Brief Introduction to R package gact

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Contents

The practical is based on the R package `gact` (Rohde et al.2022)). This package provides an infrastructure for working with large-scale genomic association data linked to different types of genomic features.

The most recent version of `gact` can be obtained from github:

```
library(devtools)
devtools::install_github("psoerensen/gact")
```

Load packages used

```
library(gact)
library(qgg)
library(corrplot)
```

Download and install GDT database

The function `gact()` dowload and install the GDT database:

```
# Set working for database
setwd("C://Users//au223366//Dropbox//GitHub//gdtdb")

# Download data bases from repository
GAlist <- gact(version = "t2dm-gact-0.0.1", task = "download")
GAlist$features
```

```
## [1] "Genes"            "GO"                 "Pathways"
## [4] "ProteinComplexes"  "ChemicalComplexes"
```

```
# Information about features in GDT database
GAlist$features
```

```
## [1] "Genes"            "GO"                 "Pathways"
## [4] "ProteinComplexes"  "ChemicalComplexes"
```
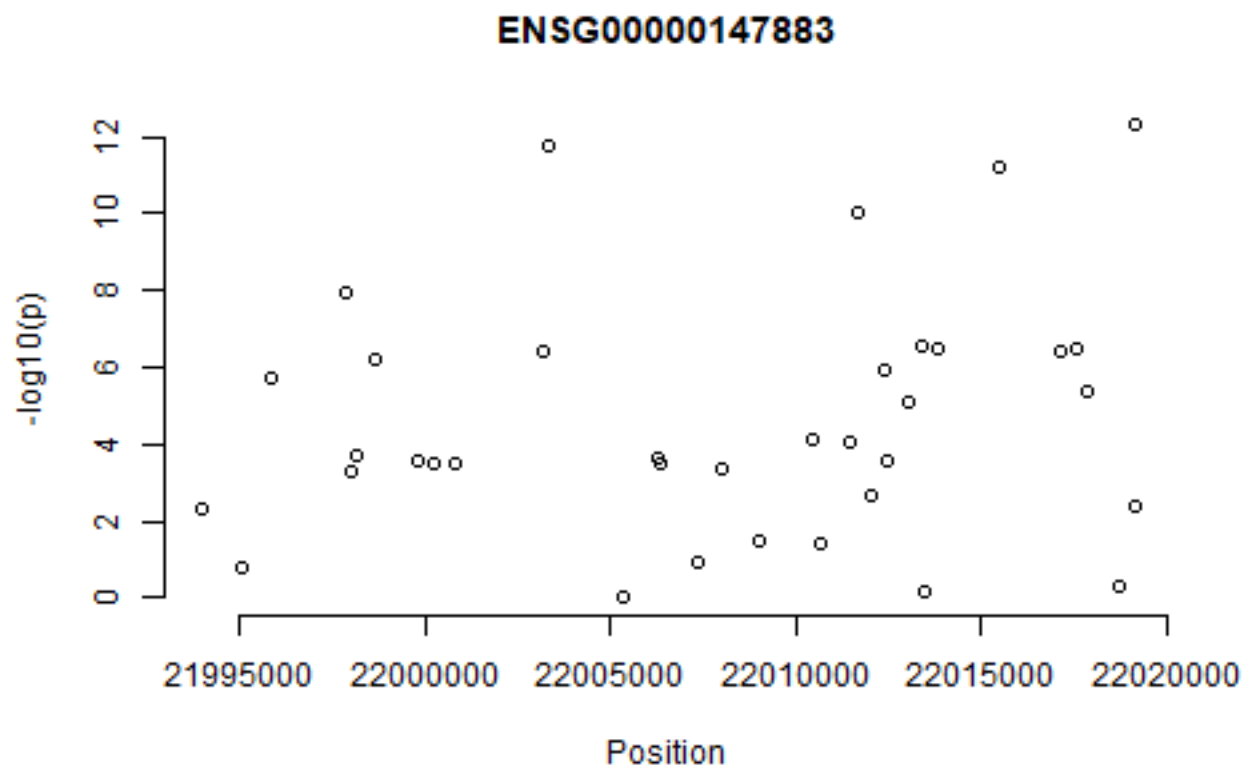
Extract data from GDT database

The function `getStat()` extract data from the database:

```
# Extract data from T2D for genomic feature Markers
stat <- getStat(GAlist = GAlist, trait = "t2d", feature = "Markers")
head(stat)
```

```
##               rsids chr    pos a1 a2    af       b   seb    p     n
## rs2000096    rs2000096   1 567867  G  A 0.000 -0.5200 0.630 0.41 28130
## rs12238997  rs12238997   1 693731  G  A 0.130 -0.0088 0.017 0.60 28130
## rs72631875  rs72631875   1 705882  A  G 0.063  0.0110 0.037 0.76 28130
## rs55727773  rs55727773   1 706368  A  G 0.500  0.0140 0.015 0.37 28130
## rs12184267  rs12184267   1 715265  T  C 0.041 -0.0610 0.061 0.32 28130
## rs12184277  rs12184277   1 715367  G  A 0.040 -0.0580 0.061 0.34 28130
```
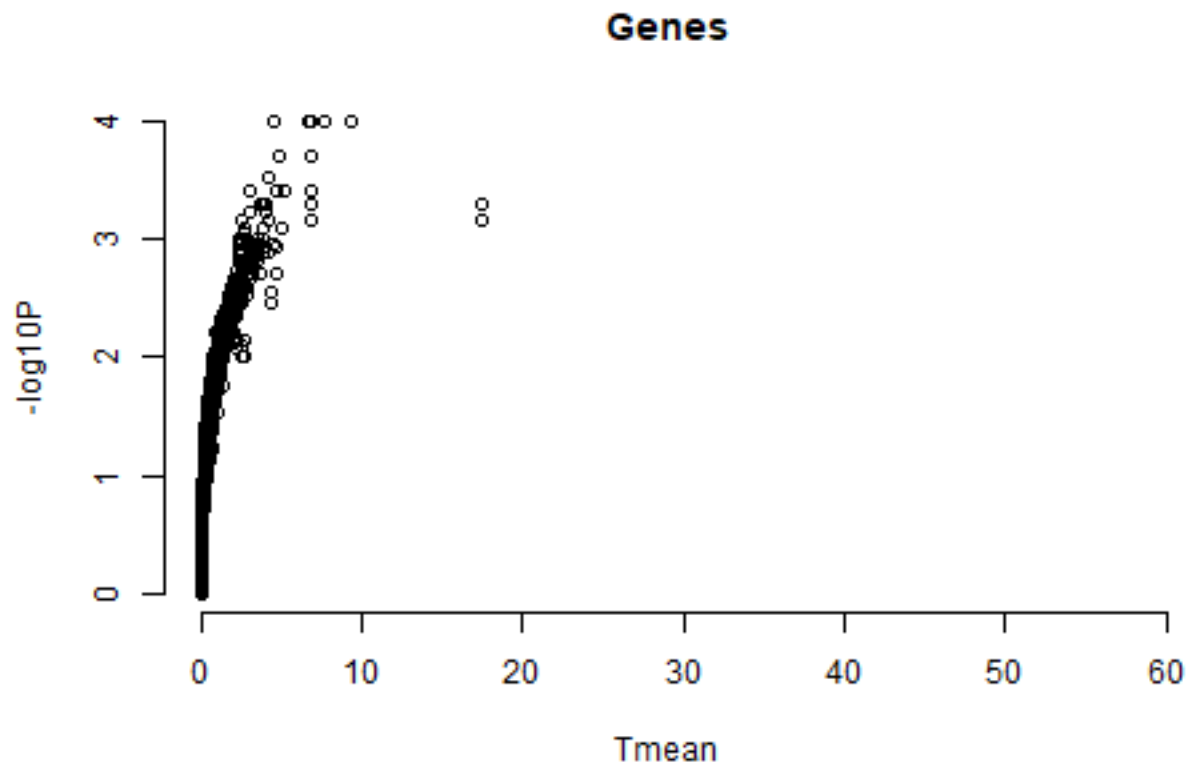
```
# Extract marker sets for ENSG00000147883 and plot
rsids <- getSets(GAlist = GAlist, feature = "Genes", featureID = "ENSG00000147883")
plot(y = -log10(stat[rsids, ]$p), x = stat[rsids, ]$pos, ylab = "-log10(p)",
    xlab = "Position", frame.plot = FALSE, main = "ENSG00000147883")
```



```
# Extract data from T2D for genomic feature Genes
stat <- getStat(GAlist = GAlist, trait = "t2d", feature = "Genes")
head(stat)
```

2

```
##                     Ensembl Gene ID   Symbol    m      stat       p
## ENSG00000121410 ENSG00000121410      A1BG   58   0.00000 1.0000
## ENSG00000175899 ENSG00000175899       A2M  153  20.78100 0.1477
## ENSG00000256069 ENSG00000256069      A2MP1   64   0.00000 1.0000
## ENSG00000171428 ENSG00000171428      NAT1  135   0.00000 1.0000
## ENSG00000156006 ENSG00000156006      NAT2  102  20.90052 0.0951
## ENSG00000196136 ENSG00000196136   SERPINA3   64   0.00000 1.0000
```
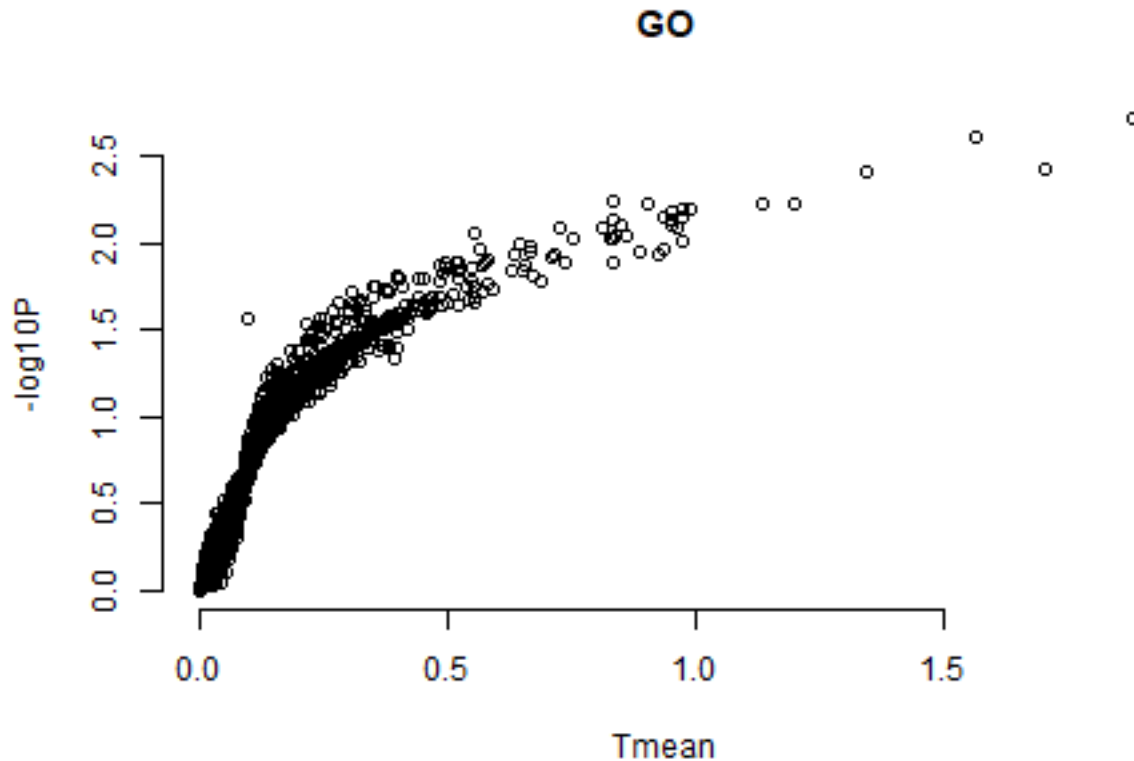
```
plot(x = stat$stat/stat$m, y = -log10(stat$p), ylab = "-log10P", xlab = "Tmean",
     frame.plot = FALSE, main = "Genes")
```



```
# Extract data from T2D for genomic feature Gene Ontology (GO) where
# output format is a data frame
stat <- getStat(GAlist = GAlist, trait = "t2d", feature = "GO")
head(stat)
```

```
##               GO ID    m       stat       p
## GO:0000002 GO:0000002 2165 143.36901 0.3208
## GO:0000012 GO:0000012 1885 107.38110 0.3577
## GO:0000027 GO:0000027 1867  72.77531 0.5031
## GO:0000028 GO:0000028  861  71.43454 0.2242
## GO:0000038 GO:0000038 2397  63.58818 0.6599
## GO:0000045 GO:0000045 8223 749.36205 0.2368
```

```
plot(x = stat$stat/stat$m, y = -log10(stat$p), ylab = "-log10P", xlab = "Tmean",
    frame.plot = FALSE, main = "GO")
```
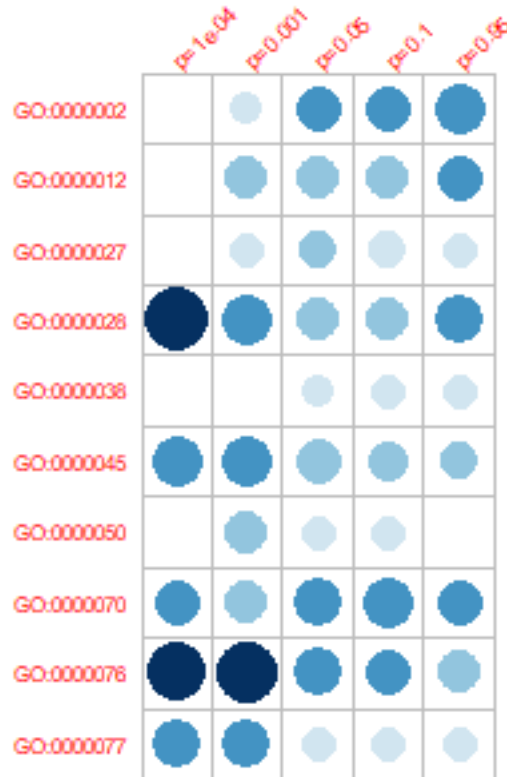


```
# Extract data from T2D for genomic feature Gene Ontology (GO) where
# output format is list
stat <- getStat(GAlist = GAlist, trait = "t2d", feature = "GO", format = "list",
    cls = c("p=1e.04", "p=0.001", "p=0.05", "p=0.1", "p=0.95"))
str(stat)
```

```
## List of 3
##  $ m   : Named int [1:4547] 2165 1885 1867 861 2397 8223 1050 3519 1077 5192 ...
##   ..- attr(*, "names")= chr [1:4547] "GO:0000002" "GO:0000012" "GO:0000027" "GO:0000028" ...
##  $ stat: num [1:4547, 1:5] 0 0 0 17 0 ...
##   ..- attr(*, "dimnames")=List of 2
##   .. ..$ : chr [1:4547] "GO:0000002" "GO:0000012" "GO:0000027" "GO:0000028" ...
##   .. ..$ : chr [1:5] "p=1e.04" "p=0.001" "p=0.05" "p=0.1" ...
##  $ p   : num [1:4547, 1:5] 1 1 1 0.0781 1 ...
##   ..- attr(*, "dimnames")=List of 2
##   .. ..$ : chr [1:4547] "GO:0000002" "GO:0000012" "GO:0000027" "GO:0000028" ...
##   .. ..$ : chr [1:5] "p=1e.04" "p=0.001" "p=0.05" "p=0.1" ...
```

```
# Plot results for genomic feature Gene Ontology (GO)
colbar <- colorRampPalette(c("#FFFFFF", "#D1E5F0", "#92C5DE", "#4393C3",
    "#2166AC", "#053061"))
```

4

```r
corrplot(-log10(stat$p[1:10, ]), is.corr = FALSE, tl.cex = 0.7, tl.srt = 45,
    col = colbar(6), cl.pos = "n", mar = c(1, 1, 1, 1))
```


Extract and write data from GDT database

The function `writeStat()` extract and write data from the database:

```r
writeStat(GAlist = GAlist, feature = "GO", trait = "t2d", file.csv = "go_t2dm_gcta.csv")
writeStat(GAlist = GAlist, feature = "Pathways", trait = "t2d", file.csv = "pathways_t2dm_gcta.csv")
writeStat(GAlist = GAlist, feature = "ProteinComplexes", trait = "t2d",
    file.csv = "proteincomplexes_t2dm_gcta.csv")
writeStat(GAlist = GAlist, feature = "ChemicalComplexes", trait = "t2d",
    file.csv = "chemicalcomplexes_t2dm_gcta.csv")
writeStat(GAlist = GAlist, feature = "Genes", trait = "t2d", file.csv = "genes_t2dm_gcta.csv")
```

