     56033
## 88                 BARX2 1.119797e-04 3.506662e-03 -3.334623      8538
## 89             BBOX1-AS1 1.693712e-04 4.958306e-03  3.418432 103695435
## 90                  BCAN 2.670079e-08 2.982983e-06  4.563505     63827
## 91                 BCAS1 3.397841e-04 8.723799e-03 -2.567226      8537
## 92                 BICD1 1.525518e-03 3.005663e-02  1.915596       636
## 93                 BIRC5 9.998321e-04 2.112938e-02  2.027227       332
## 94                  BLNK 1.616126e-03 3.121691e-02 -2.391013     29760
## 95                 BMP8A 2.447328e-03 4.386936e-02  2.355312    353500
## 96                BMPR1B 1.092653e-03 2.271926e-02  3.272940       658
## 97               BMS1P14 3.433392e-04 8.788536e-03 -2.667681 101929959
## 98               BMS1P23 1.610046e-04 4.746995e-03 -2.611368    728034
## 99                 BNIPL 2.892537e-04 7.625377e-03 -2.758131    149428
## 100                  BOC 1.705687e-04 4.979256e-03 -2.485833     91653
## 101                BPIFB2 2.727619e-03 4.818327e-02 -7.359250     80341
## 102              C15orf40 2.030561e-10 3.959211e-08  3.969106    123207
## 103              C15orf62 1.435834e-05 6.314003e-04 -3.079208    643338
## 104              C16orf74 7.270915e-05 2.463529e-03  2.810195    404550
## 105              C1orf116 2.337206e-11 6.038172e-09 -3.698696     79098
## 106               C1QTNF6 1.727401e-03 3.305734e-02  2.515549    114904
## 107               C3orf70 2.929883e-04 7.679951e-03 -2.720467    285382
## 108              C6orf132 2.440742e-03 4.378929e-02 -2.112112    647024
## 109               C6orf15 7.098018e-04 1.580771e-02  5.588939     29113
## 110             C6orf15_2 7.098018e-04 1.580771e-02  5.588939      <NA>
## 111             C6orf15_3 7.098018e-04 1.580771e-02  5.588939      <NA>
## 112             C6orf15_4 7.098018e-04 1.580771e-02  5.588939      <NA>
## 113             C6orf15_5 6.402224e-04 1.447101e-02  8.584877      <NA>
## 114                    C7 6.192494e-21 1.599831e-17 -5.700613       730
## 115               C7orf57 2.406772e-03 4.329258e-02 -3.194505    136288
## 116                  CA13 4.409623e-05 1.601724e-03 -2.574776    377677
## 117                   CA9 5.437573e-07 3.902214e-05  7.002867       768
## 118                CAB39L 5.270562e-06 2.793128e-04 -2.557420     81617
## 119                 CABYR 4.702806e-07 3.446723e-05  3.815934     26256
```

```
## 120                 CACNA1B 2.196744e-14 1.227089e-11   7.311116       774
## 121                  CACNB2 1.105349e-08 1.393010e-06  -3.233534       783
## 122                  CACNG4 9.425408e-06 4.478261e-04   4.026712     27092
## 123                   CADM3 1.567751e-06 9.848716e-05  -3.750337     57863
## 124                   CALB1 4.769728e-04 1.144956e-02   4.569876       793
## 125                 CAMK2N2 2.916652e-04 7.669384e-03   2.880172     94032
## 126                  CAPN14 1.572241e-03 3.059801e-02  -3.417891    440854
## 127                   CASC9 6.248353e-11 1.395881e-08   6.739083 101805492
## 128                   CASQ2 4.079049e-09 5.620385e-07  -4.549791       845
## 129                     CBS 2.357933e-05 9.481277e-04   3.373427       875
## 130               CCDC162P 8.330274e-12 2.295601e-09   4.473031    221262
## 131                CCDC187 2.202148e-03 4.034929e-02   4.401733    399693
## 132                  CCL14 2.594485e-09 3.803037e-07  -3.920689      6358
## 133                CCL14_1 2.594485e-09 3.803037e-07  -3.920689      <NA>
## 134                  CCL20 3.797190e-04 9.547485e-03   3.969695      6364
## 135                   CCN4 3.745370e-04 9.463241e-03   3.223451      8840
## 136                   CCN5 7.291776e-07 4.973810e-05  -3.655769      8839
## 137                  CCNA1 9.727653e-07 6.382576e-05   5.177291      8900
## 138                   CCNP 1.802282e-06 1.098807e-04   5.796424     79935
## 139                   CD1E 7.393371e-04 1.634178e-02  -3.201493       913
## 140                  CD207 1.851222e-05 7.729504e-04  -3.468188     50489
## 141                  CD276 1.382656e-04 4.205689e-03   2.302272     80381
## 142                CD300LG 8.900422e-09 1.142571e-06  -5.789410    146894
## 143                   CD83 2.299800e-03 4.184178e-02   1.943130      9308
## 144                  CDC45 4.965947e-06 2.650752e-04   2.018231      8318
## 145                   CDC6 2.503944e-06 1.466048e-04   2.646758       990
## 146                  CDCA3 1.561002e-03 3.052299e-02   2.057956     83461
## 147                  CDCA5 5.011337e-04 1.183706e-02   2.009932    113130
## 148                  CDH11 5.625934e-04 1.309738e-02   2.886782      1009
## 149                  CDH19 1.690302e-04 4.955343e-03  -2.996838     28513
## 150                  CDKN3 7.529065e-06 3.731672e-04   3.185739      1033
## 151                 CDSN_3 9.790002e-04 2.077410e-02   5.565901      <NA>
## 152                 CDSN_4 9.790002e-04 2.077410e-02   5.565901      <NA>
## 153                   CDX2 4.993953e-04 1.180950e-02   6.244599      1045
## 154                CEACAM1 1.336355e-05 6.004299e-04  -3.187936       634
## 155                CEACAM7 1.580903e-04 4.687819e-03  -3.955103      1087
## 156                  CECR2 5.511930e-04 1.287238e-02   2.898726     27443
## 157                  CENPA 1.580780e-05 6.816360e-04   2.440273      1058
## 158                  CENPF 1.048784e-04 3.329688e-03   2.116781      1063
## 159                  CENPH 1.474666e-03 2.924990e-02   1.894062     64946
## 160                  CENPM 1.972823e-03 3.689982e-02   2.001024     79019
## 161                  CENPV 2.746832e-03 4.839857e-02   2.332087    201161
## 162                  CEP55 1.507467e-03 2.978616e-02   1.776009     55165
## 163                   CES2 1.042277e-07 9.791722e-06  -2.966992      8824
## 164                CFAP251 1.145070e-10 2.414930e-08   3.881225    144406
## 165                 CFAP47 1.214480e-05 5.563847e-04   5.487401    286464
## 166                 CFAP53 1.293823e-04 3.979275e-03   3.909695    220136
## 167                    CFD 2.173576e-07 1.782677e-05  -2.904503      1675
## 168                  CFD_1 2.173576e-07 1.782677e-05  -2.904503      <NA>
## 169                 CGNL1 2.220889e-05 8.965105e-04  -3.158161     84952
## 170                   CHGB 1.361649e-03 2.745615e-02   4.803079      1114
## 171                  CHODL 1.109903e-03 2.305474e-02   3.226112    140578
## 172                   CHP2 2.878407e-04 7.597818e-03   3.586071     63928
## 173                 CHRDL1 3.648760e-13 1.479285e-10  -5.102809     91851
```

```
## 174                 CHRNA1 9.113720e-05 2.968883e-03   5.610142      1134
## 175                  CHST2 8.357707e-05 2.754977e-03   2.965152      9435
## 176                   CILP 4.409699e-11 1.012663e-08  -4.203096      8483
## 177                  CILP2 9.968839e-04 2.111024e-02   2.848603    148113
## 178                 CIMAP2 1.793239e-05 7.533062e-04  -3.154746    163747
## 179                  CIP2A 1.139882e-04 3.553406e-03   2.312590     57650
## 180                 CITED2 4.155031e-04 1.024776e-02  -2.096602     10370
## 181                  CKS1B 1.558834e-04 4.649059e-03   2.558733      1163
## 182                   CKS2 2.142588e-04 5.984191e-03   3.131849      1164
## 183                  CLCA4 4.381302e-07 3.257293e-05  -4.382132     22802
## 184                 CLDN17 1.012485e-04 3.224717e-03  -3.949774     26285
## 185           CLEC12A-AS1 1.044762e-13 4.907531e-11   5.095812    400002
## 186                 CLEC3B 8.441435e-04 1.842319e-02  -2.769500      7123
## 187                  CLIC3 2.924655e-04 7.679951e-03  -3.354401      9022
## 188                  CLSPN 3.832839e-06 2.112456e-04   2.324454     63967
## 189                   CNFN 9.185480e-08 8.748640e-06  -4.096514     84518
## 190                  CNGB1 1.065830e-03 2.220623e-02   4.438166      1258
## 191                  CNIH2 1.347200e-03 2.719134e-02   2.766163    254263
## 192                   CNN1 2.380517e-16 1.892328e-13  -4.508997      1264
## 193                  CNTN5 9.140337e-04 1.974007e-02   4.820636     53942
## 194                CNTNAP2 4.379297e-04 1.074956e-02   3.855783     26047
## 195              CNTNAP2_1 2.212718e-03 4.047120e-02   3.162057       <NA>
## 196                   COCH 1.334577e-08 1.622531e-06   4.014747      1690
## 197                 COL10A1 7.151233e-17 6.426160e-14   8.377233      1300
## 198                 COL11A1 6.034145e-15 3.708683e-12   8.011539      1301
## 199                 COL24A1 2.392427e-04 6.557914e-03   3.178407    255631
## 200                 COL27A1 1.563547e-03 3.054385e-02   2.455225     85301
## 201                  COL2A1 1.535421e-05 6.652849e-04   6.912131      1280
## 202                  COL7A1 8.507781e-04 1.854840e-02   2.132210      1294
## 203                  CPEB3 7.424140e-06 3.688944e-04  -2.359492     22849
## 204                  CPLX2 4.959148e-04 1.179467e-02   6.436563     10814
## 205                  CPNE6 8.028517e-05 2.663457e-03  -5.537337      9362
## 206                CPNE6_1 8.028517e-05 2.663457e-03  -5.537337       <NA>
## 207                  CPXM1 1.422415e-03 2.851452e-02   2.855149     56265
## 208                 CRABP1 1.054582e-03 2.199405e-02   5.228691      1381
## 209                  CRCT1 4.585677e-07 3.373720e-05  -4.475599     54544
## 210                 CRISP2 2.012905e-05 8.303938e-04  -5.036277      7180
## 211                 CRISP3 3.130142e-11 7.889485e-09  -5.865594     10321
## 212                   CRMA 6.199882e-04 1.406577e-02  -3.599019    253868
## 213                   CRNN 6.126899e-05 2.117571e-03  -5.308179     49860
## 214                 CRTAC1 1.252044e-03 2.541969e-02  -3.497130     55118
## 215                 CRYBG1 1.714009e-06 1.067022e-04  -2.662419       202
## 216                 CRYBG2 3.205208e-04 8.280655e-03  -2.968805     55057
## 217               CSAG2_1 5.076371e-07 3.681348e-05   7.902203       <NA>
## 218                  CSAG3 5.937133e-06 3.090898e-04   7.234290    389903
## 219               CSAG3_1 3.206431e-05 1.220452e-03   6.647558       <NA>
## 220                  CSF2 1.198029e-03 2.463768e-02   5.552246      1437
## 221                 CSRP1 7.114144e-05 2.422325e-03  -2.060090      1465
## 222                  CST1 1.920540e-19 3.312485e-16  11.923317      1469
## 223                  CST2 1.786405e-04 5.149431e-03   5.555372      1470
## 224                  CSTB 3.308605e-07 2.551577e-05  -3.391982      1476
## 225                CT45A5 2.201478e-03 4.034929e-02   5.827646    441521
## 226                CTHRC1 6.071635e-07 4.218224e-05   4.517651    115908
## 227                CTNNA3 2.325376e-04 6.408115e-03  -4.538274     29119
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## 228                  CTSC 2.057773e-03 3.828087e-02   2.200636      1075
## 229               CTTN-DT 1.712536e-04 4.985167e-03   3.415402 121233926
## 230             CTTN-DT_1 1.712536e-04 4.985167e-03   3.415402      <NA>
## 231               CTTNBP2 1.784483e-07 1.562784e-05  -3.887677     83992
## 232                 CXCL1 2.429952e-05 9.751894e-04   4.126697      2919
## 233                CXCL11 8.413262e-05 2.768874e-03   4.337692      6373
## 234                CXCL12 1.174842e-04 3.645892e-03  -2.788505      6387
## 235                CXCL14 4.873978e-04 1.163404e-02   3.026065      9547
## 236                 CXCL5 1.442096e-05 6.328077e-04   3.979228      6374
## 237                 CXCL6 9.331315e-05 3.013431e-03   3.963683      6372
## 238                 CXCR2 4.741313e-10 8.234745e-08  -4.041847      3579
## 239               CYP11A1 7.321300e-05 2.470764e-03  -3.650514      1583
## 240             CYP11A1_1 7.321300e-05 2.470764e-03  -3.650514      <NA>
## 241                CYP1A1 4.566759e-06 2.464380e-04  -5.160696      1543
## 242               CYP26A1 3.511465e-09 4.937072e-07   9.428985      1592
## 243               CYP2C18 5.194153e-04 1.221306e-02  -2.844339      1562
## 244                CYP2J2 2.231225e-03 4.073760e-02  -2.511379      1573
## 245                CYP4B1 2.680204e-04 7.184753e-03  -3.010827      1580
## 246               CYP4F12 7.127442e-05 2.422861e-03  -2.717821     66002
## 247               CYP4F22 3.382853e-06 1.894764e-04  -4.389495    126410
## 248              CYP4F29P 2.707595e-04 7.230049e-03  -4.192720     54055
## 249              CYP4F35P 5.144243e-04 1.210948e-02  -4.083722    284233
## 250                CYSRT1 1.583052e-05 6.816360e-04  -3.877197    375791
## 251                 DAAM2 1.033146e-05 4.875128e-04  -2.827132     23500
## 252                 DAPP1 4.104112e-04 1.015854e-02  -2.358937     27071
## 253              DEFB4B_2 1.225680e-03 2.510640e-02   4.883737      <NA>
## 254                 DEGS2 9.447866e-07 6.258606e-05  -2.898118    123099
## 255               DENND2C 2.949814e-04 7.707555e-03  -2.147567    163259
## 256                   DES 2.200340e-33 2.273832e-29  -5.823757      1674
## 257                DHCR24 7.474934e-04 1.647036e-02  -1.712001      1718
## 258              DHCR7-DT 4.277941e-04 1.051326e-02   3.296091 129810502
## 259                 DHRS2 1.384746e-10 2.805876e-08   5.897005     10202
## 260             DIP2C-AS1 6.502896e-05 2.240031e-03  -3.469270    414235
## 261                  DKK1 7.400767e-04 1.634178e-02   3.281840     22943
## 262            DLGAP1-AS1 7.635522e-04 1.680628e-02   2.398370    649446
## 263                DLGAP5 1.639670e-04 4.820582e-03   2.312016      9787
## 264                  DLL3 1.707995e-03 3.274660e-02   4.747036     10683
## 265                  DLX1 4.009265e-05 1.488488e-03   5.258218      1745
## 266                DLX1_1 4.009265e-05 1.488488e-03   5.258218      <NA>
## 267                  DLX2 1.231073e-07 1.125832e-05   6.231012      1746
## 268                  DLX6 1.390444e-12 4.789617e-10   7.220500      1750
## 269              DLX6-AS1 5.351712e-07 3.867454e-05   6.098045    285987
## 270                  DMP1 9.785835e-04 2.077410e-02   4.826783      1758
## 271                 DMRT1 1.970297e-03 3.688595e-02   5.252268      1761
## 272                DNAH14 1.742569e-06 1.077101e-04   3.360521    127602
## 273                DNAH17 6.193482e-04 1.406577e-02   3.865795      8632
## 274                 DNAH5 3.576129e-04 9.080029e-03   3.512767      1767
## 275                DNMT3B 3.206351e-11 7.984200e-09   2.935475      1789
## 276                 DOCK9 1.366046e-07 1.227541e-05  -2.201899     23348
## 277                 DOP1B 6.721441e-04 1.508347e-02  -2.007140      9980
## 278                  DPF1 5.549497e-07 3.918363e-05   3.464317      8193
## 279                DPYSL5 2.323398e-03 4.219683e-02   6.130886     56896
## 280                DRAXIN 2.148479e-03 3.964712e-02   2.887502    374946
## 281                  DSG3 1.566619e-03 3.057495e-02  -2.296234      1830
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## 282                  DTL 1.183150e-03 2.438021e-02   2.162144     51514
