

Analysis

K-6

2024-08-14

```
#  
projects <- recount3::available_projects()  
  
## 2024-09-16 02:44:12.08266 caching file sra.recount_project.MD.gz.  
  
## 2024-09-16 02:44:12.608185 caching file gtex.recount_project.MD.gz.  
  
## 2024-09-16 02:44:13.265262 caching file tcga.recount_project.MD.gz.  
  
#  
if ("SRP174505" %in% projects) {  
  rse <- recount3::create_rse_manual(  
    project = "SRP174505",  
    project_home = "data_sources/sra",  
    organism = "human",  
    annotation = "gencode_v26",  
    type = "gene"  
  )  
  
} else {  
  rse <- recount3::create_rse_manual(  
    project = "SRP174505",  
    project_home = "data_sources/sra",  
    organism = "human",  
    annotation = "gencode_v26",  
    type = "gene"  
  )  
}  
  
## 2024-09-16 02:44:17.277448 downloading and reading the metadata.  
  
## 2024-09-16 02:44:17.775987 caching file sra.sra.SRP174505.MD.gz.  
  
## 2024-09-16 02:44:18.374796 caching file sra.recount_project.SRP174505.MD.gz.  
  
## 2024-09-16 02:44:18.991272 caching file sra.recount_qc.SRP174505.MD.gz.  
  
## 2024-09-16 02:44:19.60365 caching file sra.recount_seq_qc.SRP174505.MD.gz.
```

```
## 2024-09-16 02:44:20.322346 caching file sra.recount_pred.SRP174505.MD.gz.

## 2024-09-16 02:44:20.41941 downloading and reading the feature information.

## 2024-09-16 02:44:21.00701 caching file human.gene_sums.G026.gtf.gz.

## 2024-09-16 02:44:22.363433 downloading and reading the counts: 9 samples across 63856 features.

## 2024-09-16 02:44:23.69875 caching file sra.gene_sums.SRP174505.G026.gz.

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 13:20 9<ff>622 2f93b901-36af-4787-9f69-8455a6d6ea31.tmp.ico' to a wide string

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## 17:25 83<ff>822 wct4F5B.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 18:13 1<ff>779 wct555E.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '11.09.2024
## 22:20 83<ff>764 wct5773.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wct599D.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wct599E.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '06.09.2024
## 22:00 83<ff>310 wct5B84.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '06.09.2024
## 02:35 83<ff>310 wct5F7F.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '10.09.2024
## 22:15 83<ff>754 wct6BC9.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '06.09.2024
## 04:49 71<ff>016<ff>976 wct6E1D.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wct76ED.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wct7802.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wct7964.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '11.09.2024
## 22:20 83<ff>764 wct8038.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '11.09.2024
## 04:25 83<ff>757 wct86DD.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wct88EE.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wct88FE.tmp' to a wide string

```

```
## Warning in grep(pattern, bfr, value = TRUE): unable to translate '06.09.2024
## 22:00 83<ff>310 wct93E1.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '09.09.2024
## 23:55 83<ff>547 wct967C.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '09.09.2024
## 23:55 83<ff>547 wct967D.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wct96E9.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '11.09.2024
## 22:20 83<ff>764 wctA73E.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wctA89B.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '09.09.2024
## 23:55 83<ff>547 wctB6C5.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '09.09.2024
## 23:55 83<ff>547 wctB7A1.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wctBFD5.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wctC694.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wctC6EE.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wctCC8F.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wctCE9.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wctD908.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '06.09.2024
## 22:00 83<ff>310 wctDF61.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wctE25.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wctE64D.tmp' to a wide string
```

```

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '13.09.2024
## 22:30 83<ff>823 wctED8D.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '07.09.2024
## 01:45 83<ff>344 wctFA86.tmp' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate '25.06.2024
## 13:44 <DIR> <82><e5>?<a4> <a4><ae> Outlook' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate ' 462 File(s)
## 75<ff>941<ff>204 bytes' to a wide string

## Warning in grep(pattern, bfr, value = TRUE): unable to translate ' 989 Dir(s)
## 91<ff>586<ff>961<ff>408 bytes free' to a wide string

## 2024-09-16 02:44:25.524584 constructing the RangedSummarizedExperiment (rse) object.

rse

## class: RangedSummarizedExperiment
## dim: 63856 9
## metadata(8): time_created recount3_version ... annotation recount3_url
## assays(1): raw_counts
## rownames(63856): ENSG00000278704.1 ENSG00000277400.1 ...
##   ENSG00000182484.15_PAR_Y ENSG00000227159.8_PAR_Y
## rowData names(10): source type ... havana_gene tag
## colnames(9): SRR8371688 SRR8371689 ... SRR8371695 SRR8371696
## colData names(175): rail_id external_id ...
##   recount_pred.curated.cell_line BigWigURL

rse_filtered <- rse[rowData(rse)$gene_type == "protein_coding", ]

rse_colData<- as.data.frame(colData(rse))
rse_rowData<- as.data.frame(rowData(rse))
rse_assay <- as.data.frame(assay(rse))
rse_colData_f<- as.data.frame(colData(rse_filtered))
rse_rowData_f<- as.data.frame(rowData(rse_filtered))
rse_assay_f <- as.data.frame(assay(rse_filtered))
gene_annotations <- as.data.frame(rowData(rse_filtered)[c("gene_id", "gene_name")])
#gene_annotations_unique <- gene_annotations[!duplicated(gene_annotations$gene_name), ]
make_unique_names <- function(df, id_col, name_col) {
  df %>%
    rownames_to_column(var = id_col) %>%
    left_join(gene_annotations, by = id_col) %>%
    mutate(!name_col := ifelse(is.na(.data[[name_col]]), .data[[id_col]], .data[[name_col]])) %>%
    mutate(!name_col := make.unique(as.character(.data[[name_col]]))) %>%
    column_to_rownames(var = name_col)
}

write_delim(rse_colData, "./data/rse_colData.csv", delim = ";", col_names = TRUE)
write_delim(rse_rowData, "./data/rse_rowData.csv", delim = ";", col_names = TRUE)

```

```

write_delim(rse_assay, "./data/rse_assay.csv", delim = ";", col_names = TRUE)
write_delim(rse_colData_f, "./data/rse_colData_filtered.csv", delim = ";", col_names = TRUE)
write_delim(rse_rowData_f, "./data/rse_rowData_filtered.csv", delim = ";", col_names = TRUE)
write_delim(rse_assay_f, "./data/rse_assay_filtered.csv", delim = ";", col_names = TRUE)

```

Колонка “sra.sample_title” вказує на зразки, які є контрольними (0Gy) та ті, що зазнали опромінення (2Gy, 4Gy).

```

#
colData_new <- data.frame(
  row.names = colnames(rse_filtered),
  condition = factor(c(rep("0Gy", 3), rep("2Gy", 3), rep("4Gy", 3)))
)

#      counts
countData <- assay(rse_filtered)

#
p1 <- ggplot(countData, aes(x = SRR8371688 )) +
  geom_density(color = "darkblue", fill = "lightblue")

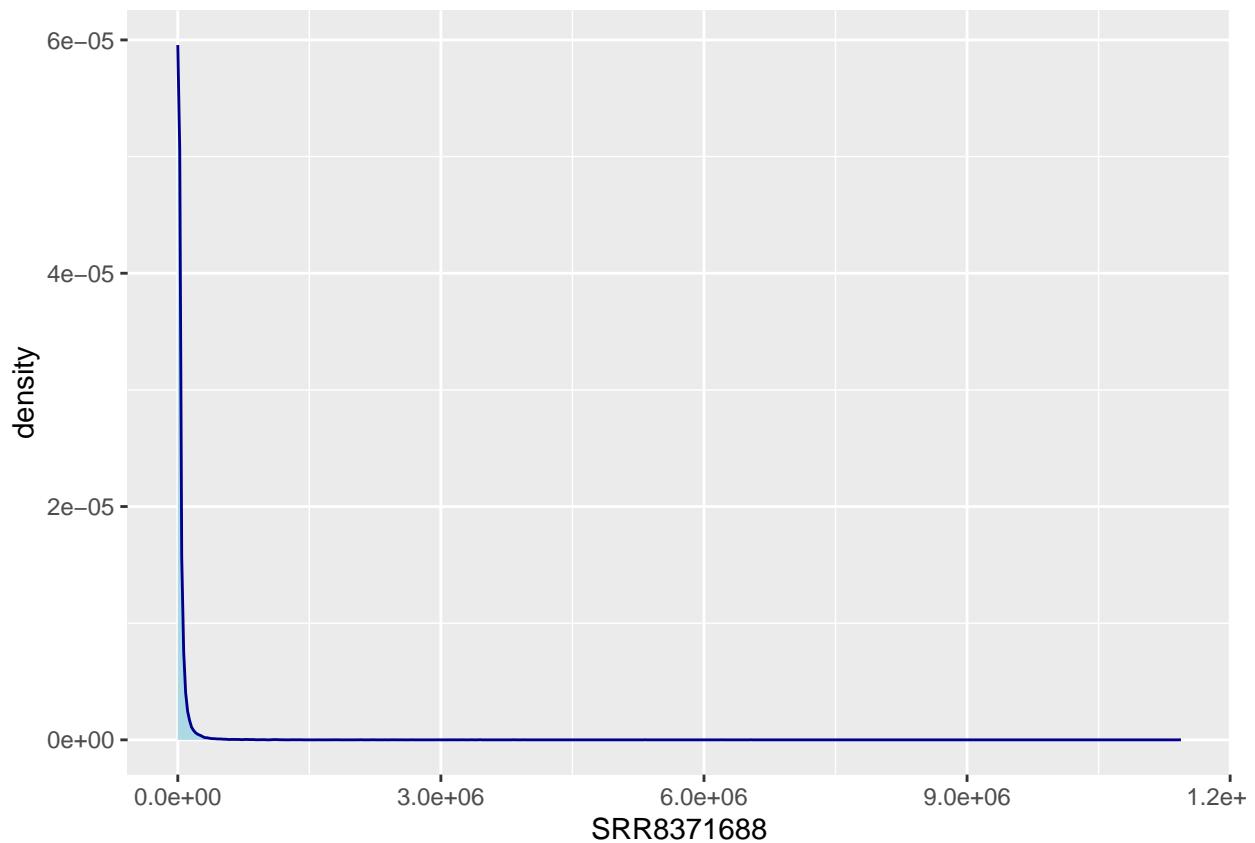
count_summary <- countData |>
  as.vector() |>
  data.frame(counts = _) |>
  group_by(counts) |>
  summarise(frequency = n(), .groups = 'drop') |>
  arrange(counts)

#

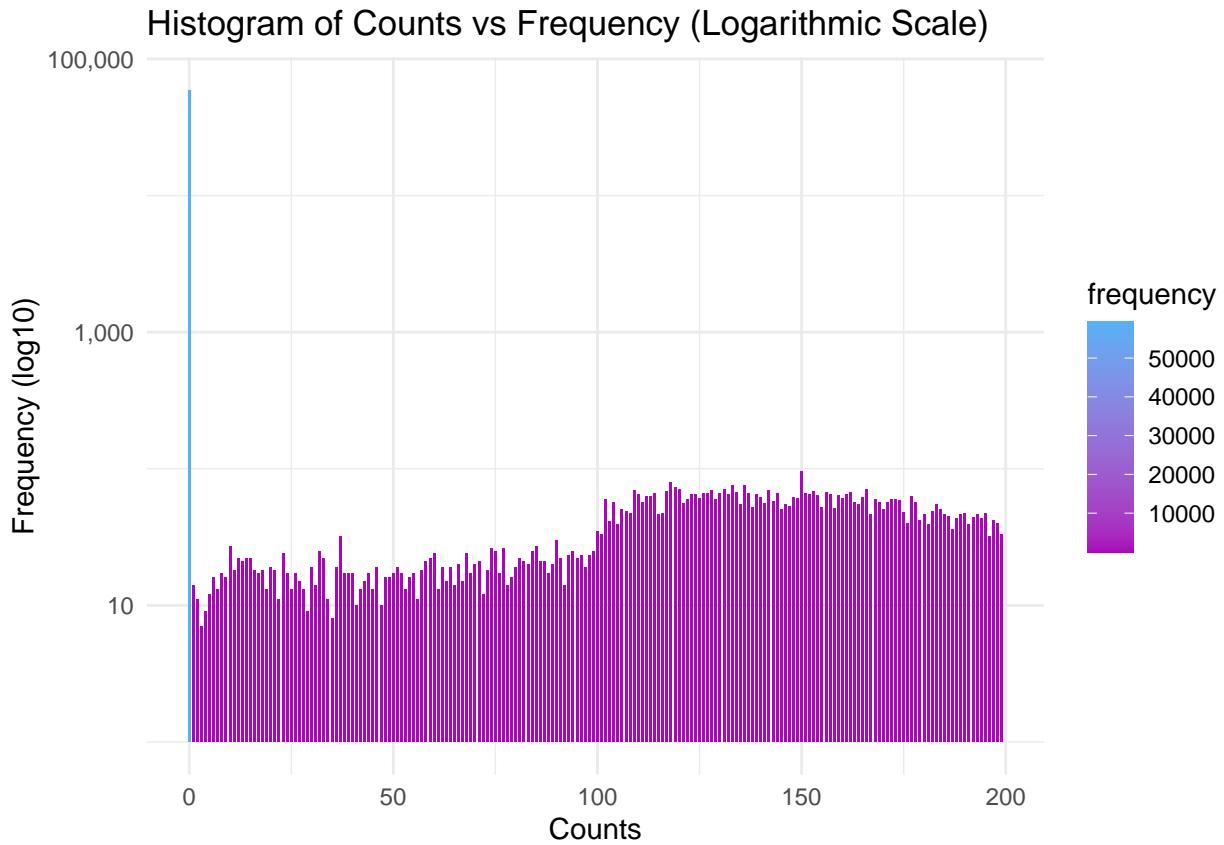
p2 <- ggplot(count_summary[1:200], aes(x = counts, y = frequency, fill = frequency)) +
  geom_bar(stat = "identity", width = 0.7) +
  scale_y_log10(labels = scales::comma) +
  labs(title = "Histogram of Counts vs Frequency (Logarithmic Scale)",
       x = "Counts",
       y = "Frequency (log10)") +
  scale_fill_gradient(low = "#AA05BA", high = "#56B1F7") +
  theme_minimal()

p1

```



p2



```
counts_info <- p1 + p2

ggsave("./figs/counts_info.png", plot = counts_info, width = 16, height = 6, dpi = 300)
```

```
#      DESeqDataSet
dds <- DESeqDataSetFromMatrix(countData = countData,
                               colData = colData_new,
                               design = ~ condition)
```

```
## converting counts to integer mode

dds <- dds[apply(counts(dds), 1, function(row) all(row > 5)), ]
vsd <- vst(dds, blind = FALSE)

#
vst_data <- assay(vsd)
```

Differential testing: multigroup

```
dds_wald <- dds[rowSums(counts(dds)) > 0, ]

dds_wald <- DESeq(dds, test="Wald")
```

```
## estimating size factors
```

```

## estimating dispersions

## gene-wise dispersion estimates

## mean-dispersion relationship

## final dispersion estimates

## fitting model and testing

res_wald <- results(dds_wald)

#res_wald$padj <- p.adjust(res_wald$pvalue, method = "fdr")

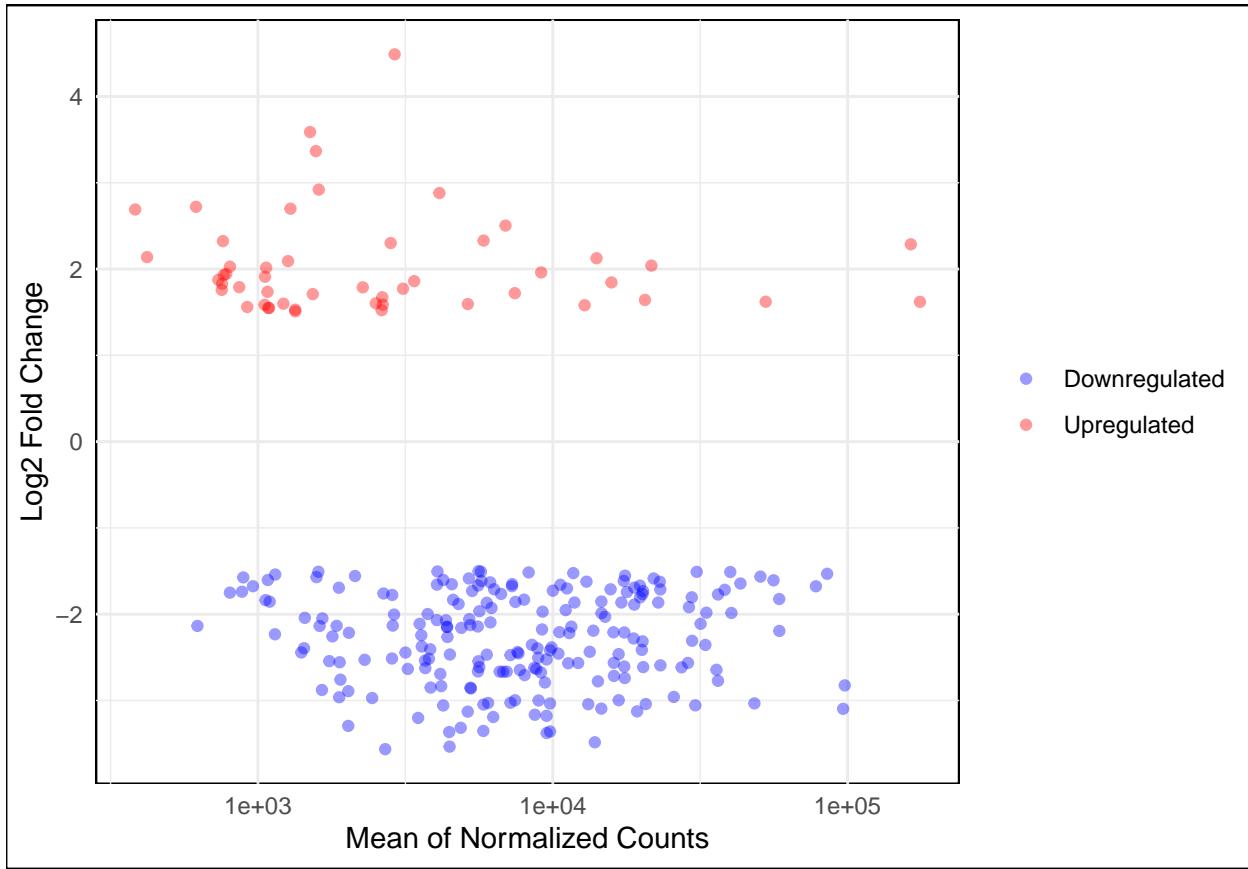
res_sig_wald <- res_wald[which(res_wald$padj < 0.05 & abs(res_wald$log2FoldChange) > 1.5), ]

res_wald_df <- as.data.frame(res_sig_wald )

#           ,
#           log2FoldChange
res_wald_df$condition <- ifelse(res_wald_df$log2FoldChange > 0, "Upregulated", "Downregulated")

#       MA-
pl2 <- ggplot(res_wald_df, aes(x = baseMean, y = log2FoldChange, color = condition)) +
  geom_point(alpha = 0.4, size = 1.5) +
  scale_x_log10() +
  labs(x = "Mean of Normalized Counts", y = "Log2 Fold Change") +
  theme_minimal() +
  scale_color_manual(values = c("Upregulated" = "red", "Downregulated" = "blue")) +
  theme(
    legend.title = element_blank(),
    plot.background = element_rect(fill = "white"),
    panel.background = element_rect(fill = "white"))
pl2

```



```
ggsave("./figs/deseq_wald_test.png", plot = p12, width = 16, height = 6, dpi = 300)
```

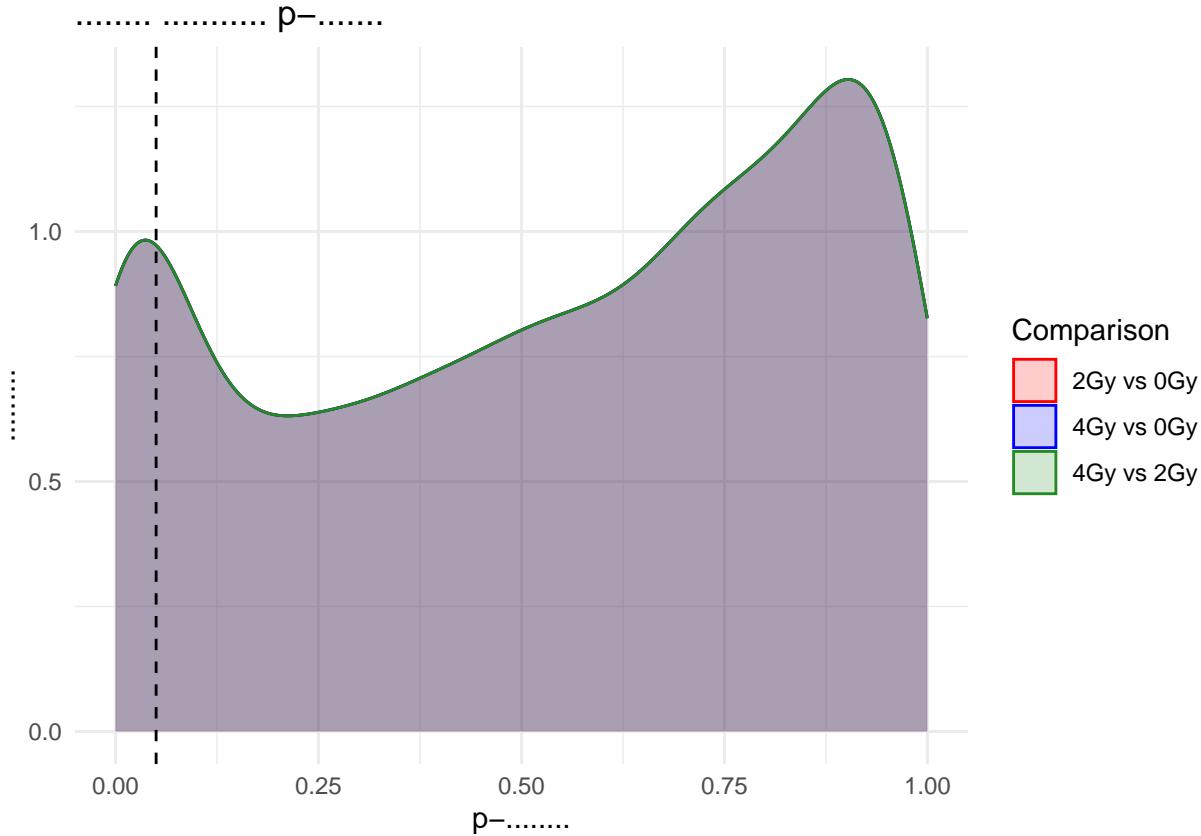
```
res_wald_2Gy_vs_0Gy <- results(dds_wald, contrast = c("condition", "2Gy", "0Gy"))
res_wald_2Gy_vs_0Gy$padj <- p.adjust(res_wald$pvalue, method = "fdr")
res_wald_4Gy_vs_0Gy <- results(dds_wald, contrast = c("condition", "4Gy", "0Gy"))
res_wald_4Gy_vs_0Gy$padj <- p.adjust(res_wald$pvalue, method = "fdr")
res_wald_4Gy_vs_2Gy <- results(dds_wald, contrast = c("condition", "4Gy", "2Gy"))
res_wald_4Gy_vs_2Gy$padj <- p.adjust(res_wald$pvalue, method = "fdr")

hist_data <- bind_rows(
  data.frame(padj = res_wald_2Gy_vs_0Gy$padj, Comparison = "2Gy vs 0Gy"),
  data.frame(padj = res_wald_4Gy_vs_0Gy$padj, Comparison = "4Gy vs 0Gy"),
  data.frame(padj = res_wald_4Gy_vs_2Gy$padj, Comparison = "4Gy vs 2Gy")
)

#
ggplot(hist_data, aes(x = padj, fill = Comparison, color = Comparison)) +
  geom_density(alpha = 0.2, adjust = 1.5) +
  scale_fill_manual(values = c("2Gy vs 0Gy" = "red", "4Gy vs 0Gy" = "blue", "4Gy vs 2Gy" = "forestgreen"))
  scale_color_manual(values = c("2Gy vs 0Gy" = "red", "4Gy vs 0Gy" = "blue", "4Gy vs 2Gy" = "forestgreen"))
  labs(title = "p-", x = "p-", y = " ") +
  geom_vline(xintercept = 0.05, linetype = "dashed", color = "black") +
  theme_minimal()

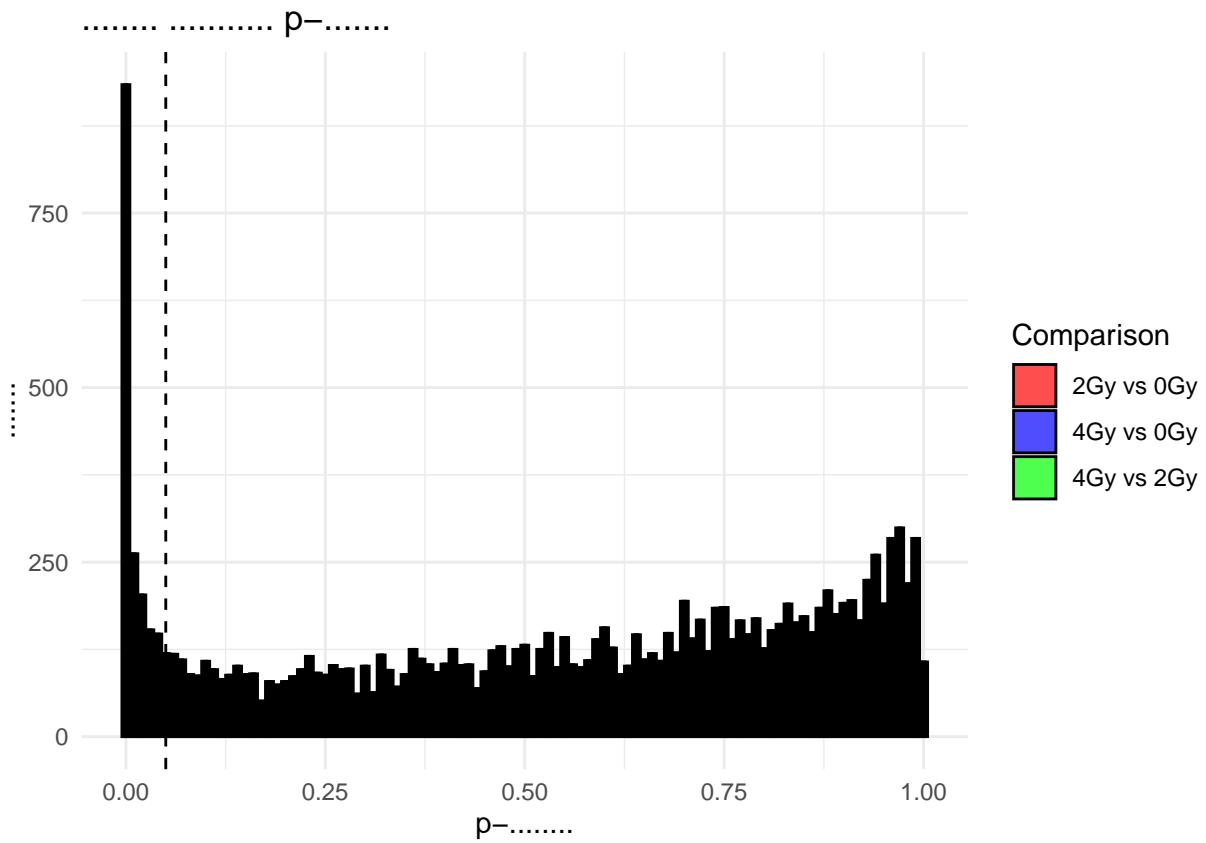
## Warning: Removed 9 rows containing non-finite outside the scale range
```

```
## (`stat_density()`).
```



```
ggplot(hist_data, aes(x = padj, fill = Comparison)) +
  geom_histogram(position = "dodge", binwidth = 0.01, color = "black", alpha = 0.7) +
  scale_fill_manual(values = c("2Gy vs 0Gy" = "red", "4Gy vs 0Gy" = "blue", "4Gy vs 2Gy" = "green")) +
  labs(title = "p-", x = "p-", y = "") +
  geom_vline(xintercept = 0.05, linetype = "dashed", color = "black") +
  theme_minimal()
```

```
## Warning: Removed 9 rows containing non-finite outside the scale range
## (`stat_bin()`).
```

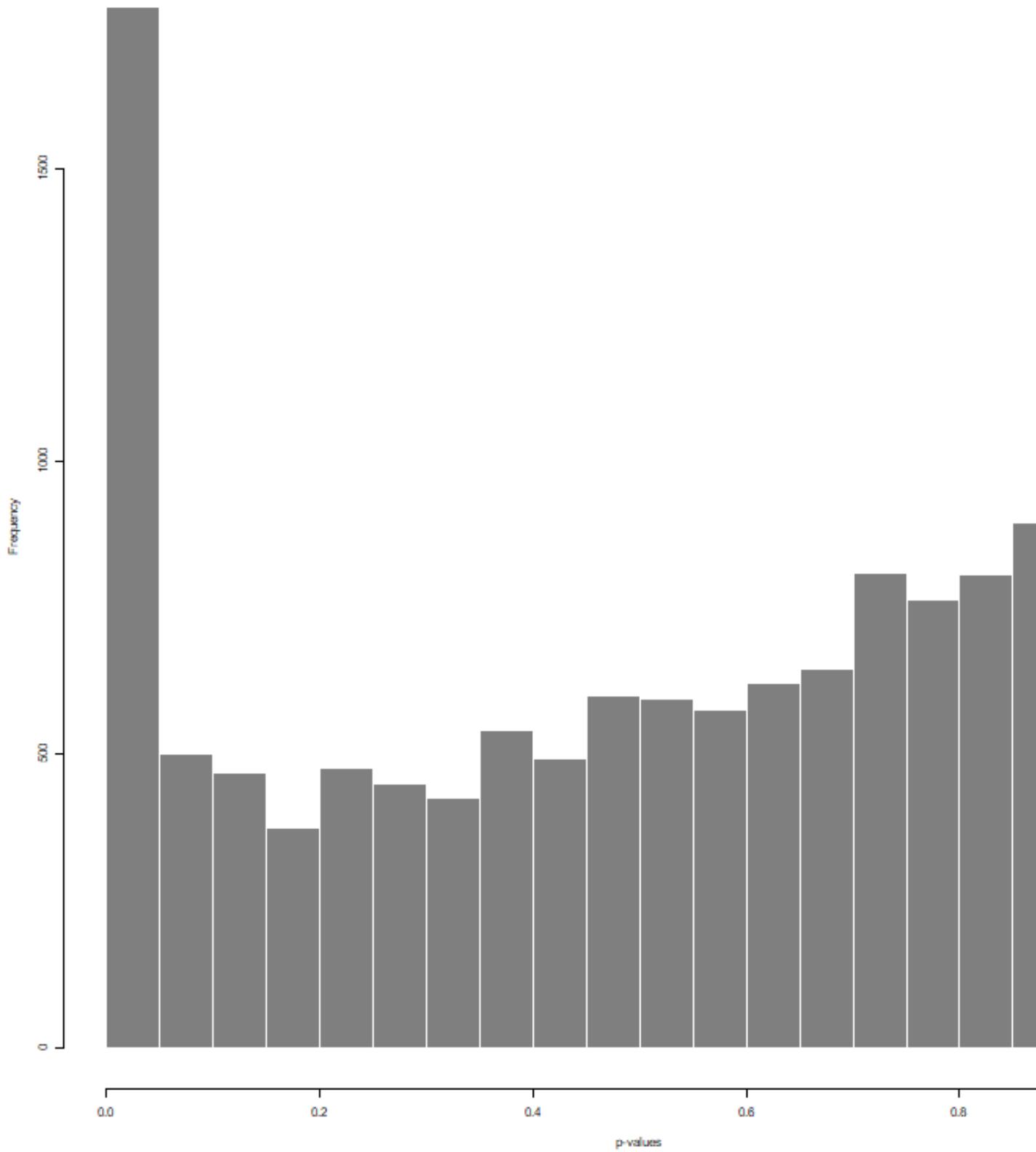


```
png("./figs/deseq_Wald_padj.png", width = 2400, height = 800)
par(mfrow = c(1, 3), mar = c(5, 5, 4, 2))
hist(res_wald_2Gy_vs_0Gy$padj, col = "grey50", border = "white", main = "2Gy vs 0Gy", xlab = "p-values")
hist(res_wald_4Gy_vs_0Gy$padj, col = "grey50", border = "white", main = "4Gy vs 0Gy", xlab = "p-values")
hist(res_wald_4Gy_vs_2Gy$padj, col = "grey50", border = "white", main = "4Gy vs 2Gy", xlab = "p-values")
dev.off()
```

```
## pdf
## 2
```

```
knitr:::include_graphics("./figs/deseq_Wald_padj.png")
```

2Gy vs 0Gy



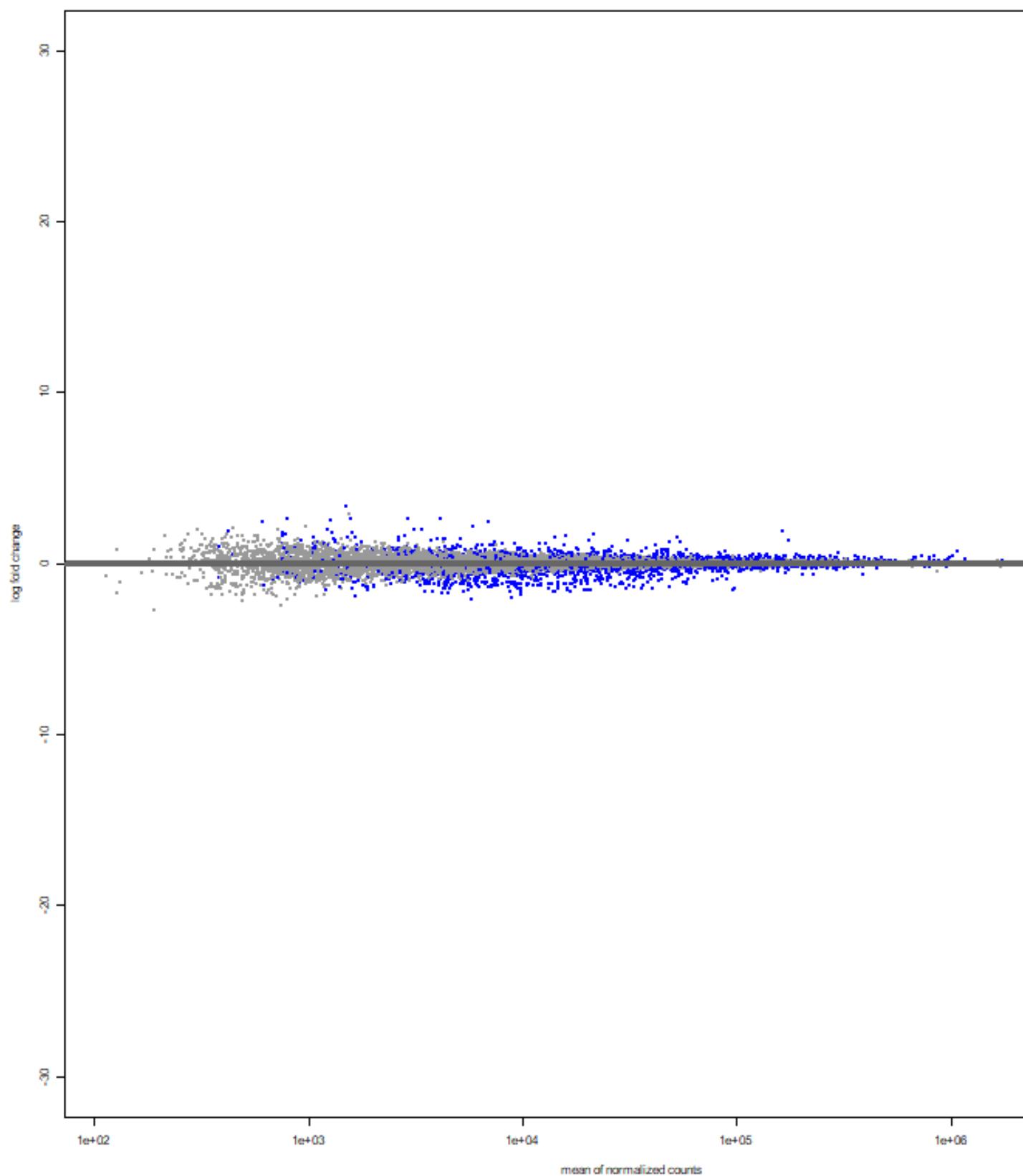
```
png("./figs/deseq_Wald.png", width = 2400, height = 800)
par(mfrow = c(1, 3), mar = c(5, 5, 4, 2))

plotMA(res_wald_2Gy_vs_0Gy, ylim=c(-30,30), main="MA-plot: 0Gy vs 2Gy")
plotMA(res_wald_4Gy_vs_0Gy, ylim=c(-30,30), main="MA-plot: 0Gy vs 4Gy")
plotMA(res_wald_4Gy_vs_2Gy, ylim=c(-30,30), main="MA-plot: 2Gy vs 4Gy")
dev.off()

## pdf
## 2

knitr:::include_graphics("./figs/deseq_Wald.png")
```

MA-plot: 0Gy vs 2Gy



```

res_wald_df_2Gy_vs_0Gy <- as.data.frame(res_wald_2Gy_vs_0Gy)
res_wald_df_2Gy_vs_0Gy$significant <- res_wald_df_2Gy_vs_0Gy$padj < 0.05

res_wald_df_4Gy_vs_0Gy <- as.data.frame(res_wald_4Gy_vs_0Gy)
res_wald_df_4Gy_vs_0Gy$significant <- res_wald_df_4Gy_vs_0Gy$padj < 0.05

res_wald_df_4Gy_vs_2Gy <- as.data.frame(res_wald_4Gy_vs_2Gy)
res_wald_df_4Gy_vs_2Gy$significant <- res_wald_df_4Gy_vs_2Gy$padj < 0.05

res_wald_df_2Gy_vs_0Gy$comparison <- "2Gy vs 0Gy"
res_wald_df_4Gy_vs_0Gy$comparison <- "4Gy vs 0Gy"
res_wald_df_4Gy_vs_2Gy$comparison <- "4Gy vs 2Gy"

res_wald_df_2Gy_vs_0Gy <- as.data.frame(res_wald_df_2Gy_vs_0Gy) |>
  mutate(gene_id = rownames(res_wald_df_2Gy_vs_0Gy), comparison = "2Gy vs 0Gy") |>
  left_join(gene_annotations, by = "gene_id")

#      res_df_4Gy_vs_0Gy
res_wald_df_4Gy_vs_0Gy <- as.data.frame(res_wald_df_4Gy_vs_0Gy) %>%
  mutate(gene_id = rownames(.), comparison = "4Gy vs 0Gy") |>
  left_join(gene_annotations, by = "gene_id")

#      res_df_4Gy_vs_2Gy
res_wald_df_4Gy_vs_2Gy <- as.data.frame(res_wald_df_4Gy_vs_2Gy) |>
  mutate(gene_id = rownames(res_wald_df_4Gy_vs_2Gy), comparison = "4Gy vs 2Gy") |>
  left_join(gene_annotations, by = "gene_id")

#      volcano plot
plot_2Gy_vs_0Gy_W <- EnhancedVolcano(res_wald_df_2Gy_vs_0Gy,
                                         lab = res_wald_df_2Gy_vs_0Gy$gene_name,
                                         x = 'log2FoldChange',
                                         y = 'padj',
                                         xlim = c(-5, 5),
                                         ylim = c(0, 10),
                                         pCutoff = 0.05,
                                         FCCutoff = 1.5,
                                         pointSize = 1.5,
                                         labSize = 2.0,
                                         col = c('grey30', 'forestgreen', 'royalblue', 'red2'),
                                         title = '2Gy vs 0Gy',
                                         legendPosition = 'top')

plot_4Gy_vs_0Gy_W <- EnhancedVolcano(res_wald_df_4Gy_vs_0Gy,
                                         lab = res_wald_df_4Gy_vs_0Gy$gene_name,
                                         x = 'log2FoldChange',
                                         y = 'padj',
                                         xlim = c(-5, 5),
                                         ylim = c(0, 10),
                                         pCutoff = 0.05,
                                         FCCutoff = 1.5,
                                         pointSize = 1.5,
                                         labSize = 2.0,
                                         col = c('grey30', 'forestgreen', 'royalblue', 'red2'),
                                         title = '4Gy vs 0Gy')

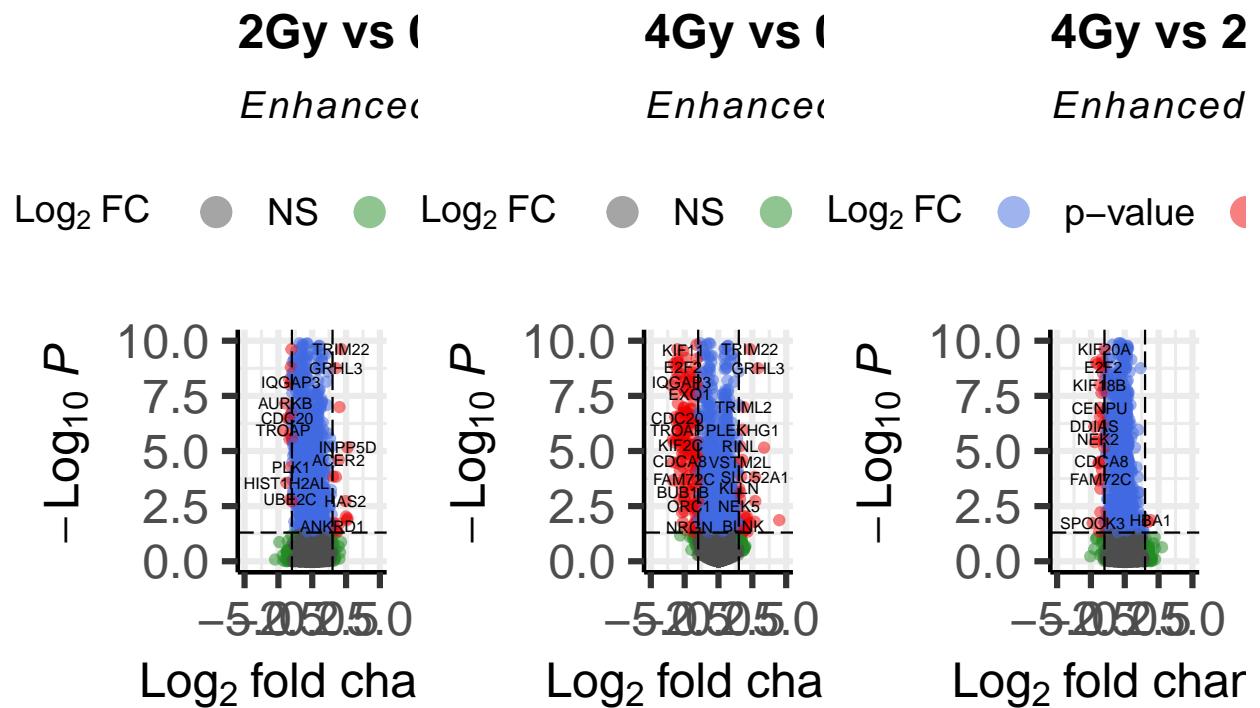
```

```

    title = '4Gy vs 0Gy',
    legendPosition = 'top')

plot_4Gy_vs_2Gy_W <- EnhancedVolcano(res_wald_df_4Gy_vs_2Gy,
                                       lab = res_wald_df_4Gy_vs_2Gy$gene_name,
                                       x = 'log2FoldChange',
                                       y = 'padj',
                                       xlim = c(-5, 5),
                                       ylim = c(0, 10),
                                       pCutoff = 0.05,
                                       FCCcutoff = 1.5,
                                       pointSize = 1.5,
                                       labSize = 2.0,
                                       col = c('grey30', 'forestgreen', 'royalblue', 'red2'),
                                       title = '4Gy vs 2Gy',
                                       legendPosition = 'top')
volc_wald_plot <- plot_2Gy_vs_0Gy_W + plot_4Gy_vs_0Gy_W + plot_4Gy_vs_2Gy_W + plot_layout(nrow = 1)
print(volc_wald_plot)

```



```
ggsave("./figs/volc_wald.png", plot = volc_wald_plot, width = 20, height = 6, dpi = 300)
```

```

res_2Gy_0Gy_up <- res_wald_df_2Gy_vs_0Gy |> as.data.frame() |> filter(pvalue < 0.05 & log2FoldChange >
res_2Gy_0Gy_down <- res_wald_df_2Gy_vs_0Gy |> as.data.frame() |> filter(pvalue < 0.05 & log2FoldChange <
res_4Gy_0Gy_up <- res_wald_df_4Gy_vs_0Gy |> as.data.frame() |> filter(pvalue < 0.05 & log2FoldChange >
res_4Gy_0Gy_down <- res_wald_df_4Gy_vs_0Gy |> as.data.frame() |> filter(pvalue < 0.05 & log2FoldChange <
res_4Gy_2Gy_up <- res_wald_df_4Gy_vs_2Gy |> as.data.frame() |> filter(pvalue < 0.05 & log2FoldChange >

```

```

res_4Gy_2Gy_down <- res_wald_df_4Gy_vs_2Gy |> as.data.frame() |> filter(pvalue < 0.05 & log2FoldChange

venn_list <- list("2Gy vs 0Gy(up)" = res_2Gy_0Gy_up$gene_name,
                  "2Gy vs 0Gy(down)" = res_2Gy_0Gy_down$gene_name,
                  "4Gy vs 0Gy(up)" = res_4Gy_0Gy_up$gene_name,
                  "4Gy vs 0Gy(down)" = res_4Gy_0Gy_down$gene_name,
                  "4Gy vs 2Gy(up)" = res_4Gy_2Gy_up$gene_name,
                  "4Gy vs 2Gy(down)" = res_4Gy_2Gy_down$gene_name)

ven <- venndetail(venn_list)

png("./figs/venn_diagram.png", width = 1600, height = 1600, res = 300)
plot(ven, type = "upset")
dev.off()

```

```

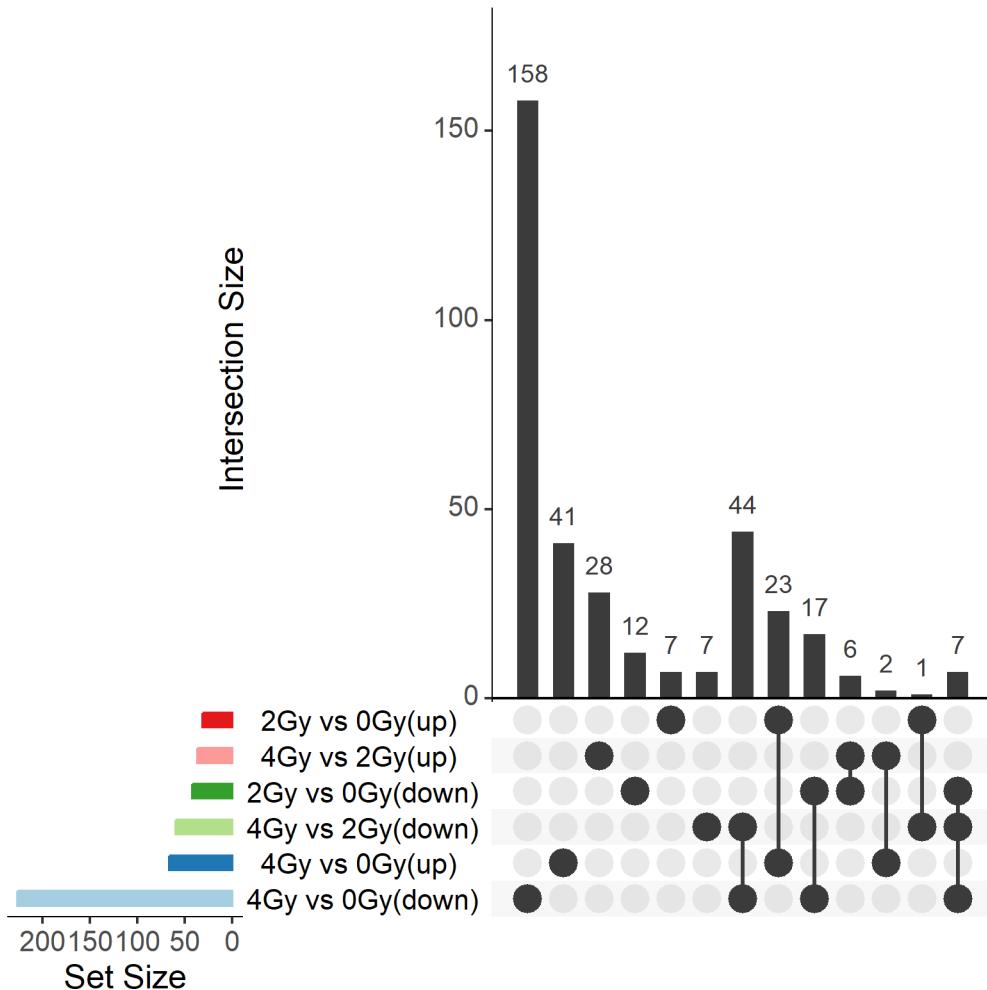
## pdf
## 2

```

```

knitr:::include_graphics("./figs/venn_diagram.png")

```




```

#           ,      gene_id   gene_name
new_row_names <- gene_annotations$gene_name[match(rownames(pca_result$loadings), gene_annotations$gene_)

#
#           ,
new_row_names <- make.unique(new_row_names)

#           pca_result$loadings
rownames(pca_result$loadings) <- new_row_names

pbiplot <- PCAtools::biplot(pca_result,
  axisLabSize = 18,
  # loadings parameters
  showLoadings = TRUE,
  sizeLoadingsNames = 4,
  colLoadingsNames = 'red4',
  #points
  lab = NULL,
  colby = 'condition',
  colLegendTitle = 'Condition',
  colkey = c('0Gy' = '#228B22', '2Gy' = '#7B68EE', '4Gy' = '#FF8C00'),
  pointSize = 5,
  #plotview
  hline = 0,
  vline = c(-5, 0, 5),

```

```

vlineType = c('dotdash', 'solid', 'dashed'),
gridlines.major = FALSE, gridlines.minor = FALSE,
legendPosition = 'right',
legendLabSize = 16,
legendIconSize = 8.0,,
subtitle = 'PC1 versus PC2',
caption = '5 PCs 80%',
returnPlot = FALSE)

## Scale for colour is already present.
## Adding another scale for colour, which will replace the existing scale.

ploadings <- PCAtools::plotloadings(pca_result,
  axisLabSize = 18,
  subtitle = 'PC1, PC2, PC3, PC4, PC5',
  labSize = 3,
  returnPlot = FALSE)

## -- variables retained:
## CDKN1A, MKI67, TOP2A, RPL27, MMS22L, MTERF1, RBM41, GPR135, HBA1, TRAM1, MCAT, ERGIC2, FMO4, RINL, S

pca_df <- as.data.frame(pca_result$rotated)

#           condition
pca_df$condition <- colData_new$condition

# , , 5
set.seed(1234)
km <- kmeans(x = pca_df[, 1:5], centers = 3, nstart = 25) #      5      25
#
pca_df$cluster <- as.factor(km$cluster)

#
pkmean <- autoplot(km, data = pca_df, frame = TRUE, frame.type = 'norm', size = 4, alpha = 0.6) +
  aes(shape = condition, color = cluster) +
  scale_shape_manual(values = c('0Gy' = 16, '2Gy' = 17, '4Gy' = 18)) +
  labs(subtitle = 'with 5 PCs',
       color = 'cluster', shape = 'Condition') +
  coord_equal() +
  theme_minimal(base_size = 18) +
  theme(legend.position = 'right', #
        panel.border = element_rect(color = 'black', fill = NA, size = 1)) #

## Warning: The `size` argument of `element_rect()` is deprecated as of ggplot2 3.4.0.
## i Please use the `linewidth` argument instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.

#
pscree <- pscree + ggtitle("A Scree plot") + theme(plot.title = element_text(face = "bold", hjust = -0.5))

```

```

ploadings <- ploadings + ggtitle("B Loading plot") + theme(plot.title = element_text(face = "bold", hjust = 0))
pbiplot <- pbiplot + ggtitle("C Bi-plot") + theme(plot.title = element_text(face = "bold", hjust = -0.05))
pkmean <- pkmean + ggtitle("D K-means Clusters") + theme(plot.title = element_text(face = "bold", hjust = 0))
ppairs <- ppairs + ggtitle("E Pairs plot") + theme(plot.title = element_text(face = "bold", hjust = 0.5))

#
combined_plot <- (pscree | ploadings) / (pbiplot | pkmean) / ppairs

ggsave("./figs/combined_plot.png", combined_plot, width = 20, height = 30)

## Warning in geom_label(aes(x = horn$n, y = 60, label = "Horn's", vjust = -1, : All aesthetics have length
## i Please consider using `annotate()` or provide this layer with data containing
##   a single row.

## Warning in geom_label(aes(x = elbow, y = 60, label = "Elbow method", vjust = -3, : All aesthetics have length
## i Please consider using `annotate()` or provide this layer with data containing
##   a single row.

## Warning in geom_label(aes(x = var_explained, y = 85, label = "80% explained variation", : All aesthetics have length
## i Please consider using `annotate()` or provide this layer with data containing
##   a single row.

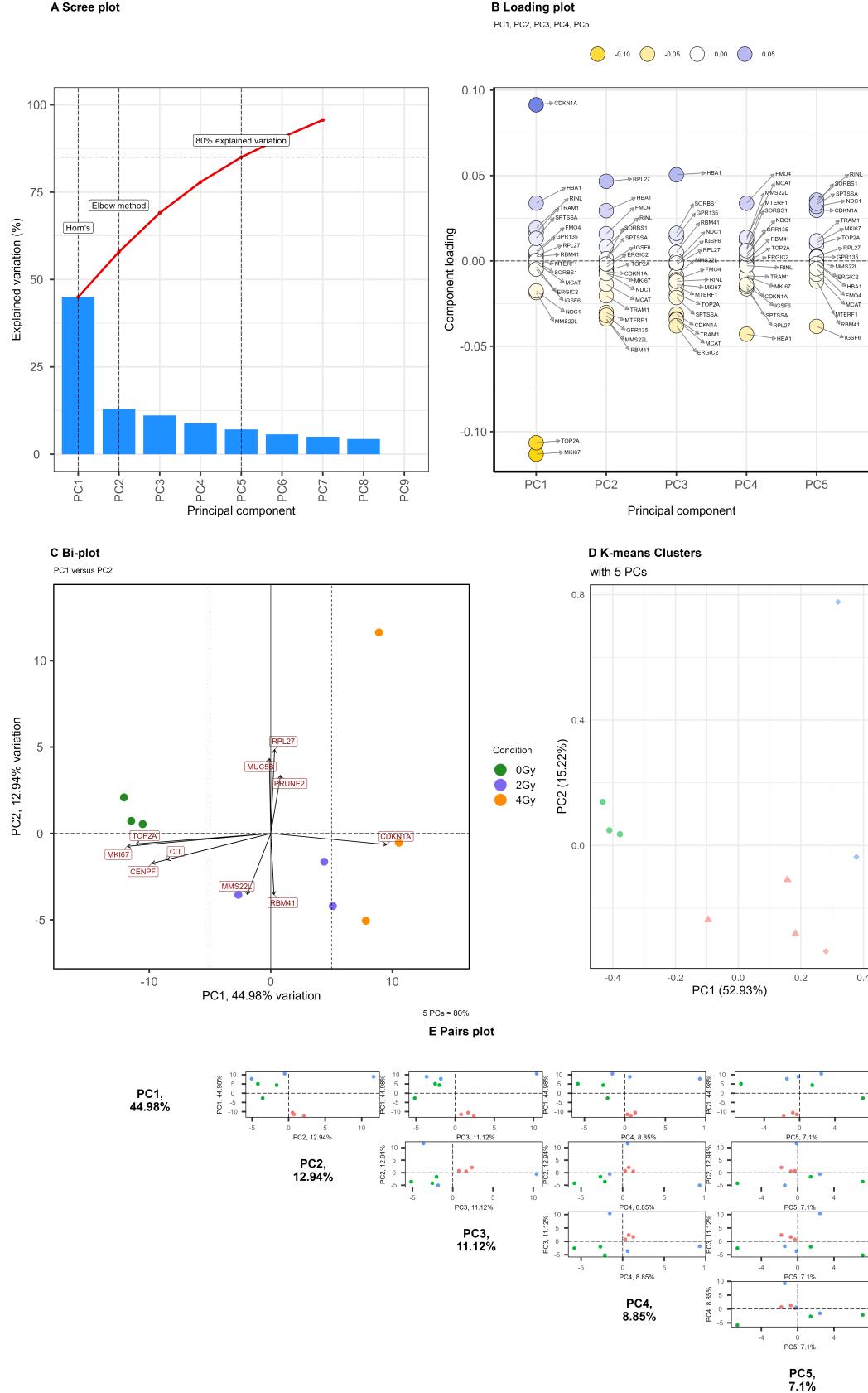
## Warning: Removed 2 rows containing missing values or values outside the scale range
## (`geom_line()`).

## Warning: Removed 2 rows containing missing values or values outside the scale range
## (`geom_point()`).

## Too few points to calculate an ellipse

knitr::include_graphics("./figs/combined_plot.png")

```



```

dbs <- listEnrichrDbs()
print(head(dbs))

##   geneCoverage genesPerTerm           libraryName
## 1      13362        275    Genome_Browser_PWMs
## 2      27884        1284 TRANSFAC_and_JASPAR_PWMs
## 3       6002         77 Transcription_Factor_PPIs
## 4      47172        1370          ChEA_2013
## 5      47107        509 Drug_Perturbations_from_GEO_2014
## 6      21493        3713 ENCODE_TF_ChIP-seq_2014
##                                     link numTerms
## 1 http://hgdownload.cse.ucsc.edu/goldenPath/hg18/database/      615
## 2             http://jaspar.genereg.net/html/DOWNLOAD/      326
## 3                                         290
## 4             http://amp.pharm.mssm.edu/lib/cheadownload.jsp      353
## 5             http://www.ncbi.nlm.nih.gov/geo/      701
## 6             http://genome.ucsc.edu/ENCODE/downloads.html      498
##                               appyter categoryId
## 1 ea115789fcfb12797fd692cec6df0ab4dbc79c6a      1
## 2 7d42eb43a64a4e3b20d721fc7148f685b53b6b30      1
## 3 849f222220618e2599d925b6b51868cf1dab3763      1
## 4 7ebe772afb55b63b41b79dd8d06ea0fdd9fa2630      7
## 5 ad270a6876534b7cb063e004289dc4d3164f342      7
## 6 497787ebc418d308045efb63b8586f10c526af51      7

databases <- c("KEGG_2021_Human", "GO_Biological_Process_2021", "Reactome_2022", "WikiPathways_2023_Human")

enrichr_results_2Gy_0Gy_up <- enrichr(res_2Gy_0Gy_up$gene_name, databases)

## Uploading data to Enrichr... Done.
## Querying KEGG_2021_Human... Done.
## Querying GO_Biological_Process_2021... Done.
## Querying Reactome_2022... Done.
## Querying WikiPathways_2023_Human... Done.
## Parsing results... Done.

enrichr_results_4Gy_0Gy_up <- enrichr(res_4Gy_0Gy_up$gene_name, databases)

## Uploading data to Enrichr... Done.
## Querying KEGG_2021_Human... Done.
## Querying GO_Biological_Process_2021... Done.
## Querying Reactome_2022... Done.
## Querying WikiPathways_2023_Human... Done.
## Parsing results... Done.

enrichr_results_4Gy_2Gy_up <- enrichr(res_4Gy_2Gy_up$gene_name, databases)

## Uploading data to Enrichr... Done.
## Querying KEGG_2021_Human... Done.
## Querying GO_Biological_Process_2021... Done.
## Querying Reactome_2022... Done.
## Querying WikiPathways_2023_Human... Done.
## Parsing results... Done.