Extract marker set data from GDT database

The marker sets in the database can be extracted using:

```r
str(GAlist$gsets)
```

```
## List of 11
```

```
## $ eg2rsids      :List of 25970
##  ..$ 1         : chr [1:58] "rs12978178" "rs143782846" "rs7257420" "rs964795" ...
##  ..$ 10        : chr [1:102] "rs1995001" "rs10087450" "rs115940167" "rs145621911" ...
##  ..$ 100       : chr [1:144] "rs6032614" "rs6017718" "rs111679943" "rs73911142" ...
##  ..$ 1000      : chr [1:866] "rs66779003" "rs2419021" "rs12606931" "rs12969166" ...
##  ..$ 10000     : chr [1:492] "rs2970546" "rs150922496" "rs10926991" "rs2490400" ...
##  ..$ 100009613: chr [1:46] "rs73512559" "rs60873817" "rs11607581" "rs150585599" ...
##  ..$ 100009667: chr [1:124] "rs74995764" "rs12414168" "rs12415440" "rs16922687" ...
##  ..$ 100009676: chr [1:51] "rs9850918" "rs75592719" "rs9880931" "rs13059489" ...
##  ..$ 10001     : chr [1:139] "rs28472318" "rs28435585" "rs11622223" "rs2081487" ...
##  ..$ 10002     : chr [1:90] "rs4130854" "rs4132884" "rs4132883" "rs113584422" ...
##  ..$ 10003     : chr [1:215] "rs562727" "rs540020" "rs79433514" "rs10765312" ...
##  ..$ 100033411: chr [1:60] "rs112394726" "rs114872429" "rs117295180" "rs118104716" ...
##  ..$ 100033413: chr [1:58] "rs149013529" "rs12902767" "rs12898505" "rs8028607" ...
##  ..$ 100033414: chr [1:67] "rs13329219" "rs12908376" "rs141380080" "rs76807007" ...
##  ..$ 100033415: chr [1:69] "rs117803257" "rs12910496" "rs12915436" "rs149294250" ...
##  ..$ 100033416: chr [1:58] "rs975629" "rs35796625" "rs113920608" "rs67222245" ...
##  ..$ 100033417: chr [1:68] "rs7167837" "rs71461559" "rs113113583" "rs2123682" ...
##  ..$ 100033418: chr [1:83] "rs11638988" "rs1077747" "rs749305" "rs7175885" ...
##  ..$ 100033419: chr [1:68] "rs7167837" "rs71461559" "rs113113583" "rs2123682" ...
##  ..$ 100033420: chr [1:101] "rs8025865" "rs8034720" "rs56056719" "rs9324123" ...
##  ..$ 100033421: chr [1:69] "rs117803257" "rs12910496" "rs12915436" "rs149294250" ...
##  ..$ 100033422: chr [1:97] "rs7181887" "rs1037461" "rs7165873" "rs7171320" ...
##  ..$ 100033423: chr [1:96] "rs1453556" "rs34975843" "rs28722144" "rs28430374" ...
##  ..$ 100033424: chr [1:95] "rs28430374" "rs113154769" "rs28529769" "rs144187721" ...
##  ..$ 100033425: chr [1:94] "rs34535284" "rs8036523" "rs17772804" "rs11161140" ...
##  ..$ 100033426: chr [1:98] "rs11161140" "rs1982981" "rs17178750" "rs28412352" ...
##  ..$ 100033427: chr [1:100] "rs17178750" "rs28412352" "rs35816817" "rs17178787" ...
##  ..$ 100033428: chr [1:89] "rs34366233" "rs1453557" "rs4541055" "rs4474655" ...
##  ..$ 100033429: chr [1:88] "rs57172404" "rs11161142" "rs11638932" "rs35701003" ...
##  ..$ 100033430: chr [1:76] "rs78562287" "rs72693627" "rs72693629" "rs72693630" ...
##  ..$ 100033431: chr [1:69] "rs1391515" "rs7178705" "rs4414472" "rs4262924" ...
##  ..$ 100033432: chr [1:66] "rs4028397" "rs4028394" "rs4028392" "rs11630764" ...
##  ..$ 100033433: chr [1:58] "rs117292838" "rs72693643" "rs11161144" "rs117664854" ...
##  ..$ 100033434: chr [1:56] "rs4454950" "rs532648227" "rs112637511" "rs140958366" ...
##  ..$ 100033435: chr [1:61] "rs56391472" "rs11161145" "rs8032959" "rs11630736" ...
##  ..$ 100033436: chr [1:63] "rs12437599" "rs4906919" "rs72693645" "rs11161146" ...
##  ..$ 100033437: chr [1:52] "rs2647353" "rs2736707" "rs2736708" "rs2075814" ...
##  ..$ 100033438: chr [1:63] "rs6576388" "rs4906921" "rs6576389" "rs12905858" ...
##  ..$ 100033439: chr [1:59] "rs736008" "rs1809140" "rs8027497" "rs11636986" ...
##  ..$ 100033440: chr [1:55] "rs2736708" "rs2075814" "rs2736711" "rs17114852" ...
##  ..$ 100033441: chr [1:54] "rs17180589" "rs11633230" "rs11629768" "rs11629775" ...
##  ..$ 100033442: chr [1:46] "rs111416412" "rs1391514" "rs57403633" "rs11637165" ...
##  ..$ 100033443: chr [1:40] "rs11635323" "rs28465221" "rs112158922" "rs61999148" ...
##  ..$ 100033444: chr [1:33] "rs28670521" "rs2647360" "rs75465312" "rs2736705" ...
##  ..$ 100033445: chr [1:34] "rs75465312" "rs2736705" "rs187049859" "rs2647358" ...
##  ..$ 100033446: chr [1:46] "rs111416412" "rs1391514" "rs57403633" "rs11637165" ...
##  ..$ 100033447: chr [1:46] "rs111416412" "rs1391514" "rs57403633" "rs11637165" ...
##  ..$ 100033448: chr [1:38] "rs71461575" "rs671362" "rs77812651" "rs75820138" ...
##  ..$ 100033449: chr [1:46] "rs111416412" "rs1391514" "rs57403633" "rs11637165" ...
##  ..$ 100033450: chr [1:39] "rs34680239" "rs610736" "rs2355601" "rs11631115" ...
##  ..$ 100033451: chr [1:38] "rs1199385" "rs147855713" "rs61999152" "rs149953234" ...
##  ..$ 100033453: chr [1:36] "rs188746" "rs11639396" "rs191982" "rs10162787" ...
##  ..$ 100033454: chr [1:35] "rs61999153" "rs61999154" "rs149446447" "rs12438669" ...
```

```
##   ..$ 100033455: chr [1:39] "rs61999153" "rs61999154" "rs149446447" "rs12438669" ...
##   ..$ 100033456: chr [1:39] "rs61999153" "rs61999154" "rs149446447" "rs12438669" ...
##   ..$ 100033458: chr [1:39] "rs61999153" "rs61999154" "rs149446447" "rs12438669" ...
##   ..$ 100033460: chr [1:32] "rs28805921" "rs34383778" "rs142326615" "rs11634690" ...
##   ..$ 100033603: chr [1:86] "rs28805921" "rs34383778" "rs142326615" "rs11634690" ...
##   ..$ 100033799: chr [1:32] "rs220029" "rs12916854" "rs220028" "rs4906939" ...
##   ..$ 100033800: chr [1:30] "rs11636807" "rs6576396" "rs17114902" "rs393784" ...
##   ..$ 100033801: chr [1:28] "rs72695314" "rs445368" "rs445264" "rs420067" ...
##   ..$ 100033802: chr [1:25] "rs186438819" "rs172679" "rs138625179" "rs220034" ...
##   ..$ 100033803: chr [1:38] "rs71461575" "rs671362" "rs77812651" "rs75820138" ...
##   ..$ 100033804: chr [1:33] "rs2554429" "rs2554428" "rs2732026" "rs12148639" ...
##   ..$ 100033805: chr [1:33] "rs12050838" "rs72695316" "rs12913403" "rs2554426" ...
##   ..$ 100033806: chr [1:42] "rs2554426" "rs705" "rs34842555" "rs61999157" ...
##   ..$ 100033807: chr [1:42] "rs61999157" "rs2732020" "rs2732019" "rs11637528" ...
##   ..$ 100033808: chr [1:43] "rs11637528" "rs77274559" "rs17114938" "rs111557911" ...
##   ..$ 100033809: chr [1:50] "rs11637528" "rs77274559" "rs17114938" "rs111557911" ...
##   ..$ 100033810: chr [1:38] "rs71461575" "rs671362" "rs77812651" "rs75820138" ...
##   ..$ 100033811: chr [1:54] "rs35342934" "rs75006467" "rs17114943" "rs112909191" ...
##   ..$ 100033812: chr [1:53] "rs112909191" "rs112097055" "rs1991275" "rs62001977" ...
##   ..$ 100033813: chr [1:51] "rs78477571" "rs78165937" "rs147947212" "rs111447400" ...
##   ..$ 100033814: chr [1:51] "rs113329212" "rs78900646" "rs111524938" "rs2554422" ...
##   ..$ 100033815: chr [1:50] "rs2732029" "rs765438" "rs2732030" "rs10451028" ...
##   ..$ 100033816: chr [1:49] "rs112742603" "rs113192224" "rs76630724" "rs117746255" ...
##   ..$ 100033817: chr [1:38] "rs71461575" "rs671362" "rs77812651" "rs75820138" ...
##   ..$ 100033818: chr [1:46] "rs719704" "rs17786183" "rs78176050" "rs75211960" ...
##   ..$ 100033819: chr [1:78] "rs12420402" "rs217247" "rs117574516" "rs61866962" ...
##   ..$ 100033820: chr [1:60] "rs8040098" "rs9806682" "rs11634921" "rs4906922" ...
##   ..$ 100033821: chr [1:70] "rs72693650" "rs7164989" "rs78945064" "rs12441693" ...
##   ..$ 100033822: chr [1:52] "rs147363053" "rs975698" "rs975699" "rs78884574" ...
##   ..$ 100034743: chr "rs147480284"
##   ..$ 100036563: chr [1:26] "rs17785573" "rs72695314" "rs445368" "rs445264" ...
##   ..$ 100036564: chr [1:26] "rs2855523" "rs2732025" "rs61999156" "rs2554429" ...
##   ..$ 100036565: chr [1:27] "rs61999156" "rs2554429" "rs2554428" "rs2732026" ...
##   ..$ 100036566: chr [1:51] "rs113178324" "rs79874145" "rs2732036" "rs113169434" ...
##   ..$ 100036567: chr [1:51] "rs113156290" "rs8033766" "rs147363053" "rs975698" ...
##   ..$ 100037417: chr [1:55] "rs12485098" "rs6003815" "rs143378620" "rs56234965" ...
##   ..$ 100038246: chr [1:128] "rs7896183" "rs78020979" "rs7899371" "rs7074950" ...
##   ..$ 10004    : chr [1:30] "rs3016000" "rs487568" "rs488289" "rs145695688" ...
##   ..$ 100048912: chr [1:228] "rs117447159" "rs3731204" "rs3731201" "rs3731198" ...
##   ..$ 100049076: chr [1:122] "rs62330200" "rs7733636" "rs78452750" "rs17568832" ...
##   ..$ 100049587: chr [1:34] "rs28588574" "rs273694" "rs2280806" "rs1568003" ...
##   ..$ 100049716: chr [1:122] "rs140614089" "rs28815546" "rs28807403" "rs56050758" ...
##   ..$ 10005    : chr [1:49] "rs73302063" "rs78161663" "rs117742425" "rs117931640" ...
##   ..$ 10006    : chr [1:341] "rs10764621" "rs12184390" "rs10741109" "rs75636291" ...
##   ..$ 10007    : chr [1:91] "rs57493049" "rs17099096" "rs7727653" "rs7727832" ...
##   ..$ 100073347: chr [1:49] "rs7245993" "rs11881864" "rs4462708" "rs35204149" ...
##   .. [list output truncated]
## $ ensg2rsids  :List of 26440
##   ..$ ENSG00000121410: chr [1:58] "rs12978178" "rs143782846" "rs7257420" "rs964795" ...
##   ..$ ENSG00000175899: chr [1:153] "ss1388089231" "ss1388089252" "ss1388089253" "ss1388089273" ...
##   ..$ ENSG00000256069: chr [1:64] "ss1388093611" "ss1388093614" "ss1388093640" "ss1388093645" ...
##   ..$ ENSG00000171428: chr [1:135] "rs56767160" "rs13258445" "rs7812408" "rs79694661" ...
##   ..$ ENSG00000156006: chr [1:102] "rs1995001" "rs10087450" "rs115940167" "rs145621911" ...
##   ..$ ENSG00000196136: chr [1:64] "rs927139" "rs17751418" "rs882002" "rs4905168" ...
```

```
##    ..$ ENSG00000114771: chr [1:70] "rs71306585" "rs1382846" "rs76305586" "rs7611957" ...
##    ..$ ENSG00000127837: chr [1:101] "rs77644976" "rs13389185" "rs4674161" "rs6723847" ...
##    ..$ ENSG00000129673: chr [1:84] "rs75753226" "rs112901983" "rs692284" "rs77493878" ...
##    ..$ ENSG00000090861: chr [1:24] "rs4247108" "rs3972075" "rs3972077" "rs145369486" ...
##    ..$ ENSG00000183044: chr [1:309] "rs6498147" "rs6498149" "rs6498150" "rs6498151" ...
##    ..$ ENSG00000165029: chr [1:639] "rs10989766" "rs79098215" "rs187006843" "rs34383269" ...
##    ..$ ENSG00000107331: chr [1:245] "rs28428662" "rs28681568" "rs35448798" "rs28681320" ...
##    ..$ ENSG00000167972: chr [1:136] "rs34421846" "rs2539999" "rs27345" "rs572791396" ...
##    ..$ ENSG00000204574: chr [1:64] "rs150002731" "rs79326778" "rs3778530" "rs1157673" ...
##    ..$ ENSG00000225989: chr [1:64] "rs150002731" "rs79326778" "rs3778530" "rs1157673" ...
##    ..$ ENSG00000236149: chr [1:64] "rs150002731" "rs79326778" "rs3778530" "rs1157673" ...
##    ..$ ENSG00000232169: chr [1:64] "rs150002731" "rs79326778" "rs3778530" "rs1157673" ...
##    ..$ ENSG00000231129: chr [1:64] "rs150002731" "rs79326778" "rs3778530" "rs1157673" ...
##    ..$ ENSG00000236342: chr [1:64] "rs150002731" "rs79326778" "rs3778530" "rs1157673" ...
##    ..$ ENSG00000206490: chr [1:64] "rs150002731" "rs79326778" "rs3778530" "rs1157673" ...
##    ..$ ENSG00000198691: chr [1:255] "rs12034656" "rs115644627" "rs72721027" "rs2818969" ...
##    ..$ ENSG00000097007: chr [1:405] "rs41306455" "rs3818510" "rs1043060" "rs35688492" ...
##    ..$ ENSG00000002726: chr [1:58] "rs138157607" "rs7808684" "rs62489630" "rs7792368" ...
##    ..$ ENSG00000143322: chr [1:294] "rs9728480" "rs9729129" "rs138399529" "rs28914538" ...
##    ..$ ENSG00000175164: chr [1:144] "rs11243623" "rs117015073" "rs117950592" "rs4451348" ...
##    ..$ ENSG00000159842: chr [1:687] "rs2260717" "rs77222549" "rs78185851" "rs2289632" ...
##    ..$ ENSG00000276016: chr [1:687] "rs2260717" "rs77222549" "rs78185851" "rs2289632" ...
##    ..$ ENSG00000278741: chr [1:687] "rs2260717" "rs77222549" "rs78185851" "rs2289632" ...
##    ..$ ENSG00000060971: chr [1:71] "rs11129777" "rs13066327" "rs13095145" "rs9858794" ...
##    ..$ ENSG00000278540: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
##    ..$ ENSG00000275176: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
##    ..$ ENSG00000076555: chr [1:400] "rs78457084" "rs7969979" "rs138492992" "rs34430227" ...
##    ..$ ENSG00000115361: chr [1:199] "rs1473332" "rs1473329" "rs77549663" "rs57091157" ...
##    ..$ ENSG00000117054: chr [1:118] "rs619193" "rs648869" "rs649352" "rs10782715" ...
##    ..$ ENSG00000122971: chr [1:75] "rs12426368" "rs11065066" "rs139848956" "rs77123459" ...
##    ..$ ENSG00000196177: chr [1:147] "rs12358504" "rs4751828" "rs72830624" "rs7478395" ...
##    ..$ ENSG00000072778: chr [1:59] "rs145599428" "rs7217981" "rs7503161" "rs4796398" ...
##    ..$ ENSG00000075239: chr [1:25] "rs4753834" "rs4987915" "rs75305266" "rs3218674" ...
##    ..$ ENSG00000120437: chr [1:75] "rs1504247" "rs111934060" "rs7746188" "rs9457599" ...
##    ..$ ENSG00000108684: chr [1:674] "rs72820119" "rs917444" "rs917443" "rs10491113" ...
##    ..$ ENSG00000110881: chr [1:44] "rs74089182" "rs57191490" "rs7963954" "rs7979262" ...
##    ..$ ENSG00000087085: chr [1:116] "rs11971079" "rs17135348" "rs3757458" "rs3757459" ...
##    ..$ ENSG00000131473: chr [1:90] "rs3760359" "rs4793028" "rs2301682" "rs71382995" ...
##    ..$ ENSG00000122729: chr [1:193] "rs9792540" "rs79012223" "rs75102799" "rs1023087" ...
##    ..$ ENSG00000100412: chr [1:112] "rs13053242" "rs9611487" "rs113322803" "rs73424602" ...
##    ..$ ENSG00000161533: chr [1:51] "rs7219698" "rs6502000" "rs9913113" "rs56286636" ...
##    ..$ ENSG00000143727: chr [1:55] "rs62114538" "rs4455191" "rs71437291" "rs10432714" ...
##    ..$ ENSG00000134575: chr [1:49] "rs11039130" "rs61897855" "rs11039131" "rs4567413" ...
##    ..$ ENSG00000102575: chr [1:77] "rs3745686" "rs311796" "rs140996707" "rs311794" ...
##    ..$ ENSG00000014257: chr [1:70] "rs72998148" "rs78223356" "rs72998150" "rs138956543" ...
##    ..$ ENSG00000134940: chr [1:80] "rs7950427" "rs11608088" "rs478972" "rs73619327" ...
##    ..$ ENSG00000143632: chr [1:33] "rs115374932" "rs237763" "rs61825327" "rs237765" ...
##    ..$ ENSG00000107796: chr [1:78] "rs4933431" "rs3129462" "rs12356405" "rs11202362" ...
##    ..$ ENSG00000075624: chr [1:79] "rs7795302" "rs10259680" "rs60692478" "rs4416742" ...
##    ..$ ENSG00000159251: chr [1:12] "rs7175956" "rs192946326" "rs76978613" "rs146253413" ...
##    ..$ ENSG00000163017: chr [1:100] "rs12611544" "rs13408433" "rs142170988" "rs2421668" ...
##    ..$ ENSG00000130402: chr [1:210] "rs8112798" "rs8101826" "rs7248428" "rs111555062" ...
##    ..$ ENSG00000282844: chr [1:210] "rs8112798" "rs8101826" "rs7248428" "rs111555062" ...
##    ..$ ENSG00000136518: chr [1:91] "rs80221742" "rs9850993" "rs12492758" "rs9681071" ...
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##      ..$ ENSG00000077522: chr [1:487] "rs12239452" "rs1857391" "rs10737810" "rs10754572" ...