## 283                DUOX1 6.406509e-04 1.447101e-02  -2.576857     53905
## 284                DUSP9 1.327409e-05 5.977099e-04   4.574561      1852
## 285               DUXAP10 2.740257e-06 1.577846e-04   4.947445    503639
## 286                DUXAP8 5.937322e-04 1.361960e-02   4.372594    503637
## 287                DUXAP9 1.172300e-07 1.081656e-05   4.197566    503638
## 288                DYNAP 2.813829e-03 4.911842e-02  -3.469109    284254
## 289                  E2F1 4.641661e-04 1.120723e-02   2.319064      1869
## 290                  E2F7 1.568869e-03 3.058998e-02   2.096709    144455
## 291                  ECM1 1.926419e-07 1.645257e-05  -3.988249      1893
## 292                ECRG4 5.931261e-07 4.141463e-05  -4.068215     84417
## 293                  ECT2 3.769425e-05 1.416481e-03   1.963196      1894
## 294                   EGF 1.382770e-04 4.205689e-03   3.352511      1950
## 295                  EHD3 4.886588e-08 5.049800e-06  -3.195210     30845
## 296                   EHF 1.110833e-04 3.504450e-03  -2.245851     26298
## 297                EIF5A2 1.960032e-03 3.676037e-02   1.952134     56648
## 298                ELOVL4 1.994715e-07 1.685641e-05  -2.963806      6785
## 299                 EMID1 7.411824e-05 2.486196e-03   3.531609    129080
## 300                  EMP1 6.115482e-13 2.298087e-10  -3.946682      2012
## 301              EMSY-DT 3.507450e-04 8.927584e-03   2.952592 124902718
## 302                  EN1 1.474718e-09 2.326678e-07   6.308133      2019
## 303                  EN2 2.437165e-03 4.376311e-02   3.507301      2020
## 304                ENDOU 3.835217e-12 1.148786e-09  -5.382425      8909
## 305              ENTREP1 3.598046e-06 2.004431e-04  -2.811934      9413
## 306             EPB41L4A 1.575207e-04 4.687819e-03  -1.956706     64097
## 307                EPCAM 9.787774e-05 3.132637e-03   2.997321      4072
## 308                 EPGN 1.114822e-04 3.504450e-03  -3.633575    255324
## 309                EPHA1 7.392239e-06 3.688944e-04  -2.597286      2041
## 310              EPHA1_1 7.392239e-06 3.688944e-04  -2.597286      <NA>
## 311                EPHB2 9.797420e-08 9.288673e-06   3.774833      2048
## 312                EPHX2 4.243490e-05 1.557805e-03  -2.691414      2053
## 313                EPHX3 1.215277e-03 2.491801e-02  -2.764085     79852
## 314               EPS8L1 1.104730e-04 3.491218e-03  -3.436726     54869
## 315               EPS8L2 6.798694e-05 2.330272e-03  -2.493373     64787
## 316                 EREG 1.166256e-03 2.412830e-02  -3.501221      2069
## 317                 ERFE 1.199550e-13 5.509399e-11   5.773914    151176
## 318                 ESM1 6.668553e-11 1.450796e-08   4.594029     11082
## 319              ESPL1_1 2.751591e-05 1.077081e-03  -2.679451      <NA>
## 320                ETFDH 5.411543e-05 1.908944e-03  -2.196594      2110
## 321                EVA1A 1.778663e-05 7.487046e-04   3.765410     84141
## 322                 EVPL 2.888457e-05 1.115862e-03  -2.835649      2125
## 323                  F10 1.072602e-03 2.232480e-02  -2.558238      2159
## 324                FABP4 6.029672e-05 2.090961e-03   6.104357      2167
## 325                 FADD 5.633620e-04 1.309738e-02   2.930394      8772
## 326                FADS1 3.266785e-08 3.553574e-06   3.344929      3992
## 327                FADS2 3.254258e-07 2.519064e-05   3.843030      9415
## 328                FADS3 1.008979e-03 2.125747e-02   2.100228      3995
## 329                FALEC 1.311990e-03 2.658451e-02  -3.179931 100874054
## 330               FAM107A 2.582856e-05 1.021630e-03  -3.042066     11170
## 331               FAM135A 8.982869e-04 1.948142e-02  -1.968922     57579
## 332                FAM25A 1.754910e-03 3.352169e-02  -3.286055    643161
## 333                FAM3B 3.550996e-07 2.708191e-05  -3.749207     54097
## 334                FAM3D 8.920157e-06 4.327742e-04  -3.042609    131177
## 335               FAR2P1 2.785398e-04 7.390066e-03   7.708595    440905
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## 336                  FBN2 6.324016e-09 8.432566e-07   4.851673      2201
## 337                FCER1A 2.135612e-03 3.944488e-02  -3.319893      2205
## 338              FCER1A_1 2.135612e-03 3.944488e-02  -3.319893      <NA>
## 339                 FCHO2 4.011458e-05 1.488488e-03  -2.262602    115548
## 340                 FEZF1 8.334211e-05 2.751621e-03   6.130205    389549
## 341             FEZF1-AS1 6.082014e-07 4.218224e-05   6.243414    154860
## 342                 FGF12 7.333436e-06 3.688944e-04   3.383388      2257
## 343                 FGF19 1.402323e-13 6.300698e-11   8.974206      9965
## 344                  FGF5 1.151590e-03 2.387269e-02   4.317060      2250
## 345                 FHAD1 9.705554e-04 2.067983e-02   2.983394    114827
## 346                  FHL1 5.736533e-07 4.019074e-05  -3.036548      2273
## 347                FIBCD1 1.158394e-06 7.435309e-05   5.385084     84929
## 348                 FIRRE 4.827620e-06 2.591617e-04   5.189665    286467
## 349                   FLG 1.044296e-06 6.765987e-05  -5.023499      2312
## 350                  FLNC 3.944896e-04 9.870837e-03  -2.946375      2318
## 351              FLOT1_1 9.342875e-04 2.007261e-02   2.897490      <NA>
## 352                 FNDC4 1.916855e-06 1.161805e-04  -3.153353     64838
## 353             FOXD2-AS1 8.972985e-06 4.342276e-04   3.244359     84793
## 354             FOXD3-AS1 1.741751e-03 3.330112e-02   4.171909 100996301
## 355                 FOXI2 2.422558e-07 1.963507e-05  -5.026217    399823
## 356                 FOXI3 1.001781e-06 6.531486e-05   6.510808    344167
## 357                 FOXL1 6.457815e-06 3.328432e-04   4.268553      2300
## 358                 FOXL2 1.177326e-05 5.421798e-04   3.883344       668
## 359                 FOXM1 2.036442e-04 5.726420e-03   2.070474      2305
## 360              FOXO6_1 2.720452e-03 4.809778e-02   2.883230      <NA>
## 361                 FREM2 5.320575e-06 2.812420e-04   6.748405    341640
## 362                FRMD4B 9.178679e-06 4.391318e-04  -2.075524     23150
## 363                FUT3_1 6.662322e-07 4.574647e-05  -2.948489      <NA>
## 364                  FUT6 6.100989e-15 3.708683e-12  -5.359433      2528
## 365                 FXYD1 1.960107e-07 1.667140e-05  -3.317661      5348
## 366                  GAB1 6.214155e-04 1.408269e-02  -1.781714      2549
## 367                GABRA4 7.356076e-05 2.476146e-03  -4.764576      2557
## 368                 GABRP 7.030203e-05 2.401657e-03  -3.348376      2568
## 369                   GAL 1.915175e-03 3.618174e-02   3.822356     51083
## 370                GALNT17 2.575261e-06 1.490910e-04  -3.219810     64409
## 371                 GAP43 4.814730e-04 1.153080e-02   4.145143      2596
## 372                  GAST 1.383718e-04 4.205689e-03   5.874735      2520
## 373                 GATA4 1.682512e-05 7.150995e-04   6.294877      2626
## 374                  GBP6 1.242332e-07 1.131124e-05  -3.403819    163351
## 375                  GBX2 3.225447e-08 3.527171e-06   6.659396      2637
## 376                  GCKR 1.436394e-03 2.868348e-02  -3.574756      2646
## 377                 GCNT4 8.034691e-07 5.426830e-05  -2.359450     51301
## 378                 GCOM1 5.881366e-06 3.069598e-04  -4.147293    145781
## 379                   GDA 9.138959e-06 4.382460e-04   4.235641      9615
## 380                 GDF15 5.564657e-05 1.942742e-03   4.510794      9518
## 381                  GDF7 1.129179e-05 5.244467e-04  -2.969267    151449
## 382                 GDPD2 5.819830e-04 1.343958e-02   3.872908     54857
## 383                 GDPD3 6.913378e-08 6.869505e-06  -3.643773     79153
## 384                 GFOD2 1.593199e-03 3.094759e-02  -2.041622     81577
## 385                 GFRA1 2.979166e-04 7.774420e-03  -3.071485      2674
## 386                  GGT6 2.544546e-06 1.477266e-04  -2.403564    124975
## 387                 GINS1 1.327456e-03 2.684526e-02   1.869682      9837
## 388                 GINS2 5.628778e-08 5.759187e-06   2.482497     51659
## 389                  GJB7 2.436688e-11 6.217464e-09   6.599639    375519
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## 390                  GLI1 3.524557e-05 1.329298e-03   4.407792      2735
## 391                  GLI2 1.753106e-04 5.079354e-03   3.164524      2736
## 392                  GLTP 2.859525e-06 1.632615e-04  -2.422314     51228
## 393                  GNG7 9.354642e-04 2.007425e-02  -2.552658      2788
## 394                  GPC2 9.342494e-04 2.007261e-02   3.008774    221914
## 395                 GPD1L 2.698436e-07 2.150220e-05  -2.264351     23171
## 396               GPIHBP1 9.854119e-06 4.660525e-04  -3.145514    338328
## 397                GPR149 1.511222e-03 2.983185e-02   6.332652    344758
## 398                GPR158 8.925844e-05 2.923603e-03   6.011792     57512
## 399                 GPR19 8.425959e-04 1.842319e-02   2.810312      2842
## 400                 GPR50 8.588241e-04 1.870409e-02   4.517511      9248
## 401                   GPT 4.861326e-06 2.602950e-04  -3.292211      2875
## 402                  GPT2 7.713634e-04 1.696015e-02  -2.076855     84706
## 403                  GPX3 2.222164e-04 6.156526e-03  -2.664937      2878
## 404                 GREM2 1.916465e-05 7.953716e-04  -3.623787     64388
## 405                 GRHL1 6.196216e-04 1.406577e-02  -2.308948     29841
## 406                 GRHL3 2.740694e-06 1.577846e-04  -2.953343     57822
## 407                GRIN2D 8.973056e-05 2.934416e-03   3.737972      2906
## 408                  GRM4 1.228695e-04 3.807297e-03   5.264138      2914
## 409                   GRP 1.902890e-04 5.405488e-03   5.865513      2922
## 410                   GSC 5.397963e-04 1.264910e-02   5.295591    145258
## 411                GTF2H2 1.424354e-03 2.852573e-02  -6.106284      2966
## 412             GTF3C2-AS2 4.317188e-06 2.341933e-04   3.212989 105374363
## 413               GUCY1B2 2.812704e-03 4.911842e-02   4.496990      2974
## 414                  GYS2 2.948686e-09 4.211868e-07  -5.079477      2998
## 415                H2AC19 7.614423e-12 2.147125e-09  21.362969    723790
## 416                 H2BC9 2.194906e-03 4.028803e-02   2.483033      8345
## 417                  H3C8 2.528918e-03 4.501953e-02   4.307085      8355
## 418                 HAGHL 4.481042e-04 1.093438e-02   2.241769     84264
## 419                 HAGLR 9.701335e-04 2.067983e-02   2.430394    401022
## 420               HAGLROS 1.520283e-05 6.601094e-04   4.681027 102800310
## 421                  HAP1 4.298065e-13 1.700489e-10   4.540555      9001
## 422               HCG22_1 2.014483e-07 1.685641e-05  -7.966206       <NA>
## 423               HCG22_2 2.014483e-07 1.685641e-05  -7.966206       <NA>
## 424               HCG22_3 2.014483e-07 1.685641e-05  -7.966206       <NA>
## 425               HCG22_6 2.122237e-07 1.754496e-05  -6.765059       <NA>
## 426               HCG22_7 3.415320e-04 8.757795e-03 -10.678966       <NA>
## 427                  HES6 4.097620e-06 2.240466e-04   3.103272     55502
## 428                  HEY1 1.292486e-08 1.580657e-06   4.315672     23462
## 429                  HHIP 4.698340e-05 1.694682e-03   6.137370     64399
## 430                HHIPL2 1.187642e-03 2.444839e-02   3.986500     79802
## 431                 HJURP 2.884248e-06 1.642194e-04   2.159983     55355
## 432              HLA-DOA_5 2.359253e-03 4.269794e-02  -4.687193       <NA>
## 433             HLA-DQB2_3 1.878587e-03 3.555553e-02  -3.314880       <NA>
## 434             HLA-DQB2_5 1.878587e-03 3.555553e-02  -3.314880       <NA>
## 435                HMCN2 1.286046e-04 3.961253e-03  -2.618386    256158
## 436                HMGA2 1.763324e-09 2.699583e-07   4.956659      8091
## 437                HMGB3 4.012457e-06 2.199721e-04   2.301583      3149
## 438               HMGCS2 3.650258e-13 1.479285e-10  -6.050288      3158
## 439                 HMMR 1.048631e-05 4.925704e-04   2.862831      3161
## 440                 HMX1 1.463395e-03 2.908217e-02   5.532836      3166
## 441               HMX1_1 1.463395e-03 2.908217e-02   5.532836       <NA>
## 442               HOMER3 8.648294e-05 2.841700e-03   1.989510      9454
## 443               HOTAIR 3.980416e-04 9.938781e-03   5.537591 100124700
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## 444                  HOXA10 6.706960e-16 5.134053e-13   5.884920      3206
## 445                HOXA10-AS 2.192250e-07 1.790886e-05   5.746006 100874323
## 446                  HOXA11 1.152148e-08 1.442054e-06   6.793580      3207
## 447                  HOXA13 9.130063e-10 1.546723e-07   7.113792      3209
## 448                   HOXA9 4.982811e-04 1.180950e-02   3.707979      3205
## 449                   HOXB6 2.280451e-05 9.187594e-04   2.900030      3216
## 450                   HOXB7 1.646840e-14 9.454691e-12   5.055295      3217
## 451                   HOXB8 4.515242e-04 1.100304e-02   5.027547      3218
## 452                   HOXB9 4.566279e-07 3.373720e-05   7.661604      3219
## 453                  HOXC10 2.694633e-10 5.062971e-08   6.298655      3226
## 454                  HOXC11 1.450383e-05 6.337532e-04   6.339022      3227
## 455                  HOXC13 3.900678e-11 9.266576e-09   6.745942      3229
## 456                HOXC13-AS 1.028874e-06 6.687033e-05   6.632678 100874366
## 457                   HOXC9 1.216789e-05 5.563847e-04   3.680899      3225
## 458                  HOXD10 7.684336e-18 9.342344e-15   4.878219      3236
## 459                  HOXD11 2.204455e-38 4.556167e-34   6.974538      3237
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## 461                   HOXD8 4.633552e-04 1.120073e-02   1.772342      3234
