

# Hepatic gene expression\_including July 2018 samples

## Purpose:

To make a heatmap of the normalized counts for a list of liver-specific drug metabolism enzymes that have been used to assess HLC differentiation as well as liver health (PMID:21746904 and PMID: 23728495). This analysis includes the July 2018 samples.

Load required libraries

```
library(gage)
library(gageData)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(stringr)
library(ggplot2)
library(reshape2)
library(openxlsx)
library(DESeq2)

## Loading required package: S4Vectors
## Loading required package: stats4
## Loading required package: BiocGenerics
## Loading required package: parallel

##
## Attaching package: 'BiocGenerics'

## The following objects are masked from 'package:parallel':
##
##   clusterApply, clusterApplyLB, clusterCall, clusterEvalQ,
##   clusterExport, clusterMap, parApply, parCapply, parLapply,
##   parLapplyLB, parRapply, parSapply, parSapplyLB

## The following objects are masked from 'package:dplyr':
##
##   combine, intersect, setdiff, union

## The following objects are masked from 'package:stats':
##
##   IQR, mad, xtabs

## The following objects are masked from 'package:base':
##
##   anyDuplicated, append, as.data.frame, cbind, colnames,
```

```

##      do.call, duplicated, eval, evalq, Filter, Find, get, grep,
##      grepl, intersect, is.unsorted, lapply, lengths, Map, mapply,
##      match, mget, order, paste, pmax, pmax.int, pmin, pmin.int,
##      Position, rank, rbind, Reduce, rownames, sapply, setdiff,
##      sort, table, tapply, union, unique, unsplit, which, which.max,
##      which.min

##
## Attaching package: 'S4Vectors'

## The following objects are masked from 'package:dplyr':
##
##      first, rename

## The following objects are masked from 'package:base':
##
##      colMeans, colSums, expand.grid, rowMeans, rowSums

## Loading required package: IRanges

##
## Attaching package: 'IRanges'

## The following objects are masked from 'package:dplyr':
##
##      collapse, desc, slice

## Loading required package: GenomicRanges

## Loading required package: GenomeInfoDb

## Loading required package: SummarizedExperiment

## Loading required package: Biobase

## Welcome to Bioconductor
##
##      Vignettes contain introductory material; view with
##      'browseVignettes()'. To cite Bioconductor, see
##      'citation("Biobase)"', and for packages 'citation("pkgname)".

library(gplots)

##
## Attaching package: 'gplots'

## The following object is masked from 'package:IRanges':
##
##      space

## The following object is masked from 'package:S4Vectors':
##
##      space

## The following object is masked from 'package:stats':
##
##      lowess

library(dplyr)
library(tibble)
library(RColorBrewer)
library(stringr)

```

```
library(genefilter)
library(data.table)
```

```
##
## Attaching package: 'data.table'
## The following object is masked from 'package:SummarizedExperiment':
##
##     shift
## The following object is masked from 'package:GenomicRanges':
##
##     shift
## The following object is masked from 'package:IRanges':
##
##     shift
## The following objects are masked from 'package:S4Vectors':
##
##     first, second
## The following objects are masked from 'package:reshape2':
##
##     dcast, melt
## The following objects are masked from 'package:dplyr':
##
##     between, first, last
```

```
library(genefilter)
library(ggrepel)
library(tidyr)
```

```
##
## Attaching package: 'tidyr'
## The following object is masked from 'package:S4Vectors':
##
##     expand
## The following object is masked from 'package:reshape2':
##
##     smiths
```

```
library(gtools)
data("egSymb")
library(org.Hs.eg.db)
```

```
## Loading required package: AnnotationDbi
##
## Attaching package: 'AnnotationDbi'
## The following object is masked from 'package:dplyr':
##
##     select
##
```

```
library(AnnotationDbi)
```

Read in the appropriate count files

```
humanHBVcounts <- "All human HBV genes"
humanHBV_sampleCounts <- basename(Sys.glob(file.path(humanHBVcounts, "*.txt")))

##Function to read in the feature counts
exptcounts <- function(files) {
  d <- read.table(files)
  d
}

##Read in all of the count files
humanHBVcounts_readin <- lapply(file.path(humanHBVcounts, humanHBV_sampleCounts),
                                exptcounts)
names(humanHBVcounts_readin) <- sub('humanHBVgenes.txt', '', humanHBV_sampleCounts)
names(humanHBVcounts_readin)
```

```
## [1] "BD330 HBV_HDV Day 28 sample 1" "BD330 HBV_HDV Day 28 sample 2"
## [3] "BD330 HBV_HDV Day 28 sample 3" "BD330 HBV_HDV Day 8 sample 1"
## [5] "BD330 HBV_HDV Day 8 sample 2" "BD330 HBV_HDV Day 8 sample 3"
## [7] "BD330_Ctrl_D28" "BD330_Ctrl_D8"
## [9] "BD330_HBV_D28" "BD330_HBV_D8"
## [11] "BD330_HBV_HDV_D28_b" "BD330_HBV_HDV_D28"
## [13] "BD330_HBV_HDV_D8_a" "BD330_HBV_HDV_D8"
## [15] "BD405A HBV_HDV D28 sample 1" "BD405A HBV_HDV D28 sample 2"
## [17] "BD405A HBV_HDV D28 sample 3" "BD405A HBV_HDV D8 sample 1"
## [19] "BD405A HBV_HDV D8 sample 2" "BD405A HBV_HDV D8 sample 3"
## [21] "BD405A_Ctrl_D28" "BD405A_Ctrl_D8"
## [23] "BD405A_HBV_D28" "BD405A_HBV_D8"
## [25] "BD405A_HBV_HDV_D28" "BD405A_HBV_HDV_D8"
## [27] "Ctrl_D28_sample_1" "Ctrl_D28_sample_2"
## [29] "Ctrl_D28_sample_3" "Ctrl_D8_sample_1"
## [31] "Ctrl_D8_sample_2" "Ctrl_D8_sample_3"
## [33] "HBV_D28_sample_1" "HBV_D28_sample_2"
## [35] "HBV_D28_sample_3" "HBV_D8_sample_1"
## [37] "HBV_D8_sample_2" "HBV_D8_sample_3"
## [39] "HU1016 Ctrl D28" "HU1016 Ctrl D8"
## [41] "HU1016_BD_co_D28" "HU1016_BD_co_D8"
## [43] "HU1016_B_D28" "HU1016_B_D8"
```

```
##Function to perform regularized log transformation on all counts for each sample.
rld_generation <- function(sampledirectory, sampleset) {
  a <- basename(Sys.glob(file.path(sampledirectory, "*.txt")))
  sampleTable <- data.frame(sampleName = names(humanHBVcounts_readin), sampleFile = a,
    treatment = ifelse(grepl("Ctrl", a), "mock", ifelse(grepl("*co|HDV", a), "coinf", "HBV")),
    donor = ifelse(grepl("BD330*", a), "HU1019",
      ifelse(grepl("BD405*", a), "HU1020",
        ifelse(grepl("HU1016*", a), "HU1016", "HU1007"))),
    time = ifelse(grepl("D8|Day 8", a), "d8", "d28"),
    replicate = ifelse(grepl("*sample_1h|D8_ah|D8_aa|D8_am|sample_1m", a), "a",
      ifelse(grepl("*sample_2h|D28_bh|D28_ba|D28_bm|sample_2m", a), "b",
        ifelse(grepl("*sample_3h| * sample 1h|* sample 1m", a), "c",
          ifelse(grepl("* sample 2h|* sample 2m", a), "d",
```

```

        ifelse(grepl("* sample 3h|* sample 3m", a), "e", ""))))))
sampleTable$sampleName <- with(sampleTable, paste(donor, treatment, time, replicate))
dds <- DESeqDataSetFromHTSeqCount(sampleTable = sampleTable, directory = sampledirectory,
  design = ~ donor + treatment)
dds@colData
rld <- rlog(dds, blind = TRUE)
}

```

```

##Execute function on the human and HBV gene counts.
rld_humanHBV <- rld_generation(humanHBVcounts, humanHBVcounts_readin)

##Pulling just the normalized gene counts out and making into a data frame.
mat_humanHBV <- assay(rld_humanHBV)
humanHBV_df <- as.data.frame(mat_humanHBV) %>%
  rownames_to_column(var = "ENSEMBL")

```

Now to limit our gene counts down to the ones of interest from the hepatic gene list first mentioned in PMID: 23728495.

```

##Read in the downloaded table of genes from PMID: 23728495.
hepatic_genes <- read.delim("Hepatic gene subset.csv", header = FALSE, sep = ",")
hepatic_genes <- hepatic_genes$V1 %>%
  droplevels() %>%
  as.character

##Since the genes in the table above are only given by gene SYMBOL, convert first to
##ENTREZ IDs
##and then ENSEMBL to compare with the normalized counts of our data set.
##Note that skipping the ENTREZ ID conversion first and going straight to ENSEMBL
##resulted in double mapping of some ALIASes to the same ENSEMBL ID.
hepatic_eg <- sym2eg(hepatic_genes)

hepatic_ENSEMBL <- as.data.frame(mapIds(org.Hs.eg.db, keys = hepatic_eg, column =
  "ENSEMBL", keytype = "ENTREZID", multiVals = "first"))

```

```

## 'select()' returned 1:many mapping between keys and columns
colnames(hepatic_ENSEMBL) <- c("ENSEMBL")
hepatic_ENSEMBL <- rownames_to_column(hepatic_ENSEMBL, var = "ENTREZID") %>%
  cbind(hepatic_genes) %>%
  dplyr::select(ENSEMBL, hepatic_genes)

##Now find the hepatic genes in our data set and generate a matrix.
all_IDed <- left_join(hepatic_ENSEMBL, humanHBV_df, by = "ENSEMBL") %>%
  na.omit()

```

```

## Warning: Column `ENSEMBL` joining factor and character vector, coercing
## into character vector

```

```

IDed_m <- as.matrix(all_IDed[,c(3:46)])
rownames(IDed_m) <- all_IDed[,2]

##Making file of the above matrix
write.table(IDed_m, file=paste(Sys.Date(), "hepatic gene heatmap_results.txt"),
  quote=FALSE, sep="\t", row.names=TRUE, col.names=NA)

```

```
##In the above matrix, you only get 86 of the original 87 inputs because "Stable ##ID
##ENSG00000277656 not present in GRCh37" according to ENSEMBL which is GSTT1, ENTREZ ID
##2952.
```

```
##Also note that in the original file, SULT1A3/4 is listed - here I broke it up
##into SULT1A3 and SULT1A4; constitutive androstane receptor (CAR in the original
##document) goes by the gene symbol NR1I3 which was used here; LTB4DH goes by PTGR1;
##PXR now goes by NR1I2.
```