##      ..$ ENSG00000248746: chr [1:26] "rs188063240" "rs664297" "rs181903029" "rs61890445" ...
##      ..$ ENSG00000115170: chr [1:281] "rs73011719" "rs75100972" "rs76822882" "rs116636792" ...
##      ..$ ENSG00000135503: chr [1:73] "rs79403724" "rs1493196" "rs75179757" "rs1908018" ...
##      ..$ ENSG00000121989: chr [1:167] "rs4662486" "rs56068499" "rs35973591" "rs2598511" ...
##      ..$ ENSG00000114739: chr [1:104] "rs4678604" "rs1002676" "rs2126534" "rs1002675" ...
##      ..$ ENSG00000139567: chr [1:66] "rs3896351" "rs3858636" "rs6580839" "rs78442567" ...
##      ..$ ENSG00000243989: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
##      ..$ ENSG00000119640: chr [1:45] "rs4903243" "rs10133124" "rs3784024" "rs61980912" ...
##      ..$ ENSG00000170634: chr [1:464] "rs186231830" "rs805397" "rs805398" "rs2293361" ...
##      ..$ ENSG00000196839: chr [1:144] "rs6032614" "rs6017718" "rs111679943" "rs73911142" ...
##      ..$ ENSG00000151651: chr [1:128] "rs72850239" "rs59004042" "rs56308761" "rs3125554" ...
##      ..$ ENSG00000137845: chr [1:684] "rs7173426" "rs2899623" "rs2899624" "rs12910051" ...
##      ..$ ENSG00000160710: chr [1:65] "rs903323" "rs11578437" "rs34651139" "rs12139887" ...
##      ..$ ENSG00000197381: chr [1:468] "rs2246610" "rs2838334" "rs143763785" "rs3788070" ...
##      ..$ ENSG00000185736: chr [1:2044] "rs147400996" "rs7899518" "rs6560711" "rs2127608" ...
##      ..$ ENSG00000164742: chr [1:336] "rs62458324" "rs1525654" "rs1404912" "rs1404913" ...
##      ..$ ENSG00000078295: chr [1:985] "rs17207543" "rs35108829" "rs13175375" "rs113338595" ...
##      ..$ ENSG00000138031: chr [1:211] "rs55881122" "rs995647" "rs995648" "rs56328211" ...
##      ..$ ENSG00000173175: chr [1:332] "rs115263448" "rs76015301" "rs79346155" "rs7619010" ...
##      ..$ ENSG00000174233: chr [1:110] "rs2468950" "rs2932091" "rs113933093" "rs2732459" ...
##      ..$ ENSG00000121281: chr [1:111] "rs4785393" "rs4490002" "rs112160849" "rs60169085" ...
##      ..$ ENSG00000155897: chr [1:577] "rs28783410" "rs112276606" "rs117253680" "rs72718325" ...
##      ..$ ENSG00000162104: chr [1:532] "rs66632878" "rs145273484" "rs144859753" "rs117844617" ...
##      ..$ ENSG00000141433: chr [1:92] "rs4797327" "rs8093310" "rs4797328" "rs4798684" ...
##      ..$ ENSG00000078549: chr [1:194] "rs115201989" "rs17159799" "rs80009944" "rs11766609" ...
##      ..$ ENSG00000087274: chr [1:204] "rs231396" "rs56106316" "rs145976743" "rs231395" ...
##      ..$ ENSG00000075340: chr [1:306] "rs2461522" "rs6749668" "rs12713698" "rs56121306" ...
##      ..$ ENSG00000148700: chr [1:486] "rs78426385" "rs11193974" "rs17338265" "rs317506" ...
##      ..$ ENSG00000147872: chr [1:68] "rs138814227" "rs72696501" "rs10963964" "rs185692883" ...
##      ..$ ENSG00000187758: chr [1:49] "rs62321488" "rs114121962" "rs12510095" "rs12502351" ...
##      ..$ ENSG00000196616: chr [1:45] "rs28656298" "rs10022047" "rs7678647" "rs10002767" ...
##      ..$ ENSG00000248144: chr [1:58] "rs1399242" "rs1399243" "rs77966077" "rs72688425" ...
##      ..$ ENSG00000198099: chr [1:70] "rs10516427" "rs72898354" "rs28557360" "rs28472839" ...
##      ..$ ENSG00000197894: chr [1:128] "rs6532724" "rs6532725" "rs7683527" "rs6823718" ...
##      ..$ ENSG00000172955: chr [1:50] "rs138629672" "rs189461946" "rs10470952" "rs79147628" ...
##      ..$ ENSG00000196344: chr [1:119] "rs12508322" "rs4414961" "rs140045215" "rs192042163" ...
##      ..$ ENSG00000156110: chr [1:591] "rs117675432" "rs12777437" "rs147045575" "rs11000279" ...
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##  $ ensp2rsids   :List of 17817
##    ..$ ENSP00000286479: chr [1:102] "rs1995001" "rs10087450" "rs115940167" "rs145621911" ...
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##    ..$ ENSP00000480371: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
##    ..$ ENSP00000482064: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
##    ..$ ENSP00000482498: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
##    ..$ ENSP00000483696: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
##    ..$ ENSP00000479621: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
##    ..$ ENSP00000481900: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
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##    ..$ ENSP00000483852: chr [1:990] "rs59225687" "rs61248729" "rs60842394" "rs148804481" ...
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##    ..$ ENSP00000233710: chr [1:199] "rs1473332" "rs1473329" "rs77549663" "rs57091157" ...
##    ..$ ENSP00000242592: chr [1:75] "rs12426368" "rs11065066" "rs139848956" "rs77123459" ...
##    ..$ ENSP00000401045: chr [1:75] "rs12426368" "rs11065066" "rs139848956" "rs77123459" ...
##    ..$ ENSP00000356015: chr [1:75] "rs1504247" "rs111934060" "rs7746188" "rs9457599" ...
##    ..$ ENSP00000290378: chr [1:12] "rs7175956" "rs192946326" "rs76978613" "rs146253413" ...
##    ..$ ENSP00000422007: chr [1:26] "rs188063240" "rs664297" "rs181903029" "rs61890445" ...
##    ..$ ENSP00000426797: chr [1:26] "rs188063240" "rs664297" "rs181903029" "rs61890445" ...
##    ..$ ENSP00000426236: chr [1:26] "rs188063240" "rs664297" "rs181903029" "rs61890445" ...
##    ..$ ENSP00000490708: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
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##    ..$ ENSP00000417618: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
##    ..$ ENSP00000490500: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
##    ..$ ENSP00000384296: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
##    ..$ ENSP00000489688: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
##    ..$ ENSP00000490007: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
##    ..$ ENSP00000490149: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
##    ..$ ENSP00000419830: chr [1:26] "rs146432768" "rs114270966" "rs929533" "rs147030584" ...
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##    ..$ ENSP00000350655: chr [1:45] "rs4903243" "rs10133124" "rs3784024" "rs61980912" ...
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##    ..$ ENSP00000451581: chr [1:45] "rs4903243" "rs10133124" "rs3784024" "rs61980912" ...
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##    ..$ ENSP00000209668: chr [1:49] "rs62321488" "rs114121962" "rs12510095" "rs12502351" ...
##    ..$ ENSP00000426083: chr [1:58] "rs1399242" "rs1399243" "rs77966077" "rs72688425" ...
##    ..$ ENSP00000478439: chr [1:58] "rs1399242" "rs1399243" "rs77966077" "rs72688425" ...
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##    ..$ ENSP00000304501: chr [1:79] "rs73981417" "rs8076864" "rs144845313" "rs6502488" ...
##    ..$ ENSP00000241356: chr [1:24] "rs1046260" "rs77945567" "rs72990667" "rs148941023" ...
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##    ..$ ENSP00000371419: chr [1:395] "rs9553075" "rs146902981" "rs75337010" "rs9578647" ...
##    ..$ ENSP00000368766: chr [1:142] "rs6052444" "rs6116268" "rs59976348" "rs79601367" ...
##    ..$ ENSP00000493019: chr [1:212] "rs7736484" "rs139576656" "rs56909954" "rs2910162" ...
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##    ..$ ENSP00000280155: chr [1:28] "rs75464759" "rs10884741" "rs2148488" "rs11194543" ...
##    ..$ ENSP00000426268: chr [1:67] "rs9790534" "rs2344600" "rs74961540" "rs146668012" ...
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##    ..$ ENSP00000358301: chr [1:60] "rs11195863" "rs139358098" "rs75807493" "rs11195865" ...
##    ..$ ENSP00000305372: chr [1:79] "rs144030343" "rs73279529" "rs147683092" "rs443402" ...
##    ..$ ENSP00000343782: chr [1:34] "rs117171368" "rs7837532" "rs59657054" "rs75749457" ...
##    ..$ ENSP00000226355: chr [1:45] "rs1589163" "rs7657200" "rs114252197" "rs16848269" ...
##    ..$ ENSP00000379138: chr [1:43] "rs76978473" "rs1518489" "rs75807729" "rs10019581" ...
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##    ..$ ENSP00000264595: chr [1:122] "rs1375738" "rs12641091" "rs146531152" "rs17685820" ...
##    ..$ ENSP00000423798: chr [1:122] "rs1375738" "rs12641091" "rs146531152" "rs17685820" ...
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##     ..$ ENSP00000505184: chr [1:227] "rs74766600" "rs76145491" "rs4846982" "rs12748513" ...
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##     ..$ ENSP00000302620: chr [1:167] "rs60987065" "rs58428283" "rs12695008" "rs13404399" ...
##     ..$ ENSP00000366927: chr [1:119] "rs55681306" "rs10973774" "rs1543495" "rs191773514" ...
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##     ..$ ENSP00000310688: chr [1:220] "rs11170862" "rs11170864" "rs12422434" "rs12229016" ...
##     ..$ ENSP00000413068: chr [1:50] "rs12614619" "rs34129538" "rs12468411" "rs7580227" ...
##     ..$ ENSP00000295463: chr [1:50] "rs12614619" "rs34129538" "rs12468411" "rs7580227" ...
##     ..$ ENSP00000375881: chr [1:94] "rs7597348" "rs7571691" "rs1584460" "rs1584461" ...
##     ..$ ENSP00000295453: chr [1:53] "rs61384904" "rs4973443" "rs12474096" "rs1797398" ...
##     ..$ ENSP00000497310: chr [1:48] "rs2570972" "rs61797152" "rs115181845" "rs2483789" ...
##     ..$ ENSP00000497035: chr [1:48] "rs2570972" "rs61797152" "rs115181845" "rs2483789" ...
##     ..$ ENSP00000221496: chr [1:72] "rs77245362" "rs35022945" "rs146982937" "rs76440256" ...
##     ..$ ENSP00000507077: chr [1:102] "rs78769305" "rs114921336" "rs6674625" "rs150479345" ...
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##     ..$ ENSP00000390832: chr [1:161] "rs75307751" "rs80002654" "rs75088772" "rs75517981" ...
##     ..$ ENSP00000397582: chr [1:161] "rs75307751" "rs80002654" "rs75088772" "rs75517981" ...
##     ..$ ENSP00000433347: chr [1:120] "rs1932987" "rs1932986" "rs10874676" "rs10874677" ...
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##     ..$ ENSP00000391423: chr [1:120] "rs1932987" "rs1932986" "rs10874676" "rs10874677" ...
##     ..$ ENSP00000401627: chr [1:120] "rs1932987" "rs1932986" "rs10874676" "rs10874677" ...
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##     ..- attr(*, "names")= chr [1:38636] "ENSG00000121410" "ENSG00000175899" "ENSG00000256069" "ENSG0000
##   $ go          :List of 4626
##     ..$ GO:0000002: Named chr [1:12] "ENSG00000151729" "ENSG00000025708" "ENSG00000068305" "ENSG0000011
##     .. ..- attr(*, "names")= chr [1:12] "291" "1890" "4205" "4358" ...
##     ..$ GO:0000012: Named chr [1:10] "ENSG00000049167" "ENSG00000225830" "ENSG00000174405" "ENSG0000011
##     .. ..- attr(*, "names")= chr [1:10] "1161" "2074" "3981" "7141" ...
##     ..$ GO:0000027: Named chr [1:25] "ENSG00000111641" "ENSG00000100316" "ENSG00000140986" "ENSG0000012
##     .. ..- attr(*, "names")= chr [1:25] "4839" "6122" "6123" "6125" ...
##     ..$ GO:0000028: Named chr [1:15] "ENSG00000168028" "ENSG00000241945" "ENSG00000083845" "ENSG0000016
##     .. ..- attr(*, "names")= chr [1:15] "3921" "5822" "6193" "6208" ...
##     ..$ GO:0000038: Named chr [1:20] "ENSG00000060971" "ENSG00000161533" "ENSG00000101986" "ENSG0000017
##     .. ..- attr(*, "names")= chr [1:20] "30" "51" "215" "225" ...
##     ..$ GO:0000045: Named chr [1:63] "ENSG00000174437" "ENSG00000078142" "ENSG00000080815" "ENSG0000013
##     .. ..- attr(*, "names")= chr [1:63] "488" "5289" "5663" "5861" ...
##     ..$ GO:0000050: Named chr [1:10] "ENSG00000118520" "ENSG00000081181" "ENSG00000126522" "ENSG0000013
##     .. ..- attr(*, "names")= chr [1:10] "383" "384" "435" "445" ...
##     ..$ GO:0000070: Named chr [1:36] "ENSG00000237649" "ENSG00000233450" "ENSG00000056678" "ENSG0000020
##     .. ..- attr(*, "names")= chr [1:36] "38331" "38332" "38333" "38334" ...
##     ..$ GO:0000076: Named chr [1:11] "ENSG00000094804" "ENSG00000138346" "ENSG00000172613" "ENSG0000015
##     .. ..- attr(*, "names")= chr [1:11] "990" "1763" "5883" "58841" ...
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##    ..$ GO:0000077: Named chr [1:35] "ENSG00000149311" "ENSG00000175054" "ENSG00000096401" "ENSG0000014
##    .. ..- attr(*, "names")= chr [1:35] "472" "545" "988" "1111" ...
##    ..$ GO:0000079: Named chr [1:54] "ENSG00000075624" "ENSG00000110092" "ENSG00000197299" "ENSG0000014
##    .. ..- attr(*, "names")= chr [1:54] "60" "595" "641" "890" ...
##    ..$ GO:0000082: Named chr [1:62] "ENSG00000135503" "ENSG00000060982" "ENSG00000110092" "ENSG0000007
##    .. ..- attr(*, "names")= chr [1:62] "91" "586" "595" "815" ...
##    ..$ GO:0000083: Named chr [1:16] "ENSG00000156273" "ENSG00000164885" "ENSG00000101412" "ENSG0000020
##    .. ..- attr(*, "names")= chr [1:16] "571" "1020" "1869" "1874" ...
##    ..$ GO:0000086: Named chr [1:51] "ENSG00000198668" "ENSG00000143933" "ENSG00000160014" "ENSG0000014
##    .. ..- attr(*, "names")= chr [1:51] "801" "805" "808" "890" ...
##    ..$ GO:0000122: Named chr [1:1001] "ENSG00000114739" "ENSG00000143799" "ENSG00000106624" "ENSG00000
##    .. ..- attr(*, "names")= chr [1:1001] "93" "142" "165" "166" ...
##    ..$ GO:0000132: Named chr [1:32] "ENSG00000115163" "ENSG00000204843" "ENSG00000070193" "ENSG0000015
##    .. ..- attr(*, "names")= chr [1:32] "1058" "1639" "2255" "2697" ...
##    ..$ GO:0000165: Named chr [1:127] "ENSG00000078061" "ENSG00000157764" "ENSG00000185650" "ENSG000000
##    .. ..- attr(*, "names")= chr [1:127] "369" "673" "677" "1234" ...
##    ..$ GO:0000184: Named chr [1:37] "ENSG00000120705" "ENSG00000103342" "ENSG00000104408" "ENSG0000010
##    .. ..- attr(*, "names")= chr [1:37] "2107" "2935" "3646" "4116" ...
##    ..$ GO:0000209: Named chr [1:180] "ENSG00000159461" "ENSG00000110330" "ENSG00000138376" "ENSG000000
##    .. ..- attr(*, "names")= chr [1:180] "267" "329" "580" "596" ...
##    ..$ GO:0000226: Named chr [1:136] "ENSG00000140463" "ENSG00000170312" "ENSG00000164885" "ENSG000000
##    .. ..- attr(*, "names")= chr [1:136] "585" "983" "1020" "1267" ...
##    ..$ GO:0000244: Named chr [1:40] "ENSG00000114316" "ENSG00000117360" "ENSG00000075856" "ENSG0000010
##    .. ..- attr(*, "names")= chr [1:40] "7375" "9129" "9733" "10421" ...
##    ..$ GO:0000245: Named chr [1:36] "ENSG00000079785" "ENSG00000136937" "ENSG00000172062" "ENSG0000027
##    .. ..- attr(*, "names")= chr [1:36] "1653" "4686" "66061" "66062" ...
##    ..$ GO:0000266: Named chr [1:16] "ENSG00000006695" "ENSG00000198836" "ENSG00000185345" "ENSG0000000
##    .. ..- attr(*, "names")= chr [1:16] "1352" "4976" "5071" "9650" ...
##    ..$ GO:0000278: Named chr [1:149] "ENSG00000097007" "ENSG00000248333" "ENSG00000094804" "ENSG000000
##    .. ..- attr(*, "names")= chr [1:149] "25" "984" "990" "994" ...
##    ..$ GO:0000281: Named chr [1:50] "ENSG00000151150" "ENSG00000134982" "ENSG00000143878" "ENSG0000015
##    .. ..- attr(*, "names")= chr [1:50] "288" "324" "388" "389" ...
##    ..$ GO:0000289: Named chr [1:24] "ENSG00000076242" "ENSG00000111596" "ENSG00000088038" "ENSG0000027
##    .. ..- attr(*, "names")= chr [1:24] "4292" "4848" "48491" "48492" ...
##    ..$ GO:0000290: Named chr [1:11] "ENSG00000151014" "ENSG00000175324" "ENSG00000110063" "ENSG0000019
##    .. ..- attr(*, "names")= chr [1:11] "25819" "27257" "28960" "29883" ...
##    ..$ GO:0000301: Named chr [1:10] "ENSG00000166685" "ENSG00000066455" "ENSG00000164597" "ENSG0000028
##    .. ..- attr(*, "names")= chr [1:10] "9382" "9950" "104661" "104662" ...
##    ..$ GO:0000302: Named chr [1:14] "ENSG00000189058" "ENSG00000130203" "ENSG00000121691" "ENSG0000017
##    .. ..- attr(*, "names")= chr [1:14] "347" "348" "847" "1263" ...
##    ..$ GO:0000338: Named chr [1:10] "ENSG00000136827" "ENSG00000169727" "ENSG00000141030" "ENSG0000016
##    .. ..- attr(*, "names")= chr [1:10] "1861" "2873" "8533" "9318" ...
##    ..$ GO:0000353: Named chr [1:10] "ENSG00000206625" "ENSG00000199377" "ENSG00000199347" "ENSG0000020
##    .. ..- attr(*, "names")= chr [1:10] "26827" "26828" "26829" "26830" ...
##    ..$ GO:0000375: Named chr [1:26] "ENSG00000116350" "ENSG00000136527" "ENSG00000092208" "ENSG0000008
##    .. ..- attr(*, "names")= chr [1:26] "6429" "6434" "8487" "8570" ...
##    ..$ GO:0000379: Named chr [1:12] "ENSG00000170892" "ENSG00000275165" "ENSG00000273896" "ENSG0000027
##    .. ..- attr(*, "names")= chr [1:12] "790421" "790422" "790423" "790424" ...
##    ..$ GO:0000380: Named chr [1:24] "ENSG00000108654" "ENSG00000135829" "ENSG00000099783" "ENSG0000023
##    .. ..- attr(*, "names")= chr [1:24] "1655" "1660" "4670" "5940" ...
##    ..$ GO:0000381: Named chr [1:64] "ENSG00000108654" "ENSG00000102081" "ENSG00000135486" "ENSG0000010
##    .. ..- attr(*, "names")= chr [1:64] "1655" "2332" "3178" "31911" ...
##    ..$ GO:0000387: Named chr [1:29] "ENSG00000074201" "ENSG00000172062" "ENSG00000273772" "ENSG0000027
##    .. ..- attr(*, "names")= chr [1:29] "1207" "66061" "66062" "66063" ...
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##      ..$ GO:0000395: Named chr [1:25] "ENSG00000207389" "ENSG00000278099" "ENSG00000273757" "ENSG0000013