## 462                    HPGD 4.751970e-04 1.143141e-02  -3.190964      3248
## 463                   HPSE2 1.067038e-26 5.513385e-23  -5.448579     60495
## 464                  HS3ST5 2.176537e-03 4.009328e-02   6.083482    222537
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## 468                   HTR2C 2.349033e-06 1.387138e-04   6.256706      3358
## 469                   HTR3B 3.182381e-06 1.787322e-04  -3.664048      9177
## 470                    IBSP 3.041223e-09 4.305206e-07   6.860903      3381
## 471                    IFI6 3.046941e-05 1.166188e-03   3.726198      2537
## 472                   IFIT1 1.384376e-03 2.780591e-02   2.932107      3434
## 473                 IGF2BP1 2.882556e-07 2.273918e-05   9.126923     10642
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## 477                    IL11 5.421667e-05 1.908944e-03   4.047767      3589
## 478                   IL12A 1.049385e-03 2.192991e-02  -3.182216      3592
## 479                IL12A-AS1 2.916248e-06 1.655852e-04  -5.929746 101928376
## 480                  IL13RA2 1.239171e-03 2.528251e-02   3.625986      3598
## 481                    IL18 5.898494e-04 1.357573e-02  -2.352964      3606
## 482                   IL1RN 4.763574e-05 1.713459e-03  -3.202644      3557
## 483                    IL24 6.191967e-04 1.406577e-02   3.712402     11009
## 484                  IL31RA 2.217981e-05 8.965105e-04   5.199156    133396
## 485                    IL34 2.575633e-07 2.079421e-05  -3.110092    146433
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## 488                   IL36G 1.426389e-03 2.853882e-02   3.211320     56300
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## 491                    IRS4 2.674034e-04 7.184753e-03   5.806283      8471
## 492                   ISG15 3.762948e-07 2.848814e-05   3.888150      9636
## 493                     IVL 2.000339e-04 5.647953e-03  -3.487145      3713
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## 495                    JPH2 1.374743e-10 2.805876e-08  -3.604444     57158
## 496                   KALRN 4.622513e-05 1.670247e-03  -2.681127      8997
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## 500                  KCNA5 1.954340e-06 1.181062e-04  -4.599263      3741
## 501                  KCNB1 4.029968e-14 2.082284e-11  -4.926136      3745
## 502                  KCNC3 2.369560e-04 6.503861e-03   2.279744      3748
## 503                  KCNG3 1.283611e-05 5.817911e-04   4.666543    170850
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## 506                 KCNMB1 4.319061e-05 1.577144e-03  -2.902699      3779
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## 509                  KCNS3 1.266605e-05 5.753449e-04   2.396974      3790
## 510               KIAA1549 8.698604e-04 1.890460e-02   2.798982     57670
## 511                  KIF14 1.399515e-05 6.180592e-04   2.708076      9928
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## 515                   KILH 2.598771e-04 7.002789e-03   5.317647 101927136
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## 528                   KRT4 3.634926e-11 8.735658e-09  -6.426344      3851
## 529                 KRT42P 2.690451e-04 7.202881e-03   4.645720    284116
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## 538                  LAYN 1.774318e-03 3.386114e-02   2.962694    143903
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## 588                     LIPH 4.102884e-04 1.015854e-02  -2.458580    200879
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## 590                    LMOD1 7.976556e-16 5.684809e-13  -4.246920     25802
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## 633             LOC105374264 1.458349e-06 9.197650e-05   2.902248 105374264
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## 642             LOC105376272 1.161395e-09 1.846439e-07   3.733960 105376272
## 643             LOC105377067 3.022947e-05 1.159151e-03   5.524255 105377067
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## 660            LOC107986141 1.412440e-03 2.834204e-02  -3.384648 107986141
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## 689            LOC124903025 1.550352e-03 3.038915e-02   5.101163 124903025
## 690            LOC124903391 1.987504e-03 3.714080e-02   3.414647 124903391
## 691            LOC124903505 1.338915e-04 4.099659e-03  -3.115815 124903505
## 692            LOC124903541 1.776107e-03 3.386400e-02   3.764075 124903541
## 693            LOC124903758 8.295246e-04 1.816167e-02  -3.491529 124903758
## 694            LOC124903859 2.846530e-04 7.523283e-03   3.511914 124903859
## 695            LOC124904198 4.872765e-04 1.163404e-02   5.455711 124904198
## 696            LOC124904253 1.609238e-05 6.886073e-04   6.332531 124904253
## 697            LOC124904420 2.881610e-05 1.115302e-03  -4.961085 124904420
## 698            LOC124904423 4.765572e-06 2.564970e-04   3.349230 124904423
## 699            LOC124904447 5.573827e-07 3.918363e-05   5.409353 124904447
## 700            LOC124904544 3.287405e-11 8.088581e-09   4.759073 124904544
## 701            LOC124904731 1.996362e-03 3.727263e-02   5.125800 124904731
## 702            LOC124904915 6.556176e-08 6.642306e-06  -6.438119 124904915
## 703            LOC124905027 2.186641e-03 4.017200e-02   4.398057 124905027
## 704            LOC124905038 8.450426e-08 8.161374e-06   6.592308 124905038
## 705            LOC124905421 9.529299e-05 3.067781e-03   4.155461 124905421
## 706            LOC124905488 5.084848e-04 1.198331e-02   4.076661 124905488
## 707            LOC124906047 2.818391e-05 1.094934e-03  -4.133062 124906047
## 708            LOC124906245 1.128560e-06 7.266381e-05   3.189047 124906245
## 709            LOC124906252 7.373334e-06 3.688944e-04  -5.490473 124906252
## 710            LOC124906274 3.290964e-08 3.561133e-06   6.422909 124906274
## 711            LOC124906315 1.820535e-07 1.580959e-05   8.092887 124906315
## 712            LOC124907726 1.757922e-05 7.430009e-04   3.322772 124907726
## 713            LOC124907737 1.232837e-03 2.520305e-02   3.671566 124907737
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## 716            LOC124907946 1.686445e-08 1.980423e-06   6.410888 124907946
## 717               LOC408186 5.629873e-04 1.309738e-02   2.922080    408186
## 718               LOC440910 1.635978e-03 3.151202e-02   5.746305    440910
## 719               LOC730101 1.938495e-03 3.650710e-02   3.148668    730101
## 720                   LOXL2 7.966121e-07 5.398157e-05   3.062593      4017
## 721                   LPIN1 8.711825e-06 4.236612e-04  -2.288133     23175
## 722                   LRP10 9.526271e-06 4.515802e-04  -1.939655     26020
## 723                   LRP12 3.320735e-04 8.557725e-03   2.409885     29967
## 724                  LRRC15 9.684445e-07 6.374462e-05   5.414281    131578
## 725                   LYPD1 1.626356e-03 3.138518e-02   3.990182    116372
## 726                   LYPD2 5.548029e-07 3.918363e-05  -4.132497    137797
## 727                   LYPD3 8.440537e-04 1.842319e-02  -2.620930     27076
## 728                   LYVE1 1.015611e-03 2.133196e-02  -2.797236     10894
## 729                 MAB21L2 1.788005e-06 1.093328e-04  -5.000498     10586
## 730                 MAB21L4 2.730976e-03 4.820137e-02  -3.259686     79919
## 731                   MACC1 1.596699e-03 3.098645e-02  -2.164663    346389
## 732                    MAFA 4.440151e-04 1.087311e-02   4.100720    389692
## 733                  MAGEA1 3.890719e-05 1.456764e-03   9.624323      4100
## 734                 MAGEA11 3.588390e-04 9.099980e-03   5.460437      4110
## 735                  MAGEA3 7.284244e-06 3.680947e-04   9.854543      4102
## 736                MAGEA3_1 1.039281e-05 4.892908e-04   9.651252      <NA>
## 737                  MAGEA4 2.485773e-05 9.918137e-04  11.350465      4103
## 738                MAGEA6_1 2.739448e-05 1.074363e-03  11.168207      <NA>
## 739                     MAL 8.215525e-06 4.023660e-04  -4.917325      4118
## 740                    MALL 2.565954e-05 1.017910e-03  -3.043013      7851
## 741                  MALLP2 6.019467e-04 1.377095e-02  -3.129838 105374855
## 742                  MAPK12 4.809211e-10 8.283065e-08   3.302408      6300
## 743                    MAPT 4.396212e-10 7.878316e-08  -4.144386      4137
## 744                  MAPT_1 5.262637e-06 2.793128e-04  -4.255444      <NA>
## 745                  MAPT_2 1.461375e-07 1.303176e-05  -3.516632      <NA>
## 746                MARCKSL1 1.275182e-07 1.155941e-05   2.569228     65108
## 747                    MC1R 6.127184e-04 1.397755e-02   2.324406      4157
## 748                 MCCC2_1 1.176000e-03 2.428129e-02   2.068511      <NA>
## 749                  MCIDAS 2.621500e-04 7.054838e-03   4.685459    345643
## 750                    MCM2 3.173350e-04 8.208611e-03   2.213711      4171
## 751                  MCOLN3 4.002930e-05 1.488488e-03   2.586861     55283
## 752                     MDK 5.418603e-07 3.902150e-05   2.902095      4192
## 753               MECOM-AS1 2.285513e-07 1.859723e-05  -5.812803 105374205
## 754                  MEGF10 2.302263e-03 4.184976e-02   3.789461     84466
## 755                   MELTF 1.327226e-04 4.069896e-03   2.761210      4241
## 756               MELTF-AS1 3.535412e-07 2.706292e-05   3.025152 100507057
## 757                    MEST 5.414268e-06 2.847381e-04   3.083017      4232
## 758                METTL21A 1.482546e-03 2.937801e-02   2.175690    151194
## 759                   MFAP2 1.282661e-07 1.157644e-05   3.881065      4237
## 760                 MFAP2_1 3.337140e-07 2.564015e-05   3.744666      <NA>
## 761                    MGLL 2.031651e-04 5.720731e-03  -2.674648     11343
## 762                  MINDY1 8.245205e-06 4.028650e-04  -2.369815     55793
## 763                 MIR9-3HG 3.761687e-04 9.492862e-03   2.841015    254559
## 764                    MISP 1.181043e-15 7.628058e-13   4.820197    126353
## 765                  MLLT11 1.893854e-04 5.391485e-03   2.860576     10962
## 766                     MME 4.519750e-06 2.445398e-04   4.577817      4311
## 767                    MMP1 1.952686e-13 8.586834e-11  10.024847      4312
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## 768                  MMP10 7.422020e-05 2.486196e-03   6.445193      4319
## 769                  MMP11 2.589043e-25 8.918389e-22   6.968003      4320
## 770                MMP11_1 2.589043e-25 8.918389e-22   6.968003      <NA>
## 771                  MMP12 8.828905e-16 6.082527e-13   5.709569      4321
## 772                  MMP13 7.687597e-12 2.147125e-09   9.204225      4322
## 773                   MMP3 7.755367e-24 2.289827e-20  10.391534      4314
## 774                   MND1 2.165218e-08 2.486151e-06   3.052369     84057
## 775                  MPZL3 4.097288e-05 1.513426e-03  -2.403439    196264
## 776                 MS4A4E 5.788984e-04 1.339829e-02   2.561356    643680
## 777               MSANTD3 2.450073e-05 9.794607e-04   2.156940     91283
## 778                    MSC 2.089611e-05 8.586098e-04   3.198001      9242
## 779                   MSI1 2.181062e-08 2.490507e-06   3.671964      4440
## 780                   MSX2 2.494772e-04 6.777814e-03   2.768051      4488
## 781                  MUC21 1.672653e-03 3.212862e-02  -4.933032    394263
## 782                MUC21_1 2.695187e-12 8.440018e-10  -8.795640      <NA>
## 783                MUC21_2 8.019181e-04 1.759453e-02  -5.661034      <NA>
## 784                MUC21_3 2.371758e-12 7.704577e-10  -8.608956      <NA>
## 785                  MUC22 1.629013e-08 1.932439e-06  -9.896729 100507679
## 786                MUC22_1 1.081617e-08 1.371463e-06  -7.786738      <NA>
## 787                MUC22_2 6.698438e-04 1.504819e-02  -7.605726      <NA>
## 788                MUC22_7 8.174218e-06 4.019718e-04  -5.754626      <NA>
## 789                  MUC5B 3.347267e-05 1.267057e-03  -6.817035    727897
## 790                  MUCL1 1.720775e-04 4.995081e-03   5.139291    118430
## 791                  MUCL3 2.811209e-14 1.529002e-11  -8.114777    135656
## 792                MUCL3_1 2.808169e-03 4.910256e-02  -6.814873      <NA>
## 793                MUCL3_2 1.115197e-04 3.504450e-03  -5.878115      <NA>
## 794                 MUSTN1 1.370208e-04 4.183082e-03  -2.927784    389125
## 795                  MYBL2 4.303610e-08 4.515077e-06   2.325377      4605
## 796                  MYH11 4.993701e-07 3.634148e-05  -3.755102      4629
## 797                MYH11_1 4.993701e-07 3.634148e-05  -3.755102      <NA>
## 798                   MYL9 2.966151e-05 1.141609e-03  -2.933443     10398
## 799                   MYOC 1.923254e-19 3.312485e-16  -9.146094      4653
## 800                  MYOCD 7.212244e-06 3.653497e-04  -3.837419     93649
## 801                  MYOZ1 1.012600e-04 3.224717e-03  -4.694806     58529
## 802                  MYRIP 4.682507e-04 1.129266e-02  -2.687636     25924
## 803                  MYZAP 2.844590e-07 2.252566e-05  -3.899927 100820829
## 804                  N4BP3 1.594870e-04 4.722460e-03  -2.265274     23138
## 805                  NAT14 1.391425e-04 4.222904e-03   2.204311     57106
## 806                  NAT8L 2.228290e-03 4.071998e-02   2.926759    339983
## 807                 NCCRP1 9.035936e-04 1.957597e-02  -3.152976    342897
## 808                NCK1-DT 4.154601e-05 1.530611e-03   3.020302 101927597
## 809                  NDC80 7.263707e-04 1.612527e-02   2.354666     10403
## 810                  NDRG2 2.593479e-03 4.612911e-02  -1.874932     57447
## 811                    NEB 1.880655e-05 7.831376e-04   3.423178      4703
## 812                 NECAB2 1.494990e-03 2.956789e-02   4.087766     54550
## 813                  NEK10 2.229698e-04 6.169130e-03  -2.618473    152110
## 814                   NEK2 2.126430e-04 5.955157e-03   2.404138      4751
## 815                  NELL2 8.094926e-08 7.854739e-06   3.520369      4753
## 816                 NEURL3 8.603913e-04 1.871849e-02   3.316015     93082
## 817                   NEXN 1.866758e-04 5.329028e-03  -2.450713     91624
## 818                    NGB 1.430257e-04 4.302846e-03   5.573539     58157
## 819                 NIBAN2 6.040170e-10 1.031721e-07  -2.746913     64855
## 820                 NICOL1 1.971434e-05 8.149121e-04   2.851845    401115
## 821                 NIPAL1 6.348598e-11 1.395881e-08  -3.120640    152519
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## 822                  NKAIN2 1.159201e-03 2.400639e-02   4.266265    154215