```

```

enrichr_results_all_up <- enrichr(unique(c(res_2Gy_0Gy_up$gene_name, res_4Gy_0Gy_up$gene_name, res_4Gy_4Gy_up$gene_name))

## Uploading data to Enrichr... Done.
## Querying KEGG_2021_Human... Done.
## Querying GO_Biological_Process_2021... Done.
## Querying Reactome_2022... Done.
## Querying WikiPathways_2023_Human... Done.
## Parsing results... Done.

head(enrichr_results_2Gy_0Gy_up)

## $KEGG_2021_Human
##                                         Term Overlap
## 1                               ErbB signaling pathway 2/85
## 2                           Proteoglycans in cancer 2/205
## 3                               Thyroid cancer 1/37
## 4                               Bladder cancer 1/41
## 5                            ABC transporters 1/45
## 6 Intestinal immune network for IgA production 1/48
## 7           Sphingolipid metabolism 1/49
## 8           Endometrial cancer 1/58
## 9           Steroid hormone biosynthesis 1/61
## 10          Human papillomavirus infection 2/331
## 11          Basal cell carcinoma 1/63
## 12          Fc epsilon RI signaling pathway 1/68
## 13          Renal cell carcinoma 1/69
## 14                               Melanoma 1/72
## 15           Non-small cell lung cancer 1/72
## 16           Inositol phosphate metabolism 1/73
## 17           p53 signaling pathway 1/73
## 18                               Glioma 1/75
## 19 Metabolism of xenobiotics by cytochrome P450 1/76
## 20           Chronic myeloid leukemia 1/76
## 21           Pancreatic cancer 1/76
## 22           B cell receptor signaling pathway 1/81
## 23           Colorectal cancer 1/86
## 24           Small cell lung cancer 1/92
## 25 Phosphatidylinositol signaling system 1/97
## 26           Fc gamma R-mediated phagocytosis 1/97
## 27           Prostate cancer 1/97
## 28 Viral protein interaction with cytokine and cytokine receptor 1/100
## 29           Parathyroid hormone synthesis, secretion and action 1/106
## 30           HIF-1 signaling pathway 1/109
## 31           Sphingolipid signaling pathway 1/119
## 32           Cell cycle 1/124
## 33           Lysosome 1/128
## 34           Relaxin signaling pathway 1/129
## 35           FoxO signaling pathway 1/131
## 36 Vascular smooth muscle contraction 1/133
## 37           Apelin signaling pathway 1/137
## 38           Breast cancer 1/147
## 39           Gastric cancer 1/149

```

## 40		Oxytocin signaling pathway	1/154		
## 41		Cushing syndrome	1/155		
## 42		Cellular senescence	1/156		
## 43		Hepatitis C	1/157		
## 44		JAK-STAT signaling pathway	1/162		
## 45		Hepatitis B	1/162		
## 46		Hepatocellular carcinoma	1/168		
## 47		Transcriptional misregulation in cancer	1/192		
## 48		Chemokine signaling pathway	1/192		
## 49	Kaposi sarcoma-associated herpesvirus infection		1/193		
## 50		Epstein-Barr virus infection	1/202		
## 51		Viral carcinogenesis	1/203		
## 52	Human T-cell leukemia virus 1 infection		1/219		
## 53		Human cytomegalovirus infection	1/225		
## 54		Chemical carcinogenesis	1/239		
## 55	Cytokine-cytokine receptor interaction		1/295		
## 56		MicroRNAs in cancer	1/310		
## 57		PI3K-Akt signaling pathway	1/354		
## 58	Amyotrophic lateral sclerosis		1/364		
## 59		Pathways of neurodegeneration	1/475		
## 60		Pathways in cancer	1/531		
##	P.value	Adjusted.P.value	Old.P.value	Old.Adjusted.P.value	Odds.Ratio
## 1	0.007662373	0.2973303	0	0	16.523473
## 2	0.040019049	0.2973303	0	0	6.715135
## 3	0.055827111	0.2973303	0	0	18.456481
## 4	0.061678612	0.2973303	0	0	16.607500
## 5	0.067495012	0.2973303	0	0	15.094697
## 6	0.071834399	0.2973303	0	0	14.129078
## 7	0.073276514	0.2973303	0	0	13.834028
## 8	0.086158345	0.2973303	0	0	11.644444
## 9	0.090413652	0.2973303	0	0	11.060556
## 10	0.092800643	0.2973303	0	0	4.116969
## 11	0.093239863	0.2973303	0	0	10.702688
## 12	0.100268262	0.2973303	0	0	9.901493
## 13	0.101667602	0.2973303	0	0	9.755392
## 14	0.105852996	0.2973303	0	0	9.341784
## 15	0.105852996	0.2973303	0	0	9.341784
## 16	0.107243929	0.2973303	0	0	9.211574
## 17	0.107243929	0.2973303	0	0	9.211574
## 18	0.110019515	0.2973303	0	0	8.961712
## 19	0.111404175	0.2973303	0	0	8.841778
## 20	0.111404175	0.2973303	0	0	8.841778
## 21	0.111404175	0.2973303	0	0	8.841778
## 22	0.118296263	0.2973303	0	0	8.287083
## 23	0.125136605	0.2973303	0	0	7.797647
## 24	0.133277243	0.2973303	0	0	7.281319
## 25	0.140005066	0.2973303	0	0	6.900347
## 26	0.140005066	0.2973303	0	0	6.900347
## 27	0.140005066	0.2973303	0	0	6.900347
## 28	0.144017472	0.2973303	0	0	6.690236
## 29	0.151988004	0.2973303	0	0	6.306032
## 30	0.155946290	0.2973303	0	0	6.129938
## 31	0.169011858	0.2973303	0	0	5.607627
## 32	0.175471030	0.2973303	0	0	5.378320

## 33	0.180603359	0.2973303	0	0	5.207874
## 34	0.181881603	0.2973303	0	0	5.166927
## 35	0.184432304	0.2973303	0	0	5.086923
## 36	0.186975308	0.2973303	0	0	5.009343
## 37	0.192038316	0.2973303	0	0	4.861029
## 38	0.204562707	0.2973303	0	0	4.525799
## 39	0.207044940	0.2973303	0	0	4.464189
## 40	0.213217773	0.2973303	0	0	4.317211
## 41	0.214446746	0.2973303	0	0	4.288961
## 42	0.215673862	0.2973303	0	0	4.261075
## 43	0.216899123	0.2973303	0	0	4.233547
## 44	0.222997695	0.2973303	0	0	4.101035
## 45	0.222997695	0.2973303	0	0	4.101035
## 46	0.230255325	0.3003330	0	0	3.952495
## 47	0.258635328	0.3181170	0	0	3.451658
## 48	0.258635328	0.3181170	0	0	3.451658
## 49	0.259795580	0.3181170	0	0	3.433507
## 50	0.270159075	0.3191787	0	0	3.278275
## 51	0.271301869	0.3191787	0	0	3.261881
## 52	0.289352769	0.3338686	0	0	3.020031
## 53	0.296009661	0.3351053	0	0	2.938244
## 54	0.311308572	0.3458984	0	0	2.763445
## 55	0.369349391	0.4029266	0	0	2.230726
## 56	0.384073901	0.4115078	0	0	2.120820
## 57	0.425371980	0.4477600	0	0	1.852314
## 58	0.434377122	0.4493556	0	0	1.800367
## 59	0.525597248	0.5345057	0	0	1.370956
## 60	0.566041501	0.5660415	0	0	1.222579
##	Combined.Score	Genes			
## 1	80.4930011	BTC;CDKN1A			
## 2	21.6119886	CDKN1A;ANK1			
## 3	53.2560973	CDKN1A			
## 4	46.2654734	CDKN1A			
## 5	40.6907986	ABCA12			
## 6	37.2073986	CCL28			
## 7	36.1554410	ACER2			
## 8	28.5471527	CDKN1A			
## 9	26.5824969	HSD11B1			
## 10	9.7872771	CDKN1A;HES2			
## 11	25.3929832	CDKN1A			
## 12	22.7725027	INPP5D			
## 13	22.3012810	CDKN1A			
## 14	20.9788816	CDKN1A			
## 15	20.9788816	CDKN1A			
## 16	20.5662147	INPP5D			
## 17	20.5662147	CDKN1A			
## 18	19.7793717	CDKN1A			
## 19	19.4040813	HSD11B1			
## 20	19.4040813	CDKN1A			
## 21	19.4040813	CDKN1A			
## 22	17.6893023	INPP5D			
## 23	16.2062343	CDKN1A			
## 24	14.6742148	CDKN1A			
## 25	13.5666117	INPP5D			

```

## 26    13.5666117    INPP5D
## 27    13.5666117    CDKN1A
## 28    12.9644769    CCL28
## 29    11.8802717    CDKN1A
## 30    11.3909187    CDKN1A
## 31     9.9691632    ACER2
## 32     9.3597895    CDKN1A
## 33     8.9130266    AP3B2
## 34     8.8065071    ACTA2
## 35     8.5993051    CDKN1A
## 36     8.3995604    ACTA2
## 37     8.0209920    ACTA2
## 38     7.1819033    CDKN1A
## 39     7.0302918    CDKN1A
## 40     6.6719964    CDKN1A
## 41     6.6036869    CDKN1A
## 42     6.5364379    CDKN1A
## 43     6.4702269    CDKN1A
## 44     6.1539882    CDKN1A
## 45     6.1539882    CDKN1A
## 46     5.8045017    CDKN1A
## 47     4.6678020    CDKN1A
## 48     4.6678020    CCL28
## 49     4.6278873    CDKN1A
## 50     4.2904242    CDKN1A
## 51     4.2551996    CDKN1A
## 52     3.7451661    CDKN1A
## 53     3.5769101    CDKN1A
## 54     3.2248597    HSD11B1
## 55     2.2218300    CCL28
## 56     2.0294556    CDKN1A
## 57     1.5833414    CDKN1A
## 58     1.5012222    NEFL
## 59     0.8818266    NEFL
## 60     0.6957547    CDKN1A
##
## $GO_Biological_Process_2021
##
## 1                         modulation by symbiont of entry into host (GO)
## 2                         regulation of viral life cycle (GO)
## 3                         regulation of DNA biosynthetic process (GO)
## 4                         negative regulation of DNA biosynthetic process (GO)
## 5                         negative regulation of DNA metabolic process (GO)
## 6                         axonal transport (GO)
## 7                         anterograde axonal transport (GO)
## 8                         regulation of viral entry into host cell (GO)
## 9                         ceramide metabolic process (GO)
## 10                        regulation of neurotransmitter receptor activity (GO)
## 11                        regulation of cell-matrix adhesion (GO)
## 12                        regulation of protein localization (GO)
## 13                        regulation of autophagy (GO)
## 14                        DNA damage response, signal transduction by p53 class mediator (GO)
## 15                        positive regulation of cell population proliferation (GO)
## 16                        cellular response to cytokine stimulus (GO)

```

```

## 17 negative regulation of leukocyte adhesion to vascular endothelial cell (G)
## 18 response to interleukin-1 (G)
## 19 positive regulation of autophagy (G)
## 20 negative regulation of cellular extravasation (G)
## 21 mitochondrial protein catabolic process (G)
## 22 skin morphogenesis (G)
## 23 cellular response to platelet-derived growth factor stimulus (G)
## 24 flavin-containing compound metabolic process (G)
## 25 delamination (G)
## 26 positive regulation of urine volume (G)
## 27 oxygen transport (G)
## 28 hyaluronan biosynthetic process (G)
## 29 riboflavin metabolic process (G)
## 30 intermediate filament bundle assembly (G)
## 31 cellular response to UV-B (G)
## 32 stress-induced premature senescence (G)
## 33 vascular associated smooth muscle contraction (G)
## 34 response to tumor necrosis factor (G)
## 35 maintenance of apical/basal cell polarity (G)
## 36 maintenance of epithelial cell apical/basal polarity (G)
## 37 organic cyclic compound catabolic process (G)
## 38 sphingolipid metabolic process (G)
## 39 negative regulation of cell adhesion mediated by integrin (G)
## 40 chloride ion homeostasis (G)
## 41 regulation of leukocyte tethering or rolling (G)
## 42 regulation of urine volume (G)
## 43 monovalent inorganic anion homeostasis (G)
## 44 cellular response to DNA damage stimulus (G)
## 45 glucocorticoid biosynthetic process (G)
## 46 glucocorticoid metabolic process (G)
## 47 positive regulation of epidermal growth factor-activated receptor activity (G)
## 48 axonal transport of mitochondrion (G)
## 49 vasoconstriction (G)
## 50 cellular response to fluid shear stress (G)
## 51 gas transport (G)
## 52 phospholipid efflux (G)
## 53 protein localization to plasma membrane (G)
## 54 protein localization to cell periphery (G)
## 55 sphingoid biosynthetic process (G)
## 56 sphingosine biosynthetic process (G)
## 57 mitochondrion transport along microtubule (G)
## 58 response to UV-B (G)
## 59 positive regulation of lipid transport (G)
## 60 positive regulation of cellular catabolic process (G)
## 61 smooth muscle contraction (G)
## 62 steroid catabolic process (G)
## 63 ceramide transport (G)
## 64 renal absorption (G)
## 65 anterograde synaptic vesicle transport (G)
## 66 synaptic vesicle transport along microtubule (G)
## 67 positive regulation of DNA damage response, signal transduction by p53 class mediator (G)
## 68 C21-steroid hormone biosynthetic process (G)
## 69 response to muscle stretch (G)
## 70 cellular response to interleukin-1 (G)

```

```

## 71 positive regulation of NF-kappaB transcription factor activity (G)
## 72 sphingolipid catabolic process (G)
## 73 ceramide catabolic process (G)
## 74 retrograde axonal transport (G)
## 75 cellular response to growth factor stimulus (G)
## 76 negative regulation of vascular associated smooth muscle cell proliferation (G)
## 77 diol biosynthetic process (G)
## 78 muscle tissue morphogenesis (G)
## 79 intermediate filament organization (G)
## 80 positive regulation of I-kappaB kinase/NF-kappaB signaling (G)
## 81 establishment of skin barrier (G)
## 82 sphingosine metabolic process (G)
## 83 regulation of water loss via skin (G)
## 84 regulation of cell population proliferation (G)
## 85 neuromuscular synaptic transmission (G)
## 86 granulocyte differentiation (G)
## 87 cardiac epithelial to mesenchymal transition (G)
## 88 epithelial cell development (G)
## 89 negative regulation of cyclin-dependent protein kinase activity (G)
## 90 positive regulation of signal transduction by p53 class mediator (G)
## 91 negative regulation of phosphate metabolic process (G)
## 92 positive regulation of cholesterol efflux (G)
## 93 hyaluronan metabolic process (G)
## 94 cellular response to tumor necrosis factor (G)
## 95 protein localization to membrane (G)
## 96 extracellular matrix assembly (G)
## 97 regulation of monooxygenase activity (G)
## 98 C21-steroid hormone metabolic process (G)
## 99 potassium ion homeostasis (G)
## 100 cellular polysaccharide biosynthetic process (G)
## 101 regulation of epidermal cell differentiation (G)
## 102 regulation of macromolecule metabolic process (G)
## 103 mononuclear cell differentiation (G)
## 104 cellular response to drug (G)
## 105 positive regulation of nuclear division (G)
## 106 cellular senescence (G)
## 107 monovalent inorganic cation homeostasis (G)
## 108 regulation of epidermal growth factor-activated receptor activity (G)
## 109 amide transport (G)
## 110 regulation of insulin secretion involved in cellular response to glucose stimulus (G)
## 111 positive regulation of fibroblast proliferation (G)
## 112 regulation of DNA damage response, signal transduction by p53 class mediator (G)
## 113 sarcomere organization (G)
## 114 lipid catabolic process (G)
## 115 primary neural tube formation (G)
## 116 regulation of I-kappaB kinase/NF-kappaB signaling (G)
## 117 steroid hormone biosynthetic process (G)
## 118 tube closure (G)
## 119 vitamin transport (G)
## 120 positive regulation of leukocyte cell-cell adhesion (G)
## 121 cellular nitrogen compound biosynthetic process (G)
## 122 ERBB2 signaling pathway (G)
## 123 establishment or maintenance of epithelial cell apical/basal polarity (G)
## 124 negative regulation of cell-matrix adhesion (G)

```

```

## 125 negative regulation of developmental growth (G)
## 126 cardiac muscle tissue morphogenesis (G)
## 127 regulation of NMDA receptor activity (G)
## 128 signal transduction by p53 class mediator (G)
## 129 negative regulation of smooth muscle cell proliferation (G)
## 130 positive regulation of cholesterol transport (G)
## 131 vasculogenesis (G)
## 132 mitotic G2 DNA damage checkpoint signaling (G)
## 133 regulation of cholesterol efflux (G)
## 134 neural tube closure (G)
## 135 regulation of keratinocyte differentiation (G)
## 136 positive regulation of epidermal growth factor receptor signaling pathway (G)
## 137 regulation of cell adhesion mediated by integrin (G)
## 138 positive regulation of intracellular signal transduction (G)
## 139 negative regulation of cell cycle G1/S phase transition (G)
## 140 regulation of cell cycle G1/S phase transition (G)
## 141 calcium-dependent cell-cell adhesion via plasma membrane cell adhesion molecules (G)
## 142 positive regulation of mitotic nuclear division (G)
## 143 positive regulation of DNA-binding transcription factor activity (G)
## 144 positive regulation of signaling receptor activity (G)
## 145 negative regulation of G1/S transition of mitotic cell cycle (G)
## 146 regulation of vascular associated smooth muscle cell proliferation (G)
## 147 regulation of nitric-oxide synthase activity (G)
## 148 positive regulation of intracellular transport (G)
## 149 negative regulation of cell-substrate adhesion (G)
## 150 negative regulation of ERBB signaling pathway (G)
## 151 autophagy of mitochondrion (G)
## 152 regulation of cell development (G)
## 153 positive regulation of protein tyrosine kinase activity (G)
## 154 regulation of nervous system development (G)
## 155 potassium ion import across plasma membrane (G)
## 156 myofibril assembly (G)
## 157 positive regulation of cell-matrix adhesion (G)
## 158 negative regulation of epidermal growth factor receptor signaling pathway (G)
## 159 metal ion homeostasis (G)
## 160 cellular response to radiation (G)
## 161 mitotic G2/M transition checkpoint (G)
## 162 regulation of fibroblast proliferation (G)
## 163 epidermal growth factor receptor signaling pathway (G)
## 164 polyol metabolic process (G)
## 165 cytokine-mediated signaling pathway (G)
## 166 positive regulation of cellular process (G)
## 167 cellular response to ionizing radiation (G)
## 168 inositol phosphate metabolic process (G)
## 169 cellular response to mechanical stimulus (G)
## 170 positive regulation of reactive oxygen species metabolic process (G)
## 171 regulation of cellular localization (G)
## 172 chloride transmembrane transport (G)
## 173 regulation of cellular component movement (G)
## 174 signal transduction in response to DNA damage (G)
## 175 heart morphogenesis (G)
## 176 cardiac muscle tissue development (G)
## 177 innate immune response (G)
## 178 MAPK cascade (G)

```

```

## 179 regulation of cyclin-dependent protein kinase activity (G)
## 180 chemical synaptic transmission (G)
## 181 positive regulation of response to DNA damage stimulus (G)
## 182 blood vessel morphogenesis (G)
## 183 DNA damage response, signal transduction by p53 class mediator resulting in cell cycle arrest (G)
## 184 regulation of reactive oxygen species metabolic process (G)
## 185 renal system development (G)
## 186 regulation of mitotic nuclear division (G)
## 187 protein polyubiquitination (G)
## 188 membrane lipid biosynthetic process (G)
## 189 mitotic DNA damage checkpoint signaling (G)
## 190 phospholipid transport (G)
## 191 cellular protein catabolic process (G)
## 192 regulation of DNA-templated transcription, initiation (G)
## 193 regulation of neurogenesis (G)
## 194 response to retinoic acid (G)
## 195 anterior/posterior pattern specification (G)
## 196 cell cycle G1/S phase transition (G)
## 197 regulation of transcription initiation from RNA polymerase II promoter (G)
## 198 steroid biosynthetic process (G)
## 199 regulation of cellular catabolic process (G)
## 200 mitotic G1 DNA damage checkpoint signaling (G)
## 201 inorganic anion transmembrane transport (G)
## 202 ERBB signaling pathway (G)
## 203 positive regulation of cell death (G)
## 204 regulation of epidermal growth factor receptor signaling pathway (G)
## 205 interferon-gamma-mediated signaling pathway (G)
## 206 synapse assembly (G)
## 207 positive regulation of protein transport (G)
## 208 cell chemotaxis (G)
## 209 kidney development (G)
## 210 positive regulation of cell-substrate adhesion (G)
## 211 regulation of G1/S transition of mitotic cell cycle (G)
## 212 myeloid leukocyte differentiation (G)
## 213 positive regulation of protein secretion (G)
## 214 positive regulation of secretion by cell (G)
## 215 response to ionizing radiation (G)
## 216 negative regulation of cell adhesion (G)
## 217 regulation of actin filament-based process (G)
## 218 neurotransmitter transport (G)
## 219 sphingolipid biosynthetic process (G)
## 220 negative regulation of protein binding (G)
## 221 cellular response to amino acid starvation (G)
## 222 response to amino acid starvation (G)
## 223 actomyosin structure organization (G)
## 224 chloride transport (G)
## 225 water-soluble vitamin metabolic process (G)
## 226 cellular response to UV (G)
## 227 inorganic cation import across plasma membrane (G)
## 228 skin development (G)
## 229 activation of cysteine-type endopeptidase activity involved in apoptotic process (G)
## 230 regulation of cyclin-dependent protein serine/threonine kinase activity (G)
## 231 epidermis development (G)
## 232 lymphocyte differentiation (G)

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## 233 G1/S transition of mitotic cell cycle (G)
## 234 negative regulation of phosphorylation (G)
## 235 regulation of transcription, DNA-templated (G)
## 236 negative regulation of binding (G)
## 237 regulation of cation channel activity (G)
## 238 negative regulation of protein kinase activity (G)
## 239 protein modification by small protein conjugation (G)
## 240 regulation of actin cytoskeleton organization (G)
## 241 negative regulation of mitotic cell cycle phase transition (G)
## 242 regulation of cell cycle phase transition (G)
## 243 glycosaminoglycan biosynthetic process (G)
## 244 organic anion transport (G)
## 245 positive regulation of cell cycle process (G)
## 246 intrinsic apoptotic signaling pathway (G)
## 247 regulation of cell death (G)
## 248 cell junction assembly (G)
## 249 steroid metabolic process (G)
## 250 regulation of insulin secretion (G)
## 251 positive regulation of cellular metabolic process (G)
## 252 small GTPase mediated signal transduction (G)
## 253 lipid transport (G)
## 254 regulation of protein kinase activity (G)
## 255 regulation of protein serine/threonine kinase activity (G)
## 256 regulation of cytoskeleton organization (G)
## 257 phosphatidylinositol metabolic process (G)
## 258 cellular response to transforming growth factor beta stimulus (G)
## 259 response to lipid (G)
## 260 positive regulation of kinase activity (G)
## 261 cellular response to molecule of bacterial origin (G)
## 262 cellular amide metabolic process (G)
## 263 regulation of protein binding (G)
## 264 positive regulation of cysteine-type endopeptidase activity involved in apoptotic process (G)
## 265 cellular response to lipopolysaccharide (G)
## 266 cytoskeleton organization (G)
## 267 cellular response to interferon-gamma (G)
## 268 regulation of phosphorylation (G)
## 269 regulation of protein secretion (G)
## 270 negative regulation of cell growth (G)
## 271 synapse organization (G)
## 272 circulatory system development (G)
## 273 negative regulation of growth (G)
## 274 phosphatidylinositol biosynthetic process (G)
## 275 muscle contraction (G)
## 276 G2/M transition of mitotic cell cycle (G)
## 277 cell cycle G2/M phase transition (G)
## 278 regulation of cell motility (G)
## 279 organic substance transport (G)
## 280 potassium ion transmembrane transport (G)
## 281 protein ubiquitination (G)
## 282 Ras protein signal transduction (G)
## 283 nitrogen compound transport (G)
## 284 negative regulation of cellular macromolecule biosynthetic process (G)
## 285 positive regulation of protein kinase activity (G)
## 286 cellular response to starvation (G)

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## 287 T cell receptor signaling pathway (G)
## 288 organonitrogen compound biosynthetic process (G)
## 289 response to lipopolysaccharide (G)
## 290 positive regulation of protein kinase B signaling (G)
## 291 heart development (G)
## 292 cell-cell adhesion via plasma-membrane adhesion molecules (G)
## 293 regulation of gene expression (G)
## 294 mitochondrion organization (G)
## 295 glycerophospholipid biosynthetic process (G)
## 296 protein stabilization (G)
## 297 regulated exocytosis (G)
## 298 antigen receptor-mediated signaling pathway (G)
## 299 endoplasmic reticulum to Golgi vesicle-mediated transport (G)
## 300 regulation of programmed cell death (G)
## 301 generation of neurons (G)
## 302 regulation of protein kinase B signaling (G)
## 303 mitotic cell cycle phase transition (G)
## 304 phosphate-containing compound metabolic process (G)
## 305 regulation of cell growth (G)
## 306 cellular response to lipid (G)
## 307 positive regulation of cell motility (G)
## 308 membrane organization (G)
## 309 anterograde trans-synaptic signaling (G)
## 310 regulation of apoptotic process (G)
## 311 cellular component assembly (G)
## 312 positive regulation of cell migration (G)
## 313 positive regulation of programmed cell death (G)
## 314 regulation of cell cycle (G)
## 315 extracellular matrix organization (G)
## 316 positive regulation of apoptotic process (G)
## 317 cellular response to oxygen-containing compound (G)
## 318 cellular protein localization (G)
## 319 intracellular protein transport (G)
## 320 supramolecular fiber organization (G)
## 321 protein transport (G)
## 322 positive regulation of protein phosphorylation (G)
## 323 negative regulation of cell population proliferation (G)
## 324 regulation of transcription by RNA polymerase II (G)
## 325 positive regulation of macromolecule metabolic process (G)
## 326 regulation of cell migration (G)
## 327 organelle organization (G)
## 328 regulation of nucleic acid-templated transcription (G)
## 329 nervous system development (G)
## 330 regulation of cellular macromolecule biosynthetic process (G)
## 331 positive regulation of gene expression (G)
## 332 positive regulation of nucleic acid-templated transcription (G)
## 333 positive regulation of transcription, DNA-templated (G)
## 334 negative regulation of cellular process (G)
## 335 positive regulation of transcription by RNA polymerase II (G)

##      Overlap      P.value Adjusted.P.value Old.P.value Old.Adjusted.P.value
## 1      2/20 0.0004341401      0.06961296      0          0
## 2      2/26 0.0007383210      0.06961296      0          0
## 3      2/29 0.0009196678      0.06961296      0          0
## 4      2/32 0.0011202887      0.06961296      0          0

```

## 5	2/36	0.0014174693	0.06961296	0	0
## 6	2/36	0.0014174693	0.06961296	0	0
## 7	2/37	0.0014970235	0.06961296	0	0
## 8	2/39	0.0016623990	0.06961296	0	0
## 9	2/55	0.0032805707	0.11088093	0	0
## 10	2/58	0.0036411755	0.11088093	0	0
## 11	2/65	0.0045510000	0.11088093	0	0
## 12	2/66	0.0046887064	0.11088093	0	0
## 13	3/231	0.0053853431	0.11088093	0	0
## 14	2/74	0.0058588119	0.11088093	0	0
## 15	4/474	0.0059038918	0.11088093	0	0
## 16	4/482	0.0062598417	0.11088093	0	0
## 17	1/5	0.0077266943	0.11088093	0	0
## 18	2/86	0.0078372811	0.11088093	0	0
## 19	2/90	0.0085548565	0.11088093	0	0
## 20	1/6	0.0092650922	0.11088093	0	0
## 21	1/6	0.0092650922	0.11088093	0	0
## 22	1/7	0.0108011828	0.11088093	0	0
## 23	1/7	0.0108011828	0.11088093	0	0
## 24	1/7	0.0108011828	0.11088093	0	0
## 25	1/7	0.0108011828	0.11088093	0	0
## 26	1/7	0.0108011828	0.11088093	0	0
## 27	1/7	0.0108011828	0.11088093	0	0
## 28	1/7	0.0108011828	0.11088093	0	0
## 29	1/7	0.0108011828	0.11088093	0	0
## 30	1/7	0.0108011828	0.11088093	0	0
## 31	1/8	0.0123349690	0.11088093	0	0
## 32	1/8	0.0123349690	0.11088093	0	0
## 33	1/8	0.0123349690	0.11088093	0	0
## 34	2/110	0.0125622926	0.11088093	0	0
## 35	1/9	0.0138664543	0.11088093	0	0
## 36	1/9	0.0138664543	0.11088093	0	0
## 37	1/9	0.0138664543	0.11088093	0	0
## 38	2/116	0.0138966221	0.11088093	0	0
## 39	1/10	0.0153956418	0.11088093	0	0
## 40	1/10	0.0153956418	0.11088093	0	0
## 41	1/10	0.0153956418	0.11088093	0	0
## 42	1/10	0.0153956418	0.11088093	0	0
## 43	1/10	0.0153956418	0.11088093	0	0
## 44	3/350	0.0166242957	0.11088093	0	0
## 45	1/11	0.0169225347	0.11088093	0	0
## 46	1/11	0.0169225347	0.11088093	0	0
## 47	1/11	0.0169225347	0.11088093	0	0
## 48	1/11	0.0169225347	0.11088093	0	0
## 49	1/11	0.0169225347	0.11088093	0	0
## 50	1/12	0.0184471365	0.11088093	0	0
## 51	1/12	0.0184471365	0.11088093	0	0
## 52	1/12	0.0184471365	0.11088093	0	0
## 53	2/136	0.0187635347	0.11088093	0	0
## 54	2/140	0.0198118169	0.11088093	0	0
## 55	1/13	0.0199694503	0.11088093	0	0
## 56	1/13	0.0199694503	0.11088093	0	0
## 57	1/13	0.0199694503	0.11088093	0	0
## 58	1/13	0.0199694503	0.11088093	0	0

## 59	1/13	0.0199694503	0.11088093	0	0
## 60	2/141	0.0200776826	0.11088093	0	0
## 61	1/14	0.0214894794	0.11088093	0	0
## 62	1/14	0.0214894794	0.11088093	0	0
## 63	1/14	0.0214894794	0.11088093	0	0
## 64	1/14	0.0214894794	0.11088093	0	0
## 65	1/15	0.0230072271	0.11088093	0	0
## 66	1/15	0.0230072271	0.11088093	0	0
## 67	1/15	0.0230072271	0.11088093	0	0
## 68	1/15	0.0230072271	0.11088093	0	0
## 69	1/15	0.0230072271	0.11088093	0	0
## 70	2/155	0.0239558897	0.11088093	0	0
## 71	2/155	0.0239558897	0.11088093	0	0
## 72	1/16	0.0245226968	0.11088093	0	0
## 73	1/16	0.0245226968	0.11088093	0	0
## 74	1/16	0.0245226968	0.11088093	0	0
## 75	2/158	0.0248240891	0.11088093	0	0
## 76	1/17	0.0260358916	0.11182082	0	0
## 77	1/17	0.0260358916	0.11182082	0	0
## 78	1/17	0.0260358916	0.11182082	0	0
## 79	1/18	0.0275468149	0.11681244	0	0
## 80	2/171	0.0287327959	0.11692174	0	0
## 81	1/19	0.0290554700	0.11692174	0	0
## 82	1/19	0.0290554700	0.11692174	0	0
## 83	1/19	0.0290554700	0.11692174	0	0
## 84	4/764	0.0293176895	0.11692174	0	0
## 85	1/20	0.0305618601	0.11768073	0	0
## 86	1/20	0.0305618601	0.11768073	0	0
## 87	1/20	0.0305618601	0.11768073	0	0
## 88	1/21	0.0320659885	0.12206939	0	0
## 89	1/22	0.0335678585	0.12357398	0	0
## 90	1/22	0.0335678585	0.12357398	0	0
## 91	1/22	0.0335678585	0.12357398	0	0
## 92	1/23	0.0350674733	0.12372950	0	0
## 93	1/23	0.0350674733	0.12372950	0	0
## 94	2/194	0.0362061680	0.12372950	0	0
## 95	2/195	0.0365465911	0.12372950	0	0
## 96	1/24	0.0365648363	0.12372950	0	0
## 97	1/24	0.0365648363	0.12372950	0	0
## 98	1/24	0.0365648363	0.12372950	0	0
## 99	1/24	0.0365648363	0.12372950	0	0
## 100	1/25	0.0380599506	0.12549824	0	0
## 101	1/25	0.0380599506	0.12549824	0	0
## 102	2/200	0.0382674240	0.12549824	0	0
## 103	1/26	0.0395528195	0.12549824	0	0
## 104	1/26	0.0395528195	0.12549824	0	0
## 105	1/27	0.0410434464	0.12549824	0	0
## 106	1/27	0.0410434464	0.12549824	0	0
## 107	1/27	0.0410434464	0.12549824	0	0
## 108	1/27	0.0410434464	0.12549824	0	0
## 109	1/28	0.0425318343	0.12549824	0	0
## 110	1/28	0.0425318343	0.12549824	0	0
## 111	1/28	0.0425318343	0.12549824	0	0
## 112	1/28	0.0425318343	0.12549824	0	0

## 113	1/28	0.0425318343	0.12549824	0	0
## 114	1/29	0.0440179867	0.12549824	0	0
## 115	1/30	0.0455019066	0.12549824	0	0
## 116	2/224	0.0469465257	0.12549824	0	0
## 117	1/31	0.0469835974	0.12549824	0	0
## 118	1/31	0.0469835974	0.12549824	0	0
## 119	1/31	0.0469835974	0.12549824	0	0
## 120	1/31	0.0469835974	0.12549824	0	0
## 121	1/31	0.0469835974	0.12549824	0	0
## 122	1/32	0.0484630623	0.12549824	0	0
## 123	1/32	0.0484630623	0.12549824	0	0
## 124	1/32	0.0484630623	0.12549824	0	0
## 125	1/32	0.0484630623	0.12549824	0	0
## 126	1/32	0.0484630623	0.12549824	0	0
## 127	1/32	0.0484630623	0.12549824	0	0
## 128	1/33	0.0499403046	0.12549824	0	0
## 129	1/33	0.0499403046	0.12549824	0	0
## 130	1/33	0.0499403046	0.12549824	0	0
## 131	1/33	0.0499403046	0.12549824	0	0
## 132	1/33	0.0499403046	0.12549824	0	0
## 133	1/33	0.0499403046	0.12549824	0	0
## 134	1/34	0.0514153273	0.12549824	0	0
## 135	1/34	0.0514153273	0.12549824	0	0
## 136	1/34	0.0514153273	0.12549824	0	0
## 137	1/34	0.0514153273	0.12549824	0	0
## 138	3/546	0.0516977829	0.12549824	0	0
## 139	1/35	0.0528881339	0.12746421	0	0
## 140	1/36	0.0543587274	0.12809645	0	0
## 141	1/36	0.0543587274	0.12809645	0	0
## 142	1/36	0.0543587274	0.12809645	0	0
## 143	2/246	0.0554754081	0.12809645	0	0
## 144	1/37	0.0558271111	0.12809645	0	0
## 145	1/37	0.0558271111	0.12809645	0	0
## 146	1/37	0.0558271111	0.12809645	0	0
## 147	1/39	0.0587572619	0.13299786	0	0
## 148	1/39	0.0587572619	0.13299786	0	0
## 149	1/40	0.0602190354	0.13359852	0	0
## 150	1/40	0.0602190354	0.13359852	0	0
## 151	1/40	0.0602190354	0.13359852	0	0
## 152	1/41	0.0616786119	0.13593641	0	0
## 153	1/42	0.0631359945	0.13645521	0	0
## 154	1/42	0.0631359945	0.13645521	0	0
## 155	1/42	0.0631359945	0.13645521	0	0
## 156	1/43	0.0645911866	0.13870543	0	0
## 157	1/44	0.0660441912	0.13914971	0	0
## 158	1/44	0.0660441912	0.13914971	0	0
## 159	1/44	0.0660441912	0.13914971	0	0
## 160	1/45	0.0674950115	0.14043993	0	0
## 161	1/45	0.0674950115	0.14043993	0	0
## 162	1/46	0.0689436508	0.14256866	0	0
## 163	1/47	0.0703901121	0.14307279	0	0
## 164	1/47	0.0703901121	0.14307279	0	0
## 165	3/621	0.0704686894	0.14307279	0	0
## 166	3/625	0.0715473758	0.14324121	0	0

## 167	1/48	0.0718343986	0.14324121	0	0
## 168	1/48	0.0718343986	0.14324121	0	0
## 169	1/49	0.0732765135	0.14355340	0	0
## 170	1/49	0.0732765135	0.14355340	0	0
## 171	1/49	0.0732765135	0.14355340	0	0
## 172	1/50	0.0747164600	0.14468216	0	0
## 173	1/50	0.0747164600	0.14468216	0	0
## 174	1/52	0.0775898602	0.14938278	0	0
## 175	1/53	0.0790233202	0.15020730	0	0
## 176	1/53	0.0790233202	0.15020730	0	0
## 177	2/302	0.0793632598	0.15020730	0	0
## 178	2/303	0.0798154362	0.15021444	0	0
## 179	1/54	0.0804546244	0.15057150	0	0
## 180	2/306	0.0811769274	0.15107928	0	0
## 181	1/55	0.0818837758	0.15155284	0	0
## 182	1/56	0.0833107775	0.15199211	0	0
## 183	1/56	0.0833107775	0.15199211	0	0
## 184	1/57	0.0847356328	0.15199211	0	0
## 185	1/57	0.0847356328	0.15199211	0	0
## 186	1/57	0.0847356328	0.15199211	0	0
## 187	2/314	0.0848433555	0.15199211	0	0
## 188	1/58	0.0861583448	0.15352684	0	0
## 189	1/59	0.0875789165	0.15441546	0	0
## 190	1/59	0.0875789165	0.15441546	0	0
## 191	1/60	0.0889973510	0.15609483	0	0
## 192	1/61	0.0904136515	0.15775299	0	0
## 193	1/62	0.0918278211	0.15856866	0	0
## 194	1/62	0.0918278211	0.15856866	0	0
## 195	1/63	0.0932398629	0.15936405	0	0
## 196	1/63	0.0932398629	0.15936405	0	0
## 197	1/64	0.0946497799	0.16009596	0	0
## 198	1/65	0.0960575753	0.16009596	0	0
## 199	1/65	0.0960575753	0.16009596	0	0
## 200	1/65	0.0960575753	0.16009596	0	0
## 201	1/65	0.0960575753	0.16009596	0	0
## 202	1/66	0.0974632521	0.16083837	0	0
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## 204	1/67	0.0988668134	0.16235482	0	0
## 205	1/68	0.1002682624	0.16374349	0	0
## 206	1/69	0.1016676020	0.16374349	0	0
## 207	1/69	0.1016676020	0.16374349	0	0
## 208	1/69	0.1016676020	0.16374349	0	0
## 209	1/70	0.1030648354	0.16441295	0	0
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## 211	1/71	0.1044599655	0.16466958	0	0
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## 213	1/72	0.1058529956	0.16466958	0	0
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## 215	1/72	0.1058529956	0.16466958	0	0
## 216	1/73	0.1072439285	0.16466958	0	0
## 217	1/73	0.1072439285	0.16466958	0	0
## 218	1/73	0.1072439285	0.16466958	0	0
## 219	1/74	0.1086327674	0.16466958	0	0
## 220	1/74	0.1086327674	0.16466958	0	0

## 221	1/74	0.1086327674	0.16466958	0	0
## 222	1/75	0.1100195154	0.16586844	0	0
## 223	1/76	0.1114041754	0.16586844	0	0
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## 225	1/76	0.1114041754	0.16586844	0	0
## 226	1/77	0.1127867505	0.16644741	0	0
## 227	1/77	0.1127867505	0.16644741	0	0
## 228	1/80	0.1169219967	0.17179328	0	0
## 229	1/81	0.1182962625	0.17305348	0	0
## 230	1/82	0.1196684586	0.17429971	0	0
## 231	1/83	0.1210385879	0.17553215	0	0
## 232	1/84	0.1224066534	0.17675099	0	0
## 233	1/85	0.1237726582	0.17795640	0	0
## 234	1/86	0.1251366053	0.17914856	0	0
## 235	6/2244	0.1271155174	0.18120723	0	0
## 236	1/88	0.1278583381	0.18149383	0	0
## 237	1/89	0.1292161299	0.18264727	0	0
## 238	1/90	0.1305718759	0.18378814	0	0
## 239	2/409	0.1318034149	0.18414612	0	0
## 240	1/91	0.1319255792	0.18414612	0	0
## 241	1/92	0.1332772425	0.18526090	0	0
## 242	1/95	0.1373200234	0.19009177	0	0
## 243	1/97	0.1400050659	0.19301110	0	0
## 244	1/99	0.1426820201	0.19589540	0	0
## 245	1/101	0.1453509096	0.19813945	0	0
## 246	1/102	0.1466823375	0.19813945	0	0
## 247	1/102	0.1466823375	0.19813945	0	0
## 248	1/102	0.1466823375	0.19813945	0	0
## 249	1/104	0.1493391740	0.20011449	0	0
## 250	1/104	0.1493391740	0.20011449	0	0
## 251	1/105	0.1506645885	0.20108620	0	0
## 252	1/106	0.1519880044	0.20204755	0	0
## 253	1/109	0.1559462895	0.20649015	0	0
## 254	1/110	0.1572617401	0.20741214	0	0
## 255	1/111	0.1585752066	0.20832429	0	0
## 256	1/112	0.1598866918	0.20841261	0	0
## 257	1/112	0.1598866918	0.20841261	0	0
## 258	1/114	0.1625037304	0.20937981	0	0
## 259	1/114	0.1625037304	0.20937981	0	0
## 260	1/114	0.1625037304	0.20937981	0	0
## 261	1/115	0.1638092894	0.20945081	0	0
## 262	1/115	0.1638092894	0.20945081	0	0
## 263	1/118	0.1677141600	0.21362830	0	0
## 264	1/119	0.1690118576	0.21446580	0	0
## 265	1/120	0.1703075971	0.21448513	0	0
## 266	1/120	0.1703075971	0.21448513	0	0
## 267	1/121	0.1716013811	0.21530510	0	0
## 268	1/125	0.1767570211	0.21767795	0	0
## 269	1/125	0.1767570211	0.21767795	0	0
## 270	1/126	0.1780410712	0.21767795	0	0
## 271	1/126	0.1780410712	0.21767795	0	0
## 272	1/126	0.1780410712	0.21767795	0	0
## 273	1/126	0.1780410712	0.21767795	0	0
## 274	1/126	0.1780410712	0.21767795	0	0

## 275	1/129	0.1818816031	0.22156486	0	0
## 276	1/130	0.1831579171	0.22231124	0	0
## 277	1/131	0.1844323040	0.22304990	0	0
## 278	1/133	0.1869753082	0.22531197	0	0
## 279	1/136	0.1907754321	0.22906728	0	0
## 280	1/139	0.1945583645	0.23267872	0	0
## 281	2/525	0.1951722959	0.23267872	0	0
## 282	1/142	0.1983241804	0.23559787	0	0
## 283	1/143	0.1995756617	0.23624681	0	0
## 284	2/547	0.2076504642	0.24493981	0	0
## 285	1/154	0.2132177725	0.25062440	0	0
## 286	1/158	0.2181225315	0.25371892	0	0
## 287	1/158	0.2181225315	0.25371892	0	0
## 288	1/158	0.2181225315	0.25371892	0	0
## 289	1/159	0.2193440901	0.25425699	0	0
## 290	1/161	0.2217816691	0.25619607	0	0
## 291	1/164	0.2254242321	0.25950900	0	0
## 292	1/170	0.2326599241	0.26633382	0	0
## 293	3/1079	0.2329427113	0.26633382	0	0
## 294	1/175	0.2386396608	0.27191934	0	0
## 295	1/177	0.2410189069	0.27369944	0	0
## 296	1/179	0.2433909571	0.27545936	0	0
## 297	1/180	0.2445742903	0.27586662	0	0
## 298	1/185	0.2504641416	0.28062036	0	0
## 299	1/185	0.2504641416	0.28062036	0	0
## 300	1/194	0.2609540743	0.29139872	0	0
## 301	1/202	0.2701590754	0.30067538	0	0
## 302	1/207	0.2758557529	0.30599893	0	0
## 303	1/209	0.2781223547	0.30749501	0	0
## 304	1/212	0.2815093893	0.31021594	0	0
## 305	1/217	0.2871202988	0.31536164	0	0
## 306	1/219	0.2893527691	0.31677509	0	0
## 307	1/221	0.2915784730	0.31817195	0	0
## 308	1/242	0.3145447954	0.34211853	0	0
## 309	1/244	0.3166940965	0.34334150	0	0
## 310	2/742	0.3203039152	0.34613488	0	0
## 311	1/261	0.3347017289	0.36053080	0	0
## 312	1/269	0.3430161604	0.36830261	0	0
## 313	1/286	0.3603517794	0.38568002	0	0
## 314	1/296	0.3703415318	0.39510960	0	0
## 315	1/300	0.3742950117	0.39805977	0	0
## 316	1/310	0.3840739013	0.40716695	0	0
## 317	1/323	0.3965655591	0.41908348	0	0
## 318	1/329	0.4022479099	0.42375173	0	0
## 319	1/336	0.4088118835	0.42931655	0	0
## 320	1/351	0.4226434898	0.44245490	0	0
## 321	1/369	0.4388283272	0.45796726	0	0
## 322	1/371	0.4405993011	0.45838747	0	0
## 323	1/379	0.4476292642	0.46425945	0	0
## 324	4/2206	0.4511839855	0.46588655	0	0
## 325	1/384	0.4519794935	0.46588655	0	0
## 326	1/408	0.4724032428	0.48544505	0	0
## 327	1/420	0.4823369254	0.49413722	0	0
## 328	1/430	0.4904765097	0.50094400	0	0

				Genes
## 329	1/447	0.5040303865	0.51322243	0
## 330	1/468	0.5202922186	0.52817543	0
## 331	1/482	0.5308454822	0.53726053	0
## 332	1/511	0.5519958445	0.55698376	0
## 333	2/1183	0.5547335265	0.55806526	0
## 334	1/566	0.5896024878	0.59136776	0
## 335	1/908	0.7634159460	0.76341595	0
##	Odds.Ratio	Combined.Score		Genes
## 1	76.4406130	591.8141768		TRIML2;TRIM22
## 2	57.3132184	413.2931745		TRIML2;TRIM22
## 3	50.9374202	356.1288723		CDKN1A;ANKRD1
## 4	45.8367816	311.4228338		CDKN1A;ANKRD1
## 5	40.4361055	265.2156513		CDKN1A;ANKRD1
## 6	40.4361055	265.2156513		NEFL;AP3B2
## 7	39.2788177	255.4802892		NEFL;AP3B2
## 8	37.1519105	237.7534118		TRIML2;TRIM22
## 9	25.9154196	148.2294073		ACER2;ABCA12
## 10	24.5233990	137.7098896		LYNX1;NEFL
## 11	21.7909141	117.5055056		ACER2;CCL28
## 12	21.4493534	115.0242716		TRIML2;TRIM22
## 13	9.2767857	48.4626174		ACER2;TRIML2;TRIM22
## 14	19.0584291	97.9566750		ACER2;CDKN1A
## 15	6.1462569	31.5434725		BTC;ACER2;CDKN1A;HAS2
## 16	6.0409112	30.6491694		CDKN1A;INPP5D;ANKRD1;HAS2
## 17	166.3750000	809.0939625		CCL28
## 18	16.3259442	79.1622716		ANKRD1;HAS2
## 19	15.5807210	74.1838036		TRIML2;TRIM22
## 20	133.0933333	623.0766346		CCL28
## 21	133.0933333	623.0766346		SPATA18
## 22	110.9055556	502.1914056		ABCA12
## 23	110.9055556	502.1914056		HAS2
## 24	110.9055556	502.1914056		SLC52A1
## 25	110.9055556	502.1914056		ABCA12
## 26	110.9055556	502.1914056		HAS2
## 27	110.9055556	502.1914056		CYGB
## 28	110.9055556	502.1914056		HAS2
## 29	110.9055556	502.1914056		SLC52A1
## 30	110.9055556	502.1914056		NEFL
## 31	95.0571429	417.8062797		CDKN1A
## 32	95.0571429	417.8062797		CDKN1A
## 33	95.0571429	417.8062797		ACTA2
## 34	12.6826309	55.5125806		ANKRD1;HAS2
## 35	83.1708333	355.8283387		ANK1
## 36	83.1708333	355.8283387		ANK1
## 37	83.1708333	355.8283387		HSD11B1
## 38	12.0114943	51.3624645		ACER2;ABCA12
## 39	73.9259259	308.5424793		ACER2
## 40	73.9259259	308.5424793		SLC12A8
## 41	73.9259259	308.5424793		CCL28
## 42	73.9259259	308.5424793		HAS2
## 43	73.9259259	308.5424793		SLC12A8
## 44	6.0586661	24.8216890		ACER2;CDKN1A;SPATA18
## 45	66.5300000	271.3831304		HSD11B1
## 46	66.5300000	271.3831304		HSD11B1

## 47	66.5300000	271.3831304	BTC
## 48	66.5300000	271.3831304	NEFL
## 49	66.5300000	271.3831304	ACTA2
## 50	60.4787879	241.4824938	HAS2
## 51	60.4787879	241.4824938	CYGB
## 52	60.4787879	241.4824938	ABCA12
## 53	10.2084406	40.5871256	ABCA12;ANK1
## 54	9.9105447	38.8639703	ABCA12;ANK1
## 55	55.4361111	216.9520847	ACER2
## 56	55.4361111	216.9520847	ACER2
## 57	55.4361111	216.9520847	NEFL
## 58	55.4361111	216.9520847	CDKN1A
## 59	55.4361111	216.9520847	ABCA12
## 60	9.8387497	38.4512742	TRIML2;TRIM22
## 61	51.1692308	196.4996601	ACTA2
## 62	51.1692308	196.4996601	HSD11B1
## 63	51.1692308	196.4996601	ABCA12
## 64	51.1692308	196.4996601	HAS2
## 65	47.5119048	179.2123814	AP3B2
## 66	47.5119048	179.2123814	AP3B2
## 67	47.5119048	179.2123814	ANKRD1
## 68	47.5119048	179.2123814	TSPOAP1
## 69	47.5119048	179.2123814	ANKRD1
## 70	8.9321614	33.3307270	ANKRD1;HAS2
## 71	8.9321614	33.3307270	TRIML2;TRIM22
## 72	44.3422222	164.4278859	ACER2
## 73	44.3422222	164.4278859	ACER2
## 74	44.3422222	164.4278859	NEFL
## 75	8.7590628	32.3729771	ANKRD1;HAS2
## 76	41.5687500	151.6544079	CDKN1A
## 77	41.5687500	151.6544079	ACER2
## 78	41.5687500	151.6544079	ANKRD1
## 79	39.1215686	140.5195246	NEFL
## 80	8.0799837	28.6816481	TRIML2;TRIM22
## 81	36.9462963	130.7362620	ABCA12
## 82	36.9462963	130.7362620	ACER2
## 83	36.9462963	130.7362620	ABCA12
## 84	3.7444444	13.2162571	BTC;ACER2;CDKN1A;HAS2
## 85	35.0000000	122.0800857	TSPOAP1
## 86	35.0000000	122.0800857	CDKN1A
## 87	35.0000000	122.0800857	HAS2
## 88	33.2483333	114.3729154	ACTA2
## 89	31.6634921	107.4717898	CDKN1A
## 90	31.6634921	107.4717898	ANKRD1
## 91	31.6634921	107.4717898	CDKN1A
## 92	30.2227273	101.2606815	ABCA12
## 93	30.2227273	101.2606815	HAS2
## 94	7.1038075	23.5741683	ANKRD1;HAS2
## 95	7.0666428	23.3847039	ABCA12;ANK1
## 96	28.9072464	95.6444885	HAS2
## 97	28.9072464	95.6444885	CYGB
## 98	28.9072464	95.6444885	TSPOAP1
## 99	28.9072464	95.6444885	SLC12A8
## 100	27.7013889	90.5445579	HAS2

## 101	27.7013889	90.5445579	ABCA12
## 102	6.8864507	22.4715650	TRIML2;TRIM22
## 103	26.5920000	85.8953058	LY6D
## 104	26.5920000	85.8953058	ACER2
## 105	25.5679487	81.6416334	BTC
## 106	25.5679487	81.6416334	CDKN1A
## 107	25.5679487	81.6416334	SLC12A8
## 108	25.5679487	81.6416334	BTC
## 109	24.6197531	77.7369305	ABCA12
## 110	24.6197531	77.7369305	ABCA12
## 111	24.6197531	77.7369305	CDKN1A
## 112	24.6197531	77.7369305	ANKRD1
## 113	24.6197531	77.7369305	ANKRD1
## 114	23.7392857	74.1415149	HSD11B1
## 115	22.9195402	70.8214034	GRHL3
## 116	6.1345138	18.7639201	TRIML2;TRIM22
## 117	22.1544444	67.7473325	TSPOAP1
## 118	22.1544444	67.7473325	GRHL3
## 119	22.1544444	67.7473325	SLC52A1
## 120	22.1544444	67.7473325	HAS2
## 121	22.1544444	67.7473325	ACER2
## 122	21.4387097	64.8939746	BTC
## 123	21.4387097	64.8939746	ANK1
## 124	21.4387097	64.8939746	ACER2
## 125	21.4387097	64.8939746	CDKN1A
## 126	21.4387097	64.8939746	ANKRD1
## 127	21.4387097	64.8939746	NEFL
## 128	20.7677083	62.2393037	ACER2
## 129	20.7677083	62.2393037	CDKN1A
## 130	20.7677083	62.2393037	ABCA12
## 131	20.7677083	62.2393037	HAS2
## 132	20.7677083	62.2393037	CDKN1A
## 133	20.7677083	62.2393037	ABCA12
## 134	20.1373737	59.7640795	GRHL3
## 135	20.1373737	59.7640795	ABCA12
## 136	20.1373737	59.7640795	BTC
## 137	20.1373737	59.7640795	ACER2
## 138	3.8330702	11.3548588	BTC;TRIML2;TRIM22
## 139	19.5441176	57.4514246	CDKN1A
## 140	18.9847619	55.2864763	CDKN1A
## 141	18.9847619	55.2864763	PCDHB14
## 142	18.9847619	55.2864763	BTC
## 143	5.5751837	16.1224024	TRIML2;TRIM22
## 144	18.4564815	53.2560973	BTC
## 145	18.4564815	53.2560973	CDKN1A
## 146	18.4564815	53.2560973	CDKN1A
## 147	17.4833333	49.5537202	CYGB
## 148	17.4833333	49.5537202	ABCA12
## 149	17.0341880	47.8620956	ACER2
## 150	17.0341880	47.8620956	BTC
## 151	17.0341880	47.8620956	SPATA18
## 152	16.6075000	46.2654734	HES2
## 153	16.2016260	44.7564124	BTC
## 154	16.2016260	44.7564124	HES2

## 155	16.2016260	44.7564124	SLC12A8
## 156	15.8150794	43.3282141	ANKRD1
## 157	15.4465116	41.9748326	CCL28
## 158	15.4465116	41.9748326	BTC
## 159	15.4465116	41.9748326	SLC12A8
## 160	15.0946970	40.6907986	CDKN1A
## 161	15.0946970	40.6907986	CDKN1A
## 162	14.7585185	39.4711525	CDKN1A
## 163	14.4369565	38.3113873	BTC
## 164	14.4369565	38.3113873	INPP5D
## 165	3.3548890	8.8991344	CDKN1A;INPP5D;TRIM22
## 166	3.3326252	8.7894505	BTC;ACER2;HAS2
## 167	14.1290780	37.2073986	CDKN1A
## 168	14.1290780	37.2073986	INPP5D
## 169	13.8340278	36.1554410	ANKRD1
## 170	13.8340278	36.1554410	CDKN1A
## 171	13.8340278	36.1554410	ABCA12
## 172	13.5510204	35.1520904	SLC12A8
## 173	13.5510204	35.1520904	BTC
## 174	13.0183007	33.2789232	ACER2
## 175	12.7673077	32.4035837	ANKRD1
## 176	12.7673077	32.4035837	ANKRD1
## 177	4.5216092	11.4564905	TRIML2;TRIM22
## 178	4.5063581	11.3922462	BTC;NEFL
## 179	12.5257862	31.5657568	CDKN1A
## 180	4.4612069	11.2026447	PCDHB14;TSPOAP1
## 181	12.2932099	30.7631972	ANKRD1
## 182	12.0690909	29.9938314	HAS2
## 183	12.0690909	29.9938314	CDKN1A
## 184	11.8529762	29.2557419	CDKN1A
## 185	11.8529762	29.2557419	HAS2
## 186	11.8529762	29.2557419	BTC
## 187	4.3450486	10.7190116	TRIML2;TRIM22
## 188	11.6444444	28.5471527	ACER2
## 189	11.4431034	27.8664170	CDKN1A
## 190	11.4431034	27.8664170	ABCA12
## 191	11.2485876	27.2120057	SPATA18
## 192	11.0605556	26.5824969	CDKN1A
## 193	10.8786885	25.9765672	HES2
## 194	10.8786885	25.9765672	ACER2
## 195	10.7026882	25.3929832	HES2
## 196	10.7026882	25.3929832	CDKN1A
## 197	10.5322751	24.8305941	CDKN1A
## 198	10.3671875	24.2883249	HSD11B1
## 199	10.3671875	24.2883249	ACER2
## 200	10.3671875	24.2883249	CDKN1A
## 201	10.3671875	24.2883249	SLC12A8
## 202	10.2071795	23.7651706	BTC
## 203	10.2071795	23.7651706	ACER2
## 204	10.0520202	23.2601903	BTC
## 205	9.9014925	22.7725027	TRIM22
## 206	9.7553922	22.3012810	PCDHB14
## 207	9.7553922	22.3012810	ANKRD1
## 208	9.7553922	22.3012810	CCL28

## 209	9.6135266	21.8457491	HAS2
## 210	9.6135266	21.8457491	CCL28
## 211	9.4757143	21.4051779	CDKN1A
## 212	9.4757143	21.4051779	CDKN1A
## 213	9.3417840	20.9788816	ANKRD1
## 214	9.3417840	20.9788816	ANKRD1
## 215	9.3417840	20.9788816	CDKN1A
## 216	9.2115741	20.5662147	ACER2
## 217	9.2115741	20.5662147	GRHL3
## 218	9.2115741	20.5662147	TSPOAP1
## 219	9.0849315	20.1665692	ACER2
## 220	9.0849315	20.1665692	CDKN1A
## 221	9.0849315	20.1665692	CDKN1A
## 222	8.9617117	19.7793717	CDKN1A
## 223	8.8417778	19.4040813	ANKRD1
## 224	8.8417778	19.4040813	SLC12A8
## 225	8.8417778	19.4040813	SLC52A1
## 226	8.7250000	19.0401872	CDKN1A
## 227	8.7250000	19.0401872	SLC12A8
## 228	8.3924051	18.0121848	ABCA12
## 229	8.2870833	17.6893023	ACER2
## 230	8.1843621	17.3756480	CDKN1A
## 231	8.0841463	17.0708543	GRHL3
## 232	7.9863454	16.7745722	LY6D
## 233	7.8908730	16.4864704	CDKN1A
## 234	7.7976471	16.2062343	CDKN1A
## 235	1.9014477	3.9220383	ACTA2;CDKN1A;ANKRD1;GRHL3;HES2;TRIM22
## 236	7.6176245	15.6681766	CDKN1A
## 237	7.5306818	15.4097996	NEFL
## 238	7.4456929	15.1581756	CDKN1A
## 239	3.3147505	6.7171554	TRIML2;TRIM22
## 240	7.3625926	14.9130587	GRHL3
## 241	7.2813187	14.6742148	CDKN1A
## 242	7.0478723	13.9931357	CDKN1A
## 243	6.9003472	13.5666117	HAS2
## 244	6.7588435	13.1603927	SLC52A1
## 245	6.6230000	12.7731469	BTC
## 246	6.5570957	12.5862534	CDKN1A
## 247	6.5570957	12.5862534	ACER2
## 248	6.5570957	12.5862534	PCDHB14
## 249	6.4291262	12.2252100	HSD11B1
## 250	6.4291262	12.2252100	ABCA12
## 251	6.3669872	12.0507914	CDKN1A
## 252	6.3060317	11.8802717	CDKN1A
## 253	6.1299383	11.3909187	ABCA12
## 254	6.0733945	11.2348307	CDKN1A
## 255	6.0178788	11.0820821	CDKN1A
## 256	5.9633634	10.9325738	GRHL3
## 257	5.9633634	10.9325738	INPP5D
## 258	5.8572271	10.6428999	ANKRD1
## 259	5.8572271	10.6428999	ACER2
## 260	5.8572271	10.6428999	CDKN1A
## 261	5.8055556	10.5025542	ANKRD1
## 262	5.8055556	10.5025542	ABCA12

## 263	5.6558405	10.0984702	CDKN1A
## 264	5.6076271	9.9691632	ACER2
## 265	5.5602241	9.8424256	ANKRD1
## 266	5.5602241	9.8424256	ANK1
## 267	5.5136111	9.7181864	TRIM22
## 268	5.3346774	9.2448853	CDKN1A
## 269	5.3346774	9.2448853	ANKRD1
## 270	5.2917333	9.1321613	CDKN1A
## 271	5.2917333	9.1321613	PCDHB14
## 272	5.2917333	9.1321613	CDKN1A
## 273	5.2917333	9.1321613	CDKN1A
## 274	5.2917333	9.1321613	INPP5D
## 275	5.1669271	8.8065071	ACTA2
## 276	5.1266150	8.7019499	CDKN1A
## 277	5.0869231	8.5993051	CDKN1A
## 278	5.0093434	8.3995604	BTC
## 279	4.8972840	8.1131261	ABCA12
## 280	4.7900966	7.8414988	SLC12A8
## 281	2.5642513	4.1896598	TRIML2;TRIM22
## 282	4.6874704	7.5836349	CDKN1A
## 283	4.6542254	7.5005721	SLC52A1
## 284	2.4579563	3.8636593	CDKN1A;ANKRD1
## 285	4.3172113	6.6719964	CDKN1A
## 286	4.2063694	6.4050316	CDKN1A
## 287	4.2063694	6.4050316	INPP5D
## 288	4.2063694	6.4050316	ACER2
## 289	4.1795359	6.3408307	ANKRD1
## 290	4.1268750	6.2153290	BTC
## 291	4.0503067	6.0340302	CDKN1A
## 292	3.9053254	5.6946575	PCDHB14
## 293	1.8812732	2.7409450	ACTA2;TRIML2;TRIM22
## 294	3.7921456	5.4333883	SPATA18
## 295	3.7486742	5.3339132	INPP5D
## 296	3.7061798	5.2371517	CDKN1A
## 297	3.6852886	5.1897568	ABCA12
## 298	3.5842391	4.9621623	INPP5D
## 299	3.5842391	4.9621623	ANK1
## 300	3.4155440	4.5884789	ACER2
## 301	3.2782753	4.2904242	HES2
## 302	3.1978964	4.1184979	BTC
## 303	3.1668269	4.0525698	CDKN1A
## 304	3.1213270	3.9565613	INPP5D
## 305	3.0483025	3.8038364	CDKN1A
## 306	3.0200306	3.7451661	ANKRD1
## 307	2.9922727	3.6878149	HAS2
## 308	2.7286307	3.1560128	BTC
## 309	2.7058985	3.1112934	PCDHB14
## 310	1.7920783	2.0402542	ACER2;ANKRD1
## 311	2.5267949	2.7656162	HAS2
## 312	2.4503731	2.6218447	HAS2
## 313	2.3022222	2.3498197	ANKRD1
## 314	2.2230508	2.2082223	CDKN1A
## 315	2.1928651	2.1549526	HAS2
## 316	2.1208198	2.0294556	ANKRD1

```

## 317 2.0338509 1.8811370 ANKRD1
## 318 1.9960366 1.8177639 ABCA12
## 319 1.9536318 1.7475240 ABCA12
## 320 1.8684762 1.6091808 NEFL
## 321 1.7754529 1.4623464 ABCA12
## 322 1.7656757 1.4471821 CDKN1A
## 323 1.7276014 1.3886286 CDKN1A
## 324 1.1953443 0.9513507 CDKN1A;ANKRD1;GRHL3;HES2
## 325 1.7046127 1.3536644 ACTA2
## 326 1.6021294 1.2014726 HAS2
## 327 1.5552904 1.1339815 ANK1
## 328 1.5182595 1.0815745 TRIM22
## 329 1.4591181 0.9996691 PCDHB14
## 330 1.3920057 0.9094873 TRIM22
## 331 1.3505198 0.8552629 ACTA2
## 332 1.2718301 0.7557402 ACTA2
## 333 1.0971415 0.6465097 ACTA2;GRHL3
## 334 1.1447788 0.6047943 CDKN1A
## 335 0.7005513 0.1891154 GRHL3
##
## $Reactome_2022
##                                         Term
## 1 Metabolism Of Steroid Hormones R-HSA-196071
## 2 Metabolism Of Lipids R-HSA-556833
## 3 TFAP2 (AP-2) Family Regulates Transcription Of Cell Cycle Factors R-HSA-8866911
## 4 Vitamin B2 (Riboflavin) Metabolism R-HSA-196843
## 5 Neurofascin Interactions R-HSA-447043
## 6 NrCAM Interactions R-HSA-447038
## 7 RUNX3 Regulates CDKN1A Transcription R-HSA-8941855
## 8 Metabolism R-HSA-1430728
## 9 PI3K/AKT Signaling In Cancer R-HSA-2219528
## 10 Inhibition Of Signaling By Overexpressed EGFR R-HSA-5638303
## 11 EGFR Interacts With Phospholipase C-gamma R-HSA-212718
## 12 CHL1 Interactions R-HSA-447041
## 13 PI3K Events In ERBB4 Signaling R-HSA-1250342
## 14 Glucocorticoid Biosynthesis R-HSA-194002
## 15 STAT5 Activation Downstream Of FLT3 ITD Mutants R-HSA-9702518
## 16 eNOS Activation R-HSA-203615
## 17 PECAM1 Interactions R-HSA-210990
## 18 GRB2 Events In EGFR Signaling R-HSA-179812
## 19 Pregnenolone Biosynthesis R-HSA-196108
## 20 SHC1 Events In EGFR Signaling R-HSA-180336
## 21 SHC1 Events In ERBB4 Signaling R-HSA-1250347
## 22 ERBB2 Activates PTK6 Signaling R-HSA-8847993
## 23 AKT Phosphorylates Targets In Cytosol R-HSA-198323
## 24 TP53 Regulates Transcription Of Genes Involved In G1 Cell Cycle Arrest R-HSA-6804116
## 25 GRB2 Events In ERBB2 Signaling R-HSA-1963640
## 26 Metabolism Of Nitric Oxide: NOS3 Activation And Regulation R-HSA-202131
## 27 ERBB2 Regulates Cell Motility R-HSA-6785631
## 28 Signaling By FLT3 ITD And TKD Mutants R-HSA-9703648
## 29 Metabolism Of Steroids R-HSA-8957322
## 30 PI3K Events In ERBB2 Signaling R-HSA-1963642
## 31 Hyaluronan Metabolism R-HSA-2142845
## 32 FOXO-mediated Transcription Of Cell Cycle Genes R-HSA-9617828

```

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## 33 Aberrant Regulation Of Mitotic G1/S Transition In Cancer Due To RB1 Defects R-HSA-9659787
## 34 Acetylcholine Neurotransmitter Release Cycle R-HSA-264642
## 35 Formation Of Senescence-Associated Heterochromatin Foci (SAHF) R-HSA-2559584
## 36 GAB1 Signalosome R-HSA-180292
## 37 ABC Transporters In Lipid Homeostasis R-HSA-1369062
## 38 Serotonin Neurotransmitter Release Cycle R-HSA-181429
## 39 Signaling By FLT3 Fusion Proteins R-HSA-9703465
## 40 Norepinephrine Neurotransmitter Release Cycle R-HSA-181430
## 41 Ras Activation Upon Ca2+ Influx Thru NMDA Receptor R-HSA-442982
## 42 NOTCH4 Intracellular Domain Regulates Transcription R-HSA-9013695
## 43 SHC1 Events In ERBB2 Signaling R-HSA-1250196
## 44 Signaling By ERBB2 TMD/JMD Mutants R-HSA-9665686
## 45 Unblocking Of NMDA Receptors, Glutamate Binding And Activation R-HSA-438066
## 46 Negative Regulation Of NMDA Receptor-Mediated Neuronal Transmission R-HSA-9617324
## 47 Long-term Potentiation R-HSA-9620244
## 48 Glutamate Neurotransmitter Release Cycle R-HSA-210500
## 49 Dopamine Neurotransmitter Release Cycle R-HSA-212676
## 50 Signaling By EGFR In Cancer R-HSA-1643713
## 51 Signaling By ERBB2 KD Mutants R-HSA-9664565
## 52 Estrogen-dependent Nuclear Events Downstream Of ESR-membrane Signaling R-HSA-9634638
## 53 Assembly And Cell Surface Presentation Of NMDA Receptors R-HSA-9609736
## 54 Signaling By ERBB2 In Cancer R-HSA-1227990
## 55 Synthesis Of IP3 And IP4 In Cytosol R-HSA-1855204
## 56 Constitutive Signaling By AKT1 E17K In Cancer R-HSA-5674400
## 57 FLT3 Signaling In Disease R-HSA-9682385
## 58 CREB1 Phosphorylation Thru NMDA Receptor-Mediated Activation Of RAS Signaling R-HSA-442742
## 59 Interleukin Receptor SHC Signaling R-HSA-912526
## 60 Downregulation Of ERBB2 Signaling R-HSA-8863795
## 61 Interaction Between L1 And Ankyrins R-HSA-445095
## 62 EGFR Downregulation R-HSA-182971
## 63 Nuclear Signaling By ERBB4 R-HSA-1251985
## 64 Aberrant Regulation Of Mitotic Cell Cycle Due To RB1 Defects R-HSA-9687139
## 65 Transcriptional Regulation By AP-2 (TFAP2) Family Of Transcription Factors R-HSA-8864260
## 66 Transmission Across Chemical Synapses R-HSA-112315
## 67 Diseases Of Mitotic Cell Cycle R-HSA-9675126
## 68 PIP3 Activates AKT Signaling R-HSA-1257604
## 69 Smooth Muscle Contraction R-HSA-445355
## 70 RAF/MAP Kinase Cascade R-HSA-5673001
## 71 Sphingolipid De Novo Biosynthesis R-HSA-1660661
## 72 Interleukin-2 Family Signaling R-HSA-451927
## 73 Interleukin-3, Interleukin-5 And GM-CSF Signaling R-HSA-512988
## 74 MAPK1/MAPK3 Signaling R-HSA-5684996
## 75 Cyclin D Associated Events In G1 R-HSA-69231
## 76 Inositol Phosphate Metabolism R-HSA-1483249
## 77 TP53 Regulates Transcription Of Cell Cycle Genes R-HSA-6791312
## 78 Signaling By EGFR R-HSA-177929
## 79 Signaling By ERBB2 R-HSA-1227986
## 80 Neurotransmitter Release Cycle R-HSA-112310
## 81 Synthesis Of PIPs At Plasma Membrane R-HSA-1660499
## 82 Signaling By Non-Receptor Tyrosine Kinases R-HSA-9006927
## 83 Intracellular Signaling By Second Messengers R-HSA-9006925
## 84 Chemokine Receptors Bind Chemokines R-HSA-380108
## 85 Signaling By ERBB4 R-HSA-1236394
## 86 MAPK Family Signaling Cascades R-HSA-5683057

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## 87 SCF(Skp2)-mediated Degradation Of P27/P21 R-HSA-187577
## 88 Role Of GTSE1 In G2/M Progression After G2 Checkpoint R-HSA-8852276
## 89 Transcriptional Regulation Of Granulopoiesis R-HSA-9616222
## 90 DNA Damage/Telomere Stress Induced Senescence R-HSA-2559586
## 91 Post NMDA Receptor Activation Events R-HSA-438064
## 92 Cytokine Signaling In Immune System R-HSA-1280215
## 93 p53-Dependent G1 DNA Damage Response R-HSA-69563
## 94 FOXO-mediated Transcription R-HSA-9614085
## 95 G1/S DNA Damage Checkpoints R-HSA-69615
## 96 Extra-nuclear Estrogen Signaling R-HSA-9009391
## 97 Activation Of NMDA Receptors And Postsynaptic Events R-HSA-442755
## 98 ABC Transporter Disorders R-HSA-5619084
## 99 Constitutive Signaling By Aberrant PI3K In Cancer R-HSA-2219530
## 100 COPI-mediated Anterograde Transport R-HSA-6807878
## 101 Senescence-Associated Secretory Phenotype (SASP) R-HSA-2559582
## 102 Signaling By NOTCH4 R-HSA-9013694
## 103 PI Metabolism R-HSA-1483255
## 104 Cyclin E Associated Events During G1/S Transition R-HSA-69202
## 105 Neuronal System R-HSA-112316
## 106 Cyclin A:Cdk2-associated Events At S Phase Entry R-HSA-69656
## 107 Sphingolipid Metabolism R-HSA-428157
## 108 Interferon Gamma Signaling R-HSA-877300
## 109 Post-translational Modification: Synthesis Of GPI-anchored Proteins R-HSA-163125
## 110 Downstream TCR Signaling R-HSA-202424
## 111 Transcriptional Regulation By RUNX3 R-HSA-8878159
## 112 Diseases Of Signal Transduction By Growth Factor Receptors And Second Messengers R-HSA-5663202
## 113 L1CAM Interactions R-HSA-373760
## 114 ABC-family Proteins Mediated Transport R-HSA-382556
## 115 Cargo Recognition For Clathrin-Mediated Endocytosis R-HSA-8856825
## 116 PI5P, PP2A And IER3 Regulate PI3K/AKT Signaling R-HSA-6811558
## 117 Interleukin-4 And Interleukin-13 Signaling R-HSA-6785807
## 118 Signaling By Interleukins R-HSA-449147
## 119 Negative Regulation Of PI3K/AKT Network R-HSA-199418
## 120 PPARA Activates Gene Expression R-HSA-1989781
## 121 TCR Signaling R-HSA-202403
## 122 Regulation Of Lipid Metabolism By PPARalpha R-HSA-400206
## 123 Transcriptional Regulation By RUNX2 R-HSA-8878166
## 124 Glycosaminoglycan Metabolism R-HSA-1630316
## 125 Metabolism Of Water-Soluble Vitamins And Cofactors R-HSA-196849
## 126 G1/S Transition R-HSA-69206
## 127 ER To Golgi Anterograde Transport R-HSA-199977
## 128 Cell Surface Interactions At Vascular Wall R-HSA-202733
## 129 Clathrin-mediated Endocytosis R-HSA-8856828
## 130 Mitotic G1 Phase And G1/S Transition R-HSA-453279
## 131 S Phase R-HSA-69242
## 132 Transport To Golgi And Subsequent Modification R-HSA-948021
## 133 Cellular Senescence R-HSA-2559583
## 134 Membrane Trafficking R-HSA-199991
## 135 Disorders Of Transmembrane Transporters R-HSA-5619115
## 136 G2/M Transition R-HSA-69275
## 137 Neurotransmitter Receptors And Postsynaptic Signal Transmission R-HSA-112314
## 138 Mitotic G2-G2/M Phases R-HSA-453274
## 139 Metabolism Of Vitamins And Cofactors R-HSA-196854
## 140 ESR-mediated Signaling R-HSA-8939211

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## 141 Vesicle-mediated Transport R-HSA-5653656
## 142 Peptide Ligand-Binding Receptors R-HSA-375276
## 143 Muscle Contraction R-HSA-397014
## 144 Interferon Signaling R-HSA-913531
## 145 Signaling By NOTCH R-HSA-157118
## 146 Phospholipid Metabolism R-HSA-1483257
## 147 Transport Of Small Molecules R-HSA-382551
## 148 Signal Transduction R-HSA-162582
## 149 Signaling By Nuclear Receptors R-HSA-9006931
## 150 Cell Cycle Checkpoints R-HSA-69620
## 151 Asparagine N-linked Glycosylation R-HSA-446203
## 152 Metabolism Of Carbohydrates R-HSA-71387
## 153 G Alpha (I) Signaling Events R-HSA-418594
## 154 Class A/1 (Rhodopsin-like Receptors) R-HSA-373076
## 155 Transcriptional Regulation By TP53 R-HSA-3700989
## 156 Developmental Biology R-HSA-1266738
## 157 Disease R-HSA-1643685
## 158 GPCR Ligand Binding R-HSA-500792
## 159 Signaling By Receptor Tyrosine Kinases R-HSA-9006934
## 160 Axon Guidance R-HSA-422475
## 161 Cell Cycle, Mitotic R-HSA-69278
## 162 Nervous System Development R-HSA-9675108
## 163 Immune System R-HSA-168256
## 164 Hemostasis R-HSA-109582
## 165 GPCR Downstream Signaling R-HSA-388396
## 166 Post-translational Protein Modification R-HSA-597592
## 167 Cell Cycle R-HSA-1640170
## 168 Signaling By GPCR R-HSA-372790
## 169 Cellular Responses To Stress R-HSA-2262752
## 170 Adaptive Immune System R-HSA-1280218
## 171 Cellular Responses To Stimuli R-HSA-8953897
## 172 Metabolism Of Proteins R-HSA-392499
## 173 Generic Transcription Pathway R-HSA-212436
## 174 RNA Polymerase II Transcription R-HSA-73857
## 175 Gene Expression (Transcription) R-HSA-74160

##      Overlap      P.value Adjusted.P.value Old.P.value Old.Adjusted.P.value
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## 2       5/732 0.004993782      0.1205173        0           0
## 3        1/5 0.007726694      0.1205173        0           0
## 4        1/7 0.010801183      0.1205173        0           0
## 5        1/7 0.010801183      0.1205173        0           0
## 6        1/7 0.010801183      0.1205173        0           0
## 7        1/7 0.010801183      0.1205173        0           0
## 8      8/2049 0.010973438      0.1205173        0           0
## 9       2/105 0.011496182      0.1205173        0           0
## 10      1/8 0.012334969      0.1205173        0           0
## 11      1/9 0.013866454      0.1205173        0           0
## 12      1/9 0.013866454      0.1205173        0           0
## 13      1/10 0.015395642     0.1205173        0           0
## 14      1/10 0.015395642     0.1205173        0           0
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## 16      1/11 0.016922535     0.1205173        0           0
## 17      1/12 0.018447136     0.1205173        0           0
## 18      1/12 0.018447136     0.1205173        0           0

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## 20	1/13	0.019969450	0.1205173	0	0
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## 23	1/14	0.021489479	0.1205173	0	0
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## 25	1/15	0.023007227	0.1205173	0	0
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## 37	1/18	0.027546815	0.1205173	0	0
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## 56	1/26	0.039552820	0.1217390	0	0
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## 61	1/29	0.044017987	0.1262811	0	0
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## 72	1/44	0.066044191	0.1583251	0	0

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## 107	1/89	0.129216130	0.2093780	0	0
## 108	1/89	0.129216130	0.2093780	0	0
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## 112	2/424	0.139697619	0.2182775	0	0
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## 115	1/104	0.149339174	0.2272553	0	0
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## 117	1/107	0.153309425	0.2293090	0	0
## 118	2/453	0.155249338	0.2302427	0	0
## 119	1/113	0.161196199	0.2370532	0	0
## 120	1/116	0.165112879	0.2387996	0	0
## 121	1/116	0.165112879	0.2387996	0	0
## 122	1/118	0.167714160	0.2403535	0	0
## 123	1/119	0.169011858	0.2403535	0	0
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## 125	1/122	0.172893213	0.2420505	0	0
## 126	1/129	0.181881603	0.2526133	0	0