##      .. ..- attr(*, "names")= chr [1:25] "6060" "60631" "60632" "6426" ...
##      ..$ GO:0000398: Named chr [1:218] "ENSG00000096401" "ENSG00000108654" "ENSG00000067596" "ENSG0000000
##      .. ..- attr(*, "names")= chr [1:218] "988" "1655" "1659" "24831" ...
##      ..$ GO:0000413: Named chr [1:41] "ENSG00000088832" "ENSG00000119782" "ENSG00000173486" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:41] "2280" "2281" "2286" "2287" ...
##      ..$ GO:0000422: Named chr [1:39] "ENSG00000176171" "ENSG00000143387" "ENSG00000072518" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:39] "664" "1513" "2011" "5071" ...
##      ..$ GO:0000423: Named chr [1:16] "ENSG00000198589" "ENSG00000185345" "ENSG00000102125" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:16] "987" "5071" "6901" "8678" ...
##      ..$ GO:0000447: Named chr [1:10] "ENSG00000171858" "ENSG00000087269" "ENSG00000120158" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:10] "6227" "8602" "10171" "10799" ...
##      ..$ GO:0000460: Named chr [1:13] "ENSG00000242372" "ENSG00000171824" "ENSG00000253729" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:13] "3692" "5394" "5591" "10200" ...
##      ..$ GO:0000462: Named chr [1:33] "ENSG00000112578" "ENSG00000104884" "ENSG00000241945" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:33] "705" "2068" "5822" "6202" ...
##      ..$ GO:0000463: Named chr [1:16] "ENSG00000147604" "ENSG00000088205" "ENSG00000273611" "ENSG0000002
##      .. ..- attr(*, "names")= chr [1:16] "6129" "8886" "93261" "93262" ...
##      ..$ GO:0000470: Named chr [1:14] "ENSG00000242372" "ENSG00000198755" "ENSG00000100138" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:14] "3692" "4736" "4809" "4839" ...
##      ..$ GO:0000492: Named chr [1:13] "ENSG00000100138" "ENSG00000273841" "ENSG00000276463" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:13] "4809" "68801" "68802" "86071" ...
##      ..$ GO:0000712: Named chr [1:18] "ENSG00000241563" "ENSG00000175595" "ENSG00000076242" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:18] "1325" "2072" "4292" "7153" ...
##      ..$ GO:0000722: Named chr [1:11] "ENSG00000139618" "ENSG00000051180" "ENSG00000108384" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:11] "675" "5888" "5889" "5892" ...
##      ..$ GO:0000723: Named chr [1:39] "ENSG00000143799" "ENSG00000100823" "ENSG00000149311" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:39] "142" "328" "472" "545" ...
##      ..$ GO:0000724: Named chr [1:87] "ENSG00000149311" "ENSG00000197299" "ENSG00000012048" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:87] "472" "641" "672" "675" ...
##      ..$ GO:0000727: Named chr [1:12] "ENSG00000073111" "ENSG00000112118" "ENSG00000104738" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:12] "4171" "4172" "4173" "4174" ...
##      ..$ GO:0000731: Named chr [1:12] "ENSG00000129355" "ENSG00000101868" "ENSG00000062822" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:12] "1032" "5422" "5424" "5426" ...
##      ..$ GO:0000737: Named chr [1:10] "ENSG00000100823" "ENSG00000213918" "ENSG00000013563" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:10] "328" "1773" "1774" "1775" ...
##      ..$ GO:0000902: Named chr [1:95] "ENSG00000151651" "ENSG00000113916" "ENSG00000077549" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:95] "101" "604" "832" "1003" ...
##      ..$ GO:0000956: Named chr [1:22] "ENSG00000108654" "ENSG00000204348" "ENSG00000224313" "ENSG0000002
##      .. ..- attr(*, "names")= chr [1:22] "1655" "17971" "17972" "17973" ...
##      ..$ GO:0001188: Named chr [1:11] "ENSG00000127616" "ENSG00000099956" "ENSG00000275837" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:11] "6597" "65981" "65982" "7343" ...
##      ..$ GO:0001501: Named chr [1:134] "ENSG00000104964" "ENSG00000157766" "ENSG00000145192" "ENSG0000000
##      .. ..- attr(*, "names")= chr [1:134] "166" "176" "197" "249" ...
##      ..$ GO:0001502: Named chr [1:20] "ENSG00000168487" "ENSG00000138696" "ENSG00000139219" "ENSG0000000
##      .. ..- attr(*, "names")= chr [1:20] "649" "658" "1280" "1301" ...
##      ..$ GO:0001503: Named chr [1:79] "ENSG00000145192" "ENSG00000161905" "ENSG00000116039" "ENSG0000001
##      .. ..- attr(*, "names")= chr [1:79] "197" "246" "525" "596" ...
##      ..$ GO:0001504: Named chr [1:10] "ENSG00000018625" "ENSG00000112759" "ENSG00000174669" "ENSG0000000
##      .. ..- attr(*, "names")= chr [1:10] "477" "2030" "3177" "6507" ...
##      ..$ GO:0001508: Named chr [1:18] "ENSG00000101204" "ENSG00000117971" "ENSG00000188603" "ENSG0000002
##      .. ..- attr(*, "names")= chr [1:18] "1137" "1143" "12011" "12012" ...
##      ..$ GO:0001510: Named chr [1:19] "ENSG00000111641" "ENSG00000068438" "ENSG00000099899" "ENSG0000002
##      .. ..- attr(*, "names")= chr [1:19] "4839" "24140" "27037" "29890" ...
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13

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##     ..$ GO:0001516: Named chr [1:21] "ENSG00000019582" "ENSG00000078401" "ENSG00000127129" "ENSG0000024
##     .. ..- attr(*, "names")= chr [1:21] "972" "1906" "1907" "42821" ...
##     ..$ GO:0001523: Named chr [1:29] "ENSG00000198691" "ENSG00000196616" "ENSG00000198099" "ENSG0000019
##     .. ..- attr(*, "names")= chr [1:29] "24" "125" "127" "128" ...
##     ..$ GO:0001525: Named chr [1:236] "ENSG00000127837" "ENSG00000184009" "ENSG00000139567" "ENSG000001
##     .. ..- attr(*, "names")= chr [1:236] "14" "71" "94" "101" ...
##     ..$ GO:0001541: Named chr [1:42] "ENSG00000104899" "ENSG00000214274" "ENSG00000149311" "ENSG0000008
##     .. ..- attr(*, "names")= chr [1:42] "268" "283" "472" "581" ...
##     ..$ GO:0001556: Named chr [1:19] "ENSG00000214274" "ENSG00000139618" "ENSG00000101224" "ENSG0000012
##     .. ..- attr(*, "names")= chr [1:19] "283" "675" "994" "2069" ...
##     ..$ GO:0001558: Named chr [1:80] "ENSG00000135744" "ENSG00000144891" "ENSG00000079385" "ENSG0000020
##     .. ..- attr(*, "names")= chr [1:80] "183" "185" "634" "7801" ...
##     ..$ GO:0001568: Named chr [1:45] "ENSG00000134817" "ENSG00000106546" "ENSG00000165240" "ENSG0000007
##     .. ..- attr(*, "names")= chr [1:45] "187" "196" "538" "634" ...
##     ..$ GO:0001569: Named chr [1:38] "ENSG00000115170" "ENSG00000187498" "ENSG00000168036" "ENSG0000007
##     .. ..- attr(*, "names")= chr [1:38] "90" "1282" "1499" "1906" ...
##     ..$ GO:0001570: Named chr [1:59] "ENSG00000148926" "ENSG00000134817" "ENSG00000185650" "ENSG0000010
##     .. ..- attr(*, "names")= chr [1:59] "133" "187" "677" "857" ...
##     ..$ GO:0001574: Named chr [1:16] "ENSG00000135454" "ENSG00000113532" "ENSG00000140557" "ENSG0000023
##     .. ..- attr(*, "names")= chr [1:16] "2583" "7903" "8128" "87051" ...
##     ..$ GO:0001578: Named chr [1:32] "ENSG00000077274" "ENSG00000182511" "ENSG00000131711" "ENSG0000007
##     .. ..- attr(*, "names")= chr [1:32] "827" "2242" "4131" "4133" ...
##     ..$ GO:0001580: Named chr [1:62] "ENSG00000160862" "ENSG00000131686" "ENSG00000170373" "ENSG0000017
##     .. ..- attr(*, "names")= chr [1:62] "563" "765" "1469" "1470" ...
##     ..$ GO:0001649: Named chr [1:123] "ENSG00000160710" "ENSG00000142208" "ENSG00000162551" "ENSG000000
##     .. ..- attr(*, "names")= chr [1:123] "103" "207" "249" "265" ...
##     ..$ GO:0001654: Named chr [1:48] "ENSG00000153162" "ENSG00000138696" "ENSG00000102678" "ENSG0000005
##     .. ..- attr(*, "names")= chr [1:48] "654" "658" "2254" "2296" ...
##     ..$ GO:0001655: Named chr [1:15] "ENSG00000115170" "ENSG00000104899" "ENSG00000099942" "ENSG0000013
##     .. ..- attr(*, "names")= chr [1:15] "90" "268" "1399" "2048" ...
##     ..$ GO:0001656: Named chr [1:30] "ENSG00000171791" "ENSG00000101144" "ENSG00000103811" "ENSG0000010
##     .. ..- attr(*, "names")= chr [1:30] "596" "655" "1512" "2138" ...
##     ..$ GO:0001657: Named chr [1:36] "ENSG00000081181" "ENSG00000125378" "ENSG00000101144" "ENSG0000012
##     .. ..- attr(*, "names")= chr [1:36] "384" "652" "655" "847" ...
##     ..$ GO:0001658: Named chr [1:42] "ENSG00000171791" "ENSG00000125845" "ENSG00000125378" "ENSG0000010
##     .. ..- attr(*, "names")= chr [1:42] "596" "650" "652" "1499" ...
##     ..$ GO:0001659: Named chr [1:23] "ENSG00000115361" "ENSG00000072778" "ENSG00000163485" "ENSG0000017
##     .. ..- attr(*, "names")= chr [1:23] "33" "37" "134" "1149" ...
##     ..$ GO:0001662: Named chr [1:28] "ENSG00000110881" "ENSG00000018625" "ENSG00000171791" "ENSG0000007
##     .. ..- attr(*, "names")= chr [1:28] "41" "477" "596" "1620" ...
##     ..$ GO:0001666: Named chr [1:178] "ENSG00000183044" "ENSG00000130402" "ENSG00000282844" "ENSG000000
##     .. ..- attr(*, "names")= chr [1:178] "18" "811" "812" "94" ...
##     ..$ GO:0001675: Named chr [1:17] "ENSG00000007168" "ENSG00000130202" "ENSG00000087903" "ENSG0000012
##     .. ..- attr(*, "names")= chr [1:17] "5048" "5819" "5990" "6691" ...
##     ..$ GO:0001676: Named chr [1:29] "ENSG00000110090" "ENSG00000157184" "ENSG00000140465" "ENSG0000010
##     .. ..- attr(*, "names")= chr [1:29] "1374" "1376" "1543" "1557" ...
##     ..$ GO:0001678: Named chr [1:25] "ENSG00000150907" "ENSG00000106633" "ENSG00000100644" "ENSG0000015
##     .. ..- attr(*, "names")= chr [1:25] "2308" "2645" "3091" "3098" ...
##     ..$ GO:0001682: Named chr [1:20] "ENSG00000138385" "ENSG00000100890" "ENSG00000258790" "ENSG0000017
##     .. ..- attr(*, "names")= chr [1:20] "6741" "96921" "96922" "10248" ...
##     ..$ GO:0001701: Named chr [1:209] "ENSG00000115170" "ENSG00000135503" "ENSG00000139567" "ENSG000000
##     .. ..- attr(*, "names")= chr [1:209] "90" "91" "94" "102" ...
##     ..$ GO:0001702: Named chr [1:16] "ENSG00000115170" "ENSG00000121989" "ENSG00000114739" "ENSG0000010
##     .. ..- attr(*, "names")= chr [1:16] "90" "92" "93" "1499" ...
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14

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##    ..$ GO:0001706: Named chr [1:15] "ENSG00000120129" "ENSG00000158050" "ENSG00000120875" "ENSG0000013
##    .. ..- attr(*, "names")= chr [1:15] "1843" "1844" "1846" "1847" ...
##    ..$ GO:0001707: Named chr [1:36] "ENSG00000115170" "ENSG00000101144" "ENSG00000107779" "ENSG0000002
##    .. ..- attr(*, "names")= chr [1:36] "90" "655" "657" "659" ...
##    ..$ GO:0001708: Named chr [1:34] "ENSG00000134982" "ENSG00000168036" "ENSG00000125798" "ENSG0000001
##    .. ..- attr(*, "names")= chr [1:34] "324" "1499" "3170" "3549" ...
##    ..$ GO:0001709: Named chr [1:25] "ENSG00000101384" "ENSG00000179348" "ENSG00000107485" "ENSG0000001
##    .. ..- attr(*, "names")= chr [1:25] "182" "2624" "2625" "3199" ...
##    ..$ GO:0001714: Named chr [1:13] "ENSG00000204531" "ENSG00000233911" "ENSG00000206454" "ENSG0000023
##    .. ..- attr(*, "names")= chr [1:13] "54601" "54602" "54603" "54604" ...
##    ..$ GO:0001731: Named chr [1:11] "ENSG00000143486" "ENSG00000130741" "ENSG00000063046" "ENSG0000001
##    .. ..- attr(*, "names")= chr [1:11] "1939" "1968" "1975" "1983" ...
##    ..$ GO:0001736: Named chr [1:13] "ENSG00000082458" "ENSG00000112655" "ENSG00000114251" "ENSG0000001
##    .. ..- attr(*, "names")= chr [1:13] "1741" "5754" "7474" "7976" ...
##    ..$ GO:0001755: Named chr [1:47] "ENSG00000115170" "ENSG00000197043" "ENSG00000124205" "ENSG0000001
##    .. ..- attr(*, "names")= chr [1:47] "90" "309" "1908" "1910" ...
##    ..$ GO:0001756: Named chr [1:42] "ENSG00000149311" "ENSG00000107779" "ENSG00000100393" "ENSG0000001
##    .. ..- attr(*, "names")= chr [1:42] "472" "657" "2033" "2294" ...
##    .. [list output truncated]
##  $ reactome    :List of 21396
##    ..$ R-HSA-109582 : chr [1:622] "1" "10019" "10112" "10125" ...
##    ..$ R-HSA-114608 : chr [1:129] "1" "10184" "10257" "10447" ...
##    ..$ R-HSA-168249 : chr [1:1080] "1" "100049587" "10006" "10010" ...
##    ..$ R-HSA-168256 : chr [1:2035] "1" "10000" "100049587" "10006" ...
##    ..$ R-HSA-6798695: chr [1:482] "1" "100049587" "100302736" "10043" ...
##    ..$ R-HSA-76002  : chr [1:263] "1" "10125" "10184" "10235" ...
##    ..$ R-HSA-76005  : chr [1:134] "1" "10184" "10257" "10447" ...
##    ..$ R-HSA-1430728: chr [1:2117] "10" "100" "10001" "10003" ...
##    ..$ R-HSA-156580 : chr [1:109] "10" "10249" "10327" "10380" ...
##    ..$ R-HSA-156582 : chr [1:2] "10" "9"
##    ..$ R-HSA-211859 : chr [1:222] "10" "100861540" "10249" "10327" ...
##    ..$ R-HSA-9748784: chr [1:99] "10" "10057" "10249" "10257" ...
##    ..$ R-HSA-9753281: chr [1:29] "10" "10057" "10257" "1244" ...
##    ..$ R-HSA-15869  : chr [1:99] "100" "100526794" "102157402" "10591" ...
##    ..$ R-HSA-1643685: chr [1:2072] "100" "10000" "10006" "10013" ...
##    ..$ R-HSA-5668914: chr [1:249] "100" "10020" "10071" "10082" ...
##    ..$ R-HSA-74217  : chr [1:13] "100" "132" "161823" "1633" ...
##    ..$ R-HSA-8956321: chr [1:23] "100" "132" "151531" "161823" ...
##    ..$ R-HSA-9734207: chr [1:3] "100" "3251" "353"
##    ..$ R-HSA-9734735: chr "100"
##    ..$ R-HSA-9735804: chr [1:4] "100" "3251" "353" "4860"
##    ..$ R-HSA-1266738: chr [1:1137] "1000" "10000" "10001" "100131902" ...
##    ..$ R-HSA-1500931: chr [1:130] "1000" "1001" "1002" "1003" ...
##    ..$ R-HSA-381426 : chr [1:125] "1000" "10117" "10130" "102" ...
##    ..$ R-HSA-392499 : chr [1:1969] "1000" "10020" "10026" "100287144" ...
##    ..$ R-HSA-418990 : chr [1:33] "1000" "1001" "1002" "1003" ...
##    ..$ R-HSA-421270 : chr [1:65] "1000" "1001" "1002" "1003" ...
##    ..$ R-HSA-446728 : chr [1:92] "1000" "1001" "1002" "1003" ...
##    ..$ R-HSA-525793 : chr [1:30] "1000" "1002" "100271849" "1013" ...
##    ..$ R-HSA-597592 : chr [1:1438] "1000" "10020" "10026" "100287144" ...
##    ..$ R-HSA-8957275: chr [1:108] "1000" "10117" "10130" "102" ...
##    ..$ R-HSA-109581 : chr [1:182] "10000" "10018" "100302736" "100506658" ...
##    ..$ R-HSA-109606 : chr [1:55] "10000" "10018" "1029" "10971" ...
##    ..$ R-HSA-111447 : chr [1:15] "10000" "10971" "207" "208" ...
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15