## 823                  NKX2-1 3.365263e-04 8.653582e-03   5.715618      7080
## 824                   NLRX1 1.342092e-06 8.534882e-05  -2.671439     79671
## 825                     NMB 1.842989e-07 1.587121e-05   4.095699      4828
## 826                   NMB_1 1.842989e-07 1.587121e-05   4.095699      <NA>
## 827                 NMRAL2P 5.560941e-07 3.918363e-05   4.624477    344887
## 828                    NOS2 1.408627e-04 4.256241e-03   4.376732      4843
## 829                   NOTUM 3.435812e-04 8.788536e-03   3.544654    147111
## 830                   NPAS2 9.128900e-05 2.968883e-03  -2.364852      4862
## 831                  NPBWR1 8.613938e-07 5.780288e-05   5.649350      2831
## 832                   NPY1R 4.092097e-04 1.015312e-02  -3.587613      4886
## 833                   NR0B1 4.314303e-05 1.577144e-03   6.295440       190
## 834                   NRCAM 4.175129e-04 1.028505e-02   3.117400      4897
## 835                    NREP 1.537652e-03 3.026637e-02   2.361352      9315
## 836                   NRIP3 2.144539e-05 8.742275e-04   2.404298     56675
## 837                   NT5C2 5.066368e-04 1.195339e-02  -1.784537     22978
## 838                   NTRK3 1.684989e-05 7.150995e-04  -3.142386      4916
## 839                     NTS 5.161906e-05 1.833097e-03   6.147847      4922
## 840                    NUF2 4.586875e-07 3.373720e-05   2.885278     83540
## 841                   NXPH4 1.720730e-04 4.995081e-03   2.976568     11247
## 842                  OCLN_1 2.260104e-03 4.119209e-02  -2.585421      <NA>
## 843                    ODC1 3.981668e-04 9.938781e-03   3.023055      4953
## 844                   OGDHL 1.547121e-05 6.689520e-04   4.916908     55753
## 845                     OGN 2.495605e-04 6.777814e-03  -3.615193      4969
## 846                   OGN_1 2.495605e-04 6.777814e-03  -3.615193      <NA>
## 847                 ONECUT2 1.824649e-05 7.633976e-04   4.524312      9480
## 848                   OPRK1 2.585216e-05 1.021630e-03   7.181649      4986
## 849                    ORC6 1.391573e-05 6.180592e-04   2.499158     23594
## 850                   OTOP3 1.098274e-06 7.093479e-05  -3.629059    347741
## 851                    OTX1 2.071860e-03 3.842563e-02   2.573373      5013
## 852                   P2RX1 2.377193e-06 1.399767e-04  -3.418050      5023
## 853                   P2RX2 2.085307e-09 3.145921e-07  -6.521712     22953
## 854                  P2RY14 5.550078e-07 3.918363e-05  -3.416390      9934
## 855                    P3H4 2.048287e-05 8.433065e-04   2.658014     10609
## 856                   P4HA3 2.124189e-03 3.930416e-02   2.957375    283208
## 857                  PABIR3 4.882167e-05 1.743269e-03   2.799606    159091
## 858                   PADI1 9.150274e-05 2.968883e-03  -3.890382     29943
## 859                 PADI1_1 9.150274e-05 2.968883e-03  -3.890382      <NA>
## 860                   PAQR5 2.557773e-04 6.919379e-03  -2.510576     54852
## 861                    PAX3 2.635461e-03 4.671501e-02   6.215198      5077
## 862                    PAX6 1.636234e-08 1.932439e-06   6.834757      5080
## 863                    PAX7 4.539370e-10 8.018778e-08   8.914945      5081
## 864                    PAX9 3.969223e-07 2.961585e-05  -2.947128      5083
## 865                     PBK 9.363061e-04 2.007425e-02   2.290988     55872
## 866                  PBX2_2 1.437124e-12 4.869260e-10  22.065777      <NA>
## 867                   PCAT7 2.614539e-10 4.957551e-08   5.440406 101928099
## 868                   PCDH1 4.295060e-05 1.573941e-03  -2.501683      5097
## 869                PCDHB9_1 9.832457e-04 2.084279e-02   2.413797      <NA>
## 870                   PCLAF 2.183426e-05 8.883277e-04   2.692258      9768
## 871                    PCP4 1.060519e-12 3.779105e-10  -5.700745      5121
## 872                  PCP4_1 1.060519e-12 3.779105e-10  -5.700745      <NA>
## 873                  PCSK1N 3.808541e-06 2.104677e-04   3.750836     27344
## 874                   PCSK2 1.539532e-03 3.026637e-02  -3.033709      5126
## 875                  PDE11A 2.829155e-03 4.930268e-02   4.633646     50940
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## 876                  PDGFA 4.874722e-04 1.163404e-02   1.875907      5154
## 877                  PDK4 3.987510e-12 1.177341e-09  -4.453273      5166
## 878                 PDLIM2 7.854303e-07 5.339893e-05  -2.656734     64236
## 879                 PDZRN3 8.008219e-04 1.758915e-02  -2.401064     23024
## 880                 PDZRN4 4.744434e-09 6.409017e-07  -4.964039     29951
## 881                   PFN2 7.966882e-08 7.803769e-06   3.263089      5217
## 882                 PGM2L1 6.686159e-06 3.429021e-04   2.712992    283209
## 883                   PGM5 4.475768e-17 4.405008e-14  -4.915019      5239
## 884               PGM5-AS1 1.357958e-11 3.598242e-09  -6.574068    572558
## 885                 PGM5P4 3.151616e-05 1.201801e-03  -5.638823    729468
## 886                PHACTR2 4.100632e-05 1.513426e-03  -2.293035      9749
## 887                PHACTR4 2.700326e-04 7.219965e-03  -1.856987     65979
## 888                 PHLDB3 2.186043e-03 4.017200e-02  -2.147347    653583
## 889                 PHYHIP 2.911076e-09 4.207421e-07  -3.863414      9796
## 890                   PI16 1.409410e-05 6.211019e-04  -4.560170    221476
## 891                 PIMREG 3.098055e-08 3.424097e-06   2.547777     54478
## 892                  PITX1 2.381226e-03 4.294518e-02  -2.245791      5307
## 893                 PKD1L1 3.767618e-04 9.496235e-03   2.553979    168507
## 894                PKHD1L1 5.106729e-05 1.816624e-03  -3.380799     93035
## 895                   PKP3 1.991059e-04 5.629441e-03  -2.008591     11187
## 896                 PLA2G2A 4.277103e-04 1.051326e-02  -4.948860      5320
## 897                 PLA2G2C 2.983984e-06 1.685117e-04  -4.638091    391013
## 898                 PLA2G4B 1.763001e-04 5.096182e-03  -2.261183 100137049
## 899                 PLAAT2 1.835967e-04 5.255645e-03   4.522061     54979
## 900                   PLAU 8.924327e-08 8.539259e-06   3.487790      5328
## 901                 PLCXD3 2.340611e-03 4.239768e-02  -3.340030    345557
## 902                   PLD6 5.885721e-04 1.356951e-02   2.224183    201164
## 903                PLEKHA7 1.745834e-06 1.077101e-04  -2.312360    144100
## 904               PLEKHG4B 9.170681e-05 2.970841e-03   2.862926    153478
## 905                PLEKHM1 3.976752e-09 5.516209e-07  -2.722018      9842
## 906              PLEKHM1_2 7.409799e-08 7.327547e-06  -2.506878      <NA>
## 907                  PLIN4 5.420294e-05 1.908944e-03  -2.621748    729359
## 908                    PLN 1.271498e-04 3.922287e-03  -2.997009      5350
## 909                   PLP1 7.572741e-16 5.589764e-13  -4.829035      5354
## 910                  PLPP4 1.949588e-05 8.074965e-04   4.244584    196051
## 911                   PMM1 1.445984e-03 2.884709e-02  -1.981647      5372
## 912                   POMC 1.243270e-03 2.530811e-02   2.856794      5443
## 913                 POPDC3 2.105389e-07 1.747558e-05   5.156923     64208
## 914                  POSTN 2.072991e-03 3.842563e-02   2.994432     10631
## 915                POTEF_1 4.507484e-05 1.631535e-03   7.272708      <NA>
## 916             POU6F2-AS2 5.564026e-05 1.942742e-03   5.163328 100689074
## 917                    PPL 2.151941e-08 2.484711e-06  -3.450053      5493
## 918                PPP1R12B 3.784147e-06 2.096803e-04  -2.239788      4660
## 919                 PPP1R1A 2.827731e-05 1.096502e-03  -3.787235      5502
## 920                 PPP1R1C 2.984095e-06 1.685117e-04   4.671039    151242
## 921                   PRAME 3.203421e-19 4.729165e-16   9.717650     23532
## 922                 PRAME_1 3.203421e-19 4.729165e-16   9.717650      <NA>
## 923                  PRDM13 2.433312e-04 6.652339e-03   5.158176     59336
## 924                PRELID3A 3.111817e-05 1.188818e-03   2.684926     10650
## 925                   PRELP 1.672549e-03 3.212862e-02  -2.698887      5549
## 926                    PROC 1.663064e-05 7.087052e-04   5.211048      5624
## 927                   PRR15 1.308674e-05 5.905608e-04   4.052911    222171
## 928                 PRR15-DT 2.206062e-03 4.038519e-02   3.373034 107986700
## 929                  PRR20G 2.673459e-03 4.734795e-02   6.387081 100419008
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## 930                  PRR4 3.540414e-08 3.771819e-06  -7.109019     11272
## 931                PRR4_1 3.540414e-08 3.771819e-06  -7.109019      <NA>
## 932                PRR4_2 3.540414e-08 3.771819e-06  -7.109019      <NA>
## 933                 PRR5L 1.551217e-03 3.038915e-02   2.251606     79899
## 934                PRSS21 2.440401e-06 1.432904e-04   4.829719     10942
## 935                PRSS27 6.003224e-04 1.375550e-02  -3.582000     83886
## 936                 PRSS3 1.241568e-03 2.530644e-02  -2.889999      5646
## 937                PRUNE2 2.569293e-09 3.803037e-07  -3.681802    158471
## 938                  PSCA 5.923937e-04 1.361271e-02  -3.259137      8000
## 939                 PTGIS 2.999263e-04 7.816995e-03  -3.399417      5740
## 940                 PTGS2 6.091846e-05 2.108983e-03   4.037431      5743
## 941                 PTH2R 5.982131e-05 2.077961e-03   6.219175      5746
## 942                 PTHLH 6.864420e-09 8.922882e-07   3.980194      5744
## 943                  PTK6 1.754722e-04 5.079354e-03  -2.678348      5753
## 944                 PTPRN 2.374273e-03 4.285718e-02   4.559153      5798
## 945                PWWP3B 1.800291e-04 5.182231e-03   6.016714    139221
## 946                  PXDN 1.540556e-03 3.026637e-02   2.418928      7837
## 947                  PYGM 1.744267e-06 1.077101e-04  -3.147673      5837
## 948                  PYY2 1.178449e-07 1.082498e-05   6.875747     23615
## 949                 RAB15 1.014687e-03 2.133196e-02   2.093009    376267
## 950                 RAB25 1.599242e-03 3.100669e-02  -1.794638     57111
## 951                 RAB32 4.940038e-04 1.176275e-02   2.280534     10981
## 952                 RAB3B 6.643433e-04 1.494086e-02   3.337368      5865
## 953                RAB40A 1.427837e-16 1.229606e-13  -5.250004    142684
## 954                 RAB9B 2.807589e-03 4.910256e-02  -2.611853     51209
## 955               RABGGTA 6.763207e-05 2.321960e-03  -2.058172      5875
## 956             RABGGTA_1 6.763207e-05 2.321960e-03  -2.058172      <NA>
## 957              RAD51AP1 1.063589e-07 9.946724e-06   3.231669     10635
## 958                RAET1E 1.244099e-03 2.530811e-02  -3.154733    135250
## 959                  RAG1 4.545504e-04 1.102658e-02   3.249189      5896
## 960                RANBP9 3.137407e-04 8.125804e-03  -2.065572     10048
## 961                  RARG 8.138982e-04 1.783844e-02  -1.750511      5916
## 962               RASL11B 1.510644e-04 4.511850e-03   3.428543     65997
## 963                RBFOX3 8.175652e-19 1.126496e-15  -5.856158    146713
## 964                 RBM47 1.036379e-03 2.168004e-02  -2.114475     54502
## 965                  RBP1 9.618717e-05 3.091752e-03   3.148141      5947
## 966                  RBP4 5.810675e-04 1.343345e-02   4.120184      5950
## 967               RBPMS2 4.334408e-05 1.579957e-03  -2.317533    348093
## 968                RDH12 1.096810e-09 1.784950e-07  -4.161113    145226
## 969                RELCH 3.830260e-04 9.618934e-03  -1.913041     57614
## 970                  RFC4 1.884428e-09 2.863777e-07   2.888049      5984
## 971                  RHCG 3.213789e-05 1.221004e-03  -3.397654     51458
## 972               RHEBL1 9.289541e-05 3.004636e-03   3.271270    121268
## 973                RIMS2 6.223337e-07 4.287464e-05   3.488222      9699
## 974                RMND5B 4.439403e-04 1.087311e-02  -1.838266     64777
## 975              RNASEH2A 3.049188e-04 7.937104e-03   1.991206     10535
## 976                RNF222 1.000872e-06 6.531486e-05  -3.856026    643904
## 977                RNF224 9.636083e-04 2.057423e-02  -3.310112    643596
## 978                RNF225 1.362425e-04 4.165473e-03  -3.196677    646862
## 979                 RNFT2 2.564937e-05 1.017910e-03   3.181044     84900
## 980                  ROR1 1.231616e-03 2.520301e-02  -2.688994      4919
## 981                  ROS1 4.186410e-09 5.730114e-07   6.882220      6098
## 982               RPL39L 5.246402e-08 5.394659e-06   3.476519    116832
## 983                  RRAD 2.474235e-03 4.423658e-02  -2.920293      6236
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## 984                  SALL4 2.140600e-13 9.217068e-11   4.122564     57167