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## 127 1/133 0.186975308      0.2573647      0      0
## 128 1/134 0.188243931      0.2573647      0      0
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## 130 1/147 0.204562707      0.2753729      0      0
## 131 1/161 0.221781669      0.2962732      0      0
## 132 1/164 0.225424232      0.2982036      0      0
## 133 1/165 0.226634749      0.2982036      0      0
## 134 2/599 0.237479920      0.3101417      0      0
## 135 1/176 0.239830185      0.3108910      0      0
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## 138 1/184 0.249289738      0.3161283      0      0
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## 141 2/637 0.259465486      0.3220316      0      0
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## 144 1/200 0.267868282      0.3255344      0      0
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## 146 1/208 0.276989913      0.3320085      0      0
## 147 2/706 0.299489620      0.3565353      0      0
## 148 5/2465 0.333475968      0.3918770      0      0
## 149 1/260 0.333655293      0.3918770      0      0
## 150 1/271 0.345079004      0.4025922      0      0
## 151 1/282 0.356313081      0.4129456      0      0
## 152 1/285 0.359344410      0.4137189      0      0
## 153 1/312 0.386011852      0.4415168      0      0
## 154 1/327 0.400359571      0.4549541      0      0
## 155 1/354 0.425371980      0.4802587      0      0
## 156 2/1073 0.501140924      0.5621773      0      0
## 157 3/1736 0.511945615      0.5677686      0      0
## 158 1/458 0.512613903      0.5677686      0      0
## 159 1/496 0.541173909      0.5956317      0      0
## 160 1/519 0.557666114      0.6092121      0      0
## 161 1/523 0.560475142      0.6092121      0      0
## 162 1/545 0.575618890      0.6218105      0      0
## 163 3/1943 0.591151026      0.6346713      0      0
## 164 1/576 0.596103597      0.6360862      0      0
## 165 1/619 0.622940518      0.6606945      0      0
## 166 2/1383 0.641982286      0.6743293      0      0
## 167 1/654 0.643502788      0.6743293      0      0
## 168 1/689 0.662977976      0.6906021      0      0
## 169 1/722 0.680394659      0.7035997      0      0
## 170 1/733 0.686004200      0.7035997      0      0
## 171 1/736 0.687517463      0.7035997      0      0
## 172 2/1890 0.805052627      0.8190942      0      0
## 173 1/1190 0.850896837      0.8607338      0      0
## 174 1/1312 0.878153597      0.8832005      0      0
## 175 1/1449 0.903021843      0.9030218      0      0
## Odds.Ratio Combined.Score
## 1    41.6635319   275.60744575
## 2    5.0899376   26.97443891
## 3   166.3750000  809.09396251
## 4   110.9055556  502.19140561

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## 5 110.905556 502.19140561
## 6 110.905556 502.19140561
## 7 110.905556 502.19140561
## 8 3.0552798 13.78627070
## 9 13.3016404 59.40167203
## 10 95.0571429 417.80627965
## 11 83.1708333 355.82833874
## 12 83.1708333 355.82833874
## 13 73.9259259 308.54247928
## 14 73.9259259 308.54247928
## 15 73.9259259 308.54247928
## 16 66.5300000 271.38313036
## 17 60.4787879 241.48249385
## 18 60.4787879 241.48249385
## 19 60.4787879 241.48249385
## 20 55.4361111 216.95208467
## 21 55.4361111 216.95208467
## 22 55.4361111 216.95208467
## 23 51.1692308 196.49966013
## 24 51.1692308 196.49966013
## 25 47.5119048 179.21238137
## 26 47.5119048 179.21238137
## 27 47.5119048 179.21238137
## 28 47.5119048 179.21238137
## 29 9.0513816 33.99419573
## 30 44.3422222 164.42788585
## 31 44.3422222 164.42788585
## 32 41.5687500 151.65440790
## 33 41.5687500 151.65440790
## 34 41.5687500 151.65440790
## 35 41.5687500 151.65440790
## 36 41.5687500 151.65440790
## 37 39.1215686 140.51952455
## 38 39.1215686 140.51952455
## 39 39.1215686 140.51952455
## 40 39.1215686 140.51952455
## 41 36.9462963 130.73626197
## 42 35.0000000 122.08008572
## 43 33.2483333 114.37291540
## 44 33.2483333 114.37291540
## 45 33.2483333 114.37291540
## 46 33.2483333 114.37291540
## 47 30.2227273 101.26068147
## 48 30.2227273 101.26068147
## 49 30.2227273 101.26068147
## 50 28.9072464 95.64448851
## 51 28.9072464 95.64448851
## 52 28.9072464 95.64448851
## 53 27.7013889 90.54455793
## 54 27.7013889 90.54455793
## 55 26.5920000 85.89530575
## 56 26.5920000 85.89530575
## 57 25.5679487 81.64163339
## 58 25.5679487 81.64163339

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## 59 25.5679487 81.64163339
## 60 23.7392857 74.14151495
## 61 23.7392857 74.14151495
## 62 22.1544444 67.74733247
## 63 21.4387097 64.89397456
## 64 18.9847619 55.28647630
## 65 18.9847619 55.28647630
## 66 5.5751837 16.12240244
## 67 17.9567568 51.34863519
## 68 5.1083744 14.00188582
## 69 15.8150794 43.32821406
## 70 5.0506345 13.74527411
## 71 15.4465116 41.97483259
## 72 15.4465116 41.97483259
## 73 15.4465116 41.97483259
## 74 4.9389342 13.25254148
## 75 14.4369565 38.31138732
## 76 14.1290780 37.20739859
## 77 13.8340278 36.15544101
## 78 13.8340278 36.15544101
## 79 13.8340278 36.15544101
## 80 13.5510204 35.15209039
## 81 13.2793333 34.19421038
## 82 13.0183007 33.27892316
## 83 4.4612069 11.20264468
## 84 12.0690909 29.99383143
## 85 11.8529762 29.25574188
## 86 4.2891750 10.48853940
## 87 11.4431034 27.86641704
## 88 11.4431034 27.86641704
## 89 11.4431034 27.86641704
## 90 11.0605556 26.58249692
## 91 11.0605556 26.58249692
## 92 2.9537094 6.99176343
## 93 10.3671875 24.28832489
## 94 10.3671875 24.28832489
## 95 10.0520202 23.26019033
## 96 9.2115741 20.56621472
## 97 9.0849315 20.16656917
## 98 8.7250000 19.04018715
## 99 8.6112554 18.68720662
## 100 8.3924051 18.01218477
## 101 8.2870833 17.68930230
## 102 8.2870833 17.68930230
## 103 8.1843621 17.37564803
## 104 8.1843621 17.37564803
## 105 3.5174210 7.46011886
## 106 7.9863454 16.77457217
## 107 7.5306818 15.40979963
## 108 7.5306818 15.40979963
## 109 7.2813187 14.67421476
## 110 7.1240143 14.21446169
## 111 7.0478723 13.99313569
## 112 3.1944762 6.28760787

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## 113 6.7588435 13.16039271
## 114 6.5570957 12.58625341
## 115 6.4291262 12.22520996
## 116 6.3060317 11.88027171
## 117 6.2462264 11.71352976
## 118 2.9846319 5.55954186
## 119 5.9098214 10.78621029
## 120 5.7547826 10.36508815
## 121 5.7547826 10.36508815
## 122 5.6558405 10.09847020
## 123 5.6076271 9.96916324
## 124 5.5602241 9.84242557
## 125 5.4677686 9.59637755
## 126 5.1669271 8.80650709
## 127 5.0093434 8.39956044
## 128 4.9714286 8.30236850
## 129 4.6874704 7.58363491
## 130 4.5257991 7.18190329
## 131 4.1268750 6.21532901
## 132 4.0503067 6.03403025
## 133 4.0254065 5.97537618
## 134 2.2378559 3.21730330
## 135 3.7702857 5.38330507
## 136 3.6441989 5.09687775
## 137 3.6441989 5.09687775
## 138 3.6040073 5.00646871
## 139 3.5646847 4.91844011
## 140 3.5262032 4.83270652
## 141 2.0998099 2.83291991
## 142 3.3801709 4.51114607
## 143 3.3801709 4.51114607
## 144 3.3115578 4.36218230
## 145 3.2618812 4.25519958
## 146 3.1822866 4.08533744
## 147 1.8872453 2.27540545
## 148 1.3687461 1.50313571
## 149 2.5366795 2.78437837
## 150 2.4319753 2.58757769
## 151 2.3354686 2.41007626
## 152 2.3104460 2.36468140
## 153 2.1069668 2.00559471
## 154 2.0084867 1.83855308
## 155 1.8523135 1.58334137
## 156 1.2169098 0.84072392
## 157 1.1274421 0.75486406
## 158 1.4231947 0.95102476
## 159 1.3113805 0.80520675
## 160 1.2516731 0.73097065
## 161 1.2418263 0.71898066
## 162 1.1902574 0.65739043
## 163 0.9957106 0.52342889
## 164 1.1242899 0.58164102
## 165 1.0437433 0.49400811
## 166 0.9282629 0.41140106

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## 167 0.9860133 0.43466317
## 168 0.9341570 0.38395114
## 169 0.8898752 0.34267515
## 170 0.8760018 0.33014015
## 171 0.8722902 0.32681929
## 172 0.6604690 0.14322114
## 173 0.5264929 0.08500984
## 174 0.4743961 0.06164007
## 175 0.4263582 0.04349218

##                                     Genes
## 1                               HSD11B1;TSPOAP1
## 2                               HSD11B1;ACER2;INPP5D;ANKRD1;TSPOAP1
## 3                               CDKN1A
## 4                               SLC52A1
## 5                               ANK1
## 6                               ANK1
## 7                               CDKN1A
## 8   HSD11B1;ACER2;INPP5D;ANKRD1;HAS2;SLC52A1;TSPOAP1;CYGB
## 9                               BTC;CDKN1A
## 10                             BTC
## 11                             BTC
## 12                             ANK1
## 13                             BTC
## 14                             HSD11B1
## 15                             CDKN1A
## 16                             CYGB
## 17                             INPP5D
## 18                             BTC
## 19                             TSPOAP1
## 20                             BTC
## 21                             BTC
## 22                             BTC
## 23                             CDKN1A
## 24                             CDKN1A
## 25                             BTC
## 26                             CYGB
## 27                             BTC
## 28                             CDKN1A
## 29   HSD11B1;TSPOAP1
## 30                             BTC
## 31                             HAS2
## 32                             CDKN1A
## 33                             CDKN1A
## 34                             TSPOAP1
## 35                             CDKN1A
## 36                             BTC
## 37                             ABCA12
## 38                             TSPOAP1
## 39                             CDKN1A
## 40                             TSPOAP1
## 41                             NEFL
## 42                             ACTA2
## 43                             BTC
## 44                             BTC

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## 45 NEFL
## 46 NEFL
## 47 NEFL
## 48 TSPOAP1
## 49 TSPOAP1
## 50 BTC
## 51 BTC
## 52 BTC
## 53 NEFL
## 54 BTC
## 55 INPP5D
## 56 CDKN1A
## 57 CDKN1A
## 58 NEFL
## 59 INPP5D
## 60 BTC
## 61 ANK1
## 62 BTC
## 63 BTC
## 64 CDKN1A
## 65 CDKN1A
## 66 NEFL;TSPOAP1
## 67 CDKN1A
## 68 BTC;CDKN1A
## 69 ACTA2
## 70 BTC;NEFL
## 71 ACER2
## 72 INPP5D
## 73 INPP5D
## 74 BTC;NEFL
## 75 CDKN1A
## 76 INPP5D
## 77 CDKN1A
## 78 BTC
## 79 BTC
## 80 TSPOAP1
## 81 INPP5D
## 82 BTC
## 83 BTC;CDKN1A
## 84 CCL28
## 85 BTC
## 86 BTC;NEFL
## 87 CDKN1A
## 88 CDKN1A
## 89 CDKN1A
## 90 CDKN1A
## 91 NEFL
## 92 CDKN1A;INPP5D;TRIM22
## 93 CDKN1A
## 94 CDKN1A
## 95 CDKN1A
## 96 BTC
## 97 NEFL
## 98 ABCA12

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## 99          BTC
## 100         ANK1
## 101         CDKN1A
## 102         ACTA2
## 103         INPP5D
## 104         CDKN1A
## 105         NEFL;TSPOAP1
## 106         CDKN1A
## 107         ACER2
## 108         TRIM22
## 109         LY6D
## 110         INPP5D
## 111         CDKN1A
## 112         BTC;CDKN1A
## 113         ANK1
## 114         ABCA12
## 115         BTC
## 116         BTC
## 117         CDKN1A
## 118         CDKN1A;INPP5D
## 119         BTC
## 120         ANKRD1
## 121         INPP5D
## 122         ANKRD1
## 123         CDKN1A
## 124         HAS2
## 125         SLC52A1
## 126         CDKN1A
## 127         ANK1
## 128         INPP5D
## 129         BTC
## 130         CDKN1A
## 131         CDKN1A
## 132         ANK1
## 133         CDKN1A
## 134         BTC;ANK1
## 135         ABCA12
## 136         CDKN1A
## 137         NEFL
## 138         CDKN1A
## 139         SLC52A1
## 140         BTC
## 141         BTC;ANK1
## 142         CCL28
## 143         ACTA2
## 144         TRIM22
## 145         ACTA2
## 146         INPP5D
## 147         ABCA12;CYGB
## 148         ACTA2;BTC;CDKN1A;NEFL;CCL28
## 149         BTC
## 150         CDKN1A
## 151         ANK1
## 152         HAS2

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## 153                               CCL28
## 154                               CCL28
## 155                               CDKN1A
## 156                               CDKN1A;ANK1
## 157                               BTC;CDKN1A;ABCA12
## 158                               CCL28
## 159                               BTC
## 160                               ANK1
## 161                               CDKN1A
## 162                               ANK1
## 163                               CDKN1A;INPP5D;TRIM22
## 164                               INPP5D
## 165                               CCL28
## 166                               LY6D;ANK1
## 167                               CDKN1A
## 168                               CCL28
## 169                               CDKN1A
## 170                               INPP5D
## 171                               CDKN1A
## 172                               LY6D;ANK1
## 173                               CDKN1A
## 174                               CDKN1A
## 175                               CDKN1A
##
## $WikiPathways_2023_Human
## [1] Term          Overlap      P.value
## [4] Adjusted.P.value Old.P.value Old.Adjusted.P.value
## [7] Odds.Ratio   Combined.Score Genes
## <0 rows> (or 0-length row.names)

head(enrichr_results_4Gy_0Gy_up)

## $KEGG_2021_Human
##                                     Term Overlap      P.value
## 1           p53 signaling pathway    5/73 4.236304e-06
## 2 Cytokine-cytokine receptor interaction 5/295 2.894568e-03
## 3           Epstein-Barr virus infection 4/202 4.467309e-03
## 4           Proteoglycans in cancer    4/205 4.706045e-03
## 5           African trypanosomiasis    2/37 6.630562e-03
## 6           Bladder cancer            2/41 8.094901e-03
## 7           Sphingolipid metabolism    2/49 1.141455e-02
## 8 Fc epsilon RI signaling pathway    2/68 2.124288e-02
## 9           Melanoma                2/72 2.363575e-02
## 10          Human papillomavirus infection 4/331 2.379736e-02
## 11          Glioma                  2/75 2.549972e-02
## 12          Chronic myeloid leukemia    2/76 2.613399e-02
## 13          B cell receptor signaling pathway 2/81 2.940027e-02
## 14          Human cytomegalovirus infection 3/225 3.830873e-02
## 15          Prostate cancer            2/97 4.085850e-02
## 16          C-type lectin receptor signaling pathway 2/104 4.631998e-02
## 17          NF-kappa B signaling pathway    2/104 4.631998e-02
## 18          Other glycan degradation     1/18 5.778642e-02
## 19          Neurotrophin signaling pathway 2/119 5.885388e-02
## 20          Cell cycle                2/124 6.326553e-02

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## 21	Steroid biosynthesis	1/20	6.400049e-02
## 22	FoxO signaling pathway	2/131	6.962363e-02
## 23	MAPK signaling pathway	3/294	7.322830e-02
## 24	Biosynthesis of unsaturated fatty acids	1/27	8.543357e-02
## 25	Fatty acid elongation	1/27	8.543357e-02
## 26	Linoleic acid metabolism	1/29	9.146802e-02
## 27	Non-alcoholic fatty liver disease	2/155	9.287236e-02
## 28	Cellular senescence	2/156	9.388520e-02
## 29	Hepatitis C	2/157	9.490128e-02
## 30	Asthma	1/31	9.746325e-02
## 31	Pathways in cancer	4/531	9.821020e-02
## 32	Hepatitis B	2/162	1.000293e-01
## 33	JAK-STAT signaling pathway	2/162	1.000293e-01
## 34	PI3K-Akt signaling pathway	3/354	1.118030e-01
## 35	Thyroid cancer	1/37	1.152162e-01
## 36	Allograft rejection	1/38	1.181414e-01
## 37	Primary immunodeficiency	1/38	1.181414e-01
## 38	Graft-versus-host disease	1/42	1.297472e-01
## 39	Transcriptional misregulation in cancer	2/192	1.322746e-01
## 40	Type I diabetes mellitus	1/43	1.326251e-01
## 41	Fat digestion and absorption	1/43	1.326251e-01
## 42	Porphyrin and chlorophyll metabolism	1/43	1.326251e-01
## 43	Kaposi sarcoma-associated herpesvirus infection	2/193	1.333877e-01
## 44	Pathogenic Escherichia coli infection	2/197	1.378619e-01
## 45	ABC transporters	1/45	1.383527e-01
## 46	Viral carcinogenesis	2/203	1.446350e-01
## 47	Malaria	1/50	1.525094e-01
## 48	Autoimmune thyroid disease	1/53	1.608932e-01
## 49	Endometrial cancer	1/58	1.746850e-01
## 50	Mineral absorption	1/60	1.801390e-01
## 51	Steroid hormone biosynthesis	1/61	1.828527e-01
## 52	Arachidonic acid metabolism	1/61	1.828527e-01
## 53	Glycerolipid metabolism	1/61	1.828527e-01
## 54	Chemical carcinogenesis	2/239	1.865558e-01
## 55	Basal cell carcinoma	1/63	1.882536e-01
## 56	Inflammatory bowel disease	1/65	1.936193e-01
## 57	Long-term potentiation	1/67	1.989500e-01
## 58	Renal cell carcinoma	1/69	2.042461e-01
## 59	Pathways of neurodegeneration	3/475	2.067266e-01
## 60	Non-small cell lung cancer	1/72	2.121255e-01
## 61	Inositol phosphate metabolism	1/73	2.147349e-01
## 62	Metabolism of xenobiotics by cytochrome P450	1/76	2.225121e-01
## 63	Pancreatic cancer	1/76	2.225121e-01
## 64	RNA degradation	1/79	2.302134e-01
## 65	ErbB signaling pathway	1/85	2.453913e-01
## 66	Colorectal cancer	1/86	2.478921e-01
## 67	Small cell lung cancer	1/92	2.627266e-01
## 68	Th1 and Th2 cell differentiation	1/92	2.627266e-01
## 69	IL-17 signaling pathway	1/94	2.676071e-01
## 70	MicroRNAs in cancer	2/310	2.727642e-01
## 71	Fc gamma R-mediated phagocytosis	1/97	2.748683e-01
## 72	Phosphatidylinositol signaling system	1/97	2.748683e-01
## 73	Progesterone-mediated oocyte maturation	1/100	2.820585e-01
## 74	Chagas disease	1/102	2.868129e-01

## 75		Longevity regulating pathway	1/102	2.868129e-01		
## 76		Pancreatic secretion	1/102	2.868129e-01		
## 77		Protein digestion and absorption	1/103	2.891785e-01		
## 78	Parathyroid hormone synthesis, secretion and action		1/106	2.962290e-01		
## 79		Drug metabolism	1/108	3.008910e-01		
## 80		Insulin resistance	1/108	3.008910e-01		
## 81		HIF-1 signaling pathway	1/109	3.032106e-01		
## 82		TNF signaling pathway	1/112	3.101239e-01		
## 83		Sphingolipid signaling pathway	1/119	3.259935e-01		
## 84		Thyroid hormone signaling pathway	1/121	3.304612e-01		
## 85		Amyotrophic lateral sclerosis	2/364	3.385780e-01		
## 86		Osteoclast differentiation	1/127	3.436902e-01		
## 87		Lysosome	1/128	3.458699e-01		
## 88		Oocyte meiosis	1/129	3.480424e-01		
## 89		Relaxin signaling pathway	1/129	3.480424e-01		
## 90	Natural killer cell mediated cytotoxicity		1/131	3.523662e-01		
## 91		Vascular smooth muscle contraction	1/133	3.566617e-01		
## 92		Apelin signaling pathway	1/137	3.651687e-01		
## 93		Autophagy	1/137	3.651687e-01		
## 94		Yersinia infection	1/137	3.651687e-01		
## 95		Measles	1/139	3.693806e-01		
## 96		Ubiquitin mediated proteolysis	1/140	3.714762e-01		
## 97		Apoptosis	1/142	3.756469e-01		
## 98		Breast cancer	1/147	3.859546e-01		
## 99		Gastric cancer	1/149	3.900306e-01		
## 100		mTOR signaling pathway	1/154	4.001045e-01		
## 101		Oxytocin signaling pathway	1/154	4.001045e-01		
## 102		Cushing syndrome	1/155	4.020995e-01		
## 103		Necroptosis	1/159	4.100144e-01		
## 104		Hepatocellular carcinoma	1/168	4.274476e-01		
## 105		Influenza A	1/172	4.350319e-01		
## 106		Tuberculosis	1/180	4.499049e-01		
## 107	Human immunodeficiency virus 1 infection		1/212	5.056366e-01		
## 108		Lipid and atherosclerosis	1/215	5.105670e-01		
## 109	Human T-cell leukemia virus 1 infection		1/219	5.170656e-01		
## 110		Thermogenesis	1/232	5.376047e-01		
## 111		Ras signaling pathway	1/232	5.376047e-01		
## 112		Shigellosis	1/246	5.587619e-01		
## 113		Endocytosis	1/252	5.675348e-01		
## 114		Alzheimer disease	1/369	7.080260e-01		
## 115	Herpes simplex virus 1 infection		1/498	8.111770e-01		
	Adjusted.P.value	Old.P.value	Adjusted.P.value	Odds.Ratio	Combined.Score	
## 1	0.000487175	0	0	23.9464802	296.2615267	
## 2	0.135298799	0	0	5.5522894	32.4526844	
## 3	0.135298799	0	0	6.4307592	34.7966387	
## 4	0.135298799	0	0	6.3338148	33.9423269	
## 5	0.152502919	0	0	17.7669643	89.1202612	
## 6	0.155152274	0	0	15.9415064	76.7825987	
## 7	0.187524674	0	0	13.2227394	59.1435522	
## 8	0.250450712	0	0	9.4071970	36.2340151	
## 9	0.250450712	0	0	8.8678571	33.2100808	
## 10	0.250450712	0	0	3.8684029	14.4607889	
## 11	0.250450712	0	0	8.5021404	31.1951002	
## 12	0.250450712	0	0	8.3868243	30.5659374	

## 13	0.260079283	0	0	7.8540348	27.6992293
## 14	0.313248489	0	0	4.2282282	13.7928083
## 15	0.313248489	0	0	6.5259868	20.8677594
## 16	0.313341025	0	0	6.0759804	18.6665172
## 17	0.313341025	0	0	6.0759804	18.6665172
## 18	0.348586941	0	0	18.0244344	51.3876892
## 19	0.348586941	0	0	5.2930021	14.9934740
## 20	0.348586941	0	0	5.0747951	14.0085384
## 21	0.348586941	0	0	16.1255061	44.3268309
## 22	0.348586941	0	0	4.7977229	12.7842582
## 23	0.348586941	0	0	3.2143675	8.4029140
## 24	0.348586941	0	0	11.7798817	28.9787000
## 25	0.348586941	0	0	11.7798817	28.9787000
## 26	0.348586941	0	0	10.9373626	26.1596111
## 27	0.348586941	0	0	4.0402369	9.6017410
## 28	0.348586941	0	0	4.0137987	9.4953735
## 29	0.348586941	0	0	3.9877016	9.3907106
## 30	0.348586941	0	0	10.2071795	23.7651706
## 31	0.348586941	0	0	2.3758340	5.5134679
## 32	0.348586941	0	0	3.8621094	8.8917042
## 33	0.348586941	0	0	3.8621094	8.8917042
## 34	0.353568047	0	0	2.6567630	5.8210123
## 35	0.353568047	0	0	8.5034188	18.3754226
## 36	0.353568047	0	0	8.2731809	17.6704675
## 37	0.353568047	0	0	8.2731809	17.6704675
## 38	0.353568047	0	0	7.4645403	15.2438414
## 39	0.353568047	0	0	3.2473684	6.5690221
## 40	0.353568047	0	0	7.2864469	14.7202932
## 41	0.353568047	0	0	7.2864469	14.7202932
## 42	0.353568047	0	0	7.2864469	14.7202932
## 43	0.353568047	0	0	3.2302029	6.5072285
## 44	0.353568047	0	0	3.1633013	6.2680912
## 45	0.353568047	0	0	6.9545455	13.7557359
## 46	0.361587464	0	0	3.0679415	5.9319940
## 47	0.373161293	0	0	6.2433281	11.7407599
## 48	0.385473277	0	0	5.8822485	10.7469535
## 49	0.393621100	0	0	5.3649123	9.3605419
## 50	0.393621100	0	0	5.1825293	8.8829913
## 51	0.393621100	0	0	5.0958974	8.6583080
## 52	0.393621100	0	0	5.0958974	8.6583080
## 53	0.393621100	0	0	5.0958974	8.6583080
## 54	0.393621100	0	0	2.5971783	4.3607267
## 55	0.393621100	0	0	4.9310174	8.2346286
## 56	0.397610973	0	0	4.7764423	7.8422574
## 57	0.401390370	0	0	4.6312354	7.4780637
## 58	0.402941751	0	0	4.4945701	7.1393095
## 59	0.402941751	0	0	1.9634786	3.0951451
## 60	0.404828090	0	0	4.3040087	6.6736972
## 61	0.404828090	0	0	4.2440171	6.5287881
## 62	0.406172822	0	0	4.0736410	6.1217616
## 63	0.406172822	0	0	4.0736410	6.1217616
## 64	0.413664643	0	0	3.9163708	5.7521646
## 65	0.430484143	0	0	3.6355311	5.1075625
## 66	0.430484143	0	0	3.5925792	5.0107919

## 67	0.430484143	0	0	3.3546915	4.4840193
## 68	0.430484143	0	0	3.3546915	4.4840193
## 69	0.430484143	0	0	3.2822167	4.3267343
## 70	0.430484143	0	0	1.9912744	2.5869591
## 71	0.430484143	0	0	3.1791667	4.1057773
## 72	0.430484143	0	0	3.1791667	4.1057773
## 73	0.430484143	0	0	3.0823621	3.9011631
## 74	0.430484143	0	0	3.0210206	3.7730282
## 75	0.430484143	0	0	3.0210206	3.7730282
## 76	0.430484143	0	0	3.0210206	3.7730282
## 77	0.430484143	0	0	2.9912519	3.7112793
## 78	0.430484143	0	0	2.9053480	3.5347118
## 79	0.430484143	0	0	2.8507549	3.4237772
## 80	0.430484143	0	0	2.8507549	3.4237772
## 81	0.430484143	0	0	2.8242165	3.3702160
## 82	0.434929907	0	0	2.7474705	3.2166926
## 83	0.444997526	0	0	2.5835724	2.8958691
## 84	0.444997526	0	0	2.5402564	2.8127393
## 85	0.444997526	0	0	1.6895718	1.8298077
## 86	0.444997526	0	0	2.4185592	2.5830565
## 87	0.444997526	0	0	2.3993943	2.5474194
## 88	0.444997526	0	0	2.3805288	2.5124839
## 89	0.444997526	0	0	2.3805288	2.5124839
## 90	0.444997526	0	0	2.3436686	2.4446442
## 91	0.444997526	0	0	2.3079254	2.3793964
## 92	0.444997526	0	0	2.2395928	2.2561563
## 93	0.444997526	0	0	2.2395928	2.2561563
## 94	0.444997526	0	0	2.2395928	2.2561563
## 95	0.444997526	0	0	2.2069119	2.1979248
## 96	0.444997526	0	0	2.1909242	2.1696076
## 97	0.445354515	0	0	2.1596290	2.1145053
## 98	0.452905930	0	0	2.0851423	1.9851294
## 99	0.453065889	0	0	2.0567568	1.9364982
## 100	0.453347445	0	0	1.9890397	1.8220193
## 101	0.453347445	0	0	1.9890397	1.8220193
## 102	0.453347445	0	0	1.9760240	1.8002681
## 103	0.457783059	0	0	1.9256086	1.7168014
## 104	0.472658421	0	0	1.8210041	1.5477143
## 105	0.476463534	0	0	1.7780477	1.4799329
## 106	0.488104392	0	0	1.6978943	1.3561404
## 107	0.543441228	0	0	1.4380605	0.9806667
## 108	0.543659315	0	0	1.4176851	0.9530153
## 109	0.545527925	0	0	1.3913903	0.9177409
## 110	0.556977793	0	0	1.3122211	0.8144062
## 111	0.556977793	0	0	1.3122211	0.8144062
## 112	0.573728782	0	0	1.2363579	0.7195996
## 113	0.577579641	0	0	1.2064358	0.6833895
## 114	0.714236773	0	0	0.8179766	0.2824264
## 115	0.811176998	0	0	0.6016716	0.1259112
##		Genes			
## 1	CDKN1A;ZMAT3;SESN1;MDM2;FAS				
## 2	GDF15;IL13;FAS;INHA;EDA2R				
## 3	CDKN1A;BLNK;MDM2;FAS				
## 4	CDKN1A;MDM2;FAS;ANK1				

```

## 5          FAS;HBA1
## 6          CDKN1A;MDM2
## 7          ACER2;NEU4
## 8          INPP5D;IL13
## 9          CDKN1A;MDM2
## 10         CDKN1A;MDM2;FAS;HES2
## 11         CDKN1A;MDM2
## 12         CDKN1A;MDM2
## 13         INPP5D;BLNK
## 14         CDKN1A;MDM2;FAS
## 15         CDKN1A;MDM2
## 16         MDM2;CLEC4E
## 17         BLNK;EDA2R
## 18         NEU4
## 19         NTF4;RPS6KA2
## 20         CDKN1A;MDM2
## 21         CEL
## 22         CDKN1A;MDM2
## 23         NTF4;RPS6KA2;FAS
## 24         ELOVL4
## 25         ELOVL4
## 26         CYP2E1
## 27         FAS;CYP2E1
## 28         CDKN1A;MDM2
## 29         CDKN1A;FAS
## 30         IL13
## 31         CDKN1A;IL13;MDM2;FAS
## 32         CDKN1A;FAS
## 33         CDKN1A;IL13
## 34         NTF4;CDKN1A;MDM2
## 35         CDKN1A
## 36         FAS
## 37         BLNK
## 38         FAS
## 39         CDKN1A;MDM2
## 40         FAS
## 41         CEL
## 42         HEPH
## 43         CDKN1A;FAS
## 44         MYO1A;FAS
## 45         ABCA12
## 46         CDKN1A;MDM2
## 47         HBA1
## 48         FAS
## 49         CDKN1A
## 50         HEPH
## 51         CYP2E1
## 52         CYP2E1
## 53         CEL
## 54         RPS6KA2;CYP2E1
## 55         CDKN1A
## 56         IL13
## 57         RPS6KA2
## 58         CDKN1A

```

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## 59          NEFL;RAB39B;FAS
## 60          CDKN1A
## 61          INPP5D
## 62          CYP2E1
## 63          CDKN1A
## 64          BTG2
## 65          CDKN1A
## 66          CDKN1A
## 67          CDKN1A
## 68          IL13
## 69          IL13
## 70          CDKN1A;MDM2
## 71          INPP5D
## 72          INPP5D
## 73          RPS6KA2
## 74          FAS
## 75          SESN1
## 76          CEL
## 77          KCNE3
## 78          CDKN1A
## 79          CYP2E1
## 80          RPS6KA2
## 81          CDKN1A
## 82          FAS
## 83          ACER2
## 84          MDM2
## 85          NEFL;RAB39B
## 86          BLNK
## 87          AP3B2
## 88          RPS6KA2
## 89          ACTA2
## 90          FAS
## 91          ACTA2
## 92          ACTA2
## 93          RAB39B
## 94          RPS6KA2
## 95          FAS
## 96          MDM2
## 97          FAS
## 98          CDKN1A
## 99          CDKN1A
## 100         RPS6KA2
## 101         CDKN1A
## 102         CDKN1A
## 103         FAS
## 104         CDKN1A
## 105         FAS
## 106         CLEC4E
## 107         FAS
## 108         FAS
## 109         CDKN1A
## 110         RPS6KA2
## 111         NTF4
## 112         MDM2

```

```

## 113 MDM2
## 114 FAS
## 115 FAS
##
## $GO_Biological_Process_2021
##
## 1 DNA damage response, signal transduction by p53 class mediator
## 2 epidermis development
## 3 skin morphogenesis
## 4 delamination
## 5 oxygen transport
## 6 sphingolipid metabolic process
## 7 gas transport
## 8 DNA damage response, signal transduction by p53 class mediator resulting in cell cycle arrest
## 9 ceramide catabolic process
## 10 mitotic G1 DNA damage checkpoint signaling pathway
## 11 cellular response to amino acid starvation
## 12 response to amino acid starvation
## 13 modulation by symbiont of entry into host cell
## 14 negative regulation of cell cycle
## 15 negative regulation of phosphate metabolic process
## 16 positive regulation of autophagy
## 17 regulation of viral life cycle
## 18 positive regulation of transmembrane receptor protein serine/threonine kinase signaling pathway
## 19 amide transport
## 20 organic anion transport
## 21 negative regulation of developmental growth
## 22 regulation of trans-synaptic signaling
## 23 axonal transport
## 24 anterograde axonal transport
## 25 regulation of autophagy
## 26 regulation of viral entry into host cell
## 27 positive regulation of protein phosphorylation
## 28 positive regulation of pathway-restricted SMAD protein phosphorylation
## 29 cellular response to ionizing radiation
## 30 protein localization to organelles
## 31 regulation of cell population proliferation
## 32 ceramide metabolic process
## 33 positive regulation of NF-kappaB transcription factor activation
## 34 cellular response to starvation
## 35 organonitrogen compound biosynthetic process
## 36 membrane lipid biosynthetic process
## 37 regulation of pathway-restricted SMAD protein phosphorylation
## 38 negative regulation of B cell differentiation
## 39 ADP transport
## 40 glial cell-derived neurotrophic factor receptor signaling pathway
## 41 negative regulation of gonadotropin secretion
## 42 hemoglobin metabolic process
## 43 negative regulation of macrophage differentiation
## 44 cellular response to antibiotic
## 45 regulation of growth hormone receptor signaling pathway
## 46 regulation of cell cycle
## 47 cellular protein catabolic process
## 48 positive regulation of I-kappaB kinase/NF-kappaB signaling pathway

```

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## 49 regulation of cellular catabolic process
## 50 mitochondrial protein catabolic process
## 51 vesicle localization
## 52 monoterpenoid metabolic process
## 53 positive regulation of cell death
## 54 regulation of protein localization
## 55 negative regulation of axon regeneration
## 56 fatty acid elongation, monounsaturated fatty acid elongation
## 57 fatty acid elongation, polyunsaturated fatty acid elongation
## 58 fatty acid elongation, saturated fatty acid elongation
## 59 fatty acid elongation, unsaturated fatty acid elongation
## 60 flavin-containing compound metabolic process
## 61 ganglioside catabolic process
## 62 negative regulation of lymphocyte differentiation
## 63 hyaluronan biosynthetic process
## 64 riboflavin metabolic process
## 65 intermediate filament bundle assembly
## 66 cellular response to platelet-derived growth factor stimulus
## 67 lipid hydroxylase activity
## 68 T cell apoptotic process
## 69 terpenoid metabolic process
## 70 positive regulation of urine volume
## 71 regulation of potassium ion export across plasma membrane
## 72 fatty acid biosynthetic process
## 73 negative regulation of neuron apoptotic process
## 74 sphingolipid biosynthetic process
## 75 positive regulation of cysteine-type endopeptidase activity involved in apoptotic signaling pathway
## 76 benzene-containing compound metabolic process
## 77 negative regulation of neuron projection regeneration
## 78 negative regulation of potassium ion transmembrane transporter activity
## 79 cellular response to UV radiation
## 80 stress-induced premature senescence
## 81 regulation of intrinsic apoptotic signaling pathway by p53 class mediator
## 82 vascular associated smooth muscle contraction
## 83 cellular response to DNA damage stimulus
## 84 skin development
## 85 axon regeneration
## 86 regulation of complement-dependent cytotoxicity
## 87 intestinal cholesterol absorption
## 88 sterol catabolic process
## 89 cholesterol catabolic process
## 90 maintenance of apical/basal cell polarity
## 91 maintenance of epithelial cell apical/basal polarity
## 92 oligosaccharide catabolic process
## 93 one-carbon compound transport
## 94 postsynaptic membrane assembly
## 95 activation of cysteine-type endopeptidase activity involved in apoptotic process
## 96 lymphocyte differentiation
## 97 negative regulation of cell adhesion mediated by integrins
## 98 negative regulation of delayed rectifier potassium channel activity
## 99 regulation of urine volume
## 100 glycosphingolipid catabolic process
## 101 response to leucine starvation
## 102 cellular response to leucine starvation

```

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## 103 cellular response to leucine starvati
## 104 nerve growth factor signaling pathw
## 105 chloride ion homeostasi
## 106 neuron projection regenerati
## 107 presynaptic membrane assem
## 108 monovalent inorganic anion homeostas
## 109 ectoderm developmen
## 110 negative regulation of phosphorylati
## 111 negative regulation of multicellular organismal proc
## 112 alcohol catabolic process
## 113 regulation of stress-activated protein kinase signaling cascad
## 114 axonal transport of mitochondri
## 115 regulation of cysteine-type endopeptidase activity involved in apoptotic signaling pathw
## 116 negative regulation of potassium ion transmembrane transpor
## 117 intestinal lipid absorpti
## 118 cellular response to increased oxygen level
## 119 negative regulation of voltage-gated potassium channel activit
## 120 T cell homeostasi
## 121 vasoconstrictor acti
## 122 postsynapse assembly
## 123 presynaptic membrane organizati
## 124 regulation of I-kappaB kinase/NF-kappaB signal
## 125 ATP transpo
## 126 regulation of axon regenerati
## 127 cellular response to fluid shear str
## 128 phospholipid efflux
## 129 negative regulation of neuron de
## 130 regulation of neuron apoptotic proces
## 131 fatty acid elongat
## 132 antifungal innate immune respons
## 133 response to UV
## 134 positive regulation of lipid transpo
## 135 positive regulation of nuclear-transcribed mRNA poly(A) tail shorteni
## 136 sphingoid biosynthetic process
## 137 sphingosine biosynthetic process
## 138 mitochondrion transport along microtubu
## 139 very long-chain fatty acid biosynthetic process
## 140 regulation of cell de
## 141 negative regulation of DNA damage response, signal transduction by p53 class media
## 142 renal absorpti
## 143 smooth muscle contract
## 144 negative regulation of TORC1 signal
## 145 ceramide transpo
## 146 membrane repolarization during action potentia
## 147 ovarian follicle developmen
## 148 potassium ion export across plasma membran
## 149 positive regulation of DNA-binding transcription factor activit
## 150 anterograde synaptic vesicle transpo
## 151 C21-steroid hormone biosynthetic process
## 152 synaptic vesicle transport along microtubu
## 153 neurotrophin TRK receptor signaling pathw
## 154 regulation of macrophage differentiat
## 155 regulation of nuclear-transcribed mRNA poly(A) tail shorteni
## 156 modulation of chemical synaptic transmissi

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157 negative regulation of epithelial cell differentiation
158 retrograde axonal transport
159 sphingolipid catabolic process
160 neuron cell-cell adhesion
161 membrane repolarization
162 dendrite self-avoidance
163 protein-containing complex subunit organization
164 cytokine-mediated signaling pathway
165 purine ribonucleotide translocation
166 negative regulation of intrinsic apoptotic signaling pathway by p53 class mediator
167 cellular response to gamma radiation
168 negative regulation of vascular associated smooth muscle cell proliferation
169 diol biosynthetic process
170 cellular component assembly
171 adenine nucleotide translocation
172 regulation of B cell differentiation
173 regulation of ventricular cardiac muscle cell membrane repolarization
174 glycoprotein catabolic process
175 regulation of catabolic process
176 response to axon injury
177 regulation of delayed rectifier potassium channel activity
178 intermediate filament organization
179 negative regulation of signal transduction by p53 class mediator
180 regulation of multicellular organism growth
181 ventricular cardiac muscle cell action potential
182 presynapse assembly
183 negative regulation of response to external stimulus
184 positive regulation of cysteine-type endopeptidase activity involved in apoptotic process
185 epoxygenase P450 pathway
186 establishment of skin barrier
187 regulation of water loss via skin
188 carbohydrate derivative catabolic process
189 sphingosine metabolic process
190 long-term memory
191 postsynaptic membrane organization
192 vesicle transport along actin filaments
193 fatty acid metabolic process
194 ganglioside metabolic process
195 positive regulation of epithelial cell differentiation
196 granulocyte differentiation
197 cardiac epithelial to mesenchymal transition
198 neuromuscular synaptic transmission
199 regulation of phosphorylation
200 epithelial cell development
201 actin filament-based transport
202 extrinsic apoptotic signaling pathway in absence of ligand
203 hydrogen peroxide catabolic process
204 cellular response to estradiol stimulation
205 negative regulation of response to wounding
206 neuron apoptotic process
207 neurotrophin signaling pathway
208 negative regulation of B cell activation
209 exogenous drug catabolic process
210 female gonad development

```

## 211 negative regulation of cyclin-dependent protein kinase activi
## 212 regulation of cardiac muscle cell membrane repolarizati
## 213 cellular response to nerve growth factor stimul
## 214 positive regulation of cell population proliferati
## 215 positive regulation of cholesterol effi
## 216 hyaluronan metabolic proc
## 217 drug catabolic proc
## 218 protein localization to plasma membr
## 219 cellular response to cytokine stimul
## 220 extracellular matrix assem
## 221 C21-steroid hormone metabolic proc
## 222 response to gamma radiati
## 223 defense response to fung
## 224 regulation of monooxygenase activi
## 225 potassium ion homeostas
## 226 potassium ion transmembrane transpo
## 227 innate immune respons
## 228 protein localization to cell periph
## 229 enzyme linked receptor protein signaling path
## 230 positive regulation of cellular catabolic proc
## 231 cellular polysaccharide biosynthetic proc
## 232 regulation of epidermal cell differentiat
## 233 peripheral nervous system developm
## 234 chemical synaptic transmiss
## 235 cellular response to di
## 236 mononuclear cell differentiat
## 237 protein polyubiquitinat
## 238 negative regulation of cation channel activi
## 239 positive regulation of BMP signaling path
## 240 negative regulation of endothelial cell apoptotic proc
## 241 cellular lipid catabolic proc
## 242 positive regulation of mitotic cell cyc
## 243 cellular senescen
## 244 presynaptic endocytot
## 245 monocarboxylic acid catabolic proc
## 246 monovalent inorganic cation homeostas
## 247 positive regulation of fibroblast proliferat
## 248 regulation of DNA damage response, signal transduction by p53 class media
## 249 regulation of insulin secretion involved in cellular response to glucose stimul
## 250 negative regulation of interferon-gamma product
## 251 negative regulation of myeloid leukocyte differentiat
## 252 hydrogen peroxide metabolic proc
## 253 regulation of DNA biosynthetic proc
## 254 lipid catabolic proc
## 255 transition metal ion homeostas
## 256 long-chain fatty acid biosynthetic proc
## 257 primary neural tube formati
## 258 cardiac muscle cell action potential involved in contracti
## 259 positive regulation of leukocyte cell-cell adhesi
## 260 cellular nitrogen compound biosynthetic proc
## 261 negative regulation of response to DNA damage stimul
## 262 steroid hormone biosynthetic proc
## 263 tube clos
## 264 vitamin transpo

```

```

## 265 activation of phospholipase C activi
## 266 establishment or maintenance of epithelial cell apical/basal polar
## 267 negative regulation of cell-matrix adhesi
## 268 negative regulation of DNA biosynthetic proc
## 269 positive regulation of interleukin-10 product
## 270 metal ion exp
## 271 regulation of NMDA receptor activi
## 272 positive regulation of cholesterol transpo
## 273 regulation of cholesterol effi
## 274 signal transduction by p53 class media
## 275 negative regulation of smooth muscle cell proliferati
## 276 vasculogene
## 277 mitotic G2 DNA damage checkpoint signali
## 278 very long-chain fatty acid metabolic proc
## 279 regulation of MAPK cascad
## 280 positive regulation of intracellular signal transduct
## 281 negative regulation of extrinsic apoptotic signaling pathway via death domain recepto
## 282 B cell receptor signaling pathw
## 283 regulation of cell adhesion mediated by integrin
## 284 cellular response to amino acid stimul
## 285 neural tube clos
## 286 synaptic vesicle recycl
## 287 regulation of keratinocyte differentiat
## 288 protein destabilizat
## 289 negative regulation of cellular macromolecule biosynthetic proc
## 290 negative regulation of cell cycle G1/S phase transit
## 291 regulation of TORC1 signal
## 292 bicarbonate transpo
## 293 protein localization to cil
## 294 neuron projection developm
## 295 supramolecular fiber organizat
## 296 negative regulation of DNA metabolic proc
## 297 regulation of cell cycle G1/S phase transit
## 298 macrophage activat
## 299 membrane assem
## 300 transition metal ion transpo
## 301 negative regulation of epithelial cell apoptotic proc
## 302 negative regulation of G1/S transition of mitotic cell cycl
## 303 regulation of vascular associated smooth muscle cell proliferati
## 304 negative regulation of cellular proc
## 305 regulation of mitotic cell cycl
## 306 regulation of apoptotic signaling pathw
## 307 response to estradiol
## 308 negative regulation of TOR signal
## 309 synaptic vesicle endocytos
## 310 positive regulation of intracellular transpo
## 311 regulation of heart rate by cardiac conduct
## 312 vesicle cytoskeletal traffick
## 313 regulation of nitric-oxide synthase activi
## 314 negative regulation of cell-substrate adhesi
## 315 autophagy of mitochondri
## 316 antigen receptor-mediated signaling pathw
## 317 regulation of cell developm
## 318 carbohydrate catabolic proc

```

```

## 319                               keratinocyte differentiation
## 320           regulation of extrinsic apoptotic signaling pathway via death domain receptor
## 321           regulation of nervous system development
## 322           potassium ion import across plasma membrane
## 323           negative regulation of cell population proliferation
## 324           cellular response to glucose starvation
## 325           positive regulation of phospholipase C activation
## 326           lipid modification
## 327           cellular response to tumor necrosis factor
## 328           regulation of programmed cell death
## 329           regulation of endothelial cell apoptotic process
## 330           positive regulation of mRNA catabolic process
## 331           metal ion homeostasis
## 332           protein localization to membrane
## 333           action potential
## 334           cellular response to radiation
## 335           mitotic G2/M transition checkpoint
## 336           erythrocyte differentiation
## 337           regulation of fibroblast proliferation
## 338           regulation of macromolecule metabolic process
## 339           negative regulation of cold-induced thermogenesis
## 340           glycosphingolipid metabolic process
## 341           polyol metabolic process
## 342           negative regulation of mitotic cell cycle
## 343           inositol phosphate metabolic process
## 344           regulation of interleukin-10 production
## 345           regulation of protein metabolic process
## 346           transmembrane receptor protein tyrosine kinase signaling pathway
## 347           negative regulation of cell projection organization
## 348           regulation of stress-activated MAPK cascade
## 349           response to hydrogen peroxide
## 350           regulation of cellular localization
## 351           cellular response to mechanical stimulus
## 352           positive regulation of reactive oxygen species metabolic process
## 353           oligosaccharide metabolic process
## 354           positive regulation of cellular process
## 355           iron ion transport
## 356           chloride transmembrane transport
## 357           protein modification by small protein conjugation
## 358           cholesterol transport
## 359           glycolipid metabolic process
## 360           signal transduction in response to DNA damage
## 361           myeloid cell differentiation
## 362           plasma membrane bounded cell projection morphogenesis
## 363           epidermal cell differentiation
## 364           positive regulation of macroautophagy
## 365           cellular macromolecule catabolic process
## 366           regulation of cyclin-dependent protein kinase activation
## 367           glycoprotein metabolic process
## 368           blood vessel morphogenesis
## 369           negative regulation of metabolic process
## 370           sensory organ development
## 371           regulation of reactive oxygen species metabolic process
## 372           arachidonic acid metabolic process

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```

## 373 renal system development
## 374 cellular response to peptide
## 375 negative regulation of neuron projection development
## 376 cellular iron ion homeostasis
## 377 regulation of neurotransmitter receptor activity
## 378 apoptotic process
## 379 positive regulation of apoptotic signaling pathway
## 380 response to reactive oxygen species
## 381 mitotic DNA damage checkpoint signaling
## 382 phospholipid transposition
## 383 homophilic cell adhesion via plasma membrane adhesion molecules
## 384 Notch signaling pathway
## 385 B cell differentiation
## 386 regulation of DNA-templated transcription, initiation
## 387 iron ion homeostasis
## 388 pattern recognition receptor signaling pathway
## 389 response to retinoic acid
## 390 regulation of neurogenesis
## 391 amyloid fibril formation
## 392 anterior/posterior pattern specification
## 393 cell cycle G1/S phase transition
## 394 monocarboxylic acid biosynthetic process
## 395 regulation of transcription initiation from RNA polymerase II promoter
## 396 negative regulation of intrinsic apoptotic signaling pathway
## 397 regulation of extrinsic apoptotic signaling pathway
## 398 protein catabolic process
## 399 anterograde trans-synaptic signaling
## 400 BMP signaling pathway
## 401 regulation of cell-matrix adhesion
## 402 inorganic anion transmembrane transport
## 403 protein autoubiquitination
## 404 positive regulation of cell cycle
## 405 anion transmembrane transport
## 406 interferon-gamma-mediated signaling pathway
## 407 cellular response to decreased oxygen levels
## 408 fatty acid catabolic process
## 409 kidney development
## 410 cellular response to BMP stimulus
## 411 regulation of G1/S transition of mitotic cell cycle
## 412 myeloid leukocyte differentiation
## 413 extrinsic apoptotic signaling pathway
## 414 response to ionizing radiation
## 415 cell junction organization
## 416 negative regulation of cell adhesion
## 417 regulation of actin filament-based processes
## 418 positive regulation of JNK cascade
## 419 neurotransmitter transport
## 420 negative regulation of apoptotic process
## 421 proteolysis involved in cellular protein catabolic process
## 422 negative regulation of protein binding
## 423 protein-containing complex assembly
## 424 establishment of protein localization to organelles
## 425 regulation of BMP signaling pathway
## 426 chloride transport

```

427 water-soluble vitamin metabolic process
428 inorganic cation import across plasma membrane
429 cellular response to
430 cholesterol metabolic process
431 axon development
432 positive regulation of proteasomal ubiquitin-dependent protein catabolic process
433 positive regulation of ubiquitin-dependent protein catabolic process
434 regulation of neuron differentiation
435 negative regulation of extrinsic apoptotic signaling pathway
436 lipid biosynthetic process
437 regulation of cyclin-dependent protein serine/threonine kinase activity
438 long-chain fatty acid metabolic process
439 positive regulation of programmed cell death
440 negative regulation of defense response
441 G1/S transition of mitotic cell cycle
442 B cell activation
443 negative regulation of cellular amide metabolic process
444 response to interleukin-6
445 positive regulation of proteasomal protein catabolic process
446 regulation of interferon-gamma production
447 protein ubiquitination
448 negative regulation of binding
449 sensory perception of mechanical stimulus
450 regulation of cation channel activity
451 transforming growth factor beta receptor signaling pathway
452 negative regulation of protein kinase activity
453 negative regulation of translation
454 regulation of actin cytoskeleton organization
455 sensory perception of sound
456 negative regulation of mitotic cell cycle phase transition
457 positive regulation of peptidyl-serine phosphorylation
458 negative regulation of cellular protein metabolic process
459 regulation of cell cycle phase transition
460 cellular transition metal ion homeostasis
461 positive regulation of apoptotic process
462 positive regulation of cold-induced thermogenesis
463 glycosaminoglycan biosynthetic process
464 regulation of peptidyl-serine phosphorylation
465 positive regulation of stress-activated MAPK cascade
466 regulation of gene expression
467 cellular response to chemical stimulus
468 intrinsic apoptotic signaling pathway
469 regulation of proteasomal ubiquitin-dependent protein catabolic process
470 regulation of protein catabolic process
471 steroid metabolic process
472 regulation of insulin secretion
473 positive regulation of cellular metabolic process
474 regulation of JNK cascade
475 small GTPase mediated signal transduction
476 protein localization to nucleus
477 lipid transport
478 response to tumor necrosis factor
479 regulation of protein kinase activity
480 regulation of protein serine/threonine kinase activity

481 regulation of cytoskeleton organization
482 regulation of macroautophagy
483 phosphatidylinositol metabolic process
484 positive regulation of metabolic process
485 response to lipid metabolism
486 positive regulation of kinase activity
487 cellular response to transforming growth factor beta stimulus
488 cellular amide metabolic process
489 cellular response to lectin receptor signaling pathway
490 stimulatory C-type lectin receptor signaling pathway
491 tumor necrosis factor-mediated signaling pathway
492 regulation of protein binding
493 innate immune response activating cell surface receptor signaling pathway
494 cytoskeleton organization
495 cellular response to interferon-gamma
496 negative regulation of cell growth
497 negative regulation of growth
498 synapse organization
499 circulatory system development
500 phosphatidylinositol biosynthetic process
501 plasma membrane bounded cell projection organization
502 muscle contraction
503 G2/M transition of mitotic cell cycle
504 cell cycle G2/M phase transition
505 cellular response to hypoxia
506 transmembrane receptor protein serine/threonine kinase signaling pathway
507 negative regulation of programmed cell death
508 positive regulation of macromolecule metabolic process
509 organic substance transport
510 neuron projection morphogenesis
511 Ras protein signal transduction
512 receptor-mediated endocytosis
513 neuron development
514 nitrogen compound transport
515 cellular response to organic cyclic compound
516 actin filament organization
517 positive regulation of protein kinase activity
518 cellular response to interleukin-6
519 regulation of signal transduction by p53 class mediator
520 regulation of cell differentiation
521 peptidyl-serine phosphorylation
522 cellular response to growth factor stimulus
523 skeletal system development
524 T cell receptor signaling pathway
525 positive regulation of protein kinase B signaling
526 regulation of nucleic acid-templated transcription
527 heart development
528 regulation of neuron projection development
529 peptidyl-serine modification
530 cell-cell adhesion via plasma-membrane adhesion molecule
531 mitochondrion organization
532 glycerophospholipid biosynthetic process
533 regulation of apoptotic process
534 regulation of translation

535 protein stabilization
536 regulated exocytosis
537 negative regulation of cytokine production
538 negative regulation of nucleic acid-templated transcription
539 endoplasmic reticulum to Golgi vesicle-mediated transport
540 regulation of cellular macromolecule biosynthetic process
541 positive regulation of gene expression
542 negative regulation of intracellular signal transduction
543 modification-dependent protein catabolic process
544 generation of neurons
545 axon guidance
546 proteasomal protein catabolic process
547 regulation of inflammatory response
548 regulation of protein kinase B signaling
549 mitotic cell cycle phase transition
550 positive regulation of nucleic acid-templated transcription
551 negative regulation of inflammatory response
552 phosphate-containing compound metabolic process
553 positive regulation of protein modification process
554 regulation of cell growth
555 cellular response to lipopolysaccharides
556 positive regulation of cell motility
557 inflammatory response
558 axonogenesis
559 positive regulation of transcription, DNA-templated
560 positive regulation of signal transduction
561 positive regulation of phosphorylation
562 regulation of protein phosphorylation
563 negative regulation of signal transduction
564 protein deubiquitination
565 positive regulation of cell migration
566 positive regulation of MAPK cascade
567 protein modification by small protein removers
568 DNA metabolic process
569 proteolytic process
570 regulation of transcription, DNA-templated
571 DNA repair
572 extracellular matrix organization
573 MAPK cascade
574 cellular macromolecule biosynthetic process
575 proteasome-mediated ubiquitin-dependent protein catabolic process
576 negative regulation of gene expression
577 cellular response to oxygen-containing compounds
578 cellular protein localization
579 positive regulation of cytokine production
580 intracellular protein transport
581 positive regulation of multicellular organismal processes
582 ubiquitin-dependent protein catabolic process
583 protein transport
584 regulation of cell migration
585 organelle organization
586 regulation of intracellular signal transduction
587 nervous system development
588 positive regulation of transcription by RNA polymerase

```

## 589                               protein phosphorylation
## 590                               negative regulation of transcription, DNA-templated
## 591                               regulation of transcription by RNA polymerase II
## 592                               negative regulation of transcription by RNA polymerase III
## 593                               cellular protein modification process

##   Overlap      P.value Adjusted.P.value Old.P.value Old.Adjusted.P.value
## 1    4/74 0.0001046087     0.02642850      0           0
## 2    4/83 0.0001633917     0.02642850      0           0
## 3    2/7  0.0002228372     0.02642850      0           0
## 4    2/7  0.0002228372     0.02642850      0           0
## 5    2/7  0.0002228372     0.02642850      0           0
## 6    4/116 0.0005868598    0.05800131      0           0
## 7    2/12 0.0006929240    0.05870056      0           0
## 8    3/56 0.0008396782    0.06224114      0           0
## 9    2/16 0.0012491774    0.07682022      0           0
## 10   3/65 0.0012954505    0.07682022      0           0
## 11   3/74 0.0018823604    0.08945651      0           0
## 12   3/75 0.0019561995    0.08945651      0           0
## 13   2/20 0.0019611040    0.08945651      0           0
## 14   3/80 0.0023524420    0.09385895      0           0
## 15   2/22 0.0023741725    0.09385895      0           0
## 16   3/90 0.0032858821    0.11517499      0           0
## 17   2/26 0.0033120173    0.11517499      0           0
## 18   3/92 0.0034960367    0.11517499      0           0
## 19   2/28 0.0038358070    0.11971756      0           0
## 20   3/99 0.0042956362    0.12736561      0           0
## 21   2/32 0.0049906897    0.14092757      0           0
## 22   2/35 0.0059488571    0.16034874      0           0
## 23   2/36 0.0062854558    0.16205545      0           0
## 24   2/37 0.0066305617    0.16383013      0           0
## 25   4/231 0.0071435215   0.16639047      0           0
## 26   2/39 0.0073460634   0.16639047      0           0
## 27   5/371 0.0075759575   0.16639047      0           0
## 28   2/47 0.0105368862   0.17218946      0           0
## 29   2/48 0.0109718014   0.17218946      0           0
## 30   3/142 0.0115744033   0.17218946      0           0
## 31   7/764 0.0127500533   0.17218946      0           0
## 32   2/55 0.0142323657   0.17218946      0           0
## 33   3/155 0.0146317314   0.17218946      0           0
## 34   3/158 0.0153961046   0.17218946      0           0
## 35   3/158 0.0153961046   0.17218946      0           0
## 36   2/58 0.0157425879   0.17218946      0           0
## 37   2/58 0.0157425879   0.17218946      0           0
## 38   1/5  0.0163929514   0.17218946      0           0
## 39   1/5  0.0163929514   0.17218946      0           0
## 40   1/5  0.0163929514   0.17218946      0           0
## 41   1/5  0.0163929514   0.17218946      0           0
## 42   1/5  0.0163929514   0.17218946      0           0
## 43   1/5  0.0163929514   0.17218946      0           0
## 44   1/5  0.0163929514   0.17218946      0           0
## 45   1/5  0.0163929514   0.17218946      0           0
## 46   4/296 0.0165322566   0.17218946      0           0
## 47   2/60 0.0167859552   0.17218946      0           0
## 48   3/171 0.0189661366   0.17218946      0           0

```

## 49	2/65	0.0195192797	0.17218946	0	0
## 50	1/6	0.0196396519	0.17218946	0	0
## 51	1/6	0.0196396519	0.17218946	0	0
## 52	1/6	0.0196396519	0.17218946	0	0
## 53	2/66	0.0200869475	0.17218946	0	0
## 54	2/66	0.0200869475	0.17218946	0	0
## 55	1/7	0.0228757988	0.17218946	0	0
## 56	1/7	0.0228757988	0.17218946	0	0
## 57	1/7	0.0228757988	0.17218946	0	0
## 58	1/7	0.0228757988	0.17218946	0	0
## 59	1/7	0.0228757988	0.17218946	0	0
## 60	1/7	0.0228757988	0.17218946	0	0
## 61	1/7	0.0228757988	0.17218946	0	0
## 62	1/7	0.0228757988	0.17218946	0	0
## 63	1/7	0.0228757988	0.17218946	0	0
## 64	1/7	0.0228757988	0.17218946	0	0
## 65	1/7	0.0228757988	0.17218946	0	0
## 66	1/7	0.0228757988	0.17218946	0	0
## 67	1/7	0.0228757988	0.17218946	0	0
## 68	1/7	0.0228757988	0.17218946	0	0
## 69	1/7	0.0228757988	0.17218946	0	0
## 70	1/7	0.0228757988	0.17218946	0	0
## 71	1/7	0.0228757988	0.17218946	0	0
## 72	2/71	0.0230275294	0.17218946	0	0
## 73	2/71	0.0230275294	0.17218946	0	0
## 74	2/74	0.0248718899	0.17218946	0	0
## 75	1/8	0.0261014256	0.17218946	0	0
## 76	1/8	0.0261014256	0.17218946	0	0
## 77	1/8	0.0261014256	0.17218946	0	0
## 78	1/8	0.0261014256	0.17218946	0	0
## 79	1/8	0.0261014256	0.17218946	0	0
## 80	1/8	0.0261014256	0.17218946	0	0
## 81	1/8	0.0261014256	0.17218946	0	0
## 82	1/8	0.0261014256	0.17218946	0	0
## 83	4/350	0.0284409290	0.17218946	0	0
## 84	2/80	0.0287345108	0.17218946	0	0
## 85	1/9	0.0293165658	0.17218946	0	0
## 86	1/9	0.0293165658	0.17218946	0	0
## 87	1/9	0.0293165658	0.17218946	0	0
## 88	1/9	0.0293165658	0.17218946	0	0
## 89	1/9	0.0293165658	0.17218946	0	0
## 90	1/9	0.0293165658	0.17218946	0	0
## 91	1/9	0.0293165658	0.17218946	0	0
## 92	1/9	0.0293165658	0.17218946	0	0
## 93	1/9	0.0293165658	0.17218946	0	0
## 94	1/9	0.0293165658	0.17218946	0	0
## 95	2/81	0.0294002668	0.17218946	0	0
## 96	2/84	0.0314342860	0.17218946	0	0
## 97	1/10	0.0325212529	0.17218946	0	0
## 98	1/10	0.0325212529	0.17218946	0	0
## 99	1/10	0.0325212529	0.17218946	0	0
## 100	1/10	0.0325212529	0.17218946	0	0
## 101	1/10	0.0325212529	0.17218946	0	0
## 102	1/10	0.0325212529	0.17218946	0	0

## 103	1/10	0.0325212529	0.17218946	0	0
## 104	1/10	0.0325212529	0.17218946	0	0
## 105	1/10	0.0325212529	0.17218946	0	0
## 106	1/10	0.0325212529	0.17218946	0	0
## 107	1/10	0.0325212529	0.17218946	0	0
## 108	1/10	0.0325212529	0.17218946	0	0
## 109	1/10	0.0325212529	0.17218946	0	0
## 110	2/86	0.0328204621	0.17218946	0	0
## 111	3/214	0.0337811673	0.17218946	0	0
## 112	1/11	0.0357155201	0.17218946	0	0
## 113	1/11	0.0357155201	0.17218946	0	0
## 114	1/11	0.0357155201	0.17218946	0	0
## 115	1/11	0.0357155201	0.17218946	0	0
## 116	1/11	0.0357155201	0.17218946	0	0
## 117	1/11	0.0357155201	0.17218946	0	0
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## 119	1/11	0.0357155201	0.17218946	0	0
## 120	1/11	0.0357155201	0.17218946	0	0
## 121	1/11	0.0357155201	0.17218946	0	0
## 122	1/11	0.0357155201	0.17218946	0	0
## 123	1/11	0.0357155201	0.17218946	0	0
## 124	3/224	0.0378848795	0.17949098	0	0
## 125	1/12	0.038899409	0.17949098	0	0
## 126	1/12	0.038899409	0.17949098	0	0
## 127	1/12	0.038899409	0.17949098	0	0
## 128	1/12	0.038899409	0.17949098	0	0
## 129	2/98	0.0416227350	0.17949098	0	0
## 130	2/98	0.0416227350	0.17949098	0	0
## 131	1/13	0.0420729282	0.17949098	0	0
## 132	1/13	0.0420729282	0.17949098	0	0
## 133	1/13	0.0420729282	0.17949098	0	0
## 134	1/13	0.0420729282	0.17949098	0	0
## 135	1/13	0.0420729282	0.17949098	0	0
## 136	1/13	0.0420729282	0.17949098	0	0
## 137	1/13	0.0420729282	0.17949098	0	0
## 138	1/13	0.0420729282	0.17949098	0	0
## 139	1/13	0.0420729282	0.17949098	0	0
## 140	2/102	0.0447332126	0.18125019	0	0
## 141	1/14	0.0452361353	0.18125019	0	0
## 142	1/14	0.0452361353	0.18125019	0	0
## 143	1/14	0.0452361353	0.18125019	0	0
## 144	1/14	0.0452361353	0.18125019	0	0
## 145	1/14	0.0452361353	0.18125019	0	0
## 146	1/14	0.0452361353	0.18125019	0	0
## 147	1/14	0.0452361353	0.18125019	0	0
## 148	1/14	0.0452361353	0.18125019	0	0
## 149	3/246	0.04776777977	0.18512716	0	0
## 150	1/15	0.0483890551	0.18512716	0	0
## 151	1/15	0.0483890551	0.18512716	0	0
## 152	1/15	0.0483890551	0.18512716	0	0
## 153	1/15	0.0483890551	0.18512716	0	0
## 154	1/15	0.0483890551	0.18512716	0	0
## 155	1/15	0.0483890551	0.18512716	0	0
## 156	2/109	0.0503761645	0.18789683	0	0

## 157	1/16	0.0515317206	0.18789683	0	0
## 158	1/16	0.0515317206	0.18789683	0	0
## 159	1/16	0.0515317206	0.18789683	0	0
## 160	1/16	0.0515317206	0.18789683	0	0
## 161	1/16	0.0515317206	0.18789683	0	0
## 162	1/16	0.0515317206	0.18789683	0	0
## 163	2/112	0.0528694543	0.18789683	0	0
## 164	5/621	0.0539945982	0.18789683	0	0
## 165	1/17	0.0546641645	0.18789683	0	0
## 166	1/17	0.0546641645	0.18789683	0	0
## 167	1/17	0.0546641645	0.18789683	0	0
## 168	1/17	0.0546641645	0.18789683	0	0
## 169	1/17	0.0546641645	0.18789683	0	0
## 170	3/261	0.0551641166	0.18789683	0	0
## 171	1/18	0.0577864196	0.18789683	0	0
## 172	1/18	0.0577864196	0.18789683	0	0
## 173	1/18	0.0577864196	0.18789683	0	0
## 174	1/18	0.0577864196	0.18789683	0	0
## 175	1/18	0.0577864196	0.18789683	0	0
## 176	1/18	0.0577864196	0.18789683	0	0
## 177	1/18	0.0577864196	0.18789683	0	0
## 178	1/18	0.0577864196	0.18789683	0	0
## 179	1/18	0.0577864196	0.18789683	0	0
## 180	1/18	0.0577864196	0.18789683	0	0
## 181	1/18	0.0577864196	0.18789683	0	0
## 182	1/18	0.0577864196	0.18789683	0	0
## 183	2/118	0.0579850236	0.18789683	0	0
## 184	2/119	0.0588538798	0.18808761	0	0
## 185	1/19	0.0608985185	0.18808761	0	0
## 186	1/19	0.0608985185	0.18808761	0	0
## 187	1/19	0.0608985185	0.18808761	0	0
## 188	1/19	0.0608985185	0.18808761	0	0
## 189	1/19	0.0608985185	0.18808761	0	0
## 190	1/19	0.0608985185	0.18808761	0	0
## 191	1/19	0.0608985185	0.18808761	0	0
## 192	1/19	0.0608985185	0.18808761	0	0
## 193	2/124	0.0632655339	0.19119355	0	0
## 194	1/20	0.0640004936	0.19119355	0	0
## 195	1/20	0.0640004936	0.19119355	0	0
## 196	1/20	0.0640004936	0.19119355	0	0
## 197	1/20	0.0640004936	0.19119355	0	0
## 198	1/20	0.0640004936	0.19119355	0	0
## 199	2/125	0.0641610733	0.19119355	0	0
## 200	1/21	0.0670923774	0.19220183	0	0
## 201	1/21	0.0670923774	0.19220183	0	0
## 202	1/21	0.0670923774	0.19220183	0	0
## 203	1/21	0.0670923774	0.19220183	0	0
## 204	1/21	0.0670923774	0.19220183	0	0
## 205	1/21	0.0670923774	0.19220183	0	0
## 206	1/21	0.0670923774	0.19220183	0	0
## 207	1/21	0.0670923774	0.19220183	0	0
## 208	1/22	0.0701742023	0.19536761	0	0
## 209	1/22	0.0701742023	0.19536761	0	0
## 210	1/22	0.0701742023	0.19536761	0	0