Now making a heat map of the normalized counts of these hepatic genes for each of our samples.

```
##Setting up color scheme.
##The rld function is log2-like, so log2 values of zero do not come up as -Inf but rather
##as zero. Counts that are less than 1 (i.e. a decimal number) come up as negative. Thus,
##my color scale is a light purple-grey for negative values, white for 0, and then shades
##of purple in increasing intensity.
```

```
my_breaks = c(seq(-2.5, -0.1, length=100), seq(-0.09, 0.1, length=10), seq(0.11, 18,
                                                                    length=100))
palette <- colorRampPalette(c('#d8daeb', 'white', '#542788'))(n=209)
```

```
##Reorganizing the row order of samples to what we want for visualization.
sampleTable <- data.frame(sampleName = colnames(IDed_m), treatment = ifelse(grepl("mock",
colnames(IDed_m)), "mock", ifelse(grepl("coinf", colnames(IDed_m)), "coinf", "HBV")),
donor = ifelse(grepl("HU1019", colnames(IDed_m)), "HU1019", ifelse(grepl("HU1007",
colnames(IDed_m)), "HU1007", ifelse(grepl("HU1016", colnames(IDed_m)), "HU1016",
"HU1020"))), time = ifelse(grepl("d8", colnames(IDed_m)), "d8", "d28"))
sampleTable <- with(sampleTable, sampleTable[order(time, treatment),])
col.order <- as.character(rev(sampleTable$sampleName))
mat_hep_subset <- IDed_m[, col.order]
```

```
##Now plotting the heatmap
png(file = file.path(paste(Sys.Date(), "hepatic_genes_heatmap.png")), units = 'in',
    height = 15, width = 30, res = 300)
distance_heatmap <- heatmap.2(t(mat_hep_subset), trace="none", keysize = 0.7,
    symm=F, symkey=F, symbreaks=F, col = palette, breaks = my_breaks, dendrogram =
    "column", sepwidth=c(0.05,0.05), sepcolor = "grey",
    colsep=1:nrow(mat_hep_subset),
##rowsep and colsep have to be set to ncol and nrow, respectively, since you have flipped
##your heatmap
    rowsep=1:ncol(mat_hep_subset), density.info = "none", margin = c(18, 18), Rowv =
    FALSE, srtCol = 90, cexRow = 1, cexCol = 2, scale = "none")
print(distance_heatmap)
```

```
## $rowInd
## [1] 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22
## [24] 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
##
## $colInd
## [1] 16 13 17 37 61 81 7 38 83 59 58 80 21 6 85 33 32 3 22 44 1 60 54
## [24] 78 71 73 40 31 28 79 24 36 10 75 53 19 42 52 27 9 63 26 77 4 43 66
## [47] 84 39 50 47 35 65 72 48 18 46 15 23 70 25 86 30 74 68 55 64 8 67 69
## [70] 62 82 49 29 41 76 20 57 11 34 14 5 12 51 45 2 56
##
## $call
## heatmap.2(x = t(mat_hep_subset), Rowv = FALSE, dendrogram = "column",
```

```

##      symm = F, scale = "none", breaks = my_breaks, symbreaks = F,
##      col = palette, colsep = 1:nrow(mat_hep_subset), rowsep = 1:ncol(mat_hep_subset),
##      sepcolor = "grey", sepwidth = c(0.05, 0.05), trace = "none",
##      margins = c(18, 18), cexRow = 1, cexCol = 2, srtCol = 90,
##      keysize = 0.7, density.info = "none", symkey = F)
##
## $carpet
##      HU1019 coinf d28 c HU1019 coinf d28 d HU1019 coinf d28 e
## ALB      17.8834033      16.9594445      17.0153109
## ACTB      12.2873767      12.1133769      12.4360916
## ALDH1A1    13.1197570      14.0480120      14.0240669
## CYP3A4      8.8602742      12.0400045      11.8678214
## MGST1     11.6017136      11.7585741      11.8179374
## TFRC      11.0757077      11.0826764      11.0183624
## ABCC3     11.1253051      11.0593623      11.2056737
## CYP3A5     10.6467229      11.4064922      11.2510862
## UGT1A1     10.7945552      11.1005713      10.8188637
## MAOA      10.4217291      10.3432921      10.3486349
## PTGR1     10.4794836      10.7309690      10.8699908
## SULT2A1    10.2769134      10.5907086      10.6360887
## CES1      10.0072674       9.5959227      9.6743432
## ABCC2     10.4058917      10.6619360      10.7475527
## UGT1A6      8.8962496      10.4897720      10.5416868
## CYP2C9      8.6021476       9.8944254      9.6912809
## CYP2C8      9.7831143       9.6943613      9.6614336
## ABCB1      9.8881925       9.4676436      9.7162262
## CES2       8.5021603       9.0004408      9.0724083
## EPHX1      8.8662985       9.1199398      9.3175064
## ABCA2      9.2526803       8.8002623      9.2092663
## MAOB       9.1529787       9.2881975      9.0113068
## HNF4A      8.4334402       9.5578072      9.2276227
## SULT1A3    -2.0699203      -2.0688754      -2.0691781
## SLC10A2    -2.0197136      -2.0181015      -1.9455286
## SLC01A2    -2.2573769      -2.2562321      -2.2565637
## CYP7A1     -0.8795553      -0.8746029      -0.8760374
## CYP2C19    -0.7694659      -0.7639003      -0.7655125
## CYP2A13    -0.9109016      -0.9045954      -0.9064221
## SULT1A4     0.0000000       0.0000000      0.0000000
## CYP11B2     0.0000000       0.0000000      0.0000000
## CYP2F1      0.0000000       0.0000000      0.0000000
## ABCG4      0.5774616       2.1156606      1.1996997
## SLC01B3     2.6979546       2.8261481      3.0181648
## GSTP1      3.9636152       4.7566374      5.5203281
## NR1I3      2.9595290       2.9858545      3.9624750
## DHRS2      3.0062210       3.6655357      4.3039943
## GSTM2      4.7169943       4.6590266      5.1429676
## CYP1B1      5.5590753       4.4783574      4.0146895
## ABCG2      4.7683943       5.1679433      4.0997803
## NAT1       4.3748927       4.2518722      5.0904269
## CYP1A2      5.1640390       6.8094120      6.6426368
## SULT1A2     3.4739666       4.3568797      4.8928916
## ABCB11     4.4935430       3.5890206      5.0581069
## DHRS4      4.8285071       3.4801576      4.1852121
## NQO1       4.3787429       5.8061078      5.8153885

```

## UGT1A3	5.5839405	4.7320864	5.5645520
## CYP3A7	5.4061869	5.6700940	6.0071279
## GSTA4	5.3466334	3.7919609	5.0727519
## FMO4	5.9127869	5.0527896	6.0859519
## CYP2E1	10.0232669	6.4642642	6.5217585
## NNMT	10.1945554	8.3457946	8.6143566
## SLC22A1	7.3753080	7.3439949	7.6545431
## NR1H4	9.4993641	9.0957839	9.1436259
## ALDH2	8.7888838	8.3443125	8.0879345
## FMO3	9.5544580	8.5474585	8.6741667
## AKR1A1	7.6778848	8.0600843	8.3804618
## COMT	8.3175836	8.1791276	8.0352809
## RXRA	8.9779445	8.5911764	9.0165574
## CYP1A1	8.9284096	7.7695991	8.0830869
## UGT1A9	5.6208257	6.9108390	7.3964169
## CYP2B6	4.5899488	5.6573692	6.7669803
## SLC01B1	5.4125429	5.7183956	6.6565265
## NR1I2	4.9865868	6.9281520	6.2035666
## HNF4G	5.9463267	6.2509614	6.4784739
## NAT2	6.1222214	6.8753975	6.8371742
## ABCC4	6.3888810	5.6490907	6.1302422
## NQO2	5.4191016	4.5487322	5.9966567
## RARA	7.0085908	5.9693241	6.3957942
## MGST2	6.8776798	6.2681541	6.3989634
## TPMT	7.3011342	7.0609943	7.1619788
## GSTA1	5.1648493	8.5239437	8.6020664
## CYP2A6	5.5869375	7.9145210	8.4762494
## DCXR	5.5588566	6.1036766	6.6999511
## SULT1A1	4.8922343	6.5582062	5.9948065
## CBR1	6.6930507	6.8572336	7.1371804
## HSD11B1	7.2682072	7.0308458	6.4080617
## ABCG5	6.7730490	6.3018899	6.3222346
## CYP2D6	6.0992823	5.8954968	7.0884403
## AHR	8.5975442	8.3031021	8.2768176
## ABCC1	7.6189968	7.3413012	7.9151078
## ABCG8	6.8361366	7.3660083	7.9769189
## GSTM1	7.9819298	9.1144006	9.4167900
## EPHX2	8.2934865	7.9015616	7.8884644
## ABCA6	8.5827551	7.2331765	7.3867296
## HNMT	8.4619494	8.0791654	7.9618122
##	HU1019 coinf d28 b	HU1019 coinf d28	HU1020 coinf d28 c
## ALB	16.9390357	17.6222696	16.8407919
## ACTB	13.1004916	13.1635992	12.0495952
## ALDH1A1	14.0027798	12.8575597	13.3017159
## CYP3A4	11.0808592	8.0745297	10.4101509
## MGST1	12.2648552	11.9726184	11.6174039
## TFRC	10.6534863	10.7442447	11.1137010
## ABCC3	11.7050830	11.6532655	11.5765803
## CYP3A5	11.2622142	10.2563238	10.4021952
## UGT1A1	10.9129572	10.4962688	10.2750174
## MAOA	10.3632098	9.9681658	10.4870398
## PTGR1	10.9046786	11.1271038	10.1331443
## SULT2A1	10.7947154	10.6420270	10.5912764
## CES1	10.1522751	10.3142190	10.1413545



## ABCC2	10.5016677	10.0089338	11.1350855
## UGT1A6	10.0025934	8.0862265	10.0692008
## CYP2C9	9.4066561	8.6366474	9.8660611
## CYP2C8	9.9282274	9.7326106	10.0747172
## ABCB1	9.0134794	9.0641626	9.7125027
## CES2	10.0965826	9.1986521	9.0447965
## EPHX1	9.7341227	9.9335278	9.6105603
## ABCA2	9.8137933	9.7234366	9.7570217
## MAOB	9.1105765	8.9732254	9.3099296
## HNF4A	9.8490586	8.8970060	9.6359591
## SULT1A3	-2.0399914	-2.0680033	-2.0693836
## SLC10A2	-2.0222288	-2.0167559	-2.0188855
## SLC01A2	-2.2591630	-2.2552766	-2.2567889
## CYP7A1	-0.8124902	-0.8704694	-0.8770116
## CYP2C19	-0.7781495	-0.7592549	-0.7666072
## CYP2A13	-0.9207405	-0.8993319	-0.9076625
## SULT1A4	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000
## ABCG4	1.0030783	0.5849458	0.5794563
## SLC01B3	2.3054738	2.3273203	3.2058069
## GSTP1	4.9134242	5.6369092	3.0988141
## NR1I3	4.6599963	3.1930364	4.5583566
## DHRS2	4.5285365	3.5031838	4.2363671
## GSTM2	4.6887981	4.0707637	5.3621491
## CYP1B1	4.2956136	4.4274516	5.5201155
## ABCG2	4.4198880	3.9068811	3.3128425
## NAT1	4.6930239	5.1048096	4.6352045
## CYP1A2	5.6361367	4.4708195	5.9903552
## SULT1A2	6.2762825	4.6587922	4.5358158
## ABCB11	4.6410570	4.7320200	5.0372580
## DHRS4	4.8588476	4.6471152	4.0815850
## NQO1	5.0237672	4.2466041	4.7519837
## UGT1A3	5.1427843	5.5486342	4.9030488
## CYP3A7	5.6678551	5.1895558	4.6634852
## GSTA4	5.5021789	5.5819061	5.3687701
## FMO4	5.3981748	5.7452990	6.5349234
## CYP2E1	7.1217507	11.1396222	7.6571731
## NNMT	8.8266416	10.4166953	9.6769272
## SLC22A1	9.1450405	8.1187409	7.9635673
## NR1H4	9.0035348	9.1459830	8.9593454
## ALDH2	8.4005549	9.0758924	8.8413108
## FMO3	8.8235753	9.2267364	9.5306849
## AKR1A1	9.4042050	8.9414516	8.1915608
## COMT	9.3400188	9.8834835	9.1045800
## RXRA	9.6198467	9.8828696	9.3482588
## CYP1A1	7.0632833	9.4485258	6.2995424
## UGT1A9	7.1696700	5.6217348	6.8619553
## CYP2B6	7.1264255	4.8505017	6.6258184
## SLC01B1	6.8987350	5.5498744	7.1792678
## NR1I2	7.0001587	5.0972967	6.6722896
## HNF4G	5.9998871	5.6533964	6.4863274
## NAT2	6.7210662	6.3931956	6.2301777
## ABCC4	5.2962936	5.7814445	5.8951269

##	NQ02	6.9562091	6.6326777	6.5408862
##	RARA	6.4491130	6.5353342	6.5038868
##	MGST2	7.2587328	6.7050284	6.4177293
##	TPMT	7.2412356	6.6836886	7.0621018
##	GSTA1	8.8477346	6.0871471	7.2173797
##	CYP2A6	9.1423939	6.6655867	8.5618231
##	DCXR	9.2247473	8.4437821	6.6288171
##	SULT1A1	8.4818763	7.4429631	6.1118301
##	CBR1	8.0837043	7.1372040	6.8828289
##	HSD11B1	7.3312321	6.2297199	6.5860480
##	ABCG5	7.3967282	6.5641152	7.5059279
##	CYP2D6	8.0451526	7.6682506	7.3528418
##	AHR	6.9442787	7.1554586	7.9888828
##	ABCC1	7.4809613	7.8544029	7.1588218
##	ABCG8	8.0003467	7.1910080	8.1199846
##	GSTM1	9.5665386	7.9658993	7.7803589
##	EPHX2	8.2242011	8.6670457	8.4676619
##	ABCA6	7.3966261	7.4574789	8.4190920
##	HNMT	7.7637851	8.2399831	8.1714231
##	HU1020	coinf d28 d	HU1020	coinf d28 e HU1020
##	ALB	17.2549703	16.8423075	16.6829778
##	ACTB	12.1674011	11.9059045	12.4556300
##	ALDH1A1	14.1336500	13.0866046	12.8907850
##	CYP3A4	11.9928193	8.8887763	8.4509524
##	MGST1	11.5465465	11.7696792	11.9773560
##	TFRC	11.0198486	11.1873551	11.0390250
##	ABCC3	11.4446150	11.5759683	11.9809695
##	CYP3A5	11.0033185	10.2619575	9.9605971
##	UGT1A1	10.7062884	10.0052637	9.8267878
##	MAOA	10.4616237	10.6109812	10.3558233
##	PTGR1	10.4779899	10.1771203	10.8166652
##	SULT2A1	10.7118979	10.7041098	11.1677111
##	CES1	10.3219230	10.0494688	10.6502753
##	ABCC2	10.9432718	10.9701386	10.7226260
##	UGT1A6	11.0395903	9.0963918	8.9978464
##	CYP2C9	10.0311311	9.4888199	9.4317641
##	CYP2C8	9.8690424	9.9289433	9.8372826
##	ABCB1	10.1218163	9.4308439	9.0199629
##	CES2	9.0805695	8.9399536	9.8716604
##	EPHX1	9.3149619	9.4685344	10.2299375
##	ABCA2	9.6702808	9.5314841	10.1531475
##	MAOB	9.3006307	8.9597171	9.3059534
##	HNF4A	9.7657664	9.7966230	9.9750759
##	SULT1A3	-2.0705188	-2.0686797	-2.0673327
##	SLC10A2	-2.0206372	-2.0177995	-2.0157212
##	SLC01A2	-2.2580328	-2.2560177	-2.2545418
##	CYP7A1	-0.8823925	-0.8736753	-0.8672909
##	CYP2C19	-0.7726545	-0.7628579	-0.7556828
##	CYP2A13	-0.9145144	-0.9034143	-0.8000476
##	SULT1A4	0.0000000	0.0000000	0.0000000
##	CYP11B2	0.0000000	0.0000000	0.0000000
##	CYP2F1	0.0000000	0.0000000	0.0000000
##	ABCG4	0.5753288	1.2255351	0.5877978
##	SLC01B3	3.1376677	2.4443524	2.9866380