## 985                  SAMD5 1.810631e-06 1.100651e-04  -3.227946    389432
## 986                  SASH1 3.540705e-10 6.533864e-08  -3.172226     23328
## 987                 SCARA5 9.760922e-05 3.132589e-03  -3.944008    286133
## 988                  SCAT2 1.141086e-03 2.367869e-02   3.885584 112935960
## 989                  SCAT8 1.939462e-03 3.650710e-02   3.737606 112935969
## 990                   SCEL 6.072728e-06 3.153546e-04  -3.811042      8796
## 991                   SCG2 1.131766e-04 3.533435e-03   4.312047      7857
## 992                 SCGB1D2 1.779927e-03 3.388698e-02  -4.681143     10647
## 993                 SCGB2A2 1.775094e-06 1.089309e-04  -8.033597      4250
## 994                 SCGB3A1 1.412706e-04 4.256241e-03  -5.443222     92304
## 995                   SCIRT 2.835134e-03 4.936524e-02   3.159560 101929705
## 996                   SCN5A 1.711758e-03 3.278833e-02   3.380014      6331
## 997                   SCN7A 5.855129e-17 5.500627e-14  -5.361083      6332
## 998                   SCN8A 9.791385e-05 3.132637e-03   2.934254      6334
## 999                   SCN9A 1.398237e-05 6.180592e-04   4.360995      6335
## 1000                 SCNN1B 2.915825e-08 3.240014e-06  -3.301441      6338
## 1001                 SCUBE3 4.978555e-04 1.180950e-02   3.427316    222663
## 1002                    SCX 2.904901e-04 7.648215e-03   2.411566    642658
## 1003                 SEC14L4 5.436615e-05 1.910952e-03   3.646183    284904
## 1004                SERPINB1 1.608432e-03 3.109735e-02  -2.502206      1992
## 1005               SERPINB11 7.353050e-04 1.630610e-02  -2.673095     89778
## 1006               SERPINB12 1.580054e-04 4.687819e-03  -3.426843     89777
## 1007                SERPINB2 6.979814e-04 1.562934e-02  -3.454279      5055
## 1008                SERPINE1 7.981042e-05 2.656235e-03   3.139149      5054
## 1009                SERPINH1 4.421737e-10 7.878316e-08   2.972488       871
## 1010                  SEZ6L2 5.889225e-04 1.356951e-02   2.929850     26470
## 1011                 SFTA2_2 1.607418e-04 4.746016e-03  -5.290253      <NA>
## 1012                    SGCA 1.577508e-04 4.687819e-03  -2.942742      6442
## 1013                SH3BGRL2 8.716296e-07 5.811239e-05  -3.267472     83699
## 1014                     SHH 1.027320e-03 2.153538e-02   5.190398      6469
## 1015                  SHISA2 1.230592e-04 3.807466e-03   4.512349    387914
## 1016                   SHOX2 8.540712e-09 1.103247e-06   7.259799      6474
## 1017                    SIM2 5.726257e-04 1.328286e-02  -2.665900      6493
## 1018                    SIX1 4.069584e-20 9.345575e-17   6.588428      6495
## 1019                    SIX2 9.305482e-10 1.563624e-07   3.881640     10736
## 1020                    SIX3 2.556274e-04 6.919379e-03   5.670471      6496
## 1021                    SIX4 1.177853e-05 5.421798e-04   3.375702     51804
## 1022                 SLC13A4 2.697109e-07 2.150220e-05  -3.522330     26266
## 1023                SLC16A10 1.444491e-04 4.339352e-03   2.606154    117247
## 1024                 SLC16A6 4.229268e-06 2.300277e-04  -2.873453      9120
## 1025                 SLC24A2 7.862712e-05 2.621073e-03   4.592379     25769
## 1026                 SLC27A4 2.566104e-04 6.926999e-03  -2.011666     10999
## 1027                 SLC27A6 4.039618e-05 1.496251e-03  -3.382189     28965
## 1028                 SLC29A4 2.610296e-03 4.634846e-02   2.548636    222962
## 1029                  SLC2A4 4.732973e-08 4.915632e-06  -3.884614      6517
## 1030                SLC2A4_1 4.732973e-08 4.915632e-06  -3.884614      <NA>
## 1031                 SLC30A3 7.112559e-06 3.611852e-04   4.767068      7781
## 1032                 SLC34A3 1.671779e-04 4.908001e-03  -3.556438    142680
## 1033                 SLC35C1 1.509611e-04 4.511850e-03  -2.074358     55343
## 1034                 SLC46A2 2.098118e-08 2.436174e-06  -4.700783     57864
## 1035                  SLC51A 4.978023e-04 1.180950e-02   4.201332    200931
## 1036                 SLC52A1 2.030464e-04 5.720731e-03   3.394591     55065
## 1037                 SLC5A12 7.059891e-06 3.593937e-04   4.947956    159963
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## 1038                SLC6A1 1.237002e-03 2.526320e-02  -3.261629      6529
## 1039                SLC6A2 1.148041e-04 3.573450e-03   4.766898      6530
## 1040             SLC7A5P2_1 2.517320e-03 4.489040e-02   3.406795      <NA>
## 1041             SLC8A1-AS1 3.178601e-08 3.494432e-06  -6.547623 100128590
## 1042                SLCO1A2 2.316120e-13 9.769302e-11   7.969568      6579
## 1043             SLCO4A1-AS2 1.585798e-06 9.931900e-05  -3.369559 101928465
## 1044                SLITRK3 3.650585e-06 2.028234e-04  -4.058491     22865
## 1045                  SLMAP 1.291355e-03 2.619209e-02  -1.593220      7871
## 1046                 SLURP1 1.030992e-07 9.729929e-06  -4.450451     57152
## 1047                  SMAGP 2.163190e-06 1.288439e-04  -2.251907     57228
## 1048                  SMC1B 1.770828e-04 5.111659e-03   5.405907     27127
## 1049                  SMOC1 3.366306e-04 8.653582e-03   3.624976     64093
## 1050                 SNCAIP 2.277406e-03 4.147086e-02   2.417071      9627
## 1051                   SNCB 9.110349e-05 2.968883e-03   5.623633      6620
## 1052                 SNHG33 2.767984e-03 4.860552e-02   2.623647 100505687
## 1053               SNORD3A 1.665177e-07 1.470764e-05   7.666877    780851
## 1054                  SNX10 2.704941e-07 2.150220e-05   2.789280     29887
## 1055                 SORBS1 1.375244e-10 2.805876e-08  -3.447275     10580
## 1056                 SORCS1 9.595141e-04 2.050800e-02  -3.180708    114815
## 1057                  SORT1 1.545014e-03 3.032511e-02  -1.890219      6272
## 1058                   SOST 6.534529e-08 6.642306e-06   7.517938     50964
## 1059                  SOX10 9.061043e-06 4.355201e-04  -3.422805      6663
## 1060                  SOX11 2.826034e-03 4.928985e-02   3.967565      6664
## 1061                   SOX4 1.791994e-03 3.407262e-02   2.103704      6659
## 1062                  SPC24 1.029815e-03 2.156455e-02   2.281515    147841
## 1063                SPC25_1 9.308849e-04 2.004118e-02   2.859116      <NA>
## 1064                SPINDOC 9.993194e-04 2.112938e-02   1.723117    144097
## 1065                 SPINK5 1.776162e-06 1.089309e-04  -4.404171     11005
## 1066                  SPNS2 1.803677e-07 1.572928e-05  -3.694177    124976
## 1067                 SPOCD1 8.188026e-06 4.019718e-04   3.833984     90853
## 1068                   SPP1 5.752457e-14 2.830757e-11   6.931695      6696
## 1069                 SPRR2G 1.005618e-03 2.120828e-02   3.929969      6706
## 1070                  SPRR3 1.249474e-05 5.700689e-04  -4.119999      6707
## 1071                  SPSB4 4.143043e-04 1.023040e-02   5.065519     92369
## 1072                 SPTLC3 2.384871e-03 4.297342e-02  -2.145970     55304
## 1073                    SRL 9.786618e-04 2.077410e-02  -2.819274      6345
## 1074             ST6GALNAC1 7.400246e-04 1.634178e-02  -2.446651     55808
## 1075                ST8SIA2 4.536053e-04 1.101954e-02   4.729849      8128
## 1076                  STIM1 2.743660e-04 7.307471e-03  -1.659554      6786
## 1077                  STK40 1.947326e-03 3.658849e-02  -2.033342     83931
## 1078                  STMN1 5.364338e-06 2.828320e-04   2.344041      3925
## 1079                  STRA6 2.154674e-04 6.009826e-03   3.321162     64220
## 1080                STRA6_1 2.782547e-04 7.390066e-03   3.266690      <NA>
## 1081                   STRN 1.827147e-04 5.237654e-03  -1.833324      6801
## 1082                   STUM 3.060956e-07 2.396358e-05  -3.342904    375057
## 1083                  STX1A 2.432045e-04 6.652339e-03   2.560746      6804
## 1084                SULT2B1 1.194528e-05 5.486333e-04  -3.267047      6820
## 1085                  SYCP2 9.168223e-04 1.977963e-02   3.160839     10388
## 1086                SYNDIG1 5.279756e-04 1.240023e-02   3.745334     79953
## 1087                   SYNM 9.144651e-11 1.948471e-08  -3.533343     23336
## 1088                 SYNPO2 2.933802e-18 3.789739e-15  -4.868168    171024
## 1089                SYNPO2L 3.043494e-07 2.391746e-05  -6.231343     79933
## 1090                   SYT1 4.263939e-12 1.223987e-09   4.128886      6857
## 1091                  SYT14 1.165198e-08 1.442054e-06   7.234694    255928
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## 1092                  TACR1 4.883651e-05 1.743269e-03  -2.962693      6869
## 1093                  TACR2 6.451959e-05 2.226195e-03  -3.349569      6865
## 1094                  TAGLN 1.604899e-03 3.105810e-02  -2.189254      6876
## 1095                  TBX15 1.153048e-05 5.343315e-04   3.732520      6913
## 1096                   TBX6 3.674554e-07 2.792121e-05  -2.294096      6911
## 1097                  TCF15 2.703510e-03 4.783917e-02   3.481067      6939
## 1098                   TDO2 2.523041e-06 1.468907e-04   5.301138      6999
## 1099                 TDO2_1 2.523041e-06 1.468907e-04   5.301138      <NA>
## 1100                    TEC 2.763829e-03 4.857383e-02  -2.229229      7006
## 1101                    TEC 2.763829e-03 4.857383e-02  -2.229229 100124696
## 1102                 TENT5B 1.856360e-03 3.523162e-02  -2.562881    115572
## 1103                 TESMIN 4.562923e-04 1.105586e-02   3.156128      9633
## 1104                 TFAP2B 4.044693e-04 1.007177e-02  -4.246749      7021
## 1105                  TGFBI 2.100421e-05 8.613392e-04   3.502259      7045
## 1106                 TGFBR3 8.928982e-07 5.933897e-05  -2.745227      7049
## 1107                   TGM1 2.202551e-05 8.925948e-04  -3.507608      7051
## 1108                 TGM1_1 2.202551e-05 8.925948e-04  -3.507608      <NA>
## 1109                   TGM3 5.897911e-09 7.915456e-07  -4.972337      7053
## 1110                  TIAM1 1.079937e-04 3.418092e-03  -2.257659      7074
## 1111                 TJP1_1 1.359637e-05 6.069327e-04  -2.338450      <NA>
## 1112                 TJP1_2 1.359637e-05 6.069327e-04  -2.338450      <NA>
## 1113                   TJP3 5.761943e-04 1.335066e-02  -2.373186     27134
## 1114                    TK1 2.452839e-03 4.393005e-02   1.961834      7083
## 1115                 TM4SF19 1.320071e-03 2.672207e-02   3.008430    116211
## 1116                 TMEFF1 1.027380e-03 2.153538e-02   4.546940      8577
## 1117               TMEM132C 1.988571e-11 5.202505e-09  -5.480825     92293
## 1118                 TMEM154 6.763835e-08 6.786163e-06  -2.908528    201799
## 1119                 TMEM35A 2.691721e-07 2.150220e-05  -3.736828     59353
## 1120              TMEM44-AS1 1.203836e-03 2.473248e-02   2.755132 100507297
## 1121                 TMEM79 4.033289e-04 1.005549e-02  -2.554608     84283
## 1122                 TMOD3 2.365252e-03 4.276905e-02  -1.752391     29766
## 1123              TMPRSS11B 1.802152e-03 3.423426e-02  -4.210995    132724
## 1124                TNFAIP6 8.886655e-05 2.915387e-03   3.271895      7130
## 1125               TNFRSF18 1.196969e-06 7.659122e-05   3.158992      8784
## 1126                 TNXB_7 1.325575e-11 3.558049e-09  -4.581801      <NA>
## 1127                 TOLLIP 2.015824e-03 3.756813e-02  -1.658110     54472
## 1128               TOLLIP_1 1.870016e-03 3.545825e-02  -1.663323      <NA>
## 1129                   TOM1 2.812058e-04 7.451232e-03  -1.908411     10043
## 1130                 TOM1L2 2.438309e-05 9.766468e-04  -2.036659    146691
## 1131                  TOP2A 1.434798e-03 2.867931e-02   2.071932      7153
## 1132                   TPM2 4.901793e-04 1.168515e-02  -2.361833      7169
## 1133                  TPRG1 1.445363e-05 6.328976e-04  -2.529544    285386
## 1134                   TREH 2.875734e-03 4.987014e-02  -2.396361     11181
## 1135                  TREM1 1.695229e-03 3.253202e-02   2.958320     54210
## 1136                  TREM2 8.676284e-07 5.803283e-05   4.014659     54209
## 1137                 TRIM29 2.740877e-04 7.307471e-03  -2.157665     23650
## 1138                 TRIM46 2.330362e-03 4.228614e-02   2.647856     80128
## 1139                 TRIP13 3.112460e-04 8.071308e-03   1.997837      9319
## 1140               TRPM2-AS 2.074563e-06 1.246427e-04   6.184315 101928607
## 1141                 TTC39A 9.294553e-06 4.426263e-04  -2.237704     22996
## 1142                   TTC9 1.882027e-04 5.365206e-03  -2.565271     23508
## 1143                  TTYH3 2.285098e-04 6.305528e-03   2.388186     80727
## 1144                  TUBB3 7.645872e-08 7.524994e-06   3.769970     10381
## 1145                  UBE2C 1.443628e-08 1.734703e-06   2.222365     11065
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## 1146	UBE2T	9.242600e-06	4.411687e-04	3.110640	29089
## 1147	UBL3	9.017130e-06	4.344197e-04	-2.126612	5412
## 1148	UCHL1	1.003493e-11	2.728973e-09	5.371256	7345
## 1149	UGT1A8	1.225521e-12	4.293061e-10	-7.320981	54576
## 1150	UNC13B	2.480866e-03	4.431680e-02	-1.685767	10497
## 1151	UNC5B-AS1	2.803935e-05	1.091369e-03	3.976938	728978
## 1152	UNC93A	1.700693e-04	4.971700e-03	-3.847726	54346
## 1153	UPK1A	4.435137e-09	6.030619e-07	-5.137915	11045
## 1154	UPK3B	2.509729e-04	6.807230e-03	-3.618064	105375355
## 1155	UPK3B_1	2.135985e-06	1.275911e-04	-3.658145	<NA>
## 1156	USP2	9.263793e-04	1.996497e-02	-2.678990	9099
## 1157	USP32P3	2.064825e-03	3.834303e-02	2.513311	347716
## 1158	USP6NL	1.371863e-06	8.697441e-05	-2.298400	9712
## 1159	UTS2R	9.514596e-05	3.067781e-03	3.040311	2837
## 1160	VAX1	7.412510e-05	2.486196e-03	5.398244	11023
## 1161	VGF	6.023291e-04	1.377095e-02	2.908115	7425
## 1162	VIT	3.082910e-07	2.404437e-05	-4.231284	5212
## 1163	VPS37D	1.816291e-05	7.614423e-04	2.890571	155382
## 1164	VPS4B	1.605215e-04	4.746016e-03	-2.031815	9525
## 1165	VSIG10L	1.561286e-10	3.132880e-08	-4.112878	147645
## 1166	VSIG2	1.063380e-04	3.370850e-03	-3.334456	23584
## 1167	VWA5B2	1.326630e-06	8.462587e-05	6.115367	90113
## 1168	WDR54	1.173555e-05	5.421798e-04	2.446509	84058
## 1169	WDR72	3.973141e-10	7.266981e-08	4.036126	256764
## 1170	WNK4	3.207310e-12	9.758363e-10	-5.772009	65266
## 1171	WNT11	4.607905e-10	8.070864e-08	5.019165	7481
## 1172	WNT2	2.528722e-03	4.501953e-02	4.186985	7472
## 1173	XCL1	4.156820e-06	2.266838e-04	3.932025	6375
## 1174	XIRP1	2.044729e-07	1.704051e-05	7.117296	165904
## 1175	XIST	9.408175e-16	6.272521e-13	-24.898870	7503
## 1176	XPNPEP2	2.837938e-04	7.510180e-03	-3.535088	7512
## 1177	ZBTB16	5.470011e-07	3.911909e-05	-2.903755	7704
## 1178	ZDHHC15	4.850272e-05	1.737356e-03	-2.477272	158866
## 1179	ZDHHC21	1.449244e-03	2.888425e-02	-1.877833	340481
## 1180	ZIC1	2.511976e-03	4.483377e-02	5.559280	7545
## 1181	ZIC2	2.272580e-06	1.349704e-04	4.318575	7546
## 1182	ZIC5	1.713194e-09	2.657141e-07	7.867597	85416
## 1183	ZNF114	5.551843e-05	1.942742e-03	3.289053	163071
## 1184	ZNF185	3.989142e-06	2.192755e-04	-3.092249	7739
## 1185	ZNF185_1	1.828335e-08	2.134917e-06	-3.513000	<NA>
## 1186	ZNF365	7.262496e-05	2.463529e-03	-3.589701	22891
## 1187	ZNF431	1.966448e-03	3.684729e-02	-2.045058	170959
## 1188	ZNF469	4.976252e-06	2.650752e-04	3.830037	84627
## 1189	ZNF536	3.270465e-04	8.438698e-03	-3.547536	9745
## 1190	ZNF584-DT	4.081939e-04	1.014400e-02	2.528976	123706526
## 1191	ZNF677	1.159294e-04	3.603050e-03	-2.738006	342926
## 1192	ZNF750	2.602564e-03	4.625090e-02	-2.333524	79755
## 1193	ZNF823	2.401370e-03	4.323302e-02	-1.767326	55552

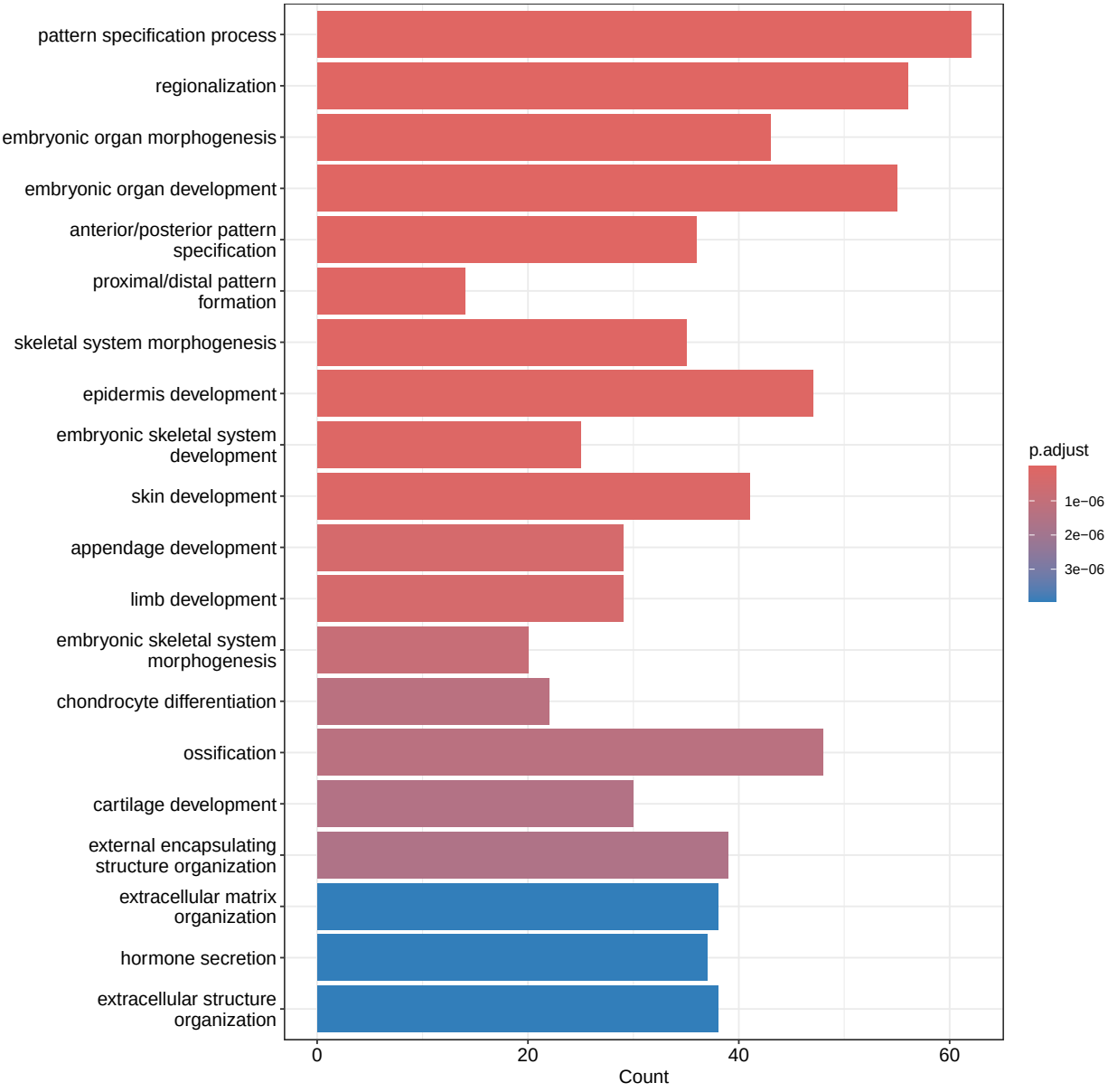
Let's take a look at some of the biological processes, molecular functions and cellular components that are enriched in this DEG profile.