## 211	1/22	0.0701742023	0.19536761	0	0
## 212	1/22	0.0701742023	0.19536761	0	0
## 213	1/22	0.0701742023	0.19536761	0	0
## 214	4/474	0.0713290542	0.19765481	0	0
## 215	1/23	0.0732460003	0.20016073	0	0
## 216	1/23	0.0732460003	0.20016073	0	0
## 217	1/23	0.0732460003	0.20016073	0	0
## 218	2/136	0.0742887090	0.20111346	0	0
## 219	4/482	0.0748402189	0.20111346	0	0
## 220	1/24	0.0763078036	0.20111346	0	0
## 221	1/24	0.0763078036	0.20111346	0	0
## 222	1/24	0.0763078036	0.20111346	0	0
## 223	1/24	0.0763078036	0.20111346	0	0
## 224	1/24	0.0763078036	0.20111346	0	0
## 225	1/24	0.0763078036	0.20111346	0	0
## 226	2/139	0.0771350341	0.20197540	0	0
## 227	3/302	0.0779620275	0.20197540	0	0
## 228	2/140	0.0780914778	0.20197540	0	0
## 229	2/140	0.0780914778	0.20197540	0	0
## 230	2/141	0.0790516982	0.20197540	0	0
## 231	1/25	0.0793596443	0.20197540	0	0
## 232	1/25	0.0793596443	0.20197540	0	0
## 233	1/25	0.0793596443	0.20197540	0	0
## 234	3/306	0.0803786460	0.20369460	0	0
## 235	1/26	0.0824015542	0.20594351	0	0
## 236	1/26	0.0824015542	0.20594351	0	0
## 237	3/314	0.0853093772	0.20594351	0	0
## 238	1/27	0.0854335651	0.20594351	0	0
## 239	1/27	0.0854335651	0.20594351	0	0
## 240	1/27	0.0854335651	0.20594351	0	0
## 241	1/27	0.0854335651	0.20594351	0	0
## 242	1/27	0.0854335651	0.20594351	0	0
## 243	1/27	0.0854335651	0.20594351	0	0
## 244	1/27	0.0854335651	0.20594351	0	0
## 245	1/27	0.0854335651	0.20594351	0	0
## 246	1/27	0.0854335651	0.20594351	0	0
## 247	1/28	0.0884557088	0.21065958	0	0
## 248	1/28	0.0884557088	0.21065958	0	0
## 249	1/28	0.0884557088	0.21065958	0	0
## 250	1/29	0.0914680169	0.21270798	0	0
## 251	1/29	0.0914680169	0.21270798	0	0
## 252	1/29	0.0914680169	0.21270798	0	0
## 253	1/29	0.0914680169	0.21270798	0	0
## 254	1/29	0.0914680169	0.21270798	0	0
## 255	1/29	0.0914680169	0.21270798	0	0
## 256	1/30	0.0944705209	0.21798062	0	0
## 257	1/30	0.0944705209	0.21798062	0	0
## 258	1/31	0.0974632521	0.21854587	0	0
## 259	1/31	0.0974632521	0.21854587	0	0
## 260	1/31	0.0974632521	0.21854587	0	0
## 261	1/31	0.0974632521	0.21854587	0	0
## 262	1/31	0.0974632521	0.21854587	0	0
## 263	1/31	0.0974632521	0.21854587	0	0
## 264	1/31	0.0974632521	0.21854587	0	0

## 265	1/32	0.1004462420	0.21854587	0	0
## 266	1/32	0.1004462420	0.21854587	0	0
## 267	1/32	0.1004462420	0.21854587	0	0
## 268	1/32	0.1004462420	0.21854587	0	0
## 269	1/32	0.1004462420	0.21854587	0	0
## 270	1/32	0.1004462420	0.21854587	0	0
## 271	1/32	0.1004462420	0.21854587	0	0
## 272	1/33	0.1034195217	0.21854587	0	0
## 273	1/33	0.1034195217	0.21854587	0	0
## 274	1/33	0.1034195217	0.21854587	0	0
## 275	1/33	0.1034195217	0.21854587	0	0
## 276	1/33	0.1034195217	0.21854587	0	0
## 277	1/33	0.1034195217	0.21854587	0	0
## 278	1/33	0.1034195217	0.21854587	0	0
## 279	2/166	0.1041869674	0.21854587	0	0
## 280	4/546	0.1059809438	0.21854587	0	0
## 281	1/34	0.1063831223	0.21854587	0	0
## 282	1/34	0.1063831223	0.21854587	0	0
## 283	1/34	0.1063831223	0.21854587	0	0
## 284	1/34	0.1063831223	0.21854587	0	0
## 285	1/34	0.1063831223	0.21854587	0	0
## 286	1/34	0.1063831223	0.21854587	0	0
## 287	1/34	0.1063831223	0.21854587	0	0
## 288	1/34	0.1063831223	0.21854587	0	0
## 289	4/547	0.1065088653	0.21854587	0	0
## 290	1/35	0.1093370749	0.22054633	0	0
## 291	1/35	0.1093370749	0.22054633	0	0
## 292	1/35	0.1093370749	0.22054633	0	0
## 293	1/35	0.1093370749	0.22054633	0	0
## 294	2/171	0.1094499381	0.22054633	0	0
## 295	3/351	0.1097152916	0.22054633	0	0
## 296	1/36	0.1122814103	0.22194292	0	0
## 297	1/36	0.1122814103	0.22194292	0	0
## 298	1/36	0.1122814103	0.22194292	0	0
## 299	1/36	0.1122814103	0.22194292	0	0
## 300	1/36	0.1122814103	0.22194292	0	0
## 301	1/37	0.1152161595	0.22548905	0	0
## 302	1/37	0.1152161595	0.22548905	0	0
## 303	1/37	0.1152161595	0.22548905	0	0
## 304	4/566	0.1167680495	0.22672434	0	0
## 305	2/178	0.1169344539	0.22672434	0	0
## 306	1/38	0.1181413532	0.22672434	0	0
## 307	1/38	0.1181413532	0.22672434	0	0
## 308	1/38	0.1181413532	0.22672434	0	0
## 309	1/38	0.1181413532	0.22672434	0	0
## 310	1/39	0.1210570219	0.22935084	0	0
## 311	1/39	0.1210570219	0.22935084	0	0
## 312	1/39	0.1210570219	0.22935084	0	0
## 313	1/39	0.1210570219	0.22935084	0	0
## 314	1/40	0.1239631962	0.23336564	0	0
## 315	1/40	0.1239631962	0.23336564	0	0
## 316	2/185	0.1245458246	0.23372049	0	0
## 317	1/41	0.1268599066	0.23582422	0	0
## 318	1/41	0.1268599066	0.23582422	0	0

## 319	1/41	0.1268599066	0.23582422	0	0
## 320	1/42	0.1297471834	0.23826876	0	0
## 321	1/42	0.1297471834	0.23826876	0	0
## 322	1/42	0.1297471834	0.23826876	0	0
## 323	3/379	0.1297821414	0.23826876	0	0
## 324	1/43	0.1326250569	0.24124742	0	0
## 325	1/43	0.1326250569	0.24124742	0	0
## 326	1/43	0.1326250569	0.24124742	0	0
## 327	2/194	0.1345030392	0.24223787	0	0
## 328	2/194	0.1345030392	0.24223787	0	0
## 329	1/44	0.1354935571	0.24223787	0	0
## 330	1/44	0.1354935571	0.24223787	0	0
## 331	1/44	0.1354935571	0.24223787	0	0
## 332	2/195	0.1356205263	0.24223787	0	0
## 333	1/45	0.1383527142	0.24490495	0	0
## 334	1/45	0.1383527142	0.24490495	0	0
## 335	1/45	0.1383527142	0.24490495	0	0
## 336	1/46	0.1412025581	0.24779577	0	0
## 337	1/46	0.1412025581	0.24779577	0	0
## 338	2/200	0.1412394086	0.24779577	0	0
## 339	1/47	0.1440431187	0.25049141	0	0
## 340	1/47	0.1440431187	0.25049141	0	0
## 341	1/47	0.1440431187	0.25049141	0	0
## 342	1/48	0.1468744258	0.25147317	0	0
## 343	1/48	0.1468744258	0.25147317	0	0
## 344	1/48	0.1468744258	0.25147317	0	0
## 345	1/48	0.1468744258	0.25147317	0	0
## 346	3/404	0.1487196603	0.25147317	0	0
## 347	1/49	0.1496965090	0.25147317	0	0
## 348	1/49	0.1496965090	0.25147317	0	0
## 349	1/49	0.1496965090	0.25147317	0	0
## 350	1/49	0.1496965090	0.25147317	0	0
## 351	1/49	0.1496965090	0.25147317	0	0
## 352	1/49	0.1496965090	0.25147317	0	0
## 353	1/49	0.1496965090	0.25147317	0	0
## 354	4/625	0.1512224598	0.25331898	0	0
## 355	1/50	0.1525093980	0.25349859	0	0
## 356	1/50	0.1525093980	0.25349859	0	0
## 357	3/409	0.1526121360	0.25349859	0	0
## 358	1/51	0.1553131222	0.25726447	0	0
## 359	1/52	0.1581077110	0.25899965	0	0
## 360	1/52	0.1581077110	0.25899965	0	0
## 361	1/52	0.1581077110	0.25899965	0	0
## 362	1/52	0.1581077110	0.25899965	0	0
## 363	1/53	0.1608931937	0.26139634	0	0
## 364	1/53	0.1608931937	0.26139634	0	0
## 365	1/53	0.1608931937	0.26139634	0	0
## 366	1/54	0.16366695996	0.26518053	0	0
## 367	1/55	0.1664369578	0.26892947	0	0
## 368	1/56	0.1691952973	0.27116976	0	0
## 369	1/56	0.1691952973	0.27116976	0	0
## 370	1/56	0.1691952973	0.27116976	0	0
## 371	1/57	0.1719446470	0.27262881	0	0
## 372	1/57	0.1719446470	0.27262881	0	0

## 373	1/57 0.1719446470	0.27262881	0	0
## 374	1/57 0.1719446470	0.27262881	0	0
## 375	1/58 0.1746850358	0.27476983	0	0
## 376	1/58 0.1746850358	0.27476983	0	0
## 377	1/58 0.1746850358	0.27476983	0	0
## 378	2/231 0.1770789216	0.27541356	0	0
## 379	1/59 0.1774164925	0.27541356	0	0
## 380	1/59 0.1774164925	0.27541356	0	0
## 381	1/59 0.1774164925	0.27541356	0	0
## 382	1/59 0.1774164925	0.27541356	0	0
## 383	1/60 0.1801390457	0.27818347	0	0
## 384	1/60 0.1801390457	0.27818347	0	0
## 385	1/61 0.1828527240	0.27946305	0	0
## 386	1/61 0.1828527240	0.27946305	0	0
## 387	1/61 0.1828527240	0.27946305	0	0
## 388	1/61 0.1828527240	0.27946305	0	0
## 389	1/62 0.1855575558	0.28214264	0	0
## 390	1/62 0.1855575558	0.28214264	0	0
## 391	1/63 0.1882535697	0.28333596	0	0
## 392	1/63 0.1882535697	0.28333596	0	0
## 393	1/63 0.1882535697	0.28333596	0	0
## 394	1/63 0.1882535697	0.28333596	0	0
## 395	1/64 0.1909407938	0.28449219	0	0
## 396	1/64 0.1909407938	0.28449219	0	0
## 397	1/64 0.1909407938	0.28449219	0	0
## 398	1/64 0.1909407938	0.28449219	0	0
## 399	2/244 0.1925162294	0.28490377	0	0
## 400	1/65 0.1936192564	0.28490377	0	0
## 401	1/65 0.1936192564	0.28490377	0	0
## 402	1/65 0.1936192564	0.28490377	0	0
## 403	1/65 0.1936192564	0.28490377	0	0
## 404	1/66 0.1962889857	0.28811725	0	0
## 405	1/67 0.1989500096	0.29130211	0	0
## 406	1/68 0.2016023561	0.29445861	0	0
## 407	1/69 0.2042460531	0.29758700	0	0
## 408	1/70 0.2068811284	0.29995235	0	0
## 409	1/70 0.2068811284	0.29995235	0	0
## 410	1/71 0.2095076096	0.30154857	0	0
## 411	1/71 0.2095076096	0.30154857	0	0
## 412	1/71 0.2095076096	0.30154857	0	0
## 413	1/72 0.2121255243	0.30310948	0	0
## 414	1/72 0.2121255243	0.30310948	0	0
## 415	1/72 0.2121255243	0.30310948	0	0
## 416	1/73 0.2147349001	0.30390882	0	0
## 417	1/73 0.2147349001	0.30390882	0	0
## 418	1/73 0.2147349001	0.30390882	0	0
## 419	1/73 0.2147349001	0.30390882	0	0
## 420	3/485 0.2152958361	0.30397722	0	0
## 421	1/74 0.2173357643	0.30540310	0	0
## 422	1/74 0.2173357643	0.30540310	0	0
## 423	2/267 0.2202294370	0.30873772	0	0
## 424	1/76 0.2225120675	0.30901559	0	0
## 425	1/76 0.2225120675	0.30901559	0	0
## 426	1/76 0.2225120675	0.30901559	0	0

## 427	1/76	0.2225120675	0.30901559	0	0
## 428	1/77	0.2250875609	0.31041145	0	0
## 429	1/77	0.2250875609	0.31041145	0	0
## 430	1/77	0.2250875609	0.31041145	0	0
## 431	1/79	0.2302133664	0.31455421	0	0
## 432	1/79	0.2302133664	0.31455421	0	0
## 433	1/79	0.2302133664	0.31455421	0	0
## 434	1/79	0.2302133664	0.31455421	0	0
## 435	1/80	0.2327637326	0.31658003	0	0
## 436	1/80	0.2327637326	0.31658003	0	0
## 437	1/82	0.2378395257	0.32274334	0	0
## 438	1/83	0.2403650061	0.32542568	0	0
## 439	2/286	0.2433774623	0.32875361	0	0
## 440	1/85	0.2453912672	0.32922403	0	0
## 441	1/85	0.2453912672	0.32922403	0	0
## 442	1/85	0.2453912672	0.32922403	0	0
## 443	1/86	0.2478921009	0.32959645	0	0
## 444	1/86	0.2478921009	0.32959645	0	0
## 445	1/86	0.2478921009	0.32959645	0	0
## 446	1/86	0.2478921009	0.32959645	0	0
## 447	3/525	0.2502796040	0.33202641	0	0
## 448	1/88	0.2528693062	0.33396770	0	0
## 449	1/88	0.2528693062	0.33396770	0	0
## 450	1/89	0.2553457301	0.33574283	0	0
## 451	1/89	0.2553457301	0.33574283	0	0
## 452	1/90	0.2578140696	0.33749171	0	0
## 453	1/90	0.2578140696	0.33749171	0	0
## 454	1/91	0.2602743508	0.33921470	0	0
## 455	1/91	0.2602743508	0.33921470	0	0
## 456	1/92	0.2627265996	0.34165981	0	0
## 457	1/93	0.2651708417	0.34408383	0	0
## 458	1/94	0.2676071029	0.34648693	0	0
## 459	1/95	0.2700354088	0.34886928	0	0
## 460	1/96	0.2724557852	0.35086592	0	0
## 461	2/310	0.2727642301	0.35086592	0	0
## 462	1/97	0.2748682573	0.35204509	0	0
## 463	1/97	0.2748682573	0.35204509	0	0
## 464	1/98	0.2772728508	0.35435948	0	0
## 465	1/99	0.2796695907	0.35665391	0	0
## 466	5/1079	0.2834978433	0.36076013	0	0
## 467	1/101	0.2844396115	0.36118349	0	0
## 468	1/102	0.2868129424	0.36187250	0	0
## 469	1/102	0.2868129424	0.36187250	0	0
## 470	1/102	0.2868129424	0.36187250	0	0
## 471	1/104	0.2915363707	0.36627345	0	0
## 472	1/104	0.2915363707	0.36627345	0	0
## 473	1/105	0.2938865179	0.36766815	0	0
## 474	1/105	0.2938865179	0.36766815	0	0
## 475	1/106	0.2962289868	0.36904157	0	0
## 476	1/106	0.2962289868	0.36904157	0	0
## 477	1/109	0.3032105702	0.37694731	0	0
## 478	1/110	0.3055225721	0.37823567	0	0
## 479	1/110	0.3055225721	0.37823567	0	0
## 480	1/111	0.3078270184	0.38029463	0	0

## 481	1/112	0.3101239335	0.38075257	0	0
## 482	1/112	0.3101239335	0.38075257	0	0
## 483	1/112	0.3101239335	0.38075257	0	0
## 484	1/113	0.3124133416	0.38277089	0	0
## 485	1/114	0.3146952669	0.38319157	0	0
## 486	1/114	0.3146952669	0.38319157	0	0
## 487	1/114	0.3146952669	0.38319157	0	0
## 488	1/115	0.3169697334	0.38359807	0	0
## 489	1/115	0.3169697334	0.38359807	0	0
## 490	1/115	0.3169697334	0.38359807	0	0
## 491	1/116	0.3192367651	0.38555479	0	0
## 492	1/118	0.3237486198	0.39020921	0	0
## 493	1/119	0.3259934905	0.39211793	0	0
## 494	1/120	0.3282310217	0.39401011	0	0
## 495	1/121	0.3304612370	0.39588589	0	0
## 496	1/126	0.3415033973	0.40502303	0	0
## 497	1/126	0.3415033973	0.40502303	0	0
## 498	1/126	0.3415033973	0.40502303	0	0
## 499	1/126	0.3415033973	0.40502303	0	0
## 500	1/126	0.3415033973	0.40502303	0	0
## 501	1/128	0.3458698688	0.40938290	0	0
## 502	1/129	0.3480423988	0.41113375	0	0
## 503	1/130	0.3502078223	0.41286926	0	0
## 504	1/131	0.3523661621	0.41376858	0	0
## 505	1/131	0.3523661621	0.41376858	0	0
## 506	1/133	0.3566616818	0.41798494	0	0
## 507	2/381	0.3589979513	0.41989307	0	0
## 508	2/384	0.3625797059	0.42296675	0	0
## 509	1/136	0.3630524019	0.42296675	0	0
## 510	1/140	0.3714761958	0.43193213	0	0
## 511	1/142	0.3756468515	0.43577649	0	0
## 512	1/143	0.3777219464	0.43577649	0	0
## 513	1/143	0.3777219464	0.43577649	0	0
## 514	1/143	0.3777219464	0.43577649	0	0
## 515	1/150	0.3920586384	0.45143839	0	0
## 516	1/152	0.3960947451	0.45520191	0	0
## 517	1/154	0.4001044595	0.45892059	0	0
## 518	1/155	0.4020994727	0.45993120	0	0
## 519	1/156	0.4040879515	0.45993120	0	0
## 520	1/156	0.4040879515	0.45993120	0	0
## 521	1/156	0.4040879515	0.45993120	0	0
## 522	1/158	0.4080453899	0.46177656	0	0
## 523	1/158	0.4080453899	0.46177656	0	0
## 524	1/158	0.4080453899	0.46177656	0	0
## 525	1/161	0.4139330640	0.46754725	0	0
## 526	2/430	0.4164967887	0.46954866	0	0
## 527	1/164	0.4197630568	0.47233300	0	0
## 528	1/165	0.4216936660	0.47360671	0	0
## 529	1/169	0.4293530398	0.48129745	0	0
## 530	1/170	0.4312522191	0.48251428	0	0
## 531	1/175	0.4406551378	0.49210640	0	0
## 532	1/177	0.4443732880	0.49532586	0	0
## 533	3/742	0.4453041634	0.49543221	0	0
## 534	1/178	0.4462232243	0.49552504	0	0

## 535	1/179	0.4480670944	0.49664259	0	0
## 536	1/180	0.4499049178	0.49774928	0	0
## 537	1/182	0.4535625024	0.50086139	0	0
## 538	2/464	0.4549064146	0.50141172	0	0
## 539	1/185	0.4590040152	0.50441646	0	0
## 540	2/468	0.4593337054	0.50441646	0	0
## 541	2/482	0.4746686473	0.52029299	0	0
## 542	1/198	0.4819737134	0.52732548	0	0
## 543	1/201	0.4871364565	0.53199248	0	0
## 544	1/202	0.4888460841	0.53287818	0	0
## 545	1/203	0.4905500987	0.53375451	0	0
## 546	1/205	0.4939413616	0.53646012	0	0
## 547	1/206	0.4956286458	0.53730857	0	0
## 548	1/207	0.4973103894	0.53814792	0	0
## 549	1/209	0.5006573259	0.54078287	0	0
## 550	2/511	0.5056068835	0.54319296	0	0
## 551	1/212	0.5056366211	0.54319296	0	0
## 552	1/212	0.5056366211	0.54319296	0	0
## 553	1/214	0.5089289511	0.54574117	0	0
## 554	1/217	0.5138269973	0.54999893	0	0
## 555	1/219	0.5170655985	0.55246829	0	0
## 556	1/221	0.5202829506	0.55490610	0	0
## 557	1/230	0.5345017394	0.56904763	0	0
## 558	1/240	0.5498138977	0.58430043	0	0
## 559	4/1183	0.5533425092	0.58699840	0	0
## 560	1/252	0.5675347772	0.60097879	0	0
## 561	1/253	0.5689801197	0.60143531	0	0
## 562	1/266	0.5873421990	0.61899350	0	0
## 563	1/267	0.5887223212	0.61899350	0	0
## 564	1/267	0.5887223212	0.61899350	0	0
## 565	1/269	0.5914689422	0.62078068	0	0
## 566	1/274	0.5982567088	0.62679546	0	0
## 567	1/276	0.6009406069	0.62849697	0	0
## 568	1/277	0.6022759261	0.62878455	0	0
## 569	1/287	0.6153894189	0.64134609	0	0
## 570	7/2244	0.6208212891	0.64587197	0	0
## 571	1/298	0.6293227211	0.65356983	0	0
## 572	1/300	0.6318020893	0.65499762	0	0
## 573	1/303	0.6354905479	0.65767172	0	0
## 574	1/314	0.6487061925	0.67017905	0	0
## 575	1/321	0.6568692573	0.67743212	0	0
## 576	1/322	0.6580200547	0.67744079	0	0
## 577	1/323	0.6591670507	0.67744551	0	0
## 578	1/329	0.6659698896	0.68325285	0	0
## 579	1/335	0.6726389635	0.68883867	0	0
## 580	1/336	0.6737376536	0.68883867	0	0
## 581	1/345	0.6834638451	0.69758014	0	0
## 582	1/354	0.6929043518	0.70600048	0	0
## 583	1/369	0.7080260184	0.72017055	0	0
## 584	1/408	0.7439947826	0.75546046	0	0
## 585	1/420	0.7541568418	0.76447010	0	0
## 586	1/437	0.7678762931	0.77704888	0	0
## 587	1/447	0.7755913570	0.78351904	0	0
## 588	2/908	0.8076877849	0.81455588	0	0

				Genes
## 589	1/496	0.8098925357	0.81539265	0
## 590	2/948	0.8267100701	0.83091368	0
## 591	5/2206	0.8665698476	0.86950240	0
## 592	1/684	0.8997906189	0.90131054	0
## 593	1/1025	0.9691309724	0.96913097	0
##	Odds.Ratio	Combined.Score		
## 1	18.3078341	1.677965e+02		ACER2;BTG2;CDKN1A;MDM2
## 2	16.2147815	1.413825e+02		NTF4;CDSN;GRHL3;EDA2R
## 3	124.5562500	1.047402e+03		CDSN;ABCA12
## 4	124.5562500	1.047402e+03		CDSN;ABCA12
## 5	124.5562500	1.047402e+03		HBA1;CYGB
## 6	11.4182028	8.495970e+01		ACER2;NEU4;ELOVL4;ABCA12
## 7	62.2625000	4.529342e+02		HBA1;CYGB
## 8	17.8625337	1.265112e+02		BTG2;CDKN1A;MDM2
## 9	44.4642857	2.972558e+02		ACER2;NEU4
## 10	15.2626728	1.014799e+02		BTG2;CDKN1A;MDM2
## 11	13.3219316	8.359817e+01		CDKN1A;SESN1;FAS
## 12	13.1362434	8.192749e+01		CDKN1A;SESN1;FAS
## 13	34.5763889	2.155578e+02		TRIML2;TRIM22
## 14	12.2801484	7.432316e+01		BTG2;RPS6KA2;INHA
## 15	31.1156250	1.880350e+02		CDKN1A;INHA
## 16	10.8631637	6.211687e+01		TRIML2;SESN1;TRIM22
## 17	25.9244792	1.480339e+02		TRIML2;TRIM22
## 18	10.6179775	6.005661e+01		GDF15;ZNF423;INHA
## 19	23.9278846	1.331198e+02		SLC14A1;ABCA12
## 20	9.8402778	5.363105e+01		SLC25A41;SLC52A1;HBA1
## 21	20.7333333	1.098904e+02		CDKN1A;GDF15
## 22	18.8456439	9.657556e+01		NTF4;CEL
## 23	18.2904412	9.272370e+01		NEFL;AP3B2
## 24	17.7669643	8.912026e+01		NEFL;AP3B2
## 25	5.6009663	2.767745e+01		ACER2;TRIML2;RAB39B;TRIM22
## 26	16.8048986	8.257239e+01		TRIML2;TRIM22
## 27	4.3823345	2.139796e+01		NTF4;CDKN1A;GDF15;FAS;INHA
## 28	13.8118056	6.288340e+01		GDF15;INHA
## 29	13.5108696	6.096681e+01		CDKN1A;MDM2
## 30	6.7814320	3.023813e+01		MDM2;ZNF423;TSPAN10
## 31	3.0055975	1.311108e+01		ACER2;BTG2;CDKN1A;RPS6KA2;MDM2;HAS2;INHA
## 32	11.7222877	4.984594e+01		ACER2;ABCA12
## 33	6.1973684	2.618117e+01		TRIML2;EDA2R;TRIM22
## 34	6.0764977	2.536112e+01		CDKN1A;SESN1;FAS
## 35	6.0764977	2.536112e+01		ACER2;ELOVL4;INHA
## 36	11.0926339	4.604980e+01		ACER2;ELOVL4
## 37	11.0926339	4.604980e+01		GDF15;INHA
## 38	76.6538462	3.151166e+02		INHA
## 39	76.6538462	3.151166e+02		SLC25A41
## 40	76.6538462	3.151166e+02		GDF15
## 41	76.6538462	3.151166e+02		INHA
## 42	76.6538462	3.151166e+02		INHA
## 43	76.6538462	3.151166e+02		INHA
## 44	76.6538462	3.151166e+02		MDM2
## 45	76.6538462	3.151166e+02		GDF15
## 46	4.3398144	1.780384e+01		CDKN1A;RPS6KA2;MDM2;INHA
## 47	10.7090517	4.377017e+01		MDM2;SPATA18
## 48	5.6026077	2.221490e+01		TRIML2;EDA2R;TRIM22

## 49	9.8566468	3.879924e+01	ACER2;RAB39B
## 50	61.3200000	2.410002e+02	SPATA18
## 51	61.3200000	2.410002e+02	MYO1A
## 52	61.3200000	2.410002e+02	CYP2E1
## 53	9.7021484	3.791294e+01	ACER2;HBA1
## 54	9.7021484	3.791294e+01	TRIML2;TRIM22
## 55	51.0974359	1.930295e+02	RTN4RL1
## 56	51.0974359	1.930295e+02	ELOVL4
## 57	51.0974359	1.930295e+02	ELOVL4
## 58	51.0974359	1.930295e+02	ELOVL4
## 59	51.0974359	1.930295e+02	ELOVL4
## 60	51.0974359	1.930295e+02	SLC52A1
## 61	51.0974359	1.930295e+02	NEU4
## 62	51.0974359	1.930295e+02	INHA
## 63	51.0974359	1.930295e+02	HAS2
## 64	51.0974359	1.930295e+02	SLC52A1
## 65	51.0974359	1.930295e+02	NEFL
## 66	51.0974359	1.930295e+02	HAS2
## 67	51.0974359	1.930295e+02	CYP2E1
## 68	51.0974359	1.930295e+02	FAS
## 69	51.0974359	1.930295e+02	CYP2E1
## 70	51.0974359	1.930295e+02	HAS2
## 71	51.0974359	1.930295e+02	KCNE3
## 72	8.9968297	3.392763e+01	ELOVL4;CYP2E1
## 73	8.9968297	3.392763e+01	NTF4;VSTM2L
## 74	8.6206597	3.184486e+01	ACER2;ELOVL4
## 75	43.7956044	1.596685e+02	FAS
## 76	43.7956044	1.596685e+02	CYP2E1
## 77	43.7956044	1.596685e+02	RTN4RL1
## 78	43.7956044	1.596685e+02	KCNE3
## 79	43.7956044	1.596685e+02	CDKN1A
## 80	43.7956044	1.596685e+02	CDKN1A
## 81	43.7956044	1.596685e+02	MDM2
## 82	43.7956044	1.596685e+02	ACTA2
## 83	3.6524333	1.300239e+01	ACER2;BTG2;CDKN1A;SPATA18
## 84	7.9551282	2.823797e+01	CDSN;ABCA12
## 85	38.3192308	1.352517e+02	RTN4RL1
## 86	38.3192308	1.352517e+02	IL13
## 87	38.3192308	1.352517e+02	CEL
## 88	38.3192308	1.352517e+02	CEL
## 89	38.3192308	1.352517e+02	CEL
## 90	38.3192308	1.352517e+02	ANK1
## 91	38.3192308	1.352517e+02	ANK1
## 92	38.3192308	1.352517e+02	NEU4
## 93	38.3192308	1.352517e+02	SLC14A1
## 94	38.3192308	1.352517e+02	CEL
## 95	7.8540348	2.769923e+01	ACER2;FAS
## 96	7.5655488	2.617571e+01	BLNK;LY6D
## 97	34.0598291	1.166843e+02	ACER2
## 98	34.0598291	1.166843e+02	KCNE3
## 99	34.0598291	1.166843e+02	HAS2
## 100	34.0598291	1.166843e+02	NEU4
## 101	34.0598291	1.166843e+02	SESN1
## 102	34.0598291	1.166843e+02	SESN1

## 103	34.0598291	1.166843e+02	SESN1
## 104	34.0598291	1.166843e+02	NTF4
## 105	34.0598291	1.166843e+02	SLC12A8
## 106	34.0598291	1.166843e+02	RTN4RL1
## 107	34.0598291	1.166843e+02	CEL
## 108	34.0598291	1.166843e+02	SLC12A8
## 109	34.0598291	1.166843e+02	EDA2R
## 110	7.3846726	2.523123e+01	CDKN1A;INHA
## 111	4.4511397	1.507980e+01	GDF15;IL13;ZNF423
## 112	30.6523077	1.021387e+02	CEL
## 113	30.6523077	1.021387e+02	FAS
## 114	30.6523077	1.021387e+02	NEFL
## 115	30.6523077	1.021387e+02	FAS
## 116	30.6523077	1.021387e+02	KCNE3
## 117	30.6523077	1.021387e+02	CEL
## 118	30.6523077	1.021387e+02	FAS
## 119	30.6523077	1.021387e+02	KCNE3
## 120	30.6523077	1.021387e+02	FAS
## 121	30.6523077	1.021387e+02	ACTA2
## 122	30.6523077	1.021387e+02	CEL
## 123	30.6523077	1.021387e+02	CEL
## 124	4.2475760	1.390318e+01	TRIML2;EDA2R;TRIM22
## 125	27.8643357	9.046927e+01	SLC25A41
## 126	27.8643357	9.046927e+01	RTN4RL1
## 127	27.8643357	9.046927e+01	HAS2
## 128	27.8643357	9.046927e+01	ABCA12
## 129	6.4576823	2.052967e+01	NTF4;VSTM2L
## 130	6.4576823	2.052967e+01	NTF4;VSTM2L
## 131	25.5410256	8.092293e+01	ELOVL4
## 132	25.5410256	8.092293e+01	CLEC4E
## 133	25.5410256	8.092293e+01	CDKN1A
## 134	25.5410256	8.092293e+01	ABCA12
## 135	25.5410256	8.092293e+01	BTG2
## 136	25.5410256	8.092293e+01	ACER2
## 137	25.5410256	8.092293e+01	ACER2
## 138	25.5410256	8.092293e+01	NEFL
## 139	25.5410256	8.092293e+01	ELOVL4
## 140	6.1981250	1.925782e+01	ACER2;HBA1
## 141	23.5751479	7.298534e+01	MDM2
## 142	23.5751479	7.298534e+01	HAS2
## 143	23.5751479	7.298534e+01	ACTA2
## 144	23.5751479	7.298534e+01	SESN1
## 145	23.5751479	7.298534e+01	ABCA12
## 146	23.5751479	7.298534e+01	KCNE3
## 147	23.5751479	7.298534e+01	INHA
## 148	23.5751479	7.298534e+01	KCNE3
## 149	3.8587106	1.173590e+01	TRIML2;EDA2R;TRIM22
## 150	21.8901099	6.629380e+01	AP3B2
## 151	21.8901099	6.629380e+01	TSPOAP1
## 152	21.8901099	6.629380e+01	AP3B2
## 153	21.8901099	6.629380e+01	NTF4
## 154	21.8901099	6.629380e+01	INHA
## 155	21.8901099	6.629380e+01	BTG2
## 156	5.7905958	1.730367e+01	NTF4;CEL

## 157	20.4297436	6.058558e+01	IL13
## 158	20.4297436	6.058558e+01	NEFL
## 159	20.4297436	6.058558e+01	ACER2
## 160	20.4297436	6.058558e+01	CEL
## 161	20.4297436	6.058558e+01	KCNE3
## 162	20.4297436	6.058558e+01	VSTM2L
## 163	5.6318182	1.655715e+01	MDM2;FAS
## 164	2.5705237	7.503028e+00	CDKN1A;INPP5D;IL13;EDA2R;TRIM22
## 165	19.1519231	5.566596e+01	SLC25A41
## 166	19.1519231	5.566596e+01	MDM2
## 167	19.1519231	5.566596e+01	MDM2
## 168	19.1519231	5.566596e+01	CDKN1A
## 169	19.1519231	5.566596e+01	ACER2
## 170	3.6315984	1.052235e+01	MDM2;HAS2;FAS
## 171	18.0244344	5.138769e+01	SLC25A41
## 172	18.0244344	5.138769e+01	INHA
## 173	18.0244344	5.138769e+01	KCNE3
## 174	18.0244344	5.138769e+01	NEU4
## 175	18.0244344	5.138769e+01	MDM2
## 176	18.0244344	5.138769e+01	RTN4RL1
## 177	18.0244344	5.138769e+01	KCNE3
## 178	18.0244344	5.138769e+01	NEFL
## 179	18.0244344	5.138769e+01	MDM2
## 180	18.0244344	5.138769e+01	GDF15
## 181	18.0244344	5.138769e+01	KCNE3
## 182	18.0244344	5.138769e+01	CEL
## 183	5.3389009	1.520290e+01	RTN4RL1;IL13
## 184	5.2930021	1.499347e+01	ACER2;FAS
## 185	17.0222222	4.763748e+01	CYP2E1
## 186	17.0222222	4.763748e+01	ABCA12
## 187	17.0222222	4.763748e+01	ABCA12
## 188	17.0222222	4.763748e+01	NEU4
## 189	17.0222222	4.763748e+01	ACER2
## 190	17.0222222	4.763748e+01	NTF4
## 191	17.0222222	4.763748e+01	CEL
## 192	17.0222222	4.763748e+01	MYO1A
## 193	5.0747951	1.400854e+01	ELOVL4;CEL
## 194	16.1255061	4.432683e+01	NEU4
## 195	16.1255061	4.432683e+01	IL13
## 196	16.1255061	4.432683e+01	CDKN1A
## 197	16.1255061	4.432683e+01	HAS2
## 198	16.1255061	4.432683e+01	TSPOAP1
## 199	5.0332825	1.382320e+01	CDKN1A;INHA
## 200	15.3184615	4.138566e+01	ACTA2
## 201	15.3184615	4.138566e+01	MYO1A
## 202	15.3184615	4.138566e+01	FAS
## 203	15.3184615	4.138566e+01	HBA1
## 204	15.3184615	4.138566e+01	CCDC62
## 205	15.3184615	4.138566e+01	RTN4RL1
## 206	15.3184615	4.138566e+01	FAS
## 207	15.3184615	4.138566e+01	NTF4
## 208	14.5882784	3.875777e+01	INHA
## 209	14.5882784	3.875777e+01	CYP2E1
## 210	14.5882784	3.875777e+01	INHA

## 211	14.5882784	3.875777e+01	CDKN1A
## 212	14.5882784	3.875777e+01	KCNE3
## 213	14.5882784	3.875777e+01	NTF4
## 214	2.6717914	7.054736e+00	ACER2;CDKN1A;MDM2;HAS2
## 215	13.9244755	3.639763e+01	ABCA12
## 216	13.9244755	3.639763e+01	HAS2
## 217	13.9244755	3.639763e+01	CYP2E1
## 218	4.6175373	1.200466e+01	ABCA12;ANK1
## 219	2.6259954	6.807630e+00	CDKN1A;INPP5D;IL13;HAS2
## 220	13.3183946	3.426796e+01	HAS2
## 221	13.3183946	3.426796e+01	TSPOAP1
## 222	13.3183946	3.426796e+01	MDM2
## 223	13.3183946	3.426796e+01	CLEC4E
## 224	13.3183946	3.426796e+01	CYGB
## 225	13.3183946	3.426796e+01	SLC12A8
## 226	4.5157391	1.157022e+01	KCNE3;SLC12A8
## 227	3.1270903	7.978875e+00	TRIML2;CLEC4E;TRIM22
## 228	4.4827899	1.143055e+01	ABCA12;ANK1
## 229	4.4827899	1.143055e+01	NTF4;BLNK
## 230	4.4503147	1.129336e+01	TRIML2;TRIM22
## 231	12.7628205	3.233799e+01	HAS2
## 232	12.7628205	3.233799e+01	ABCA12
## 233	12.7628205	3.233799e+01	NTF4
## 234	3.0851799	7.777759e+00	RPS6KA2;CEL;TSPOAP1
## 235	12.2516923	3.058207e+01	ACER2
## 236	12.2516923	3.058207e+01	LY6D
## 237	3.0045935	7.395719e+00	TRIML2;MDM2;TRIM22
## 238	11.7798817	2.897870e+01	KCNE3
## 239	11.7798817	2.897870e+01	ZNF423
## 240	11.7798817	2.897870e+01	IL13
## 241	11.7798817	2.897870e+01	CEL
## 242	11.7798817	2.897870e+01	MDM2
## 243	11.7798817	2.897870e+01	CDKN1A
## 244	11.7798817	2.897870e+01	CEL
## 245	11.7798817	2.897870e+01	CEL
## 246	11.7798817	2.897870e+01	SLC12A8
## 247	11.3430199	2.750970e+01	CDKN1A
## 248	11.3430199	2.750970e+01	MDM2
## 249	11.3430199	2.750970e+01	ABCA12
## 250	10.9373626	2.615961e+01	INHA
## 251	10.9373626	2.615961e+01	INHA
## 252	10.9373626	2.615961e+01	HBA1
## 253	10.9373626	2.615961e+01	CDKN1A
## 254	10.9373626	2.615961e+01	CEL
## 255	10.9373626	2.615961e+01	HEPH
## 256	10.5596817	2.491523e+01	CYP2E1
## 257	10.5596817	2.491523e+01	GRHL3
## 258	10.2071795	2.376517e+01	KCNE3
## 259	10.2071795	2.376517e+01	HAS2
## 260	10.2071795	2.376517e+01	ACER2
## 261	10.2071795	2.376517e+01	MDM2
## 262	10.2071795	2.376517e+01	TSPOAP1
## 263	10.2071795	2.376517e+01	GRHL3
## 264	10.2071795	2.376517e+01	SLC52A1

## 265	9.8774194	2.269962e+01	NTF4
## 266	9.8774194	2.269962e+01	ANK1
## 267	9.8774194	2.269962e+01	ACER2
## 268	9.8774194	2.269962e+01	CDKN1A
## 269	9.8774194	2.269962e+01	IL13
## 270	9.8774194	2.269962e+01	KCNE3
## 271	9.8774194	2.269962e+01	NEFL
## 272	9.5682692	2.171003e+01	ABCA12
## 273	9.5682692	2.171003e+01	ABCA12
## 274	9.5682692	2.171003e+01	ACER2
## 275	9.5682692	2.171003e+01	CDKN1A
## 276	9.5682692	2.171003e+01	HAS2
## 277	9.5682692	2.171003e+01	CDKN1A
## 278	9.5682692	2.171003e+01	ELOVL4
## 279	3.7671494	8.519665e+00	GDF15;FAS
## 280	2.3082966	5.180963e+00	TRIML2;GDF15;EDA2R;TRIM22
## 281	9.2778555	2.078897e+01	FAS
## 282	9.2778555	2.078897e+01	BLNK
## 283	9.2778555	2.078897e+01	ACER2
## 284	9.2778555	2.078897e+01	SESN1
## 285	9.2778555	2.078897e+01	GRHL3
## 286	9.2778555	2.078897e+01	CEL
## 287	9.2778555	2.078897e+01	ABCA12
## 288	9.2778555	2.078897e+01	MDM2
## 289	2.3039268	5.159706e+00	BTG2;CDKN1A;MDM2;ZNF423
## 290	9.0045249	1.992989e+01	CDKN1A
## 291	9.0045249	1.992989e+01	SESN1
## 292	9.0045249	1.992989e+01	HBA1
## 293	9.0045249	1.992989e+01	ZNF423
## 294	3.6547707	8.085405e+00	NTF4;BTG2
## 295	2.6800766	5.922612e+00	MYO1A;MDM2;NEFL
## 296	8.7468132	1.912707e+01	CDKN1A
## 297	8.7468132	1.912707e+01	CDKN1A
## 298	8.7468132	1.912707e+01	IL13
## 299	8.7468132	1.912707e+01	CEL
## 300	8.7468132	1.912707e+01	HEPH
## 301	8.5034188	1.837542e+01	IL13
## 302	8.5034188	1.837542e+01	CDKN1A
## 303	8.5034188	1.837542e+01	CDKN1A
## 304	2.2238549	4.775875e+00	BTG2;CDKN1A;RPS6KA2;INHA
## 305	3.5081676	7.529025e+00	BTG2;MDM2
## 306	8.2731809	1.767047e+01	FAS
## 307	8.2731809	1.767047e+01	CCDC62
## 308	8.2731809	1.767047e+01	SESN1
## 309	8.2731809	1.767047e+01	CEL
## 310	8.0550607	1.700821e+01	ABCA12
## 311	8.0550607	1.700821e+01	KCNE3
## 312	8.0550607	1.700821e+01	MYO1A
## 313	8.0550607	1.700821e+01	CYGB
## 314	7.8481262	1.638509e+01	ACER2
## 315	7.8481262	1.638509e+01	SPATA18
## 316	3.3727801	7.025776e+00	INPP5D;BLNK
## 317	7.6515385	1.579792e+01	HES2
## 318	7.6515385	1.579792e+01	NEU4

## 319	7.6515385	1.579792e+01	CDSN
## 320	7.4645403	1.524384e+01	FAS
## 321	7.4645403	1.524384e+01	HES2
## 322	7.4645403	1.524384e+01	SLC12A8
## 323	2.4769504	5.057680e+00	BTG2;CDKN1A;RPS6KA2
## 324	7.2864469	1.472029e+01	SESN1
## 325	7.2864469	1.472029e+01	NTF4
## 326	7.2864469	1.472029e+01	CYP2E1
## 327	3.2132161	6.446253e+00	HAS2;EDA2R
## 328	3.2132161	6.446253e+00	ACER2;FAS
## 329	7.1166369	1.422496e+01	IL13
## 330	7.1166369	1.422496e+01	BTG2
## 331	7.1166369	1.422496e+01	SLC12A8
## 332	3.1964054	6.386081e+00	ABCA12;ANK1
## 333	6.9545455	1.375574e+01	KCNE3
## 334	6.9545455	1.375574e+01	CDKN1A
## 335	6.9545455	1.375574e+01	CDKN1A
## 336	6.7996581	1.331074e+01	INHA
## 337	6.7996581	1.331074e+01	CDKN1A
## 338	3.1148990	6.096788e+00	TRIML2;TRIM22
## 339	6.6515050	1.288824e+01	ZNF423
## 340	6.6515050	1.288824e+01	NEU4
## 341	6.6515050	1.288824e+01	INPP5D
## 342	6.5096563	1.248667e+01	BTG2
## 343	6.5096563	1.248667e+01	INPP5D
## 344	6.5096563	1.248667e+01	IL13
## 345	6.5096563	1.248667e+01	MDM2
## 346	2.3195582	4.420364e+00	NTF4;GDF15;BLNK
## 347	6.3737179	1.210462e+01	RTN4RL1
## 348	6.3737179	1.210462e+01	FAS
## 349	6.3737179	1.210462e+01	HBA1
## 350	6.3737179	1.210462e+01	ABCA12
## 351	6.3737179	1.210462e+01	FAS
## 352	6.3737179	1.210462e+01	CDKN1A
## 353	6.3737179	1.210462e+01	NEU4
## 354	2.0064412	3.790174e+00	ACER2;MDM2;HAS2;HBA1
## 355	6.2433281	1.174076e+01	HEPH
## 356	6.2433281	1.174076e+01	SLC12A8
## 357	2.2904058	4.305632e+00	TRIML2;MDM2;TRIM22
## 358	6.1181538	1.139391e+01	CEL
## 359	5.9978884	1.106298e+01	NEU4
## 360	5.9978884	1.106298e+01	ACER2
## 361	5.9978884	1.106298e+01	INHA
## 362	5.9978884	1.106298e+01	NTF4
## 363	5.8822485	1.074695e+01	CDSN
## 364	5.8822485	1.074695e+01	SESN1
## 365	5.8822485	1.074695e+01	NEU4
## 366	5.7709724	1.044491e+01	CDKN1A
## 367	5.6638177	1.015601e+01	NEU4
## 368	5.5605594	9.879455e+00	HAS2
## 369	5.5605594	9.879455e+00	ZNF423
## 370	5.5605594	9.879455e+00	NTF4
## 371	5.4609890	9.614523e+00	CDKN1A
## 372	5.4609890	9.614523e+00	CYP2E1

## 373	5.4609890	9.614523e+00	HAS2
## 374	5.4609890	9.614523e+00	MDM2
## 375	5.3649123	9.360542e+00	RTN4RL1
## 376	5.3649123	9.360542e+00	HEPH
## 377	5.3649123	9.360542e+00	NEFL
## 378	2.6890011	4.655090e+00	MDM2;FAS
## 379	5.2721485	9.116891e+00	FAS
## 380	5.2721485	9.116891e+00	HBA1
## 381	5.2721485	9.116891e+00	CDKN1A
## 382	5.2721485	9.116891e+00	ABCA12
## 383	5.1825293	8.882991e+00	VSTM2L
## 384	5.1825293	8.882991e+00	ZNF423
## 385	5.0958974	8.658308e+00	BLNK
## 386	5.0958974	8.658308e+00	CDKN1A
## 387	5.0958974	8.658308e+00	HEPH
## 388	5.0958974	8.658308e+00	CLEC4E
## 389	5.0121059	8.442342e+00	ACER2
## 390	5.0121059	8.442342e+00	HES2
## 391	4.9310174	8.234629e+00	MDM2
## 392	4.9310174	8.234629e+00	HES2
## 393	4.9310174	8.234629e+00	CDKN1A
## 394	4.9310174	8.234629e+00	ELOVL4
## 395	4.8525031	8.034735e+00	CDKN1A
## 396	4.8525031	8.034735e+00	MDM2
## 397	4.8525031	8.034735e+00	FAS
## 398	4.8525031	8.034735e+00	NEU4
## 399	2.5428719	4.189572e+00	RPS6KA2;CEL
## 400	4.7764423	7.842257e+00	GDF15
## 401	4.7764423	7.842257e+00	ACER2
## 402	4.7764423	7.842257e+00	SLC12A8
## 403	4.7764423	7.842257e+00	MDM2
## 404	4.7027219	7.656818e+00	MDM2
## 405	4.6312354	7.478064e+00	SLC25A41
## 406	4.5618829	7.305664e+00	TRIM22
## 407	4.4945701	7.139309e+00	MDM2
## 408	4.4292085	6.978709e+00	CEL
## 409	4.4292085	6.978709e+00	HAS2
## 410	4.3657143	6.823591e+00	GDF15
## 411	4.3657143	6.823591e+00	CDKN1A
## 412	4.3657143	6.823591e+00	CDKN1A
## 413	4.3040087	6.673697e+00	FAS
## 414	4.3040087	6.673697e+00	CDKN1A
## 415	4.3040087	6.673697e+00	RAB39B
## 416	4.2440171	6.528788e+00	ACER2
## 417	4.2440171	6.528788e+00	GRHL3
## 418	4.2440171	6.528788e+00	EDA2R
## 419	4.2440171	6.528788e+00	TSPOAP1
## 420	1.9217546	2.951320e+00	NTF4;VSTM2L;FAS
## 421	4.1856691	6.388636e+00	MDM2
## 422	4.1856691	6.388636e+00	CDKN1A
## 423	2.3194575	3.509537e+00	MDM2;FAS
## 424	4.0736410	6.121762e+00	TSPAN10
## 425	4.0736410	6.121762e+00	ZNF423
## 426	4.0736410	6.121762e+00	SLC12A8

## 427	4.0736410	6.121762e+00	SLC52A1
## 428	4.0198381	5.994647e+00	SLC12A8
## 429	4.0198381	5.994647e+00	CDKN1A
## 430	4.0198381	5.994647e+00	CEL
## 431	3.9163708	5.752165e+00	RTN4RL1
## 432	3.9163708	5.752165e+00	MDM2
## 433	3.9163708	5.752165e+00	MDM2
## 434	3.9163708	5.752165e+00	NTF4
## 435	3.8666018	5.636467e+00	FAS
## 436	3.8666018	5.636467e+00	ELOVL4
## 437	3.7707502	5.415397e+00	CDKN1A
## 438	3.7245779	5.309746e+00	CYP2E1
## 439	2.1621919	3.055484e+00	RPS6KA2;FAS
## 440	3.6355311	5.107563e+00	IL13
## 441	3.6355311	5.107563e+00	CDKN1A
## 442	3.6355311	5.107563e+00	BLNK
## 443	3.5925792	5.010792e+00	BTG2
## 444	3.5925792	5.010792e+00	HAS2
## 445	3.5925792	5.010792e+00	MDM2
## 446	3.5925792	5.010792e+00	INHA
## 447	1.7708447	2.452933e+00	TRIML2;MDM2;TRIM22
## 448	3.5096375	4.825339e+00	CDKN1A
## 449	3.5096375	4.825339e+00	MYO1A
## 450	3.4695804	4.736452e+00	NEFL
## 451	3.4695804	4.736452e+00	GDF15
## 452	3.4304235	4.649996e+00	CDKN1A
## 453	3.4304235	4.649996e+00	BTG2
## 454	3.3921368	4.565881e+00	GRHL3
## 455	3.3921368	4.565881e+00	MYO1A
## 456	3.3546915	4.484019e+00	CDKN1A
## 457	3.3180602	4.404330e+00	NTF4
## 458	3.2822167	4.326734e+00	BTG2
## 459	3.2471358	4.251157e+00	CDKN1A
## 460	3.2127935	4.177528e+00	HEPH
## 461	1.9912744	2.586959e+00	RPS6KA2;FAS
## 462	3.1791667	4.105777e+00	IL13
## 463	3.1791667	4.105777e+00	HAS2
## 464	3.1462331	4.035841e+00	NTF4
## 465	3.1139717	3.967656e+00	EDA2R
## 466	1.4393870	1.814420e+00	ACTA2;TRIML2;IL13;ZNF423;TRIM22
## 467	3.0513846	3.836305e+00	FAS
## 468	3.0210206	3.773028e+00	CDKN1A
## 469	3.0210206	3.773028e+00	MDM2
## 470	3.0210206	3.773028e+00	MDM2
## 471	2.9620612	3.651009e+00	CYP2E1
## 472	2.9620612	3.651009e+00	ABCA12
## 473	2.9334320	3.592168e+00	CDKN1A
## 474	2.9334320	3.592168e+00	EDA2R
## 475	2.9053480	3.534712e+00	CDKN1A
## 476	2.9053480	3.534712e+00	MDM2
## 477	2.8242165	3.370216e+00	ABCA12
## 478	2.7981651	3.317873e+00	HAS2
## 479	2.7981651	3.317873e+00	CDKN1A
## 480	2.7725874	3.266710e+00	CDKN1A

## 481	2.7474705	3.216693e+00	GRHL3
## 482	2.7474705	3.216693e+00	SESN1
## 483	2.7474705	3.216693e+00	INPP5D
## 484	2.7228022	3.167785e+00	IL13
## 485	2.6985705	3.119954e+00	ACER2
## 486	2.6985705	3.119954e+00	CDKN1A
## 487	2.6985705	3.119954e+00	GDF15
## 488	2.6747638	3.073167e+00	ABCA12
## 489	2.6747638	3.073167e+00	CLEC4E
## 490	2.6747638	3.073167e+00	CLEC4E
## 491	2.6513712	3.027395e+00	EDA2R
## 492	2.6057857	2.938774e+00	CDKN1A
## 493	2.5835724	2.895869e+00	CLEC4E
## 494	2.5617324	2.853866e+00	ANK1
## 495	2.5402564	2.812739e+00	TRIM22
## 496	2.4380308	2.619415e+00	CDKN1A
## 497	2.4380308	2.619415e+00	CDKN1A
## 498	2.4380308	2.619415e+00	RAB39B
## 499	2.4380308	2.619415e+00	CDKN1A
## 500	2.4380308	2.619415e+00	INPP5D
## 501	2.3993943	2.547419e+00	BTG2
## 502	2.3805288	2.512484e+00	ACTA2
## 503	2.3619559	2.478231e+00	CDKN1A
## 504	2.3436686	2.444644e+00	CDKN1A
## 505	2.3436686	2.444644e+00	MDM2
## 506	2.3079254	2.379396e+00	GDF15
## 507	1.6123846	1.651789e+00	CDSN;FAS
## 508	1.5994764	1.622686e+00	ACTA2;IL13
## 509	2.2562963	2.286098e+00	ABCA12
## 510	2.1909242	2.169608e+00	NTF4
## 511	2.1596290	2.114505e+00	CDKN1A
## 512	2.1443120	2.087696e+00	HBA1
## 513	2.1443120	2.087696e+00	BTG2
## 514	2.1443120	2.087696e+00	SLC52A1
## 515	2.0428498	1.912810e+00	CCDC62
## 516	2.0155884	1.866640e+00	MYO1A
## 517	1.9890397	1.822019e+00	CDKN1A
## 518	1.9760240	1.800268e+00	HAS2
## 519	1.9631762	1.778879e+00	MDM2
## 520	1.9631762	1.778879e+00	NTF4
## 521	1.9631762	1.778879e+00	RPS6KA2
## 522	1.9379716	1.737153e+00	HAS2
## 523	1.9379716	1.737153e+00	INHA
## 524	1.9379716	1.737153e+00	INPP5D
## 525	1.9013462	1.677084e+00	GDF15
## 526	1.4242114	1.247433e+00	ZNF423;TRIM22
## 527	1.8660689	1.619869e+00	CDKN1A
## 528	1.8545966	1.601400e+00	RTN4RL1
## 529	1.8100733	1.530373e+00	RPS6KA2
## 530	1.7992717	1.513299e+00	VSTM2L
## 531	1.7471264	1.431757e+00	SPATA18
## 532	1.7270979	1.400832e+00	INPP5D
## 533	1.2368709	1.000626e+00	ACER2;RPS6KA2;FAS
## 534	1.7172534	1.385713e+00	BTG2

## 535	1.7075194	1.370818e+00	CDKN1A
## 536	1.6978943	1.356140e+00	ABCA12
## 537	1.6789630	1.327425e+00	INHA
## 538	1.3170996	1.037431e+00	MDM2;ZNF423
## 539	1.6513378	1.285891e+00	ANK1
## 540	1.3055258	1.015671e+00	ZNF423;TRIM22
## 541	1.2665365	9.437448e-01	ACTA2;IL13
## 542	1.5413510	1.124979e+00	MDM2
## 543	1.5180000	1.091762e+00	MDM2
## 544	1.5103712	1.080984e+00	HES2
## 545	1.5028180	1.070349e+00	VSTM2L
## 546	1.4879336	1.049497e+00	MDM2
## 547	1.4806004	1.039275e+00	IL13
## 548	1.4733383	1.029187e+00	GDF15
## 549	1.4590237	1.009401e+00	CDKN1A
## 550	1.1925958	8.133453e-01	ACTA2;ZNF423
## 551	1.4380605	9.806667e-01	IL13
## 552	1.4380605	9.806667e-01	INPP5D
## 553	1.4244131	9.621154e-01	FAS
## 554	1.4044160	9.351566e-01	CDKN1A
## 555	1.3913903	9.177409e-01	CCDC62
## 556	1.3786014	9.007540e-01	HAS2
## 557	1.3238159	8.292652e-01	BLNK
## 558	1.26777824	7.583563e-01	VSTM2L
## 559	1.0262935	6.073380e-01	ACTA2;GRHL3;ZNF423;CCDC62
## 560	1.2064358	6.833895e-01	FAS
## 561	1.2015873	6.775868e-01	FAS
## 562	1.1418868	6.076524e-01	FAS
## 563	1.1375361	6.026674e-01	GDF15
## 564	1.1375361	6.026674e-01	MDM2
## 565	1.1289323	5.928544e-01	HAS2
## 566	1.1079741	5.692054e-01	GDF15
## 567	1.0998042	5.600854e-01	MDM2
## 568	1.0957637	5.555956e-01	BTG2
## 569	1.0569123	5.131309e-01	MDM2
## 570	0.9385982	4.474410e-01	ACTA2;CDKN1A;MDM2;GRHL3;ZNF423;HES2;TRIM22
## 571	1.0171976	4.710755e-01	BTG2
## 572	1.0102907	4.639044e-01	HAS2
## 573	1.0001019	4.534043e-01	NEFL
## 574	0.9644139	4.173746e-01	INHA
## 575	0.9429808	3.963068e-01	MDM2
## 576	0.9399952	3.934067e-01	BTG2
## 577	0.9370282	3.905330e-01	CCDC62
## 578	0.9196060	3.738298e-01	ABCA12
## 579	0.9028098	3.580061e-01	IL13
## 580	0.9000689	3.554502e-01	ABCA12
## 581	0.8761181	3.334343e-01	IL13
## 582	0.8533885	3.130769e-01	MDM2
## 583	0.8179766	2.824264e-01	ABCA12
## 584	0.7381213	2.182782e-01	HAS2
## 585	0.7165412	2.021756e-01	ANK1
## 586	0.6880028	1.817199e-01	MDM2
## 587	0.6722318	1.708339e-01	NTF4
## 588	0.6563190	1.401764e-01	GRHL3;CCDC62

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## 589 0.6041647 1.273904e-01 RPS6KA2
## 590 0.6272463 1.193657e-01 MDM2;ZNF423
## 591 0.6603928 9.457655e-02 CDKN1A;MDM2;GRHL3;HES2;CCDC62
## 592 0.4336299 4.578837e-02 MDM2
## 593 0.2841046 8.908245e-03 CEL
##
## $Reactome_2022
##
## 1 AKT Phosphorylates Targets In Cytosol
## 2 Constitutive Signaling By AKT1 E17K In Cancer
## 3 CREB1 Phosphorylation Thru NMDA Receptor-Mediated Activation Of RAS Signaling
## 4 Cytokine Signaling In Immune System
## 5 Transmission Across Chemical Synapses
## 6 Interleukin-3, Interleukin-5 And GM-CSF Signaling
## 7 TP53 Regulates Transcription Of Cell Cycle Genes
## 8 TFAP2 (AP-2) Family Regulates Transcription Of Cell Cycle Factors
## 9 Signaling By Interleukins
## 10 Cellular Senescence
## 11 Post NMDA Receptor Activation Events
## 12 p53-Dependent G1 DNA Damage Response
## 13 Activated NTRK2 Signals Thru PI3K
## 14 Biosynthesis Of Maresin-Like SPMs
## 15 G1/S DNA Damage Checkpoint
## 16 Neurotransmitter Receptors And Postsynaptic Signal Transmission
## 17 Activated NTRK2 Signals Thru RAS
## 18 CREB Phosphorylation
## 19 Vitamin B2 (Riboflavin) Metabolism
## 20 RSK Activation
## 21 RUNX3 Regulates CDKN1A Transcription
## 22 Digestion Of Dietary Lipid
## 23 Erythrocytes Take Up Oxygen And Release Carbon Dioxide
## 24 Neurofascin Interactions
## 25 NrCAM Interactions
## 26 Activation Of NMDA Receptors And Postsynaptic Events
## 27 Biosynthesis Of Maresins
## 28 Interleukin-18 Signaling
## 29 Activated NTRK2 Signals Thru FRS2 And FRS3
## 30 Phase 3 - Rapid Repolarisation
## 31 CHL1 Interactions
## 32 Senescence-Associated Secretory Phenotype (SASP)
## 33 Transcriptional Regulation By TP53
## 34 Glycoprotein Hormones
## 35 STAT5 Activation Downstream Of FLT3 ITD Mutants
## 36 Transport Of Bile Salts And Organic Acids, Metal Ions And Amine Compounds
## 37 Metabolism Of Lipids
## 38 Sphingolipid Metabolism
## 39 RAB GEFs Exchange GTP For GDP On RABs
## 40 CYP2E1 Reactions
## 41 eNOS Activation
## 42 Erythrocytes Take Up Carbon Dioxide And Release Oxygen
## 43 Post-translational Modification: Synthesis Of GPI-anchored Proteins
## 44 Neuronal System
## 45 PECAM1 Interactions
## 46 Peptide Hormone Biosynthesis

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## 47 Pregnenolone Biosynthesis
## 48 Scavenging Of Heme From Plasma
## 49 Transcriptional Regulation By RUNX3
## 50 L1CAM Interactions
## 51 TP53 Regulates Transcription Of Genes Involved In G1 Cell Cycle Arrest
## 52 PI3K/AKT Signaling In Cancer
## 53 Phase 2 - Plateau Phase
## 54 Metabolism Of Nitric Oxide: NOS3 Activation And Regulation
## 55 Signaling By FLT3 ITD And TKD Mutants
## 56 Interleukin-4 And Interleukin-13 Signaling
## 57 Hyaluronan Metabolism
## 58 FOXO-mediated Transcription Of Cell Cycle Genes
## 59 Aberrant Regulation Of Mitotic G1/S Transition In Cancer Due To RB1 Defects
## 60 Acetylcholine Neurotransmitter Release Cycle
## 61 Formation Of Senescence-Associated Heterochromatin Foci (SAHF)
## 62 Gastrin-CREB Signaling Pathway Via PKC And MAPK
## 63 Biosynthesis Of DHA-derived SPMs
## 64 ABC Transporters In Lipid Homeostasis
## 65 Regulation Of Signaling By CBL
## 66 Serotonin Neurotransmitter Release Cycle
## 67 Signaling By FLT3 Fusion Proteins
## 68 Norepinephrine Neurotransmitter Release Cycle
## 69 Biosynthesis Of Specialized Proresolving Mediators (SPMs)
## 70 Ras Activation Upon Ca2+ Influx Thru NMDA Receptor
## 71 Regulation Of TP53 Activity Thru Methylation
## 72 SUMOylation Of Transcription Factors
## 73 Rab Regulation Of Trafficking
## 74 NOTCH4 Intracellular Domain Regulates Transcription
## 75 TP53 Regulates Transcription Of Additional Cell Cycle Genes With Uncertain Roles In P53 Pathway
## 76 Unblocking Of NMDA Receptors, Glutamate Binding And Activation
## 77 Negative Regulation Of NMDA Receptor-Mediated Neuronal Transmission
## 78 ERK/MAPK Targets
## 79 Signaling By NTRKs
## 80 Glutamate Neurotransmitter Release Cycle
## 81 Long-term Potentiation
## 82 Digestion
## 83 Dopamine Neurotransmitter Release Cycle
## 84 Signaling By NTRK2 (TRKB)
## 85 Synthesis Of Very Long-Chain Fatty acyl-CoA
## 86 Xenobiotics
## 87 Assembly And Cell Surface Presentation Of NMDA Receptors
## 88 Synthesis Of IP3 And IP4 In Cytosol
## 89 Metal Ion SLC Transporters
## 90 Transport Of Small Molecules
## 91 FLT3 Signaling In Disease
## 92 Interleukin Receptor SHC Signaling
## 93 Paracetamol ADME
## 94 Recycling Pathway Of L1
## 95 Digestion And Absorption
## 96 Cellular Responses To Stress
## 97 TNFs Bind Their Physiological Receptors
## 98 Interaction Between L1 And Ankyrins
## 99 Dectin-2 Family
## 100 MAPK Targets/ Nuclear Events Mediated By MAP Kinases

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101 Cellular Responses To Stimuli
102 Antigen Activates B Cell Receptor Leading To Second Messenger Generation
103 Glutamate Binding, Activation Of AMPA Receptors And Synaptic Plasticity
104 Oncogene Induced Senescence
105 Sialic Acid Metabolism
106 Metabolism Of Steroid Hormones
107 Aberrant Regulation Of Mitotic Cell Cycle Due To RB1 Defects
108 Transcriptional Regulation By AP-2 (TFAP2) Family Of Transcription Factors
109 Regulation Of TP53 Degradation
110 Disorders Of Transmembrane Transporters
111 Fatty acyl-CoA Biosynthesis
112 Regulation Of TP53 Expression And Degradation
113 Diseases Of Mitotic Cell Cycle
114 SUMOylation Of Ubiquitylation Proteins
115 Cellular Response To Chemical Stress
116 Binding And Uptake Of Ligands By Scavenger Receptors
117 RND1 GTPase Cycle
118 Smooth Muscle Contraction
119 Sphingolipid De Novo Biosynthesis
120 Aspirin ADME
121 Interleukin-2 Family Signaling
122 Muscle Contraction
123 Glycosphingolipid Metabolism
124 Heme Signaling
125 Cyclin D Associated Events In G1
126 Inositol Phosphate Metabolism
127 Neurotransmitter Release Cycle
128 Synthesis Of PIPs At Plasma Membrane
129 Vesicle-mediated Transport
130 Regulation Of RUNX3 Expression And Activity
131 Amino Acids Regulate mTORC1
132 Stabilization Of P53
133 Cytoprotection By HMOX1
134 Role Of GTSE1 In G2/M Progression After G2 Checkpoint
135 Transcriptional Regulation Of Granulopoiesis
136 Iron Uptake And Transport
137 SCF(Skp2)-mediated Degradation Of P27/P21
138 DNA Damage/Telomere Stress Induced Senescence
139 Nuclear Events (Kinase And Transcription Factor Activation)
140 RAB Geranylgeranylation
141 MAP Kinase Activation
142 Synthesis Of Substrates In N-glycan Biosynthesis
143 FOXO-mediated Transcription
144 Cytochrome P450 - Arranged By Substrate Type
145 SLC-mediated Transmembrane Transport
146 Interleukin-17 Signaling
147 Formation Of Cornified Envelope
148 PIP3 Activates AKT Signaling
149 ABC Transporter Disorders
150 Biosynthesis Of N-glycan Precursor (Dolichol LLO) And Transfer To Protein
151 Cell Cycle Checkpoints
152 Metabolism
153 COP1-mediated Anterograde Transport
154 TP53 Regulates Metabolic Genes

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## 155                               Signaling By NOTCH4
## 156                               PI Metabolism
## 157                               Cyclin E Associated Events During G1/S Transition
## 158                               Asparagine N-linked Glycosylation
## 159                               Cyclin A:Cdk2-associated Events At S Phase Entry
## 160                               Peptide Hormone Metabolism
## 161                               Interferon Gamma Signaling
## 162                               Regulation Of TP53 Activity Thru Phosphorylation
## 163                               Oxidative Stress Induced Senescence
## 164                               Downstream TCR Signaling
## 165                               Intracellular Signaling By Second Messengers
## 166                               Drug ADME
## 167                               MyD88 Cascade Initiated On Plasma Membrane
## 168                               Potential Therapeutics For SARS
## 169                               SLC Transporter Disorders
## 170                               TNFR2 Non-Canonical NF- $\kappa$ B Pathway
## 171                               KEAP1-NFE2L2 Pathway
## 172                               TRAF6 Mediated Induction Of NF $\kappa$ B And MAP Kinases Upon TLR7/8 Or 9 Activation
## 173                               ABC-family Proteins Mediated Transport
## 174                               MyD88 Dependent Cascade Initiated On Endosome
## 175                               Toll Like Receptor 3 (TLR3) Cascade
## 176                               Toll Like Receptor 7/8 (TLR7/8) Cascade
## 177                               Phase I - Functionalization Of Compounds
## 178                               Toll Like Receptor 9 (TLR9) Cascade
## 179                               MyD88-independent TLR4 Cascade
## 180                               Signaling By B Cell Receptor (BCR)
## 181                               Post-translational Protein Modification
## 182                               Immune System
## 183                               MyD88:MAL(TIRAP) Cascade Initiated On Plasma Membrane
## 184                               Signaling By NTRK1 (TRKA)
## 185                               Membrane Trafficking
## 186                               TCR Signaling
## 187                               Transcriptional Regulation By RUNX2
## 188                               Glycosaminoglycan Metabolism
## 189                               Metabolism Of Water-Soluble Vitamins And Cofactors
## 190                               Cardiac Conduction
## 191                               G1/S Transition
## 192                               ER To Golgi Anterograde Transport
## 193                               Cell Surface Interactions At Vascular Wall
## 194                               Toll Like Receptor 4 (TLR4) Cascade
## 195                               C-type Lectin Receptors (CLRs)
## 196                               Mitotic G1 Phase And G1/S Transition
## 197                               CDC42 GTPase Cycle
## 198                               Interleukin-1 Family Signaling
## 199                               Cellular Response To Starvation
## 200                               Metabolism Of Steroids
## 201                               Regulation Of TP53 Activity
## 202                               Diseases Of Signal Transduction By Growth Factor Receptors And Second Messengers
## 203                               S Phase
## 204                               Toll-like Receptor Cascades
## 205                               Transport To Golgi And Subsequent Modification
## 206                               SUMO E3 Ligases SUMOylate Target Proteins
## 207                               RHO GTPase Cycle
## 208                               Metabolism Of Proteins