## GSTP1	3.0394335	3.9625731	4.7316448
## NR1I3	3.2324737	4.6672481	4.6812282
## DHRS2	3.9816306	3.3427683	4.2440119
## GSTM2	4.9970249	5.0510682	5.3492120
## CYP1B1	4.7483554	6.4221888	5.4863751
## ABCG2	4.5538611	4.3501241	4.5284419
## NAT1	3.8999346	4.8380209	4.4436258
## CYP1A2	5.9612798	5.2977706	5.3449445
## SULT1A2	4.6651835	3.9704611	4.1813458
## ABCB11	5.0061130	6.2400055	6.0877163
## DHRS4	3.9138931	3.6512358	4.9891839
## NQO1	4.4728194	5.6301808	5.2538664
## UGT1A3	5.0097311	4.9187940	4.7342042
## CYP3A7	4.2709410	4.9687311	4.1913914
## GSTA4	5.8275816	5.2934660	5.3896087
## FMO4	5.1448243	5.7659028	5.7494419
## CYP2E1	5.7735178	7.5788977	8.6987571
## NNMT	7.2409546	10.1416772	10.1156057
## SLC22A1	8.1683779	7.8069669	9.1102962
## NR1H4	9.1264789	8.9896021	8.4908517
## ALDH2	8.4599812	8.6047724	8.8416585
## FMO3	9.2482780	9.7472761	9.4571175
## AKR1A1	8.5351849	7.9072363	9.3031953
## COMT	8.0952949	8.8442988	10.0219045
## RXRA	8.1137893	9.2653991	10.1472389
## CYP1A1	7.0838981	6.6169194	6.6516180
## UGT1A9	6.3275376	5.6054553	6.3015823
## CYP2B6	7.1079975	6.3243469	6.6747181
## SLC01B1	6.3517016	6.1570881	6.1769245
## NR1I2	6.1920012	6.8751874	7.1164244
## HNF4G	6.4692504	6.8215497	5.5925739
## NAT2	7.2825149	6.4003000	6.0556281
## ABCC4	6.8956920	5.5015255	5.5430206
## NQO2	6.8477131	6.1995223	7.1926923
## RARA	5.9221135	6.5011386	7.2894158
## MGST2	6.4562955	5.8166611	6.3661373
## TPMT	6.5353451	6.7208019	7.0126929
## GSTA1	8.6414713	6.0451573	6.6638348
## CYP2A6	8.8145240	8.5272020	9.1646459
## DCXR	7.1850497	6.7127744	8.4274357
## SULT1A1	5.8470700	5.5878945	7.2290891
## CBR1	6.6754491	6.3771719	7.1210283
## HSD11B1	7.1034606	6.8449429	6.7949631
## ABCG5	7.2523330	7.8251899	8.2252078
## CYP2D6	6.9040979	7.7472935	8.5884359
## AHR	8.6193068	8.1233285	6.7732856
## ABCC1	7.5149400	7.2611197	7.6372362
## ABCG8	8.1658423	7.7542453	8.1524688
## GSTM1	8.6683031	6.9937590	7.5383042
## EPHX2	8.2295151	8.8463416	9.0469803
## ABCA6	8.1605030	8.5408905	7.7333232
## HNMT	8.3567039	7.3465689	7.1510765
##	HU1016 coinf d28	HU1019 HBV d28	HU1020 HBV d28
## ALB	16.8760585	16.5365910	16.9143787
			15.9912244

## ACTB	13.3069131	13.0582233	12.8034643	13.3244468
## ALDH1A1	13.3478139	11.5926014	14.3176361	13.3189269
## CYP3A4	11.0768195	6.9507177	11.5266264	11.4159615
## MGST1	11.7435545	11.6882968	12.1946751	11.3058809
## TFRC	10.8282894	10.8191866	10.5877596	10.8540338
## ABCC3	11.8074130	11.4751352	11.6152101	11.0121246
## CYP3A5	10.0841566	8.9686387	10.4905928	8.5907379
## UGT1A1	9.0526653	8.7835847	10.5705526	9.7978842
## MAOA	9.8092616	10.1277917	10.4839321	9.4536747
## PTGR1	10.0291365	10.2010088	11.0972544	9.8136131
## SULT2A1	9.4724789	9.8486566	11.0563051	9.3215835
## CES1	10.0299755	10.1952419	10.8003353	10.0278827
## ABCC2	10.3858699	10.0122465	10.7183649	9.8906574
## UGT1A6	10.1970447	6.7657728	10.7028042	9.7579877
## CYP2C9	9.1771699	8.3660382	9.4230761	8.3603625
## CYP2C8	9.2848029	8.2308461	9.8807451	8.3021208
## ABCB1	10.2088706	8.5358862	9.7814924	10.0395428
## CES2	10.0022812	9.2773067	10.0228463	9.6431077
## EPHX1	9.9932352	8.9983472	10.3060290	9.1140976
## ABCA2	10.3269350	9.6729043	9.9552385	9.9456591
## MAOB	9.5261177	9.4195225	9.4693538	9.4634461
## HNF4A	9.5273200	9.3221749	9.7965368	9.0157201
## SULT1A3	-2.0712283	-2.0623909	-2.0660810	-2.0776946
## SLC10A2	-2.0217317	-2.0324430	-2.0137898	-2.0317087
## SLC01A2	-2.2588100	-2.2664164	-2.2531703	-2.2658950
## CYP7A1	-0.8857550	-0.8552234	-0.8613577	-0.8969872
## CYP2C19	-0.7764333	-0.7866345	-0.7490150	-0.7864844
## CYP2A13	-0.9187960	-0.9351031	-0.8877295	-0.9348893
## SULT1A4	0.0000000	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000	0.0000000
## ABCG4	0.5729261	0.5558986	0.8040146	0.9000016
## SLC01B3	2.7837526	2.2805022	2.3422301	2.2817639
## GSTP1	5.8791453	5.9436493	3.9034492	5.5684218
## NR1I3	3.8044631	3.6894028	4.6101970	2.8078766
## DHRS2	4.3295338	3.7293079	4.2107877	3.5265330
## GSTM2	5.1950757	4.7232727	5.0330680	3.3133212
## CYP1B1	3.4704235	5.1427008	4.2550954	3.9229962
## ABCG2	4.4902326	3.8372598	4.4982217	4.8295314
## NAT1	4.4314270	4.4171957	4.8795011	5.0133113
## CYP1A2	6.0801226	3.8430306	6.7174232	6.3612059
## SULT1A2	5.6329973	4.8414389	5.8611711	4.6165110
## ABCB11	4.5083291	4.3880296	5.1118965	4.9413881
## DHRS4	4.7830937	5.0842135	5.3022426	5.4813355
## NQO1	4.6426374	5.7299222	4.4935036	5.9015674
## UGT1A3	5.2341436	5.2013354	5.2767981	5.3475012
## CYP3A7	6.2122155	4.4940327	4.1332193	4.1744724
## GSTA4	5.7472570	5.4676997	5.7212830	4.8624450
## FMO4	5.6969644	6.0250580	5.1147634	4.8998408
## CYP2E1	6.6872634	10.2839558	7.8307533	6.3643596
## NNMT	7.9668946	11.1142772	8.0710952	8.1985834
## SLC22A1	9.1691701	8.2019148	9.3276413	7.7696938
## NR1H4	8.1527667	8.5752841	8.6801789	7.8970824
## ALDH2	8.8180809	9.3729410	8.7442148	8.3261195

## FM03	8.7536606	8.8877940	8.8771709	8.2130988
## AKR1A1	9.2050327	8.9715267	9.4390890	8.7632576
## COMT	9.4362915	10.0554839	9.2654476	8.9688114
## RXRA	9.1808084	9.8707702	9.2412428	8.9388268
## CYP1A1	5.4252813	5.1830270	7.1645928	8.0387343
## UGT1A9	7.6869842	4.6132303	6.5497531	8.6558445
## CYP2B6	5.8933874	5.6442170	7.4175377	6.7468135
## SLC01B1	6.9049640	5.3473096	7.5291564	7.0012265
## NR1I2	6.5898936	5.6586656	7.3328880	5.5649020
## HNF4G	6.3098846	5.6330546	6.0558425	5.8518690
## NAT2	6.3983905	5.8018201	6.2974931	5.9826868
## ABCC4	6.5552282	6.3248442	5.9532371	6.9463086
## NQO2	6.8172316	6.8627553	7.2418190	5.4656097
## RARA	7.2401987	7.1900540	6.6915488	7.4889501
## MGST2	6.7276598	6.5461386	6.4225988	6.6044992
## TPMT	6.6424996	6.8482612	6.9615107	6.5963244
## GSTA1	7.3545304	4.4160286	9.2307944	7.0163932
## CYP2A6	8.6178071	5.0472804	9.5230416	6.8245741
## DCXR	8.7038866	8.0356787	9.0964991	7.3539849
## SULT1A1	8.5463903	7.5961679	8.4056921	7.8425911
## CBR1	7.7721271	7.3823032	7.9917554	7.3738751
## HSD11B1	6.9432683	7.1275080	6.0384327	6.7731480
## ABCG5	7.1206062	7.4033107	7.5843060	5.9862365
## CYP2D6	6.7001288	7.6476600	8.0044462	5.9343983
## AHR	6.7826705	6.6109353	7.4341605	7.0476166
## ABCC1	7.9971484	7.7085729	7.8016190	8.1966336
## ABCG8	7.4478246	7.6577556	7.8626418	6.5066975
## GSTM1	7.2684623	8.2008155	8.5825594	6.3788916
## EPHX2	7.9206211	8.5489904	8.6521912	7.1084749
## ABCA6	7.3508549	7.4096154	7.3840507	7.4708737
## HNMT	8.1029530	8.0744925	7.8925532	7.9423238
##	HU1007 HBV d28 b	HU1007 HBV d28 c	HU1016 HBV d28	HU1019 mock d28
## ALB	16.1053785	15.9176517	16.78362252	16.9872098
## ACTB	13.1741713	13.8228043	13.19286022	12.7253508
## ALDH1A1	12.7686355	12.5410021	12.82310367	12.9233328
## CYP3A4	11.1918577	10.9535538	11.36738950	8.6225481
## MGST1	11.4534129	11.5351566	11.54249065	11.8346399
## TFRC	11.0117602	10.7542255	10.60865358	10.9302559
## ABCC3	11.2769607	11.1318839	12.10705523	12.0501803
## CYP3A5	8.5513743	8.7338664	10.56646542	10.5511785
## UGT1A1	9.7025672	9.5775516	8.82903281	10.0557804
## MAOA	9.2106377	9.1276661	9.85517478	10.1119938
## PTGR1	9.4275929	9.5827202	9.80183871	10.8211940
## SULT2A1	9.7858098	9.7358468	10.04082452	10.7053111
## CES1	9.9893852	9.8616021	10.00677870	9.9573356
## ABCC2	10.0276488	9.8059726	10.59457277	10.5866782
## UGT1A6	9.1387378	8.8671203	9.41228371	8.8954108
## CYP2C9	8.2045653	8.3225952	9.99526724	9.3739359
## CYP2C8	8.3231113	8.1320830	9.51792809	10.5980129
## ABCB1	9.6089779	9.2109548	9.81735231	8.7468166
## CES2	9.5194010	9.6260398	9.62119190	9.8863442
## EPHX1	9.1664713	9.3832796	9.95252198	10.0370012
## ABCA2	9.8940450	9.5824447	10.36240568	9.9703555
## MAOB	9.4399806	9.2168018	9.51713537	9.3304050