```
# GO enrichment
library(clusterProfiler)
library(org.Hs.eg.db)
```

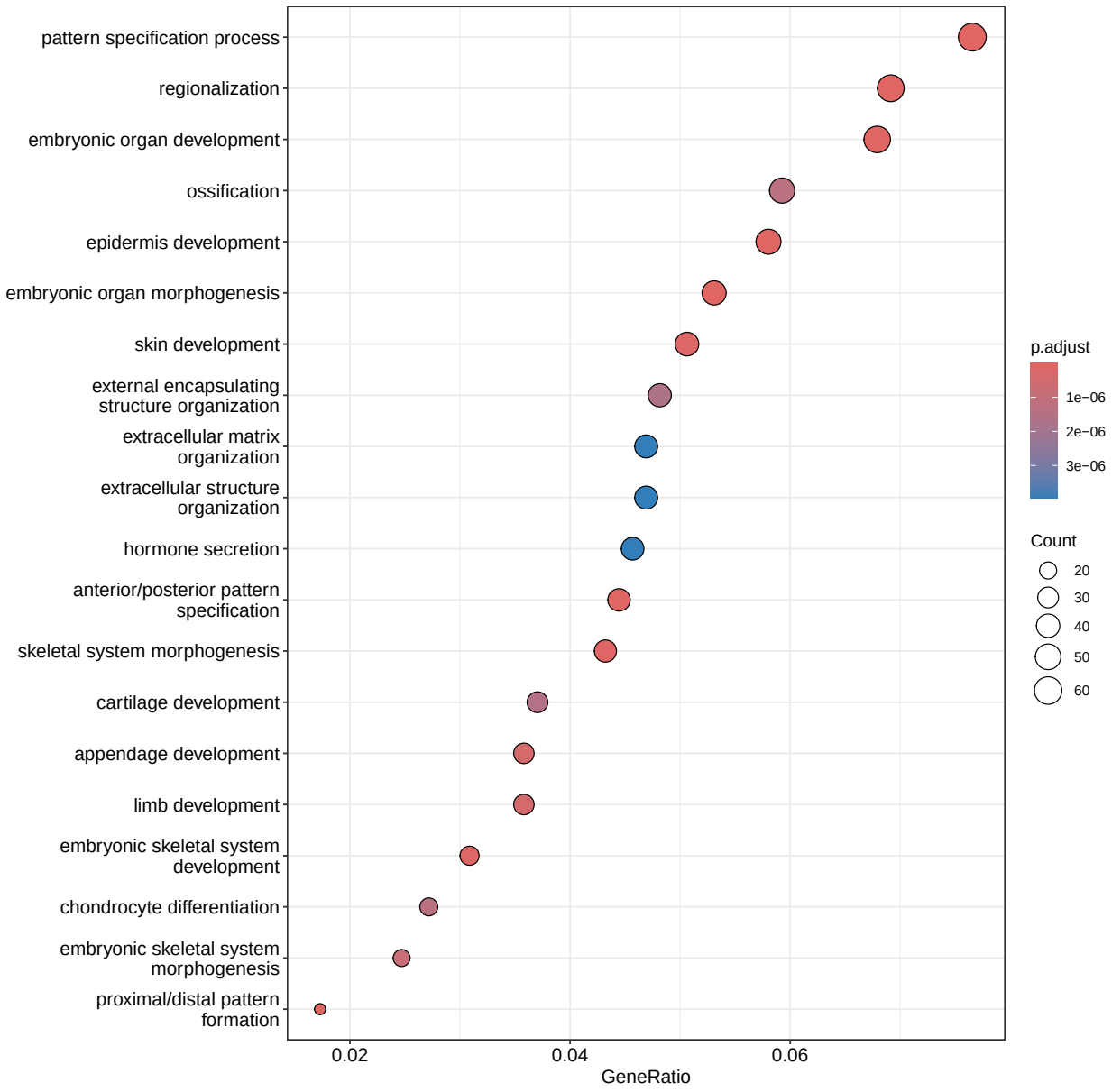
```
# For BP (Biological Process)
rs_ego <- enrichGO(rownames(res_lfc_padj_0.05), OrgDb = "org.Hs.eg.db", keyType = "SYMBOL",
                   ont ="BP", pAdjustMethod = "BH", pvalueCutoff = 0.05)
head(rs_ego)
```

```
##                    ID                                Description GeneRatio
## GO:0007389 GO:0007389            pattern specification process    62/810
## GO:0003002 GO:0003002                          regionalization    56/810
## GO:0048562 GO:0048562            embryonic organ morphogenesis    43/810
## GO:0048568 GO:0048568              embryonic organ development    55/810
## GO:0009952 GO:0009952 anterior/posterior pattern specification    36/810
## GO:0009954 GO:0009954        proximal/distal pattern formation    14/810
##              BgRatio       pvalue     p.adjust       qvalue
## GO:0007389 475/18870 4.549951e-15 2.177151e-11 1.836743e-11
## GO:0003002 430/18870 1.114470e-13 2.666369e-10 2.249469e-10
## GO:0048562 295/18870 1.977370e-12 3.153905e-09 2.660777e-09
## GO:0048568 453/18870 3.274792e-12 3.505226e-09 2.957167e-09
## GO:0009952 219/18870 3.662723e-12 3.505226e-09 2.957167e-09
## GO:0009954  34/18870 4.036119e-11 3.218805e-08 2.715529e-08
##
## GO:0007389 AURKA/BARX1/BMPR1B/CDX2/CFAP53/CHRDL1/CITED2/DAAM2/DKK1/DLL3/DLX1/DLX2/DNAH5/DOP1B/EN1/FE
## GO:0003002                                    AURKA/BARX1/BMPR1B/CDX2/CFAP53/CITED2/DAAM2/DKK1/DLL3/D
## GO:0048562
## GO:0048568                                                 ALX1/ASCL2/CDX2/CITED2/COL11A1/COL27A1/COL2A1/
## GO:0009952
## GO:0009954
##            Count
## GO:0007389    62
## GO:0003002    56
## GO:0048562    43
## GO:0048568    55
## GO:0009952    36
## GO:0009954    14
```

```
barplot(rs_ego, showCategory = 20)
```



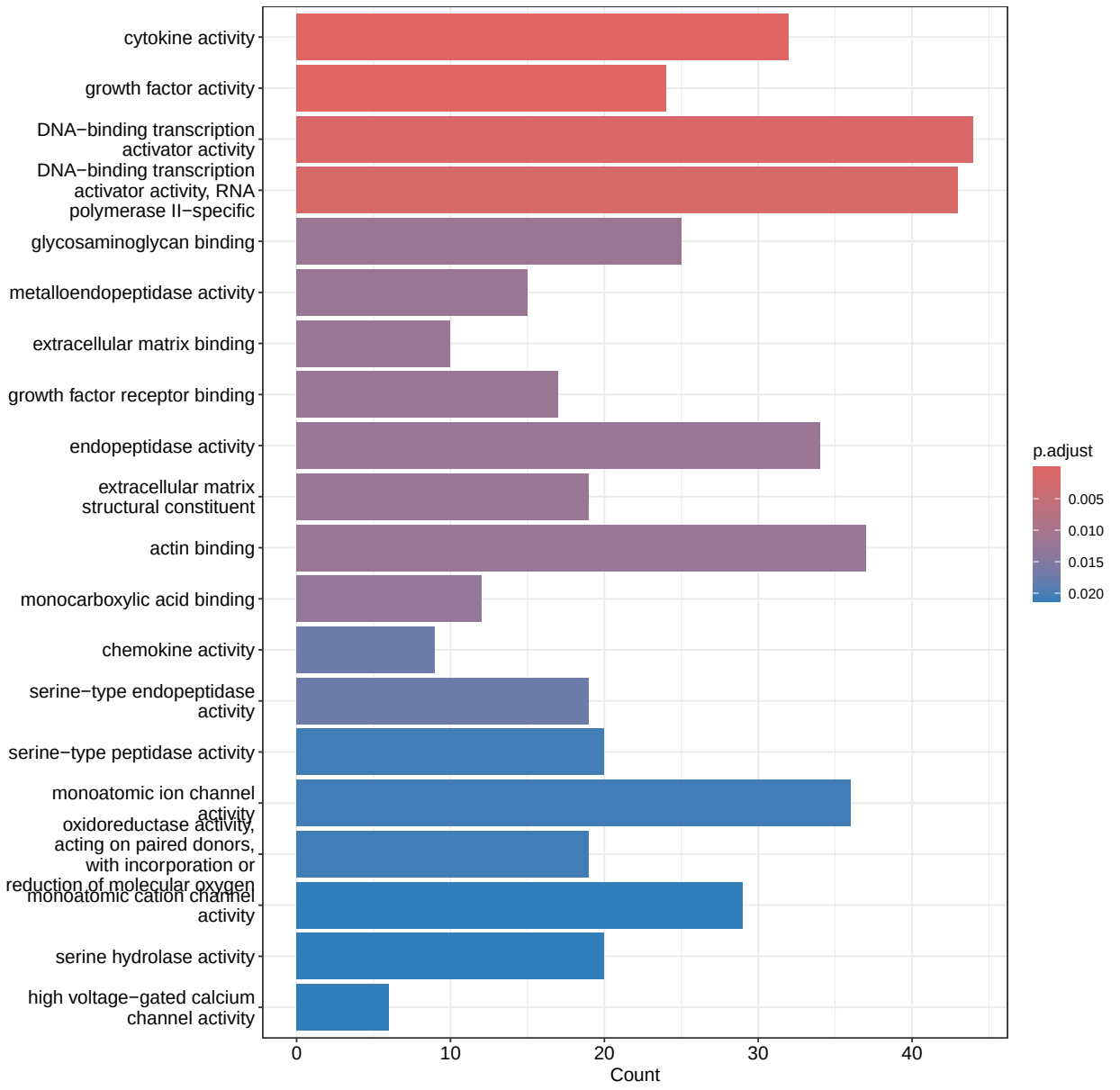

```
dotplot(rs_ego, showCategory = 20)
```



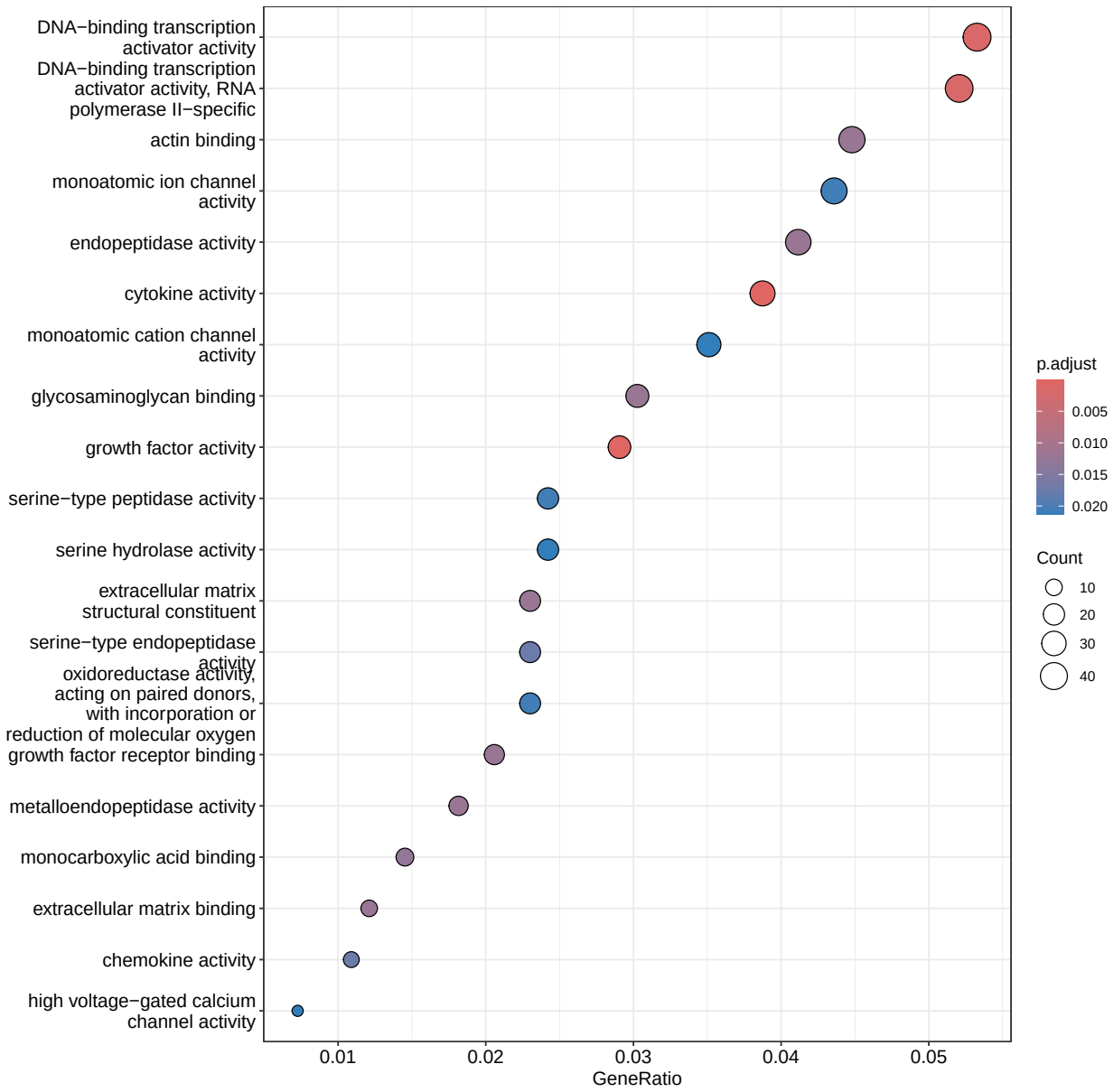

```
# For MF (molecular function)

mf_ego <- enrichGO(rownames(res_lfc_padj_0.05), OrgDb = "org.Hs.eg.db", keyType = "SYMBOL",
                   ont = "MF", pAdjustMethod = "BH", pvalueCutoff = 0.05)

barplot(mf_ego, showCategory = 20)
```

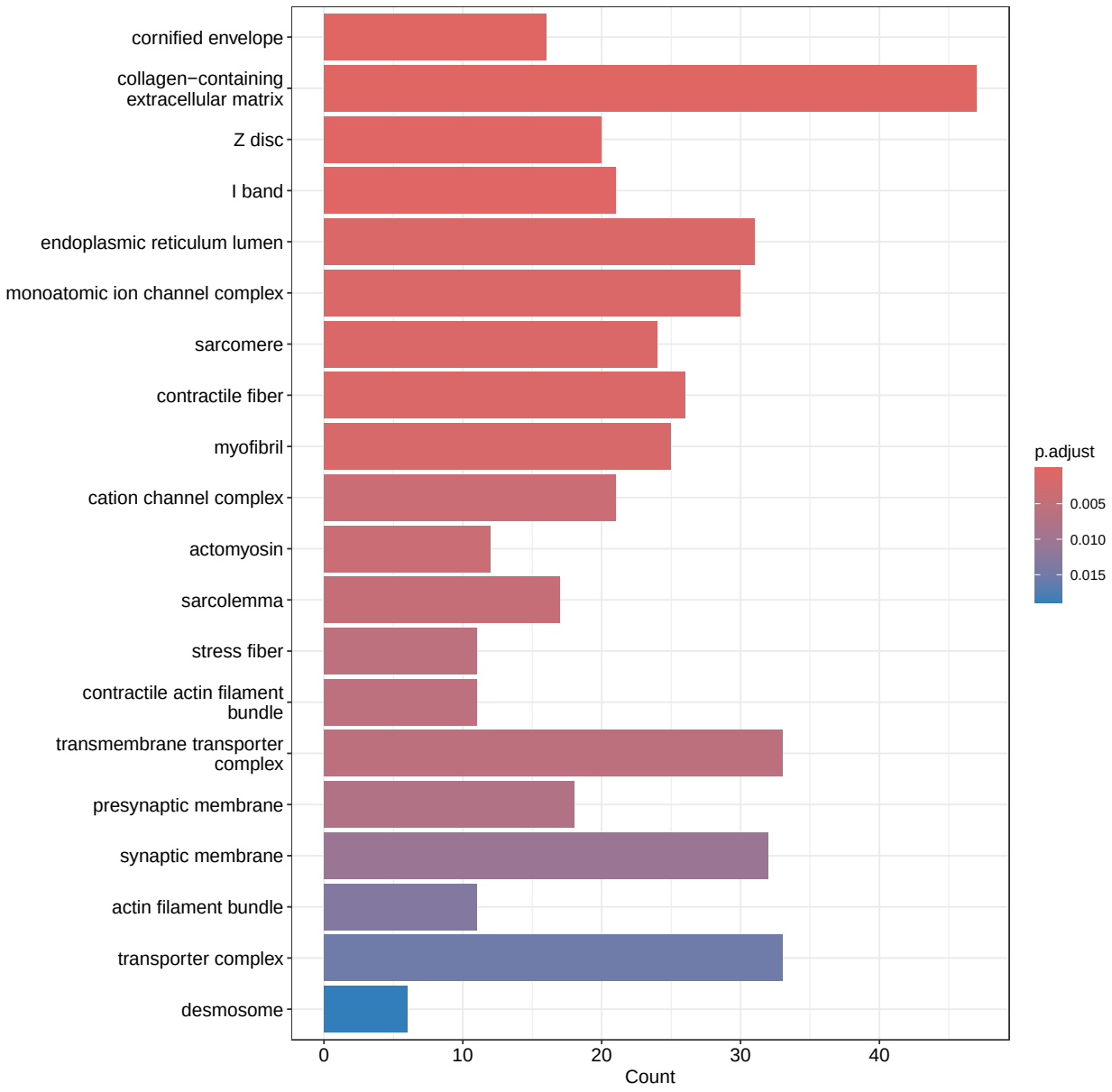



```
dotplot(mf_ego, showCategory = 20)
```

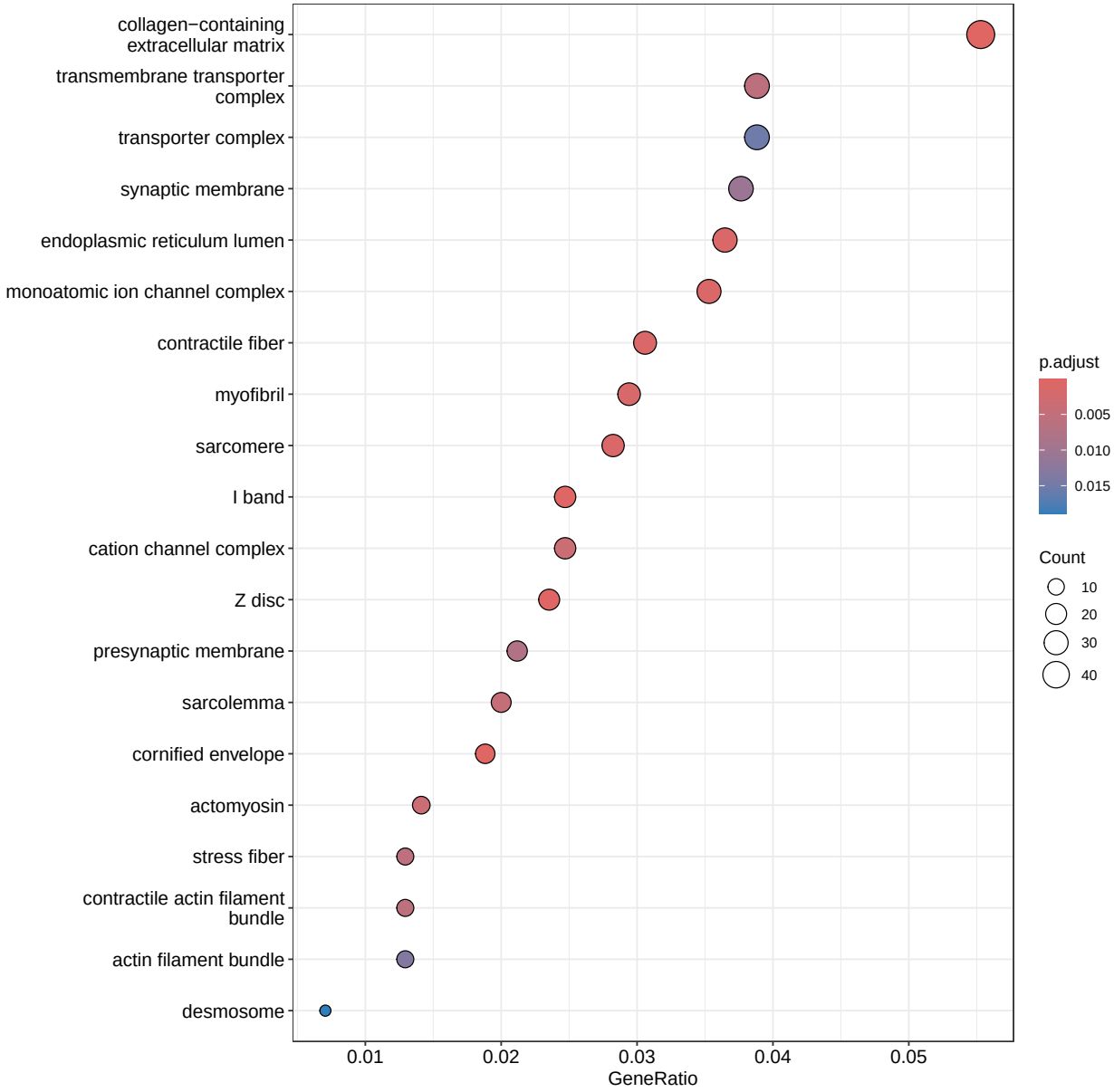



```
# For CC (cellular component)
cc_ego <- enrichGO(rownames(res_lfc_padj_0.05), OrgDb = "org.Hs.eg.db", keyType = "SYMBOL",
                   ont = "CC", pAdjustMethod = "BH", pvalueCutoff = 0.05)

barplot(cc_ego, showCategory = 20)
```




```
dotplot(cc_ego, showCategory = 20)
```




```
deg_list
```

```
##    [1] "A2ML1"                  "ABCA13"
##    [3] "ABCC2"                  "ABCG4"
##    [5] "ABLIM1"                 "ABLIM3"
##    [7] "ACER1"                  "ACKR1"
##    [9] "ACKR3"                  "ACOT11"
##   [11] "ACOX1"                  "ACOX2"
##   [13] "ACOX3"                  "ACP3"
##   [15] "ACTG2"                  "ACVR1C"
##   [17] "ADAM12"                 "ADAM23"
##   [19] "ADAM32_1"               "ADAM33"
##   [21] "ADAMTS12"               "ADAMTS14"
```

```
##   [23] "ADAMTS7"                "ADAMTS8"
##   [25] "ADAMTS9-AS1"            "ADAMTS9-AS2"
##   [27] "ADCY5"                  "ADD2"
##   [29] "ADGRF2P"                "ADGRG6"
##   [31] "ADH1B"                  "AFDN"
##   [33] "AFF3"                   "AGFG2"
##   [35] "AGTR1"                  "AIF1L"
##   [37] "AKR1B1"                 "AKR1C1"
##   [39] "AKR1C2"                 "AKR1C3"
##   [41] "ALDH9A1"                "ALG1L1P"
##   [43] "ALOX12"                 "ALOX12P2"
##   [45] "ALOX15"                 "ALX1"
##   [47] "AMOTL2"                 "ANGPTL1"
##   [49] "ANKRD19P"               "ANKRD20A11P"
##   [51] "ANKRD20A5P"             "ANKRD20A9P"
##   [53] "ANKRD20A9P_1"           "ANKRD22"
##   [55] "ANKRD34B"               "ANO1"
##   [57] "ANXA10"                 "ANXA9"
##   [59] "AOC3"                   "AOX1"
##   [61] "APLN"                   "APOC1"
##   [63] "AQP5"                   "AQP7P1"
##   [65] "ARHGAP10"               "ARHGAP27"
##   [67] "ARHGAP27_2"             "ARHGEF10L"
##   [69] "ARSF"                   "ARTN"
##   [71] "ASB5"                   "ASCL2"
##   [73] "ASPA"                   "ASPG"
##   [75] "ASPN_1"                 "ATG9B"
##   [77] "ATOH8"                  "ATP13A4"
##   [79] "ATP1A2"                 "AUNIP"
##   [81] "AURKA"                  "AURKB"
##   [83] "B3GNT8"                 "B4GALNT1"
##   [85] "B4GALNT4"               "BAMBI"
##   [87] "BARX1"                  "BARX2"
##   [89] "BBOX1-AS1"              "BCAN"
##   [91] "BCAS1"                  "BICD1"
##   [93] "BIRC5"                  "BLNK"
##   [95] "BMP8A"                  "BMPR1B"
##   [97] "BMS1P14"                "BMS1P23"
##   [99] "BNIPL"                  "BOC"
##  [101] "BPIFB2"                 "C15orf40"
##  [103] "C15orf62"               "C16orf74"
##  [105] "C1orf116"               "C1QTNF6"
##  [107] "C3orf70"                "C6orf132"
##  [109] "C6orf15"                "C6orf15_2"
##  [111] "C6orf15_3"              "C6orf15_4"
##  [113] "C6orf15_5"              "C7"
##  [115] "C7orf57"                "CA13"
##  [117] "CA9"                    "CAB39L"
##  [119] "CABYR"                  "CACNA1B"
##  [121] "CACNB2"                 "CACNG4"
##  [123] "CADM3"                  "CALB1"
##  [125] "CAMK2N2"                "CAPN14"
##  [127] "CASC9"                  "CASQ2"
##  [129] "CBS"                    "CCDC162P"
```

```
##  [131] "CCDC187"                "CCL14"
##  [133] "CCL14_1"                "CCL20"
##  [135] "CCN4"                   "CCN5"
##  [137] "CCNA1"                  "CCNP"
##  [139] "CD1E"                   "CD207"
##  [141] "CD276"                  "CD300LG"
##  [143] "CD83"                   "CDC45"
##  [145] "CDC6"                   "CDCA3"
##  [147] "CDCA5"                  "CDH11"
##  [149] "CDH19"                  "CDKN3"
##  [151] "CDSN_3"                 "CDSN_4"
##  [153] "CDX2"                   "CEACAM1"
##  [155] "CEACAM7"                "CECR2"
##  [157] "CENPA"                  "CENPF"
##  [159] "CENPH"                  "CENPM"
##  [161] "CENPV"                  "CEP55"
##  [163] "CES2"                   "CFAP251"
##  [165] "CFAP47"                 "CFAP53"
##  [167] "CFD"                    "CFD_1"
##  [169] "CGNL1"                  "CHGB"
##  [171] "CHODL"                  "CHP2"
##  [173] "CHRDL1"                 "CHRNA1"
##  [175] "CHST2"                  "CILP"
##  [177] "CILP2"                  "CIMAP2"
##  [179] "CIP2A"                  "CITED2"
##  [181] "CKS1B"                  "CKS2"
##  [183] "CLCA4"                  "CLDN17"
##  [185] "CLEC12A-AS1"            "CLEC3B"
##  [187] "CLIC3"                  "CLSPN"
##  [189] "CNFN"                   "CNGB1"
##  [191] "CNIH2"                  "CNN1"
##  [193] "CNTN5"                  "CNTNAP2"
##  [195] "CNTNAP2_1"              "COCH"
##  [197] "COL10A1"                "COL11A1"
##  [199] "COL24A1"                "COL27A1"
##  [201] "COL2A1"                 "COL7A1"
##  [203] "CPEB3"                  "CPLX2"
##  [205] "CPNE6"                  "CPNE6_1"
##  [207] "CPXM1"                  "CRABP1"
##  [209] "CRCT1"                  "CRISP2"
##  [211] "CRISP3"                 "CRMA"
##  [213] "CRNN"                   "CRTAC1"
##  [215] "CRYBG1"                 "CRYBG2"
##  [217] "CSAG2_1"                "CSAG3"
##  [219] "CSAG3_1"                "CSF2"
##  [221] "CSRP1"                  "CST1"
##  [223] "CST2"                   "CSTB"
##  [225] "CT45A5"                 "CTHRC1"
##  [227] "CTNNA3"                 "CTSC"
##  [229] "CTTN-DT"                "CTTN-DT_1"
##  [231] "CTTNBP2"                "CXCL1"
##  [233] "CXCL11"                 "CXCL12"
##  [235] "CXCL14"                 "CXCL5"
##  [237] "CXCL6"                  "CXCR2"
```