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## 209				Fatty Acid Metabolism	
## 210				SUMOylation	
## 211				RAC1 GTPase Cycle	
## 212				G2/M Transition	
## 213				Mitotic G2-G2/M Phases	
## 214				Metabolism Of Vitamins And Cofactors	
## 215				Developmental Biology	
## 216				Interferon Signaling	
## 217				Ub-specific Processing Proteases	
## 218				Signaling By Receptor Tyrosine Kinases	
## 219				Signaling By NOTCH	
## 220				Phospholipid Metabolism	
## 221				Keratinization	
## 222				G Alpha (Q) Signaling Events	
## 223				Axon Guidance	
## 224				Biological Oxidations	
## 225				Nervous System Development	
## 226				Generic Transcription Pathway	
## 227				Signal Transduction	
## 228				RAF/MAP Kinase Cascade	
## 229				MAPK1/MAPK3 Signaling	
## 230				Deubiquitination	
## 231				Metabolism Of Carbohydrates	
## 232				Signaling By Rho GTPases	
## 233				RNA Polymerase II Transcription	
## 234				Cell Cycle	
## 235				Signaling By Rho GTPases, Miro GTPases And RHOBTB3	
## 236				MAPK Family Signaling Cascades	
## 237				Disease	
## 238				Adaptive Immune System	
## 239				SARS-CoV Infections	
## 240				Gene Expression (Transcription)	
## 241				Cell Cycle, Mitosis	
## 242				Hemostasis	
## 243				Innate Immune System	
## 244				GPCR Downstream Signaling	
## 245				Signaling By GPCR	
## 246				Infectious Disease	
##	Overlap	P.value	Adjusted.P.value	Old.P.value	Old.Adjusted.P.value
## 1	2/14	0.0009513347	0.1975349	0	0
## 2	2/26	0.0033120173	0.1975349	0	0
## 3	2/27	0.0035693908	0.1975349	0	0
## 4	7/702	0.0082492057	0.1975349	0	0
## 5	4/246	0.0088713509	0.1975349	0	0
## 6	2/44	0.0092796653	0.1975349	0	0
## 7	2/49	0.0114145454	0.1975349	0	0
## 8	1/5	0.0163929514	0.1975349	0	0
## 9	5/453	0.0168289729	0.1975349	0	0
## 10	3/165	0.0172662339	0.1975349	0	0
## 11	2/61	0.0173184481	0.1975349	0	0
## 12	2/65	0.0195192797	0.1975349	0	0
## 13	1/6	0.0196396519	0.1975349	0	0
## 14	1/6	0.0196396519	0.1975349	0	0
## 15	2/67	0.0206614981	0.1975349	0	0

## 16	3/182	0.0223161078	0.1975349	0	0
## 17	1/7	0.0228757988	0.1975349	0	0
## 18	1/7	0.0228757988	0.1975349	0	0
## 19	1/7	0.0228757988	0.1975349	0	0
## 20	1/7	0.0228757988	0.1975349	0	0
## 21	1/7	0.0228757988	0.1975349	0	0
## 22	1/7	0.0228757988	0.1975349	0	0
## 23	1/7	0.0228757988	0.1975349	0	0
## 24	1/7	0.0228757988	0.1975349	0	0
## 25	1/7	0.0228757988	0.1975349	0	0
## 26	2/74	0.0248718899	0.1975349	0	0
## 27	1/8	0.0261014256	0.1975349	0	0
## 28	1/8	0.0261014256	0.1975349	0	0
## 29	1/9	0.0293165658	0.1975349	0	0
## 30	1/9	0.0293165658	0.1975349	0	0
## 31	1/9	0.0293165658	0.1975349	0	0
## 32	2/81	0.0294002668	0.1975349	0	0
## 33	4/354	0.0294827782	0.1975349	0	0
## 34	1/10	0.0325212529	0.1975349	0	0
## 35	1/10	0.0325212529	0.1975349	0	0
## 36	2/86	0.0328204621	0.1975349	0	0
## 37	6/732	0.0334444898	0.1975349	0	0
## 38	2/89	0.0349440565	0.1975349	0	0
## 39	2/89	0.0349440565	0.1975349	0	0
## 40	1/11	0.0357155201	0.1975349	0	0
## 41	1/11	0.0357155201	0.1975349	0	0
## 42	1/11	0.0357155201	0.1975349	0	0
## 43	2/92	0.0371197647	0.1975349	0	0
## 44	4/386	0.0386338325	0.1975349	0	0
## 45	1/12	0.0388994009	0.1975349	0	0
## 46	1/12	0.0388994009	0.1975349	0	0
## 47	1/12	0.0388994009	0.1975349	0	0
## 48	1/12	0.0388994009	0.1975349	0	0
## 49	2/95	0.0393463853	0.1975349	0	0
## 50	2/99	0.0423923673	0.2072046	0	0
## 51	1/14	0.0452361353	0.2072046	0	0
## 52	2/105	0.0471210949	0.2072046	0	0
## 53	1/15	0.0483890551	0.2072046	0	0
## 54	1/15	0.0483890551	0.2072046	0	0
## 55	1/15	0.0483890551	0.2072046	0	0
## 56	2/107	0.0487385918	0.2072046	0	0
## 57	1/16	0.0515317206	0.2072046	0	0
## 58	1/17	0.0546641645	0.2072046	0	0
## 59	1/17	0.0546641645	0.2072046	0	0
## 60	1/17	0.0546641645	0.2072046	0	0
## 61	1/17	0.0546641645	0.2072046	0	0
## 62	1/17	0.0546641645	0.2072046	0	0
## 63	1/17	0.0546641645	0.2072046	0	0
## 64	1/18	0.0577864196	0.2072046	0	0
## 65	1/18	0.0577864196	0.2072046	0	0
## 66	1/18	0.0577864196	0.2072046	0	0
## 67	1/18	0.0577864196	0.2072046	0	0
## 68	1/18	0.0577864196	0.2072046	0	0
## 69	1/19	0.0608985185	0.2072046	0	0

## 70	1/19	0.0608985185	0.2072046	0	0
## 71	1/19	0.0608985185	0.2072046	0	0
## 72	1/19	0.0608985185	0.2072046	0	0
## 73	2/122	0.0614875503	0.2072046	0	0
## 74	1/20	0.0640004936	0.2127584	0	0
## 75	1/21	0.0670923774	0.2143471	0	0
## 76	1/21	0.0670923774	0.2143471	0	0
## 77	1/21	0.0670923774	0.2143471	0	0
## 78	1/22	0.0701742023	0.2145061	0	0
## 79	2/132	0.0705486010	0.2145061	0	0
## 80	1/23	0.0732460003	0.2145061	0	0
## 81	1/23	0.0732460003	0.2145061	0	0
## 82	1/23	0.0732460003	0.2145061	0	0
## 83	1/23	0.0732460003	0.2145061	0	0
## 84	1/23	0.0732460003	0.2145061	0	0
## 85	1/24	0.0763078036	0.2182758	0	0
## 86	1/24	0.0763078036	0.2182758	0	0
## 87	1/25	0.0793596443	0.2243962	0	0
## 88	1/26	0.0824015542	0.2272842	0	0
## 89	1/26	0.0824015542	0.2272842	0	0
## 90	5/706	0.0833329158	0.2272842	0	0
## 91	1/27	0.0854335651	0.2272842	0	0
## 92	1/27	0.0854335651	0.2272842	0	0
## 93	1/28	0.0884557088	0.2272842	0	0
## 94	1/28	0.0884557088	0.2272842	0	0
## 95	1/28	0.0884557088	0.2272842	0	0
## 96	5/722	0.0896521758	0.2272842	0	0
## 97	1/29	0.0914680169	0.2272842	0	0
## 98	1/29	0.0914680169	0.2272842	0	0
## 99	1/29	0.0914680169	0.2272842	0	0
## 100	1/30	0.0944705209	0.2323200	0	0
## 101	5/736	0.0953834105	0.2323200	0	0
## 102	1/31	0.0974632521	0.2327763	0	0
## 103	1/31	0.0974632521	0.2327763	0	0
## 104	1/33	0.1034195217	0.2422972	0	0
## 105	1/33	0.1034195217	0.2422972	0	0
## 106	1/35	0.1093370749	0.2530641	0	0
## 107	1/36	0.1122814103	0.2530641	0	0
## 108	1/36	0.1122814103	0.2530641	0	0
## 109	1/36	0.1122814103	0.2530641	0	0
## 110	2/176	0.1147826523	0.2530641	0	0
## 111	1/37	0.1152161595	0.2530641	0	0
## 112	1/37	0.1152161595	0.2530641	0	0
## 113	1/38	0.1181413532	0.2571927	0	0
## 114	1/39	0.1210570219	0.2594100	0	0
## 115	2/182	0.1212688923	0.2594100	0	0
## 116	1/41	0.1268599066	0.2690305	0	0
## 117	1/42	0.1297471834	0.2728018	0	0
## 118	1/43	0.1326250569	0.2744739	0	0
## 119	1/44	0.1354935571	0.2744739	0	0
## 120	1/44	0.1354935571	0.2744739	0	0
## 121	1/44	0.1354935571	0.2744739	0	0
## 122	2/196	0.1367401439	0.2744739	0	0
## 123	1/45	0.1383527142	0.2744739	0	0

## 124	1/45	0.1383527142	0.2744739	0	0
## 125	1/47	0.1440431187	0.2834769	0	0
## 126	1/48	0.1468744258	0.2867548	0	0
## 127	1/50	0.1525093980	0.2954119	0	0
## 128	1/51	0.1553131222	0.2984924	0	0
## 129	4/637	0.1586720685	0.3025839	0	0
## 130	1/54	0.1636695996	0.3097132	0	0
## 131	1/55	0.1664369578	0.3125457	0	0
## 132	1/56	0.1691952973	0.3153185	0	0
## 133	1/57	0.1719446470	0.3180330	0	0
## 134	1/59	0.1774164925	0.3185727	0	0
## 135	1/59	0.1774164925	0.3185727	0	0
## 136	1/59	0.1774164925	0.3185727	0	0
## 137	1/59	0.1774164925	0.3185727	0	0
## 138	1/61	0.1828527240	0.3236099	0	0
## 139	1/61	0.1828527240	0.3236099	0	0
## 140	1/62	0.1855575558	0.3237387	0	0
## 141	1/62	0.1855575558	0.3237387	0	0
## 142	1/63	0.1882535697	0.3261294	0	0
## 143	1/65	0.1936192564	0.3307662	0	0
## 144	1/65	0.1936192564	0.3307662	0	0
## 145	2/247	0.1961049902	0.3327023	0	0
## 146	1/69	0.2042460531	0.3441406	0	0
## 147	1/74	0.2173357643	0.3637047	0	0
## 148	2/268	0.2214432421	0.3666999	0	0
## 149	1/77	0.2250875609	0.3666999	0	0
## 150	1/77	0.2250875609	0.3666999	0	0
## 151	2/271	0.2250881568	0.3666999	0	0
## 152	9/2049	0.2313941248	0.3713221	0	0
## 153	1/80	0.2327637326	0.3713221	0	0
## 154	1/81	0.2353057768	0.3713221	0	0
## 155	1/81	0.2353057768	0.3713221	0	0
## 156	1/82	0.2378395257	0.3713221	0	0
## 157	1/82	0.2378395257	0.3713221	0	0
## 158	2/282	0.2384914085	0.3713221	0	0
## 159	1/84	0.2428822444	0.3757801	0	0
## 160	1/89	0.2553457301	0.3901556	0	0
## 161	1/89	0.2553457301	0.3901556	0	0
## 162	1/90	0.2578140696	0.3914954	0	0
## 163	1/93	0.2651708417	0.3993588	0	0
## 164	1/94	0.2676071029	0.3993588	0	0
## 165	2/306	0.2678625966	0.3993588	0	0
## 166	1/95	0.2700354088	0.4001730	0	0
## 167	1/96	0.2724557852	0.4013421	0	0
## 168	1/97	0.2748682573	0.4024857	0	0
## 169	1/99	0.2796695907	0.4041927	0	0
## 170	1/100	0.2820585026	0.4041927	0	0
## 171	1/100	0.2820585026	0.4041927	0	0
## 172	1/101	0.2844396115	0.4041927	0	0
## 173	1/102	0.2868129424	0.4041927	0	0
## 174	1/102	0.2868129424	0.4041927	0	0
## 175	1/103	0.2891785206	0.4041927	0	0
## 176	1/103	0.2891785206	0.4041927	0	0
## 177	1/104	0.2915363707	0.4051861	0	0

## 178	1/106	0.2962289868	0.4093951	0	0
## 179	1/107	0.2985638020	0.4103167	0	0
## 180	1/109	0.3032105702	0.4143878	0	0
## 181	6/1383	0.3050571721	0.4146081	0	0
## 182	8/1943	0.3096212697	0.4168879	0	0
## 183	1/112	0.3101239335	0.4168879	0	0
## 184	1/114	0.3146952669	0.4207339	0	0
## 185	3/599	0.3168742461	0.4213571	0	0
## 186	1/116	0.3192367651	0.4222164	0	0
## 187	1/119	0.3259934905	0.4288471	0	0
## 188	1/120	0.3282310217	0.4294938	0	0
## 189	1/122	0.3326841600	0.4330175	0	0
## 190	1/126	0.3415033973	0.4421570	0	0
## 191	1/129	0.3480423988	0.4482640	0	0
## 192	1/133	0.3566616818	0.4569728	0	0
## 193	1/134	0.3587989071	0.4573292	0	0
## 194	1/140	0.3714761958	0.4710471	0	0
## 195	1/141	0.3735649419	0.4712665	0	0
## 196	1/147	0.3859546184	0.4844124	0	0
## 197	1/149	0.3900306346	0.4870433	0	0
## 198	1/152	0.3960947451	0.4896666	0	0
## 199	1/153	0.3981028907	0.4896666	0	0
## 200	1/153	0.3981028907	0.4896666	0	0
## 201	1/157	0.4060699169	0.4969811	0	0
## 202	2/424	0.4095823788	0.4987983	0	0
## 203	1/161	0.4139330640	0.5015057	0	0
## 204	1/162	0.4158827764	0.5015057	0	0
## 205	1/164	0.4197630568	0.5037157	0	0
## 206	1/168	0.4274476151	0.5099100	0	0
## 207	2/441	0.4290706055	0.5099100	0	0
## 208	7/1890	0.4335460869	0.5127516	0	0
## 209	1/173	0.4369124859	0.5140075	0	0
## 210	1/174	0.4387868845	0.5140075	0	0
## 211	1/178	0.4462232243	0.5202413	0	0
## 212	1/182	0.4535625024	0.5263037	0	0
## 213	1/184	0.4571961337	0.5280293	0	0
## 214	1/186	0.4608059663	0.5297115	0	0
## 215	4/1073	0.4755346101	0.5441001	0	0
## 216	1/200	0.4854211976	0.5510289	0	0
## 217	1/201	0.4871364565	0.5510289	0	0
## 218	2/496	0.4897465963	0.5510289	0	0
## 219	1/203	0.4905500987	0.5510289	0	0
## 220	1/208	0.4989866101	0.5554331	0	0
## 221	1/208	0.4989866101	0.5554331	0	0
## 222	1/212	0.5056366211	0.5603000	0	0
## 223	2/519	0.5139380919	0.5660734	0	0
## 224	1/218	0.5154489626	0.5660734	0	0
## 225	2/545	0.5403859239	0.5908219	0	0
## 226	4/1190	0.5581005135	0.6074899	0	0
## 227	8/2465	0.5762265321	0.6244569	0	0
## 228	1/271	0.5941974965	0.6411078	0	0
## 229	1/277	0.6022759261	0.6469864	0	0
## 230	1/279	0.6049333766	0.6470157	0	0
## 231	1/285	0.6128012472	0.6525935	0	0

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## 232 2/644 0.6319578633      0.6700933      0      0
## 233 4/1312 0.6365832634    0.6721008      0      0
## 234 2/654 0.6403916256     0.6732322      0      0
## 235 2/660 0.6453802925     0.6755896      0      0
## 236 1/318 0.6533939332     0.6810801      0      0
## 237 5/1736 0.6888918711    0.7150523      0      0
## 238 2/733 0.7018407588     0.7254320      0      0
## 239 1/369 0.7080260184     0.7287632      0      0
## 240 4/1449 0.7136529813    0.7314943      0      0
## 241 1/523 0.8265293614     0.8436773      0      0
## 242 1/576 0.8551255023     0.8692598      0      0
## 243 2/1035 0.8624469576    0.8730945      0      0
## 244 1/619 0.8748698623     0.8820409      0      0
## 245 1/689 0.9014911082     0.9051707      0      0
## 246 1/961 0.9614346579     0.9614347      0      0
## Odds.Ratio Combined.Score
## 1 51.8802083 360.96405424
## 2 25.9244792 148.03390445
## 3 24.8862500 140.24298607
## 4 3.2843068 15.75691626
## 5 5.2498001 24.80492828
## 6 14.8005952 69.26574678
## 7 13.2227394 59.14355225
## 8 76.6538462 315.11658962
## 9 3.5652078 14.56263798
## 10 5.8118754 23.59041656
## 11 10.5270127 42.69738440
## 12 9.8566468 38.79923734
## 13 61.3200000 241.00015221
## 14 61.3200000 241.00015221
## 15 9.5524038 37.05839125
## 16 5.2553871 19.98332838
## 17 51.0974359 193.02954438
## 18 51.0974359 193.02954438
## 19 51.0974359 193.02954438
## 20 51.0974359 193.02954438
## 21 51.0974359 193.02954438
## 22 51.0974359 193.02954438
## 23 51.0974359 193.02954438
## 24 51.0974359 193.02954438
## 25 51.0974359 193.02954438
## 26 8.6206597 31.84486386
## 27 43.7956044 159.66849675
## 28 43.7956044 159.66849675
## 29 38.3192308 135.25165408
## 30 38.3192308 135.25165408
## 31 38.3192308 135.25165408
## 32 7.8540348 27.69922927
## 33 3.6099539 12.72129341
## 34 34.0598291 116.68425597
## 35 34.0598291 116.68425597
## 36 7.3846726 25.23123394
## 37 2.6457300 8.98984202
## 38 7.1289511 23.91055122

```

```

## 39    7.1289511   23.91055122
## 40    30.6523077  102.13869849
## 41    30.6523077  102.13869849
## 42    30.6523077  102.13869849
## 43    6.8902778   22.69385824
## 44    3.3021449   10.74394749
## 45    27.8643357  90.46926829
## 46    27.8643357  90.46926829
## 47    27.8643357  90.46926829
## 48    27.8643357  90.46926829
## 49    6.6670027   21.57009495
## 50    6.3907861   20.19991325
## 51    23.5751479  72.98533527
## 52    6.0166869   18.38118606
## 53    21.8901099  66.29379556
## 54    21.8901099  66.29379556
## 55    21.8901099  66.29379556
## 56    5.9014881   17.83007229
## 57    20.4297436  60.58558396
## 58    19.1519231  55.66596287
## 59    19.1519231  55.66596287
## 60    19.1519231  55.66596287
## 61    19.1519231  55.66596287
## 62    19.1519231  55.66596287
## 63    19.1519231  55.66596287
## 64    18.0244344  51.38768922
## 65    18.0244344  51.38768922
## 66    18.0244344  51.38768922
## 67    18.0244344  51.38768922
## 68    18.0244344  51.38768922
## 69    17.0222222  47.63747926
## 70    17.0222222  47.63747926
## 71    17.0222222  47.63747926
## 72    17.0222222  47.63747926
## 73    5.1598958   14.39053957
## 74    16.1255061  44.32683091
## 75    15.3184615  41.38565534
## 76    15.3184615  41.38565534
## 77    15.3184615  41.38565534
## 78    14.5882784  38.75776638
## 79    4.7605769   12.62244801
## 80    13.9244755  36.39762709
## 81    13.9244755  36.39762709
## 82    13.9244755  36.39762709
## 83    13.9244755  36.39762709
## 84    13.9244755  36.39762709
## 85    13.3183946  34.26796400
## 86    13.3183946  34.26796400
## 87    12.7628205  32.33799172
## 88    12.2516923  30.58207377
## 89    12.2516923  30.58207377
## 90    2.2488950   5.58830546
## 91    11.7798817  28.97869996
## 92    11.7798817  28.97869996

```

```

## 93 11.3430199 27.50969675
## 94 11.3430199 27.50969675
## 95 11.3430199 27.50969675
## 96 2.1968814 5.29847759
## 97 10.9373626 26.15961110
## 98 10.9373626 26.15961110
## 99 10.9373626 26.15961110
## 100 10.5596817 24.91522516
## 101 2.1532372 5.05978575
## 102 10.2071795 23.76517057
## 103 10.2071795 23.76517057
## 104 9.5682692 21.71003486
## 105 9.5682692 21.71003486
## 106 9.0045249 19.92989267
## 107 8.7468132 19.12706720
## 108 8.7468132 19.12706720
## 109 8.7468132 19.12706720
## 110 3.5488506 7.68224978
## 111 8.5034188 18.37542261
## 112 8.5034188 18.37542261
## 113 8.2731809 17.67046748
## 114 8.0550607 17.00820909
## 115 3.4295139 7.23539960
## 116 7.6515385 15.79791644
## 117 7.4645403 15.24384142
## 118 7.2864469 14.72029315
## 119 7.1166369 14.22495570
## 120 7.1166369 14.22495570
## 121 7.1166369 14.22495570
## 122 3.1797680 6.32669835
## 123 6.9545455 13.75573591
## 124 6.9545455 13.75573591
## 125 6.6515050 12.88823940
## 126 6.5096563 12.48667497
## 127 6.2433281 11.74075992
## 128 6.1181538 11.39391167
## 129 1.9671814 3.62141501
## 130 5.7709724 10.44491484
## 131 5.6638177 10.15601049
## 132 5.5605594 9.87945500
## 133 5.4609890 9.61452263
## 134 5.2721485 9.11689052
## 135 5.2721485 9.11689052
## 136 5.2721485 9.11689052
## 137 5.2721485 9.11689052
## 138 5.0958974 8.65830805
## 139 5.0958974 8.65830805
## 140 5.0121059 8.44234196
## 141 5.0121059 8.44234196
## 142 4.9310174 8.23462864
## 143 4.7764423 7.84225742
## 144 4.7764423 7.84225742
## 145 2.5113520 4.09125641
## 146 4.4945701 7.13930945

```

```

## 147 4.1856691 6.38863626
## 148 2.3106203 3.48346567
## 149 4.0198381 5.99464699
## 150 4.0198381 5.99464699
## 151 2.2845028 3.40679481
## 152 1.3849845 2.02710885
## 153 3.8666018 5.63646664
## 154 3.8180769 5.52425879
## 155 3.8180769 5.52425879
## 156 3.7707502 5.41539725
## 157 3.7707502 5.41539725
## 158 2.1935268 3.14424954
## 159 3.6795181 5.20717503
## 160 3.4695804 4.73645208
## 161 3.4695804 4.73645208
## 162 3.4304235 4.64999606
## 163 3.3180602 4.40432998
## 164 3.2822167 4.32673428
## 165 2.0178865 2.65812382
## 166 3.2471358 4.25115734
## 167 3.2127935 4.17752774
## 168 3.1791667 4.10577727
## 169 3.1139717 3.96765590
## 170 3.0823621 3.90116313
## 171 3.0823621 3.90116313
## 172 3.0513846 3.83630543
## 173 3.0210206 3.77302824
## 174 3.0210206 3.77302824
## 175 2.9912519 3.71127931
## 176 2.9912519 3.71127931
## 177 2.9620612 3.65100857
## 178 2.9053480 3.53471179
## 179 2.8777939 3.47859562
## 180 2.8242165 3.37021599
## 181 1.3476398 1.59999353
## 182 1.2830081 1.50420568
## 183 2.7474705 3.21669257
## 184 2.6985705 3.11995362
## 185 1.5450623 1.77566331
## 186 2.6513712 3.02739465
## 187 2.5835724 2.89586907
## 188 2.5617324 2.85386616
## 189 2.5191354 2.77246397
## 190 2.4380308 2.61941453
## 191 2.3805288 2.51248387
## 192 2.3079254 2.37939636
## 193 2.2904569 2.34770275
## 194 2.1909242 2.16960757
## 195 2.1751648 2.14180524
## 196 2.0851423 1.98512942
## 197 2.0567568 1.93649817
## 198 2.0155884 1.86664011
## 199 2.0022267 1.84414048
## 200 2.0022267 1.84414048

```

## 201	1.9504931	1.75784275
## 202	1.4449052	1.28974728
## 203	1.9013462	1.67708428
## 204	1.8894410	1.65770454
## 205	1.8660689	1.61986887
## 206	1.8210041	1.54771428
## 207	1.3877420	1.17421542
## 208	1.1373574	0.95055464
## 209	1.7676208	1.46362952
## 210	1.7573144	1.44757266
## 211	1.7172534	1.38571348
## 212	1.6789630	1.32742544
## 213	1.6604456	1.29953577
## 214	1.6423285	1.27244034
## 215	1.1385377	0.84629283
## 216	1.5257055	1.10268579
## 217	1.5180000	1.09176229
## 218	1.2297571	0.87788321
## 219	1.5028180	1.07034884
## 220	1.4661464	1.01922982
## 221	1.4661464	1.01922982
## 222	1.4380605	0.98066669
## 223	1.1736581	0.78124842
## 224	1.3978731	0.92639424
## 225	1.1159645	0.68684462
## 226	1.0198553	0.59479613
## 227	0.9811236	0.54084871
## 228	1.1204558	0.58324604
## 229	1.0957637	0.55559555
## 230	1.0877698	0.54675328
## 231	1.0644637	0.52128344
## 232	0.9390576	0.43096412
## 233	0.9187136	0.41492787
## 234	0.9241756	0.41188231
## 235	0.9154635	0.40089570
## 236	0.9520505	0.40516894
## 237	0.8619579	0.32122669
## 238	0.8209217	0.29064629
## 239	0.8179766	0.28242641
## 240	0.8254939	0.27848735
## 241	0.5721191	0.10900003
## 242	0.5179666	0.08106541
## 243	0.5717873	0.08461401
## 244	0.4808564	0.06428094
## 245	0.4303667	0.04463122
## 246	0.3040705	0.01195869
##		Genes
## 1		CDKN1A;MDM2
## 2		CDKN1A;MDM2
## 3		RPS6KA2;NEFL
## 4	CDKN1A;RPS6KA2;INPP5D;IL13;BLNK;EDA2R;TRIM22	
## 5		RPS6KA2;MDM2;NEFL;TSPOAP1
## 6		INPP5D;BLNK
## 7		BTG2;CDKN1A

```

## 8                               CDKN1A
## 9                               CDKN1A;RPS6KA2;INPP5D;IL13;BLNK
## 10                             CDKN1A;RPS6KA2;MDM2
## 11                             RPS6KA2;NEFL
## 12                             CDKN1A;MDM2
## 13                             NTF4
## 14                             CYP2E1
## 15                             CDKN1A;MDM2
## 16                             RPS6KA2;MDM2;NEFL
## 17                             NTF4
## 18                             RPS6KA2
## 19                             SLC52A1
## 20                             RPS6KA2
## 21                             CDKN1A
## 22                             CEL
## 23                             HBA1
## 24                             ANK1
## 25                             ANK1
## 26                             RPS6KA2;NEFL
## 27                             CYP2E1
## 28                             IL13
## 29                             NTF4
## 30                             KCNE3
## 31                             ANK1
## 32                             CDKN1A;RPS6KA2
## 33                             BTG2;CDKN1A;SESN1;MDM2
## 34                             INHA
## 35                             CDKN1A
## 36                             SLC14A1;HEPH
## 37                             ACER2;NEU4;ELOVL4;INPP5D;CYP2E1;TSPOAP1
## 38                             ACER2;NEU4
## 39                             RINL;RAB39B
## 40                             CYP2E1
## 41                             CYGB
## 42                             HBA1
## 43                             RTN4RL1;LY6D
## 44                             RPS6KA2;MDM2;NEFL;TSPOAP1
## 45                             INPP5D
## 46                             INHA
## 47                             TSPOAP1
## 48                             HBA1
## 49                             CDKN1A;MDM2
## 50                             RPS6KA2;ANK1
## 51                             CDKN1A
## 52                             CDKN1A;MDM2
## 53                             KCNE3
## 54                             CYGB
## 55                             CDKN1A
## 56                             CDKN1A;IL13
## 57                             HAS2
## 58                             CDKN1A
## 59                             CDKN1A
## 60                             TSPOAP1
## 61                             CDKN1A

```

```

## 62 RPS6KA2
## 63 CYP2E1
## 64 ABCA12
## 65 BLNK
## 66 TSPOAP1
## 67 CDKN1A
## 68 TSPOAP1
## 69 CYP2E1
## 70 NEFL
## 71 MDM2
## 72 MDM2
## 73 RINL;RAB39B
## 74 ACTA2
## 75 BTG2
## 76 NEFL
## 77 NEFL
## 78 RPS6KA2
## 79 NTF4;RPS6KA2
## 80 TSPOAP1
## 81 NEFL
## 82 CEL
## 83 TSPOAP1
## 84 NTF4
## 85 ELOVL4
## 86 CYP2E1
## 87 NEFL
## 88 INPP5D
## 89 HEPH
## 90 SLC14A1;HEPH;HBA1;ABCA12;CYGB
## 91 CDKN1A
## 92 INPP5D
## 93 CYP2E1
## 94 RPS6KA2
## 95 CEL
## 96 CDKN1A;SESN1;RPS6KA2;MDM2;HBA1
## 97 EDA2R
## 98 ANK1
## 99 CLEC4E
## 100 RPS6KA2
## 101 CDKN1A;SESN1;RPS6KA2;MDM2;HBA1
## 102 BLNK
## 103 MDM2
## 104 MDM2
## 105 NEU4
## 106 TSPOAP1
## 107 CDKN1A
## 108 CDKN1A
## 109 MDM2
## 110 HEPH;ABCA12
## 111 ELOVL4
## 112 MDM2
## 113 CDKN1A
## 114 MDM2
## 115 SESN1;HBA1

```

```

## 116          HBA1
## 117          EPSTI1
## 118          ACTA2
## 119          ACER2
## 120          CYP2E1
## 121          INPP5D
## 122          ACTA2;KCNE3
## 123          NEU4
## 124          HBA1
## 125          CDKN1A
## 126          INPP5D
## 127          TSPOAP1
## 128          INPP5D
## 129          RINL;RAB39B;HBA1;ANK1
## 130          MDM2
## 131          SESN1
## 132          MDM2
## 133          HBA1
## 134          CDKN1A
## 135          CDKN1A
## 136          HEPH
## 137          CDKN1A
## 138          CDKN1A
## 139          RPS6KA2
## 140          RAB39B
## 141          RPS6KA2
## 142          NEU4
## 143          CDKN1A
## 144          CYP2E1
## 145          SLC14A1;HEPH
## 146          RPS6KA2
## 147          CDSN
## 148          CDKN1A;MDM2
## 149          ABCA12
## 150          NEU4
## 151          CDKN1A;MDM2
## 152 ACER2;NEU4;ELOVL4;INPP5D;HAS2;SLC52A1;CYP2E1;TSPOAP1;CYGB
## 153          ANK1
## 154          SESN1
## 155          ACTA2
## 156          INPP5D
## 157          CDKN1A
## 158          NEU4;ANK1
## 159          CDKN1A
## 160          INHA
## 161          TRIM22
## 162          MDM2
## 163          MDM2
## 164          INPP5D
## 165          CDKN1A;MDM2
## 166          CYP2E1
## 167          RPS6KA2
## 168          BLNK
## 169          HEPH

```

```

## 170 EDA2R
## 171 SESN1
## 172 RPS6KA2
## 173 ABCA12
## 174 RPS6KA2
## 175 RPS6KA2
## 176 RPS6KA2
## 177 CYP2E1
## 178 RPS6KA2
## 179 RPS6KA2
## 180 BLNK
## 181 NEU4;RTN4RL1;LY6D;MDM2;RAB39B;ANK1
## 182 CDKN1A;RPS6KA2;INPP5D;IL13;BLNK;CLEC4E;EDA2R;TRIM22
## 183 RPS6KA2
## 184 RPS6KA2
## 185 RINL;RAB39B;ANK1
## 186 INPP5D
## 187 CDKN1A
## 188 HAS2
## 189 SLC52A1
## 190 KCNE3
## 191 CDKN1A
## 192 ANK1
## 193 INPP5D
## 194 RPS6KA2
## 195 CLEC4E
## 196 CDKN1A
## 197 PLEKHG1
## 198 IL13
## 199 SESN1
## 200 TSPOAP1
## 201 MDM2
## 202 CDKN1A;MDM2
## 203 CDKN1A
## 204 RPS6KA2
## 205 ANK1
## 206 MDM2
## 207 PLEKHG1;EPSTI1
## 208 NEU4;RTN4RL1;LY6D;MDM2;RAB39B;INHA;ANK1
## 209 ELOVL4
## 210 MDM2
## 211 PLEKHG1
## 212 CDKN1A
## 213 CDKN1A
## 214 SLC52A1
## 215 CDKN1A;CDSN;RPS6KA2;ANK1
## 216 TRIM22
## 217 MDM2
## 218 NTF4;RPS6KA2
## 219 ACTA2
## 220 INPP5D
## 221 CDSN
## 222 RPS6KA2
## 223 RPS6KA2;ANK1

```

```

## 224                               CYP2E1
## 225                               RPS6KA2;ANK1
## 226                               BTG2;CDKN1A;SESN1;MDM2
## 227 ACTA2;NTF4;CDKN1A;PLEKHG1;RPS6KA2;EPSTI1;MDM2;NEFL
## 228                               NEFL
## 229                               NEFL
## 230                               MDM2
## 231                               HAS2
## 232                               PLEKHG1;EPSTI1
## 233                               BTG2;CDKN1A;SESN1;MDM2
## 234                               CDKN1A;MDM2
## 235                               PLEKHG1;EPSTI1
## 236                               NEFL
## 237 CDKN1A;HEPH;BLNK;MDM2;ABCA12
## 238                               INPP5D;BLNK
## 239                               BLNK
## 240                               BTG2;CDKN1A;SESN1;MDM2
## 241                               CDKN1A
## 242                               INPP5D
## 243                               RPS6KA2;CLEC4E
## 244                               RPS6KA2
## 245                               RPS6KA2
## 246                               BLNK
##
## $WikiPathways_2023_Human
## [1] Term          Overlap      P.value
## [4] Adjusted.P.value Old.P.value Old.Adjusted.P.value
## [7] Odds.Ratio    Combined.Score Genes
## <0 rows> (or 0-length row.names)

```

```
head(enrichr_results_4Gy_2Gy_up)
```

```

## $KEGG_2021_Human
##                                         Term Overlap      P.value Adjusted.P.value
## 1 Pantothenate and CoA biosynthesis   1/21 0.03714533 0.2699828
## 2 Proximal tubule bicarbonate reclamation 1/23 0.04061220 0.2699828
## 3 Nicotinate and nicotinamide metabolism 1/35 0.06115999 0.2699828
## 4 Porphyrin and chlorophyll metabolism 1/43 0.07462014 0.2699828
## 5 Mineral absorption 1/60 0.10260294 0.2699828
## 6 Adipocytokine signaling pathway 1/69 0.11708251 0.2699828
## 7 Renin secretion 1/69 0.11708251 0.2699828
## 8 Peroxisome 1/82 0.13759719 0.2699828
## 9 Insulin secretion 1/86 0.14381563 0.2699828
## 10 Bile secretion 1/90 0.14999046 0.2699828
## 11 Drug metabolism 1/108 0.17724557 0.2900382
## 12 Vascular smooth muscle contraction 1/133 0.21369469 0.3054577
## 13 Ubiquitin mediated proteolysis 1/140 0.22361588 0.3054577
## 14 Adrenergic signaling in cardiomyocytes 1/150 0.23757818 0.3054577
## 15 cGMP-PKG signaling pathway 1/167 0.26075578 0.3129069
## 16 Parkinson disease 1/249 0.36327035 0.4086791
## 17 Cytokine-cytokine receptor interaction 1/295 0.41458025 0.4389673
## 18 Pathways of neurodegeneration 1/475 0.57940388 0.5794039
## Old.P.value Old.Adjusted.P.value Odds.Ratio Combined.Score Genes
## 1          0            28.491429     93.8199160  VNN2

```

```

## 2      0      0  25.898701  82.9713261    AQP1
## 3      0      0  16.747899  46.7980191    NMNAT2
## 4      0      0  13.552381  35.1731016    HEPH
## 5      0      0  9.639225  21.9474430    HEPH
## 6      0      0  8.359664  17.9304452    AGRP
## 7      0      0  8.359664  17.9304452    AQP1
## 8      0      0  7.013404  13.9105590    PEX5L
## 9      0      0  6.682017  12.9579218    KCNMB4
## 10     0      0  6.380417  12.1048229    AQP1
## 11     0      0  5.302270  9.1740883     FM04
## 12     0      0  4.292641  6.6244331    KCNMB4
## 13     0      0  4.075026  6.1036775    UBA7
## 14     0      0  3.799616  5.4610312    SCN5A
## 15     0      0  3.407573  4.5803610    KCNMB4
## 16     0      0  2.271429  2.3000666    UBA7
## 17     0      0  1.911565  1.6831111    TNFRSF6B
## 18     0      0  1.174804  0.6411558    UBA7
##
## $GO_Biological_Process_2021
##
## 1      neuronal action potential
## 2      regulation of neurotransmitter secretion
## 3      odontogenesis
## 4      action potential
## 5      cation transport
## 6      positive regulation of action potential
## 7      positive regulation of myoblast proliferation
## 8      cellular response to salt stress
## 9      membrane depolarization during AV node cell action potential
## 10     membrane depolarization during SA node cell action potential
## 11     positive regulation of feeding behavior
## 12     trophoblast giant cell differentiation
## 13     bundle of His cell action potential
## 14     response to denervation involved in regulation of muscle adaptation
## 15     regulation of myoblast proliferation
## 16     carbon dioxide transport
## 17     response to salt stress
## 18     SA node cell to atrial cardiac muscle cell signaling
## 19     polyphosphate catabolic process
## 20     ISG15-protein conjugation
## 21     regulation of saliva secretion
## 22     cellular water homeostasis
## 23     regulation of tooth mineralization
## 24     regulation of ventricular cardiac muscle cell membrane depolarization
## 25     embryonic hindlimb morphogenesis
## 26     cellular hyperosmotic response
## 27     polyphosphate metabolic process
## 28     negative regulation of striated muscle tissue development
## 29     ammonium transport
## 30     nicotinamide nucleotide biosynthetic process
## 31     regulation of atrial cardiac muscle cell membrane depolarization
## 32     regulation of atrial cardiac muscle cell membrane repolarization
## 33     AV node cell action potential
## 34     AV node cell to bundle of His cell communication

```

```

## 35 glycerol transport
## 36 pantothenate metabolic process
## 37 hindlimb morphogenesis
## 38 hyperosmotic response
## 39 SA node cell action potential
## 40 regulation of striated muscle tissue development
## 41 atrial cardiac muscle cell to AV node cell signaling
## 42 water homeostasis
## 43 response to calcium ion
## 44 positive regulation of NLRP3 inflammasome complex assembly
## 45 cellular response to nitric oxide
## 46 cellular response to reactive nitrogen species
## 47 one-carbon compound transport
## 48 positive regulation of behavior
## 49 positive regulation of cell activation
## 50 regulation of actin filament-based movement
## 51 potassium ion transport
## 52 regulation of feeding behavior
## 53 gas transport
## 54 nuclear body organization
## 55 protein import into peroxisome matrix
## 56 polyol transport
## 57 atrial cardiac muscle cell action potential
## 58 positive regulation of sodium ion transport
## 59 detection of calcium ion
## 60 response to nitric oxide
## 61 embryonic appendage morphogenesis
## 62 cellular response to metal ion
## 63 protein modification by small protein conjugation or removal
## 64 cGMP-mediated signaling
## 65 nucleoside phosphate biosynthetic process
## 66 carbohydrate transport
## 67 positive regulation of secretion
## 68 myoblast differentiation
## 69 odontogenesis of dentin-containing tooth
## 70 regulation of neurotransmitter transport
## 71 membrane depolarization during cardiac muscle cell action potential
## 72 regulation of NLRP3 inflammasome complex assembly
## 73 cellular response to glucocorticoid stimulus
## 74 fluid transport
## 75 regulation of membrane depolarization
## 76 regulation of ventricular cardiac muscle cell membrane repolarization
## 77 nucleotide biosynthetic process
## 78 ventricular cardiac muscle cell action potential
## 79 water transport
## 80 regulation of synaptic vesicle exocytosis
## 81 cardiac muscle cell contraction
## 82 cellular response to copper ion
## 83 mesoderm development
## 84 cardiac ventricle development
## 85 cellular response to inorganic substance
## 86 NAD biosynthetic process
## 87 negative regulation of biomineral tissue development
## 88 cellular response to osmotic stress

```

```

## 89 limb morphogenesis
## 90 regulation of cardiac muscle cell membrane repolarization
## 91 cytoskeleton-dependent intracellular transport
## 92 nucleotide metabolic process
## 93 response to copper ion
## 94 regulation of cysteine-type endopeptidase activity
## 95 regulation of nucleic acid-templated transcription
## 96 protein K48-linked deubiquitination
## 97 regulation of cAMP-mediated signaling
## 98 cardiac conduction system development
## 99 membrane depolarization during action potential
## 100 regulation of cardiac muscle cell contraction
## 101 regulation of sodium ion transmembrane transport
## 102 positive regulation of fibroblast proliferation
## 103 limb development
## 104 transition metal ion homeostasis
## 105 regulation of cellular macromolecule biosynthetic process
## 106 positive regulation of endopeptidase activity
## 107 regulation of vasoconstriction
## 108 regulation of cation transmembrane transport
## 109 cardiac muscle cell action potential
## 110 positive regulation of cell population proliferation
## 111 renal water homeostasis
## 112 cardiac muscle cell action potential involved in contraction
## 113 cellular response to cAMP
## 114 membrane depolarization
## 115 modulation by host of symbiont process
## 116 protein K63-linked deubiquitination
## 117 cardiac muscle contraction
## 118 cellular response to hydrogen peroxide
## 119 regulation of regulated secretory pathway
## 120 regulation of blood circulation
## 121 bicarbonate transport
## 122 blood vessel diameter maintenance
## 123 regulation of sodium ion transport
## 124 cyclic-nucleotide-mediated signaling
## 125 transition metal ion transport
## 126 regulation of microtubule-based process
## 127 regulation of cardiac muscle contraction
## 128 embryonic limb morphogenesis
## 129 regulation of microtubule cytoskeleton organization
## 130 positive regulation of potassium ion transport
## 131 response to cAMP
## 132 cellular response to ketone
## 133 regulation of heart rate by cardiac conduction
## 134 regulation of G0 to G1 transition
## 135 positive regulation of cation transmembrane transport
## 136 heart contraction
## 137 endosome organization
## 138 skeletal system morphogenesis
## 139 cellular response to retinoic acid
## 140 negative regulation of type I interferon production
## 141 male gonad development
## 142 development of primary male sexual characteristics

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```

## 143 positive regulation of potassium ion transmembrane transport
## 144 regulation of fibroblast proliferation
## 145 vesicle organization
## 146 cellular response to mechanical stimulus
## 147 aminoglycan biosynthetic process
## 148 response to hydrogen peroxide
## 149 iron ion transport
## 150 positive regulation of ion transport
## 151 gonad development
## 152 negative regulation of cysteine-type endopeptidase activity
## 153 cardiac muscle tissue development
## 154 striated muscle contraction
## 155 glycosaminoglycan metabolic process
## 156 regulation of potassium ion transmembrane transport
## 157 negative regulation of cysteine-type endopeptidase activity involved in apoptotic process
## 158 positive regulation of interleukin-1 beta production
## 159 cellular iron ion homeostasis
## 160 regulation of secretion by cell
## 161 iron ion homeostasis
## 162 positive regulation of cysteine-type endopeptidase activity
## 163 positive regulation of interleukin-1 production
## 164 response to retinoic acid
## 165 cellular response to reactive oxygen species
## 166 neuropeptide signaling pathway
## 167 embryonic organ development
## 168 negative regulation of transforming growth factor beta receptor signaling pathway
## 169 cellular response to calcium ion
## 170 cellular response to decreased oxygen levels
## 171 cellular response to light stimulus
## 172 defense response to Gram-negative bacterium
## 173 integrin-mediated signaling pathway
## 174 water-soluble vitamin metabolic process
## 175 cellular response to UV
## 176 protein modification process
## 177 epidermis development
## 178 regulation of interleukin-1 beta production
## 179 sodium ion transmembrane transport
## 180 regulation of type I interferon production
## 181 regulation of cysteine-type endopeptidase activity involved in apoptotic process
## 182 negative regulation of programmed cell death
## 183 sodium ion transport
## 184 regulation of epithelial cell proliferation
## 185 cellular transition metal ion homeostasis
## 186 glycosaminoglycan biosynthetic process
## 187 organic anion transport
## 188 response to UV
## 189 regulation of transforming growth factor beta receptor signaling pathway
## 190 positive regulation of cell cycle process
## 191 positive regulation of vasculature development
## 192 cellular response to organonitrogen compound
## 193 small GTPase mediated signal transduction
## 194 chromosome organization
## 195 negative regulation of transmembrane receptor protein serine/threonine kinase signaling pathway
## 196 modulation of chemical synaptic transmission

```

```

## 197 regulation of cytoskeleton organization
## 198 cellular amide metabolic process
## 199 positive regulation of angiogenesis
## 200 tumor necrosis factor-mediated signaling pathway
## 201 positive regulation of protein-containing complex assembly
## 202 positive regulation of epithelial cell proliferation
## 203 cellular response to hypoxia
## 204 negative regulation of apoptotic process
## 205 protein localization to plasma membrane
## 206 protein localization to cell periphery
## 207 Ras protein signal transduction
## 208 chromatin organization
## 209 nitrogen compound transport
## 210 monocarboxylic acid metabolic process
## 211 cellular response to organic cyclic compound
## 212 skeletal system development
## 213 T cell receptor signaling pathway
## 214 positive regulation of I-kappaB kinase/NF-kappaB signaling
## 215 defense response to bacterium
## 216 negative regulation of cytokine production
## 217 antigen receptor-mediated signaling pathway
## 218 cellular response to tumor necrosis factor
## 219 protein localization to membrane
## 220 endomembrane system organization
## 221 regulation of gene expression
## 222 regulation of angiogenesis
## 223 cellular response to lipid
## 224 regulation of I-kappaB kinase/NF-kappaB signaling
## 225 apoptotic process
## 226 anterograde trans-synaptic signaling
## 227 regulation of transcription, DNA-templated
## 228 protein deubiquitination
## 229 regulation of apoptotic process
## 230 inorganic cation transmembrane transport
## 231 protein modification by small protein removal
## 232 chemical synaptic transmission
## 233 protein polyubiquitination
## 234 cellular response to oxygen-containing compound
## 235 post-translational protein modification
## 236 cellular response to DNA damage stimulus
## 237 protein modification by small protein conjugation
## 238 cellular protein metabolic process
## 239 regulation of intracellular signal transduction
## 240 cellular protein modification process
## 241 regulation of transcription by RNA polymerase II
## 242 protein ubiquitination
## 243 positive regulation of intracellular signal transduction
## 244 cytokine-mediated signaling pathway
## 245 negative regulation of transcription by RNA polymerase II
## 246 positive regulation of transcription by RNA polymerase II
## 247 negative regulation of transcription, DNA-templated
## 248 positive regulation of transcription, DNA-templated

##      Overlap      P.value Adjusted.P.value Old.P.value Old.Adjusted.P.value
## 1      2/22 0.0007113648     0.07970285      0                      0

```

## 2	2/33	0.0016058795	0.07970285	0	0
## 3	2/39	0.0022384806	0.07970285	0	0
## 4	2/45	0.0029704902	0.07970285	0	0
## 5	3/174	0.0037425408	0.07970285	0	0
## 6	1/5	0.0089684555	0.07970285	0	0
## 7	1/5	0.0089684555	0.07970285	0	0
## 8	1/5	0.0089684555	0.07970285	0	0
## 9	1/5	0.0089684555	0.07970285	0	0
## 10	1/5	0.0089684555	0.07970285	0	0
## 11	1/5	0.0089684555	0.07970285	0	0
## 12	1/5	0.0089684555	0.07970285	0	0
## 13	1/5	0.0089684555	0.07970285	0	0
## 14	1/5	0.0089684555	0.07970285	0	0
## 15	1/5	0.0089684555	0.07970285	0	0
## 16	1/5	0.0089684555	0.07970285	0	0
## 17	1/5	0.0089684555	0.07970285	0	0
## 18	1/5	0.0089684555	0.07970285	0	0
## 19	1/5	0.0089684555	0.07970285	0	0
## 20	1/6	0.0107527473	0.07970285	0	0
## 21	1/6	0.0107527473	0.07970285	0	0
## 22	1/6	0.0107527473	0.07970285	0	0
## 23	1/6	0.0107527473	0.07970285	0	0
## 24	1/6	0.0107527473	0.07970285	0	0
## 25	1/6	0.0107527473	0.07970285	0	0
## 26	1/6	0.0107527473	0.07970285	0	0
## 27	1/6	0.0107527473	0.07970285	0	0
## 28	1/7	0.0125339166	0.07970285	0	0
## 29	1/7	0.0125339166	0.07970285	0	0
## 30	1/7	0.0125339166	0.07970285	0	0
## 31	1/7	0.0125339166	0.07970285	0	0
## 32	1/7	0.0125339166	0.07970285	0	0
## 33	1/7	0.0125339166	0.07970285	0	0
## 34	1/7	0.0125339166	0.07970285	0	0
## 35	1/7	0.0125339166	0.07970285	0	0
## 36	1/7	0.0125339166	0.07970285	0	0
## 37	1/7	0.0125339166	0.07970285	0	0
## 38	1/7	0.0125339166	0.07970285	0	0
## 39	1/7	0.0125339166	0.07970285	0	0
## 40	1/8	0.0143119686	0.08450877	0	0
## 41	1/8	0.0143119686	0.08450877	0	0
## 42	1/8	0.0143119686	0.08450877	0	0
## 43	2/107	0.0158693142	0.08488411	0	0
## 44	1/9	0.0160869083	0.08488411	0	0
## 45	1/9	0.0160869083	0.08488411	0	0
## 46	1/9	0.0160869083	0.08488411	0	0
## 47	1/9	0.0160869083	0.08488411	0	0
## 48	1/10	0.0178587410	0.08857936	0	0
## 49	1/10	0.0178587410	0.08857936	0	0
## 50	1/10	0.0178587410	0.08857936	0	0
## 51	2/122	0.0203102412	0.09278360	0	0
## 52	1/12	0.0213931063	0.09278360	0	0
## 53	1/12	0.0213931063	0.09278360	0	0
## 54	1/12	0.0213931063	0.09278360	0	0
## 55	1/12	0.0213931063	0.09278360	0	0

## 56	1/12	0.0213931063	0.09278360	0	0
## 57	1/13	0.0231556493	0.09278360	0	0
## 58	1/13	0.0231556493	0.09278360	0	0
## 59	1/13	0.0231556493	0.09278360	0	0
## 60	1/13	0.0231556493	0.09278360	0	0
## 61	1/13	0.0231556493	0.09278360	0	0
## 62	2/131	0.0231958989	0.09278360	0	0
## 63	1/14	0.0249151061	0.09362040	0	0
## 64	1/14	0.0249151061	0.09362040	0	0
## 65	1/14	0.0249151061	0.09362040	0	0
## 66	1/14	0.0249151061	0.09362040	0	0
## 67	1/15	0.0266714820	0.09727246	0	0
## 68	1/15	0.0266714820	0.09727246	0	0
## 69	1/16	0.0284247823	0.10021139	0	0
## 70	1/16	0.0284247823	0.10021139	0	0
## 71	1/17	0.0301750120	0.10021139	0	0
## 72	1/17	0.0301750120	0.10021139	0	0
## 73	1/18	0.0319221764	0.10021139	0	0
## 74	1/18	0.0319221764	0.10021139	0	0
## 75	1/18	0.0319221764	0.10021139	0	0
## 76	1/18	0.0319221764	0.10021139	0	0
## 77	1/18	0.0319221764	0.10021139	0	0
## 78	1/18	0.0319221764	0.10021139	0	0
## 79	1/18	0.0319221764	0.10021139	0	0
## 80	1/19	0.03366662807	0.10181997	0	0
## 81	1/19	0.03366662807	0.10181997	0	0
## 82	1/19	0.03366662807	0.10181997	0	0
## 83	1/20	0.0354073301	0.10453593	0	0
## 84	1/20	0.0354073301	0.10453593	0	0
## 85	1/21	0.0371453298	0.10711677	0	0
## 86	1/21	0.0371453298	0.10711677	0	0
## 87	1/22	0.0388802850	0.10713679	0	0
## 88	1/22	0.0388802850	0.10713679	0	0
## 89	1/22	0.0388802850	0.10713679	0	0
## 90	1/22	0.0388802850	0.10713679	0	0
## 91	1/23	0.0406122007	0.10714708	0	0
## 92	1/23	0.0406122007	0.10714708	0	0
## 93	1/23	0.0406122007	0.10714708	0	0
## 94	1/23	0.0406122007	0.10714708	0	0
## 95	3/430	0.0417560861	0.10900536	0	0
## 96	1/24	0.0423410823	0.10938113	0	0
## 97	1/25	0.0440669348	0.11151632	0	0
## 98	1/25	0.0440669348	0.11151632	0	0
## 99	1/26	0.0457897634	0.11470567	0	0
## 100	1/27	0.0475095732	0.11782374	0	0
## 101	1/28	0.0492263694	0.11930057	0	0
## 102	1/28	0.0492263694	0.11930057	0	0
## 103	1/29	0.0509401571	0.11930057	0	0
## 104	1/29	0.0509401571	0.11930057	0	0
## 105	3/468	0.0514428407	0.11930057	0	0
## 106	1/30	0.0526509414	0.11930057	0	0
## 107	1/30	0.0526509414	0.11930057	0	0
## 108	1/30	0.0526509414	0.11930057	0	0
## 109	1/30	0.0526509414	0.11930057	0	0

## 110	3/474	0.0530650087	0.11930057	0	0
## 111	1/31	0.0543587274	0.11930057	0	0
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## 113	1/31	0.0543587274	0.11930057	0	0
## 114	1/32	0.0560635202	0.11985994	0	0
## 115	1/32	0.0560635202	0.11985994	0	0
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## 117	1/34	0.0594641466	0.12177742	0	0
## 118	1/35	0.0611599904	0.12177742	0	0
## 119	1/35	0.0611599904	0.12177742	0	0
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## 122	1/35	0.0611599904	0.12177742	0	0
## 123	1/36	0.0628528613	0.12177742	0	0
## 124	1/36	0.0628528613	0.12177742	0	0
## 125	1/36	0.0628528613	0.12177742	0	0
## 126	1/36	0.0628528613	0.12177742	0	0
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## 128	1/36	0.0628528613	0.12177742	0	0
## 129	1/37	0.0645427644	0.12408221	0	0
## 130	1/38	0.0662297048	0.12538143	0	0
## 131	1/38	0.0662297048	0.12538143	0	0
## 132	1/39	0.0679136874	0.12663605	0	0
## 133	1/39	0.0679136874	0.12663605	0	0
## 134	1/41	0.0712727997	0.12901937	0	0
## 135	1/41	0.0712727997	0.12901937	0	0
## 136	1/41	0.0712727997	0.12901937	0	0
## 137	1/41	0.0712727997	0.12901937	0	0
## 138	1/42	0.0729479394	0.13032250	0	0
## 139	1/43	0.0746201415	0.13032250	0	0
## 140	1/43	0.0746201415	0.13032250	0	0
## 141	1/43	0.0746201415	0.13032250	0	0
## 142	1/43	0.0746201415	0.13032250	0	0
## 143	1/44	0.0762894110	0.13230611	0	0
## 144	1/46	0.0796191720	0.13617624	0	0
## 145	1/46	0.0796191720	0.13617624	0	0
## 146	1/49	0.0845919436	0.14174866	0	0
## 147	1/49	0.0845919436	0.14174866	0	0
## 148	1/49	0.0845919436	0.14174866	0	0
## 149	1/50	0.0862437220	0.14258962	0	0
## 150	1/50	0.0862437220	0.14258962	0	0
## 151	1/51	0.0878926025	0.14435341	0	0
## 152	1/53	0.0911816899	0.14756303	0	0
## 153	1/53	0.0911816899	0.14756303	0	0
## 154	1/54	0.0928219066	0.14756303	0	0
## 155	1/54	0.0928219066	0.14756303	0	0
## 156	1/54	0.0928219066	0.14756303	0	0
## 157	1/55	0.0944592451	0.14920951	0	0
## 158	1/56	0.0960937105	0.15083063	0	0
## 159	1/58	0.0993540411	0.15496731	0	0
## 160	1/59	0.1009799161	0.15651887	0	0
## 161	1/61	0.1042231100	0.16005140	0	0
## 162	1/62	0.1058404386	0.16005140	0	0
## 163	1/62	0.1058404386	0.16005140	0	0

## 164	1/62	0.1058404386	0.16005140	0	0
## 165	1/63	0.1074549281	0.16053507	0	0
## 166	1/63	0.1074549281	0.16053507	0	0
## 167	1/66	0.1122814103	0.16674126	0	0
## 168	1/68	0.1154849582	0.17047780	0	0
## 169	1/69	0.1170825144	0.17080273	0	0
## 170	1/69	0.1170825144	0.17080273	0	0
## 171	1/70	0.1186772653	0.17211674	0	0
## 172	1/73	0.1234447333	0.17799008	0	0
## 173	1/75	0.1266091060	0.18149745	0	0
## 174	1/76	0.1281871248	0.18270349	0	0
## 175	1/77	0.1297623715	0.18389182	0	0
## 176	1/78	0.1313348509	0.18506274	0	0
## 177	1/83	0.1391559030	0.19388013	0	0
## 178	1/83	0.1391559030	0.19388013	0	0
## 179	1/87	0.1453634125	0.20139735	0	0
## 180	1/89	0.1484508259	0.20326576	0	0
## 181	1/89	0.1484508259	0.20326576	0	0
## 182	2/381	0.1497150848	0.20326576	0	0
## 183	1/90	0.1499904635	0.20326576	0	0
## 184	1/93	0.1545931557	0.20836469	0	0
## 185	1/96	0.1591716136	0.21337600	0	0
## 186	1/97	0.1606924023	0.21425654	0	0
## 187	1/99	0.1637259612	0.21597893	0	0
## 188	1/99	0.1637259612	0.21597893	0	0
## 189	1/100	0.1652387406	0.21682120	0	0
## 190	1/101	0.1667488593	0.21765114	0	0
## 191	1/102	0.1682563218	0.21846894	0	0
## 192	1/103	0.1697611328	0.21927480	0	0
## 193	1/106	0.1742597017	0.22276498	0	0
## 194	1/106	0.1742597017	0.22276498	0	0
## 195	1/108	0.1772455725	0.22542001	0	0
## 196	1/109	0.1787345689	0.22615394	0	0
## 197	1/112	0.1831858560	0.23060961	0	0
## 198	1/115	0.1876136836	0.23446470	0	0
## 199	1/116	0.1890844337	0.23446470	0	0
## 200	1/116	0.1890844337	0.23446470	0	0
## 201	1/118	0.1920181719	0.23691794	0	0
## 202	1/123	0.1993074447	0.24469429	0	0
## 203	1/131	0.2108374920	0.25757487	0	0
## 204	2/485	0.2170103370	0.26368041	0	0
## 205	1/136	0.2179616266	0.26368041	0	0
## 206	1/140	0.2236158783	0.26905693	0	0
## 207	1/142	0.2264280795	0.26905693	0	0
## 208	1/142	0.2264280795	0.26905693	0	0
## 209	1/143	0.2278304639	0.26905693	0	0
## 210	1/143	0.2278304639	0.26905693	0	0
## 211	1/150	0.2375781795	0.27923881	0	0
## 212	1/158	0.2485719659	0.28941712	0	0
## 213	1/158	0.2485719659	0.28941712	0	0
## 214	1/171	0.2661089580	0.30838795	0	0
## 215	1/176	0.2727474485	0.31461101	0	0
## 216	1/182	0.2806365986	0.32221239	0	0
## 217	1/185	0.2845499094	0.32519990	0	0

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## 218 1/194 0.2961660664 0.33683312 0 0
## 219 1/195 0.2974453748 0.33683312 0 0
## 220 1/199 0.3025400390 0.34104513 0 0
## 221 3/1079 0.3071433588 0.34362386 0 0
## 222 1/203 0.3075987775 0.34362386 0 0
## 223 1/219 0.3274793732 0.36419231 0 0
## 224 1/224 0.3335774398 0.36931788 0 0
## 225 1/231 0.3420244996 0.37698700 0 0
## 226 1/244 0.3574365761 0.39223129 0 0
## 227 5/2244 0.3790473522 0.41411341 0 0
## 228 1/267 0.3838486373 0.41751957 0 0
## 229 2/742 0.3880469321 0.42024297 0 0
## 230 1/274 0.3916754248 0.42232828 0 0
## 231 1/276 0.3938938387 0.42288170 0 0
## 232 1/306 0.4262411237 0.45563706 0 0
## 233 1/314 0.4345795969 0.46255682 0 0
## 234 1/323 0.4438195743 0.47037288 0 0
## 235 1/345 0.4657924704 0.49155971 0 0
## 236 1/350 0.4706673250 0.49459956 0 0
## 237 1/409 0.5250229514 0.54939111 0 0
## 238 1/417 0.5319618837 0.55431322 0 0
## 239 1/437 0.5488808332 0.56954999 0 0
## 240 2/1025 0.5571150354 0.57568554 0 0
## 241 4/2206 0.5721844910 0.58880396 0 0
## 242 1/525 0.6165218487 0.63180751 0 0
## 243 1/546 0.6311434288 0.64412992 0 0
## 244 1/621 0.6790691260 0.69020141 0 0
## 245 1/684 0.7145988975 0.72334909 0 0
## 246 1/908 0.8125339332 0.81913990 0 0
## 247 1/948 0.8261790473 0.82952390 0 0
## 248 1/1183 0.8888580115 0.88885801 0 0

## Odds.Ratio Combined.Score Genes
## 1 58.6588235 425.17822935 KCNMB4;SCN5A
## 2 37.8235294 243.35975347 RIMS4;KCNMB4
## 3 31.6804452 193.31274433 SCN5A;AQP1
## 4 27.2517100 158.57847101 KCNMB4;SCN5A
## 5 10.5225944 58.80015763 KCNMB4;SCN5A;AQP1
## 6 142.5714286 672.08767444 SCN5A
## 7 142.5714286 672.08767444 SOX15
## 8 142.5714286 672.08767444 AQP1
## 9 142.5714286 672.08767444 SCN5A
## 10 142.5714286 672.08767444 SCN5A
## 11 142.5714286 672.08767444 AGRP
## 12 142.5714286 672.08767444 SOX15
## 13 142.5714286 672.08767444 SCN5A
## 14 142.5714286 672.08767444 SCN5A
## 15 142.5714286 672.08767444 SOX15
## 16 142.5714286 672.08767444 AQP1
## 17 142.5714286 672.08767444 AQP1
## 18 142.5714286 672.08767444 SCN5A
## 19 142.5714286 672.08767444 PRUNE2
## 20 114.0514286 516.94882012 UBA7
## 21 114.0514286 516.94882012 AQP1
## 22 114.0514286 516.94882012 AQP1

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## 23	114.0514286	516.94882012	ASPN
## 24	114.0514286	516.94882012	SCN5A
## 25	114.0514286	516.94882012	TBX4
## 26	114.0514286	516.94882012	AQP1
## 27	114.0514286	516.94882012	PRUNE2
## 28	95.0380952	416.20194420	SOX15
## 29	95.0380952	416.20194420	AQP1
## 30	95.0380952	416.20194420	NMNAT2
## 31	95.0380952	416.20194420	SCN5A
## 32	95.0380952	416.20194420	SCN5A
## 33	95.0380952	416.20194420	SCN5A
## 34	95.0380952	416.20194420	SCN5A
## 35	95.0380952	416.20194420	AQP1
## 36	95.0380952	416.20194420	VNN2
## 37	95.0380952	416.20194420	TBX4
## 38	95.0380952	416.20194420	AQP1
## 39	95.0380952	416.20194420	SCN5A
## 40	81.4571429	345.92071941	SOX15
## 41	81.4571429	345.92071941	SCN5A
## 42	81.4571429	345.92071941	AQP1
## 43	11.1254902	46.09699962	KCNMB4;SCN5A
## 44	71.2714286	294.33314563	USP50
## 45	71.2714286	294.33314563	AQP1
## 46	71.2714286	294.33314563	AQP1
## 47	71.2714286	294.33314563	AQP1
## 48	63.3492063	254.99716560	AGRP
## 49	63.3492063	254.99716560	SOX15
## 50	63.3492063	254.99716560	SCN5A
## 51	9.7274510	37.90427758	KCNMB4;AQP1
## 52	51.8259740	199.25462502	AGRP
## 53	51.8259740	199.25462502	AQP1
## 54	51.8259740	199.25462502	USP50
## 55	51.8259740	199.25462502	PEX5L
## 56	51.8259740	199.25462502	AQP1
## 57	47.5047619	178.87996473	SCN5A
## 58	47.5047619	178.87996473	SCN5A
## 59	47.5047619	178.87996473	KCNMB4
## 60	47.5047619	178.87996473	AQP1
## 61	47.5047619	178.87996473	TBX4
## 62	9.0446876	34.04221255	SCN5A;AQP1
## 63	43.8483516	161.90043513	UBA7
## 64	43.8483516	161.90043513	AQP1
## 65	43.8483516	161.90043513	NMNAT2
## 66	43.8483516	161.90043513	AQP1
## 67	40.7142857	147.55510088	AQP1
## 68	40.7142857	147.55510088	SOX15
## 69	37.9980952	135.29198628	SCN5A
## 70	37.9980952	135.29198628	KCNMB4
## 71	35.6214286	124.70139958	SCN5A
## 72	35.6214286	124.70139958	USP50
## 73	33.5243697	115.47316040	AQP1
## 74	33.5243697	115.47316040	AQP1
## 75	33.5243697	115.47316040	SCN5A
## 76	33.5243697	115.47316040	SCN5A

## 77	33.5243697	115.47316040	NMNAT2
## 78	33.5243697	115.47316040	SCN5A
## 79	33.5243697	115.47316040	AQP1
## 80	31.6603175	107.36832117	RIMS4
## 81	31.6603175	107.36832117	SCN5A
## 82	31.6603175	107.36832117	AQP1
## 83	29.9924812	100.19997337	SECTM1
## 84	29.9924812	100.19997337	SCN5A
## 85	28.4914286	93.81991597	AQP1
## 86	28.4914286	93.81991597	NMNAT2
## 87	27.1333333	88.10920426	ASPN
## 88	27.1333333	88.10920426	AQP1
## 89	27.1333333	88.10920426	TBX4
## 90	27.1333333	88.10920426	SCN5A
## 91	25.8987013	82.97132612	MAP6D1
## 92	25.8987013	82.97132612	NMNAT2
## 93	25.8987013	82.97132612	AQP1
## 94	25.8987013	82.97132612	USP50
## 95	4.1594635	13.21008195	CRABP2;SOX15;TBX4
## 96	24.7714286	78.32719402	USP50
## 97	23.7380952	74.11141474	PEX5L
## 98	23.7380952	74.11141474	SCN5A
## 99	22.7874286	70.26947317	SCN5A
## 100	21.9098901	66.75558005	SCN5A
## 101	21.0973545	63.53100867	SCN5A
## 102	21.0973545	63.53100867	AQP1
## 103	20.3428571	60.56279580	TBX4
## 104	20.3428571	60.56279580	HEPH
## 105	3.8121212	11.31164619	CRABP2;SOX15;TBX4
## 106	19.6403941	57.82271782	USP50
## 107	19.6403941	57.82271782	KCNMB4
## 108	19.6403941	57.82271782	SCN5A
## 109	19.6403941	57.82271782	SCN5A
## 110	3.7624011	11.04730328	SOX15;SCN5A;AQP1
## 111	18.9847619	55.28647630	AQP1
## 112	18.9847619	55.28647630	SCN5A
## 113	18.9847619	55.28647630	AQP1
## 114	18.3714286	52.93304494	SCN5A
## 115	18.3714286	52.93304494	AQP1
## 116	18.3714286	52.93304494	USP50
## 117	17.2562771	48.70380102	SCN5A
## 118	16.7478992	46.79801912	AQP1
## 119	16.7478992	46.79801912	RIMS4
## 120	16.7478992	46.79801912	KCNMB4
## 121	16.7478992	46.79801912	AQP1
## 122	16.7478992	46.79801912	KCNMB4
## 123	16.2685714	45.01446719	SCN5A
## 124	16.2685714	45.01446719	AQP1
## 125	16.2685714	45.01446719	HEPH
## 126	16.2685714	45.01446719	MAP6D1
## 127	16.2685714	45.01446719	SCN5A
## 128	16.2685714	45.01446719	TBX4
## 129	15.8158730	43.34224956	MAP6D1
## 130	15.3876448	41.77170376	KCNMB4

## 131	15.3876448	41.77170376	AQP1
## 132	14.9819549	40.29423259	AQP1
## 133	14.9819549	40.29423259	SCN5A
## 134	14.2314286	37.58862573	SOX15
## 135	14.2314286	37.58862573	KCNMB4
## 136	14.2314286	37.58862573	SCN5A
## 137	14.2314286	37.58862573	USP50
## 138	13.8836237	36.34745526	TBX4
## 139	13.5523810	35.17310163	AQP1
## 140	13.5523810	35.17310163	UBA7
## 141	13.5523810	35.17310163	SOX15
## 142	13.5523810	35.17310163	SOX15
## 143	13.2365449	34.06055692	KCNMB4
## 144	12.6469841	32.00319789	AQP1
## 145	12.6469841	32.00319789	USP50
## 146	11.8547619	29.28026902	AQP1
## 147	11.8547619	29.28026902	HS3ST6
## 148	11.8547619	29.28026902	AQP1
## 149	11.6122449	28.45671205	HEPH
## 150	11.6122449	28.45671205	SCN5A
## 151	11.3794286	27.67066955	SOX15
## 152	10.9406593	26.20179786	AQP1
## 153	10.9406593	26.20179786	SCN5A
## 154	10.7336927	25.51476692	SCN5A
## 155	10.7336927	25.51476692	HS3ST6
## 156	10.7336927	25.51476692	KCNMB4
## 157	10.5343915	24.85681127	AQP1
## 158	10.3423377	24.22621662	USP50
## 159	9.9784461	23.04088702	HEPH
## 160	9.8059113	22.48332329	KCNMB4
## 161	9.4780952	21.43207168	HEPH
## 162	9.3222482	20.93611593	USP50
## 163	9.3222482	20.93611593	USP50
## 164	9.3222482	20.93611593	AQP1
## 165	9.1714286	20.45855707	AQP1
## 166	9.1714286	20.45855707	AGRP
## 167	8.7468132	19.12706720	TBX4
## 168	8.4848614	18.31554902	ASPN
## 169	8.3596639	17.93044525	SCN5A
## 170	8.3596639	17.93044525	AQP1
## 171	8.2380952	17.55824391	AQP1
## 172	7.8936508	16.51321534	AQP1
## 173	7.6795367	15.87092096	PRAM1
## 174	7.5767619	15.56467051	VNN2
## 175	7.4766917	15.26778143	AQP1
## 176	7.3792208	14.97985584	UBA7
## 177	6.9275261	13.66219250	CRABP2
## 178	6.9275261	13.66219250	USP50
## 179	6.6039867	12.73590975	SCN5A
## 180	6.4532468	12.30957795	UBA7
## 181	6.4532468	12.30957795	AQP1
## 182	3.0397330	5.77251757	TNFRSF6B;AQP1
## 183	6.3804173	12.10482290	SCN5A
## 184	6.1714286	11.52180050	SCN5A

## 185	5.9756391	10.98186417		HEPH
## 186	5.9130952	10.81069493		HS3ST6
## 187	5.7918367	10.48068313		AQP1
## 188	5.7918367	10.48068313		AQP1
## 189	5.7330447	10.32156699		ASPN
## 190	5.6754286	10.16620471		SOX15
## 191	5.6189533	10.01447361		AQP1
## 192	5.5635854	9.86625617		AQP1
## 193	5.4038095	9.44158223		USP50
## 194	5.4038095	9.44158223		SOX15
## 195	5.3022697	9.17408826		ASPN
## 196	5.2529101	9.04474119		KCNMB4
## 197	5.1101673	8.67325209		MAP6D1
## 198	4.9749373	8.32491242		VNN2
## 199	4.9314286	8.21359818		AQP1
## 200	4.9314286	8.21359818		TNFRSF6B
## 201	4.8466422	7.99776069		USP50
## 202	4.6468384	7.49491679		SCN5A
## 203	4.3591209	6.78570233		AQP1
## 204	2.3725490	3.62480481		TNFRSF6B; AQP1
## 205	4.1966138	6.39327355		PRAM1
## 206	4.0750257	6.10367751		PRAM1
## 207	4.0168186	5.96629286		USP50
## 208	4.0168186	5.96629286		SOX15
## 209	3.9883300	5.89935227		AQP1
## 210	3.9883300	5.89935227		VNN2
## 211	3.7996165	5.46103122		AQP1
## 212	3.6045496	5.01761548		TBX4
## 213	3.6045496	5.01761548		PRAM1
## 214	3.3267227	4.40407996		SECTM1
## 215	3.2308571	4.19755871		AQP1
## 216	3.1228098	3.96813781		UBA7
## 217	3.0714286	3.86031459		PRAM1
## 218	2.9268690	3.56151647		TNFRSF6B
## 219	2.9116348	3.53042902		PRAM1
## 220	2.8522367	3.40996771		USP50
## 221	1.5958094	1.88375832		CRABP2; SOX15; TBX4
## 222	2.7951909	3.29541557		AQP1
## 223	2.5879423	2.88899820		AQP1
## 224	2.5292761	2.77684225		SECTM1
## 225	2.4514286	2.63007130		PRUNE2
## 226	2.3187537	2.38552762		KCNMB4
## 227	1.2768517	1.23866636	ZNF572; CRABP2; SOX15; ZNF704; TBX4	
## 228	2.1157895	2.02588318		USP50
## 229	1.5281399	1.44658153		TNFRSF6B; AQP1
## 230	2.0608059	1.93163822		SCN5A
## 231	2.0456104	1.90584171		USP50
## 232	1.8415925	1.57041815		KCNMB4
## 233	1.7937928	1.49490414		FBXW12
## 234	1.7428571	1.41578763		AQP1
## 235	1.6295681	1.24501462		FBXW12
## 236	1.6058125	1.21014634		UBA7
## 237	1.3694678	0.88236631		UBA7
## 238	1.3425824	0.84741579		UBA7

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## 239 1.2796855 0.76764993 PEX5L
## 240 1.0891266 0.63712110 FBXW12;UBA7
## 241 1.0082879 0.56292090 ZNF572;SOX15;ZNF704;TBX4
## 242 1.0599782 0.51267066 FBXW12
## 243 1.0180341 0.46852182 SECTM1
## 244 0.8914286 0.34501170 TNFRSF6B
## 245 0.8065677 0.27103406 SOX15
## 246 0.6003150 0.12462396 SOX15
## 247 0.5737517 0.10955431 SOX15
## 248 0.4540005 0.05348933 SOX15
##
## $Reactome_2022
##                                         Term
## 1                                         Ca2+ Activated K+ Channels R-HSA-1296052
## 2                                         Metabolism Of Water-Soluble Vitamins And Cofactors R-HSA-196849
## 3                                         cGMP Effects R-HSA-418457
## 4                                         Vitamin B5 (Pantothenate) Metabolism R-HSA-199220
## 5                                         Nitric Oxide Stimulates Guanylate Cyclase R-HSA-392154
## 6                                         Metabolism Of Vitamins And Cofactors R-HSA-196854
## 7                                         Metal Ion SLC Transporters R-HSA-425410
## 8                                         FOXO-mediated Transcription Of Oxidative Stress, Metabolic And Neuronal Genes R-HSA-9615017
## 9                                         TNFs Bind Their Physiological Receptors R-HSA-5669034
## 10                                         Interaction Between L1 And Ankyrins R-HSA-445095
## 11                                         HS-GAG Biosynthesis R-HSA-2022928
## 12                                         Nicotinate Metabolism R-HSA-196807
## 13                                         Phase 0 - Rapid Depolarisation R-HSA-5576892
## 14                                         Termination Of Translesion DNA Synthesis R-HSA-5656169
## 15                                         Negative Regulators Of DDX58/IFIH1 Signaling R-HSA-936440
## 16                                         Translesion Synthesis By Y Family DNA Polymerases Bypasses Lesions On DNA Template R-HSA-110313
## 17                                         Signaling By Retinoic Acid R-HSA-5362517
## 18                                         DNA Damage Bypass R-HSA-73893
## 19                                         Heparan Sulfate/Heparin (HS-GAG) Metabolism R-HSA-1638091
## 20                                         ECM Proteoglycans R-HSA-3000178
## 21                                         Iron Uptake And Transport R-HSA-917937
## 22                                         Antigen Processing: Ubiquitination And Proteasome Degradation R-HSA-983168
## 23                                         FOXO-mediated Transcription R-HSA-9614085
## 24                                         ISG15 Antiviral Mechanism R-HSA-1169408
## 25                                         DDX58/IFIH1-mediated Induction Of Interferon-Alpha/Beta R-HSA-168928
## 26                                         Platelet Homeostasis R-HSA-418346
## 27                                         Antiviral Mechanism By IFN-stimulated Genes R-HSA-1169410
## 28                                         Transport Of Bile Salts And Organic Acids, Metal Ions And Amine Compounds R-HSA-425366
## 29                                         Class I MHC Mediated Antigen Processing And Presentation R-HSA-983169
## 30                                         Post-translational Modification: Synthesis Of GPI-anchored Proteins R-HSA-163125
## 31                                         L1CAM Interactions R-HSA-373760
## 32                                         SLC Transporter Disorders R-HSA-5619102
## 33                                         TNFR2 Non-Canonical NF- $\kappa$ B Pathway R-HSA-5668541
## 34                                         Potassium Channels R-HSA-1296071
## 35                                         Phase I - Functionalization Of Compounds R-HSA-211945
## 36                                         Glycosaminoglycan Metabolism R-HSA-1630316
## 37                                         Cardiac Conduction R-HSA-5576891
## 38                                         Disorders Of Transmembrane Transporters R-HSA-5619115
## 39                                         Muscle Contraction R-HSA-397014
## 40                                         Interferon Signaling R-HSA-913531
## 41                                         Biological Oxidations R-HSA-211859

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## 42 Neddylation R-HSA-8951664
## 43 SLC-mediated Transmembrane Transport R-HSA-425407
## 44 Cytokine Signaling In Immune System R-HSA-1280215
## 45 Signaling By Nuclear Receptors R-HSA-9006931
## 46 Adaptive Immune System R-HSA-1280218
## 47 Metabolism Of Carbohydrates R-HSA-71387
## 48 Extracellular Matrix Organization R-HSA-1474244
## 49 DNA Repair R-HSA-73894
## 50 Neuronal System R-HSA-112316
## 51 Metabolism R-HSA-1430728
## 52 Axon Guidance R-HSA-422475
## 53 Nervous System Development R-HSA-9675108
## 54 Generic Transcription Pathway R-HSA-212436
## 55 Hemostasis R-HSA-109582
## 56 Immune System R-HSA-168256
## 57 RNA Polymerase II Transcription R-HSA-73857
## 58 Post-translational Protein Modification R-HSA-597592
## 59 Transport Of Small Molecules R-HSA-382551
## 60 Gene Expression (Transcription) R-HSA-74160
## 61 Innate Immune System R-HSA-168249
## 62 Developmental Biology R-HSA-1266738
## 63 Metabolism Of Proteins R-HSA-392499
## 64 Disease R-HSA-1643685
## 65 Signal Transduction R-HSA-162582

##      Overlap     P.value Adjusted.P.value Old.P.value Old.Adjusted.P.value
## 1      1/8 0.01431197 0.2602949 0 0
## 2      2/122 0.02031024 0.2602949 0 0
## 3      1/15 0.02667148 0.2602949 0 0
## 4      1/17 0.03017501 0.2602949 0 0
## 5      1/21 0.03714533 0.2602949 0 0
## 6      2/186 0.04408109 0.2602949 0 0
## 7      1/26 0.04578976 0.2602949 0 0
## 8      1/29 0.05094016 0.2602949 0 0
## 9      1/29 0.05094016 0.2602949 0 0
## 10     1/29 0.05094016 0.2602949 0 0
## 11     1/30 0.05265094 0.2602949 0 0
## 12     1/31 0.05435873 0.2602949 0 0
## 13     1/32 0.05606352 0.2602949 0 0
## 14     1/32 0.05606352 0.2602949 0 0
## 15     1/35 0.06115999 0.2650266 0 0
## 16     1/39 0.06791369 0.2725136 0 0
## 17     1/41 0.07127280 0.2725136 0 0
## 18     1/48 0.08293726 0.2994957 0 0
## 19     1/53 0.09118169 0.3069925 0 0
## 20     1/55 0.09445925 0.3069925 0 0
## 21     1/59 0.10097992 0.3111282 0 0
## 22     2/307 0.10530494 0.3111282 0 0
## 23     1/65 0.11067541 0.3127783 0 0
## 24     1/75 0.12660911 0.3180604 0 0
## 25     1/81 0.13603573 0.3180604 0 0
## 26     1/83 0.13915590 0.3180604 0 0
## 27     1/83 0.13915590 0.3180604 0 0
## 28     1/86 0.14381563 0.3180604 0 0
## 29     2/378 0.14784406 0.3180604 0 0

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##	Index	Odds.Ratio	Combined.Score	Genes	
##	30	1/92	0.15306162	0.3180604	0
##	31	1/99	0.16372596	0.3180604	0
##	32	1/99	0.16372596	0.3180604	0
##	33	1/100	0.16523874	0.3180604	0
##	34	1/102	0.16825632	0.3180604	0
##	35	1/104	0.17126330	0.3180604	0
##	36	1/120	0.19494159	0.3519779	0
##	37	1/126	0.20365028	0.3577640	0
##	38	1/176	0.27274745	0.4665417	0
##	39	1/196	0.29872242	0.4936881	0
##	40	1/200	0.30380808	0.4936881	0
##	41	1/218	0.32625327	0.5172308	0
##	42	1/237	0.34918191	0.5347246	0
##	43	1/247	0.36094305	0.5347246	0
##	44	2/702	0.36196744	0.5347246	0
##	45	1/260	0.37592398	0.5400852	0
##	46	2/733	0.38221414	0.5400852	0
##	47	1/285	0.40377975	0.5555917	0
##	48	1/291	0.41028307	0.5555917	0
##	49	1/310	0.43042520	0.5709722	0
##	50	1/386	0.50451174	0.6516377	0
##	51	4/2049	0.51128495	0.6516377	0
##	52	1/519	0.61224177	0.7653022	0
##	53	1/545	0.63045962	0.7694760	0
##	54	2/1190	0.64011965	0.7694760	0
##	55	1/576	0.65109504	0.7694760	0
##	56	3/1943	0.69306445	0.7909706	0
##	57	2/1312	0.69362041	0.7909706	0
##	58	2/1383	0.72175531	0.7999196	0
##	59	1/706	0.72608088	0.7999196	0
##	60	2/1449	0.74600475	0.8081718	0
##	61	1/1035	0.85260635	0.8942996	0
##	62	1/1073	0.86288284	0.8942996	0
##	63	2/1890	0.86678270	0.8942996	0
##	64	1/1736	0.96206057	0.9770928	0
##	65	1/2465	0.99125598	0.9912560	0
##		Odds.Ratio	Combined.Score	Genes	
##	1	81.4571429	3.459207e+02	KCNMB4	
##	2	9.7274510	3.790428e+01	VNN2;NMNAT2	
##	3	40.7142857	1.475551e+02	KCNMB4	
##	4	35.6214286	1.247014e+02	VNN2	
##	5	28.4914286	9.381992e+01	KCNMB4	
##	6	6.3235294	1.974032e+01	VNN2;NMNAT2	
##	7	22.7874286	7.026947e+01	HEPH	
##	8	20.3428571	6.056280e+01	AGRP	
##	9	20.3428571	6.056280e+01	TNFRSF6B	
##	10	20.3428571	6.056280e+01	SCN5A	
##	11	19.6403941	5.782272e+01	HS3ST6	
##	12	18.9847619	5.528648e+01	NMNAT2	
##	13	18.3714286	5.293304e+01	SCN5A	
##	14	18.3714286	5.293304e+01	UBA7	
##	15	16.7478992	4.679802e+01	UBA7	
##	16	14.9819549	4.029423e+01	UBA7	
##	17	14.2314286	3.758863e+01	CRABP2	

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## 18 12.1075988 3.014394e+01 UBA7
## 19 10.9406593 2.620180e+01 HS3ST6
## 20 10.5343915 2.485681e+01 ASPN
## 21 9.8059113 2.248332e+01 HEPH
## 22 3.7915140 8.534300e+00 FBXW12;UBA7
## 23 8.8839286 1.955489e+01 AGRP
## 24 7.6795367 1.587092e+01 UBA7
## 25 7.1014286 1.416620e+01 UBA7
## 26 6.9275261 1.366219e+01 KCNMB4
## 27 6.9275261 1.366219e+01 UBA7
## 28 6.6820168 1.295792e+01 HEPH
## 29 3.0644556 5.858005e+00 FBXW12;UBA7
## 30 6.2395604 1.171112e+01 VNN2
## 31 5.7918367 1.048068e+01 SCN5A
## 32 5.7918367 1.048068e+01 HEPH
## 33 5.7330447 1.032157e+01 TNFRSF6B
## 34 5.6189533 1.001447e+01 KCNMB4
## 35 5.5092926 9.721440e+00 FM04
## 36 4.7647059 7.790558e+00 HS3ST6
## 37 4.5346286 7.216186e+00 SCN5A
## 38 3.2308571 4.197559e+00 HEPH
## 39 2.8965568 3.499737e+00 SCN5A
## 40 2.8377602 3.380791e+00 UBA7
## 41 2.6000000 2.912211e+00 FM04
## 42 2.3883777 2.512961e+00 FBXW12
## 43 2.2901278 2.333721e+00 HEPH
## 44 1.6188235 1.645050e+00 TNFRSF6B;UBA7
## 45 2.1737452 2.126723e+00 CRABP2
## 46 1.5476784 1.488517e+00 FBXW12;UBA7
## 47 1.9798793 1.795524e+00 HS3ST6
## 48 1.9383251 1.726869e+00 ASPN
## 49 1.8173833 1.532021e+00 UBA7
## 50 1.4529870 9.940816e-01 KCNMB4
## 51 1.0952934 7.347537e-01 VNN2;NMNAT2;HS3ST6;FM04
## 52 1.0725869 5.262412e-01 SCN5A
## 53 1.0199580 4.705129e-01 SCN5A
## 54 0.9296890 4.147344e-01 ZNF704;AGRP
## 55 0.9634286 4.134069e-01 KCNMB4
## 56 0.8446111 3.096617e-01 FBXW12;TNFRSF6B;UBA7
## 57 0.8376291 3.064302e-01 ZNF704;AGRP
## 58 0.7915407 2.580970e-01 FBXW12;VNN2
## 59 0.7805066 2.498354e-01 HEPH
## 60 0.7527542 2.205745e-01 ZNF704;AGRP
## 61 0.5230727 8.340777e-02 UBA7
## 62 0.5035181 7.425702e-02 SCN5A
## 63 0.5631854 8.051692e-02 FBXW12;VNN2
## 64 0.3001894 1.161068e-02 HEPH
## 65 0.2029221 1.782158e-03 CRABP2
##
## $WikiPathways_2023_Human
## [1] Term          Overlap        P.value
## [4] Adjusted.P.value Old.P.value   Old.Adjusted.P.value
## [7] Odds.Ratio    Combined.Score Genes
## <0 rows> (or 0-length row.names)