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##   ..$ R-HSA-114452 : chr [1:30] "10000" "10018" "10971" "140735" ...
##   ..$ R-HSA-1227986: chr [1:50] "10000" "10193" "10273" "10718" ...
##   ..$ R-HSA-1257604: chr [1:269] "10000" "10014" "100532731" "10197" ...
##   ..$ R-HSA-1280215: chr [1:728] "10000" "10018" "10019" "10068" ...
##   ..$ R-HSA-1280218: chr [1:774] "10000" "100131439" "100132285" "100302652" ...
##   ..$ R-HSA-1358803: chr [1:13] "10000" "10193" "2064" "2065" ...
##   ..$ R-HSA-162582 : chr [1:2583] "10000" "10006" "10013" "10014" ...
##   ..$ R-HSA-1640170: chr [1:692] "10000" "100134934" "10051" "100526739" ...
##   ..$ R-HSA-186712 : chr [1:41] "10000" "10046" "1387" "2033" ...
##   ..$ R-HSA-194138 : chr [1:110] "10000" "10006" "1003" "10152" ...
##   ..$ R-HSA-198323 : chr [1:14] "10000" "1026" "1027" "1147" ...
##   ..$ R-HSA-198693 : chr [1:9] "10000" "1385" "207" "208" ...
##   ..$ R-HSA-199418 : chr [1:113] "10000" "10718" "10818" "117145" ...
##   ..$ R-HSA-199991 : chr [1:635] "10000" "100302736" "10052" "100526767" ...
##   ..$ R-HSA-210745 : chr [1:21] "10000" "207" "208" "222546" ...
##   ..$ R-HSA-211163 : chr [1:4] "10000" "207" "208" "2308"
##   ..$ R-HSA-212436 : chr [1:1243] "10000" "10001" "10002" "100129543" ...
##   ..$ R-HSA-2219528: chr [1:104] "10000" "1026" "1027" "10718" ...
##   ..$ R-HSA-2262752: chr [1:787] "10000" "10013" "100137049" "10049" ...
##   ..$ R-HSA-3700989: chr [1:362] "10000" "10111" "10128" "1017" ...
##   ..$ R-HSA-372790 : chr [1:708] "10000" "10022" "100271715" "100996758" ...
##   ..$ R-HSA-388396 : chr [1:633] "10000" "10022" "100271715" "100996758" ...
##   ..$ R-HSA-388841 : chr [1:71] "10000" "117145" "1326" "1445" ...
##   ..$ R-HSA-389356 : chr [1:35] "10000" "117145" "1326" "207" ...
##   ..$ R-HSA-389357 : chr [1:24] "10000" "117145" "1326" "207" ...
##   ..$ R-HSA-389513 : chr [1:21] "10000" "1493" "207" "208" ...
##   ..$ R-HSA-392451 : chr [1:25] "10000" "10681" "146850" "207" ...
##   ..$ R-HSA-397795 : chr [1:32] "10000" "10681" "146850" "207" ...
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##   ..$ R-HSA-453279 : chr [1:149] "10000" "1017" "1019" "10197" ...
##   ..$ R-HSA-5218920: chr [1:31] "10000" "1003" "10451" "117145" ...
##   ..$ R-HSA-5357801: chr [1:217] "10000" "10015" "10018" "100302736" ...
##   ..$ R-HSA-5628897: chr [1:87] "10000" "10128" "10325" "10542" ...
##   ..$ R-HSA-5633007: chr [1:160] "10000" "10111" "1017" "1020" ...
##   ..$ R-HSA-5653656: chr [1:674] "10000" "100302736" "10052" "100526767" ...
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##   ..$ R-HSA-5663205: chr [1:1283] "10000" "10006" "10015" "100526767" ...
##   ..$ R-HSA-5674400: chr [1:25] "10000" "1026" "1027" "1147" ...
##   ..$ R-HSA-6804757: chr [1:36] "10000" "1017" "1029" "11200" ...
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##   ..$ R-HSA-6804759: chr [1:14] "10000" "10848" "207" "208" ...
##   ..$ R-HSA-6806003: chr [1:37] "10000" "1017" "1029" "11200" ...
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##   ..$ R-HSA-69206   : chr [1:131] "10000" "1017" "1019" "10197" ...
##   ..$ R-HSA-69242   : chr [1:163] "10000" "1017" "1019" "10197" ...
##   ..$ R-HSA-69278   : chr [1:561] "10000" "10051" "100526739" "100526767" ...
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##   ..$ R-HSA-8863795: chr [1:29] "10000" "10193" "10273" "10718" ...
##   ..$ R-HSA-8876198: chr [1:90] "10000" "10260" "10890" "10981" ...
##   ..$ R-HSA-8878166: chr [1:121] "10000" "10013" "100526737" "1019" ...
##   ..$ R-HSA-8939211: chr [1:223] "10000" "1025" "1027" "102724334" ...
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##    ..$ R-HSA-8948751: chr [1:69] "10000" "10197" "10213" "10273" ...
##    ..$ R-HSA-8953897: chr [1:801] "10000" "10013" "100137049" "10049" ...
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##    ..$ R-HSA-9006931: chr [1:299] "10000" "10062" "10123" "10170" ...
##    ..$ R-HSA-9006934: chr [1:523] "10000" "10006" "10019" "1003" ...
##    ..$ R-HSA-9007101: chr [1:124] "10000" "10133" "10260" "107080638" ...
##    ..$ R-HSA-9009391: chr [1:77] "10000" "1027" "10681" "127933" ...
##    ..$ R-HSA-9607240: chr [1:38] "10000" "10018" "10019" "1027" ...
##    ..$ R-HSA-9614085: chr [1:65] "10000" "10018" "1026" "1027" ...
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##    ..$ ENSP00000001146: chr [1:197] "ENSG00000057468" "ENSG00000186479" "ENSG00000119913" "ENSG0000010
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##    ..$ ENSP00000005257: chr [1:234] "ENSG00000278599" "ENSG00000275153" "ENSG00000273513" "ENSG0000010
##    ..$ ENSP00000005284: chr [1:283] "ENSG00000258986" "ENSG00000276342" "ENSG00000183090" "ENSG0000010
##    ..$ ENSP00000006015: chr [1:160] "ENSG00000189134" "ENSG00000128342" "ENSG00000145088" "ENSG0000012
##    ..$ ENSP00000006053: chr [1:250] "ENSG00000163515" "ENSG00000108702" "ENSG00000121691" "ENSG0000020
##    ..$ ENSP00000007390: chr [1:57] "ENSG00000187676" "ENSG00000130725" "ENSG00000165916" "ENSG0000022
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##    ..$ ENSP00000011473: chr [1:67] "ENSG00000074201" "ENSG00000233954" "ENSG00000162896" "ENSG0000012'
##    ..$ ENSP00000013222: chr [1:103] "ENSG00000099974" "ENSG00000275003" "ENSG00000275758" "ENSG0000009
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##    ..$ ENSP00000020926: chr [1:169] "ENSG00000204851" "ENSG00000106236" "ENSG00000187957" "ENSG0000014
##    ..$ ENSP00000025301: chr [1:57] "ENSG00000206538" "ENSG00000179813" "ENSG00000189334" "ENSG0000022'
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##    ..$ CIDm00000004: chr [1:40] "ENSP00000001008" "ENSP00000179259" "ENSP00000221444" "ENSP0000023170
##    ..$ CIDm00000006: chr [1:62] "ENSP00000211314" "ENSP00000220764" "ENSP00000225275" "ENSP0000022583
##    ..$ CIDm00000007: chr [1:47] "ENSP00000219481" "ENSP00000220764" "ENSP00000221476" "ENSP0000022228
##    ..$ CIDm00000009: chr [1:95] "ENSP00000037243" "ENSP00000078429" "ENSP00000173229" "ENSP0000020103
##    ..$ CIDm00000010: chr [1:14] "ENSP00000215838" "ENSP00000221486" "ENSP00000257248" "ENSP0000025726
##    ..$ CIDm00000011: chr [1:16] "ENSP00000013034" "ENSP00000200652" "ENSP00000219066" "ENSP0000021930
##    ..$ CIDm00000013: chr [1:11] "ENSP00000221444" "ENSP00000280701" "ENSP00000295822" "ENSP0000029851
##    ..$ CIDm00000015: chr [1:81] "ENSP00000005178" "ENSP00000172229" "ENSP00000216639" "ENSP0000022076
##    ..$ CIDm00000017: chr [1:13] "ENSP00000254654" "ENSP00000265174" "ENSP00000295304" "ENSP0000030954
##    ..$ CIDm00000019: chr [1:31] "ENSP00000085068" "ENSP00000159060" "ENSP00000199280" "ENSP0000021948
##    ..$ CIDm00000020: chr [1:10] "ENSP00000221403" "ENSP00000252997" "ENSP00000278412" "ENSP0000030132
##    ..$ CIDm00000022: chr [1:13] "ENSP00000265395" "ENSP00000267119" "ENSP00000296096" "ENSP0000030262
##    ..$ CIDm00000023: chr [1:6] "ENSP00000217420" "ENSP00000219320" "ENSP00000303532" "ENSP00000334223
##    ..$ CIDm00000031: chr [1:19] "ENSP00000219368" "ENSP00000220764" "ENSP00000222286" "ENSP0000023290
##    ..$ CIDm00000032: chr [1:7] "ENSP00000005178" "ENSP00000257408" "ENSP00000335060" "ENSP0000034079
##    ..$ CIDm00000033: chr [1:19] "ENSP00000244571" "ENSP00000282276" "ENSP00000285667" "ENSP0000029530
##    ..$ CIDm00000036: chr [1:16] "ENSP00000230050" "ENSP00000252818" "ENSP00000263256" "ENSP0000026499
##    ..$ CIDm00000037: chr [1:21] "ENSP00000196551" "ENSP00000217407" "ENSP00000221801" "ENSP0000023157
##    ..$ CIDm00000038: chr [1:9] "ENSP00000216540" "ENSP00000220764" "ENSP00000245312" "ENSP0000027386
##    ..$ CIDm00000040: chr [1:49] "ENSP00000037243" "ENSP00000159060" "ENSP00000220764" "ENSP0000023429
##    ..$ CIDm00000043: chr [1:34] "ENSP00000220764" "ENSP00000233710" "ENSP00000238558" "ENSP0000024005
##    ..$ CIDm00000044: chr [1:7] "ENSP00000303754" "ENSP00000331435" "ENSP00000358719" "ENSP0000036246
##    ..$ CIDm00000046: chr [1:6] "ENSP00000302441" "ENSP00000303077" "ENSP00000311436" "ENSP0000035968
##    ..$ CIDm00000047: chr [1:7] "ENSP00000262193" "ENSP00000282091" "ENSP00000302620" "ENSP0000036293
##    ..$ CIDm00000049: chr [1:23] "ENSP00000199280" "ENSP00000219481" "ENSP00000220764" "ENSP0000022551
##    ..$ CIDm00000050: chr [1:27] "ENSP00000005178" "ENSP00000194118" "ENSP00000220562" "ENSP0000022076
##    ..$ CIDm00000051: chr [1:317] "ENSP00000040584" "ENSP00000176183" "ENSP00000179259" "ENSP0000019413
##    ..$ CIDm00000054: chr [1:9] "ENSP00000231706" "ENSP00000233710" "ENSP00000242592" "ENSP0000026499
##    ..$ CIDm00000058: chr [1:17] "ENSP00000221801" "ENSP00000222381" "ENSP00000247219" "ENSP0000026011
##    ..$ CIDm00000059: chr [1:29] "ENSP00000216034" "ENSP00000220764" "ENSP00000229277" "ENSP0000023100
##    ..$ CIDm00000061: chr [1:44] "ENSP00000001008" "ENSP00000179259" "ENSP00000220764" "ENSP0000023067
##    ..$ CIDm00000065: chr [1:30] "ENSP00000221444" "ENSP00000252321" "ENSP00000260270" "ENSP0000026337
##    ..$ CIDm00000067: chr [1:9] "ENSP00000220764" "ENSP00000259053" "ENSP00000301327" "ENSP0000033329
##    ..$ CIDm00000068: chr [1:18] "ENSP00000199708" "ENSP00000222286" "ENSP00000222388" "ENSP0000027348
##    ..$ CIDm00000070: chr [1:37] "ENSP00000005178" "ENSP00000216144" "ENSP00000223167" "ENSP0000022336
##    ..$ CIDm00000071: chr [1:9] "ENSP00000225655" "ENSP00000278412" "ENSP00000298198" "ENSP0000030946
##    ..$ CIDm00000072: chr [1:15] "ENSP00000220764" "ENSP00000225275" "ENSP00000229390" "ENSP0000024105
##    ..$ CIDm00000073: chr [1:48] "ENSP00000053468" "ENSP00000196551" "ENSP00000222002" "ENSP0000022553
##    ..$ CIDm00000074: chr [1:22] "ENSP00000013034" "ENSP00000219302" "ENSP00000220764" "ENSP0000023899
##    ..$ CIDm00000075: chr [1:11] "ENSP00000220764" "ENSP00000222005" "ENSP00000253799" "ENSP0000026162
##    ..$ CIDm00000076: chr [1:56] "ENSP00000005178" "ENSP00000217386" "ENSP00000220764" "ENSP0000022149
##    ..$ CIDm00000077: chr [1:44] "ENSP00000215574" "ENSP00000216479" "ENSP00000221403" "ENSP0000023005
##    ..$ CIDm00000078: chr [1:6] "ENSP00000246747" "ENSP00000340402" "ENSP00000364212" "ENSP0000036692
##    ..$ CIDm00000079: chr [1:7] "ENSP00000264382" "ENSP00000288022" "ENSP00000306397" "ENSP0000035690
##    ..$ CIDm00000080: chr [1:7] "ENSP00000220764" "ENSP00000225519" "ENSP00000265100" "ENSP0000028103
##    ..$ CIDm00000081: chr [1:10] "ENSP00000221403" "ENSP00000263321" "ENSP00000281154" "ENSP0000028312
##    ..$ CIDm00000082: chr [1:13] "ENSP00000228476" "ENSP00000256458" "ENSP00000261326" "ENSP0000026422
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19

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##    ..$ CIDm00000084: chr [1:31] "ENSP00000220764" "ENSP00000225831" "ENSP00000232905" "ENSP0000025695{
##    ..$ CIDm00000085: chr [1:55] "ENSP00000200652" "ENSP00000216115" "ENSP00000219066" "ENSP0000022076{
##    ..$ CIDm00000086: chr [1:34] "ENSP00000217420" "ENSP00000219320" "ENSP00000221538" "ENSP0000022185{
##    ..$ CIDm00000087: chr [1:26] "ENSP00000005178" "ENSP00000209668" "ENSP00000217043" "ENSP0000024259{
##    ..$ CIDm00000089: chr [1:6] "ENSP00000220764" "ENSP00000247219" "ENSP00000303754" "ENSP0000030917{
##    ..$ CIDm00000090: chr [1:14] "ENSP00000199708" "ENSP00000226460" "ENSP00000252951" "ENSP0000029289{
##    ..$ CIDm00000091: chr [1:13] "ENSP00000217386" "ENSP00000225655" "ENSP00000261867" "ENSP0000027523{
##    ..$ CIDm00000093: chr [1:28] "ENSP00000216144" "ENSP00000222304" "ENSP00000232975" "ENSP0000025485{
##    ..$ CIDm00000094: chr [1:19] "ENSP00000199708" "ENSP00000226460" "ENSP00000252951" "ENSP0000026510{
##    ..$ CIDm00000096: chr [1:26] "ENSP00000220764" "ENSP00000225831" "ENSP00000241052" "ENSP0000024616{
##    ..$ CIDm00000098: chr [1:11] "ENSP00000001146" "ENSP00000084798" "ENSP00000244051" "ENSP0000025379{
##    ..$ CIDm00000099: chr [1:27] "ENSP00000037243" "ENSP00000084798" "ENSP00000221418" "ENSP0000022256{
##    ..$ CIDm00000102: chr [1:11] "ENSP00000215906" "ENSP00000256458" "ENSP00000295206" "ENSP0000029737{
##    ..$ CIDm00000104: chr [1:12] "ENSP00000219481" "ENSP00000220764" "ENSP00000257408" "ENSP0000026327{
##    ..$ CIDm00000105: chr [1:8] "ENSP00000216484" "ENSP00000262030" "ENSP00000295822" "ENSP0000029819{
##    ..$ CIDm00000106: chr [1:207] "ENSP00000179259" "ENSP00000194152" "ENSP00000194155" "ENSP0000019970{
##    ..$ CIDm00000107: chr [1:24] "ENSP00000225275" "ENSP00000225371" "ENSP00000253719" "ENSP0000026027{
##    ..$ CIDm00000109: chr [1:64] "ENSP00000217260" "ENSP00000222286" "ENSP00000223023" "ENSP0000022600{
##    ..$ CIDm00000111: chr [1:16] "ENSP00000234389" "ENSP00000241052" "ENSP00000252603" "ENSP0000025346{
##    ..$ CIDm00000118: chr [1:23] "ENSP00000229633" "ENSP00000244571" "ENSP00000253799" "ENSP0000026178{
##    ..$ CIDm00000119: chr [1:197] "ENSP00000005257" "ENSP00000037243" "ENSP00000157812" "ENSP0000017322{
##    ..$ CIDm00000120: chr [1:10] "ENSP00000222381" "ENSP00000231706" "ENSP00000261622" "ENSP0000029665{
##    ..$ CIDm00000121: chr [1:8] "ENSP00000222286" "ENSP00000222388" "ENSP00000232905" "ENSP0000027751{
##    ..$ CIDm00000122: chr [1:52] "ENSP00000230050" "ENSP00000231121" "ENSP00000246529" "ENSP0000024727{
##    ..$ CIDm00000123: chr [1:13] "ENSP00000215886" "ENSP00000219320" "ENSP00000221804" "ENSP0000026131{
##    ..$ CIDm00000125: chr [1:6] "ENSP00000209668" "ENSP00000263321" "ENSP00000263354" "ENSP0000034891{
##    ..$ CIDm00000126: chr [1:20] "ENSP00000263967" "ENSP00000267291" "ENSP00000280362" "ENSP0000028364{
##    ..$ CIDm00000127: chr [1:16] "ENSP00000209668" "ENSP00000222726" "ENSP00000229277" "ENSP0000022939{
##    ..$ CIDm00000129: chr [1:7] "ENSP00000005178" "ENSP00000217260" "ENSP00000222286" "ENSP0000026107{
##    ..$ CIDm00000131: chr [1:8] "ENSP00000216127" "ENSP00000225688" "ENSP00000239231" "ENSP0000028314{
##    ..$ CIDm00000132: chr [1:10] "ENSP00000217043" "ENSP00000239231" "ENSP00000260113" "ENSP0000026027{
##    ..$ CIDm00000133: chr [1:14] "ENSP00000200652" "ENSP00000233143" "ENSP00000261313" "ENSP0000026318{
##    ..$ CIDm00000134: chr [1:36] "ENSP00000001146" "ENSP00000005178" "ENSP00000199280" "ENSP0000022228{
##    ..$ CIDm00000135: chr [1:19] "ENSP00000220764" "ENSP00000222381" "ENSP00000229390" "ENSP0000023396{
##    ..$ CIDm00000136: chr [1:57] "ENSP00000013034" "ENSP00000215838" "ENSP00000220764" "ENSP0000022894{
##    ..$ CIDm00000137: chr [1:31] "ENSP00000005178" "ENSP00000159060" "ENSP00000220764" "ENSP0000023170{
##    ..$ CIDm00000138: chr [1:20] "ENSP00000199280" "ENSP00000216639" "ENSP00000221476" "ENSP0000022628{
##    ..$ CIDm00000139: chr [1:6] "ENSP00000258415" "ENSP00000260270" "ENSP00000272286" "ENSP0000030164{
##    ..$ CIDm00000142: chr [1:57] "ENSP00000216144" "ENSP00000216479" "ENSP00000221801" "ENSP0000022913{
##    ..$ CIDm00000143: chr [1:35] "ENSP00000167588" "ENSP00000194130" "ENSP00000215838" "ENSP0000022149{
##    ..$ CIDm00000144: chr [1:134] "ENSP00000176183" "ENSP00000216336" "ENSP00000217270" "ENSP0000021871{
##    ..$ CIDm00000145: chr [1:21] "ENSP00000042931" "ENSP00000238994" "ENSP00000263160" "ENSP0000026539{
##    ..$ CIDm00000146: chr [1:45] "ENSP00000215838" "ENSP00000223095" "ENSP00000225655" "ENSP0000023850{
##    ..$ CIDm00000149: chr [1:41] "ENSP00000177694" "ENSP00000182527" "ENSP00000215904" "ENSP0000022180{
##    ..$ CIDm00000150: chr [1:12] "ENSP00000216479" "ENSP00000249016" "ENSP00000264220" "ENSP0000027523{
##    ..$ CIDm00000151: chr [1:9] "ENSP00000223642" "ENSP00000254190" "ENSP00000264220" "ENSP0000030262{
##    ..$ CIDm00000152: chr [1:10] "ENSP00000223642" "ENSP00000229277" "ENSP00000264220" "ENSP0000027430{
##    ..$ CIDm00000153: chr [1:24] "ENSP00000037243" "ENSP00000216484" "ENSP00000221801" "ENSP0000022364{
##    ..$ CIDm00000154: chr [1:10] "ENSP00000160740" "ENSP00000179259" "ENSP00000223642" "ENSP0000024405{
##    ..$ CIDm00000156: chr [1:9] "ENSP00000220764" "ENSP00000234454" "ENSP00000260447" "ENSP0000034200{
##    ..$ CIDm00000157: chr [1:13] "ENSP00000223023" "ENSP00000264220" "ENSP00000274008" "ENSP0000028898{
##    .. [list output truncated]
## $ reactome2ensg:List of 2541
##    ..$ R-HSA-109582 : chr [1:664] "ENSG00000121410" "ENSG00000111252" "ENSG00000112984" "ENSG0000017255
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##     ..$ R-HSA-114608 : chr [1:140] "ENSG00000121410" "ENSG00000145685" "ENSG00000125257" "ENSG000001969