```
##  [239] "CYP11A1"                "CYP11A1_1"
##  [241] "CYP1A1"                 "CYP26A1"
##  [243] "CYP2C18"                "CYP2J2"
##  [245] "CYP4B1"                 "CYP4F12"
##  [247] "CYP4F22"                "CYP4F29P"
##  [249] "CYP4F35P"               "CYSRT1"
##  [251] "DAAM2"                  "DAPP1"
##  [253] "DEFB4B_2"               "DEGS2"
##  [255] "DENND2C"                "DES"
##  [257] "DHCR24"                 "DHCR7-DT"
##  [259] "DHRS2"                  "DIP2C-AS1"
##  [261] "DKK1"                   "DLGAP1-AS1"
##  [263] "DLGAP5"                 "DLL3"
##  [265] "DLX1"                   "DLX1_1"
##  [267] "DLX2"                   "DLX6"
##  [269] "DLX6-AS1"               "DMP1"
##  [271] "DMRT1"                  "DNAH14"
##  [273] "DNAH17"                 "DNAH5"
##  [275] "DNMT3B"                 "DOCK9"
##  [277] "DOP1B"                  "DPF1"
##  [279] "DPYSL5"                 "DRAXIN"
##  [281] "DSG3"                   "DTL"
##  [283] "DUOX1"                  "DUSP9"
##  [285] "DUXAP10"                "DUXAP8"
##  [287] "DUXAP9"                 "DYNAP"
##  [289] "E2F1"                   "E2F7"
##  [291] "ECM1"                   "ECRG4"
##  [293] "ECT2"                   "EGF"
##  [295] "EHD3"                   "EHF"
##  [297] "EIF5A2"                 "ELOVL4"
##  [299] "EMID1"                  "EMP1"
##  [301] "EMSY-DT"                "EN1"
##  [303] "EN2"                    "ENDOU"
##  [305] "ENTREP1"                "EPB41L4A"
##  [307] "EPCAM"                  "EPGN"
##  [309] "EPHA1"                  "EPHA1_1"
##  [311] "EPHB2"                  "EPHX2"
##  [313] "EPHX3"                  "EPS8L1"
##  [315] "EPS8L2"                 "EREG"
##  [317] "ERFE"                   "ESM1"
##  [319] "ESPL1_1"                "ETFDH"
##  [321] "EVA1A"                  "EVPL"
##  [323] "F10"                    "FABP4"
##  [325] "FADD"                   "FADS1"
##  [327] "FADS2"                  "FADS3"
##  [329] "FALEC"                  "FAM107A"
##  [331] "FAM135A"                "FAM25A"
##  [333] "FAM3B"                  "FAM3D"
##  [335] "FAR2P1"                 "FBN2"
##  [337] "FCER1A"                 "FCER1A_1"
##  [339] "FCHO2"                  "FEZF1"
##  [341] "FEZF1-AS1"              "FGF12"
##  [343] "FGF19"                  "FGF5"
##  [345] "FHAD1"                  "FHL1"
```

```
##  [347] "FIBCD1"                "FIRRE"
##  [349] "FLG"                   "FLNC"
##  [351] "FLOT1_1"               "FNDC4"
##  [353] "FOXD2-AS1"             "FOXD3-AS1"
##  [355] "FOXI2"                 "FOXI3"
##  [357] "FOXL1"                 "FOXL2"
##  [359] "FOXM1"                 "FOXO6_1"
##  [361] "FREM2"                 "FRMD4B"
##  [363] "FUT3_1"                "FUT6"
##  [365] "FXYD1"                 "GAB1"
##  [367] "GABRA4"                "GABRP"
##  [369] "GAL"                   "GALNT17"
##  [371] "GAP43"                 "GAST"
##  [373] "GATA4"                 "GBP6"
##  [375] "GBX2"                  "GCKR"
##  [377] "GCNT4"                 "GCOM1"
##  [379] "GDA"                   "GDF15"
##  [381] "GDF7"                  "GDPD2"
##  [383] "GDPD3"                 "GFOD2"
##  [385] "GFRA1"                 "GGT6"
##  [387] "GINS1"                 "GINS2"
##  [389] "GJB7"                  "GLI1"
##  [391] "GLI2"                  "GLTP"
##  [393] "GNG7"                  "GPC2"
##  [395] "GPD1L"                 "GPIHBP1"
##  [397] "GPR149"                "GPR158"
##  [399] "GPR19"                 "GPR50"
##  [401] "GPT"                   "GPT2"
##  [403] "GPX3"                  "GREM2"
##  [405] "GRHL1"                 "GRHL3"
##  [407] "GRIN2D"                "GRM4"
##  [409] "GRP"                   "GSC"
##  [411] "GTF2H2"                "GTF3C2-AS2"
##  [413] "GUCY1B2"               "GYS2"
##  [415] "H2AC19"                "H2BC9"
##  [417] "H3C8"                  "HAGHL"
##  [419] "HAGLR"                 "HAGLROS"
##  [421] "HAP1"                  "HCG22_1"
##  [423] "HCG22_2"               "HCG22_3"
##  [425] "HCG22_6"               "HCG22_7"
##  [427] "HES6"                  "HEY1"
##  [429] "HHIP"                  "HHIPL2"
##  [431] "HJURP"                 "HLA-DOA_5"
##  [433] "HLA-DQB2_3"            "HLA-DQB2_5"
##  [435] "HMCN2"                 "HMGA2"
##  [437] "HMGB3"                 "HMGCS2"
##  [439] "HMMR"                  "HMX1"
##  [441] "HMX1_1"                "HOMER3"
##  [443] "HOTAIR"                "HOXA10"
##  [445] "HOXA10-AS"             "HOXA11"
##  [447] "HOXA13"                "HOXA9"
##  [449] "HOXB6"                 "HOXB7"
##  [451] "HOXB8"                 "HOXB9"
##  [453] "HOXC10"                "HOXC11"
```

```
##  [455] "HOXC13"                "HOXC13-AS"
##  [457] "HOXC9"                 "HOXD10"
##  [459] "HOXD11"                "HOXD13"
##  [461] "HOXD8"                 "HPGD"
##  [463] "HPSE2"                 "HS3ST5"
##  [465] "HSPA6"                 "HSPB6"
##  [467] "HSPB7"                 "HTR2C"
##  [469] "HTR3B"                 "IBSP"
##  [471] "IFI6"                  "IFIT1"
##  [473] "IGF2BP1"               "IGF2BP2"
##  [475] "IGFBP3"                "IGFL1"
##  [477] "IL11"                  "IL12A"
##  [479] "IL12A-AS1"             "IL13RA2"
##  [481] "IL18"                  "IL1RN"
##  [483] "IL24"                  "IL31RA"
##  [485] "IL34"                  "IL36A"
##  [487] "IL36B"                 "IL36G"
##  [489] "INHBA"                 "IP6K3"
##  [491] "IRS4"                  "ISG15"
##  [493] "IVL"                   "JAKMIP3"
##  [495] "JPH2"                  "KALRN"
##  [497] "KANK1"                 "KAT2B"
##  [499] "KAZN"                  "KCNA5"
##  [501] "KCNB1"                 "KCNC3"
##  [503] "KCNG3"                 "KCNK3"
##  [505] "KCNMA1"                "KCNMB1"
##  [507] "KCNMB2-AS1"            "KCNMB3"
##  [509] "KCNS3"                 "KIAA1549"
##  [511] "KIF14"                 "KIF1A"
##  [513] "KIF26B"                "KIF4A"
##  [515] "KILH"                  "KLHDC7B"
##  [517] "KLHDC7B-DT"            "KLHDC8A"
##  [519] "KLK11"                 "KLK12"
##  [521] "KLK13"                 "KPRP"
##  [523] "KREMEN2"               "KRT13"
##  [525] "KRT24"                 "KRT3"
##  [527] "KRT32"                 "KRT4"
##  [529] "KRT42P"                "KRT75"
##  [531] "KRT78"                 "KRT8"
##  [533] "KRTAP4-1_1"            "LAMA1"
##  [535] "LAMB4"                 "LAMC2"
##  [537] "LAMP3"                 "LAYN"
##  [539] "LCAL1"                 "LCN1"
##  [541] "LCN10"                 "LDB3"
##  [543] "LGI1"                  "LGI3"
##  [545] "LHX2"                  "LHX5"
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##  [557] "LINC01305"             "LINC01614"