```

```
head(enrichr_results_all_up)
```

		Term	Overlap
## 1	p53 signaling pathway	5/73	
## 2	Cytokine-cytokine receptor interaction	7/295	
## 3	African trypanosomiasis	2/37	
## 4	Bladder cancer	2/41	
## 5	Epstein-Barr virus infection	4/202	
## 6	Proteoglycans in cancer	4/205	
## 7	Sphingolipid metabolism	2/49	
## 8	Steroid hormone biosynthesis	2/61	
## 9	Fc epsilon RI signaling pathway	2/68	
## 10	Melanoma	2/72	
## 11	Glioma	2/75	
## 12	Chronic myeloid leukemia	2/76	
## 13	Metabolism of xenobiotics by cytochrome P450	2/76	
## 14	B cell receptor signaling pathway	2/81	
## 15	ErbB signaling pathway	2/85	
## 16	Other glycan degradation	1/18	
## 17	Prostate cancer	2/97	
## 18	Steroid biosynthesis	1/20	
## 19	Human papillomavirus infection	4/331	
## 20	Pantothenate and CoA biosynthesis	1/21	
## 21	C-type lectin receptor signaling pathway	2/104	
## 22	NF-kappa B signaling pathway	2/104	
## 23	Drug metabolism	2/108	
## 24	Proximal tubule bicarbonate reclamation	1/23	
## 25	Human cytomegalovirus infection	3/225	
## 26	Neurotrophin signaling pathway	2/119	
## 27	Biosynthesis of unsaturated fatty acids	1/27	
## 28	Fatty acid elongation	1/27	
## 29	Chemical carcinogenesis	3/239	
## 30	Cell cycle	2/124	
## 31	Linoleic acid metabolism	1/29	
## 32	Asthma	1/31	
## 33	FoxO signaling pathway	2/131	
## 34	Vascular smooth muscle contraction	2/133	
## 35	Nicotinate and nicotinamide metabolism	1/35	
## 36	Ubiquitin mediated proteolysis	2/140	
## 37	Thyroid cancer	1/37	
## 38	Allograft rejection	1/38	
## 39	Primary immunodeficiency	1/38	
## 40	Graft-versus-host disease	1/42	
## 41	Non-alcoholic fatty liver disease	2/155	
## 42	Cellular senescence	2/156	
## 43	Type I diabetes mellitus	1/43	
## 44	Fat digestion and absorption	1/43	
## 45	Porphyrin and chlorophyll metabolism	1/43	
## 46	Hepatitis C	2/157	
## 47	MAPK signaling pathway	3/294	
## 48	ABC transporters	1/45	
## 49	Hepatitis B	2/162	

## 50	JAK-STAT signaling pathway	2/162
## 51	Intestinal immune network for IgA production	1/48
## 52	Malaria	1/50
## 53	Autoimmune thyroid disease	1/53
## 54	Pathways of neurodegeneration	4/475
## 55	Endometrial cancer	1/58
## 56	Mineral absorption	1/60
## 57	Transcriptional misregulation in cancer	2/192
## 58	Kaposi sarcoma-associated herpesvirus infection	2/193
## 59	Arachidonic acid metabolism	1/61
## 60	Glycerolipid metabolism	1/61
## 61	Pathogenic Escherichia coli infection	2/197
## 62	Basal cell carcinoma	1/63
## 63	Inflammatory bowel disease	1/65
## 64	PI3K-Akt signaling pathway	3/354
## 65	Viral carcinogenesis	2/203
## 66	Long-term potentiation	1/67
## 67	Adipocytokine signaling pathway	1/69
## 68	Renal cell carcinoma	1/69
## 69	Renin secretion	1/69
## 70	Pathways in cancer	4/531
## 71	Non-small cell lung cancer	1/72
## 72	Inositol phosphate metabolism	1/73
## 73	Pancreatic cancer	1/76
## 74	RNA degradation	1/79
## 75	Peroxisome	1/82
## 76	Colorectal cancer	1/86
## 77	Insulin secretion	1/86
## 78	Bile secretion	1/90
## 79	Small cell lung cancer	1/92
## 80	Th1 and Th2 cell differentiation	1/92
## 81	IL-17 signaling pathway	1/94
## 82	Fc gamma R-mediated phagocytosis	1/97
## 83	Phosphatidylinositol signaling system	1/97
## 84	Viral protein interaction with cytokine and cytokine receptor	1/100
## 85	Progesterone-mediated oocyte maturation	1/100
## 86	Chagas disease	1/102
## 87	Longevity regulating pathway	1/102
## 88	Pancreatic secretion	1/102
## 89	Protein digestion and absorption	1/103
## 90	Parathyroid hormone synthesis, secretion and action	1/106
## 91	Insulin resistance	1/108
## 92	HIF-1 signaling pathway	1/109
## 93	TNF signaling pathway	1/112
## 94	Sphingolipid signaling pathway	1/119
## 95	Thyroid hormone signaling pathway	1/121
## 96	Osteoclast differentiation	1/127
## 97	MicroRNAs in cancer	2/310
## 98	Lysosome	1/128
## 99	Oocyte meiosis	1/129
## 100	Relaxin signaling pathway	1/129
## 101	Natural killer cell mediated cytotoxicity	1/131
## 102	Apelin signaling pathway	1/137
## 103	Autophagy	1/137

## 104		Yersinia infection	1/137		
## 105		Measles	1/139		
## 106		Apoptosis	1/142		
## 107		Breast cancer	1/147		
## 108		Gastric cancer	1/149		
## 109	Adrenergic signaling in cardiomyocytes		1/150		
## 110	mTOR signaling pathway		1/154		
## 111	Oxytocin signaling pathway		1/154		
## 112	Cushing syndrome		1/155		
## 113	Necroptosis		1/159		
## 114	Amyotrophic lateral sclerosis		2/364		
## 115	CGMP-PKG signaling pathway		1/167		
## 116	Hepatocellular carcinoma		1/168		
## 117	Influenza A		1/172		
## 118	Tuberculosis		1/180		
## 119	Chemokine signaling pathway		1/192		
## 120	Human immunodeficiency virus 1 infection		1/212		
## 121	Lipid and atherosclerosis		1/215		
## 122	Human T-cell leukemia virus 1 infection		1/219		
## 123	Thermogenesis		1/232		
## 124	Ras signaling pathway		1/232		
## 125	Shigellosis		1/246		
## 126	Parkinson disease		1/249		
## 127	Endocytosis		1/252		
## 128	Alzheimer disease		1/369		
## 129	Herpes simplex virus 1 infection		1/498		
##	P.value	Adjusted.P.value	Old.P.value	Old.Adjusted.P.value	Odds.Ratio
## 1	0.0000469213	0.006052848	0	0	14.1519132
## 2	0.0011084205	0.071493123	0	0	4.7176843
## 3	0.0170140249	0.530998817	0	0	10.7045822
## 4	0.0206580947	0.530998817	0	0	9.6047412
## 5	0.0239956330	0.530998817	0	0	3.8255633
## 6	0.0251573925	0.530998817	0	0	3.7678913
## 7	0.0288138893	0.530998817	0	0	7.9666800
## 8	0.0430131261	0.562410338	0	0	6.3425008
## 9	0.0522662416	0.562410338	0	0	5.6678102
## 10	0.0578432955	0.562410338	0	0	5.3428571
## 11	0.0621556497	0.562410338	0	0	5.1225123
## 12	0.0636168696	0.562410338	0	0	5.0530342
## 13	0.0636168696	0.562410338	0	0	5.0530342
## 14	0.0710937658	0.562410338	0	0	4.7320277
## 15	0.0772705549	0.562410338	0	0	4.5030689
## 16	0.0929018344	0.562410338	0	0	10.9263332
## 17	0.0967389408	0.562410338	0	0	3.9318769
## 18	0.1026810483	0.562410338	0	0	9.7752091
## 19	0.1045423498	0.562410338	0	0	2.3012232
## 20	0.1075314130	0.562410338	0	0	9.2859813
## 21	0.1086714478	0.562410338	0	0	3.6607473
## 22	0.1086714478	0.562410338	0	0	3.6607473
## 23	0.1156575540	0.562410338	0	0	3.5218939
## 24	0.1171543506	0.562410338	0	0	8.4409516
## 25	0.1223301430	0.562410338	0	0	2.5315315
## 26	0.1354210990	0.562410338	0	0	3.1890018
## 27	0.1360928919	0.562410338	0	0	7.1409058

## 28	0.1360928919	0.562410338	0	0	7.1409058
## 29	0.1392952497	0.562410338	0	0	2.3796610
## 30	0.1446403279	0.562410338	0	0	3.0575317
## 31	0.1454106605	0.562410338	0	0	6.6301736
## 32	0.1546288520	0.562410338	0	0	6.1875389
## 33	0.1577588311	0.562410338	0	0	2.8905953
## 34	0.1615478825	0.562410338	0	0	2.8461760
## 35	0.1727707098	0.562410338	0	0	5.4584937
## 36	0.1749358619	0.562410338	0	0	2.7008477
## 37	0.1816964516	0.562410338	0	0	5.1547248
## 38	0.1861234744	0.562410338	0	0	5.0151553
## 39	0.1861234744	0.562410338	0	0	5.0151553
## 40	0.2035955261	0.562410338	0	0	4.5249601
## 41	0.2041626757	0.562410338	0	0	2.4342089
## 42	0.2061318334	0.562410338	0	0	2.4182798
## 43	0.2079051543	0.562410338	0	0	4.4170004
## 44	0.2079051543	0.562410338	0	0	4.4170004
## 45	0.2079051543	0.562410338	0	0	4.4170004
## 46	0.2081031088	0.562410338	0	0	2.4025563
## 47	0.2123454597	0.562410338	0	0	1.9244968
## 48	0.2164552149	0.562410338	0	0	4.2158029
## 49	0.2179885032	0.562410338	0	0	2.3268868
## 50	0.2179885032	0.562410338	0	0	2.3268868
## 51	0.2291091478	0.579511374	0	0	3.9461125
## 52	0.2374324070	0.583665447	0	0	3.7846653
## 53	0.2497506363	0.583665447	0	0	3.5657800
## 54	0.2549816152	0.583665447	0	0	1.5859056
## 55	0.2698444062	0.583665447	0	0	3.2521725
## 56	0.2777317916	0.583665447	0	0	3.1416125
## 57	0.2778644472	0.583665447	0	0	1.9565045
## 58	0.2798648017	0.583665447	0	0	1.9461622
## 59	0.2816437699	0.583665447	0	0	3.0890966
## 60	0.2816437699	0.583665447	0	0	3.0890966
## 61	0.2878622569	0.583665447	0	0	1.9058539
## 62	0.2894048589	0.583665447	0	0	2.9891468
## 63	0.2970828653	0.583665447	0	0	2.8954439
## 64	0.2991106638	0.583665447	0	0	1.5906390
## 65	0.2998407667	0.583665447	0	0	1.8483995
## 66	0.3046786704	0.583665447	0	0	2.8074200
## 67	0.3121931461	0.583665447	0	0	2.7245739
## 68	0.3121931461	0.583665447	0	0	2.7245739
## 69	0.3121931461	0.583665447	0	0	2.7245739
## 70	0.3225753726	0.585841946	0	0	1.4132973
## 71	0.3233142517	0.585841946	0	0	2.6090562
## 72	0.3269815511	0.585841946	0	0	2.5726895
## 73	0.3378657161	0.597050375	0	0	2.4694081
## 74	0.3485754640	0.607651822	0	0	2.3740714
## 75	0.3591135640	0.617675330	0	0	2.2857967
## 76	0.3729020613	0.620791144	0	0	2.1777900
## 77	0.3729020613	0.620791144	0	0	2.1777900
## 78	0.3863965903	0.620791144	0	0	2.0794918
## 79	0.3930355624	0.620791144	0	0	2.0335832
## 80	0.3930355624	0.620791144	0	0	2.0335832
## 81	0.3996033610	0.620791144	0	0	1.9896493

##	82	0.4093232601	0.620791144	0	0	1.9271807
##	83	0.4093232601	0.620791144	0	0	1.9271807
##	84	0.4188872358	0.620791144	0	0	1.8684981
##	85	0.4188872358	0.620791144	0	0	1.8684981
##	86	0.4251778208	0.620791144	0	0	1.8313130
##	87	0.4251778208	0.620791144	0	0	1.8313130
##	88	0.4251778208	0.620791144	0	0	1.8313130
##	89	0.4282977662	0.620791144	0	0	1.8132674
##	90	0.4375572906	0.626306512	0	0	1.7611927
##	91	0.4436476019	0.626306512	0	0	1.7280985
##	92	0.4466682099	0.626306512	0	0	1.7120111
##	93	0.4556328872	0.632006908	0	0	1.6654879
##	94	0.4759947440	0.649876977	0	0	1.5661334
##	95	0.4816725412	0.649876977	0	0	1.5398754
##	96	0.4983427731	0.649876977	0	0	1.4661030
##	97	0.5008527415	0.649876977	0	0	1.1997060
##	98	0.5010690275	0.649876977	0	0	1.4544852
##	99	0.5037806024	0.649876977	0	0	1.4430491
##	100	0.5037806024	0.649876977	0	0	1.4430491
##	101	0.5091600269	0.650313302	0	0	1.4207045
##	102	0.5249540533	0.651144931	0	0	1.3576141
##	103	0.5249540533	0.651144931	0	0	1.3576141
##	104	0.5249540533	0.651144931	0	0	1.3576141
##	105	0.5301060081	0.651273096	0	0	1.3378031
##	106	0.5377303204	0.654407654	0	0	1.3091403
##	107	0.5501660678	0.655800688	0	0	1.2639867
##	108	0.5550470437	0.655800688	0	0	1.2467795
##	109	0.5574678178	0.655800688	0	0	1.2383491
##	110	0.5670211190	0.655800688	0	0	1.2057296
##	111	0.5670211190	0.655800688	0	0	1.2057296
##	112	0.5693773413	0.655800688	0	0	1.1978395
##	113	0.5786758642	0.660612270	0	0	1.1672779
##	114	0.5877564360	0.665092809	0	0	1.0179297
##	115	0.5966802294	0.665991957	0	0	1.1105731
##	116	0.5988764880	0.665991957	0	0	1.1038670
##	117	0.6075436592	0.669855829	0	0	1.0778270
##	118	0.6243252057	0.682525013	0	0	1.0292382
##	119	0.6481733626	0.702641712	0	0	0.9639869
##	120	0.6846317023	0.735371972	0	0	0.8717279
##	121	0.6897675082	0.735371972	0	0	0.8593764
##	122	0.6964865612	0.736448905	0	0	0.8434365
##	123	0.7173433510	0.746268486	0	0	0.7954444
##	124	0.7173433510	0.746268486	0	0	0.7954444
##	125	0.7382182716	0.758449013	0	0	0.7494564
##	126	0.7424887072	0.758449013	0	0	0.7402774
##	127	0.7466901133	0.758449013	0	0	0.7313177
##	128	0.8668995670	0.873672220	0	0	0.4958350
##	129	0.9348215387	0.934821539	0	0	0.3647116
##		Combined.Score		Genes		
##	1	141.05266749		CDKN1A ; ZMAT3 ; SESN1 ; MDM2 ; FAS		
##	2	32.10298865	TNFRSF6B ; GDF15 ; IL13 ; FAS ; INHA ; CCL28 ; EDA2R			
##	3	43.60744156		FAS ; HBA1		
##	4	37.26301525		CDKN1A ; MDM2		
##	5	14.26890523		CDKN1A ; MDM2 ; BLNK ; FAS		

## 6	13.87564969	CDKN1A;MDM2;FAS;ANK1
## 7	28.25699947	ACER2;NEU4
## 8	19.95509283	HSD11B1;CYP2E1
## 9	16.72800099	INPP5D;IL13
## 10	15.22723756	CDKN1A;MDM2
## 11	14.23092083	CDKN1A;MDM2
## 12	13.92048557	CDKN1A;MDM2
## 13	13.92048557	HSD11B1;CYP2E1
## 14	12.51032488	INPP5D;BLNK
## 15	11.52984811	BTC;CDKN1A
## 16	25.96328271	NEU4
## 17	9.18383915	CDKN1A;MDM2
## 18	22.24962422	CEL
## 19	5.19653724	CDKN1A;MDM2;FAS;HES2
## 20	20.70748072	VNN2
## 21	8.12475847	MDM2;CLEC4E
## 22	8.12475847	BLNK;EDA2R
## 23	7.59715334	CYP2E1;FM04
## 24	18.09961995	AQP1
## 25	5.31882825	CDKN1A;MDM2;FAS
## 26	6.37598205	NTF4;RPS6KA2
## 27	14.24194823	ELOVL4
## 28	14.24194823	ELOVL4
## 29	4.69069142	HSD11B1;RPS6KA2;CYP2E1
## 30	5.91175319	CDKN1A;MDM2
## 31	12.78425690	CYP2E1
## 32	11.55044933	IL13
## 33	5.33802705	CDKN1A;MDM2
## 34	5.18844706	ACTA2;KCNMB4
## 35	9.58396829	NMNAT2
## 36	4.70848467	UBA7;MDM2
## 37	8.79095963	CDKN1A
## 38	8.43220628	FAS
## 39	8.43220628	BLNK
## 40	7.20201687	FAS
## 41	3.86756403	FAS;CYP2E1
## 42	3.81904267	CDKN1A;MDM2
## 43	6.93766463	FAS
## 44	6.93766463	CEL
## 45	6.93766463	HEPH
## 46	3.77134453	CDKN1A;FAS
## 47	2.98208633	NTF4;RPS6KA2;FAS
## 48	6.45174506	ABCA12
## 49	3.54457680	CDKN1A;FAS
## 50	3.54457680	CDKN1A;IL13
## 51	5.81482082	CCL28
## 52	5.44186535	HBA1
## 53	4.94677921	FAS
## 54	2.16724124	UBA7;RAB39B;NEFL;FAS
## 55	4.26005248	CDKN1A
## 56	4.02471798	HEPH
## 57	2.50554244	CDKN1A;MDM2
## 58	2.47833762	CDKN1A;FAS
## 59	3.91423206	CYP2E1

## 60	3.91423206	CEL
## 61	2.37330876	MYO1A;FAS
## 62	3.70632886	CDKN1A
## 63	3.51432819	IL13
## 64	1.91980847	NTF4;CDKN1A;MDM2
## 65	2.22640409	CDKN1A;MDM2
## 66	3.33661192	RPS6KA2
## 67	3.17176705	AGRP
## 68	3.17176705	CDKN1A
## 69	3.17176705	AQP1
## 70	1.59903068	CDKN1A;IL13;MDM2;FAS
## 71	2.94596497	CDKN1A
## 72	2.87588490	INPP5D
## 73	2.67957140	CDKN1A
## 74	2.50203513	BTG2
## 75	2.34092236	PEX5L
## 76	2.14825800	CDKN1A
## 77	2.14825800	KCNMB4
## 78	1.97737000	AQP1
## 79	1.89907225	CDKN1A
## 80	1.89907225	IL13
## 81	1.82507111	IL13
## 82	1.72145428	INPP5D
## 83	1.72145428	INPP5D
## 84	1.62588017	CCL28
## 85	1.62588017	RPS6KA2
## 86	1.56622644	FAS
## 87	1.56622644	SESN1
## 88	1.56622644	CEL
## 89	1.53753578	KCNE3
## 90	1.45570966	CDKN1A
## 91	1.40446839	RPS6KA2
## 92	1.37977687	CDKN1A
## 93	1.30918653	FAS
## 94	1.16261671	ACER2
## 95	1.12486476	MDM2
## 96	1.02109253	BLNK
## 97	0.82952846	CDKN1A;MDM2
## 98	1.00506590	AP3B2
## 99	0.98937525	RPS6KA2
## 100	0.98937525	ACTA2
## 101	0.95896549	FAS
## 102	0.87490697	ACTA2
## 103	0.87490697	RAB39B
## 104	0.87490697	RPS6KA2
## 105	0.84907454	FAS
## 106	0.81218818	FAS
## 107	0.75527642	CDKN1A
## 108	0.73398208	CDKN1A
## 109	0.72362993	SCN5A
## 110	0.68408124	RPS6KA2
## 111	0.68408124	CDKN1A
## 112	0.67463748	CDKN1A
## 113	0.63851592	FAS

```

## 114    0.54097127          RAB39B;NEFL
## 115    0.57347102          KCNMB4
## 116    0.56595252          CDKN1A
## 117    0.53711485          FAS
## 118    0.48485755          CLEC4E
## 119    0.41798190          CCL28
## 120    0.33027524          FAS
## 121    0.31917297          FAS
## 122    0.30507670          CDKN1A
## 123    0.26424718          RPS6KA2
## 124    0.26424718          NTF4
## 125    0.22747182          MDM2
## 126    0.22041582          UBA7
## 127    0.21362158          MDM2
## 128    0.07082118          FAS
## 129    0.02458143          FAS
##
## $GO_Biological_Process_2021
##
## 1                               gas transpo
## 2                               epidermis developm
## 3                               delaminat
## 4                               oxygen transpo
## 5                               skin morphogene
## 6                               DNA damage response, signal transduction by p53 class media
## 7                               one-carbon compound transpo
## 8                               action potent
## 9                               organic anion transpo
## 10                              cellular response to mechanical stimul
## 11                              ceramide catabolic proc
## 12      DNA damage response, signal transduction by p53 class mediator resulting in cell cycle arr
## 13                              sphingolipid metabolic proc
## 14      regulation of ventricular cardiac muscle cell membrane repolarizati
## 15                              ventricular cardiac muscle cell action potent
## 16                              positive regulation of cell population proliferat
## 17                              modulation by symbiont of entry into host
## 18                              mitotic G1 DNA damage checkpoint signal
## 19      regulation of cardiac muscle cell membrane repolarizati
## 20                              negative regulation of phosphate metabolic proc
## 21                              neuronal action potent
## 22      cellular response to amino acid starvat
## 23                              response to amino acid starvat
## 24                              regulation of viral life cyc
## 25                              negative regulation of cell cyc
## 26                              amide transpo
## 27      regulation of DNA damage response, signal transduction by p53 class media
## 28                              positive regulation of fibroblast proliferati
## 29                              regulation of DNA biosynthetic proc
## 30                              lipid catabolic proc
## 31      cardiac muscle cell action potential involved in contracti
## 32                              positive regulation of autophag
## 33                              negative regulation of developmental grow
## 34                              negative regulation of DNA biosynthetic proc
## 35      positive regulation of transmembrane receptor protein serine/threonine kinase signaling path

```

```

## 36 regulation of neurotransmitter secretion
## 37 positive regulation of I-kappaB kinase/NF-kappaB signaling
## 38 bicarbonate transport
## 39 regulation of trans-synaptic signaling
## 40 negative regulation of DNA metabolic process
## 41 axonal transport
## 42 anterograde axonal transport
## 43 regulation of heart rate by cardiac conductive system
## 44 odontogenesis
## 45 regulation of viral entry into host cell
## 46 cellular response to tumor necrosis factor
## 47 modulation of chemical synaptic transmission
## 48 chemical synaptic transmission
## 49 regulation of fibroblast proliferation
## 50 positive regulation of pathway-restricted SMAD protein phosphorylation
## 51 negative regulation of B cell differentiation
## 52 ADP transport
## 53 negative regulation of gonadotropin secretion
## 54 bundle of His cell action potential
## 55 negative regulation of leukocyte adhesion to vascular endothelial cells
## 56 negative regulation of macrophage differentiation
## 57 carbon dioxide transport
## 58 cellular response to antibiotic
## 59 regulation of growth hormone receptor signaling pathway
## 60 cellular response to salt stress
## 61 regulation of myoblast proliferation
## 62 polyphosphate catabolic process
## 63 positive regulation of action potential
## 64 glial cell-derived neurotrophic factor receptor signaling pathway
## 65 positive regulation of feeding behavior
## 66 response to denervation involved in regulation of muscle adaptation
## 67 hemoglobin metabolic process
## 68 response to salt stress
## 69 SA node cell to atrial cardiac muscle cell signaling
## 70 positive regulation of myoblast proliferation
## 71 membrane depolarization during AV node cell action potential
## 72 membrane depolarization during SA node cell action potential
## 73 trophoblast giant cell differentiation
## 74 cellular response to ionizing radiation
## 75 response to hydrogen peroxide
## 76 negative regulation of cellular extravasation
## 77 cellular hyperosmotic response
## 78 cellular water homeostasis
## 79 embryonic hindlimb morphogenesis
## 80 polyphosphate metabolic process
## 81 regulation of saliva secretion
## 82 regulation of tooth mineralization
## 83 regulation of ventricular cardiac muscle cell membrane depolarization
## 84 ISG15-protein conjugation
## 85 mitochondrial protein catabolic process
## 86 vesicle localization
## 87 monoterpenoid metabolic process
## 88 cardiac muscle tissue development
## 89 regulation of I-kappaB kinase/NF-kappaB signaling

```

```

## 90 ceramide metabolic process
## 91 regulation of autophagy
## 92 negative regulation of axon regeneration
## 93 ammonium transport
## 94 regulation of atrial cardiac muscle cell membrane depolarization
## 95 regulation of atrial cardiac muscle cell membrane repolarization
## 96 AV node cell action potential
## 97 AV node cell to bundle of His cell communication
## 98 negative regulation of lymphocyte differentiation
## 99 negative regulation of striated muscle tissue development
## 100 cellular response to platelet-derived growth factor stimulus
## 101 nicotinamide nucleotide biosynthetic process
## 102 pantothenate metabolic process
## 103 regulation of potassium ion export across plasma membrane
## 104 fatty acid elongation, monounsaturated fatty acid
## 105 fatty acid elongation, polyunsaturated fatty acid
## 106 fatty acid elongation, saturated fatty acid
## 107 fatty acid elongation, unsaturated fatty acid
## 108 flavin-containing compound metabolic process
## 109 ganglioside catabolic process
## 110 glycerol transport
## 111 hindlimb morphogenesis
## 112 hyaluronan biosynthetic process
## 113 hyperosmotic response
## 114 riboflavin metabolic process
## 115 SA node cell action potential
## 116 intermediate filament bundle assembly
## 117 lipid hydroxylase
## 118 T cell apoptotic process
## 119 terpenoid metabolic process
## 120 positive regulation of urine volume
## 121 protein localization to plasma membrane
## 122 regulation of neurotransmitter receptor activity
## 123 regulation of pathway-restricted SMAD protein phosphorylation
## 124 membrane lipid biosynthetic process
## 125 protein localization to cell periphery
## 126 cellular response to DNA damage stimulus
## 127 protein localization to organelles
## 128 cellular protein catabolic process
## 129 atrial cardiac muscle cell to AV node cell signaling
## 130 benzene-containing compound metabolic process
## 131 negative regulation of neuron projection regeneration
## 132 negative regulation of potassium ion transmembrane transporter activity
## 133 cellular response to UV radiation
## 134 regulation of intrinsic apoptotic signaling pathway by p53 class mediator
## 135 regulation of striated muscle tissue development
## 136 positive regulation of cysteine-type endopeptidase activity involved in apoptotic signaling pathway
## 137 stress-induced premature senescence
## 138 vascular associated smooth muscle contraction
## 139 water homeostasis
## 140 anterograde trans-synaptic signal
## 141 response to retinoic acid
## 142 axon regeneration
## 143 regulation of complement-dependent cytotoxicity

```

```

## 144 cellular response to nitric oxide
## 145 cellular response to reactive nitrogen species
## 146 cholesterol catabolic process
## 147 oligosaccharide catabolic process
## 148 organic cyclic compound catabolic process
## 149 intestinal cholesterol absorption
## 150 positive regulation of NLRP3 inflammasome complex assembly
## 151 sterol catabolic process
## 152 maintenance of apical/basal cell polarity
## 153 maintenance of epithelial cell apical/basal polarity
## 154 postsynaptic membrane assembly
## 155 regulation of cell-matrix adhesion
## 156 regulation of cellular catabolic process
## 157 regulation of protein localization
## 158 positive regulation of cell death
## 159 positive regulation of protein phosphorylation
## 160 positive regulation of NF-kappaB transcription factor activity
## 161 negative regulation of cell adhesion mediated by integrins
## 162 negative regulation of delayed rectifier potassium channel activity
## 163 regulation of actin filament-based movement
## 164 cellular response to leucine starvation
## 165 cellular response to leucine starvation
## 166 nerve growth factor signaling pathway
## 167 chloride ion homeostasis
## 168 neuron projection regeneration
## 169 regulation of leukocyte tethering or rolling
## 170 ectoderm development
## 171 positive regulation of behavior
## 172 positive regulation of cell activation
## 173 regulation of urine volume
## 174 glycosphingolipid catabolic process
## 175 response to leucine starvation
## 176 presynaptic membrane assembly
## 177 monovalent inorganic anion homeostasis
## 178 cellular response to decreased oxygen levels
## 179 cellular response to starvation
## 180 organonitrogen compound biosynthetic process
## 181 regulation of cell population proliferation
## 182 negative regulation of neuron apoptotic process
## 183 fatty acid biosynthetic process
## 184 alcohol catabolic process
## 185 axonal transport of mitochondria
## 186 regulation of cysteine-type endopeptidase activity involved in apoptotic signaling pathways
## 187 negative regulation of potassium ion transmembrane transport
## 188 cellular response to increased oxygen levels
## 189 negative regulation of voltage-gated potassium channel activity
## 190 regulation of stress-activated protein kinase signaling cascade
## 191 glucocorticoid biosynthetic process
## 192 glucocorticoid metabolic process
## 193 positive regulation of epidermal growth factor-activated receptor activity
## 194 intestinal lipid absorption
## 195 T cell homeostasis
## 196 vasoconstrictor activity
## 197 postsynapse assembly

```

198 presynaptic membrane organization
199 sphingolipid biosynthetic process
200 ATP transport
201 regulation of axon regeneration
202 cellular response to fluid shear stress
203 regulation of feeding behavior
204 nuclear body organization
205 phospholipid efflux
206 polyol transport
207 protein import into peroxisome matrix
208 water-soluble vitamin metabolic process
209 cellular response to UV
210 antifungal innate immune response
211 atrial cardiac muscle cell action potential
212 detection of calcium ion concentration
213 embryonic appendage morphogenesis
214 fatty acid elongation
215 response to nitric oxide
216 response to UV
217 positive regulation of lipid transport
218 positive regulation of nuclear-transcribed mRNA poly(A) tail shortening
219 sphingoid biosynthetic process
220 sphingosine biosynthetic process
221 positive regulation of sodium ion transport
222 mitochondrion transport along microtubule
223 very long-chain fatty acid biosynthetic process
224 cation transport
225 skin development
226 activation of cysteine-type endopeptidase activity involved in apoptotic process
227 protein modification by small protein conjugation or removal
228 negative regulation of DNA damage response, signal transduction by p53 class mediator
229 carbohydrate transport
230 negative regulation of TORC1 signaling
231 ceramide transport
232 cGMP-mediated signaling
233 nucleoside phosphate biosynthetic process
234 ovarian follicle development
235 renal absorption
236 smooth muscle contraction
237 steroid catabolic process
238 membrane repolarization during action potential
239 potassium ion export across plasma membrane
240 positive regulation of intracellular signal transduction
241 lymphocyte differentiation
242 regulation of cell cycle
243 anterograde synaptic vesicle transport
244 C21-steroid hormone biosynthetic process
245 neurotrophin TRK receptor signaling pathway
246 regulation of macrophage differentiation
247 regulation of nuclear-transcribed mRNA poly(A) tail shortening
248 positive regulation of DNA damage response, signal transduction by p53 class mediator
249 response to muscle stretching
250 synaptic vesicle transport along microtubule
251 positive regulation of secretion

252 myoblast differentiation
253 antigen receptor-mediated signaling pathway
254 negative regulation of phosphorylation
255 response to interleukin-6
256 negative regulation of epithelial cell differentiation
257 neuron cell-cell adhesion
258 dendrite self-avoidance
259 odontogenesis of dentin-containing tooth
260 regulation of neurotransmitter transport
261 retrograde axonal transport
262 sphingolipid catabolic process
263 membrane repolarization
264 regulation of nucleic acid-templated transcription
265 purine ribonucleotide transport
266 negative regulation of intrinsic apoptotic signaling pathway by p53 class mediator
267 cellular response to gamma radiation
268 negative regulation of vascular associated smooth muscle cell proliferation
269 diol biosynthetic process
270 regulation of NLRP3 inflammasome complex assembly
271 membrane depolarization during cardiac muscle cell action potential
272 muscle tissue morphogenesis
273 protein localization to membrane
274 protein polyubiquitination
275 adenine nucleotide translocator
276 regulation of B cell differentiation
277 regulation of catabolic process
278 regulation of delayed rectifier potassium channel activity
279 cellular response to glucocorticoid stimulus
280 negative regulation of signal transduction by p53 class mediator
281 regulation of membrane depolarization
282 nucleotide biosynthetic process
283 regulation of multicellular organism growth
284 fluid transport
285 glycoprotein catabolic process
286 response to axon injury
287 intermediate filament organization
288 presynapse assembly
289 water transport
290 glycosaminoglycan biosynthetic process
291 carbohydrate derivative catabolic process
292 cardiac muscle cell contraction
293 cellular response to copper ion
294 epoxygenase P450 pathway
295 establishment of skin barrier
296 regulation of synaptic vesicle exocytosis
297 regulation of water loss via sweat gland
298 sphingosine metabolic process
299 long-term memory
300 postsynaptic membrane organization
301 vesicle transport along actin filaments
302 negative regulation of neuron death
303 regulation of neuron apoptotic process
304 cardiac epithelial to mesenchymal transition
305 cardiac ventricle development

306 neuromuscular synaptic transmission
307 ganglioside metabolic process
308 positive regulation of epithelial cell differentiation
309 granulocyte differentiation
310 mesoderm development
311 positive regulation of cell cycle process
312 regulation of cell death
313 actin filament-based transport
314 cellular response to estradiol stimulation
315 negative regulation of response to wounding
316 cellular response to inorganic substance
317 neuron apoptotic process
318 neurotrophin signaling pathway
319 epithelial cell development
320 extrinsic apoptotic signaling pathway in absence of ligand
321 hydrogen peroxide catabolic process
322 NAD biosynthetic process
323 steroid metabolic process
324 regulation of cellular macromolecule biosynthetic process
325 negative regulation of multicellular organismal process
326 small GTPase mediated signal transduction
327 negative regulation of B cell activation
328 negative regulation of biomineral tissue development
329 negative regulation of cyclin-dependent protein kinase activity
330 cellular response to nerve growth factor stimulus
331 cellular response to osmotic stress
332 exogenous drug catabolic process
333 female gonad development
334 limb morphogenesis
335 positive regulation of signal transduction by p53 class mediator
336 response to calcium ion concentration
337 cellular response to lipid
338 regulation of cysteine-type endopeptidase activity
339 cytoskeleton-dependent intracellular transport
340 nucleotide metabolic process
341 drug catabolic process
342 positive regulation of cholesterol efflux
343 response to copper ion
344 hyaluronan metabolic process
345 response to tumor necrosis factor
346 cytokine-mediated signaling pathway
347 cellular response to cytokine stimulus
348 C21-steroid hormone metabolic process
349 defense response to fungus
350 regulation of monooxygenase activity
351 extracellular matrix assembly
352 response to gamma radiation
353 potassium ion homeostasis
354 protein K48-linked deubiquitination
355 negative regulation of apoptotic process
356 protein-containing complex subunit organization
357 regulation of cytoskeleton organization
358 cellular response to transforming growth factor beta stimulus
359 regulation of cAMP-mediated signaling

360 cardiac conduction system development
361 cellular polysaccharide biosynthetic process
362 regulation of epidermal cell differentiation
363 peripheral nervous system development
364 cellular amide metabolic process
365 apoptotic process
366 tumor necrosis factor-mediated signaling pathway
367 cellular response to DNA damage stimulus
368 membrane depolarization during action potential
369 mononuclear cell differentiation
370 negative regulation of response to external stimulus
371 positive regulation of cysteine-type endopeptidase activity involved in apoptotic process
372 negative regulation of cation channel activity
373 negative regulation of endothelial cell apoptotic process
374 regulation of cardiac muscle cell contraction
375 cellular lipid catabolic process
376 regulation of epidermal growth factor-activated receptor activity
377 cellular senescence
378 positive regulation of BMP signaling pathway
379 positive regulation of mitotic cell cycle
380 positive regulation of nuclear division
381 presynaptic endocytosis
382 monocarboxylic acid catabolic process
383 monovalent inorganic cation homeostasis
384 regulation of insulin secretion involved in cellular response to glucose stimulus
385 regulation of sodium ion transmembrane transport
386 sarcomere organization
387 potassium ion transport
388 fatty acid metabolic process
389 negative regulation of interferon-gamma production
390 negative regulation of myeloid leukocyte differentiation
391 hydrogen peroxide metabolic process
392 limb development
393 transition metal ion homeostasis
394 regulation of phosphorylation
395 positive regulation of DNA-binding transcription factor activity
396 synapse organization
397 regulation of cation transmembrane transport
398 cardiac muscle cell action potential
399 positive regulation of endopeptidase activity
400 regulation of vasoconstrictor activity
401 long-chain fatty acid biosynthetic process
402 primary neural tube formation
403 negative regulation of programmed cell death
404 cellular nitrogen compound biosynthetic process
405 cellular response to calcium ion concentration
406 negative regulation of response to DNA damage stimulus
407 renal water homeostasis
408 positive regulation of leukocyte cell-cell adhesion
409 steroid hormone biosynthetic process
410 tube closure
411 vitamin transport
412 cellular response to hypoxia
413 cellular response to metal ion concentration