## HNF4A	9.1324003	9.1118992	9.89530544	9.9661392
## SULT1A3	-2.0798630	-2.0780042	-2.06955839	-2.0734922
## SLC10A2	-2.0345797	-2.0321865	-2.01915526	-2.0252249
## SLC01A2	-2.2682847	-2.2662342	-2.25698042	-2.2612906
## CYP7A1	-0.8975034	-0.8970685	-0.87784012	-0.8955582
## CYP2C19	-0.7871104	-0.7865830	-0.76753838	-0.3148729
## CYP2A13	-0.9357833	-0.9350296	-0.04643432	-0.9324541
## SULT1A4	0.0000000	0.0000000	0.00000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.00000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.00000000	0.0000000
## ABCG4	0.5532220	0.8894560	0.57879800	1.0672618
## SLC01B3	3.0198403	2.2809353	2.42827233	2.2962853
## GSTP1	6.4263720	7.8368944	5.47339767	4.8872155
## NR1I3	3.2998352	3.3126152	4.57880687	4.8456410
## DHRS2	4.3052847	3.5807230	4.81558299	4.6715601
## GSTM2	3.1646025	3.8260125	5.17931055	5.4070376
## CYP1B1	5.1767874	5.3484162	3.89391225	4.8863456
## ABCG2	3.8778380	3.7356677	3.59204458	4.8645230
## NAT1	4.7387550	4.2454453	4.66768611	4.1135385
## CYP1A2	6.2880219	5.9311244	4.82233114	5.0527090
## SULT1A2	4.1807197	5.0008961	6.23302078	5.5889364
## ABCB11	4.8181329	5.2724092	4.87868666	5.3714742
## DHRS4	4.9634360	4.9183569	5.05790644	4.8485405
## NQO1	6.0824058	6.2937908	4.94125106	4.8672086
## UGT1A3	4.3549149	3.3963148	4.67239951	4.6178613
## CYP3A7	5.1927714	4.9630453	7.05279211	5.5571261
## GSTA4	5.4442597	5.2899022	5.67118331	5.4789445
## FMO4	5.7760768	4.9368785	5.97668388	6.0647447
## CYP2E1	8.3005033	8.5334513	8.21667763	8.9295313
## NNMT	9.7366057	9.5261039	9.23270912	9.8325955
## SLC22A1	7.8595179	8.0298053	9.43005505	9.2957512
## NR1H4	8.3528806	8.1989281	8.54815054	8.2056225
## ALDH2	8.6654573	8.8406794	9.00178031	9.2451121
## FMO3	8.4336942	8.3391197	8.59750371	9.5867300
## AKR1A1	9.0027593	9.0467270	9.13591955	9.4284498
## COMT	9.2930337	9.4024947	9.13878259	10.2504152
## RXRA	9.5019203	9.3362603	9.50709083	10.2984693
## CYP1A1	7.9006990	7.7456763	5.40129699	6.9807444
## UGT1A9	8.2453976	7.8163115	7.01617457	6.7287384
## CYP2B6	6.3432075	6.1073236	5.53887155	8.1932196
## SLC01B1	6.5580926	6.5092844	6.05574799	6.2687004
## NR1I2	6.0886671	5.5727662	5.74739139	6.9454947
## HNF4G	5.9786770	5.8269588	6.58735804	5.8693298
## NAT2	5.7369365	5.3817198	6.04070766	6.4032620
## ABCC4	6.8629490	6.7533694	6.06192640	5.9839946
## NQO2	5.9410048	6.5951993	6.46272039	7.4564407
## RARA	7.6393743	7.5689441	7.41456411	7.2798566
## MGST2	6.9150143	6.8808463	6.76870792	6.4142472
## TPMT	6.6367906	6.6863086	6.93393079	6.6346030
## GSTA1	4.9198483	5.2868837	6.47962835	7.1242273
## CYP2A6	6.6840182	6.4603992	7.92852193	9.4464814
## DCXR	7.4790576	8.1755558	9.14736040	9.1490793
## SULT1A1	7.2067235	7.6730863	8.34235432	7.5565911
## CBR1	7.4017094	7.7596941	7.70135312	7.1719705

##	HSD11B1	6.2015234	6.3753724	6.92938288	7.4190846
##	ABCG5	6.7566869	5.9389944	8.26487920	8.0270825
##	CYP2D6	6.3363736	6.1403833	7.54362875	8.6489510
##	AHR	6.8693423	7.2190495	6.43460076	6.8279891
##	ABCC1	7.7666788	7.9892638	8.24992321	7.7452294
##	ABCG8	6.5297921	6.7110390	7.73423017	8.4226290
##	GSTM1	6.0665433	6.4407698	7.14129661	8.9959131
##	EPHX2	7.6073798	7.3569866	7.93836350	8.8702892
##	ABCA6	7.3690217	7.4229786	7.51215017	7.9289958
##	HNMT	8.1813347	7.5657769	7.95851570	7.6622869
##	HU1020 mock d28	HU1007 mock d28 a	HU1007 mock d28 b		
##	ALB	16.7521214	15.4577056	15.8539126	
##	ACTB	12.5420579	13.7149717	13.5454472	
##	ALDH1A1	14.4420950	12.0673465	12.4226612	
##	CYP3A4	11.5445164	8.6136392	9.3874795	
##	MGST1	12.1158320	11.2126056	11.2127015	
##	TFRC	10.8823919	11.0187591	10.7562735	
##	ABCC3	11.4888879	11.1316549	11.3592621	
##	CYP3A5	10.5188448	8.1707469	8.2018497	
##	UGT1A1	10.8520960	9.0628426	9.5858716	
##	MAOA	10.3371147	9.4931662	9.3995595	
##	PTGR1	10.9592745	9.0030636	9.4471819	
##	SULT2A1	11.2046955	9.1125974	9.3674033	
##	CES1	10.4401884	9.6448692	9.8726225	
##	ABCC2	10.6740623	9.1685463	9.5715425	
##	UGT1A6	10.7827257	8.3622532	8.8039258	
##	CYP2C9	9.4094636	7.4371388	8.0207847	
##	CYP2C8	9.3756491	7.1673743	7.3491365	
##	ABCB1	9.6784736	8.7671501	9.3199714	
##	CES2	9.8878606	9.2307422	9.1955302	
##	EPHX1	9.8982042	8.4464893	8.6353682	
##	ABCA2	9.6559234	9.5090976	9.9129777	
##	MAOB	9.4167526	8.9225581	9.2913228	
##	HNF4A	9.6268680	8.8428676	9.2298880	
##	SULT1A3	-2.0694489	-2.0799182	-2.0799234	
##	SLC10A2	-2.0189863	-2.0346750	-1.9560648	
##	SLC01A2	-2.2568605	-2.2694949	-2.2695018	
##	CYP7A1	-0.8773212	-0.8979681	-0.8980100	
##	CYP2C19	-0.6829019	-0.7876747	-0.7877257	
##	CYP2A13	-0.9080568	-0.9365951	-0.9366686	
##	SULT1A4	0.0000000	0.0000000	0.0000000	
##	CYP11B2	0.0000000	0.0000000	0.0000000	
##	CYP2F1	0.0000000	0.0000000	0.0000000	
##	ABCG4	0.5792094	0.7932104	0.5497094	
##	SLC01B3	2.5340665	2.2717569	2.4802861	
##	GSTP1	3.0953659	8.1872798	7.2868598	
##	NR1I3	4.1305791	2.9457441	3.3083966	
##	DHRS2	4.4958056	3.4035729	3.6940863	
##	GSTM2	4.8370352	2.9308214	3.2650698	
##	CYP1B1	4.4263824	4.9371565	3.9817082	
##	ABCG2	4.5603807	3.0796052	4.2030942	
##	NAT1	4.9617075	4.8814087	4.4575854	
##	CYP1A2	6.2120988	5.2560696	5.4546910	
##	SULT1A2	5.0429954	4.3197944	4.2792088	

## ABCB11	4.4610649	5.0991535	4.3930362
## DHRS4	3.9802367	5.2374825	5.5247292
## NQ01	4.6877646	6.1937927	5.7066632
## UGT1A3	5.7295948	4.3303340	4.7342932
## CYP3A7	4.7217774	3.4572029	4.4088956
## GSTA4	5.6315748	5.2347498	4.7992283
## FMO4	4.6738324	4.9060458	5.3399402
## CYP2E1	7.0719495	8.2119643	7.7332801
## NNMT	8.3779303	9.6878989	9.9259370
## SLC22A1	8.6547674	7.2024238	7.4061689
## NR1H4	9.1257983	7.8738896	7.9542045
## ALDH2	8.4156424	8.3370781	8.6070262
## FMO3	8.7032430	8.2460800	8.5339395
## AKR1A1	9.2327467	8.8095678	8.9268660
## COMT	9.1165037	9.2205724	9.2418919
## RXRA	9.0897744	9.1080403	9.3939459
## CYP1A1	7.6129364	7.5358196	7.4170643
## UGT1A9	6.7003873	7.2920358	7.8203058
## CYP2B6	6.3461200	5.3929938	5.0088587
## SLC01B1	6.6965858	5.9162436	6.5428213
## NR1I2	7.0802358	5.1709319	5.6503621
## HNF4G	6.4286873	6.1656093	5.4827487
## NAT2	6.1767462	5.2712787	5.5567930
## ABCC4	6.0745499	6.7208407	6.7527841
## NQ02	7.0561013	6.2871337	6.1345671
## RARA	6.4960696	7.6216727	7.6365750
## MGST2	6.6376431	6.4492922	6.9135945
## TPMT	7.1508851	6.3111359	6.6190883
## GSTA1	9.0187664	4.5960958	4.9927584
## CYP2A6	8.8106244	4.3711830	5.0163049
## DCXR	8.2437530	7.7771964	7.6324345
## SULT1A1	7.7615937	7.3376641	7.9413730
## CBR1	8.0184879	7.3728973	7.5829409
## HSD11B1	5.4201323	6.6371224	6.3275525
## ABCG5	7.5244913	5.8945471	6.4057969
## CYP2D6	7.1463988	5.7074672	5.3565662
## AHR	7.0770310	7.2485662	6.7861052
## ABCC1	7.3051345	8.0713294	8.0193048
## ABCG8	7.6974642	6.5068689	6.9174315
## GSTM1	8.1101966	5.7440580	5.5119022
## EPHX2	8.2333150	7.1275730	7.1945642
## ABCA6	7.2880134	6.9527360	7.3291427
## HNMT	7.7075588	7.5348944	7.7545937
##	HU1007 mock d28 c	HU1016 mock d28	HU1019 coinf d8 c
## ALB	16.1400150	17.0602071	17.3776276
## ACTB	13.5866963	12.3005588	12.2649141
## ALDH1A1	12.4194514	14.1367000	12.3238264
## CYP3A4	9.5652226	11.6853379	7.7836459
## MGST1	11.6249916	11.7708207	11.7491470
## TFRC	10.8859288	10.9341681	11.0238682
## ABCC3	11.3258312	11.5884846	11.3763673
## CYP3A5	8.1703795	10.7354921	9.4135961
## UGT1A1	9.5053457	10.5885523	9.2929952
## MAOA	8.9655761	10.4982327	10.2421790



## PTGR1	9.6601856	10.1634400	10.7123012
## SULT2A1	9.5989065	11.0372522	9.8838682
## CES1	10.0058624	10.1868740	10.0042411
## ABCC2	9.8883944	10.8676903	10.5509667
## UGT1A6	8.9423520	10.9903455	8.0522348
## CYP2C9	8.0677495	9.7719441	9.3870359
## CYP2C8	7.4517338	10.0957857	9.2805691
## ABCB1	9.4233565	10.2064347	9.0951288
## CES2	9.3435255	9.4926722	8.3931926
## EPHX1	8.9057859	9.4642964	8.7546914
## ABCA2	9.7725427	9.8426676	9.4065386
## MAOB	9.3387486	9.4842693	9.3393130
## HNF4A	9.2190849	9.6194954	9.1682750
## SULT1A3	-2.0799379	-2.0705196	-2.0741523
## SLC10A2	-2.0347068	-2.0206383	-2.0262433
## SLC01A2	-2.2695210	-2.2580336	-2.2620138
## CYP7A1	-0.8981242	-0.8823960	-0.8958276
## CYP2C19	-0.7878645	-0.7726585	-0.7850820
## CYP2A13	-0.9368693	-0.9145189	-0.9329101
## SULT1A4	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000
## ABCG4	0.7660493	0.5753262	0.5643999
## SLC01B3	2.3795493	2.3111097	2.2935524
## GSTP1	6.1003687	4.0968709	3.6007864
## NR1I3	2.7892563	2.9450366	3.8001611
## DHRS2	3.6545904	2.9933131	2.9247857
## GSTM2	3.3527400	4.6200456	3.7564878
## CYP1B1	3.7854965	5.5452988	5.5828511
## ABCG2	3.8669553	4.3160780	4.3801973
## NAT1	4.1938518	5.2784760	4.5298412
## CYP1A2	5.7120840	7.1828562	4.0655926
## SULT1A2	4.7881395	5.7532959	4.5098133
## ABCB11	4.8555181	5.0826034	4.5784445
## DHRS4	5.3511922	3.5731352	5.3414385
## NQO1	5.3389925	5.3459924	5.6101819
## UGT1A3	4.7723121	3.6001508	4.9909027
## CYP3A7	4.7372159	4.7389503	5.1640226
## GSTA4	5.0620483	6.0219474	4.3038643
## FMO4	5.1922610	5.7015484	5.7817958
## CYP2E1	8.9370988	5.8676848	9.6362471
## NNMT	10.1650141	8.4868153	10.8602943
## SLC22A1	7.5662934	7.9877370	7.4487159
## NR1H4	8.2614975	8.6688686	9.2997612
## ALDH2	8.4692999	8.8839836	8.9558938
## FMO3	8.5732486	9.3812454	9.4106444
## AKR1A1	9.0602321	7.9622582	8.2886275
## COMT	9.3337509	8.4082497	8.8808725
## RXRA	9.5494567	8.2464240	9.4745714
## CYP1A1	7.8778807	6.4082666	7.1597997
## UGT1A9	8.3070687	7.3610736	5.8130597
## CYP2B6	5.5189404	7.3783051	5.2104336
## SLC01B1	6.6252461	7.3879167	6.6348774
## NR1I2	5.5803132	6.5583154	4.9028423