##     ..$ R-HSA-168249 : chr [1:1384] "ENSG00000121410" "ENSG00000254415" "ENSG00000136754" "ENSG0000013(
##     ..$ R-HSA-168256 : chr [1:2784] "ENSG00000121410" "ENSG00000117020" "ENSG00000275199" "ENSG00000254
##     ..$ R-HSA-6798695: chr [1:603] "ENSG00000121410" "ENSG00000254415" "ENSG00000251201" "ENSG000001002
##     ..$ R-HSA-76002  : chr [1:292] "ENSG00000121410" "ENSG00000172575" "ENSG00000145685" "ENSG000000688
##     ..$ R-HSA-76005  : chr [1:145] "ENSG00000121410" "ENSG00000145685" "ENSG00000125257" "ENSG000001969
##     ..$ R-HSA-1430728: chr [1:2340] "ENSG00000156006" "ENSG00000196839" "ENSG00000133997" "ENSG00000077
##     ..$ R-HSA-156580 : chr [1:115] "ENSG00000156006" "ENSG00000149124" "ENSG00000117448" "ENSG000001628
##     ..$ R-HSA-156582 : chr [1:2] "ENSG00000156006" "ENSG00000171428"
##     ..$ R-HSA-211859 : chr [1:240] "ENSG00000156006" "ENSG00000282301" "ENSG00000149124" "ENSG000001174
##     ..$ R-HSA-9748784: chr [1:111] "ENSG00000156006" "ENSG00000114770" "ENSG00000149124" "ENSG000001252
##     ..$ R-HSA-9753281: chr [1:32] "ENSG00000156006" "ENSG00000114770" "ENSG00000125257" "ENSG0000002383
##     ..$ R-HSA-15869  : chr [1:102] "ENSG00000196839" "ENSG00000250741" "ENSG00000085231" "ENSG000002792
##     ..$ R-HSA-1643685: chr [1:2053] "ENSG00000196839" "ENSG00000117020" "ENSG00000275199" "ENSG0000013(
##     ..$ R-HSA-5668914: chr [1:301] "ENSG00000196839" "ENSG00000159921" "ENSG00000205277" "ENSG000001830
##     ..$ R-HSA-74217  : chr [1:14] "ENSG00000196839" "ENSG00000156110" "ENSG00000168803" "ENSG0000015613
##     ..$ R-HSA-8956321: chr [1:24] "ENSG00000196839" "ENSG00000156110" "ENSG00000007001" "ENSG0000016880
##     ..$ R-HSA-9734207: chr [1:3] "ENSG00000196839" "ENSG00000165704" "ENSG00000198931"
##     ..$ R-HSA-9734735: chr "ENSG00000196839"
##     ..$ R-HSA-9735804: chr [1:4] "ENSG00000196839" "ENSG00000165704" "ENSG00000198931" "ENSG0000019880!
##     ..$ R-HSA-1266738: chr [1:1270] "ENSG00000170558" "ENSG00000117020" "ENSG00000275199" "ENSG0000013:
##     ..$ R-HSA-1500931: chr [1:133] "ENSG00000170558" "ENSG00000062038" "ENSG00000179242" "ENSG000002800
##     ..$ R-HSA-381426 : chr [1:137] "ENSG00000170558" "ENSG00000132464" "ENSG00000143870" "ENSG000001378
##     ..$ R-HSA-392499 : chr [1:2211] "ENSG00000170558" "ENSG00000159921" "ENSG00000142892" "ENSG0000023:
##     ..$ R-HSA-418990 : chr [1:34] "ENSG00000170558" "ENSG00000062038" "ENSG00000179242" "ENSG0000028064
##     ..$ R-HSA-421270 : chr [1:67] "ENSG00000170558" "ENSG00000062038" "ENSG00000179242" "ENSG0000028064
##     ..$ R-HSA-446728 : chr [1:94] "ENSG00000170558" "ENSG00000062038" "ENSG00000179242" "ENSG0000028064
##     ..$ R-HSA-525793 : chr [1:30] "ENSG00000170558" "ENSG00000179242" "ENSG00000280641" "ENSG0000021399
##     ..$ R-HSA-597592 : chr [1:1612] "ENSG00000170558" "ENSG00000159921" "ENSG00000142892" "ENSG0000023:
##     ..$ R-HSA-8957275: chr [1:120] "ENSG00000170558" "ENSG00000132464" "ENSG00000143870" "ENSG000001378
##     ..$ R-HSA-109581 : chr [1:206] "ENSG00000117020" "ENSG00000275199" "ENSG00000153094" "ENSG000002511
##     ..$ R-HSA-109606 : chr [1:58] "ENSG00000117020" "ENSG00000275199" "ENSG00000153094" "ENSG0000014788
##     ..$ R-HSA-111447 : chr [1:17] "ENSG00000117020" "ENSG00000275199" "ENSG00000134308" "ENSG0000014220
##     ..$ R-HSA-114452 : chr [1:32] "ENSG00000117020" "ENSG00000275199" "ENSG00000153094" "ENSG0000013430
##     ..$ R-HSA-1227986: chr [1:52] "ENSG00000117020" "ENSG00000275199" "ENSG00000181852" "ENSG0000010320
##     ..$ R-HSA-1257604: chr [1:314] "ENSG00000117020" "ENSG00000275199" "ENSG00000108840" "ENSG000002698
##     ..$ R-HSA-1280215: chr [1:918] "ENSG00000117020" "ENSG00000275199" "ENSG00000153094" "ENSG000001111
##     ..$ R-HSA-1280218: chr [1:1255] "ENSG00000117020" "ENSG00000275199" "ENSG00000204345" "ENSG0000027(
##     ..$ R-HSA-1358803: chr [1:14] "ENSG00000117020" "ENSG00000275199" "ENSG00000181852" "ENSG0000014173
##     ..$ R-HSA-162582 : chr [1:2850] "ENSG00000117020" "ENSG00000275199" "ENSG00000136754" "ENSG00000094
##     ..$ R-HSA-1640170: chr [1:780] "ENSG00000117020" "ENSG00000275199" "ENSG00000257949" "ENSG000001138
##     ..$ R-HSA-186712 : chr [1:45] "ENSG00000117020" "ENSG00000275199" "ENSG00000013619" "ENSG0000000533
##     ..$ R-HSA-194138 : chr [1:115] "ENSG00000117020" "ENSG00000275199" "ENSG00000136754" "ENSG00000179:
##     ..$ R-HSA-198323 : chr [1:15] "ENSG00000117020" "ENSG00000275199" "ENSG00000124762" "ENSG000001112:
##     ..$ R-HSA-198693 : chr [1:10] "ENSG00000117020" "ENSG00000275199" "ENSG00000118260" "ENSG0000014220
##     ..$ R-HSA-199418 : chr [1:121] "ENSG00000117020" "ENSG00000275199" "ENSG00000185737" "ENSG000001662
##     ..$ R-HSA-199991 : chr [1:669] "ENSG00000117020" "ENSG00000275199" "ENSG00000251201" "ENSG000001829
##     ..$ R-HSA-210745 : chr [1:23] "ENSG00000117020" "ENSG00000275199" "ENSG00000142208" "ENSG0000010522
##     ..$ R-HSA-211163 : chr [1:5] "ENSG00000117020" "ENSG00000275199" "ENSG00000142208" "ENSG0000010522:
##     ..$ R-HSA-212436 : chr [1:1387] "ENSG00000117020" "ENSG00000275199" "ENSG00000133997" "ENSG0000027:
##     ..$ R-HSA-2219528: chr [1:106] "ENSG00000117020" "ENSG00000275199" "ENSG00000124762" "ENSG000001112
##     ..$ R-HSA-2262752: chr [1:876] "ENSG00000117020" "ENSG00000275199" "ENSG00000094631" "ENSG000002437
##     ..$ R-HSA-3700989: chr [1:428] "ENSG00000117020" "ENSG00000275199" "ENSG00000113522" "ENSG000001380
##     ..$ R-HSA-372790 : chr [1:797] "ENSG00000117020" "ENSG00000275199" "ENSG00000172410" "ENSG000002140
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##    ..$ R-HSA-388396 : chr [1:712] "ENSG00000117020" "ENSG00000275199" "ENSG00000172410" "ENSG0000021
##    ..$ R-HSA-388841 : chr [1:128] "ENSG00000117020" "ENSG00000275199" "ENSG00000159445" "ENSG0000010795
##    ..$ R-HSA-389356 : chr [1:35] "ENSG00000117020" "ENSG00000275199" "ENSG00000159445" "ENSG0000010790
##    ..$ R-HSA-389357 : chr [1:24] "ENSG00000117020" "ENSG00000275199" "ENSG00000159445" "ENSG0000010790
##    ..$ R-HSA-389513 : chr [1:22] "ENSG00000117020" "ENSG00000275199" "ENSG00000163599" "ENSG0000014220
##    ..$ R-HSA-392451 : chr [1:27] "ENSG00000117020" "ENSG00000275199" "ENSG00000069966" "ENSG0000027623
##    ..$ R-HSA-397795 : chr [1:34] "ENSG00000117020" "ENSG00000275199" "ENSG00000069966" "ENSG0000027623
##    ..$ R-HSA-4420097: chr [1:106] "ENSG00000117020" "ENSG00000275199" "ENSG00000136754" "ENSG0000017917
##    ..$ R-HSA-453279 : chr [1:175] "ENSG00000117020" "ENSG00000275199" "ENSG00000123374" "ENSG0000013544
##    ..$ R-HSA-5218920: chr [1:30] "ENSG00000117020" "ENSG00000275199" "ENSG00000179776" "ENSG0000013421
##    ..$ R-HSA-5357801: chr [1:246] "ENSG00000117020" "ENSG00000275199" "ENSG00000170248" "ENSG0000015304
##    ..$ R-HSA-5628897: chr [1:94] "ENSG00000117020" "ENSG00000275199" "ENSG00000138095" "ENSG0000008375
##    ..$ R-HSA-5633007: chr [1:186] "ENSG00000117020" "ENSG00000275199" "ENSG00000113522" "ENSG0000012333
##    ..$ R-HSA-5653656: chr [1:711] "ENSG00000117020" "ENSG00000275199" "ENSG00000251201" "ENSG0000018295
##    ..$ R-HSA-5663202: chr [1:470] "ENSG00000117020" "ENSG00000275199" "ENSG00000094631" "ENSG0000010885
##    ..$ R-HSA-5663205: chr [1:1180] "ENSG00000117020" "ENSG00000275199" "ENSG00000136754" "ENSG0000017C
##    ..$ R-HSA-5674400: chr [1:26] "ENSG00000117020" "ENSG00000275199" "ENSG00000124762" "ENSG0000011127
##    ..$ R-HSA-6804757: chr [1:42] "ENSG00000117020" "ENSG00000275199" "ENSG00000123374" "ENSG0000014788
##    ..$ R-HSA-6804758: chr [1:33] "ENSG00000117020" "ENSG00000275199" "ENSG00000170004" "ENSG0000011164
##    ..$ R-HSA-6804759: chr [1:15] "ENSG00000117020" "ENSG00000275199" "ENSG00000104881" "ENSG0000014220
##    ..$ R-HSA-6806003: chr [1:43] "ENSG00000117020" "ENSG00000275199" "ENSG00000123374" "ENSG0000014788
##    ..$ R-HSA-6807070: chr [1:181] "ENSG00000117020" "ENSG00000275199" "ENSG00000108840" "ENSG0000026980
##    ..$ R-HSA-69202  : chr [1:104] "ENSG00000117020" "ENSG00000275199" "ENSG00000123374" "ENSG0000013544
##    ..$ R-HSA-69206  : chr [1:155] "ENSG00000117020" "ENSG00000275199" "ENSG00000123374" "ENSG0000013544
##    ..$ R-HSA-69242  : chr [1:185] "ENSG00000117020" "ENSG00000275199" "ENSG00000123374" "ENSG0000013544
##    ..$ R-HSA-69278  : chr [1:622] "ENSG00000117020" "ENSG00000275199" "ENSG00000113810" "ENSG0000025150
##    ..$ R-HSA-69656  : chr [1:106] "ENSG00000117020" "ENSG00000275199" "ENSG00000123374" "ENSG0000013544
##    ..$ R-HSA-73857  : chr [1:1520] "ENSG00000117020" "ENSG00000275199" "ENSG00000133997" "ENSG0000027£
##    ..$ R-HSA-74160  : chr [1:1673] "ENSG00000117020" "ENSG00000275199" "ENSG00000133997" "ENSG0000027£
##    ..$ R-HSA-8863795: chr [1:30] "ENSG00000117020" "ENSG00000275199" "ENSG00000181852" "ENSG0000010320
##    ..$ R-HSA-8876198: chr [1:96] "ENSG00000117020" "ENSG00000275199" "ENSG00000174485" "ENSG0000008473
##    ..$ R-HSA-8878166: chr [1:143] "ENSG00000117020" "ENSG00000275199" "ENSG00000094631" "ENSG0000024860
##    ..$ R-HSA-8939211: chr [1:229] "ENSG00000117020" "ENSG00000275199" "ENSG00000136807" "ENSG0000011112
##    ..$ R-HSA-8941332: chr [1:9] "ENSG00000117020" "ENSG00000275199" "ENSG00000142208" "ENSG0000010522
##    ..$ R-HSA-8948751: chr [1:103] "ENSG00000117020" "ENSG00000275199" "ENSG00000131467" "ENSG0000011512
##    ..$ R-HSA-8953897: chr [1:890] "ENSG00000117020" "ENSG00000275199" "ENSG00000094631" "ENSG0000024372
##    ..$ R-HSA-9006925: chr [1:359] "ENSG00000117020" "ENSG00000275199" "ENSG00000108840" "ENSG0000026980
##    ..$ R-HSA-9006931: chr [1:321] "ENSG00000117020" "ENSG00000275199" "ENSG00000025434" "ENSG0000018800
##    ..$ R-HSA-9006934: chr [1:558] "ENSG00000117020" "ENSG00000275199" "ENSG00000136754" "ENSG0000011112
##    ..$ R-HSA-9007101: chr [1:131] "ENSG00000117020" "ENSG00000275199" "ENSG00000123240" "ENSG0000017440
##    ..$ R-HSA-9009391: chr [1:80] "ENSG00000117020" "ENSG00000275199" "ENSG00000111276" "ENSG0000006990
##    ..$ R-HSA-9607240: chr [1:40] "ENSG00000117020" "ENSG00000275199" "ENSG00000153094" "ENSG0000011125
##    ..$ R-HSA-9614085: chr [1:66] "ENSG00000117020" "ENSG00000275199" "ENSG00000153094" "ENSG0000012470
##    ..$ R-HSA-9614399: chr [1:12] "ENSG00000117020" "ENSG00000275199" "ENSG00000134308" "ENSG0000014220
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##    ..$ ENSP00000001008: chr [1:377] "ENSG00000183831" "ENSG00000051382" "ENSG0000125827" "ENSG0000002C
##    ..$ ENSP00000001146: chr [1:197] "ENSG00000057468" "ENSG00000186479" "ENSG00000119913" "ENSG0000010
##    ..$ ENSP00000005178: chr [1:253] "ENSG00000171227" "ENSG00000139329" "ENSG00000203668" "ENSG0000005
##    ..$ ENSP00000005257: chr [1:234] "ENSG00000278599" "ENSG00000275153" "ENSG00000273513" "ENSG0000010
##    ..$ ENSP00000005284: chr [1:283] "ENSG00000258986" "ENSG00000276342" "ENSG00000183090" "ENSG0000010
##    ..$ ENSP00000006015: chr [1:160] "ENSG00000189134" "ENSG00000128342" "ENSG00000145088" "ENSG0000011
##    ..$ ENSP00000006053: chr [1:250] "ENSG00000163515" "ENSG00000108702" "ENSG00000121691" "ENSG0000002C
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22

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##     ..$ ENSP00000007390: chr [1:57] "ENSG00000187676" "ENSG00000130725" "ENSG00000165916" "ENSG0000022
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##     ..$ ENSP00000008391: chr [1:103] "ENSG00000136897" "ENSG00000183783" "ENSG00000205922" "ENSG0000003
##     ..$ ENSP00000008938: chr [1:178] "ENSG00000129988" "ENSG00000158764" "ENSG00000163191" "ENSG0000001
##     ..$ ENSP00000011473: chr [1:67] "ENSG00000074201" "ENSG00000233954" "ENSG00000162896" "ENSG0000012
##     ..$ ENSP00000013222: chr [1:103] "ENSG00000099974" "ENSG00000275003" "ENSG00000275758" "ENSG0000009
##     ..$ ENSP00000014914: chr [1:118] "ENSG00000170775" "ENSG00000176971" "ENSG00000112299" "ENSG0000002
##     ..$ ENSP00000016913: chr [1:75] "ENSG00000248144" "ENSG00000158457" "ENSG00000256870" "ENSG0000026
##     ..$ ENSP00000020926: chr [1:169] "ENSG00000204851" "ENSG00000106236" "ENSG00000187957" "ENSG0000014
##     ..$ ENSP00000025301: chr [1:57] "ENSG00000206538" "ENSG00000179813" "ENSG00000189334" "ENSG0000022
##     ..$ ENSP00000037243: chr [1:283] "ENSG00000137462" "ENSG00000212864" "ENSG00000204450" "ENSG0000001
##     ..$ ENSP00000037869: chr [1:108] "ENSG00000137168" "ENSG00000239264" "ENSG00000127324" "ENSG0000001
##     ..$ ENSP00000040584: chr [1:187] "ENSG00000154342" "ENSG00000130382" "ENSG00000163064" "ENSG0000001
##     ..$ ENSP00000046087: chr [1:92] "ENSG00000181323" "ENSG00000284598" "ENSG00000177143" "ENSG0000118
##     ..$ ENSP00000053468: chr [1:255] "ENSG00000223496" "ENSG00000196743" "ENSG00000156928" "ENSG0000001
##     ..$ ENSP00000056233: chr [1:92] "ENSG00000182950" "ENSG00000159231" "ENSG00000016602" "ENSG0000178
##     ..$ ENSP00000061240: chr [1:117] "ENSG00000088882" "ENSG00000055813" "ENSG00000137674" "ENSG0000013
##     ..$ ENSP00000064571: chr [1:270] "ENSG00000128250" "ENSG00000203877" "ENSG00000164061" "ENSG0000001
##     ..$ ENSP00000075503: chr [1:83] "ENSG00000250719" "ENSG00000282017" "ENSG00000270672" "ENSG0000160
##     ..$ ENSP00000078429: chr [1:393] "ENSG00000173156" "ENSG00000152266" "ENSG00000158786" "ENSG0000001
##     ..$ ENSP00000084798: chr [1:107] "ENSG00000183783" "ENSG00000162188" "ENSG00000177098" "ENSG0000002
##     ..$ ENSP00000085068: chr [1:196] "ENSG00000289549" "ENSG00000184227" "ENSG00000204021" "ENSG0000015
##     ..$ ENSP00000086933: chr [1:80] "ENSG00000182759" "ENSG00000212993" "ENSG00000255009" "ENSG0000139
##     ..$ ENSP00000157812: chr [1:343] "ENSG00000222028" "ENSG00000157999" "ENSG00000158022" "ENSG0000001
##     ..$ ENSP00000159060: chr [1:126] "ENSG00000142149" "ENSG00000177453" "ENSG00000090339" "ENSG0000011
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##     ..$ ENSP00000162749: chr [1:410] "ENSG00000216490" "ENSG00000137673" "ENSG00000249437" "ENSG0000027