414 activation of phospholipase C activi
415 negative regulation of cell-matrix adhes
416 cardiac muscle tissue morphogene
417 regulation of NMDA receptor activi
418 ERBB2 signaling path
419 establishment or maintenance of epithelial cell apical/basal polar
420 positive regulation of interleukin-10 product
421 membrane depolarizat
422 metal ion exp
423 modulation by host of symbiont proc
424 protein K63-linked deubiquitinat
425 regulation of cholesterol effi
426 negative regulation of smooth muscle cell proliferati
427 positive regulation of cholesterol transpo
428 signal transduction by p53 class media
429 vasculogene
430 mitotic G2 DNA damage checkpoint signali
431 very long-chain fatty acid metabolic proc
432 cellular component assem
433 negative regulation of extrinsic apoptotic signaling pathway via death domain recepto
434 B cell receptor signaling path
435 regulation of cell adhesion mediated by integrin
436 cardiac muscle contract
437 cellular response to amino acid stimul
438 neural tube clos
439 regulation of keratinocyte differentiat
440 positive regulation of epidermal growth factor receptor signaling path
441 synaptic vesicle recycl
442 protein destabilizat
443 negative regulation of cell cycle G1/S phase transit
444 regulation of blood circulat
445 blood vessel diameter maintenan
446 cellular response to hydrogen perox
447 regulation of regulated secretory path
448 regulation of TORC1 signal
449 protein localization to cil
450 potassium ion transmembrane transpo
451 negative regulation of cellular macromolecule biosynthetic proc
452 enzyme linked receptor protein signaling path
453 positive regulation of cellular catabolic proc
454 regulation of cardiac muscle contract
455 regulation of cell cycle G1/S phase transit
456 calcium-dependent cell-cell adhesion via plasma membrane cell adhesion molecu
457 cyclic-nucleotide-mediated signal
458 regulation of microtubule-based proc
459 embryonic limb morphogene
460 regulation of sodium ion transpo
461 positive regulation of mitotic nuclear divis
462 macrophage activatio
463 membrane assem
464 transition metal ion transpo
465 Ras protein signal transduct
466 protein modification by small protein conjugat
467 nitrogen compound transpo

```

## 468 negative regulation of epithelial cell apoptotic process
## 469 negative regulation of G1/S transition of mitotic cell cycle
## 470 regulation of microtubule cytoskeleton organization
## 471 regulation of vascular associated smooth muscle cell proliferation
## 472 positive regulation of signaling receptor activation
## 473 regulation of apoptotic signaling pathway
## 474 negative regulation of TOR signaling
## 475 response to carbohydrate stimulus
## 476 response to estradiol
## 477 positive regulation of potassium ion transport
## 478 synaptic vesicle endocytosis
## 479 cellular response to ketone body
## 480 regulation of nitric-oxide synthase activity
## 481 positive regulation of intracellular transport
## 482 vesicle cytoskeletal trafficking
## 483 cellular response to organic cyclic compound
## 484 negative regulation of cell-substrate adhesion
## 485 negative regulation of ERBB signaling pathway
## 486 autophagy of mitochondria
## 487 regulation of cell development
## 488 carbohydrate catabolic process
## 489 regulation of G0 to G1 transition
## 490 endosome organization
## 491 positive regulation of cation transmembrane transport
## 492 heart contraction
## 493 keratinocyte differentiation
## 494 positive regulation of programmed cell death
## 495 regulation of extrinsic apoptotic signaling pathway via death domain receptor
## 496 regulation of nervous system development
## 497 skeletal system morphogenesis
## 498 positive regulation of protein tyrosine kinase activity
## 499 potassium ion import across plasma membrane
## 500 cellular response to interleukin-6
## 501 cellular response to glucose starvation
## 502 cellular response to retinoic acid
## 503 negative regulation of type I interferon production
## 504 development of primary male sexual characteristics
## 505 positive regulation of phospholipase C activation
## 506 lipid modification
## 507 male gonad development
## 508 myofibril assembly
## 509 cellular response to growth factor stimulation
## 510 skeletal system development
## 511 T cell receptor signaling pathway
## 512 negative regulation of epidermal growth factor receptor signaling pathway
## 513 regulation of endothelial cell apoptotic process
## 514 positive regulation of cell-matrix adhesion
## 515 positive regulation of mRNA catabolic process
## 516 positive regulation of potassium ion transmembrane transport
## 517 metal ion homeostasis
## 518 regulation of apoptotic process
## 519 positive regulation of protein kinase B signaling
## 520 cellular response to radiation
## 521 mitotic G2/M transition checkpoint

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522 erythrocyte differentiation
523 vesicle organization
524 innate immune response
525 negative regulation of cold-induced thermogenesis
526 polyol metabolic process
527 epidermal growth factor receptor signaling pathway
528 glycosphingolipid metabolic process
529 regulation of MAPK cascade
530 regulation of gene expression
531 negative regulation of mitotic cell cycle
532 regulation of interleukin-10 production
533 regulation of protein metabolic process
534 inositol phosphate metabolic process
535 negative regulation of cell projection organization
536 aminoglycan biosynthetic process
537 regulation of cellular localization
538 oligosaccharide metabolic process
539 regulation of stress-activated MAPK cascade
540 positive regulation of reactive oxygen species metabolic process
541 cell-cell adhesion via plasma-membrane adhesion molecule
542 positive regulation of apoptotic process
543 neuron projection development
544 regulation of cellular component movement
545 chloride transmembrane transport
546 positive regulation of ion transport
547 iron ion transport
548 cholesterol transport
549 gonad development
550 plasma membrane bounded cell projection morphogenesis
551 glycolipid metabolic process
552 signal transduction in response to DNA damage
553 myeloid cell differentiation
554 positive regulation of cellular process
555 negative regulation of cysteine-type endopeptidase activity
556 cellular macromolecule catabolic process
557 epidermal cell differentiation
558 heart morphogenesis
559 positive regulation of macroautophagy
560 regulation of mitotic cell cycle
561 cellular response to oxygen-containing compound
562 regulation of cyclin-dependent protein kinase activity
563 regulation of potassium ion transmembrane transport
564 glycosaminoglycan metabolic process
565 striated muscle contraction
566 negative regulation of cysteine-type endopeptidase activity involved in apoptotic process
567 glycoprotein metabolic process
568 positive regulation of response to DNA damage stimulus
569 negative regulation of cytokine production
570 blood vessel morphogenesis
571 negative regulation of metabolic process
572 positive regulation of interleukin-1 beta production
573 sensory organ development
574 arachidonic acid metabolic process
575 cellular response to peptide

576 regulation of mitotic nuclear division## 577 regulation of reactive oxygen species metabolic process## 578 renal system development## 579 negative regulation of neuron projection development## 580 cellular iron ion homeostasis## 581 phospholipid transport## 582 positive regulation of apoptotic signaling pathway## 583 regulation of secretion by cell## 584 response to reactive oxygen species## 585 mitotic DNA damage checkpoint signal transduction## 586 Notch signaling pathway## 587 homophilic cell adhesion via plasma membrane adhesion molecule## 588 B cell differentiation## 589 regulation of DNA-templated transcription, initiation## 590 pattern recognition receptor signaling pathway## 591 iron ion homeostasis## 592 regulation of programmed cell death## 593 regulation of neurogenesis## 594 positive regulation of cysteine-type endopeptidase activity## 595 positive regulation of interleukin-1 production## 596 amyloid fibril formation## 597 anterior/posterior pattern specification## 598 cell cycle G1/S phase transition## 599 cellular response to reactive oxygen species## 600 neuropeptide signaling pathway## 601 monocarboxylic acid biosynthetic process## 602 negative regulation of intrinsic apoptotic signaling pathway## 603 regulation of extrinsic apoptotic signaling pathway## 604 regulation of transcription initiation from RNA polymerase II promoter## 605 protein catabolic process## 606 regulation of macromolecule metabolic process## 607 supramolecular fiber organization## 608 BMP signaling pathway## 609 inorganic anion transmembrane transporter activity## 610 steroid biosynthetic process## 611 protein autoubiquitination## 612 embryonic organ development## 613 ERBB signaling pathway## 614 positive regulation of cell cycle## 615 anion transmembrane transporter activity## 616 regulation of epidermal growth factor receptor signaling pathway## 617 regulation of protein kinase B signaling## 618 negative regulation of transforming growth factor beta receptor signaling pathway## 619 interferon-gamma-mediated signaling pathway## 620 cell chemotaxis## 621 cellular response to calcium ion## 622 synapse assembly## 623 positive regulation of protein transport## 624 protein ubiquitination## 625 cellular response to light stimulus## 626 fatty acid catabolic process## 627 positive regulation of cell-substrate adhesion## 628 kidney development## 629 cellular response to BMP stimulus

630 regulation of G1/S transition of mitotic cell cycle
631 myeloid leukocyte differentiation
632 cell junction organization
633 extrinsic apoptotic signaling pathway
634 response to ionizing radiation
635 positive regulation of protein secretion
636 positive regulation of secretion by cell
637 negative regulation of cell adhesion
638 regulation of actin filament-based processes
639 neurotransmitter transport
640 defense response to Gram-negative bacteria
641 positive regulation of JNK cascade
642 proteolysis involved in cellular protein catabolic process
643 negative regulation of protein binding
644 integrin-mediated signaling pathway
645 negative regulation of cell population proliferation
646 actomyosin structure organization
647 regulation of BMP signaling pathway
648 chloride transporter activity
649 establishment of protein localization to organelles
650 cholesterol metabolic process
651 inorganic cation import across plasma membrane
652 protein modification process
653 axon development
654 regulation of neuron differentiation
655 positive regulation of proteasomal ubiquitin-dependent protein catabolic process
656 positive regulation of ubiquitin-dependent protein catabolic process
657 negative regulation of extrinsic apoptotic signaling pathway
658 lipid biosynthetic process
659 regulation of cyclin-dependent protein serine/threonine kinase activation
660 regulation of interleukin-1 beta production
661 long-chain fatty acid metabolic process
662 negative regulation of cellular process
663 negative regulation of defense response
664 B cell activation
665 G1/S transition of mitotic cell cycle
666 negative regulation of cellular amide metabolic process
667 regulation of interferon-gamma production
668 positive regulation of proteasomal protein catabolic process
669 transmembrane receptor protein tyrosine kinase signaling pathway
670 sodium ion transmembrane transporter activity
671 negative regulation of binding
672 sensory perception of mechanical stimulus
673 regulation of cation channel activity
674 regulation of cysteine-type endopeptidase activity involved in apoptotic process
675 regulation of type I interferon production
676 transforming growth factor beta receptor signaling pathway
677 negative regulation of protein kinase activity
678 negative regulation of translation
679 sodium ion transporter activity
680 regulation of actin cytoskeleton organization
681 sensory perception of sound
682 negative regulation of mitotic cell cycle phase transition
683 regulation of epithelial cell proliferation

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## 684 positive regulation of peptidyl-serine phosphorylation
## 685 negative regulation of cellular protein metabolic process
## 686 regulation of cell cycle phase transition
## 687 cellular transition metal ion homeostasis
## 688 positive regulation of cold-induced thermogenesis
## 689 regulation of peptidyl-serine phosphorylation
## 690 response to cold stress
## 691 positive regulation of stress-activated MAPK cascade
## 692 regulation of transforming growth factor beta receptor signaling pathway
## 693 cellular response to chemical stimulus
## 694 protein-containing complex assembly
## 695 protein deubiquitination
## 696 cell junction assembly
## 697 regulation of proteasomal ubiquitin-dependent protein catabolic process
## 698 regulation of protein catabolic process
## 699 intrinsic apoptotic signaling pathway
## 700 positive regulation of vasculature development
## 701 cellular response to organonitrogen compound
## 702 regulation of insulin secretion
## 703 regulation of JNK cascade
## 704 positive regulation of cellular metabolic process
## 705 chromosome organization
## 706 protein localization to nucleus
## 707 regulation of transcription, DNA-templated
## 708 protein modification by small protein removal
## 709 negative regulation of transmembrane receptor protein serine/threonine kinase signaling pathway
## 710 lipid transport
## 711 regulation of protein kinase activation
## 712 regulation of protein serine/threonine kinase activation
## 713 regulation of macroautophagy
## 714 phosphatidylinositol metabolic process
## 715 positive regulation of metabolic process
## 716 response to lipid
## 717 positive regulation of kinase activation
## 718 cellular response to lectin
## 719 cellular response to molecule of bacterial origin
## 720 stimulatory C-type lectin receptor signaling pathway
## 721 positive regulation of angiogenesis
## 722 regulation of protein binding
## 723 positive regulation of protein-containing complex assembly
## 724 innate immune response activating cell surface receptor signaling pathway
## 725 cellular response to lipopolysaccharide
## 726 cytoskeleton organization
## 727 cellular response to interferon-gamma
## 728 positive regulation of epithelial cell proliferation
## 729 MAPK cascade
## 730 regulation of protein secretion
## 731 negative regulation of cell growth
## 732 negative regulation of growth
## 733 circulatory system development
## 734 phosphatidylinositol biosynthetic process
## 735 plasma membrane bounded cell projection organization
## 736 muscle contraction
## 737 G2/M transition of mitotic cell cycle

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738 cell cycle G2/M phase transition
739 regulation of cell motility
740 transmembrane receptor protein serine/threonine kinase signaling pathway
741 organic substance transporter activity
742 neuron projection morphogenesis
743 chromatin organization
744 receptor-mediated endocytosis
745 neuron development
746 monocarboxylic acid metabolic process
747 actin filament organization
748 positive regulation of protein kinase activity
749 regulation of cell differentiation
750 peptidyl-serine phosphorylation
751 regulation of signal transduction by p53 class mediator
752 response to lipopolysaccharide
753 heart development
754 regulation of neuron projection development
755 peptidyl-serine modification
756 mitochondrion organization
757 defense response to bacterium
758 positive regulation of macromolecule metabolic process
759 glycerophospholipid biosynthetic process
760 regulation of translation
761 protein stabilization
762 regulated exocytosis
763 endoplasmic reticulum to Golgi vesicle-mediated transport
764 negative regulation of intracellular signal transduction
765 endomembrane system organization
766 modification-dependent protein catabolic process
767 generation of neurons
768 regulation of angiogenesis
769 axon guidance
770 proteasomal protein catabolic process
771 regulation of inflammatory response
772 mitotic cell cycle phase transition
773 negative regulation of inflammatory response
774 phosphate-containing compound metabolic process
775 regulation of intracellular signal transduction
776 positive regulation of protein modification process
777 regulation of cell growth
778 nervous system development
779 positive regulation of cell motility
780 inflammatory response
781 negative regulation of nucleic acid-templated transcription
782 axonogenesis
783 membrane organization
784 positive regulation of gene expression
785 positive regulation of signal transduction
786 positive regulation of phosphorylation
787 regulation of protein phosphorylation
788 regulation of transcription by RNA polymerase
789 negative regulation of signal transduction
790 positive regulation of nucleic acid-templated transcription
791 positive regulation of cell migration

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## 792 positive regulation of transcription, DNA-templa...
## 793 positive regulation of MAPK cascade
## 794 inorganic cation transmembrane transport
## 795 DNA metabolic process
## 796 proteolytic processing
## 797 DNA repair
## 798 extracellular matrix organization
## 799 cellular macromolecule biosynthetic process
## 800 proteasome-mediated ubiquitin-dependent protein catabolic process
## 801 negative regulation of gene expression
## 802 cellular protein localization
## 803 positive regulation of cytokine production
## 804 intracellular protein transport
## 805 positive regulation of multicellular organismal process
## 806 post-translational protein modification
## 807 ubiquitin-dependent protein catabolic process
## 808 protein transport
## 809 positive regulation of transcription by RNA polymerase II
## 810 negative regulation of transcription by RNA polymerase II
## 811 negative regulation of transcription, DNA-templated
## 812 regulation of cell migration
## 813 cellular protein metabolic process
## 814 organelle organization
## 815 cellular protein modification process
## 816 protein phosphorylation

##      Overlap      P.value Adjusted.P.value Old.P.value Old.Adjusted.P.value
## 1      3/12 3.251469e-05    0.02653199      0          0
## 2      5/83 8.690364e-05    0.03545668      0          0
## 3      2/7  5.960687e-04    0.09410614      0          0
## 4      2/7  5.960687e-04    0.09410614      0          0
## 5      2/7  5.960687e-04    0.09410614      0          0
## 6      4/74 6.919569e-04    0.09410614      0          0
## 7      2/9  1.014643e-03    0.11827836      0          0
## 8      3/45 1.842571e-03    0.18515721      0          0
## 9      4/99 2.042175e-03    0.18515721      0          0
## 10     3/49 2.355267e-03    0.19218982      0          0
## 11     2/16 3.299721e-03    0.21339936      0          0
## 12     3/56 3.448184e-03    0.21339936      0          0
## 13     4/116 3.622414e-03   0.21339936      0          0
## 14     2/18 4.177644e-03    0.21339936      0          0
## 15     2/18 4.177644e-03    0.21339936      0          0
## 16     8/474 4.184301e-03   0.21339936      0          0
## 17     2/20 5.151575e-03    0.23783696      0          0
## 18     3/65 5.246403e-03    0.23783696      0          0
## 19     2/22 6.219384e-03    0.23835328      0          0
## 20     2/22 6.219384e-03    0.23835328      0          0
## 21     2/22 6.219384e-03    0.23835328      0          0
## 22     3/74 7.518480e-03    0.23835328      0          0
## 23     3/75 7.801421e-03    0.23835328      0          0
## 24     2/26 8.628278e-03    0.23835328      0          0
## 25     3/80 9.310010e-03    0.23835328      0          0
## 26     2/28 9.965269e-03    0.23835328      0          0
## 27     2/28 9.965269e-03    0.23835328      0          0
## 28     2/28 9.965269e-03    0.23835328      0          0

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## 32	3/90	1.280697e-02	0.23835328	0	0
## 33	2/32	1.289435e-02	0.23835328	0	0
## 34	2/32	1.289435e-02	0.23835328	0	0
## 35	3/92	1.358459e-02	0.23835328	0	0
## 36	2/33	1.367834e-02	0.23835328	0	0
## 37	4/171	1.389750e-02	0.23835328	0	0
## 38	2/35	1.530671e-02	0.23835328	0	0
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## 40	2/36	1.615062e-02	0.23835328	0	0
## 41	2/36	1.615062e-02	0.23835328	0	0
## 42	2/37	1.701402e-02	0.23835328	0	0
## 43	2/39	1.879843e-02	0.23835328	0	0
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## 47	3/109	2.126910e-02	0.23835328	0	0
## 48	5/306	2.524426e-02	0.23835328	0	0
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## 300	1/19	9.780457e-02	0.26505031	0	0
## 301	1/19	9.780457e-02	0.26505031	0	0
## 302	2/98	9.841941e-02	0.26505031	0	0
## 303	2/98	9.841941e-02	0.26505031	0	0
## 304	1/20	1.026810e-01	0.27028302	0	0
## 305	1/20	1.026810e-01	0.27028302	0	0
## 306	1/20	1.026810e-01	0.27028302	0	0
## 307	1/20	1.026810e-01	0.27028302	0	0
## 308	1/20	1.026810e-01	0.27028302	0	0
## 309	1/20	1.026810e-01	0.27028302	0	0
## 310	1/20	1.026810e-01	0.27028302	0	0
## 311	2/101	1.035100e-01	0.27158890	0	0
## 312	2/102	1.052228e-01	0.27250197	0	0
## 313	1/21	1.075314e-01	0.27250197	0	0
## 314	1/21	1.075314e-01	0.27250197	0	0
## 315	1/21	1.075314e-01	0.27250197	0	0
## 316	1/21	1.075314e-01	0.27250197	0	0
## 317	1/21	1.075314e-01	0.27250197	0	0
## 318	1/21	1.075314e-01	0.27250197	0	0
## 319	1/21	1.075314e-01	0.27250197	0	0
## 320	1/21	1.075314e-01	0.27250197	0	0
## 321	1/21	1.075314e-01	0.27250197	0	0
## 322	1/21	1.075314e-01	0.27250197	0	0
## 323	2/104	1.086714e-01	0.27367861	0	0
## 324	5/468	1.095553e-01	0.27367861	0	0
## 325	3/214	1.095823e-01	0.27367861	0	0
## 326	2/106	1.121501e-01	0.27367861	0	0
## 327	1/22	1.123558e-01	0.27367861	0	0
## 328	1/22	1.123558e-01	0.27367861	0	0
## 329	1/22	1.123558e-01	0.27367861	0	0
## 330	1/22	1.123558e-01	0.27367861	0	0
## 331	1/22	1.123558e-01	0.27367861	0	0
## 332	1/22	1.123558e-01	0.27367861	0	0
## 333	1/22	1.123558e-01	0.27367861	0	0
## 334	1/22	1.123558e-01	0.27367861	0	0
## 335	1/22	1.123558e-01	0.27367861	0	0
## 336	2/107	1.139003e-01	0.27661490	0	0
## 337	3/219	1.153101e-01	0.27790102	0	0
## 338	1/23	1.171544e-01	0.27790102	0	0
## 339	1/23	1.171544e-01	0.27790102	0	0
## 340	1/23	1.171544e-01	0.27790102	0	0
## 341	1/23	1.171544e-01	0.27790102	0	0
## 342	1/23	1.171544e-01	0.27790102	0	0
## 343	1/23	1.171544e-01	0.27790102	0	0
## 344	1/23	1.171544e-01	0.27790102	0	0
## 345	2/110	1.191929e-01	0.28058338	0	0
## 346	6/621	1.198419e-01	0.28058338	0	0
## 347	5/482	1.199976e-01	0.28058338	0	0
## 348	1/24	1.219272e-01	0.28058338	0	0
## 349	1/24	1.219272e-01	0.28058338	0	0
## 350	1/24	1.219272e-01	0.28058338	0	0
## 351	1/24	1.219272e-01	0.28058338	0	0
## 352	1/24	1.219272e-01	0.28058338	0	0

## 353	1/24	1.219272e-01	0.28058338	0	0
## 354	1/24	1.219272e-01	0.28058338	0	0
## 355	5/485	1.222950e-01	0.28058338	0	0
## 356	2/112	1.227552e-01	0.28058338	0	0
## 357	2/112	1.227552e-01	0.28058338	0	0
## 358	2/114	1.263434e-01	0.28475586	0	0
## 359	1/25	1.266745e-01	0.28475586	0	0
## 360	1/25	1.266745e-01	0.28475586	0	0
## 361	1/25	1.266745e-01	0.28475586	0	0
## 362	1/25	1.266745e-01	0.28475586	0	0
## 363	1/25	1.266745e-01	0.28475586	0	0
## 364	2/115	1.281470e-01	0.28727449	0	0
## 365	3/231	1.295037e-01	0.28952063	0	0
## 366	2/116	1.299566e-01	0.28973930	0	0
## 367	1/26	1.313963e-01	0.28995248	0	0
## 368	1/26	1.313963e-01	0.28995248	0	0
## 369	1/26	1.313963e-01	0.28995248	0	0
## 370	2/118	1.335938e-01	0.28995248	0	0
## 371	2/119	1.354211e-01	0.28995248	0	0
## 372	1/27	1.360929e-01	0.28995248	0	0
## 373	1/27	1.360929e-01	0.28995248	0	0
## 374	1/27	1.360929e-01	0.28995248	0	0
## 375	1/27	1.360929e-01	0.28995248	0	0
## 376	1/27	1.360929e-01	0.28995248	0	0
## 377	1/27	1.360929e-01	0.28995248	0	0
## 378	1/27	1.360929e-01	0.28995248	0	0
## 379	1/27	1.360929e-01	0.28995248	0	0
## 380	1/27	1.360929e-01	0.28995248	0	0
## 381	1/27	1.360929e-01	0.28995248	0	0
## 382	1/27	1.360929e-01	0.28995248	0	0
## 383	1/27	1.360929e-01	0.28995248	0	0
## 384	1/28	1.407643e-01	0.29716854	0	0
## 385	1/28	1.407643e-01	0.29716854	0	0
## 386	1/28	1.407643e-01	0.29716854	0	0
## 387	2/122	1.409365e-01	0.29716854	0	0
## 388	2/124	1.446403e-01	0.30192137	0	0
## 389	1/29	1.454107e-01	0.30192137	0	0
## 390	1/29	1.454107e-01	0.30192137	0	0
## 391	1/29	1.454107e-01	0.30192137	0	0
## 392	1/29	1.454107e-01	0.30192137	0	0
## 393	1/29	1.454107e-01	0.30192137	0	0
## 394	2/125	1.464999e-01	0.30341103	0	0
## 395	3/246	1.480636e-01	0.30454285	0	0
## 396	2/126	1.483645e-01	0.30454285	0	0
## 397	1/30	1.500321e-01	0.30454285	0	0
## 398	1/30	1.500321e-01	0.30454285	0	0
## 399	1/30	1.500321e-01	0.30454285	0	0
## 400	1/30	1.500321e-01	0.30454285	0	0
## 401	1/30	1.500321e-01	0.30454285	0	0
## 402	1/30	1.500321e-01	0.30454285	0	0
## 403	4/381	1.511994e-01	0.30615070	0	0
## 404	1/31	1.546289e-01	0.30638671	0	0
## 405	1/31	1.546289e-01	0.30638671	0	0
## 406	1/31	1.546289e-01	0.30638671	0	0

## 407	1/31	1.546289e-01	0.30638671	0	0
## 408	1/31	1.546289e-01	0.30638671	0	0
## 409	1/31	1.546289e-01	0.30638671	0	0
## 410	1/31	1.546289e-01	0.30638671	0	0
## 411	1/31	1.546289e-01	0.30638671	0	0
## 412	2/131	1.577588e-01	0.30638671	0	0
## 413	2/131	1.577588e-01	0.30638671	0	0
## 414	1/32	1.592009e-01	0.30638671	0	0
## 415	1/32	1.592009e-01	0.30638671	0	0
## 416	1/32	1.592009e-01	0.30638671	0	0
## 417	1/32	1.592009e-01	0.30638671	0	0
## 418	1/32	1.592009e-01	0.30638671	0	0
## 419	1/32	1.592009e-01	0.30638671	0	0
## 420	1/32	1.592009e-01	0.30638671	0	0
## 421	1/32	1.592009e-01	0.30638671	0	0
## 422	1/32	1.592009e-01	0.30638671	0	0
## 423	1/32	1.592009e-01	0.30638671	0	0
## 424	1/32	1.592009e-01	0.30638671	0	0
## 425	1/33	1.637485e-01	0.31002040	0	0
## 426	1/33	1.637485e-01	0.31002040	0	0
## 427	1/33	1.637485e-01	0.31002040	0	0
## 428	1/33	1.637485e-01	0.31002040	0	0
## 429	1/33	1.637485e-01	0.31002040	0	0
## 430	1/33	1.637485e-01	0.31002040	0	0
## 431	1/33	1.637485e-01	0.31002040	0	0
## 432	3/261	1.674303e-01	0.31065551	0	0
## 433	1/34	1.682717e-01	0.31065551	0	0
## 434	1/34	1.682717e-01	0.31065551	0	0
## 435	1/34	1.682717e-01	0.31065551	0	0
## 436	1/34	1.682717e-01	0.31065551	0	0
## 437	1/34	1.682717e-01	0.31065551	0	0
## 438	1/34	1.682717e-01	0.31065551	0	0
## 439	1/34	1.682717e-01	0.31065551	0	0
## 440	1/34	1.682717e-01	0.31065551	0	0
## 441	1/34	1.682717e-01	0.31065551	0	0
## 442	1/34	1.682717e-01	0.31065551	0	0
## 443	1/35	1.727707e-01	0.31170773	0	0
## 444	1/35	1.727707e-01	0.31170773	0	0
## 445	1/35	1.727707e-01	0.31170773	0	0
## 446	1/35	1.727707e-01	0.31170773	0	0
## 447	1/35	1.727707e-01	0.31170773	0	0
## 448	1/35	1.727707e-01	0.31170773	0	0
## 449	1/35	1.727707e-01	0.31170773	0	0
## 450	2/139	1.730120e-01	0.31170773	0	0
## 451	5/547	1.741244e-01	0.31170773	0	0
## 452	2/140	1.749359e-01	0.31170773	0	0
## 453	2/141	1.768632e-01	0.31170773	0	0
## 454	1/36	1.772456e-01	0.31170773	0	0
## 455	1/36	1.772456e-01	0.31170773	0	0
## 456	1/36	1.772456e-01	0.31170773	0	0
## 457	1/36	1.772456e-01	0.31170773	0	0
## 458	1/36	1.772456e-01	0.31170773	0	0
## 459	1/36	1.772456e-01	0.31170773	0	0
## 460	1/36	1.772456e-01	0.31170773	0	0

## 461	1/36	1.772456e-01	0.31170773	0	0
## 462	1/36	1.772456e-01	0.31170773	0	0
## 463	1/36	1.772456e-01	0.31170773	0	0
## 464	1/36	1.772456e-01	0.31170773	0	0
## 465	2/142	1.787939e-01	0.31375447	0	0
## 466	4/409	1.802752e-01	0.31411929	0	0
## 467	2/143	1.807279e-01	0.31411929	0	0
## 468	1/37	1.816965e-01	0.31411929	0	0
## 469	1/37	1.816965e-01	0.31411929	0	0
## 470	1/37	1.816965e-01	0.31411929	0	0
## 471	1/37	1.816965e-01	0.31411929	0	0
## 472	1/37	1.816965e-01	0.31411929	0	0
## 473	1/38	1.861235e-01	0.31773380	0	0
## 474	1/38	1.861235e-01	0.31773380	0	0
## 475	1/38	1.861235e-01	0.31773380	0	0
## 476	1/38	1.861235e-01	0.31773380	0	0
## 477	1/38	1.861235e-01	0.31773380	0	0
## 478	1/38	1.861235e-01	0.31773380	0	0
## 479	1/39	1.905268e-01	0.32255154	0	0
## 480	1/39	1.905268e-01	0.32255154	0	0
## 481	1/39	1.905268e-01	0.32255154	0	0
## 482	1/39	1.905268e-01	0.32255154	0	0
## 483	2/150	1.943515e-01	0.32725035	0	0
## 484	1/40	1.949065e-01	0.32725035	0	0
## 485	1/40	1.949065e-01	0.32725035	0	0
## 486	1/40	1.949065e-01	0.32725035	0	0
## 487	1/41	1.992627e-01	0.32981407	0	0
## 488	1/41	1.992627e-01	0.32981407	0	0
## 489	1/41	1.992627e-01	0.32981407	0	0
## 490	1/41	1.992627e-01	0.32981407	0	0
## 491	1/41	1.992627e-01	0.32981407	0	0
## 492	1/41	1.992627e-01	0.32981407	0	0
## 493	1/41	1.992627e-01	0.32981407	0	0
## 494	3/286	2.012074e-01	0.33235870	0	0
## 495	1/42	2.035955e-01	0.33293377	0	0
## 496	1/42	2.035955e-01	0.33293377	0	0
## 497	1/42	2.035955e-01	0.33293377	0	0
## 498	1/42	2.035955e-01	0.33293377	0	0
## 499	1/42	2.035955e-01	0.33293377	0	0
## 500	2/155	2.041627e-01	0.33319349	0	0
## 501	1/43	2.079052e-01	0.33395789	0	0
## 502	1/43	2.079052e-01	0.33395789	0	0
## 503	1/43	2.079052e-01	0.33395789	0	0
## 504	1/43	2.079052e-01	0.33395789	0	0
## 505	1/43	2.079052e-01	0.33395789	0	0
## 506	1/43	2.079052e-01	0.33395789	0	0
## 507	1/43	2.079052e-01	0.33395789	0	0
## 508	1/43	2.079052e-01	0.33395789	0	0
## 509	2/158	2.100764e-01	0.33475669	0	0
## 510	2/158	2.100764e-01	0.33475669	0	0
## 511	2/158	2.100764e-01	0.33475669	0	0
## 512	1/44	2.121917e-01	0.33475669	0	0
## 513	1/44	2.121917e-01	0.33475669	0	0
## 514	1/44	2.121917e-01	0.33475669	0	0

## 515	1/44	2.121917e-01	0.33475669	0	0
## 516	1/44	2.121917e-01	0.33475669	0	0
## 517	1/44	2.121917e-01	0.33475669	0	0
## 518	6/742	2.125049e-01	0.33475669	0	0
## 519	2/161	2.160078e-01	0.33901623	0	0
## 520	1/45	2.164552e-01	0.33901623	0	0
## 521	1/45	2.164552e-01	0.33901623	0	0
## 522	1/46	2.206959e-01	0.34433623	0	0
## 523	1/46	2.206959e-01	0.34433623	0	0
## 524	3/302	2.236166e-01	0.34759410	0	0
## 525	1/47	2.249138e-01	0.34759410	0	0
## 526	1/47	2.249138e-01	0.34759410	0	0
## 527	1/47	2.249138e-01	0.34759410	0	0
## 528	1/47	2.249138e-01	0.34759410	0	0
## 529	2/166	2.259271e-01	0.34849995	0	0
## 530	8/1079	2.276296e-01	0.35009937	0	0
## 531	1/48	2.291091e-01	0.35009937	0	0
## 532	1/48	2.291091e-01	0.35009937	0	0
## 533	1/48	2.291091e-01	0.35009937	0	0
## 534	1/48	2.291091e-01	0.35009937	0	0
## 535	1/49	2.332820e-01	0.35251497	0	0
## 536	1/49	2.332820e-01	0.35251497	0	0
## 537	1/49	2.332820e-01	0.35251497	0	0
## 538	1/49	2.332820e-01	0.35251497	0	0
## 539	1/49	2.332820e-01	0.35251497	0	0
## 540	1/49	2.332820e-01	0.35251497	0	0
## 541	2/170	2.338874e-01	0.35277649	0	0
## 542	3/310	2.350056e-01	0.35380916	0	0
## 543	2/171	2.358803e-01	0.35419533	0	0
## 544	1/50	2.374324e-01	0.35419533	0	0
## 545	1/50	2.374324e-01	0.35419533	0	0
## 546	1/50	2.374324e-01	0.35419533	0	0
## 547	1/50	2.374324e-01	0.35419533	0	0
## 548	1/51	2.415606e-01	0.35904087	0	0
## 549	1/51	2.415606e-01	0.35904087	0	0
## 550	1/52	2.456666e-01	0.36250265	0	0
## 551	1/52	2.456666e-01	0.36250265	0	0
## 552	1/52	2.456666e-01	0.36250265	0	0
## 553	1/52	2.456666e-01	0.36250265	0	0
## 554	5/625	2.489814e-01	0.36407486	0	0
## 555	1/53	2.497506e-01	0.36407486	0	0
## 556	1/53	2.497506e-01	0.36407486	0	0
## 557	1/53	2.497506e-01	0.36407486	0	0
## 558	1/53	2.497506e-01	0.36407486	0	0
## 559	1/53	2.497506e-01	0.36407486	0	0
## 560	2/178	2.498553e-01	0.36407486	0	0
## 561	3/323	2.537261e-01	0.36656849	0	0
## 562	1/54	2.538127e-01	0.36656849	0	0
## 563	1/54	2.538127e-01	0.36656849	0	0
## 564	1/54	2.538127e-01	0.36656849	0	0
## 565	1/54	2.538127e-01	0.36656849	0	0
## 566	1/55	2.578531e-01	0.36978770	0	0
## 567	1/55	2.578531e-01	0.36978770	0	0
## 568	1/55	2.578531e-01	0.36978770	0	0

## 569	2/182	2.578544e-01	0.36978770	0	0
## 570	1/56	2.618717e-01	0.37292723	0	0
## 571	1/56	2.618717e-01	0.37292723	0	0
## 572	1/56	2.618717e-01	0.37292723	0	0
## 573	1/56	2.618717e-01	0.37292723	0	0
## 574	1/57	2.658688e-01	0.37534415	0	0
## 575	1/57	2.658688e-01	0.37534415	0	0
## 576	1/57	2.658688e-01	0.37534415	0	0
## 577	1/57	2.658688e-01	0.37534415	0	0
## 578	1/57	2.658688e-01	0.37534415	0	0
## 579	1/58	2.698444e-01	0.37964316	0	0
## 580	1/58	2.698444e-01	0.37964316	0	0
## 581	1/59	2.737987e-01	0.38191410	0	0
## 582	1/59	2.737987e-01	0.38191410	0	0
## 583	1/59	2.737987e-01	0.38191410	0	0
## 584	1/59	2.737987e-01	0.38191410	0	0
## 585	1/59	2.737987e-01	0.38191410	0	0
## 586	1/60	2.777318e-01	0.38608031	0	0
## 587	1/60	2.777318e-01	0.38608031	0	0
## 588	1/61	2.816438e-01	0.38851636	0	0
## 589	1/61	2.816438e-01	0.38851636	0	0
## 590	1/61	2.816438e-01	0.38851636	0	0
## 591	1/61	2.816438e-01	0.38851636	0	0
## 592	2/194	2.818648e-01	0.38851636	0	0
## 593	1/62	2.855348e-01	0.39159052	0	0
## 594	1/62	2.855348e-01	0.39159052	0	0
## 595	1/62	2.855348e-01	0.39159052	0	0
## 596	1/63	2.894049e-01	0.39293572	0	0
## 597	1/63	2.894049e-01	0.39293572	0	0
## 598	1/63	2.894049e-01	0.39293572	0	0
## 599	1/63	2.894049e-01	0.39293572	0	0
## 600	1/63	2.894049e-01	0.39293572	0	0
## 601	1/63	2.894049e-01	0.39293572	0	0
## 602	1/64	2.932542e-01	0.39552962	0	0
## 603	1/64	2.932542e-01	0.39552962	0	0
## 604	1/64	2.932542e-01	0.39552962	0	0
## 605	1/64	2.932542e-01	0.39552962	0	0
## 606	2/200	2.938547e-01	0.39568554	0	0
## 607	3/351	2.946878e-01	0.39615362	0	0
## 608	1/65	2.970829e-01	0.39675879	0	0
## 609	1/65	2.970829e-01	0.39675879	0	0
## 610	1/65	2.970829e-01	0.39675879	0	0
## 611	1/65	2.970829e-01	0.39675879	0	0
## 612	1/66	3.008910e-01	0.39988118	0	0
## 613	1/66	3.008910e-01	0.39988118	0	0
## 614	1/66	3.008910e-01	0.39988118	0	0
## 615	1/67	3.046787e-01	0.40360032	0	0
## 616	1/67	3.046787e-01	0.40360032	0	0
## 617	2/207	3.078099e-01	0.40661059	0	0
## 618	1/68	3.084460e-01	0.40661059	0	0
## 619	1/68	3.084460e-01	0.40661059	0	0
## 620	1/69	3.121931e-01	0.40890788	0	0
## 621	1/69	3.121931e-01	0.40890788	0	0
## 622	1/69	3.121931e-01	0.40890788	0	0

## 623	1/69	3.121931e-01	0.40890788	0	0
## 624	4/525	3.152335e-01	0.41049498	0	0
## 625	1/70	3.159202e-01	0.41049498	0	0
## 626	1/70	3.159202e-01	0.41049498	0	0
## 627	1/70	3.159202e-01	0.41049498	0	0
## 628	1/70	3.159202e-01	0.41049498	0	0
## 629	1/71	3.196272e-01	0.41333718	0	0
## 630	1/71	3.196272e-01	0.41333718	0	0
## 631	1/71	3.196272e-01	0.41333718	0	0
## 632	1/72	3.233143e-01	0.41481829	0	0
## 633	1/72	3.233143e-01	0.41481829	0	0
## 634	1/72	3.233143e-01	0.41481829	0	0
## 635	1/72	3.233143e-01	0.41481829	0	0
## 636	1/72	3.233143e-01	0.41481829	0	0
## 637	1/73	3.269816e-01	0.41625109	0	0
## 638	1/73	3.269816e-01	0.41625109	0	0
## 639	1/73	3.269816e-01	0.41625109	0	0
## 640	1/73	3.269816e-01	0.41625109	0	0
## 641	1/73	3.269816e-01	0.41625109	0	0
## 642	1/74	3.306292e-01	0.41958537	0	0
## 643	1/74	3.306292e-01	0.41958537	0	0
## 644	1/75	3.342572e-01	0.42353084	0	0
## 645	3/379	3.360666e-01	0.42480497	0	0
## 646	1/76	3.378657e-01	0.42480497	0	0
## 647	1/76	3.378657e-01	0.42480497	0	0
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## 650	1/77	3.414549e-01	0.42799874	0	0
## 651	1/77	3.414549e-01	0.42799874	0	0
## 652	1/78	3.450248e-01	0.43181012	0	0
## 653	1/79	3.485755e-01	0.43359387	0	0
## 654	1/79	3.485755e-01	0.43359387	0	0
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## 656	1/79	3.485755e-01	0.43359387	0	0
## 657	1/80	3.521071e-01	0.43665561	0	0
## 658	1/80	3.521071e-01	0.43665561	0	0
## 659	1/82	3.591136e-01	0.44466869	0	0
## 660	1/83	3.625886e-01	0.44761315	0	0
## 661	1/83	3.625886e-01	0.44761315	0	0
## 662	4/566	3.655851e-01	0.45063058	0	0
## 663	1/85	3.694827e-01	0.45338033	0	0
## 664	1/85	3.694827e-01	0.45338033	0	0
## 665	1/85	3.694827e-01	0.45338033	0	0
## 666	1/86	3.729021e-01	0.45490745	0	0
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## 669	3/404	3.729572e-01	0.45490745	0	0
## 670	1/87	3.763030e-01	0.45830337	0	0
## 671	1/88	3.796857e-01	0.46104690	0	0
## 672	1/88	3.796857e-01	0.46104690	0	0
## 673	1/89	3.830502e-01	0.46238009	0	0
## 674	1/89	3.830502e-01	0.46238009	0	0
## 675	1/89	3.830502e-01	0.46238009	0	0
## 676	1/89	3.830502e-01	0.46238009	0	0

## 677	1/90	3.863966e-01	0.46435879	0	0
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## 679	1/90	3.863966e-01	0.46435879	0	0
## 680	1/91	3.897250e-01	0.46698328	0	0
## 681	1/91	3.897250e-01	0.46698328	0	0
## 682	1/92	3.930356e-01	0.47025956	0	0
## 683	1/93	3.963283e-01	0.47281272	0	0
## 684	1/93	3.963283e-01	0.47281272	0	0
## 685	1/94	3.996034e-01	0.47602386	0	0
## 686	1/95	4.028608e-01	0.47920469	0	0
## 687	1/96	4.061007e-01	0.48235547	0	0
## 688	1/97	4.093233e-01	0.48547642	0	0
## 689	1/98	4.125285e-01	0.48856781	0	0
## 690	1/99	4.157164e-01	0.49091837	0	0
## 691	1/99	4.157164e-01	0.49091837	0	0
## 692	1/100	4.188872e-01	0.49394795	0	0
## 693	1/101	4.220410e-01	0.49563586	0	0
## 694	2/267	4.239192e-01	0.49563586	0	0
## 695	2/267	4.239192e-01	0.49563586	0	0
## 696	1/102	4.251778e-01	0.49563586	0	0
## 697	1/102	4.251778e-01	0.49563586	0	0
## 698	1/102	4.251778e-01	0.49563586	0	0
## 699	1/102	4.251778e-01	0.49563586	0	0
## 700	1/102	4.251778e-01	0.49563586	0	0
## 701	1/103	4.282978e-01	0.49856060	0	0
## 702	1/104	4.314009e-01	0.50145750	0	0
## 703	1/105	4.344874e-01	0.50361041	0	0
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## 705	1/106	4.375573e-01	0.50572630	0	0
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## 707	13/2244	4.381722e-01	0.50572630	0	0
## 708	2/276	4.405355e-01	0.50773583	0	0
## 709	1/108	4.436476e-01	0.51060147	0	0
## 710	1/109	4.466682e-01	0.51335389	0	0
## 711	1/110	4.496726e-01	0.51607991	0	0
## 712	1/111	4.526608e-01	0.51877975	0	0
## 713	1/112	4.556329e-01	0.52072330	0	0
## 714	1/112	4.556329e-01	0.52072330	0	0
## 715	1/113	4.585890e-01	0.52336873	0	0
## 716	1/114	4.615292e-01	0.52525504	0	0
## 717	1/114	4.615292e-01	0.52525504	0	0
## 718	1/115	4.644536e-01	0.52638080	0	0
## 719	1/115	4.644536e-01	0.52638080	0	0
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## 721	1/116	4.673623e-01	0.52894265	0	0
## 722	1/118	4.731328e-01	0.53399219	0	0
## 723	1/118	4.731328e-01	0.53399219	0	0
## 724	1/119	4.759947e-01	0.53648026	0	0
## 725	1/120	4.788413e-01	0.53820180	0	0
## 726	1/120	4.788413e-01	0.53820180	0	0
## 727	1/121	4.816725e-01	0.54063933	0	0
## 728	1/123	4.872894e-01	0.54619249	0	0
## 729	2/303	4.887694e-01	0.54709988	0	0
## 730	1/125	4.928459e-01	0.55090721	0	0

## 731	1/126	4.956018e-01	0.55096871	0	0
## 732	1/126	4.956018e-01	0.55096871	0	0
## 733	1/126	4.956018e-01	0.55096871	0	0
## 734	1/126	4.956018e-01	0.55096871	0	0
## 735	1/128	5.010690e-01	0.55628888	0	0
## 736	1/129	5.037806e-01	0.55853936	0	0
## 737	1/130	5.064776e-01	0.56076757	0	0
## 738	1/131	5.091600e-01	0.56297369	0	0
## 739	1/133	5.144817e-01	0.56732033	0	0
## 740	1/133	5.144817e-01	0.56732033	0	0
## 741	1/136	5.223571e-01	0.57522728	0	0
## 742	1/140	5.326612e-01	0.58578373	0	0
## 743	1/142	5.377303e-01	0.59056251	0	0
## 744	1/143	5.402444e-01	0.59093760	0	0
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## 747	1/152	5.622703e-01	0.61420690	0	0
## 748	1/154	5.670211e-01	0.61856849	0	0
## 749	1/156	5.717209e-01	0.62120402	0	0
## 750	1/156	5.717209e-01	0.62120402	0	0
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## 752	1/159	5.786759e-01	0.62792487	0	0
## 753	1/164	5.900197e-01	0.63938392	0	0
## 754	1/165	5.922519e-01	0.64095167	0	0
## 755	1/169	6.010609e-01	0.64962343	0	0
## 756	1/175	6.139220e-01	0.66264601	0	0
## 757	1/176	6.160253e-01	0.66403779	0	0
## 758	2/384	6.170120e-01	0.66422405	0	0
## 759	1/177	6.181171e-01	0.66453698	0	0
## 760	1/178	6.201977e-01	0.66589647	0	0
## 761	1/179	6.222670e-01	0.66724034	0	0
## 762	1/180	6.243252e-01	0.66856872	0	0
## 763	1/185	6.344506e-01	0.67852120	0	0
## 764	1/198	6.595287e-01	0.70441804	0	0
## 765	1/199	6.613856e-01	0.70547795	0	0
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## 767	1/202	6.668964e-01	0.70950120	0	0
## 768	1/203	6.687135e-01	0.70958411	0	0
## 769	1/203	6.687135e-01	0.70958411	0	0
## 770	1/205	6.723183e-01	0.71248272	0	0
## 771	1/206	6.741061e-01	0.71345077	0	0
## 772	1/209	6.794117e-01	0.71813462	0	0
## 773	1/212	6.846317e-01	0.72178226	0	0
## 774	1/212	6.846317e-01	0.72178226	0	0
## 775	2/437	6.8868604e-01	0.72319750	0	0
## 776	1/214	6.880648e-01	0.72353211	0	0
## 777	1/217	6.931453e-01	0.72793633	0	0
## 778	2/447	6.988171e-01	0.73294959	0	0
## 779	1/221	6.997918e-01	0.73302968	0	0
## 780	1/230	7.142296e-01	0.74719403	0	0
## 781	2/464	7.182837e-01	0.75047313	0	0
## 782	1/240	7.294658e-01	0.76118171	0	0
## 783	1/242	7.324150e-01	0.76328310	0	0
## 784	2/482	7.377446e-01	0.76785661	0	0

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## 785 1/252 7.466901e-01 0.77617724 0 0
## 786 1/253 7.480754e-01 0.77662793 0 0
## 787 1/266 7.654160e-01 0.79194196 0 0
## 788 10/2206 7.657666e-01 0.79194196 0 0
## 789 1/267 7.666998e-01 0.79194196 0 0
## 790 2/511 7.667085e-01 0.79194196 0 0
## 791 1/269 7.692466e-01 0.79355906 0 0
## 792 5/1183 7.727681e-01 0.79618527 0 0
## 793 1/274 7.754937e-01 0.79698093 0 0
## 794 1/274 7.754937e-01 0.79698093 0 0
## 795 1/277 7.791612e-01 0.79974284 0 0
## 796 1/287 7.909629e-01 0.81083631 0 0
## 797 1/298 8.032239e-01 0.82237229 0 0
## 798 1/300 8.053754e-01 0.82354172 0 0
## 799 1/314 8.197967e-01 0.83723921 0 0
## 800 1/321 8.266052e-01 0.84305407 0 0
## 801 1/322 8.275567e-01 0.84305407 0 0
## 802 1/329 8.340746e-01 0.84863450 0 0
## 803 1/335 8.394666e-01 0.85289078 0 0
## 804 1/336 8.403483e-01 0.85289078 0 0
## 805 1/345 8.480702e-01 0.85859217 0 0
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## 807 1/354 8.554219e-01 0.86496197 0 0
## 808 1/369 8.668996e-01 0.87548273 0 0
## 809 3/908 8.735866e-01 0.88114545 0 0
## 810 2/684 8.881279e-01 0.89470666 0 0
## 811 3/948 8.915279e-01 0.89702434 0 0
## 812 1/408 8.926873e-01 0.89708475 0 0
## 813 1/417 8.978963e-01 0.90120961 0 0
## 814 1/420 8.995764e-01 0.90178666 0 0
## 815 3/1025 9.198272e-01 0.92095584 0 0
## 816 1/496 9.340937e-01 0.93409367 0 0
## Odds.Ratio Combined.Score
## 1 63.1206349 652.27718427
## 2 12.3313418 115.30680941
## 3 75.0452830 557.22283365
## 4 75.0452830 557.22283365
## 5 75.0452830 557.22283365
## 6 10.8912088 79.24429238
## 7 53.5983827 369.46537233
## 8 13.5034014 85.02543027
## 9 8.0149798 49.64269932
## 10 12.3267081 74.59015576
## 11 26.7897574 153.07446221
## 12 10.6948787 60.63897374
## 13 6.7925824 38.17848769
## 14 23.4386792 128.39727115
## 15 23.4386792 128.39727115
## 16 3.3349356 18.26349331
## 17 20.8322851 109.75391118
## 18 9.1382488 47.97774828
## 19 18.7471698 95.23720656
## 20 18.7471698 95.23720656
## 21 18.7471698 95.23720656

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## 22    7.9762575   39.00702040
## 23    7.8650794   38.17276508
## 24   15.6194969   74.23494449
## 25    7.3525046   34.38520198
## 26   14.4165457   66.44080358
## 27   14.4165457   66.44080358
## 28   14.4165457   66.44080358
## 29   13.8819008   63.03343790
## 30   13.8819008   63.03343790
## 31   12.9232271   57.01736991
## 32    6.5041051   28.34336567
## 33   12.4918239   54.35150128
## 34   12.4918239   54.35150128
## 35    6.3573034   27.32889683
## 36   12.0882532   51.88207683
## 37    4.5428374   19.42538387
## 38   11.3544883   47.45567458
## 39   11.3544883   47.45567458
## 40   11.0199778   45.46619223
## 41   11.0199778   45.46619223
## 42   10.7045822   43.60744156
## 43   10.1249363   40.23631447
## 44   10.1249363   40.23631447
## 45   10.1249363   40.23631447
## 46    3.9882591   15.39621836
## 47    5.3331536   20.53530891
## 48    3.1595329   11.62441640
## 49    8.5111492   31.18650230
## 50    8.3215933   30.15898636
## 51    46.4672897  168.33361195
## 52    46.4672897  168.33361195
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## 63    46.4672897  168.33361195
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## 70    46.4672897  168.33361195
## 71    46.4672897  168.33361195
## 72    46.4672897  168.33361195
## 73    46.4672897  168.33361195
## 74     8.1402789   29.18369950
## 75    7.9666800   28.25699947

```

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## 76 37.1719626 127.98207714
## 77 37.1719626 127.98207714
## 78 37.1719626 127.98207714
## 79 37.1719626 127.98207714
## 80 37.1719626 127.98207714
## 81 37.1719626 127.98207714
## 82 37.1719626 127.98207714
## 83 37.1719626 127.98207714
## 84 37.1719626 127.98207714
## 85 37.1719626 127.98207714
## 86 37.1719626 127.98207714
## 87 37.1719626 127.98207714
## 88 7.3403626 24.97380194
## 89 3.4391608 11.70076013
## 90 7.0626557 23.54974471
## 91 3.3319214 11.01694732
## 92 30.9750779 101.95414068
## 93 30.9750779 101.95414068
## 94 30.9750779 101.95414068
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## 96 30.9750779 101.95414068
## 97 30.9750779 101.95414068
## 98 30.9750779 101.95414068
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## 120 30.9750779 101.95414068
## 121 4.2446831 13.94175092
## 122 6.6832884 21.63786214
## 123 6.6832884 21.63786214
## 124 6.6832884 21.63786214
## 125 4.1199166 13.23394541
## 126 2.7503869 8.76335907
## 127 4.0602261 12.89915891
## 128 6.4521796 20.49297546
## 129 26.5487316 83.91051868

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## 130 26.5487316    83.91051868
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## 135 26.5487316    83.91051868
## 136 26.5487316    83.91051868
## 137 26.5487316    83.91051868
## 138 26.5487316    83.91051868
## 139 26.5487316    83.91051868
## 140 3.1493590     9.88369026
## 141 6.2364780    19.43855782
## 142 23.2289720   70.74387377
## 143 23.2289720   70.74387377
## 144 23.2289720   70.74387377
## 145 23.2289720   70.74387377
## 146 23.2289720   70.74387377
## 147 23.2289720   70.74387377
## 148 23.2289720   70.74387377
## 149 23.2289720   70.74387377
## 150 23.2289720   70.74387377
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## 167 20.6469367   60.75982922
## 168 20.6469367   60.75982922
## 169 20.6469367   60.75982922
## 170 20.6469367   60.75982922
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## 292 10.3187954 23.98897041
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## 685 1.9896493    1.82507111
## 686 1.9683834    1.78958364
## 687 1.9475652    1.75505618
## 688 1.9271807    1.72145428
## 689 1.9072165    1.68874503
## 690 1.8876597    1.65689701
## 691 1.8876597    1.65689701
## 692 1.8684981    1.62588017
## 693 1.8497196    1.59566581
## 694 1.3974368    1.19929745
## 695 1.3974368    1.19929745
## 696 1.8313130    1.56622644
## 697 1.8313130    1.56622644
## 698 1.8313130    1.56622644
## 699 1.8313130    1.56622644
## 700 1.8313130    1.56622644
## 701 1.8132674    1.53753578
## 702 1.7955721    1.50956867
## 703 1.7782171    1.48230099
## 704 1.7782171    1.48230099
## 705 1.7611927    1.45570966
## 706 1.7611927    1.45570966
## 707 1.0832669    0.89385046
## 708 1.3509159    1.10743251
## 709 1.7280985    1.40446839
## 710 1.7120111    1.37977687
## 711 1.6962188    1.35567843
## 712 1.6807137    1.33215433
## 713 1.6654879    1.30918653
## 714 1.6654879    1.30918653
## 715 1.6505340    1.28675776
## 716 1.6358448    1.26485137
## 717 1.6358448    1.26485137
## 718 1.6214133    1.24345138
## 719 1.6214133    1.24345138
## 720 1.6214133    1.24345138
## 721 1.6072328    1.22254243
## 722 1.5795990    1.18213906
## 723 1.5795990    1.18213906

```

```

## 724 1.5661334 1.16261671
## 725 1.5528941 1.14352951
## 726 1.5528941 1.14352951
## 727 1.5398754 1.12486476
## 728 1.5144783 1.08875411
## 729 1.2280449 0.87911375
## 730 1.4899005 1.05419208
## 731 1.4779065 1.03746464
## 732 1.4779065 1.03746464
## 733 1.4779065 1.03746464
## 734 1.4779065 1.03746464
## 735 1.4544852 1.00506590
## 736 1.4430491 0.98937525
## 737 1.4317902 0.97401140
## 738 1.4207045 0.95896549
## 739 1.3990371 0.92979356
## 740 1.3990371 0.92979356
## 741 1.3677397 0.88821532
## 742 1.3281113 0.83653713
## 743 1.3091403 0.81218818
## 744 1.2998552 0.80036454
## 745 1.2998552 0.80036454
## 746 1.2998552 0.80036454
## 747 1.2218234 0.70349242
## 748 1.2057296 0.68408124
## 749 1.1900513 0.66536291
## 750 1.1900513 0.66536291
## 751 1.1900513 0.66536291
## 752 1.1672779 0.63851592
## 753 1.1311851 0.59681251
## 754 1.1242307 0.58889813
## 755 1.0972408 0.55856031
## 756 1.0590826 0.51671299
## 757 1.0529773 0.51013309
## 758 0.9636471 0.46531315
## 759 1.0469414 0.50365976
## 760 1.0409737 0.49729080
## 761 1.0350730 0.49102409
## 762 1.0292382 0.48485755
## 763 1.0010158 0.45545809
## 764 0.9343422 0.38890113
## 765 0.9295761 0.38430377
## 766 0.9201869 0.37531105
## 767 0.9155624 0.37091321
## 768 0.9109836 0.36657947
## 769 0.9109836 0.36657947
## 770 0.9019608 0.35809959
## 771 0.8975154 0.35395119
## 772 0.8844357 0.34185918
## 773 0.8717279 0.33027524
## 774 0.8717279 0.33027524
## 775 0.8439384 0.31700374
## 776 0.8634549 0.32282176
## 777 0.8513326 0.31202678

```

## 778	0.8245495	0.29549065	
## 779	0.8356839	0.29831610	
## 780	0.8024732	0.27007300	
## 781	0.7935147	0.26256657	
## 782	0.7685058	0.24241963	
## 783	0.7620506	0.23730862	
## 784	0.7630503	0.23208756	
## 785	0.7313177	0.21362158	
## 786	0.7283786	0.21141295	
## 787	0.6921883	0.18504675	
## 788	0.8222743	0.21944679	
## 789	0.6895510	0.18318609	
## 790	0.7185009	0.19086876	
## 791	0.6843353	0.17953107	
## 792	0.7711771	0.19879120	
## 793	0.6716306	0.17076571	
## 794	0.6716306	0.17076571	
## 795	0.6642286	0.16574982	
## 796	0.6406771	0.15024150	
## 797	0.6166022	0.13511095	
## 798	0.6124152	0.13255533	
## 799	0.5846048	0.11616032	
## 800	0.5716121	0.10885104	
## 801	0.5698023	0.10785081	
## 802	0.5574424	0.10113814	
## 803	0.5472606	0.09576434	
## 804	0.5455991	0.09490089	
## 805	0.5310802	0.08751769	
## 806	0.5310802	0.08751769	
## 807	0.5173016	0.08078204	
## 808	0.4958350	0.07082118	
## 809	0.5994317	0.08101201	
## 810	0.5314558	0.06305163	
## 811	0.5728496	0.06577378	
## 812	0.4474270	0.05079145	
## 813	0.4375449	0.04712387	
## 814	0.4343452	0.04596732	
## 815	0.5275370	0.04408597	
## 816	0.3662230	0.02496855	
##			Genes
## 1			HBA1;CYGB;AQP1
## 2			NTF4;CDSN;CRABP2;GRHL3;EDA2R
## 3			CDSN;ABCA12
## 4			HBA1;CYGB
## 5			CDSN;ABCA12
## 6			ACER2;BTG2;CDKN1A;MDM2
## 7			SLC14A1;AQP1
## 8			KCNE3;KCNMB4;SCN5A
## 9			SLC25A41;SLC52A1;HBA1;AQP1
## 10			ANKRD1;FAS;AQP1
## 11			ACER2;NEU4
## 12			BTG2;CDKN1A;MDM2
## 13			ACER2;NEU4;ELOVL4;ABCA12
## 14			KCNE3;SCN5A

```

## 15 KCNE3;SCN5A
## 16 BTC;ACER2;CDKN1A;SOX15;MDM2;HAS2;SCN5A;AQP1
## 17 TRIML2;TRIM22
## 18 BTG2;CDKN1A;MDM2
## 19 KCNE3;SCN5A
## 20 CDKN1A;INHA
## 21 KCNMB4;SCN5A
## 22 CDKN1A;SESN1;FAS
## 23 CDKN1A;SESN1;FAS
## 24 TRIML2;TRIM22
## 25 BTG2;RPS6KA2;INHA
## 26 SLC14A1;ABCA12
## 27 ANKRD1;MDM2
## 28 CDKN1A;AQP1
## 29 CDKN1A;ANKRD1
## 30 HSD11B1;CEL
## 31 KCNE3;SCN5A
## 32 TRIML2;SESN1;TRIM22
## 33 CDKN1A;GDF15
## 34 CDKN1A;ANKRD1
## 35 GDF15;ZNF423;INHA
## 36 RIMS4;KCNMB4
## 37 TRIML2;SECTM1;TRIM22;EDA2R
## 38 HBA1;AQP1
## 39 NTF4;CEL
## 40 CDKN1A;ANKRD1
## 41 NEFL;AP3B2
## 42 NEFL;AP3B2
## 43 KCNE3;SCN5A
## 44 SCN5A;AQP1
## 45 TRIML2;TRIM22
## 46 TNFRSF6B;ANKRD1;HAS2;EDA2R
## 47 NTF4;KCNMB4;CEL
## 48 RPS6KA2;KCNMB4;PCDHB14;CEL;TSPOAP1
## 49 CDKN1A;AQP1
## 50 GDF15;INHA
## 51 INHA
## 52 SLC25A41
## 53 INHA
## 54 SCN5A
## 55 CCL28
## 56 INHA
## 57 AQP1
## 58 MDM2
## 59 GDF15
## 60 AQP1
## 61 SOX15
## 62 PRUNE2
## 63 SCN5A
## 64 GDF15
## 65 AGRP
## 66 SCN5A
## 67 INHA
## 68 AQP1

```

## 69	SCN5A
## 70	SOX15
## 71	SCN5A
## 72	SCN5A
## 73	SOX15
## 74	CDKN1A;MDM2
## 75	HBA1;AQP1
## 76	CCL28
## 77	AQP1
## 78	AQP1
## 79	TBX4
## 80	PRUNE2
## 81	AQP1
## 82	ASPN
## 83	SCN5A
## 84	UBA7
## 85	SPATA18
## 86	MYO1A
## 87	CYP2E1
## 88	ANKRD1;SCN5A
## 89	TRIML2;SECTM1;TRIM22;EDA2R
## 90	ACER2;ABCA12
## 91	ACER2;TRIML2;RAB39B;TRIM22
## 92	RTN4RL1
## 93	AQP1
## 94	SCN5A
## 95	SCN5A
## 96	SCN5A
## 97	SCN5A
## 98	INHA
## 99	SOX15
## 100	HAS2
## 101	NMNAT2
## 102	VNN2
## 103	KCNE3
## 104	ELOVL4
## 105	ELOVL4
## 106	ELOVL4
## 107	ELOVL4
## 108	SLC52A1
## 109	NEU4
## 110	AQP1
## 111	TBX4
## 112	HAS2
## 113	AQP1
## 114	SLC52A1
## 115	SCN5A
## 116	NEFL
## 117	CYP2E1
## 118	FAS
## 119	CYP2E1
## 120	HAS2
## 121	ABCA12;ANK1;PRAM1
## 122	LYNX1;NEFL

```

## 123 GDF15;INHA
## 124 ACER2;ELOVL4
## 125 ABCA12;ANK1;PRAM1
## 126 ACER2;CDKN1A;BTG2;UBA7;SPATA18
## 127 MDM2;ZNF423;TSPAN10
## 128 MDM2;SPATA18
## 129 SCN5A
## 130 CYP2E1
## 131 RTN4RL1
## 132 KCNE3
## 133 CDKN1A
## 134 MDM2
## 135 SOX15
## 136 FAS
## 137 CDKN1A
## 138 ACTA2
## 139 AQP1
## 140 RPS6KA2;KCNMB4;PCDHB14;CEL
## 141 ACER2;AQP1
## 142 RTN4RL1
## 143 IL13
## 144 AQP1
## 145 AQP1
## 146 CEL
## 147 NEU4
## 148 HSD11B1
## 149 CEL
## 150 USP50
## 151 CEL
## 152 ANK1
## 153 ANK1
## 154 CEL
## 155 ACER2;CCL28
## 156 ACER2;RAB39B
## 157 TRIML2;TRIM22
## 158 ACER2;HBA1
## 159 NTF4;CDKN1A;GDF15;FAS;INHA
## 160 TRIML2;TRIM22;EDA2R
## 161 ACER2
## 162 KCNE3
## 163 SCN5A
## 164 SESN1
## 165 SESN1
## 166 NTF4
## 167 SLC12A8
## 168 RTN4RL1
## 169 CCL28
## 170 EDA2R
## 171 AGRP
## 172 SOX15
## 173 HAS2
## 174 NEU4
## 175 SESN1
## 176 CEL

```

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## 177           SLC12A8
## 178           MDM2;AQP1
## 179           CDKN1A;SESN1;FAS
## 180           ACER2;ELOVL4;INHA
## 181           BTC;ACER2;CDKN1A;BTG2;RPS6KA2;MDM2;HAS2;INHA
## 182           NTF4;VSTM2L
## 183           ELOVL4;CYP2E1
## 184           CEL
## 185           NEFL
## 186           FAS
## 187           KCNE3
## 188           FAS
## 189           KCNE3
## 190           FAS
## 191           HSD11B1
## 192           HSD11B1
## 193           BTC
## 194           CEL
## 195           FAS
## 196           ACTA2
## 197           CEL
## 198           CEL
## 199           ACER2;ELOVL4
## 200           SLC25A41
## 201           RTN4RL1
## 202           HAS2
## 203           AGRP
## 204           USP50
## 205           ABCA12
## 206           AQP1
## 207           PEX5L
## 208           VNN2;SLC52A1
## 209           CDKN1A;AQP1
## 210           CLEC4E
## 211           SCN5A
## 212           KCNMB4
## 213           TBX4
## 214           ELOVL4
## 215           AQP1
## 216           CDKN1A
## 217           ABCA12
## 218           BTG2
## 219           ACER2
## 220           ACER2
## 221           SCN5A
## 222           NEFL
## 223           ELOVL4
## 224           KCNMB4;SCN5A;AQP1
## 225           CDSN;ABCA12
## 226           ACER2;FAS
## 227           UBA7
## 228           MDM2
## 229           AQP1
## 230           SESN1

```

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## 231 ABCA12
## 232 AQP1
## 233 MMNAT2
## 234 INHA
## 235 HAS2
## 236 ACTA2
## 237 HSD11B1
## 238 KCNE3
## 239 KCNE3
## 240 BTC;TRIML2;GDF15;SECTM1;TRIM22;EDA2R
## 241 BLNK;LY6D
## 242 CDKN1A;RPS6KA2;MDM2;INHA
## 243 AP3B2
## 244 TSPOAP1
## 245 NTF4
## 246 INHA
## 247 BTG2
## 248 ANKRD1
## 249 ANKRD1
## 250 AP3B2
## 251 AQP1
## 252 SOX15
## 253 INPP5D;BLNK;PRAM1
## 254 CDKN1A;INHA
## 255 ANKRD1;HAS2
## 256 IL13
## 257 CEL
## 258 VSTM2L
## 259 SCN5A
## 260 KCNMB4
## 261 NEFL
## 262 ACER2
## 263 KCNE3
## 264 CRABP2;SOX15;ZNF423;TBX4;TRIM22
## 265 SLC25A41
## 266 MDM2
## 267 MDM2
## 268 CDKN1A
## 269 ACER2
## 270 USP50
## 271 SCN5A
## 272 ANKRD1
## 273 ABCA12;ANK1;PRAM1
## 274 FBXW12;TRIML2;MDM2;TRIM22
## 275 SLC25A41
## 276 INHA
## 277 MDM2
## 278 KCNE3
## 279 AQP1
## 280 MDM2
## 281 SCN5A
## 282 MMNAT2
## 283 GDF15
## 284 AQP1

```

```

## 285          NEU4
## 286          RTN4RL1
## 287          NEFL
## 288          CEL
## 289          AQP1
## 290          HAS2;HS3ST6
## 291          NEU4
## 292          SCN5A
## 293          AQP1
## 294          CYP2E1
## 295          ABCA12
## 296          RIMS4
## 297          ABCA12
## 298          ACER2
## 299          NTF4
## 300          CEL
## 301          MYO1A
## 302          NTF4;VSTM2L
## 303          NTF4;VSTM2L
## 304          HAS2
## 305          SCN5A
## 306          TSPOAP1
## 307          NEU4
## 308          IL13
## 309          CDKN1A
## 310          SECTM1
## 311          BTC;SOX15
## 312          ACER2;HBA1
## 313          MYO1A
## 314          CCDC62
## 315          RTN4RL1
## 316          AQP1
## 317          FAS
## 318          NTF4
## 319          ACTA2
## 320          FAS
## 321          HBA1
## 322          MMNAT2
## 323          HSD11B1;CYP2E1
## 324          CRABP2;SOX15;ZNF423;TBX4;TRIM22
## 325          GDF15;IL13;ZNF423
## 326          CDKN1A;USP50
## 327          INHA
## 328          ASPN
## 329          CDKN1A
## 330          NTF4
## 331          AQP1
## 332          CYP2E1
## 333          INHA
## 334          TBX4
## 335          ANKRD1
## 336          KCNMB4;SCN5A
## 337          ANKRD1;AQP1;CCDC62
## 338          USP50

```

```

## 339          MAP6D1
## 340          MMNAT2
## 341          CYP2E1
## 342          ABCA12
## 343          AQP1
## 344          HAS2
## 345          ANKRD1;HAS2
## 346          CDKN1A;TNFRSF6B;INPP5D;IL13;TRIM22;EDA2R
## 347          CDKN1A;INPP5D;IL13;ANKRD1;HAS2
## 348          TSPOAP1
## 349          CLEC4E
## 350          CYGB
## 351          HAS2
## 352          MDM2
## 353          SLC12A8
## 354          USP50
## 355          NTF4;TNFRSF6B;VSTM2L;FAS;AQP1
## 356          MDM2;FAS
## 357          MAP6D1;GRHL3
## 358          GDF15;ANKRD1
## 359          PEX5L
## 360          SCN5A
## 361          HAS2
## 362          ABCA12
## 363          NTF4
## 364          VNN2;ABCA12
## 365          PRUNE2;MDM2;FAS
## 366          TNFRSF6B;EDA2R
## 367          ACER2
## 368          SCN5A
## 369          LY6D
## 370          RTN4RL1;IL13
## 371          ACER2;FAS
## 372          KCNE3
## 373          IL13
## 374          SCN5A
## 375          CEL
## 376          BTC
## 377          CDKN1A
## 378          ZNF423
## 379          MDM2
## 380          BTC
## 381          CEL
## 382          CEL
## 383          SLC12A8
## 384          ABCA12
## 385          SCN5A
## 386          ANKRD1
## 387          KCNMB4;AQP1
## 388          ELOVL4;CEL
## 389          INHA
## 390          INHA
## 391          HBA1
## 392          TBX4

```

```

## 393          HEPH
## 394          CDKN1A;INHA
## 395          TRIML2;TRIM22;EDA2R
## 396          RAB39B;PCDHB14
## 397          SCN5A
## 398          SCN5A
## 399          USP50
## 400          KCNMB4
## 401          CYP2E1
## 402          GRHL3
## 403          TNFRSF6B;CDSN;FAS;AQP1
## 404          ACER2
## 405          AQP1
## 406          MDM2
## 407          AQP1
## 408          HAS2
## 409          TSPOAP1
## 410          GRHL3
## 411          SLC52A1
## 412          MDM2;AQP1
## 413          SCN5A;AQP1
## 414          NTF4
## 415          ACER2
## 416          ANKRD1
## 417          NEFL
## 418          BTC
## 419          ANK1
## 420          IL13
## 421          SCN5A
## 422          KCNE3
## 423          AQP1
## 424          USP50
## 425          ABCA12
## 426          CDKN1A
## 427          ABCA12
## 428          ACER2
## 429          HAS2
## 430          CDKN1A
## 431          ELOVL4
## 432          MDM2;HAS2;FAS
## 433          FAS
## 434          BLNK
## 435          ACER2
## 436          SCN5A
## 437          SESN1
## 438          GRHL3
## 439          ABCA12
## 440          BTC
## 441          CEL
## 442          MDM2
## 443          CDKN1A
## 444          KCNMB4
## 445          KCNMB4
## 446          AQP1

```

```

## 447 RIMS4
## 448 SESN1
## 449 ZNF423
## 450 KCNE3;SLC12A8
## 451 CDKN1A;BTG2;MDM2;ANKRD1;ZNF423
## 452 NTF4;BLNK
## 453 TRIML2;TRIM22
## 454 SCN5A
## 455 CDKN1A
## 456 PCDHB14
## 457 AQP1
## 458 MAP6D1
## 459 TBX4
## 460 SCN5A
## 461 BTC
## 462 IL13
## 463 CEL
## 464 HEPH
## 465 CDKN1A;USP50
## 466 UBA7;TRIML2;MDM2;TRIM22
## 467 SLC52A1;AQP1
## 468 IL13
## 469 CDKN1A
## 470 MAP6D1
## 471 CDKN1A
## 472 BTC
## 473 FAS
## 474 SESN1
## 475 AQP1
## 476 CCDC62
## 477 KCNMB4
## 478 CEL
## 479 AQP1
## 480 CYGB
## 481 ABCA12
## 482 MYO1A
## 483 AQP1;CCDC62
## 484 ACER2
## 485 BTC
## 486 SPATA18
## 487 HES2
## 488 NEU4
## 489 SOX15
## 490 USP50
## 491 KCNMB4
## 492 SCN5A
## 493 CDSN
## 494 RPS6KA2;ANKRD1;FAS
## 495 FAS
## 496 HES2
## 497 TBX4
## 498 BTC
## 499 SLC12A8
## 500 ANKRD1;HAS2

```

```

## 501          SESN1
## 502          AQP1
## 503          UBA7
## 504          SOX15
## 505          NTF4
## 506          CYP2E1
## 507          SOX15
## 508          ANKRD1
## 509          ANKRD1;HAS2
## 510          INHA;TBX4
## 511          INPP5D;PRAM1
## 512          BTC
## 513          IL13
## 514          CCL28
## 515          BTG2
## 516          KCNMB4
## 517          SLC12A8
## 518          ACER2;TNFRSF6B;RPS6KA2;ANKRD1;FAS;AQP1
## 519          BTC;GDF15
## 520          CDKN1A
## 521          CDKN1A
## 522          INHA
## 523          USP50
## 524          TRIML2;CLEC4E;TRIM22
## 525          ZNF423
## 526          INPP5D
## 527          BTC
## 528          NEU4
## 529          GDF15;FAS
## 530          ACTA2;CRABP2;TRIML2;SOX15;IL13;ZNF423;TBX4;TRIM22
## 531          BTG2
## 532          IL13
## 533          MDM2
## 534          INPP5D
## 535          RTN4RL1
## 536          HS3ST6
## 537          ABCA12
## 538          NEU4
## 539          FAS
## 540          CDKN1A
## 541          VSTM2L;PCDHB14
## 542          RPS6KA2;ANKRD1;FAS
## 543          NTF4;BTG2
## 544          BTC
## 545          SLC12A8
## 546          SCN5A
## 547          HEPH
## 548          CEL
## 549          SOX15
## 550          NTF4
## 551          NEU4
## 552          ACER2
## 553          INHA
## 554          BTC;ACER2;MDM2;HAS2;HBA1

```

## 555	AQP1
## 556	NEU4
## 557	CDSN
## 558	ANKRD1
## 559	SESN1
## 560	BTG2;MDM2
## 561	ANKRD1;AQP1;CCDC62
## 562	CDKN1A
## 563	KCNMB4
## 564	HS3ST6
## 565	SCN5A
## 566	AQP1
## 567	NEU4
## 568	ANKRD1
## 569	UBA7;INHA
## 570	HAS2
## 571	ZNF423
## 572	USP50
## 573	NTF4
## 574	CYP2E1
## 575	MDM2
## 576	BTC
## 577	CDKN1A
## 578	HAS2
## 579	RTN4RL1
## 580	HEPH
## 581	ABCA12
## 582	FAS
## 583	KCNMB4
## 584	HBA1
## 585	CDKN1A
## 586	ZNF423
## 587	VSTM2L
## 588	BLNK
## 589	CDKN1A
## 590	CLEC4E
## 591	HEPH
## 592	ACER2;FAS
## 593	HES2
## 594	USP50
## 595	USP50
## 596	MDM2
## 597	HES2
## 598	CDKN1A
## 599	AQP1
## 600	AGRP
## 601	ELOVL4
## 602	MDM2
## 603	FAS
## 604	CDKN1A
## 605	NEU4
## 606	TRIML2;TRIM22
## 607	MYO1A;MDM2;NEFL
## 608	GDF15

## 609	SLC12A8
## 610	HSD11B1
## 611	MDM2
## 612	TBX4
## 613	BTC
## 614	MDM2
## 615	SLC25A41
## 616	BTC
## 617	BTC;GDF15
## 618	ASPN
## 619	TRIM22
## 620	CCL28
## 621	SCN5A
## 622	PCDHB14
## 623	ANKRD1
## 624	FBXW12;TRIML2;MDM2;TRIM22
## 625	AQP1
## 626	CEL
## 627	CCL28
## 628	HAS2
## 629	GDF15
## 630	CDKN1A
## 631	CDKN1A
## 632	RAB39B
## 633	FAS
## 634	CDKN1A
## 635	ANKRD1
## 636	ANKRD1
## 637	ACER2
## 638	GRHL3
## 639	TSPOAP1
## 640	AQP1
## 641	EDA2R
## 642	MDM2
## 643	CDKN1A
## 644	PRAM1
## 645	CDKN1A;BTG2;RPS6KA2
## 646	ANKRD1
## 647	ZNF423
## 648	SLC12A8
## 649	TSPAN10
## 650	CEL
## 651	SLC12A8
## 652	UBA7
## 653	RTN4RL1
## 654	NTF4
## 655	MDM2
## 656	MDM2
## 657	FAS
## 658	ELOVL4
## 659	CDKN1A
## 660	USP50
## 661	CYP2E1
## 662	CDKN1A;BTG2;RPS6KA2;INHA

```

## 663 IL13
## 664 BLNK
## 665 CDKN1A
## 666 BTG2
## 667 INHA
## 668 MDM2
## 669 NTF4;GDF15;BLNK
## 670 SCN5A
## 671 CDKN1A
## 672 MYO1A
## 673 NEFL
## 674 AQP1
## 675 UBA7
## 676 GDF15
## 677 CDKN1A
## 678 BTG2
## 679 SCN5A
## 680 GRHL3
## 681 MYO1A
## 682 CDKN1A
## 683 SCN5A
## 684 NTF4
## 685 BTG2
## 686 CDKN1A
## 687 HEPH
## 688 IL13
## 689 NTF4
## 690 AQP1
## 691 EDA2R
## 692 ASPN
## 693 FAS
## 694 MDM2;FAS
## 695 MDM2;USP50
## 696 PCDHB14
## 697 MDM2
## 698 MDM2
## 699 CDKN1A
## 700 AQP1
## 701 AQP1
## 702 ABCA12
## 703 EDA2R
## 704 CDKN1A
## 705 SOX15
## 706 MDM2
## 707 ZNF572;CDKN1A;CRABP2;GRHL3;TBX4;ACTA2;SOX15;ZNF704;MDM2;ANKRD1;ZNF423;HES2;TRIM22
## 708 MDM2;USP50
## 709 ASPN
## 710 ABCA12
## 711 CDKN1A
## 712 CDKN1A
## 713 SESN1
## 714 INPP5D
## 715 IL13
## 716 ACER2

```

## 717	CDKN1A
## 718	CLEC4E
## 719	ANKRD1
## 720	CLEC4E
## 721	AQP1
## 722	CDKN1A
## 723	USP50
## 724	CLEC4E
## 725	ANKRD1
## 726	ANK1
## 727	TRIM22
## 728	SCN5A
## 729	BTC;NEFL
## 730	ANKRD1
## 731	CDKN1A
## 732	CDKN1A
## 733	CDKN1A
## 734	INPP5D
## 735	BTG2
## 736	ACTA2
## 737	CDKN1A
## 738	CDKN1A
## 739	BTC
## 740	GDF15
## 741	ABCA12
## 742	NTF4
## 743	SOX15
## 744	HBA1
## 745	BTG2
## 746	VNN2
## 747	MYO1A
## 748	CDKN1A
## 749	NTF4
## 750	RPS6KA2
## 751	MDM2
## 752	ANKRD1
## 753	CDKN1A
## 754	RTN4RL1
## 755	RPS6KA2
## 756	SPATA18
## 757	AQP1
## 758	ACTA2;IL13
## 759	INPP5D
## 760	BTG2
## 761	CDKN1A
## 762	ABCA12
## 763	ANK1
## 764	MDM2
## 765	USP50
## 766	MDM2
## 767	HES2
## 768	AQP1
## 769	VSTM2L
## 770	MDM2