##	HNF4G	5.9465640	6.9216460	6.2437705
##	NAT2	5.7386275	6.8051743	6.6641258
##	ABCC4	6.7568888	6.6559939	5.7904094
##	NQO2	6.4068652	6.0401077	5.6371820
##	RARA	7.7513496	6.6549498	6.7705860
##	MGST2	6.7067488	6.1054125	6.2843752
##	TPMT	6.7091622	5.9458427	7.1001399
##	GSTA1	4.5736629	8.6287002	4.7626159
##	CYP2A6	5.3151189	7.8045734	4.3044006
##	DCXR	7.9181935	6.4714022	6.7083601
##	SULT1A1	7.7770577	6.9505970	5.4295822
##	CBR1	7.6556524	7.6583585	6.3887650
##	HSD11B1	6.8208320	7.2413437	7.6990485
##	ABCG5	6.4651409	6.6325161	7.2700186
##	CYP2D6	6.2962666	7.0339145	7.1656560
##	AHR	6.8804868	8.2408220	7.8415098
##	ABCC1	8.1953860	7.1213838	7.9265447
##	ABCG8	6.9290717	8.3532032	7.4739513
##	GSTM1	5.5149076	8.2141891	7.8578326
##	EPHX2	7.2492043	8.7726148	8.4125953
##	ABCA6	7.1580720	8.3987183	8.5172467
##	HNMT	7.9172742	8.3802840	8.4802610
##	HU1019	coinf d8 d	HU1019	coinf d8 e HU1019
##	ALB	16.9521652	17.2760314	17.1226225
##	ACTB	11.9134791	12.2697913	13.1005074
##	ALDH1A1	12.1532821	12.3139394	12.1414607
##	CYP3A4	8.1295010	8.2935503	7.9931677
##	MGST1	11.4482069	11.9291033	12.2337101
##	TFRC	10.9799164	10.9778724	10.4977184
##	ABCC3	11.3075405	10.9585264	11.3380183
##	CYP3A5	8.9606726	11.4657291	10.9250915
##	UGT1A1	9.6430988	9.5520942	9.6248893
##	MAOA	9.7854361	10.2558920	10.0202931
##	PTGR1	10.3725335	10.2184111	10.7671038
##	SULT2A1	10.3725762	10.2980038	10.4353259
##	CES1	10.0344993	10.0171877	10.3710004
##	ABCC2	10.6773600	10.5774071	10.2190589
##	UGT1A6	8.6951809	7.8232194	7.3601968
##	CYP2C9	9.1215207	8.9935808	8.4012402
##	CYP2C8	9.4038007	9.0849615	9.1099037
##	ABCB1	8.6653299	9.7415922	9.3578801
##	CES2	8.9818162	8.3113509	9.0563467
##	EPHX1	9.2155901	9.0608476	9.8600056
##	ABCA2	9.7783501	9.0510836	9.3483979
##	MAOB	9.6122416	9.2889889	9.2024120
##	HNF4A	9.4739026	8.5520360	8.5784312
##	SULT1A3	-2.0743240	-2.0771338	-2.0768242
##	SLC10A2	-2.0265083	-2.0308435	-2.0303659
##	SLC01A2	-2.2622020	-2.2652805	-2.2649414
##	CYP7A1	-0.8958947	-0.8968324	-0.8967427
##	CYP2C19	-0.7851630	-0.7862969	-0.7861883
##	CYP2A13	-0.9330235	-0.9346228	-0.9344688
##	SULT1A4	0.0000000	0.0000000	0.0000000
##	CYP11B2	0.0000000	0.0000000	0.0000000

## CYP2F1	0.0000000	0.0000000	0.0000000
## ABCG4	0.5639647	0.5577765	0.7020320
## SLC01B3	3.2492866	3.0983185	2.7130434
## GSTP1	2.8509356	4.2654087	5.5573059
## NR1I3	3.6916904	2.8162024	2.8209646
## DHRS2	2.9219587	2.8807934	3.1812584
## GSTM2	4.7167439	4.1634811	3.9837693
## CYP1B1	5.3949382	5.0904369	3.6322043
## ABCG2	4.4576583	4.3651876	4.3204491
## NAT1	3.8401075	4.8031966	4.2819915
## CYP1A2	3.4453799	4.8943916	4.5466133
## SULT1A2	3.3286763	4.0196344	4.6528822
## ABCB11	4.3505587	4.3528496	3.4195190
## DHRS4	4.8909649	4.4821615	5.1110422
## NQO1	5.1216856	5.0930807	5.3279947
## UGT1A3	4.6543124	5.6274710	5.7621963
## CYP3A7	5.0741455	6.5286111	5.5784765
## GSTA4	5.3339371	5.1178523	4.8583166
## FMO4	6.6618792	6.0950510	5.4730271
## CYP2E1	9.9992708	11.0165797	11.7564955
## NNMT	10.8567026	10.7179659	10.7743390
## SLC22A1	6.5471425	6.7821388	8.5902540
## NR1H4	8.7917410	9.6982088	9.6294318
## ALDH2	9.0235589	8.8270219	9.3107290
## FMO3	9.2940063	9.4801711	9.0012747
## AKR1A1	8.1143805	7.8117163	9.1502064
## COMT	9.2257331	8.6185336	9.7963192
## RXRA	9.9658470	9.1141222	9.6351970
## CYP1A1	7.4104667	7.6978447	7.9172144
## UGT1A9	6.2332080	4.9030809	5.1349389
## CYP2B6	5.3524023	4.9127370	5.4449026
## SLC01B1	6.3946395	6.3914839	6.2953959
## NR1I2	4.4852437	4.5987792	4.5421458
## HNF4G	5.6129135	5.8406084	5.1468824
## NAT2	5.9426830	5.7977211	5.9876108
## ABCC4	6.1044896	6.0045662	5.9232164
## NQO2	5.9737223	5.4301573	6.8026320
## RARA	6.7125635	5.9096399	6.7576809
## MGST2	5.7979521	6.3429396	6.4304290
## TPMT	6.5228912	6.7631986	6.8569549
## GSTA1	5.0147314	4.8694945	4.8993587
## CYP2A6	4.8793488	5.4474889	5.5311393
## DCXR	6.9278582	7.0953776	8.8037355
## SULT1A1	6.0226218	5.0034574	6.9928297
## CBR1	6.6714365	5.7874612	7.4724095
## HSD11B1	7.7174816	7.0369442	6.5356765
## ABCG5	6.8600615	6.3796491	6.6086326
## CYP2D6	7.1364112	6.8862753	7.2298281
## AHR	7.0284056	8.3761351	7.0082749
## ABCC1	7.6877408	7.6142832	7.8116040
## ABCG8	7.9670203	7.0579490	7.2453406
## GSTM1	8.3600424	7.6801967	7.9663128
## EPHX2	8.4437817	8.5377988	8.4517248
## ABCA6	8.4210407	8.4735446	7.6804467

## HNMT	7.6957691	8.7655116	8.3698810
##	HU1019 coinf d8	HU1020 coinf d8 c	HU1020 coinf d8 d
## ALB	17.0288355	17.7950535	17.7094872
## ACTB	13.0657368	11.9078528	12.0703259
## ALDH1A1	12.1113655	14.1318521	14.1204024
## CYP3A4	7.4685593	13.9644344	13.9084218
## MGST1	12.1455701	12.1106875	12.1475895
## TFRC	10.5135961	11.2622846	11.2845831
## ABCC3	11.6894512	11.0951982	11.2442315
## CYP3A5	9.1931095	10.7944964	10.4170165
## UGT1A1	9.2231064	10.2415639	10.1049675
## MAOA	9.6967876	9.7992240	9.7266696
## PTGR1	11.0435753	10.1747340	10.0551022
## SULT2A1	10.2902172	10.5890964	10.1553565
## CES1	10.4070442	10.6990661	10.7575014
## ABCC2	10.2751363	11.5292242	11.5802763
## UGT1A6	7.8928304	10.5125974	10.5768035
## CYP2C9	9.0850374	10.1335727	10.1807517
## CYP2C8	9.3836679	10.2018675	10.0084114
## ABCB1	8.6123279	10.4120906	10.3597863
## CES2	9.3026023	9.2730245	9.6317064
## EPHX1	9.4438950	10.3104035	10.1021583
## ABCA2	9.9074338	9.3339625	9.4178729
## MAOB	9.1950212	10.0637834	10.0008807
## HNF4A	9.6665907	9.7703369	9.8925268
## SULT1A3	-2.0734163	-2.0771886	-2.0779055
## SLC10A2	-2.0251077	-2.0309280	-2.0320342
## SLC01A2	-2.2612074	-2.2653406	-2.2661261
## CYP7A1	-0.8955259	-0.8968480	-0.4387668
## CYP2C19	-0.7847180	-0.7863158	-0.5806848
## CYP2A13	-0.9320018	-0.9346496	-0.9349854
## SULT1A4	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000
## ABCG4	1.0043137	0.5576722	0.5563595
## SLC01B3	2.8824762	3.1851474	2.3255203
## GSTP1	5.1111617	2.7227326	2.6928086
## NR1I3	3.2107018	4.3777082	4.2182850
## DHRS2	3.6590632	3.7374732	3.9831576
## GSTM2	4.1121506	3.3977482	4.1470807
## CYP1B1	4.6883902	4.1912830	4.6337272
## ABCG2	4.1349697	5.1941839	5.3216350
## NAT1	4.5618599	4.8901037	4.5587240
## CYP1A2	4.1988834	6.1057752	5.5077993
## SULT1A2	4.0797388	4.2821363	5.2952734
## ABCB11	4.7219443	4.7096937	4.6414311
## DHRS4	4.8560154	4.2263023	3.7964898
## NQO1	4.6684426	4.7071911	4.7282186
## UGT1A3	5.3908782	5.6582136	5.5856163
## CYP3A7	4.3763220	6.4797839	5.8860937
## GSTA4	5.1631235	5.4139838	5.6707027
## FMO4	5.5043841	5.6303269	6.3824860
## CYP2E1	10.5901804	8.4429253	7.3241497
## NNMT	10.7325675	6.4562426	6.7407037

##	SLC22A1	8.9466603	8.8850371	8.8532589
##	NR1H4	8.9181887	9.7602538	9.4900068
##	ALDH2	9.2128523	8.6528290	8.8156393
##	FM03	9.3601774	9.5050704	9.4728748
##	AKR1A1	9.1999209	8.1750871	8.0947603
##	COMT	10.3623707	8.1866763	8.0381200
##	RXRA	10.2603305	8.6880758	8.7334509
##	CYP1A1	7.5234495	6.1488704	4.8711081
##	UGT1A9	5.7229261	7.3445602	6.8735109
##	CYP2B6	5.8503561	7.3476622	7.3173687
##	SLC01B1	6.5314915	7.8056263	7.9013473
##	NR1I2	5.2682808	6.0861131	6.2721181
##	HNF4G	5.3873522	6.4524573	6.8464417
##	NAT2	6.2777505	6.5548991	6.7704017
##	ABCC4	6.0402272	6.8529521	6.6456835
##	NQO2	6.9198342	6.8341102	6.7269567
##	RARA	7.3445958	6.4073759	5.5140648
##	MGST2	6.4607892	6.8151359	6.6804807
##	TPMT	6.6213532	6.8973914	7.2186690
##	GSTA1	5.4004433	8.3123564	8.2724232
##	CYP2A6	5.5470206	9.1275684	9.5114342
##	DCXR	8.9081086	6.7907925	6.7699377
##	SULT1A1	7.3505337	6.5890436	6.3911844
##	CBR1	7.3280367	7.3048015	7.0840104
##	HSD11B1	7.0394040	6.8056170	7.2862058
##	ABCG5	7.3662860	7.6483560	7.9334357
##	CYP2D6	7.9802585	6.9444738	6.7070672
##	AHR	6.7938007	8.5474092	8.3745014
##	ABCC1	7.6084744	7.4702651	7.4004931
##	ABCG8	7.4964483	8.4906168	8.2786293
##	GSTM1	7.4627103	8.4581966	8.2081597
##	EPHX2	8.7164225	8.5954527	8.4428963
##	ABCA6	7.7139333	8.7073546	8.7448577
##	HNMT	7.8244668	8.9957415	8.8541024
##	HU1020	coinf d8 e	HU1020	coinf d8
##	ALB	17.6889044	17.3708931	17.4545488
##	ACTB	12.1507168	12.7244350	13.3794052
##	ALDH1A1	13.8097529	13.5804335	13.5150081
##	CYP3A4	13.2527838	12.7083587	11.9909367
##	MGST1	12.0599098	12.2944556	12.4212648
##	TFRC	11.0076757	10.5120894	10.8921973
##	ABCC3	10.8904293	11.4491621	11.7775906
##	CYP3A5	10.3233140	10.0627549	10.1292199
##	UGT1A1	9.9613133	9.7890018	9.5311011
##	MAOA	9.8737348	9.5971845	9.8533024
##	PTGR1	9.8979519	10.3978442	10.2500853
##	SULT2A1	10.2776411	10.9106658	10.2424725
##	CES1	10.5474047	11.0390958	10.8234336
##	ABCC2	11.1054648	10.6663004	10.5940831
##	UGT1A6	10.7450115	10.2996384	10.3041898
##	CYP2C9	9.9576346	9.7343661	9.7198891
##	CYP2C8	9.9804332	10.0560853	9.8012037
##	ABCB1	10.3126483	9.5554963	9.5639011
##	CES2	9.0172189	9.7484285	10.2401253
				10.2175078