##     ..$ ENSP00000165524: chr [1:98] "ENSG00000241563" "ENSG00000128310" "ENSG00000184502" "ENSG0000119
##     ..$ ENSP00000167586: chr [1:313] "ENSG00000180921" "ENSG00000273889" "ENSG00000104901" "ENSG0000001
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##     ..$ ENSP00000170150: chr [1:90] "ENSG00000143536" "ENSG00000163083" "ENSG00000228278" "ENSG0000107
##     ..$ ENSP00000170564: chr [1:78] "ENSG00000150990" "ENSG00000034713" "ENSG00000213139" "ENSG0000151
##     ..$ ENSP00000172229: chr [1:270] "ENSG00000130513" "ENSG00000164106" "ENSG00000136634" "ENSG0000012
##     ..$ ENSP00000173229: chr [1:262] "ENSG00000154764" "ENSG00000168505" "ENSG00000109851" "ENSG0000018
##     ..$ ENSP00000175091: chr [1:44] "ENSG00000123091" "ENSG00000206172" "ENSG00000198892" "ENSG0000180
##     ..$ ENSP00000176183: chr [1:139] "ENSG00000174697" "ENSG00000167771" "ENSG00000256061" "ENSG0000016
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##     ..$ ENSP00000179259: chr [1:115] "ENSG00000083845" "ENSG00000164237" "ENSG00000111674" "ENSG0000014
##     ..$ ENSP00000180166: chr [1:163] "ENSG00000152518" "ENSG00000138083" "ENSG00000163132" "ENSG0000023
##     ..$ ENSP00000182527: chr [1:92] "ENSG00000255245" "ENSG00000023318" "ENSG00000142178" "ENSG0000012
##     ..$ ENSP00000184266: chr [1:125] "ENSG00000131055" "ENSG00000176749" "ENSG00000165502" "ENSG0000013
##     ..$ ENSP00000187762: chr [1:100] "ENSG00000122180" "ENSG00000104823" "ENSG00000282853" "ENSG0000017
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##     ..$ ENSP00000194152: chr [1:69] "ENSG00000237521" "ENSG00000100302" "ENSG00000120329" "ENSG0000265
##     ..$ ENSP00000194155: chr [1:43] "ENSG00000116745" "ENSG00000120329" "ENSG00000265107" "ENSG0000254
##     ..$ ENSP00000196489: chr [1:24] "ENSG00000179331" "ENSG00000205544" "ENSG00000283771" "ENSG0000240
##     ..$ ENSP00000199280: chr [1:183] "ENSG00000197417" "ENSG00000197405" "ENSG00000114638" "ENSG0000017
##     ..$ ENSP00000199708: chr [1:50] "ENSG00000197993" "ENSG00000276615" "ENSG00000059573" "ENSG0000198
##     ..$ ENSP00000199764: chr [1:102] "ENSG00000107447" "ENSG00000137462" "ENSG00000174521" "ENSG0000011
##     ..$ ENSP00000200135: chr [1:124] "ENSG00000153140" "ENSG00000110200" "ENSG00000108798" "ENSG0000015
##     ..$ ENSP00000200453: chr [1:162] "ENSG00000176046" "ENSG00000109819" "ENSG00000197919" "ENSG0000027
##     ..$ ENSP00000200652: chr [1:134] "ENSG00000138459" "ENSG00000134538" "ENSG00000164893" "ENSG0000012
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##     ..$ ENSP00000201031: chr [1:245] "ENSG00000215474" "ENSG00000214336" "ENSG00000178403" "ENSG0000001
##     ..$ ENSP00000201979: chr [1:326] "ENSG00000204020" "ENSG00000165059" "ENSG00000171219" "ENSG0000001
##     ..$ ENSP00000202017: chr [1:45] "ENSG00000158092" "ENSG00000198952" "ENSG00000170027" "ENSG00000187
##     ..$ ENSP00000202967: chr [1:267] "ENSG00000183598" "ENSG00000104808" "ENSG00000169627" "ENSG0000018
##     ..$ ENSP00000203629: chr [1:238] "ENSG00000179934" "ENSG00000169442" "ENSG00000067182" "ENSG0000001
##     ..$ ENSP00000205194: chr [1:40] "ENSG00000179943" "ENSG00000106436" "ENSG00000206203" "ENSG0000013
##     ..$ ENSP00000205636: chr [1:30] "ENSG00000178913" "ENSG00000100558" "ENSG00000111897" "ENSG0000012
##     ..$ ENSP00000206020: chr [1:24] "ENSG00000229676" "ENSG00000198890" "ENSG00000197766" "ENSG0000027
##     ..$ ENSP00000206513: chr [1:154] "ENSG00000104918" "ENSG00000197993" "ENSG00000276615" "ENSG0000002
##     ..$ ENSP00000209540: chr [1:60] "ENSG00000172150" "ENSG00000170915" "ENSG00000188324" "ENSG0000016
##     ..$ ENSP00000209668: chr [1:163] "ENSG00000137124" "ENSG00000196917" "ENSG00000244734" "ENSG0000028
##     ..$ ENSP00000211314: chr [1:77] "ENSG00000163221" "ENSG00000134049" "ENSG00000116096" "ENSG0000012
##     ..$ ENSP00000214869: chr [1:50] "ENSG00000128564" "ENSG00000213339" "ENSG00000074695" "ENSG0000024
##     ..$ ENSP00000215057: chr [1:97] "ENSG00000137463" "ENSG00000129596" "ENSG00000254402" "ENSG0000016
##     ..$ ENSP00000215061: chr [1:17] "ENSG00000198740" "ENSG00000198774" "ENSG00000168209" "ENSG0000012
##     ..$ ENSP00000215368: chr [1:76] "ENSG00000184697" "ENSG00000179774" "ENSG00000105246" "ENSG0000025
##     ..$ ENSP00000215375: chr [1:257] "ENSG00000184857" "ENSG00000239789" "ENSG00000149761" "ENSG0000009
##     ..$ ENSP00000215531: chr [1:21] "ENSG00000213625" "ENSG00000175189" "ENSG00000125255" "ENSG0000025
##     ..$ ENSP00000215565: chr [1:195] "ENSG00000007520" "ENSG00000139168" "ENSG00000179091" "ENSG0000013
##     ..$ ENSP00000215570: chr [1:253] "ENSG00000115128" "ENSG00000163866" "ENSG00000158786" "ENSG0000001
##     ..$ ENSP00000215574: chr [1:372] "ENSG00000100596" "ENSG00000126003" "ENSG00000110092" "ENSG0000001
##     ..$ ENSP00000215582: chr [1:50] "ENSG00000164695" "ENSG00000116032" "ENSG00000189334" "ENSG0000017
##     ..$ ENSP00000215631: chr [1:188] "ENSG00000178718" "ENSG00000135625" "ENSG00000132002" "ENSG0000014
##     ..$ ENSP00000215754: chr [1:291] "ENSG00000156795" "ENSG00000129988" "ENSG00000164399" "ENSG0000001
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##     ..$ ENSP00000215781: chr [1:302] "ENSG00000239732" "ENSG00000166527" "ENSG00000276231" "ENSG0000002
##     ..$ ENSP00000215838: chr [1:67] "ENSG00000173141" "ENSG00000235718" "ENSG00000114113" "ENSG0000011
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##     ..$ ENSP00000215906: chr [1:28] "ENSG00000162702" "ENSG00000187676" "ENSG00000154174" "ENSG0000013
##     ..$ ENSP00000216034: chr [1:208] "ENSG00000172172" "ENSG00000233927" "ENSG00000276180" "ENSG0000002
##     ..$ ENSP00000216115: chr [1:60] "ENSG00000124766" "ENSG00000135116" "ENSG00000110092" "ENSG0000016
##     ..$ ENSP00000216127: chr [1:312] "ENSG00000106299" "ENSG00000215045" "ENSG00000257365" "ENSG0000001
##     ..$ ENSP00000216144: chr [1:172] "ENSG00000044574" "ENSG00000051382" "ENSG00000198355" "ENSG0000018
##     ..$ ENSP00000216225: chr [1:397] "ENSG00000288859" "ENSG00000181449" "ENSG00000104671" "ENSG0000002
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##     ..$ CIDm00000006: chr [1:72] "ENSG00000096092" "ENSG00000104325" "ENSG00000005381" "ENSG0000010869
##     ..$ CIDm00000007: chr [1:56] "ENSG00000242612" "ENSG00000274296" "ENSG00000104325" "ENSG0000010487
##     ..$ CIDm00000009: chr [1:101] "ENSG00000034713" "ENSG00000088256" "ENSG00000065320" "ENSG0000008751
##     ..$ CIDm00000010: chr [1:14] "ENSG00000185339" "ENSG00000104889" "ENSG00000134812" "ENSG0000013482
##     ..$ CIDm00000011: chr [1:16] "ENSG00000239672" "ENSG00000197208" "ENSG00000065057" "ENSG0000010302
##     ..$ CIDm00000013: chr [1:11] "ENSG00000104848" "ENSG00000151093" "ENSG00000163577" "ENSG0000016567
##     ..$ CIDm00000015: chr [1:91] "ENSG00000004799" "ENSG00000064300" "ENSG00000100749" "ENSG0000010432
##     ..$ CIDm00000017: chr [1:13] "ENSG00000132323" "ENSG00000138801" "ENSG00000143942" "ENSG0000017284
##     ..$ CIDm00000019: chr [1:38] "ENSG00000063241" "ENSG00000074771" "ENSG00000167580" "ENSG0000024261
##     ..$ CIDm00000020: chr [1:10] "ENSG00000104808" "ENSG00000130700" "ENSG00000149136" "ENSG0000016770
##     ..$ CIDm00000022: chr [1:14] "ENSG00000106049" "ENSG00000139648" "ENSG00000163792" "ENSG0000017248
##     ..$ CIDm00000023: chr [1:11] "ENSG00000101438" "ENSG00000103042" "ENSG00000171711" "ENSG0000027544
##     ..$ CIDm00000031: chr [1:19] "ENSG00000103089" "ENSG00000104325" "ENSG00000105679" "ENSG0000011478
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##     ..$ CIDm00000036: chr [1:22] "ENSG00000112306" "ENSG00000130522" "ENSG00000100418" "ENSG0000011468
##     ..$ CIDm00000037: chr [1:23] "ENSG00000083845" "ENSG00000129988" "ENSG00000105202" "ENSG0000028054
##     ..$ CIDm00000038: chr [1:9] "ENSG00000100652" "ENSG00000104325" "ENSG00000125255" "ENSG00000145248
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##     ..$ CIDm00000043: chr [1:34] "ENSG00000104325" "ENSG00000115361" "ENSG00000133937" "ENSG0000012083
##     ..$ CIDm00000044: chr [1:7] "ENSG00000171497" "ENSG00000237247" "ENSG00000065833" "ENSG00000124767
##     ..$ CIDm00000046: chr [1:6] "ENSG00000170191" "ENSG00000169154" "ENSG00000174429" "ENSG00000241935
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##     ..$ CIDm00000081: chr [1:10] "ENSG00000104808" "ENSG00000077498" "ENSG00000151475" "ENSG0000015314
##     ..$ CIDm00000082: chr [1:13] "ENSG00000110887" "ENSG00000134070" "ENSG00000075643" "ENSG0000012805
##     ..$ CIDm00000084: chr [1:43] "ENSG00000104325" "ENSG00000108691" "ENSG00000114784" "ENSG0000013453
##     ..$ CIDm00000085: chr [1:58] "ENSG00000197208" "ENSG00000100290" "ENSG00000065057" "ENSG0000010432
##     ..$ CIDm00000086: chr [1:39] "ENSG00000101438" "ENSG00000103042" "ENSG00000104941" "ENSG0000010525
##     ..$ CIDm00000087: chr [1:28] "ENSG00000004799" "ENSG00000187758" "ENSG00000101074" "ENSG0000012297
##     ..$ CIDm00000089: chr [1:7] "ENSG00000104325" "ENSG00000182521" "ENSG00000171497" "ENSG00000175376
##     ..$ CIDm00000090: chr [1:20] "ENSG00000086506" "ENSG00000109208" "ENSG00000130656" "ENSG0000021393
##     ..$ CIDm00000091: chr [1:13] "ENSG00000101405" "ENSG00000108518" "ENSG00000104154" "ENSG0000014641
##     ..$ CIDm00000093: chr [1:28] "ENSG00000100314" "ENSG00000105697" "ENSG00000114854" "ENSG0000013251
##     ..$ CIDm00000094: chr [1:25] "ENSG00000086506" "ENSG00000109208" "ENSG00000130656" "ENSG0000003724
##     ..$ CIDm00000096: chr [1:42] "ENSG00000104325" "ENSG00000108691" "ENSG00000121691" "ENSG0000025736
##     ..$ CIDm00000098: chr [1:12] "ENSG00000003137" "ENSG00000063180" "ENSG00000124217" "ENSG0000013148
##     ..$ CIDm00000099: chr [1:28] "ENSG00000034713" "ENSG00000063180" "ENSG00000104823" "ENSG0000028285
##     ..$ CIDm00000102: chr [1:11] "ENSG00000128203" "ENSG00000134070" "ENSG00000163064" "ENSG0000016477
##     ..$ CIDm00000104: chr [1:13] "ENSG00000242612" "ENSG00000274296" "ENSG00000104325" "ENSG0000013496
##     ..$ CIDm00000105: chr [1:8] "ENSG00000100596" "ENSG00000110955" "ENSG00000163577" "ENSG00000165434
##     ..$ CIDm00000106: chr [1:215] "ENSG00000078237" "ENSG00000081818" "ENSG00000112852" "ENSG0000008654
##     ..$ CIDm00000107: chr [1:25] "ENSG00000005381" "ENSG00000121053" "ENSG00000131400" "ENSG0000013771
##     ..$ CIDm00000109: chr [1:68] "ENSG00000101282" "ENSG00000105679" "ENSG00000106299" "ENSG0000010886
##     ..$ CIDm00000111: chr [1:18] "ENSG00000116032" "ENSG00000121691" "ENSG00000130313" "ENSG0000013115
##     ..$ CIDm00000118: chr [1:23] "ENSG00000111911" "ENSG00000124608" "ENSG00000131480" "ENSG0000008118
##     ..$ CIDm00000119: chr [1:227] "ENSG00000006451" "ENSG00000034713" "ENSG00000013275" "ENSG0000028122
```

```
##     ..$ CIDm00000120: chr [1:11] "ENSG00000005421" "ENSG00000013293" "ENSG00000103257" "ENSG0000016423
##     ..$ CIDm00000121: chr [1:8] "ENSG00000105679" "ENSG00000285292" "ENSG00000114784" "ENSG0000014837
##     ..$ CIDm00000122: chr [1:54] "ENSG00000112306" "ENSG00000113196" "ENSG00000126243" "ENSG0000012686
##     ..$ CIDm00000123: chr [1:16] "ENSG00000100079" "ENSG00000103042" "ENSG00000105205" "ENSG0000008922
##     ..$ CIDm00000125: chr [1:7] "ENSG00000187758" "ENSG00000077498" "ENSG00000105402" "ENSG0000019795
##     ..$ CIDm00000126: chr [1:25] "ENSG00000121879" "ENSG00000139797" "ENSG00000150787" "ENSG0000015357
##     ..$ CIDm00000127: chr [1:17] "ENSG00000187758" "ENSG00000106004" "ENSG00000111674" "ENSG0000011178
##     ..$ CIDm00000129: chr [1:7] "ENSG00000004799" "ENSG00000101282" "ENSG00000105679" "ENSG0000013849
##     ..$ CIDm00000131: chr [1:8] "ENSG00000100302" "ENSG00000108551" "ENSG00000120137" "ENSG0000015316
##     ..$ CIDm00000132: chr [1:10] "ENSG00000101074" "ENSG00000120137" "ENSG00000137558" "ENSG0000013771
##     ..$ CIDm00000133: chr [1:15] "ENSG00000197208" "ENSG00000034510" "ENSG00000089220" "ENSG0000012915
##     ..$ CIDm00000134: chr [1:36] "ENSG00000003137" "ENSG00000004799" "ENSG00000167580" "ENSG0000010567
##     ..$ CIDm00000135: chr [1:19] "ENSG00000104325" "ENSG00000005421" "ENSG00000111786" "ENSG0000011561
##     ..$ CIDm00000136: chr [1:65] "ENSG00000239672" "ENSG00000185339" "ENSG00000104325" "ENSG0000011134
##     ..$ CIDm00000137: chr [1:34] "ENSG00000004799" "ENSG00000074771" "ENSG00000104325" "ENSG0000001329
##     ..$ CIDm00000138: chr [1:32] "ENSG00000167580" "ENSG00000100749" "ENSG00000104879" "ENSG0000002955
##     ..$ CIDm00000139: chr [1:6] "ENSG00000135929" "ENSG00000137714" "ENSG00000143921" "ENSG0000016791
##     ..$ CIDm00000142: chr [1:60] "ENSG00000100314" "ENSG00000100591" "ENSG00000105202" "ENSG0000028054
##     ..$ CIDm00000143: chr [1:38] "ENSG00000171431" "ENSG00000263057" "ENSG00000081800" "ENSG0000018533
##     ..$ CIDm00000144: chr [1:151] "ENSG00000069696" "ENSG00000276825" "ENSG00000100448" "ENSG0000010129
##     ..$ CIDm00000145: chr [1:22] "ENSG00000039987" "ENSG00000119938" "ENSG00000091664" "ENSG0000010604
##     ..$ CIDm00000146: chr [1:46] "ENSG00000185339" "ENSG00000106366" "ENSG00000108518" "ENSG0000024255
##     ..$ CIDm00000149: chr [1:46] "ENSG00000073861" "ENSG00000065308" "ENSG00000241360" "ENSG0000010520
##     ..$ CIDm00000150: chr [1:12] "ENSG00000100591" "ENSG00000128285" "ENSG00000128059" "ENSG0000014641
##     ..$ CIDm00000151: chr [1:9] "ENSG00000106804" "ENSG00000131873" "ENSG00000128059" "ENSG0000019810
##     ..$ CIDm00000152: chr [1:10] "ENSG00000106804" "ENSG00000111674" "ENSG00000128059" "ENSG0000014564
##     ..$ CIDm00000153: chr [1:28] "ENSG00000034713" "ENSG00000100596" "ENSG00000105202" "ENSG0000028054
##     ..$ CIDm00000154: chr [1:10] "ENSG00000079432" "ENSG00000078237" "ENSG00000106804" "ENSG0000012421
##     ..$ CIDm00000156: chr [1:10] "ENSG00000104325" "ENSG00000116096" "ENSG00000137880" "ENSG0000014050
##     ..$ CIDm00000157: chr [1:14] "ENSG00000106299" "ENSG00000128059" "ENSG00000145375" "ENSG0000015809
##   .. [list output truncated]
```

```r
geneSets <- getSets(GAlist = GAlist, feature = "Genes")
chemSets <- getSets(GAlist = GAlist, feature = "ChemicalComplexes2Genes")
```