```

## 771 IL13
## 772 CDKN1A
## 773 IL13
## 774 INPP5D
## 775 PEX5L;MDM2
## 776 FAS
## 777 CDKN1A
## 778 NTF4;PCDHB14
## 779 HAS2
## 780 BLNK
## 781 MDM2;ZNF423
## 782 VSTM2L
## 783 BTC
## 784 ACTA2;IL13
## 785 FAS
## 786 FAS
## 787 FAS
## 788 ZNF572;CDKN1A;SOX15;ZNF704;MDM2;ANKRD1;GRHL3;HES2;TBX4;CCDC62
## 789 GDF15
## 790 ACTA2;ZNF423
## 791 HAS2
## 792 ACTA2;SOX15;GRHL3;ZNF423;CCDC62
## 793 GDF15
## 794 SCN5A
## 795 BTG2
## 796 MDM2
## 797 BTG2
## 798 HAS2
## 799 INHA
## 800 MDM2
## 801 BTG2
## 802 ABCA12
## 803 IL13
## 804 ABCA12
## 805 IL13
## 806 FBXW12
## 807 MDM2
## 808 ABCA12
## 809 SOX15;GRHL3;CCDC62
## 810 SOX15;MDM2
## 811 SOX15;MDM2;ZNF423
## 812 HAS2
## 813 UBA7
## 814 ANK1
## 815 FBXW12;UBA7;CEL
## 816 RPS6KA2
##
## $Reactome_2022
##
## AKT Phosphorylates Targets In Cytosol
## 1 Constitutive Signaling By AKT1 E17K In Cancer
## 2
## 3 CREB1 Phosphorylation Thru NMDA Receptor-Mediated Activation Of RAS Signaling
## 4 TNFs Bind Their Physiological Receptors
## 5 Interaction Between L1 And Ankyrins

```

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## 6 Post-translational Modification: Synthesis Of GPI-anchored Proteins
## 7 Cytokine Signaling In Immune System
## 8 Metabolism Of Steroid Hormones
## 9 L1CAM Interactions
## 10 PI3K/AKT Signaling In Cancer
## 11 Interleukin-3, Interleukin-5 And GM-CSF Signaling
## 12 TFAP2 (AP-2) Family Regulates Transcription Of Cell Cycle Factors
## 13 Metabolism Of Water-Soluble Vitamins And Cofactors
## 14 TP53 Regulates Transcription Of Cell Cycle Genes
## 15 Activated NTRK2 Signals Thru PI3K
## 16 Biosynthesis Of Maresin-Like SPMs
## 17 Activated NTRK2 Signals Thru RAS
## 18 CREB Phosphorylation
## 19 Vitamin B2 (Riboflavin) Metabolism
## 20 RSK Activation
## 21 RUNX3 Regulates CDKN1A Transcription
## 22 Digestion Of Dietary Lipids
## 23 Erythrocytes Take Up Oxygen And Release Carbon Dioxide
## 24 Neurofascin Interactions
## 25 NrCAM Interactions
## 26 Biosynthesis Of Maresins
## 27 Ca2+ Activated K+ Channels
## 28 Inhibition Of Signaling By Overexpressed EGFR
## 29 Interleukin-18 Signaling
## 30 Post NMDA Receptor Activation Events
## 31 Transmission Across Chemical Synapses
## 32 Metabolism Of Lipids
## 33 Activated NTRK2 Signals Thru FRS2 And FRS3
## 34 Phase 3 - Rapid Repolarisation
## 35 CHL1 Interactions
## 36 EGFR Interacts With Phospholipase C-gamma
## 37 FOXO-mediated Transcription
## 38 p53-Dependent G1 DNA Damage Response
## 39 G1/S DNA Damage Checkpoint
## 40 PI3K Events In ERBB4 Signaling
## 41 Glucocorticoid Biosynthesis
## 42 Glycoprotein Hormones
## 43 STAT5 Activation Downstream Of FLT3 ITD Mutants
## 44 CYP2E1 Reactions
## 45 eNOS Activation
## 46 Erythrocytes Take Up Carbon Dioxide And Release Oxygen
## 47 Neuronal System
## 48 Cellular Senescence
## 49 Activation Of NMDA Receptors And Postsynaptic Events
## 50 PECAM1 Interactions
## 51 Peptide Hormone Biosynthesis
## 52 GRB2 Events In EGFR Signaling
## 53 Pregnenolone Biosynthesis
## 54 Scavenging Of Heme From Plasma
## 55 SHC1 Events In EGFR Signaling
## 56 SHC1 Events In ERBB4 Signaling
## 57 ERBB2 Activates PTK6 Signaling
## 58 Senescence-Associated Secretory Phenotype (SASP)
## 59 TP53 Regulates Transcription Of Genes Involved In G1 Cell Cycle Arrest

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## 60 Neurotransmitter Receptors And Postsynaptic Signal Transmission
## 61 Phase 2 - Plateau Phase I
## 62 GRB2 Events In ERBB2 Signaling I
## 63 cGMP Effects
## 64 Metabolism Of Nitric Oxide: NOS3 Activation And Regulation
## 65 ERBB2 Regulates Cell Motility I
## 66 Signaling By FLT3 ITD And TKD Mutants I
## 67 Transport Of Bile Salts And Organic Acids, Metal Ions And Amine Compounds
## 68 Metabolism Of Vitamins And Cofactors
## 69 PI3K Events In ERBB2 Signaling I
## 70 Hyaluronan Metabolism I
## 71 Sphingolipid Metabolism
## 72 RAB GEFs Exchange GTP For GDP On RABs I
## 73 FOXO-mediated Transcription Of Cell Cycle Genes I
## 74 Aberrant Regulation Of Mitotic G1/S Transition In Cancer Due To RB1 Defects I
## 75 Acetylcholine Neurotransmitter Release Cycle
## 76 Formation Of Senescence-Associated Heterochromatin Foci (SAHF) I
## 77 GAB1 Signalosome
## 78 Gastrin-CREB Signaling Pathway Via PKC And MAPK
## 79 Biosynthesis Of DHA-derived SPMs I
## 80 Vitamin B5 (Pantothenate) Metabolism
## 81 Muscle Contraction
## 82 ABC Transporters In Lipid Homeostasis I
## 83 Regulation Of Signaling By CBL
## 84 Serotonin Neurotransmitter Release Cycle
## 85 Signaling By FLT3 Fusion Proteins I
## 86 Norepinephrine Neurotransmitter Release Cycle
## 87 Transcriptional Regulation By RUNX3 I
## 88 Biosynthesis Of Specialized Proresolving Mediators (SPMs) I
## 89 Ras Activation Upon Ca2+ Influx Thru NMDA Receptor
## 90 Regulation Of TP53 Activity Thru Methylation I
## 91 SUMOylation Of Transcription Factors I
## 92 Signaling By Interleukins I
## 93 TNFR2 Non-Canonical NF- $\kappa$ B Pathway I
## 94 NOTCH4 Intracellular Domain Regulates Transcription I
## 95 TP53 Regulates Transcription Of Additional Cell Cycle Genes With Uncertain Roles In P53 Pathway I
## 96 Unblocking Of NMDA Receptors, Glutamate Binding And Activation
## 97 SHC1 Events In ERBB2 Signaling I
## 98 Signaling By ERBB2 TMD/JMD Mutants I
## 99 Negative Regulation Of NMDA Receptor-Mediated Neuronal Transmission I
## 100 Nitric Oxide Stimulates Guanylate Cyclase
## 101 Phase I - Functionalization Of Compounds
## 102 ERK/MAPK Targets
## 103 Interleukin-4 And Interleukin-13 Signaling I
## 104 Glutamate Neurotransmitter Release Cycle
## 105 Long-term Potentiation I
## 106 Digestion I
## 107 Dopamine Neurotransmitter Release Cycle
## 108 Signaling By NTRK2 (TRKB) I
## 109 Synthesis Of Very Long-Chain Fatty acyl-CoA
## 110 Xenobiotics
## 111 Signaling By EGFR In Cancer I
## 112 Signaling By ERBB2 KD Mutants I
## 113 Estrogen-dependent Nuclear Events Downstream Of ESR-membrane Signaling I

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```

## 114 Transcriptional Regulation By TP53
## 115 Assembly And Cell Surface Presentation Of NMDA Receptors
## 116 Signaling By ERBB2 In Cancer
## 117 Synthesis Of IP3 And IP4 In Cytosol
## 118 Metal Ion SLC Transporters
## 119 FLT3 Signaling In Disease
## 120 Interleukin Receptor SHC Signaling
## 121 Glycosaminoglycan Metabolism
## 122 Metabolism
## 123 Paracetamol ADME
## 124 Recycling Pathway Of L1
## 125 Digestion And Absorption
## 126 Rab Regulation Of Trafficking
## 127 FOXO-mediated Transcription Of Oxidative Stress, Metabolic And Neuronal Genes
## 128 Dectin-2 Family
## 129 Downregulation Of ERBB2 Signaling
## 130 Cardiac Conduction
## 131 HS-GAG Biosynthesis
## 132 MAPK Targets/ Nuclear Events Mediated By MAP Kinases
## 133 Antigen Activates B Cell Receptor Leading To Second Messenger Generation
## 134 Glutamate Binding, Activation Of AMPA Receptors And Synaptic Plasticity
## 135 EGFR Downregulation
## 136 Nicotinate Metabolism
## 137 Phase 0 - Rapid Depolarisation
## 138 Termination Of Translesion DNA Synthesis
## 139 Nuclear Signaling By ERBB4
## 140 Signaling By NTRKs
## 141 Oncogene Induced Senescence
## 142 Sialic Acid Metabolism
## 143 Negative Regulators Of DDX58/IFIH1 Signaling
## 144 PIP3 Activates AKT Signaling
## 145 Aberrant Regulation Of Mitotic Cell Cycle Due To RB1 Defects
## 146 Transcriptional Regulation By AP-2 (TFAP2) Family Of Transcription Factors
## 147 Regulation Of TP53 Degradation
## 148 Fatty acyl-CoA Biosynthesis
## 149 Regulation Of TP53 Expression And Degradation
## 150 Diseases Of Mitotic Cell Cycle
## 151 Translesion Synthesis By Y Family DNA Polymerases Bypasses Lesions On DNA Template
## 152 SUMOylation Of Ubiquitinylated Proteins
## 153 Binding And Uptake Of Ligands By Scavenger Receptors
## 154 Signaling By Retinoic Acid
## 155 Metabolism Of Steroids
## 156 RND1 GTPase Cycle
## 157 Smooth Muscle Contraction
## 158 Sphingolipid De Novo Biosynthesis
## 159 Aspirin ADME
## 160 Interleukin-2 Family Signaling
## 161 Glycosphingolipid Metabolism
## 162 Heme Signaling
## 163 Cyclin D Associated Events In G1
## 164 Inositol Phosphate Metabolism
## 165 DNA Damage Bypass
## 166 Intracellular Signaling By Second Messengers
## 167 Signaling By EGFR

```

```

## 168 Signalizing By ERBB2
## 169 Neurotransmitter Release Cycle
## 170 Synthesis Of PIPs At Plasma Membrane
## 171 Signaling By Non-Receptor Tyrosine Kinases
## 172 Disorders Of Transmembrane Transporters
## 173 Heparan Sulfate/Heparin (HS-GAG) Metabolism
## 174 Regulation Of RUNX3 Expression And Activity
## 175 Amino Acids Regulate mTORC1
## 176 ECM Proteoglycans
## 177 Cellular Response To Chemical Stress
## 178 Vesicle-mediated Transport
## 179 Stabilization Of P53
## 180 Chemokine Receptors Bind Chemokines
## 181 Cytoprotection By HMOX1
## 182 Signaling By ERBB4
## 183 Role Of GTSE1 In G2/M Progression After G2 Checkpoint
## 184 Transcriptional Regulation Of Granulopoiesis
## 185 Iron Uptake And Transport
## 186 SCF(Skp2)-mediated Degradation Of P27/P21
## 187 DNA Damage/Telomere Stress Induced Senescence
## 188 Nuclear Events (Kinase And Transcription Factor Activation)
## 189 RAB Geranylgeranylation
## 190 MAP Kinase Activation
## 191 Synthesis Of Substrates In N-glycan Biosynthesis
## 192 Interferon Signaling
## 193 Cytochrome P450 - Arranged By Substrate Type
## 194 Interleukin-17 Signaling
## 195 Extra-nuclear Estrogen Signaling
## 196 Biological Oxidations
## 197 Formation Of Cornified Envelope
## 198 Transport Of Small Molecules
## 199 ISG15 Antiviral Mechanism
## 200 ABC Transporter Disorders
## 201 Biosynthesis Of N-glycan Precursor (Dolichol LLO) And Transfer To Protein
## 202 Constitutive Signaling By Aberrant PI3K In Cancer
## 203 Cellular Responses To Stress
## 204 COPI-mediated Anterograde Transport
## 205 TP53 Regulates Metabolic Genes
## 206 DDX58/IFIH1-mediated Induction Of Interferon-Alpha/Beta
## 207 Signaling By NOTCH4
## 208 PI Metabolism
## 209 Cyclin E Associated Events During G1/S Transition
## 210 Platelet Homeostasis
## 211 Antiviral Mechanism By IFN-stimulated Genes
## 212 Cellular Responses To Stimuli
## 213 Cyclin A:Cdk2-associated Events At S Phase Entry
## 214 Peptide Hormone Metabolism
## 215 Interferon Gamma Signaling
## 216 SLC-mediated Transmembrane Transport
## 217 Regulation Of TP53 Activity Thru Phosphorylation
## 218 Oxidative Stress Induced Senescence
## 219 Downstream TCR Signaling
## 220 Diseases Of Signal Transduction By Growth Factor Receptors And Second Messengers
## 221 Drug ADME

```

```

## 222 Membrane Trafficking
## 223 MyD88 Cascade Initiated On Plasma Membrane
## 224 Potential Therapeutics For SARS
## 225 Signaling By Nuclear Receptors
## 226 SLC Transporter Disorders
## 227 KEAP1-NFE2L2 Pathway
## 228 TRAF6 Mediated Induction Of NFkB And MAP Kinases Upon TLR7/8 Or 9 Activation
## 229 ABC-family Proteins Mediated Transport
## 230 Potassium Channels
## 231 MyD88 Dependent Cascade Initiated On Endosome
## 232 Toll Like Receptor 3 (TLR3) Cascade
## 233 Toll Like Receptor 7/8 (TLR7/8) Cascade
## 234 RAF/MAP Kinase Cascade
## 235 Cell Cycle Checkpoints
## 236 Cargo Recognition For Clathrin-Mediated Endocytosis
## 237 PI5P, PP2A And IER3 Regulate PI3K/AKT Signaling
## 238 Toll Like Receptor 9 (TLR9) Cascade
## 239 MyD88-independent TLR4 Cascade
## 240 MAPK1/MAPK3 Signaling
## 241 Signaling By B Cell Receptor (BCR)
## 242 Asparagine N-linked Glycosylation
## 243 MyD88:MAL(TIRAP) Cascade Initiated On Plasma Membrane
## 244 Metabolism Of Carbohydrates
## 245 Negative Regulation Of PI3K/AKT Network
## 246 Signaling By NTRK1 (TRKA)
## 247 PPARA Activates Gene Expression
## 248 TCR Signaling
## 249 Regulation Of Lipid Metabolism By PPARalpha
## 250 Post-translational Protein Modification
## 251 Transcriptional Regulation By RUNX2
## 252 Immune System
## 253 Antigen Processing: Ubiquitination And Proteasome Degradation
## 254 Signaling By Receptor Tyrosine Kinases
## 255 G1/S Transition
## 256 MAPK Family Signaling Cascades
## 257 ER To Golgi Anterograde Transport
## 258 Cell Surface Interactions At Vascular Wall
## 259 Toll Like Receptor 4 (TLR4) Cascade
## 260 Axon Guidance
## 261 C-type Lectin Receptors (CLRs)
## 262 Clathrin-mediated Endocytosis
## 263 Mitotic G1 Phase And G1/S Transition
## 264 CDC42 GTPase Cycle
## 265 Interleukin-1 Family Signaling
## 266 Adaptive Immune System
## 267 Cellular Response To Starvation
## 268 Nervous System Development
## 269 Regulation Of TP53 Activity
## 270 S Phase
## 271 Toll-like Receptor Cascades
## 272 Transport To Golgi And Subsequent Modification
## 273 SUMO E3 Ligases SUMOylate Target Proteins
## 274 Class I MHC Mediated Antigen Processing And Presentation
## 275 Fatty Acid Metabolism

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## 276				SUMOylation	
## 277				RAC1 GTPase Cycle	
## 278				Generic Transcription Pathway	
## 279				G2/M Transition	
## 280				Mitotic G2-G2/M Phases	
## 281				ESR-mediated Signaling	
## 282				Peptide Ligand-Binding Receptors	
## 283				Ub-specific Processing Proteases	
## 284				Signaling By NOTCH	
## 285				Phospholipid Metabolism	
## 286				Keratinization	
## 287				G Alpha (Q) Signaling Events	
## 288				RHO GTPase Cycle	
## 289				Developmental Biology	
## 290				Metabolism Of Proteins	
## 291				RNA Polymerase II Transcription	
## 292				Neddylation	
## 293				Deubiquitination	
## 294				Signal Transduction	
## 295				Extracellular Matrix Organization	
## 296				Gene Expression (Transcription)	
## 297				DNA Repair	
## 298				G Alpha (I) Signaling Events	
## 299				Hemostasis	
## 300				Class A/1 (Rhodopsin-like Receptors)	
## 301				GPCR Downstream Signaling	
## 302				Signaling By Rho GTPases	
## 303				SARS-CoV Infections	
## 304				Cell Cycle	
## 305				Signaling By Rho GTPases, Miro GTPases And RHOBTB3	
## 306				Signaling By GPCR	
## 307				Disease	
## 308				GPCR Ligand Binding	
## 309				Innate Immune System	
## 310				Cell Cycle, Mitotic	
## 311				Infectious Disease	
##	Overlap	P.value	Adjusted.P.value	Old.P.value	Old.Adjusted.P.value
## 1	2/14	0.002519972	0.3338903	0	0
## 2	2/26	0.008628278	0.3338903	0	0
## 3	2/27	0.009285938	0.3338903	0	0
## 4	2/29	0.010666021	0.3338903	0	0
## 5	2/29	0.010666021	0.3338903	0	0
## 6	3/92	0.013584592	0.3338903	0	0
## 7	9/702	0.013766199	0.3338903	0	0
## 8	2/35	0.015306710	0.3338903	0	0
## 9	3/99	0.016514828	0.3338903	0	0
## 10	3/105	0.019286796	0.3338903	0	0
## 11	2/44	0.023584789	0.3338903	0	0
## 12	1/5	0.026712437	0.3338903	0	0
## 13	3/122	0.028455265	0.3338903	0	0
## 14	2/49	0.028813889	0.3338903	0	0
## 15	1/6	0.031969487	0.3338903	0	0
## 16	1/6	0.031969487	0.3338903	0	0
## 17	1/7	0.037198405	0.3338903	0	0

## 18	1/7 0.037198405	0.3338903	0	0
## 19	1/7 0.037198405	0.3338903	0	0
## 20	1/7 0.037198405	0.3338903	0	0
## 21	1/7 0.037198405	0.3338903	0	0
## 22	1/7 0.037198405	0.3338903	0	0
## 23	1/7 0.037198405	0.3338903	0	0
## 24	1/7 0.037198405	0.3338903	0	0
## 25	1/7 0.037198405	0.3338903	0	0
## 26	1/8 0.042399339	0.3338903	0	0
## 27	1/8 0.042399339	0.3338903	0	0
## 28	1/8 0.042399339	0.3338903	0	0
## 29	1/8 0.042399339	0.3338903	0	0
## 30	2/61 0.043013126	0.3338903	0	0
## 31	4/246 0.044445679	0.3338903	0	0
## 32	8/732 0.044672339	0.3338903	0	0
## 33	1/9 0.047572439	0.3338903	0	0
## 34	1/9 0.047572439	0.3338903	0	0
## 35	1/9 0.047572439	0.3338903	0	0
## 36	1/9 0.047572439	0.3338903	0	0
## 37	2/65 0.048219130	0.3338903	0	0
## 38	2/65 0.048219130	0.3338903	0	0
## 39	2/67 0.050903986	0.3338903	0	0
## 40	1/10 0.052717850	0.3338903	0	0
## 41	1/10 0.052717850	0.3338903	0	0
## 42	1/10 0.052717850	0.3338903	0	0
## 43	1/10 0.052717850	0.3338903	0	0
## 44	1/11 0.057835721	0.3338903	0	0
## 45	1/11 0.057835721	0.3338903	0	0
## 46	1/11 0.057835721	0.3338903	0	0
## 47	5/386 0.058256807	0.3338903	0	0
## 48	3/165 0.060142563	0.3338903	0	0
## 49	2/74 0.060706202	0.3338903	0	0
## 50	1/12 0.062926197	0.3338903	0	0
## 51	1/12 0.062926197	0.3338903	0	0
## 52	1/12 0.062926197	0.3338903	0	0
## 53	1/12 0.062926197	0.3338903	0	0
## 54	1/12 0.062926197	0.3338903	0	0
## 55	1/13 0.067989423	0.3338903	0	0
## 56	1/13 0.067989423	0.3338903	0	0
## 57	1/13 0.067989423	0.3338903	0	0
## 58	2/81 0.071093766	0.3338903	0	0
## 59	1/14 0.073025544	0.3338903	0	0
## 60	3/182 0.075820370	0.3338903	0	0
## 61	1/15 0.078034702	0.3338903	0	0
## 62	1/15 0.078034702	0.3338903	0	0
## 63	1/15 0.078034702	0.3338903	0	0
## 64	1/15 0.078034702	0.3338903	0	0
## 65	1/15 0.078034702	0.3338903	0	0
## 66	1/15 0.078034702	0.3338903	0	0
## 67	2/86 0.078840560	0.3338903	0	0
## 68	3/186 0.079748071	0.3338903	0	0
## 69	1/16 0.083017042	0.3338903	0	0
## 70	1/16 0.083017042	0.3338903	0	0
## 71	2/89 0.083610063	0.3338903	0	0

## 72	2/89	0.083610063	0.3338903	0	0
## 73	1/17	0.087972706	0.3338903	0	0
## 74	1/17	0.087972706	0.3338903	0	0
## 75	1/17	0.087972706	0.3338903	0	0
## 76	1/17	0.087972706	0.3338903	0	0
## 77	1/17	0.087972706	0.3338903	0	0
## 78	1/17	0.087972706	0.3338903	0	0
## 79	1/17	0.087972706	0.3338903	0	0
## 80	1/17	0.087972706	0.3338903	0	0
## 81	3/196	0.089945393	0.3338903	0	0
## 82	1/18	0.092901834	0.3338903	0	0
## 83	1/18	0.092901834	0.3338903	0	0
## 84	1/18	0.092901834	0.3338903	0	0
## 85	1/18	0.092901834	0.3338903	0	0
## 86	1/18	0.092901834	0.3338903	0	0
## 87	2/95	0.093403390	0.3338903	0	0
## 88	1/19	0.097804569	0.3342552	0	0
## 89	1/19	0.097804569	0.3342552	0	0
## 90	1/19	0.097804569	0.3342552	0	0
## 91	1/19	0.097804569	0.3342552	0	0
## 92	5/453	0.098890162	0.3342917	0	0
## 93	2/100	0.101805072	0.3344227	0	0
## 94	1/20	0.102681048	0.3344227	0	0
## 95	1/21	0.107531413	0.3344227	0	0
## 96	1/21	0.107531413	0.3344227	0	0
## 97	1/21	0.107531413	0.3344227	0	0
## 98	1/21	0.107531413	0.3344227	0	0
## 99	1/21	0.107531413	0.3344227	0	0
## 100	1/21	0.107531413	0.3344227	0	0
## 101	2/104	0.108671448	0.3346220	0	0
## 102	1/22	0.112355801	0.3355695	0	0
## 103	2/107	0.113900254	0.3355695	0	0
## 104	1/23	0.117154351	0.3355695	0	0
## 105	1/23	0.117154351	0.3355695	0	0
## 106	1/23	0.117154351	0.3355695	0	0
## 107	1/23	0.117154351	0.3355695	0	0
## 108	1/23	0.117154351	0.3355695	0	0
## 109	1/24	0.121927198	0.3355695	0	0
## 110	1/24	0.121927198	0.3355695	0	0
## 111	1/24	0.121927198	0.3355695	0	0
## 112	1/24	0.121927198	0.3355695	0	0
## 113	1/24	0.121927198	0.3355695	0	0
## 114	4/354	0.125087514	0.3396187	0	0
## 115	1/25	0.126674481	0.3396187	0	0
## 116	1/25	0.126674481	0.3396187	0	0
## 117	1/26	0.131396334	0.3463073	0	0
## 118	1/26	0.131396334	0.3463073	0	0
## 119	1/27	0.136092892	0.3478672	0	0
## 120	1/27	0.136092892	0.3478672	0	0
## 121	2/120	0.137254072	0.3478672	0	0
## 122	15/2049	0.138168331	0.3478672	0	0
## 123	1/28	0.140764290	0.3478672	0	0
## 124	1/28	0.140764290	0.3478672	0	0
## 125	1/28	0.140764290	0.3478672	0	0

## 126	2/122	0.140936549	0.3478672	0	0
## 127	1/29	0.145410661	0.3505637	0	0
## 128	1/29	0.145410661	0.3505637	0	0
## 129	1/29	0.145410661	0.3505637	0	0
## 130	2/126	0.148364534	0.3534848	0	0
## 131	1/30	0.150032137	0.3534848	0	0
## 132	1/30	0.150032137	0.3534848	0	0
## 133	1/31	0.154628852	0.3535998	0	0
## 134	1/31	0.154628852	0.3535998	0	0
## 135	1/31	0.154628852	0.3535998	0	0
## 136	1/31	0.154628852	0.3535998	0	0
## 137	1/32	0.159200936	0.3546538	0	0
## 138	1/32	0.159200936	0.3546538	0	0
## 139	1/32	0.159200936	0.3546538	0	0
## 140	2/132	0.159651221	0.3546538	0	0
## 141	1/33	0.163748521	0.3586323	0	0
## 142	1/33	0.163748521	0.3586323	0	0
## 143	1/35	0.172770710	0.3749889	0	0
## 144	3/268	0.176713648	0.3749889	0	0
## 145	1/36	0.177245573	0.3749889	0	0
## 146	1/36	0.177245573	0.3749889	0	0
## 147	1/36	0.177245573	0.3749889	0	0
## 148	1/37	0.181696452	0.3792456	0	0
## 149	1/37	0.181696452	0.3792456	0	0
## 150	1/38	0.186123474	0.3858960	0	0
## 151	1/39	0.190526768	0.3898278	0	0
## 152	1/39	0.190526768	0.3898278	0	0
## 153	1/41	0.199262668	0.4017539	0	0
## 154	1/41	0.199262668	0.4017539	0	0
## 155	2/153	0.200231035	0.4017539	0	0
## 156	1/42	0.203595526	0.4058860	0	0
## 157	1/43	0.207905154	0.4118376	0	0
## 158	1/44	0.212191676	0.4124476	0	0
## 159	1/44	0.212191676	0.4124476	0	0
## 160	1/44	0.212191676	0.4124476	0	0
## 161	1/45	0.216455215	0.4155406	0	0
## 162	1/45	0.216455215	0.4155406	0	0
## 163	1/47	0.224913830	0.4291301	0	0
## 164	1/48	0.229109148	0.4295871	0	0
## 165	1/48	0.229109148	0.4295871	0	0
## 166	3/306	0.229297293	0.4295871	0	0
## 167	1/49	0.233281967	0.4318494	0	0
## 168	1/49	0.233281967	0.4318494	0	0
## 169	1/50	0.237432407	0.4369318	0	0
## 170	1/51	0.241560586	0.4419138	0	0
## 171	1/52	0.245666624	0.4445469	0	0
## 172	2/176	0.245858744	0.4445469	0	0
## 173	1/53	0.249750636	0.4489737	0	0
## 174	1/54	0.253812741	0.4524561	0	0
## 175	1/55	0.257853056	0.4524561	0	0
## 176	1/55	0.257853056	0.4524561	0	0
## 177	2/182	0.257854413	0.4524561	0	0
## 178	5/637	0.261205761	0.4524561	0	0
## 179	1/56	0.261871694	0.4524561	0	0

## 180	1/56	0.261871694	0.4524561	0	0
## 181	1/57	0.265868773	0.4543142	0	0
## 182	1/57	0.265868773	0.4543142	0	0
## 183	1/59	0.273798708	0.4578032	0	0
## 184	1/59	0.273798708	0.4578032	0	0
## 185	1/59	0.273798708	0.4578032	0	0
## 186	1/59	0.273798708	0.4578032	0	0
## 187	1/61	0.281643770	0.4659107	0	0
## 188	1/61	0.281643770	0.4659107	0	0
## 189	1/62	0.285534755	0.4673753	0	0
## 190	1/62	0.285534755	0.4673753	0	0
## 191	1/63	0.289404859	0.4712299	0	0
## 192	2/200	0.293854703	0.4759834	0	0
## 193	1/65	0.297082865	0.4787190	0	0
## 194	1/69	0.312193146	0.5004746	0	0
## 195	1/73	0.326981551	0.5214937	0	0
## 196	2/218	0.329629975	0.5219577	0	0
## 197	1/74	0.330629158	0.5219577	0	0
## 198	5/706	0.333762615	0.5223818	0	0
## 199	1/75	0.334257179	0.5223818	0	0
## 200	1/77	0.341454874	0.5283207	0	0
## 201	1/77	0.341454874	0.5283207	0	0
## 202	1/78	0.345024756	0.5312015	0	0
## 203	5/722	0.350936059	0.5342886	0	0
## 204	1/80	0.352107100	0.5342886	0	0
## 205	1/81	0.355619767	0.5342886	0	0
## 206	1/81	0.355619767	0.5342886	0	0
## 207	1/81	0.355619767	0.5342886	0	0
## 208	1/82	0.359113564	0.5343747	0	0
## 209	1/82	0.359113564	0.5343747	0	0
## 210	1/83	0.362588592	0.5344315	0	0
## 211	1/83	0.362588592	0.5344315	0	0
## 212	5/736	0.366008889	0.5344600	0	0
## 213	1/84	0.366044952	0.5344600	0	0
## 214	1/89	0.383050176	0.5537758	0	0
## 215	1/89	0.383050176	0.5537758	0	0
## 216	2/247	0.386138340	0.5537758	0	0
## 217	1/90	0.386396590	0.5537758	0	0
## 218	1/93	0.396328311	0.5654042	0	0
## 219	1/94	0.399603361	0.5663557	0	0
## 220	3/424	0.402214448	0.5663557	0	0
## 221	1/95	0.402860807	0.5663557	0	0
## 222	4/599	0.406079762	0.5663557	0	0
## 223	1/96	0.406100742	0.5663557	0	0
## 224	1/97	0.409323260	0.5678509	0	0
## 225	2/260	0.410824579	0.5678509	0	0
## 226	1/99	0.415716415	0.5684987	0	0
## 227	1/100	0.418887236	0.5684987	0	0
## 228	1/101	0.422041007	0.5684987	0	0
## 229	1/102	0.425177821	0.5684987	0	0
## 230	1/102	0.425177821	0.5684987	0	0
## 231	1/102	0.425177821	0.5684987	0	0
## 232	1/103	0.428297766	0.5684987	0	0
## 233	1/103	0.428297766	0.5684987	0	0

## 234	2/271	0.431335550	0.5684987	0	0
## 235	2/271	0.431335550	0.5684987	0	0
## 236	1/104	0.431400933	0.5684987	0	0
## 237	1/106	0.437557291	0.5717660	0	0
## 238	1/106	0.437557291	0.5717660	0	0
## 239	1/107	0.440610658	0.5732325	0	0
## 240	2/277	0.442365904	0.5732325	0	0
## 241	1/109	0.446668210	0.5764059	0	0
## 242	2/282	0.451468926	0.5801935	0	0
## 243	1/112	0.455632887	0.5821273	0	0
## 244	2/285	0.456890911	0.5821273	0	0
## 245	1/113	0.458589018	0.5821273	0	0
## 246	1/114	0.461529243	0.5834780	0	0
## 247	1/116	0.467362317	0.5860874	0	0
## 248	1/116	0.467362317	0.5860874	0	0
## 249	1/118	0.473132782	0.5887943	0	0
## 250	8/1383	0.473307311	0.5887943	0	0
## 251	1/119	0.475994744	0.5897783	0	0
## 252	11/1943	0.481520387	0.5942573	0	0
## 253	2/307	0.495696219	0.6093341	0	0
## 254	3/496	0.503608683	0.6144148	0	0
## 255	1/129	0.503780602	0.6144148	0	0
## 256	2/318	0.514439393	0.6225829	0	0
## 257	1/133	0.514481668	0.6225829	0	0
## 258	1/134	0.517121012	0.6233513	0	0
## 259	1/140	0.532661188	0.6377318	0	0
## 260	3/519	0.534187278	0.6377318	0	0
## 261	1/141	0.535202601	0.6377318	0	0
## 262	1/142	0.537730320	0.6382982	0	0
## 263	1/147	0.550166068	0.6505766	0	0
## 264	1/149	0.555047044	0.6538622	0	0
## 265	1/152	0.562270289	0.6574940	0	0
## 266	4/733	0.562358173	0.6574940	0	0
## 267	1/153	0.564652124	0.6577034	0	0
## 268	3/545	0.567467511	0.6585164	0	0
## 269	1/157	0.574051741	0.6636806	0	0
## 270	1/161	0.583250248	0.6718179	0	0
## 271	1/162	0.585518953	0.6719424	0	0
## 272	1/164	0.590019718	0.6746181	0	0
## 273	1/168	0.598876488	0.6822366	0	0
## 274	2/378	0.608403541	0.6893917	0	0
## 275	1/173	0.609681300	0.6893917	0	0
## 276	1/174	0.611807405	0.6893917	0	0
## 277	1/178	0.620197691	0.6963230	0	0
## 278	6/1190	0.627161611	0.7004838	0	0
## 279	1/182	0.628408275	0.7004838	0	0
## 280	1/184	0.632447373	0.7024683	0	0
## 281	1/188	0.640395527	0.7087652	0	0
## 282	1/196	0.655784496	0.7232233	0	0
## 283	1/201	0.665069374	0.7308713	0	0
## 284	1/203	0.668713458	0.7322883	0	0
## 285	1/208	0.677652713	0.7368881	0	0
## 286	1/208	0.677652713	0.7368881	0	0
## 287	1/212	0.684631702	0.7418831	0	0

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## 288 2/441 0.691688571      0.7469276      0      0
## 289 5/1073 0.694221670     0.7470690      0      0
## 290 9/1890 0.702401371     0.7532649      0      0
## 291 6/1312 0.719507649     0.7689583      0      0
## 292 1/237  0.724981464     0.7721549      0      0
## 293 1/279  0.781573201     0.8295879      0      0
## 294 11/2465 0.792073728    0.8378739      0      0
## 295 1/291  0.795506613     0.8386527      0      0
## 296 6/1449 0.803216501     0.8439200      0      0
## 297 1/310  0.815787960     0.8534792      0      0
## 298 1/312  0.817803264     0.8534792      0      0
## 299 2/576  0.821779592     0.8547607      0      0
## 300 1/327  0.832237670     0.8627531      0      0
## 301 2/619  0.851566004     0.8798572      0      0
## 302 2/644  0.8666748486    0.8897880      0      0
## 303 1/369  0.866899567     0.8897880      0      0
## 304 2/654  0.872416603     0.8925051      0      0
## 305 2/660  0.875711273     0.8929384      0      0
## 306 2/689  0.890567217     0.9051190      0      0
## 307 6/1736 0.915669900     0.9275766      0      0
## 308 1/458  0.918628873     0.9275766      0      0
## 309 3/1035 0.922967862     0.9289418      0      0
## 310 1/523  0.943274948     0.9463178      0      0
## 311 1/961  0.995167274     0.9951673      0      0
##          Odds.Ratio Combined.Score
## 1 31.2578616 1.870316e+02
## 2 15.6194969 7.423494e+01
## 3 14.9939623 7.016056e+01
## 4 13.8819008 6.303344e+01
## 5 13.8819008 6.303344e+01
## 6 6.3573034 2.732890e+01
## 7 2.5185622 1.079340e+01
## 8 11.3544883 4.745567e+01
## 9 5.8916667 2.417643e+01
## 10 5.5434174 2.188727e+01
## 11 8.9173405 3.341464e+01
## 12 46.4672897 1.683336e+02
## 13 4.7474190 1.689807e+01
## 14 7.9666800 2.825700e+01
## 15 37.1719626 1.279821e+02
## 16 37.1719626 1.279821e+02
## 17 30.9750779 1.019541e+02
## 18 30.9750779 1.019541e+02
## 19 30.9750779 1.019541e+02
## 20 30.9750779 1.019541e+02
## 21 30.9750779 1.019541e+02
## 22 30.9750779 1.019541e+02
## 23 30.9750779 1.019541e+02
## 24 30.9750779 1.019541e+02
## 25 30.9750779 1.019541e+02
## 26 26.5487316 8.391052e+01
## 27 26.5487316 8.391052e+01
## 28 26.5487316 8.391052e+01
## 29 26.5487316 8.391052e+01

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## 30 6.3425008 1.995509e+01
## 31 3.1230134 9.723463e+00
## 32 2.1180110 6.583627e+00
## 33 23.2289720 7.074387e+01
## 34 23.2289720 7.074387e+01
## 35 23.2289720 7.074387e+01
## 36 23.2289720 7.074387e+01
## 37 5.9386044 1.800585e+01
## 38 5.9386044 1.800585e+01
## 39 5.7552975 1.713821e+01
## 40 20.6469367 6.075983e+01
## 41 20.6469367 6.075983e+01
## 42 20.6469367 6.075983e+01
## 43 20.6469367 6.075983e+01
## 44 18.5813084 5.295949e+01
## 45 18.5813084 5.295949e+01
## 46 18.5813084 5.295949e+01
## 47 2.4859211 7.067211e+00
## 48 3.4797178 9.781617e+00
## 49 5.1939203 1.455186e+01
## 50 16.8912489 4.671769e+01
## 51 16.8912489 4.671769e+01
## 52 16.8912489 4.671769e+01
## 53 16.8912489 4.671769e+01
## 54 16.8912489 4.671769e+01
## 55 15.4828660 4.162419e+01
## 56 15.4828660 4.162419e+01
## 57 15.4828660 4.162419e+01
## 58 4.7320277 1.251032e+01
## 59 14.2911574 3.739919e+01
## 60 3.1465283 8.116118e+00
## 61 13.2696929 3.384570e+01
## 62 13.2696929 3.384570e+01
## 63 13.2696929 3.384570e+01
## 64 13.2696929 3.384570e+01
## 65 13.2696929 3.384570e+01
## 66 13.2696929 3.384570e+01
## 67 4.4492363 1.130252e+01
## 68 3.0771272 7.781694e+00
## 69 12.3844237 3.082123e+01
## 70 12.3844237 3.082123e+01
## 71 4.2951637 1.065884e+01
## 72 4.2951637 1.065884e+01
## 73 11.6098131 2.822031e+01
## 74 11.6098131 2.822031e+01
## 75 11.6098131 2.822031e+01
## 76 11.6098131 2.822031e+01
## 77 11.6098131 2.822031e+01
## 78 11.6098131 2.822031e+01
## 79 11.6098131 2.822031e+01
## 80 11.6098131 2.822031e+01
## 81 2.9162102 7.023846e+00
## 82 10.9263332 2.596328e+01
## 83 10.9263332 2.596328e+01

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## 84 10.9263332 2.596328e+01
## 85 10.9263332 2.596328e+01
## 86 10.9263332 2.596328e+01
## 87 4.0168391 9.523233e+00
## 88 10.3187954 2.398897e+01
## 89 10.3187954 2.398897e+01
## 90 10.3187954 2.398897e+01
## 91 10.3187954 2.398897e+01
## 92 2.1068828 4.874791e+00
## 93 3.8109357 8.706827e+00
## 94 9.7752091 2.224962e+01
## 95 9.2859813 2.070748e+01
## 96 9.2859813 2.070748e+01
## 97 9.2859813 2.070748e+01
## 98 9.2859813 2.070748e+01
## 99 9.2859813 2.070748e+01
## 100 9.2859813 2.070748e+01
## 101 3.6607473 8.124758e+00
## 102 8.8433467 1.933230e+01
## 103 3.5556155 7.724333e+00
## 104 8.4409516 1.809962e+01
## 105 8.4409516 1.809962e+01
## 106 8.4409516 1.809962e+01
## 107 8.4409516 1.809962e+01
## 108 8.4409516 1.809962e+01
## 109 8.0735473 1.698942e+01
## 110 8.0735473 1.698942e+01
## 111 8.0735473 1.698942e+01
## 112 8.0735473 1.698942e+01
## 113 8.0735473 1.698942e+01
## 114 2.1474725 4.464041e+00
## 115 7.7367601 1.598519e+01
## 116 7.7367601 1.598519e+01
## 117 7.4269159 1.507320e+01
## 118 7.4269159 1.507320e+01
## 119 7.1409058 1.424195e+01
## 120 7.1409058 1.424195e+01
## 121 3.1618164 6.279119e+00
## 122 1.4160878 2.802838e+00
## 123 6.8760817 1.348172e+01
## 124 6.8760817 1.348172e+01
## 125 6.8760817 1.348172e+01
## 126 3.1088050 6.091534e+00
## 127 6.6301736 1.278426e+01
## 128 6.6301736 1.278426e+01
## 129 6.6301736 1.278426e+01
## 130 3.0079124 5.739346e+00
## 131 6.4012246 1.214252e+01
## 132 6.4012246 1.214252e+01
## 133 6.1875389 1.155045e+01
## 134 6.1875389 1.155045e+01
## 135 6.1875389 1.155045e+01
## 136 6.1875389 1.155045e+01
## 137 5.9876394 1.100282e+01

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## 138 5.9876394 1.100282e+01
## 139 5.9876394 1.100282e+01
## 140 2.8682148 5.262496e+00
## 141 5.8002336 1.049508e+01
## 142 5.8002336 1.049508e+01
## 143 5.4584937 9.583968e+00
## 144 2.1161186 3.667709e+00
## 145 5.3022697 9.174088e+00
## 146 5.3022697 9.174088e+00
## 147 5.3022697 9.174088e+00
## 148 5.1547248 8.790960e+00
## 149 5.1547248 8.790960e+00
## 150 5.0151553 8.432206e+00
## 151 4.8829316 8.095718e+00
## 152 4.8829316 8.095718e+00
## 153 4.6383178 7.482216e+00
## 154 4.6383178 7.482216e+00
## 155 2.4667000 3.967153e+00
## 156 4.5249601 7.202017e+00
## 157 4.4170004 6.937665e+00
## 158 4.3140622 6.687941e+00
## 159 4.3140622 6.687941e+00
## 160 4.3140622 6.687941e+00
## 161 4.2158029 6.451745e+00
## 162 4.2158029 6.451745e+00
## 163 4.0321008 6.016047e+00
## 164 3.9461125 5.814821e+00
## 165 3.9461125 5.814821e+00
## 166 1.8471476 2.720361e+00
## 167 3.8637072 5.623654e+00
## 168 3.8637072 5.623654e+00
## 169 3.7846653 5.441865e+00
## 170 3.7087850 5.268830e+00
## 171 3.6358805 5.103976e+00
## 172 2.1381479 2.999817e+00
## 173 3.5657800 4.946779e+00
## 174 3.4983248 4.796758e+00
## 175 3.4333679 4.653468e+00
## 176 3.4333679 4.653468e+00
## 177 2.0662474 2.800509e+00
## 178 1.4793536 1.985954e+00
## 179 3.3707732 4.516501e+00
## 180 3.3707732 4.516501e+00
## 181 3.3104139 4.385479e+00
## 182 3.3104139 4.385479e+00
## 183 3.1959394 4.139899e+00
## 184 3.1959394 4.139899e+00
## 185 3.1959394 4.139899e+00
## 186 3.1959394 4.139899e+00
## 187 3.0890966 3.914232e+00
## 188 3.0890966 3.914232e+00
## 189 3.0383024 3.808183e+00
## 190 3.0383024 3.808183e+00
## 191 2.9891468 3.706329e+00

```

```

## 192 1.8766914 2.298327e+00
## 193 2.8954439 3.514328e+00
## 194 2.7245739 3.171767e+00
## 195 2.5726895 2.875885e+00
## 196 1.7187282 1.907418e+00
## 197 2.5373192 2.808198e+00
## 198 1.3289614 1.458303e+00
## 199 2.5029048 2.742795e+00
## 200 2.4367929 2.618431e+00
## 201 2.4367929 2.618431e+00
## 202 2.4050249 2.559281e+00
## 203 1.2982221 1.359435e+00
## 204 2.3439016 2.446611e+00
## 205 2.3144860 2.392931e+00
## 206 2.3144860 2.392931e+00
## 207 2.3144860 2.392931e+00
## 208 2.2857967 2.340922e+00
## 209 2.2857967 2.340922e+00
## 210 2.2578072 2.290515e+00
## 211 2.2578072 2.290515e+00
## 212 1.2724290 1.278915e+00
## 213 2.2304921 2.241643e+00
## 214 2.1032285 2.018236e+00
## 215 2.1032285 2.018236e+00
## 216 1.5130535 1.439761e+00
## 217 2.0794918 1.977370e+00
## 218 2.0113775 1.861555e+00
## 219 1.9896493 1.825071e+00
## 220 1.3214116 1.203502e+00
## 221 1.9683834 1.789584e+00
## 222 1.2473820 1.124148e+00
## 223 1.9475652 1.755056e+00
## 224 1.9271807 1.721454e+00
## 225 1.4358637 1.277328e+00
## 226 1.8876597 1.656897e+00
## 227 1.8684981 1.625880e+00
## 228 1.8497196 1.595666e+00
## 229 1.8313130 1.566226e+00
## 230 1.8313130 1.566226e+00
## 231 1.8313130 1.566226e+00
## 232 1.8132674 1.537536e+00
## 233 1.8132674 1.537536e+00
## 234 1.3763765 1.157352e+00
## 235 1.3763765 1.157352e+00
## 236 1.7955721 1.509569e+00
## 237 1.7611927 1.455710e+00
## 238 1.7611927 1.455710e+00
## 239 1.7444895 1.429773e+00
## 240 1.3459348 1.097769e+00
## 241 1.7120111 1.379777e+00
## 242 1.3215633 1.050972e+00
## 243 1.6654879 1.309187e+00
## 244 1.3073538 1.024064e+00
## 245 1.6505340 1.286758e+00

```

```

## 246 1.6358448 1.264851e+00
## 247 1.6072328 1.222542e+00
## 248 1.6072328 1.222542e+00
## 249 1.5795990 1.182139e+00
## 250 1.0773527 8.058710e-01
## 251 1.5661334 1.162617e+00
## 252 1.0541931 7.704114e-01
## 253 1.2116919 8.503557e-01
## 254 1.1242538 7.711884e-01
## 255 1.4430491 9.893752e-01
## 256 1.1688560 7.769123e-01
## 257 1.3990371 9.297936e-01
## 258 1.3884478 9.156513e-01
## 259 1.3281113 8.365371e-01
## 260 1.0728682 6.726978e-01
## 261 1.3185581 8.242437e-01
## 262 1.3091403 8.121882e-01
## 263 1.2639867 7.552764e-01
## 264 1.2467795 7.339821e-01
## 265 1.2218234 7.034924e-01
## 266 1.0110267 5.819635e-01
## 267 1.2137236 6.936982e-01
## 268 1.0200316 5.779211e-01
## 269 1.1823628 6.562536e-01
## 270 1.1525701 6.213954e-01
## 271 1.1453532 6.130580e-01
## 272 1.1311851 5.968125e-01
## 273 1.1038670 5.659525e-01
## 274 0.9793256 4.866434e-01
## 275 1.0715062 5.302015e-01
## 276 1.0652585 5.234017e-01
## 277 1.0409737 4.972908e-01
## 278 0.9294515 4.336365e-01
## 279 1.0177622 4.728169e-01
## 280 1.0065369 4.611532e-01
## 281 0.9848068 4.388982e-01
## 282 0.9440211 3.983043e-01
## 283 0.9201869 3.753110e-01
## 284 0.9109836 3.665795e-01
## 285 0.8887534 3.458320e-01
## 286 0.8887534 3.458320e-01
## 287 0.8717279 3.302752e-01
## 288 0.8360768 3.081942e-01
## 289 0.8556053 3.122651e-01
## 290 0.8704751 3.074956e-01
## 291 0.8371318 2.755738e-01
## 292 0.7783938 2.503386e-01
## 293 0.6593828 1.625026e-01
## 294 0.8058293 1.878395e-01
## 295 0.6317112 1.445204e-01
## 296 0.7520688 1.648016e-01
## 297 0.5922935 1.205914e-01
## 298 0.5884244 1.183519e-01
## 299 0.6350010 1.246399e-01

```

```

## 300 0.5609197 1.030057e-01
## 301 0.5894315 9.470883e-02
## 302 0.5657438 8.090501e-02
## 303 0.4958350 7.082118e-02
## 304 0.5567774 7.599355e-02
## 305 0.5515284 7.319820e-02
## 306 0.5274505 6.112977e-02
## 307 0.6175451 5.440532e-02
## 308 0.3974519 3.373296e-02
## 309 0.5221484 4.185587e-02
## 310 0.3467970 2.025207e-02
## 311 0.1843069 8.928638e-04
##
## 1
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## 41

```

Genes

CDKN1A;MDM2	CDKN1A;MDM2
RPS6KA2;NEFL	TNFRSF6B;EDA2R
SCN5A;ANK1	VNN2;RTN4RL1;LY6D
CDKN1A;TNFRSF6B;UBA7;RPS6KA2;INPP5D;IL13;BLNK;TRIM22;EDA2R	HSD11B1;TSPOAP1
RPS6KA2;SCN5A;ANK1	RPS6KA2;CDKN1A;ANK2
BTC;CDKN1A;MDM2	INPP5D;BLNK
CDKN1A	VNN2;SLC52A1;NMNAT2
BTG2;CDKN1A	NTF4
CYP2E1	RPS6KA2
NTF4	SLC52A1
RPS6KA2	RPS6KA2
CDKN1A	CDKN1A
CEL	ANK1
HBA1	ANK1
ANK1	CYP2E1
KCNMB4	NTF4
BTC	RPS6KA2;NEFL
IL13	RPS6KA2;MDM2;NEFL;TSPOAP1
HSD11B1;ACER2;NEU4;ELOVL4;INPP5D;ANKRD1;CYP2E1;TSPOAP1	NTF4
KCNE3	ANK1
BTC	CDKN1A;AGRP
CDKN1A;MDM2	CDKN1A;MDM2
BTC	HSD11B1

```

## 42 INHA
## 43 CDKN1A
## 44 CYP2E1
## 45 CYGB
## 46 HBA1
## 47 RPS6KA2;MDM2;KCNMB4;NEFL;TSPOAP1
## 48 CDKN1A;RPS6KA2;MDM2
## 49 RPS6KA2;NEFL
## 50 INPP5D
## 51 INHA
## 52 BTC
## 53 TSPOAP1
## 54 HBA1
## 55 BTC
## 56 BTC
## 57 BTC
## 58 CDKN1A;RPS6KA2
## 59 CDKN1A
## 60 RPS6KA2;MDM2;NEFL
## 61 KCNE3
## 62 BTC
## 63 KCNMB4
## 64 CYGB
## 65 BTC
## 66 CDKN1A
## 67 SLC14A1;HEPH
## 68 VNN2;SLC52A1;NMNAT2
## 69 BTC
## 70 HAS2
## 71 ACER2;NEU4
## 72 RINL;RAB39B
## 73 CDKN1A
## 74 CDKN1A
## 75 TSPOAP1
## 76 CDKN1A
## 77 BTC
## 78 RPS6KA2
## 79 CYP2E1
## 80 VNN2
## 81 ACTA2;KCNE3;SCN5A
## 82 ABCA12
## 83 BLNK
## 84 TSPOAP1
## 85 CDKN1A
## 86 TSPOAP1
## 87 CDKN1A;MDM2
## 88 CYP2E1
## 89 NEFL
## 90 MDM2
## 91 MDM2
## 92 CDKN1A;RPS6KA2;INPP5D;IL13;BLNK
## 93 TNFRSF6B;EDA2R
## 94 ACTA2
## 95 BTG2

```

```

## 96 NEFL
## 97 BTC
## 98 BTC
## 99 NEFL
## 100 KCNMB4
## 101 CYP2E1;FM04
## 102 RPS6KA2
## 103 CDKN1A;IL13
## 104 TSPOAP1
## 105 NEFL
## 106 CEL
## 107 TSPOAP1
## 108 NTF4
## 109 ELOVL4
## 110 CYP2E1
## 111 BTC
## 112 BTC
## 113 BTC
## 114 CDKN1A;BTG2;SESN1;MDM2
## 115 NEFL
## 116 BTC
## 117 INPP5D
## 118 HEPH
## 119 CDKN1A
## 120 INPP5D
## 121 HAS2;HS3ST6
## 122 ELOVL4;SLC52A1;NMNAT2;HS3ST6;FM04;CYGB;HSD11B1;ACER2;NEU4;VNN2;INPP5D;ANKRD1;HAS2;CYP2E1;TSPOAP1
## 123 CYP2E1
## 124 RPS6KA2
## 125 CEL
## 126 RINL;RAB39B
## 127 AGRP
## 128 CLEC4E
## 129 BTC
## 130 KCNE3;SCN5A
## 131 HS3ST6
## 132 RPS6KA2
## 133 BLNK
## 134 MDM2
## 135 BTC
## 136 NMNAT2
## 137 SCN5A
## 138 UBA7
## 139 BTC
## 140 NTF4;RPS6KA2
## 141 MDM2
## 142 NEU4
## 143 UBA7
## 144 BTC;CDKN1A;MDM2
## 145 CDKN1A
## 146 CDKN1A
## 147 MDM2
## 148 ELOVL4
## 149 MDM2

```

```

## 150 CDKN1A
## 151 UBA7
## 152 MDM2
## 153 HBA1
## 154 CRABP2
## 155 HSD11B1;TSPOAP1
## 156 EPSTI1
## 157 ACTA2
## 158 ACER2
## 159 CYP2E1
## 160 INPP5D
## 161 NEU4
## 162 HBA1
## 163 CDKN1A
## 164 INPP5D
## 165 UBA7
## 166 BTC;CDKN1A;MDM2
## 167 BTC
## 168 BTC
## 169 TSPOAP1
## 170 INPP5D
## 171 BTC
## 172 HEPH;ABCA12
## 173 HS3ST6
## 174 MDM2
## 175 SESN1
## 176 ASPN
## 177 SESN1;HBA1
## 178 BTC;RINL;RAB39B;HBA1;ANK1
## 179 MDM2
## 180 CCL28
## 181 HBA1
## 182 BTC
## 183 CDKN1A
## 184 CDKN1A
## 185 HEPH
## 186 CDKN1A
## 187 CDKN1A
## 188 RPS6KA2
## 189 RAB39B
## 190 RPS6KA2
## 191 NEU4
## 192 UBA7;TRIM22
## 193 CYP2E1
## 194 RPS6KA2
## 195 BTC
## 196 CYP2E1;FM04
## 197 CDSN
## 198 SLC14A1;HEPH;HBA1;ABCA12;CYGB
## 199 UBA7
## 200 ABCA12
## 201 NEU4
## 202
## 203 CDKN1A;SESN1;RPS6KA2;MDM2;HBA1

```

```

## 204 ANK1
## 205 SESN1
## 206 UBA7
## 207 ACTA2
## 208 INPP5D
## 209 CDKN1A
## 210 KCNMB4
## 211 UBA7
## 212 CDKN1A;SESN1;RPS6KA2;MDM2;HBA1
## 213 CDKN1A
## 214 INHA
## 215 TRIM22
## 216 SLC14A1;HEPH
## 217 MDM2
## 218 MDM2
## 219 INPP5D
## 220 BTC;CDKN1A;MDM2
## 221 CYP2E1
## 222 BTC;RINL;RAB39B;ANK1
## 223 RPS6KA2
## 224 BLNK
## 225 BTC;CRABP2
## 226 HEPH
## 227 SESN1
## 228 RPS6KA2
## 229 ABCA12
## 230 KCNMB4
## 231 RPS6KA2
## 232 RPS6KA2
## 233 RPS6KA2
## 234 BTC;NEFL
## 235 CDKN1A;MDM2
## 236 BTC
## 237 BTC
## 238 RPS6KA2
## 239 RPS6KA2
## 240 BTC;NEFL
## 241 BLNK
## 242 NEU4;ANK1
## 243 RPS6KA2
## 244 HAS2;HS3ST6
## 245 BTC
## 246 RPS6KA2
## 247 ANKRD1
## 248 INPP5D
## 249 ANKRD1
## 250 FBXW12;NEU4;VNN2;RTN4RL1;LY6D;MDM2;RAB39B;ANK1
## 251 CDKN1A
## 252 FBXW12;CDKN1A;TNFRSF6B;UBA7;RPS6KA2;INPP5D;IL13;BLNK;CLEC4E;TRIM22;EDA2R
## 253 FBXW12;UBA7
## 254 BTC;NTF4;RPS6KA2
## 255 CDKN1A
## 256 BTC;NEFL
## 257 ANK1

```

```

## 258 INPP5D
## 259 RPS6KA2
## 260 RPS6KA2;SCN5A;ANK1
## 261 CLEC4E
## 262 BTC
## 263 CDKN1A
## 264 PLEKHG1
## 265 IL13
## 266 FBXW12;UBA7;INPP5D;BLNK
## 267 SESN1
## 268 RPS6KA2;SCN5A;ANK1
## 269 MDM2
## 270 CDKN1A
## 271 RPS6KA2
## 272 ANK1
## 273 MDM2
## 274 FBXW12;UBA7
## 275 ELOVL4
## 276 MDM2
## 277 PLEKHG1
## 278 CDKN1A;BTG2;SESN1;ZNF704;MDM2;AGRP
## 279 CDKN1A
## 280 CDKN1A
## 281 BTC
## 282 CCL28
## 283 MDM2
## 284 ACTA2
## 285 INPP5D
## 286 CDSN
## 287 RPS6KA2
## 288 PLEKHG1;EPSTI1
## 289 CDKN1A;CDSN;RPS6KA2;SCN5A;ANK1
## 290 FBXW12;NEU4;VNN2;RTN4RL1;LY6D;MDM2;RAB39B;INHA;ANK1
## 291 CDKN1A;BTG2;SESN1;ZNF704;MDM2;AGRP
## 292 FBXW12
## 293 MDM2
## 294 BTC;ACTA2;NTF4;CDKN1A;PLEKHG1;CRABP2;RPS6KA2;EPSTI1;MDM2;NEFL;CCL28
## 295 ASPN
## 296 CDKN1A;BTG2;SESN1;ZNF704;MDM2;AGRP
## 297 UBA7
## 298 CCL28
## 299 INPP5D;KCNMB4
## 300 CCL28
## 301 RPS6KA2;CCL28
## 302 PLEKHG1;EPSTI1
## 303 BLNK
## 304 CDKN1A;MDM2
## 305 PLEKHG1;EPSTI1
## 306 RPS6KA2;CCL28
## 307 BTC;CDKN1A;HEPH;MDM2;BLNK;ABCA12
## 308 CCL28
## 309 UBA7;RPS6KA2;CLEC4E
## 310 CDKN1A
## 311 BLNK

```

```

## 
## $WikiPathways_2023_Human
## [1] Term          Overlap        P.value
## [4] Adjusted.P.value Old.P.value   Old.Adjusted.P.value
## [7] Odds.Ratio    Combined.Score Genes
## <0 rows> (or 0-length row.names)

# #           CSV-
# write.csv(enrichr_results_2Gy_0Gy_up, "./data/enrichr_results_2Gy_vs_0Gy_up.csv")
# write.csv(enrichr_results_4Gy_0Gy_up, "./data/enrichr_results_4Gy_vs_0Gy_up.csv")
# write.csv(enrichr_results_4Gy_2Gy_up, "./data/enrichr_results_4Gy_vs_2Gy_up.csv")

#
plot_enrichr_barplot <- function(enrichr_result, title) {
  #
  enrichr_result_df <- as.data.frame(enrichr_result[[1]])

  #           Overlap      "x/y"      (      x)
  enrichr_result_df$Gene_number <- sapply(enrichr_result_df$Overlap, function(x) as.numeric(strsplit(x, ",")[[1]]))

  #
  enrichr_result_df$Term <- paste0(enrichr_result_df$Term, " (", enrichr_result_df$Genes, ")")

  #
  if (nrow(enrichr_result_df) > 0) {
    p <- ggplot(enrichr_result_df, aes(x = reorder(Term, Gene_number),
                                         y = Gene_number,
                                         fill = -log10(as.numeric(Adjusted.P.value)))) +
      geom_bar(stat = "identity", width = 0.5, alpha = 0.8) +
      coord_flip() +
      labs(title = title,
           x = "Biological Process",
           y = "Gene Number",
           fill = "-log10(Adjusted P.value)") +
      scale_fill_viridis_c(option = "inferno") +
      theme_minimal() +
      theme(axis.text.y = element_text(size = 7), #
            plot.margin = margin(10, 10, 10, 10), #
            panel.background = element_rect(fill = "white"), #
            plot.background = element_rect(fill = "white"), #
            panel.grid.major = element_line(color = "gray90"), #
            panel.grid.minor = element_line(color = "gray95")) #

    return(p)
  } else {
    print(paste("           :", title))
    return(NULL)
  }
}

#
enrichr_results_2Gy_0Gy_up <- plot_enrichr_barplot(enrichr_results_2Gy_0Gy_up, "Enrichr: 2Gy vs 0Gy")
enrichr_results_4Gy_0Gy_up <- plot_enrichr_barplot(enrichr_results_4Gy_0Gy_up, "Enrichr: 4Gy vs 0Gy")
enrichr_results_4Gy_2Gy_up <- plot_enrichr_barplot(enrichr_results_4Gy_2Gy_up, "Enrichr: 4Gy vs 2Gy")
enrichr_results_all_up <- plot_enrichr_barplot(enrichr_results_all_up, "Enrichr: All Comparisons")

```

```

ggsave("./figs/enrichr_results_2Gy_0Gy_up.png", plot = enrichr_results_2Gy_0Gy_up, width = 20, height =
ggsave("./figs/enrichr_results_4Gy_0Gy_up.png", plot = enrichr_results_4Gy_0Gy_up, width = 20, height =
ggsave("./figs/enrichr_results_4Gy_2Gy_up.png", plot = enrichr_results_4Gy_2Gy_up, width = 20, height =
ggsave("./figs/enrichr_results_all_up.png", plot = enrichr_results_all_up, width = 20, height = 20, dpi = 300)

path_4Gy_vs_0Gy <- res_wald_df_4Gy_vs_0Gy |> as.data.frame() |> filter(pvalue < 0.05 & abs(log2FoldChange) >= 1)

#           ENSEMBL IDs          DataFrame
path_4Gy_vs_0Gy$genes_of_interest <- gsub("\\..*", "", path_4Gy_vs_0Gy$gene_id)

#   -
ensembl <- useMart("ensembl", dataset = "hsapiens_gene_ensembl")

#      Entrez IDs      ENSEMBL IDs
entrez_ids <- getBM(attributes = c('ensembl_gene_id', 'entrezgene_id'),
                      filters = 'ensembl_gene_id',
                      values = path_4Gy_vs_0Gy$genes_of_interest,
                      mart = ensembl)

#   '      Entrez IDs      DataFrame
path_4Gy_vs_0Gy <- merge(path_4Gy_vs_0Gy, entrez_ids, by.x = "genes_of_interest", by.y = "ensembl_gene_id")

# 
head(path_4Gy_vs_0Gy)

##   genes_of_interest    baseMean log2FoldChange      lfcSE      stat      pvalue
## 1   ENSG00000005379    420.6295     2.138752 0.7712724  2.773018 5.553901e-03
## 2   ENSG00000007968    3694.8610    -2.625115 0.3913981 -6.707020 1.986395e-11
## 3   ENSG00000011426    28737.2925   -2.564711 0.4678525 -5.481879 4.208314e-08
## 4   ENSG00000012048    15047.7186   -2.030126 0.3231661 -6.281989 3.342676e-10
## 5   ENSG00000024526    5573.2407    -2.663722 0.5245959 -5.077664 3.821041e-07
## 6   ENSG00000026103    9132.5797    1.960818 0.2192218  8.944448 3.738132e-19
##           padj significant comparison      gene_id gene_name
## 1 4.581726e-02        TRUE 4Gy vs 0Gy ENSG00000005379.15 TSPOAP1
## 2 1.643480e-09        TRUE 4Gy vs 0Gy ENSG00000007968.6   E2F2
## 3 1.820771e-06        TRUE 4Gy vs 0Gy ENSG00000011426.10 ANLN
## 4 2.199636e-08        TRUE 4Gy vs 0Gy ENSG00000012048.20 BRCA1
## 5 1.328258e-05        TRUE 4Gy vs 0Gy ENSG00000024526.16 DEPDC1
## 6 1.079328e-16        TRUE 4Gy vs 0Gy ENSG00000026103.21   FAS
##   entrezgene_id
## 1           9256
## 2           1870
## 3          54443
## 4            672
## 5          55635
## 6            355

logFC <- path_4Gy_vs_0Gy$log2FoldChange
names(logFC) <- path_4Gy_vs_0Gy$entrezgene_id

```

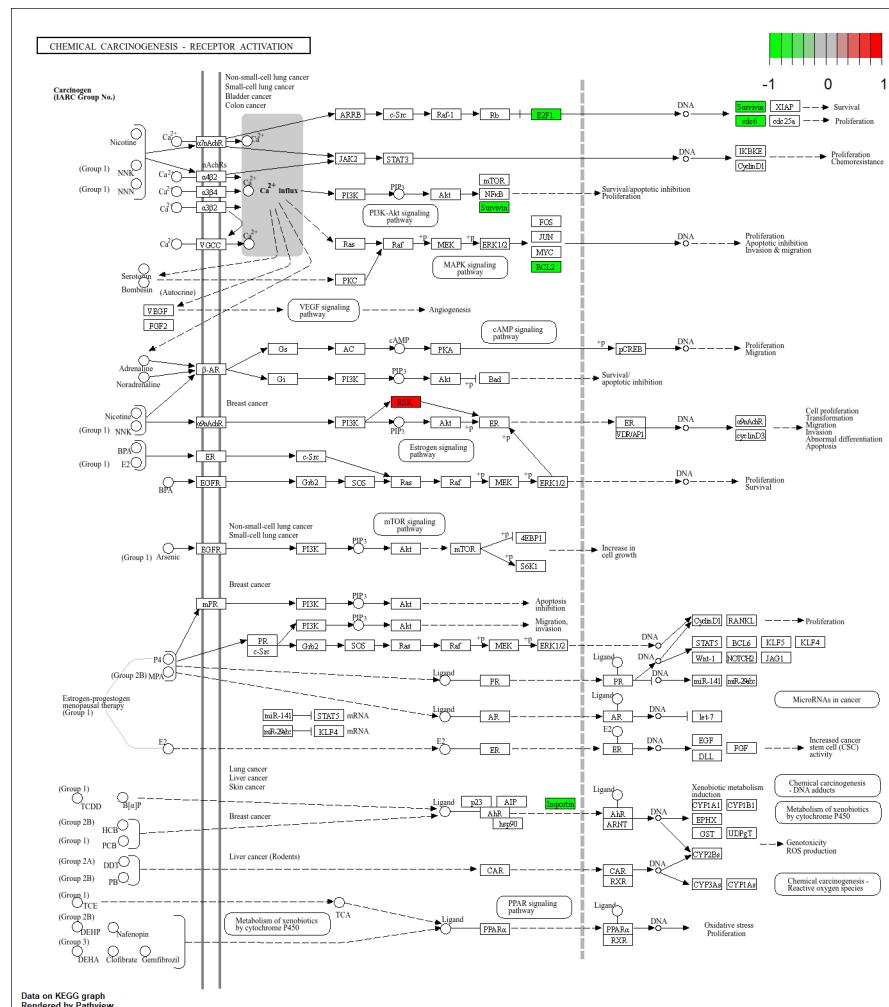
```
pathview(gene.data = logFC,
         pathway.id = "hsa05207",
         species = "hsa",
         #kegg.native = T
         ut.suffix = "Non-small cell lung cancer (      A549)")
```

'select()' returned 1:1 mapping between keys and columns

Info: Working in directory D:/Study/Summer School/Statistics/GenomicsUA/2024-daad-project

Info: Writing image file hsa05207.pathview.png

```
knitr::include_graphics("hsa05207.pathview.png")
```



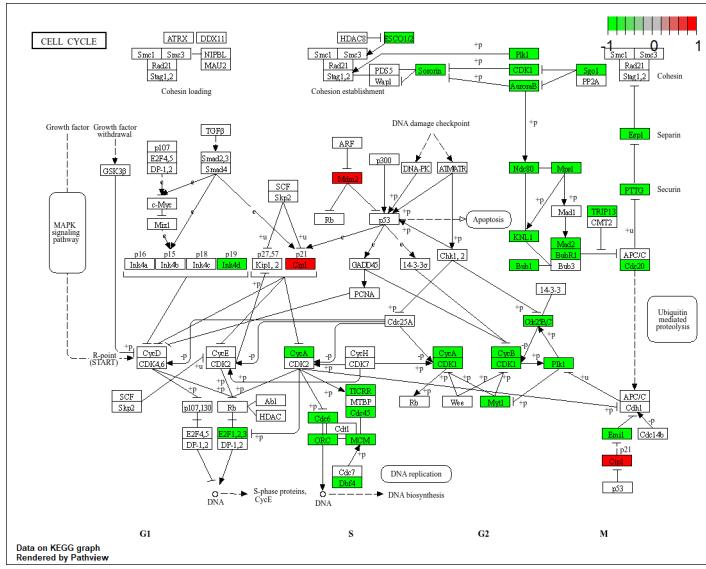
```
pathview(gene.data = logFC,
         pathway.id = "hsa04110",
         species = "hsa",
         #kegg.native = T
         ut.suffix = "Cell cycle")
```

```
## 'select()' returned 1:1 mapping between keys and columns

## Info: Working in directory D:/Study/Summer School/Statistics/GenomicsUA/2024-daad-project

## Info: Writing image file hsa04110.pathview.png

knitr:::include_graphics("hsa04110.pathview.png")
```



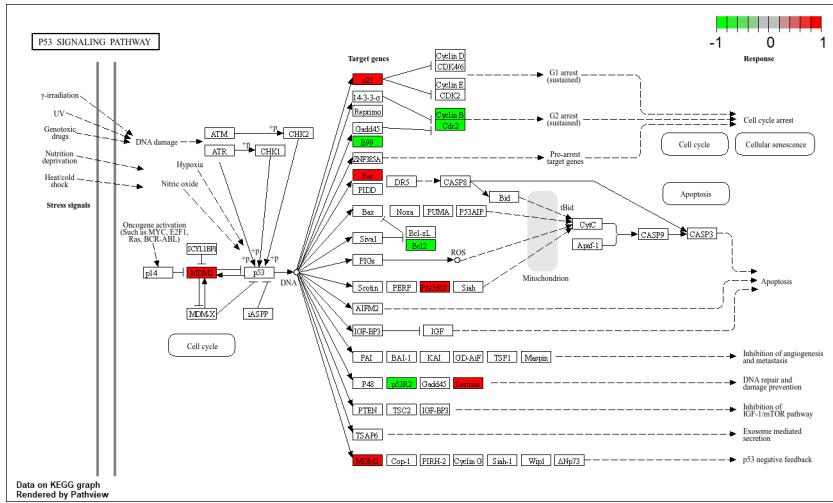
```
pathview(gene.data = logFC,
          pathway.id = "hsa04115",
          species = "hsa",
          #kegg.native = T
          ut.suffix = "p53 signaling pathway")
```

'select()' returned 1:1 mapping between keys and columns

Info: Working in directory D:/Study/Summer School/Statistics/GenomicsUA/2024-daad-project

Info: Writing image file hsa04115.pathview.png

```
knitr::include_graphics("hsa04115.pathview.png")
```



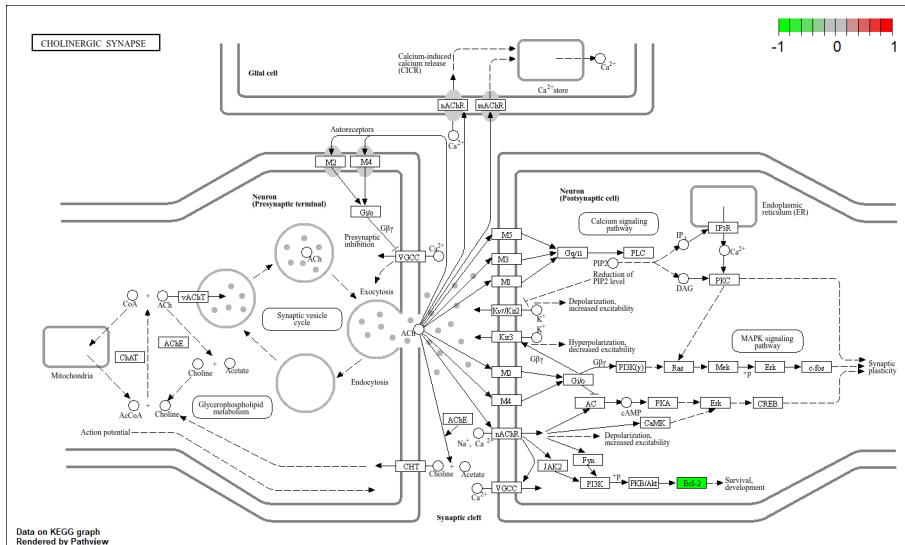
```
pathview(gene.data = logFC,  
         pathway.id = "hsa04725",  
         species = "hsa",  
         #kegg.native = T  
         ut.suffix = "NACHR")
```

```
## 'select()' returned 1:1 mapping between keys and columns
```

Info: Working in directory D:/Study/Summer School/Statistics/GenomicsUA/2024-daad-project

```
## Info: Writing image file hsa04725.pathview.png
```

```
knitr:::include_graphics("hsa04725.pathview.png")
```



```
pathview(gene.data = logFC,
          pathway.id = "hsa04210",
          species = "hsa",
          #kegg.native = T
          ut.suffix = "Apoptosis")
```

```
## 'select()' returned 1:1 mapping between keys and columns
```

```
## Info: Working in directory D:/Study/Summer School/Statistics/GenomicsUA/2024-daad-project
```

```
## Info: Writing image file hsa04210.pathview.png
```

```
knitr:::include_graphics("hsa04210.pathview.png")
```