## EPHX1	9.6772265	10.6332700	10.6411651	10.2375743
## ABCA2	9.1987829	9.7286326	9.9048882	9.7821220
## MAOB	9.8030976	9.7014699	9.6566792	9.7931807
## HNF4A	9.6615364	9.6570281	9.7104040	9.9294758
## SULT1A3	-2.0745937	-2.0707976	-2.0719420	-2.0725132
## SLC10A2	-2.0269243	-2.0210673	-2.0228330	-2.0237143
## SLC01A2	-2.2624974	-2.2583382	-2.2595921	-2.2602179
## CYP7A1	-0.8959976	-0.8837138	-0.5988013	-0.6766881
## CYP2C19	-0.4959701	-0.7741394	-0.7802354	-0.7004196
## CYP2A13	-0.9331977	-0.9161969	-0.5600166	-0.9265513
## SULT1A4	0.0000000	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000	0.0000000
## ABCG4	1.2285224	0.5743686	0.5706434	0.8820026
## SLC01B3	2.2918273	2.3095350	2.6199928	2.7246410
## GSTP1	2.8383147	3.5349183	5.2109196	3.9902125
## NR1I3	3.9317454	4.0703354	4.7453238	4.4513207
## DHRS2	3.3445182	3.9021021	4.2649396	3.7196968
## GSTM2	3.9727738	3.9348791	4.6495703	4.6520290
## CYP1B1	4.9587372	3.2088338	3.4366749	4.5883843
## ABCG2	5.3380362	4.1812950	3.8379702	4.5590737
## NAT1	4.9254189	5.0193924	5.1945720	4.8787202
## CYP1A2	5.1912731	4.8212565	5.2856644	4.4158243
## SULT1A2	5.3221857	5.8754159	5.8300424	6.0398351
## ABCB11	5.6847100	4.8526584	5.2714278	5.6470634
## DHRS4	3.3168995	5.2814857	5.5060470	5.0993843
## NQO1	3.8478907	4.2364642	5.0180839	4.7101466
## UGT1A3	6.0347347	5.1247373	5.7137000	4.8192143
## CYP3A7	6.0026112	5.2479294	5.7711868	5.7871139
## GSTA4	4.5088962	5.2243950	5.4370660	5.0550044
## FMO4	6.2085138	5.3813140	5.8472276	6.1808011
## CYP2E1	7.0453751	8.0090961	6.6592700	7.0506964
## NNMT	7.0182739	7.1608577	8.3078336	9.8023849
## SLC22A1	8.6807005	9.8738611	10.0086517	9.9551076
## NR1H4	9.7665882	9.4192997	8.8516019	9.1139270
## ALDH2	8.6354007	9.1762261	9.5398096	9.2013552
## FMO3	9.4003444	8.9289206	9.1529237	9.1214188
## AKR1A1	7.9143447	9.2139925	9.3353578	9.2895423
## COMT	8.1380715	9.4273582	9.6285500	9.7458104
## RXRA	8.4877569	9.2742237	9.3286150	9.4816526
## CYP1A1	5.9365460	7.2949762	5.5499949	4.4026474
## UGT1A9	7.0378877	6.3994836	7.1274085	7.7593147
## CYP2B6	6.7279179	6.9899149	6.6849342	6.9025809
## SLC01B1	7.7762491	7.4088650	7.7176858	7.1329876
## NR1I2	6.0604386	6.3393741	6.9235048	7.1746010
## HNF4G	6.0745278	5.4384884	6.0981656	5.6821306
## NAT2	6.3889177	6.6084006	6.3574740	6.8791484
## ABCC4	6.1601221	5.6502765	6.0782803	5.1634166
## NQO2	6.5534844	7.3695035	7.3573618	7.4947052
## RARA	6.3462290	6.4698646	7.2376565	7.2536056
## MGST2	7.1855710	7.2015890	7.3226704	7.4856709
## TPMT	7.7801976	7.1393372	7.0876030	7.1653164
## GSTA1	7.9566397	8.2700911	8.2692086	8.4503600
## CYP2A6	8.9574749	9.7524990	9.4962548	8.9293800

## DCXR	6.1160740	9.1577005	9.0432383	9.0550660
## SULT1A1	6.5873745	8.2691614	8.8045487	8.3953574
## CBR1	6.5824692	8.2093503	8.1573404	7.7746201
## HSD11B1	6.8302217	6.5483770	7.7012919	7.8828637
## ABCG5	7.0750018	7.4565101	7.6107891	7.6495702
## CYP2D6	6.6866955	7.5797250	7.1110004	8.5407577
## AHR	8.6187777	7.3972504	6.7931156	7.0535608
## ABCC1	7.3687585	7.0989990	7.4381657	7.4325135
## ABCG8	7.8694261	7.9470481	7.9475938	8.0282210
## GSTM1	7.7232402	8.1957227	7.4258466	8.8773940
## EPHX2	7.7685336	8.3448484	8.5896164	8.5853401
## ABCA6	8.8746751	8.0505898	7.8861923	7.8047675
## HNMT	8.8477337	8.2947906	8.2554600	8.2622955
##	HU1020 HBV d8	HU1007 HBV d8 a	HU1007 HBV d8 b	HU1007 HBV d8 c
## ALB	17.1657679	17.4911384	17.4497223	17.4741443
## ACTB	12.6053145	13.1019354	13.1277934	13.1069114
## ALDH1A1	14.2289832	13.7727897	13.9314898	13.9387270
## CYP3A4	12.5946597	13.0736416	12.9055466	12.9987705
## MGST1	12.4071280	12.2399218	12.2589543	12.1893322
## TFRC	10.5944943	10.9529176	11.3207956	11.2873465
## ABCC3	11.5036239	11.0564430	11.1492726	11.0923030
## CYP3A5	9.5946390	9.5101049	9.1179826	8.9553372
## UGT1A1	9.9260603	10.3988122	10.0928896	10.2764987
## MAOA	9.9513635	9.8612336	9.8433874	9.8880350
## PTGR1	10.5298644	10.6223897	10.5699051	10.6701669
## SULT2A1	10.9681376	11.5067592	11.1862165	11.2028593
## CES1	11.0572370	11.3090457	11.1228334	11.3677318
## ABCC2	10.7424095	10.8451394	10.8644593	10.7961385
## UGT1A6	10.6907724	10.0440240	9.7973498	10.0632158
## CYP2C9	9.3586667	9.8270366	9.4116182	9.8756735
## CYP2C8	9.0932689	10.1667264	10.0286548	10.3819484
## ABCB1	9.6409317	9.6415465	9.6684035	9.7982735
## CES2	10.0803299	10.1400081	10.1973587	10.3799513
## EPHX1	10.2025619	10.4877328	10.3336940	10.5064852
## ABCA2	9.5691374	9.8545950	9.8426021	9.9681889
## MAOB	9.7698964	9.6638491	9.8196975	9.9529556
## HNF4A	9.7574480	9.6473068	9.7458887	9.9216118
## SULT1A3	-2.0700093	-2.0787420	-2.0760724	-2.0785486
## SLC10A2	-2.0198509	-2.0333248	-2.0292058	-2.0330264
## SLC01A2	-2.2574744	-2.2670426	-2.2641176	-2.2668307
## CYP7A1	-0.8799771	-0.6574124	-0.8965116	-0.8972048
## CYP2C19	-0.7699400	-0.7868044	-0.7859086	-0.7867481
## CYP2A13	-0.9114388	-0.9353455	-0.8640487	-0.8822922
## SULT1A4	0.0000000	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000	0.0000000
## ABCG4	0.8545828	0.5549468	0.5599162	0.5552625
## SLC01B3	2.7720508	3.3158217	3.3595757	2.8598931
## GSTP1	3.5944731	4.1631096	4.5949374	4.7229545
## NR1I3	4.6712043	4.5077452	5.0906912	4.0618575
## DHRS2	4.4426567	4.6513186	4.9660645	4.7027228
## GSTM2	4.5050078	3.5936594	3.7274146	3.6821960
## CYP1B1	3.2324665	4.5675759	3.8821257	3.8932296
## ABCG2	4.3583707	5.2523983	4.9391447	5.2175881

## NAT1	5.0986242	4.6057171	4.7826318	4.6068116
## CYP1A2	4.8407615	7.7260296	7.7709681	7.6131841
## SULT1A2	5.8860074	5.4497258	4.5069113	4.7864960
## ABCB11	4.7843777	6.5465736	6.3248826	6.5989158
## DHRS4	4.0394657	4.7711961	5.6036504	5.4593053
## NQO1	4.9433265	5.0728954	5.2512473	5.4499759
## UGT1A3	5.5249109	5.6684868	4.9176264	5.3522150
## CYP3A7	4.6708800	5.1175135	5.6068938	5.3827625
## GSTA4	5.4603142	5.6775962	5.0166085	6.1448469
## FMO4	5.4964444	6.1965417	5.6526020	6.1228437
## CYP2E1	6.9120556	10.0464132	9.0609991	9.7223422
## NNMT	8.8117669	7.6835577	7.8865489	7.8468023
## SLC22A1	9.1875030	10.0144268	9.9491378	9.9256593
## NR1H4	9.2029752	9.2152694	8.9170015	8.7304128
## ALDH2	8.6522395	9.2185246	9.3208299	9.2935185
## FMO3	9.0599732	9.3566764	9.5211400	9.6141105
## AKR1A1	9.1573456	9.3577176	9.3597697	8.9872693
## COMT	9.1415712	9.3538476	9.3703456	9.3782257
## RXRA	8.8640692	9.5070721	9.3864449	9.5618804
## CYP1A1	5.1094533	8.4730211	7.8072323	7.5311721
## UGT1A9	7.0860181	8.5919378	8.3299546	8.8159080
## CYP2B6	6.5296375	8.3759427	8.0841729	8.3567642
## SLC01B1	7.2402993	8.4056449	8.5296178	8.4740262
## NR1I2	7.1593834	6.5240207	7.0357609	6.8088110
## HNF4G	6.6014949	5.7831721	5.9154983	6.3580602
## NAT2	6.8812955	6.4535065	6.6810702	6.4065347
## ABCC4	5.2750515	6.5000045	5.7816254	6.1975884
## NQO2	7.1554004	6.9984573	7.0711292	7.0793689
## RARA	6.8661254	6.9983118	7.2195592	6.8043630
## MGST2	7.0797013	6.8645706	6.9046161	6.7444722
## TPMT	7.2101710	7.2611591	7.2794761	7.2011583
## GSTA1	9.2417554	8.6360524	8.3026927	8.5673708
## CYP2A6	9.1733102	8.9371194	8.6596509	9.0054487
## DCXR	8.1553137	8.7530642	8.8001931	8.8464694
## SULT1A1	7.8349967	8.2127677	7.8967686	8.0119715
## CBR1	8.0141302	8.2403219	7.6954962	7.9910836
## HSD11B1	6.4688700	7.9911905	8.4797216	8.4196862
## ABCG5	7.8009175	7.1762856	7.7230420	7.7135695
## CYP2D6	7.9013014	7.8771844	7.6366923	7.6315787
## AHR	7.4056112	7.0718386	7.2078359	7.0419094
## ABCC1	6.6139981	7.3263017	7.0562693	7.4362260
## ABCG8	7.9856505	7.8857568	7.9500588	8.0644833
## GSTM1	8.1686753	7.7688357	7.9351149	8.1371275
## EPHX2	8.3411193	8.6715717	8.8364420	8.8434046
## ABCA6	7.9623107	8.3440221	8.0331122	8.5929965
## HNMT	7.9584209	8.6328960	8.5574821	8.6556617
##	HU1016 HBV d8	HU1019 mock d8	HU1020 mock d8	HU1007 mock d8 a
## ALB	17.3210896	16.9583701	16.9381457	17.0518082
## ACTB	13.5342960	12.7212550	12.6729264	13.0001857
## ALDH1A1	13.6351212	12.6536201	14.0228508	13.0883185
## CYP3A4	11.9208723	8.1495094	12.1152370	11.6200236
## MGST1	12.4196538	11.8587957	12.2327795	12.1427857
## TFRC	10.6844025	10.8734778	10.7123994	11.1509076
## ABCC3	11.6766859	11.9649864	11.4903648	11.0328749