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##  [561] "LINC02041_1"           "LINC02043"
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##  [567] "LINC02253"               "LINC02321"
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##  [571] "LINC02538"               "LINC02560"
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##  [575] "LINC02609"               "LINC02623"
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##  [579] "LINC02884"               "LINC02893"
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##  [731] "MACC1"                   "MAFA"
##  [733] "MAGEA1"                  "MAGEA11"
##  [735] "MAGEA3"                  "MAGEA3_1"
##  [737] "MAGEA4"                  "MAGEA6_1"
##  [739] "MAL"                     "MALL"
##  [741] "MALLP2"                  "MAPK12"
##  [743] "MAPT"                    "MAPT_1"
##  [745] "MAPT_2"                  "MARCKSL1"
##  [747] "MC1R"                    "MCCC2_1"
##  [749] "MCIDAS"                  "MCM2"
##  [751] "MCOLN3"                  "MDK"
##  [753] "MECOM-AS1"               "MEGF10"
##  [755] "MELTF"                   "MELTF-AS1"
##  [757] "MEST"                    "METTL21A"
##  [759] "MFAP2"                   "MFAP2_1"
##  [761] "MGLL"                    "MINDY1"
##  [763] "MIR9-3HG"                "MISP"
##  [765] "MLLT11"                  "MME"
##  [767] "MMP1"                    "MMP10"
##  [769] "MMP11"                   "MMP11_1"
##  [771] "MMP12"                   "MMP13"
##  [773] "MMP3"                    "MND1"
##  [775] "MPZL3"                   "MS4A4E"
##  [777] "MSANTD3"                 "MSC"
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##  [783] "MUC21_2"               "MUC21_3"
##  [785] "MUC22"                 "MUC22_1"
##  [787] "MUC22_2"               "MUC22_7"
##  [789] "MUC5B"                 "MUCL1"
##  [791] "MUCL3"                 "MUCL3_1"
##  [793] "MUCL3_2"               "MUSTN1"
##  [795] "MYBL2"                 "MYH11"
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##  [799] "MYOC"                  "MYOCD"
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##  [803] "MYZAP"                 "N4BP3"
##  [805] "NAT14"                 "NAT8L"
##  [807] "NCCRP1"                "NCK1-DT"
##  [809] "NDC80"                 "NDRG2"
##  [811] "NEB"                   "NECAB2"
##  [813] "NEK10"                 "NEK2"
##  [815] "NELL2"                 "NEURL3"
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##  [821] "NIPAL1"                "NKAIN2"
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##  [829] "NOTUM"                 "NPAS2"
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##  [835] "NREP"                  "NRIP3"
##  [837] "NT5C2"                 "NTRK3"
##  [839] "NTS"                   "NUF2"
##  [841] "NXPH4"                 "OCLN_1"
##  [843] "ODC1"                  "OGDHL"
##  [845] "OGN"                   "OGN_1"
##  [847] "ONECUT2"               "OPRK1"
##  [849] "ORC6"                  "OTOP3"
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##  [853] "P2RX2"                 "P2RY14"
##  [855] "P3H4"                  "P4HA3"
##  [857] "PABIR3"                "PADI1"
##  [859] "PADI1_1"               "PAQR5"
##  [861] "PAX3"                  "PAX6"
##  [863] "PAX7"                  "PAX9"
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##  [867] "PCAT7"                 "PCDH1"
##  [869] "PCDHB9_1"              "PCLAF"
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##  [873] "PCSK1N"                "PCSK2"
##  [875] "PDE11A"                "PDGFA"
##  [877] "PDK4"                  "PDLIM2"
##  [879] "PDZRN3"                "PDZRN4"
##  [881] "PFN2"                  "PGM2L1"
##  [883] "PGM5"                  "PGM5-AS1"
##  [885] "PGM5P4"                "PHACTR2"
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##  [897] "PLA2G2C"                "PLA2G4B"
##  [899] "PLAAT2"                 "PLAU"
##  [901] "PLCXD3"                 "PLD6"
##  [903] "PLEKHA7"                "PLEKHG4B"
##  [905] "PLEKHM1"                "PLEKHM1_2"
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##  [915] "POTEF_1"                "POU6F2-AS2"
##  [917] "PPL"                    "PPP1R12B"
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##  [925] "PRELP"                  "PROC"
##  [927] "PRR15"                  "PRR15-DT"
##  [929] "PRR20G"                 "PRR4"
##  [931] "PRR4_1"                 "PRR4_2"
##  [933] "PRR5L"                  "PRSS21"
##  [935] "PRSS27"                 "PRSS3"
##  [937] "PRUNE2"                 "PSCA"
##  [939] "PTGIS"                  "PTGS2"
##  [941] "PTH2R"                  "PTHLH"
##  [943] "PTK6"                   "PTPRN"
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##  [947] "PYGM"                   "PYY2"
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##  [951] "RAB32"                  "RAB3B"
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##  [963] "RBFOX3"                 "RBM47"
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##  [971] "RHCG"                   "RHEBL1"
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##  [981] "ROS1"                   "RPL39L"
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##  [993] "SCGB2A2"                "SCGB3A1"
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##  [999] "SCN9A"                 "SCNN1B"
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## [1009] "SERPINH1"              "SEZ6L2"
## [1011] "SFTA2_2"               "SGCA"
## [1013] "SH3BGRL2"              "SHH"
## [1015] "SHISA2"                "SHOX2"
## [1017] "SIM2"                  "SIX1"
## [1019] "SIX2"                  "SIX3"
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## [1033] "SLC35C1"               "SLC46A2"
## [1035] "SLC51A"                "SLC52A1"
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## [1043] "SLCO4A1-AS2"           "SLITRK3"
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## [1051] "SNCB"                  "SNHG33"
## [1053] "SNORD3A"               "SNX10"
## [1055] "SORBS1"                "SORCS1"
## [1057] "SORT1"                 "SOST"
## [1059] "SOX10"                 "SOX11"
## [1061] "SOX4"                  "SPC24"
## [1063] "SPC25_1"               "SPINDOC"
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## [1071] "SPSB4"                 "SPTLC3"
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## [1075] "ST8SIA2"               "STIM1"
## [1077] "STK40"                 "STMN1"
## [1079] "STRA6"                 "STRA6_1"
## [1081] "STRN"                  "STUM"
## [1083] "STX1A"                 "SULT2B1"
## [1085] "SYCP2"                 "SYNDIG1"
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## [1089] "SYNPO2L"               "SYT1"
## [1091] "SYT14"                 "TACR1"
## [1093] "TACR2"                 "TAGLN"
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## [1097] "TCF15"                 "TDO2"
## [1099] "TDO2_1"                "TEC"
## [1101] "TENT5B"                "TESMIN"
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## [1133] "TREH"                    "TREM1"
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