Extract data for chemical "CIDm00004091" from GDT database

The marker sets in the database can be extracted using:

```r
chemStat <- getStat(GAlist = GAlist, trait = "t2d", feature = "ChemicalComplexes",
    cls = c("p=1e.04", "p=0.001", "p=0.05", "p=0.1", "p=0.95"))
chemStat["CIDm00004091", ]
```

```
##               Chemical ID      m stat.p.1e.04 stat.p.0.001 stat.p.0.05
## CIDm00004091 CIDm00004091 13369     279.0648     525.4034    2521.156
##           stat.p.0.1 stat.p.0.95 p.p.1e.04 p.p.0.001 p.p.0.05 p.p.0.1
## CIDm00004091   3560.588    6134.161    0.1882    0.2233   0.2662  0.2413
##           p.p.0.95
## CIDm00004091   0.2592
```

```
genesStat <- getStat(GAlist = GAlist, trait = "t2d", feature = "Genes")
ensgIDs <- getSets(GAlist = GAlist, feature = "ChemicalComplexes2Genes",
    featureID = "CIDm00004091")
head(genesStat[ensgIDs, ])
```

```
##                 Ensembl Gene ID Symbol   m     stat      p
## ENSG00000050344 ENSG00000050344 NFE2L3 109 6.698962 0.3215
## ENSG00000065970 ENSG00000065970  FOXJ2 127 0.000000 1.0000
## ENSG00000100448 ENSG00000100448   CTSG  26 0.000000 1.0000
## ENSG00000103121 ENSG00000103121   CMC2 274 6.950413 0.5150
## ENSG00000104899 ENSG00000104899    AMH  72 0.000000 1.0000
## ENSG00000104918 ENSG00000104918   RETN  40 0.000000 1.0000
```