## CYP3A5	9.5588953	9.9516318	9.7132354	8.7150623
## UGT1A1	9.2440263	9.6636574	10.0384537	9.8530411
## MAOA	10.1080327	10.1456172	10.0117889	9.5361375
## PTGR1	10.3607115	10.8300237	10.3457535	10.3532805
## SULT2A1	10.2357365	10.7179763	10.6614925	10.9120804
## CES1	10.8899262	9.9944086	10.7857042	10.8530566
## ABCC2	10.3310117	10.1084873	10.6009825	10.4908089
## UGT1A6	10.4818340	8.2591215	10.8455335	9.4200663
## CYP2C9	9.3455994	9.1349924	9.3228325	9.0137792
## CYP2C8	9.7292290	10.1909765	8.9507227	9.4431446
## ABCB1	9.7621920	8.9432089	9.7328826	9.4768636
## CES2	10.3127796	9.6316765	9.8844880	9.8336860
## EPHX1	10.6015440	9.4692785	9.7709095	10.0590222
## ABCA2	10.2432162	10.1776337	9.9097949	9.8193361
## MAOB	9.6716831	9.5098828	9.5259746	9.8258231
## HNF4A	9.7273277	9.6412320	9.7767453	9.7128585
## SULT1A3	-2.0699092	-2.0735782	-2.0704012	-2.0798670
## SLC10A2	-2.0196965	-2.0253576	-2.0204557	-2.0345869
## SLC01A2	-2.2054973	-2.2613848	-2.2579039	-2.2684693
## CYP7A1	-0.8795027	-0.8955943	-0.8818351	-0.8975381
## CYP2C19	-0.6853536	-0.7848005	-0.6879748	-0.7871525
## CYP2A13	-0.6251236	-0.9325166	-0.9138046	-0.9358438
## SULT1A4	0.0000000	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000	0.0000000
## ABCG4	0.5775020	0.5659053	0.5757402	0.5529832
## SLC01B3	2.3147137	2.9160098	2.5968158	2.3441930
## GSTP1	5.7713182	5.1627508	3.5647462	4.1945423
## NR1I3	4.6149482	5.1147661	4.1556763	4.1106201
## DHRS2	4.4898572	4.0509437	3.3805419	4.7810775
## GSTM2	3.4228332	4.5184543	3.8899032	2.9060876
## CYP1B1	3.5357541	4.1711319	4.2205462	3.4935806
## ABCG2	4.2508066	3.7398591	4.9798174	4.3745435
## NAT1	4.5403026	4.4460009	4.3377542	4.9880394
## CYP1A2	5.0700366	4.9760775	4.6753221	6.2712252
## SULT1A2	6.2028497	5.2507606	5.6495871	4.6235974
## ABCB11	5.6231839	5.1929199	4.6393123	6.1063965
## DHRS4	5.1545114	5.1796557	4.7825746	5.6217739
## NQO1	5.3524823	5.0809553	4.4147159	4.4340231
## UGT1A3	5.4301085	5.4964619	5.5773358	4.4305007
## CYP3A7	5.0405221	4.7602083	5.0740837	5.2071778
## GSTA4	5.7050776	4.9832335	5.3897593	5.7928602
## FMO4	5.8678379	5.8917423	5.3162750	6.2183938
## CYP2E1	6.1764136	8.7807870	5.7346942	10.6839346
## NNMT	8.8972052	10.4049224	8.2836356	9.7887473
## SLC22A1	10.0582709	8.7969201	9.0261620	9.4614945
## NR1H4	8.6021930	8.8841439	9.0229911	8.9189699
## ALDH2	9.1956353	9.0738015	8.5813243	9.3330898
## FMO3	9.0836547	9.3476036	8.4966486	9.6580033
## AKR1A1	9.4376161	9.1422509	9.1027399	9.4226559
## COMT	9.8755433	9.8496662	8.8936298	9.7060086
## RXRA	9.2757314	10.1730248	8.9167644	9.6071753
## CYP1A1	5.3085057	7.7682497	5.7568106	6.0362587
## UGT1A9	7.3092315	5.7049907	6.7939850	7.9732555

## CYP2B6	6.7339130	6.7550950	6.2512963	7.2281925
## SLC01B1	7.1788028	6.6529776	6.5425189	8.4626109
## NR1I2	6.9461697	6.3343033	7.0806739	6.3762940
## HNF4G	6.0868141	5.1627018	5.9859511	5.4205419
## NAT2	6.5585177	6.3338223	6.8879115	6.5571935
## ABCC4	6.0692175	5.2050865	5.7235420	6.6384694
## NQO2	7.4802419	6.8502462	6.6322679	6.7888452
## RARA	7.4555244	7.4469278	6.9476400	7.1274396
## MGST2	7.2344012	6.7946052	7.0079746	6.7797635
## TPMT	7.0206128	6.9155418	7.0182277	7.3013534
## GSTA1	8.4092860	5.9892947	8.6069691	7.2313048
## CYP2A6	9.6640783	7.7518183	8.5097985	7.8449323
## DCXR	9.2565149	8.6132964	7.4679369	8.7094815
## SULT1A1	8.8625803	7.6693226	7.4621910	7.4935088
## CBR1	8.3095674	7.3274192	7.5573097	7.7038457
## HSD11B1	7.7932222	7.4076841	6.2147804	8.0437861
## ABCG5	7.4547660	7.4912004	7.0607687	6.8357230
## CYP2D6	7.5317662	8.2680020	6.9595735	8.1263680
## AHR	6.8019612	7.0565290	7.6097451	6.6522419
## ABCC1	7.4338074	7.4381607	7.2649970	7.9611159
## ABCG8	8.3329441	8.1892669	7.7558895	8.1784480
## GSTM1	7.6934925	8.2835091	7.8632271	7.1314640
## EPHX2	8.5308919	8.6063062	8.0229759	8.5606096
## ABCA6	7.6356307	7.8473835	8.0448971	8.1628075
## HNMT	8.1821201	8.1622520	8.3582128	8.4186968
##	HU1007 mock d8 b	HU1007 mock d8 c	HU1016 mock d8	
## ALB	17.4081399	17.1777253	17.5778454	
## ACTB	13.0476056	13.0060484	12.1891179	
## ALDH1A1	13.6018025	13.2872236	13.7947649	
## CYP3A4	12.7677916	12.0674041	12.8398265	
## MGST1	12.1363092	12.1155693	11.7047521	
## TFRC	11.2963158	11.1505275	11.2309876	
## ABCC3	10.8964936	10.8639366	11.1967023	
## CYP3A5	8.8440781	9.2481350	10.0485550	
## UGT1A1	9.7984402	9.8617336	9.4486067	
## MAOA	9.6334705	9.4515680	10.3818008	
## PTGR1	10.2192052	10.2749378	9.6968878	
## SULT2A1	10.3528488	10.5304338	9.6033411	
## CES1	10.9584196	10.7686936	10.1073991	
## ABCC2	10.7329681	10.5541338	11.0884174	
## UGT1A6	10.0053828	9.7040865	11.0437504	
## CYP2C9	9.6268165	9.2417977	10.1272311	
## CYP2C8	10.0354494	9.4032083	9.7563942	
## ABCB1	9.9931736	9.8306115	10.8338947	
## CES2	9.8247962	9.6061961	9.3785466	
## EPHX1	10.0951112	9.8901549	9.0808267	
## ABCA2	9.5242989	9.5686061	9.6421315	
## MAOB	10.1023330	9.8295743	9.9063365	
## HNF4A	9.5975971	9.4764417	9.1903414	
## SULT1A3	-2.0798516	-2.0387425	-2.0745802	
## SLC10A2	-2.0345787	-2.0346166	-2.0269036	
## SLC01A2	-2.2682583	-2.2692811	-2.2624827	
## CYP7A1	-0.8302751	-0.8976831	-0.8959925	
## CYP2C19	-0.5346927	-0.6934961	-0.7852811	

## CYP2A13	-0.9357746	-0.8952137	-0.9331891
## SULT1A4	0.0000000	0.0000000	0.0000000
## CYP11B2	0.0000000	0.0000000	0.0000000
## CYP2F1	0.0000000	0.0000000	0.0000000
## ABCG4	0.7489302	0.5519838	0.5633284
## SLC01B3	3.1632792	3.4505627	2.6391745
## GSTP1	4.3563221	4.6351277	3.7285650
## NR1I3	4.4805625	3.9452240	3.3171127
## DHRS2	4.1526238	4.3736650	3.5299411
## GSTM2	3.3633234	3.3174210	4.3353965
## CYP1B1	3.7978574	4.1240414	4.1318075
## ABCG2	4.8014023	4.6666601	4.7771831
## NAT1	4.9397606	4.5542645	4.2554965
## CYP1A2	6.5545689	6.2320144	4.7650745
## SULT1A2	4.8388664	5.0456124	4.4715309
## ABCB11	6.2267148	5.7408061	6.1560526
## DHRS4	5.4308777	4.8273910	3.8923139
## NQO1	5.4999015	5.3961429	5.5191616
## UGT1A3	4.2836055	5.3012417	5.5519399
## CYP3A7	5.1729694	5.6283872	6.5988030
## GSTA4	5.5379075	5.5181001	5.2278375
## FMO4	5.9932906	5.6056672	5.7632511
## CYP2E1	8.6851937	9.7487311	7.0184700
## NNMT	7.4301630	9.1942681	7.8022560
## SLC22A1	9.6446522	9.1881712	8.0590561
## NR1H4	8.7670311	9.0084307	9.5067668
## ALDH2	9.2223321	9.0723786	8.7892758
## FMO3	9.6122251	9.2893101	9.4077866
## AKR1A1	8.8996885	9.0744337	6.8958773
## COMT	9.1073940	9.2556621	7.9902266
## RXRA	9.1243940	9.2864004	8.3789464
## CYP1A1	6.3314888	6.8857384	4.9044636
## UGT1A9	8.7014209	8.4173565	7.9204685
## CYP2B6	8.2271142	7.4238148	6.4615935
## SLC01B1	8.5535040	8.1494445	7.4899708
## NR1I2	6.4154041	6.1513957	5.8724642
## HNF4G	6.3922175	5.8177255	6.4740376
## NAT2	6.3297610	5.9171668	6.5333086
## ABCC4	6.4939458	6.7336356	7.1031471
## NQO2	7.0357356	6.5552198	5.7428614
## RARA	7.0337257	6.6558146	6.5839905
## MGST2	6.6023440	6.6385931	6.6788280
## TPMT	6.7621677	6.9079709	7.2075976
## GSTA1	8.1979331	7.6029290	7.4819248
## CYP2A6	8.4522963	7.8413238	7.9266177
## DCXR	8.0147025	7.9875890	5.3262489
## SULT1A1	7.5929660	7.2122726	6.1378865
## CBR1	7.7145773	7.4887971	6.6293682
## HSD11B1	8.8398499	8.0290011	7.8102135
## ABCG5	7.0877819	7.0848506	6.6988495
## CYP2D6	7.4977690	7.4126811	5.4448074
## AHR	7.4224749	7.1181665	8.3015969
## ABCC1	7.2915320	7.6566436	7.8339871
## ABCG8	7.6790663	7.6919949	7.6835498

```

## GSTM1          7.7965112          7.1535800          6.9409370
## EPHX2          8.6896231          8.2693455          7.7505350
## ABCA6          8.3962021          8.2972250          9.0337850
## HNMT           8.5354897          8.6970943          8.8153764
##
## $rowDendrogram
## 'dendrogram' with 2 branches and 44 members total, at height 1.414214
##
## $colDendrogram
## 'dendrogram' with 2 branches and 86 members total, at height 127.9109
##
## $breaks
## [1] -2.500000000 -2.475757576 -2.451515152 -2.427272727 -2.403030303
## [6] -2.378787879 -2.354545455 -2.330303030 -2.306060606 -2.281818182
## [11] -2.257575758 -2.233333333 -2.209090909 -2.184848485 -2.160606061
## [16] -2.136363636 -2.112121212 -2.087878788 -2.063636364 -2.039393939
## [21] -2.015151515 -1.990909091 -1.966666667 -1.942424242 -1.918181818
## [26] -1.893939394 -1.869696970 -1.845454545 -1.821212121 -1.796969697
## [31] -1.772727273 -1.748484848 -1.724242424 -1.700000000 -1.675757576
## [36] -1.651515152 -1.627272727 -1.603030303 -1.578787879 -1.554545455
## [41] -1.530303030 -1.506060606 -1.481818182 -1.457575758 -1.433333333
## [46] -1.409090909 -1.384848485 -1.360606061 -1.336363636 -1.312121212
## [51] -1.287878788 -1.263636364 -1.239393939 -1.215151515 -1.190909091
## [56] -1.166666667 -1.142424242 -1.118181818 -1.093939394 -1.069696970
## [61] -1.045454545 -1.021212121 -0.996969697 -0.972727273 -0.948484848
## [66] -0.924242424 -0.900000000 -0.875757576 -0.851515152 -0.827272727
## [71] -0.803030303 -0.778787879 -0.754545455 -0.730303030 -0.706060606
## [76] -0.681818182 -0.657575758 -0.633333333 -0.609090909 -0.584848485
## [81] -0.560606061 -0.536363636 -0.512121212 -0.487878788 -0.463636364
## [86] -0.439393939 -0.415151515 -0.390909091 -0.366666667 -0.342424242
## [91] -0.318181818 -0.293939394 -0.269696970 -0.245454545 -0.221212121
## [96] -0.196969697 -0.172727273 -0.148484848 -0.124242424 -0.100000000
## [101] -0.090000000 -0.068888889 -0.047777778 -0.026666667 -0.005555556
## [106] 0.015555556 0.036666667 0.057777778 0.078888889 0.100000000
## [111] 0.110000000 0.290707071 0.471414141 0.652121212 0.832828283
## [116] 1.013535354 1.194242424 1.374949495 1.555656566 1.736363636
## [121] 1.917070707 2.097777778 2.278484848 2.459191919 2.639898990
## [126] 2.820606061 3.001313131 3.182020202 3.362727273 3.543434343
## [131] 3.724141414 3.904848485 4.085555556 4.266262626 4.446969697
## [136] 4.627676768 4.808383838 4.989090909 5.169797980 5.350505051
## [141] 5.531212121 5.711919192 5.892626263 6.073333333 6.254040404
## [146] 6.434747475 6.615454545 6.796161616 6.976868687 7.157575758
## [151] 7.338282828 7.518989899 7.699696970 7.880404040 8.061111111
## [156] 8.241818182 8.422525253 8.603232323 8.783939394 8.964646465
## [161] 9.145353535 9.326060606 9.506767677 9.687474747 9.868181818
## [166] 10.048888889 10.229595960 10.410303030 10.591010101 10.771717172
## [171] 10.952424242 11.133131313 11.313838384 11.494545455 11.675252525
## [176] 11.855959596 12.036666667 12.217373737 12.398080808 12.578787879
## [181] 12.759494949 12.940202020 13.120909091 13.301616162 13.482323232
## [186] 13.663030303 13.843737374 14.024444444 14.205151515 14.385858586
## [191] 14.566565657 14.747272727 14.927979798 15.108686869 15.289393939
## [196] 15.470101010 15.650808081 15.831515152 16.012222222 16.192929293
## [201] 16.373636364 16.554343434 16.735050505 16.915757576 17.096464646
## [206] 17.277171717 17.457878788 17.638585859 17.819292929 18.000000000

```

```
##
## $col
## [1] "#D8DAEB" "#D8DAEB" "#D8DAEB" "#D9DBEB" "#D9DBEB" "#D9DBEB" "#DADCEC"
## [8] "#DADCEC" "#DBDCEC" "#DBDDEC" "#DBDDEC" "#DCDDED" "#DCDEED" "#DCDEED"
## [15] "#DDDEED" "#DDDFED" "#DEDFEE" "#DEE0EE" "#DEE0EE" "#DFE0EE" "#DFE1EE"
## [22] "#DFE1EF" "#E0E1EF" "#E0E2EF" "#E1E2EF" "#E1E2EF" "#E1E3F0" "#E2E3F0"
## [29] "#E2E3F0" "#E2E4F0" "#E3E4F0" "#E3E5F0" "#E4E5F1" "#E4E5F1" "#E4E6F1"
## [36] "#E5E6F1" "#E5E6F1" "#E5E7F2" "#E6E7F2" "#E6E7F2" "#E7E8F2" "#E7E8F2"
## [43] "#E7E8F3" "#E8E9F3" "#E8E9F3" "#E8EAF3" "#E9EAF3" "#E9EAF4" "#EAEBF4"
## [50] "#EAEBF4" "#EAEBF4" "#EBECF4" "#EBECF4" "#EBECF5" "#ECEDF5" "#ECEDF5"
## [57] "#EEDF5" "#EEDF5" "#EEDF6" "#EEEEF6" "#EEEEF6" "#EEEEF6" "#EFF0F6"
## [64] "#EFF0F7" "#F0F0F7" "#F0F1F7" "#F0F1F7" "#F1F1F7" "#F1F2F8" "#F1F2F8"
## [71] "#F2F2F8" "#F2F3F8" "#F3F3F8" "#F3F3F9" "#F3F4F9" "#F4F4F9" "#F4F5F9"
## [78] "#F4F5F9" "#F5F5FA" "#F5F6FA" "#F6F6FA" "#F6F6FA" "#F6F7FA" "#F7F7FA"
## [85] "#F7F7FB" "#F7F8FB" "#F8F8FB" "#F8F8FB" "#F9F9FB" "#F9F9FC" "#F9FAFC"
## [92] "#FAFAFC" "#FAFAFC" "#FABFBC" "#FABFBC" "#FABFBC" "#FCFCFD" "#FCFCFD"
## [99] "#FCFCFD" "#FDFDFE" "#FDFDFE" "#FDFDFE" "#FEFEFE" "#FEFEFE" "#FFFFFF"
## [106] "#FDFCFD" "#FBFAFC" "#FAF8FB" "#F8F6FA" "#F6F4F9" "#F5F2F8" "#F3F0F6"
## [113] "#F1EEF5" "#F0ECF4" "#EEEEAF3" "#ECE8F2" "#EBE6F1" "#E9E4F0" "#E7E1EE"
## [120] "#E6DFED" "#E4DDEC" "#E3DBEB" "#E1D9EA" "#DFD7E9" "#DED5E8" "#DCD3E6"
## [127] "#DAD1E5" "#D9CFE4" "#D7CDE3" "#D5CBE2" "#D4C9E1" "#D2C6E0" "#DOC4DE"
## [134] "#CFC2DD" "#CDC0DC" "#CCBEDB" "#CABCD A" "#C8BAD9" "#C7B8D8" "#C5B6D6"
## [141] "#C3B4D5" "#C2B2D4" "#C0B0D3" "#BEAED2" "#BDABD1" "#BBA9D0" "#B9A7CE"
## [148] "#B8A5CD" "#B6A3CC" "#B5A1CB" "#B39FCA" "#B19DC9" "#B09BC8" "#AE99C6"
## [155] "#AC97C5" "#AB95C4" "#A993C3" "#A790C2" "#A68EC1" "#A48CC0" "#A28ABE"
## [162] "#A188BD" "#9F86BC" "#9D84BB" "#9C82BA" "#9A80B9" "#997EB8" "#977CB6"
## [169] "#957AB5" "#9478B4" "#9275B3" "#9073B2" "#8F71B1" "#8D6FB0" "#8B6DAE"
## [176] "#8A6BAD" "#8869AC" "#8667AB" "#8565AA" "#8363A9" "#8261A8" "#805FA6"
## [183] "#7E5DA5" "#7D5AA4" "#7B58A3" "#7956A2" "#7854A1" "#7652A0" "#74509E"
## [190] "#734E9D" "#714C9C" "#6F4A9B" "#6E489A" "#6C4699" "#6B4498" "#694196"
## [197] "#673F95" "#663D94" "#643B93" "#623992" "#613791" "#5F3590" "#5D338E"
## [204] "#5C318D" "#5A2F8C" "#582D8B" "#572B8A" "#552989" "#542788"
```

```
##
## $colorTable
##          low          high    color
## 1 -2.500000000 -2.475757576 #D8DAEB
## 2 -2.475757576 -2.451515152 #D8DAEB
## 3 -2.451515152 -2.427272727 #D8DAEB
## 4 -2.427272727 -2.403030303 #D9DBEB
## 5 -2.403030303 -2.378787879 #D9DBEB
## 6 -2.378787879 -2.354545455 #D9DBEB
## 7 -2.354545455 -2.330303030 #DADCEC
## 8 -2.330303030 -2.306060606 #DADCEC
## 9 -2.306060606 -2.281818182 #DBDCEC
## 10 -2.281818182 -2.257575758 #DBDDEC
## 11 -2.257575758 -2.233333333 #DBDDEC
## 12 -2.233333333 -2.209090909 #DCDDED
## 13 -2.209090909 -2.184848485 #DCDEED
## 14 -2.184848485 -2.160606061 #DCDEED
## 15 -2.160606061 -2.136363636 #DDDEED
## 16 -2.136363636 -2.112121212 #DDDFED
## 17 -2.112121212 -2.087878788 #DEDFEE
## 18 -2.087878788 -2.063636364 #DEE0EE
## 19 -2.063636364 -2.039393939 #DEE0EE
```

```

## 20 -2.039393939 -2.015151515 #DFE0EE
## 21 -2.015151515 -1.990909091 #DFE1EE
## 22 -1.990909091 -1.966666667 #DFE1EF
## 23 -1.966666667 -1.942424242 #EOE1EF
## 24 -1.942424242 -1.918181818 #EOE2EF
## 25 -1.918181818 -1.893939394 #E1E2EF
## 26 -1.893939394 -1.869696970 #E1E2EF
## 27 -1.869696970 -1.845454545 #E1E3F0
## 28 -1.845454545 -1.821212121 #E2E3F0
## 29 -1.821212121 -1.796969697 #E2E3F0
## 30 -1.796969697 -1.772727273 #E2E4F0
## 31 -1.772727273 -1.748484848 #E3E4F0
## 32 -1.748484848 -1.724242424 #E3E5F0
## 33 -1.724242424 -1.700000000 #E4E5F1
## 34 -1.700000000 -1.675757576 #E4E5F1
## 35 -1.675757576 -1.651515152 #E4E6F1
## 36 -1.651515152 -1.627272727 #E5E6F1
## 37 -1.627272727 -1.603030303 #E5E6F1
## 38 -1.603030303 -1.578787879 #E5E7F2
## 39 -1.578787879 -1.554545455 #E6E7F2
## 40 -1.554545455 -1.530303030 #E6E7F2
## 41 -1.530303030 -1.506060606 #E7E8F2
## 42 -1.506060606 -1.481818182 #E7E8F2
## 43 -1.481818182 -1.457575758 #E7E8F3
## 44 -1.457575758 -1.433333333 #E8E9F3
## 45 -1.433333333 -1.409090909 #E8E9F3
## 46 -1.409090909 -1.384848485 #E8EAF3
## 47 -1.384848485 -1.360606061 #E9EAF3
## 48 -1.360606061 -1.336363636 #E9EAF4
## 49 -1.336363636 -1.312121212 #EAEBF4
## 50 -1.312121212 -1.287878788 #EAEBF4
## 51 -1.287878788 -1.263636364 #EAEBF4
## 52 -1.263636364 -1.239393939 #EBECF4
## 53 -1.239393939 -1.215151515 #EBECF4
## 54 -1.215151515 -1.190909091 #EBECF5
## 55 -1.190909091 -1.166666667 #ECEDF5
## 56 -1.166666667 -1.142424242 #ECEDF5
## 57 -1.142424242 -1.118181818 #EDEDf5
## 58 -1.118181818 -1.093939394 #EDEEF5
## 59 -1.093939394 -1.069696970 #EDEEF6
## 60 -1.069696970 -1.045454545 #EEEEF6
## 61 -1.045454545 -1.021212121 #EEEEF6
## 62 -1.021212121 -0.996969697 #EEEEF6
## 63 -0.996969697 -0.972727273 #EFF0F6
## 64 -0.972727273 -0.948484848 #EFF0F7
## 65 -0.948484848 -0.924242424 #F0F0F7
## 66 -0.924242424 -0.900000000 #F0F1F7
## 67 -0.900000000 -0.875757576 #F0F1F7
## 68 -0.875757576 -0.851515152 #F1F1F7
## 69 -0.851515152 -0.827272727 #F1F2F8
## 70 -0.827272727 -0.803030303 #F1F2F8
## 71 -0.803030303 -0.778787879 #F2F2F8
## 72 -0.778787879 -0.754545455 #F2F3F8
## 73 -0.754545455 -0.730303030 #F3F3F8

```

```

## 74 -0.730303030 -0.706060606 #F3F3F9
## 75 -0.706060606 -0.681818182 #F3F4F9
## 76 -0.681818182 -0.657575758 #F4F4F9
## 77 -0.657575758 -0.633333333 #F4F5F9
## 78 -0.633333333 -0.609090909 #F4F5F9
## 79 -0.609090909 -0.584848485 #F5F5FA
## 80 -0.584848485 -0.560606061 #F5F6FA
## 81 -0.560606061 -0.536363636 #F6F6FA
## 82 -0.536363636 -0.512121212 #F6F6FA
## 83 -0.512121212 -0.487878788 #F6F7FA
## 84 -0.487878788 -0.463636364 #F7F7FA
## 85 -0.463636364 -0.439393939 #F7F7FB
## 86 -0.439393939 -0.415151515 #F7F8FB
## 87 -0.415151515 -0.390909091 #F8F8FB
## 88 -0.390909091 -0.366666667 #F8F8FB
## 89 -0.366666667 -0.342424242 #F9F9FB
## 90 -0.342424242 -0.318181818 #F9F9FC
## 91 -0.318181818 -0.293939394 #F9FAFC
## 92 -0.293939394 -0.269696970 #FAFAFC
## 93 -0.269696970 -0.245454545 #FAFAFC
## 94 -0.245454545 -0.221212121 #FAFBFC
## 95 -0.221212121 -0.196969697 #FBFBFD
## 96 -0.196969697 -0.172727273 #FBFBFD
## 97 -0.172727273 -0.148484848 #FCFCFD
## 98 -0.148484848 -0.124242424 #FCFCFD
## 99 -0.124242424 -0.100000000 #FCFCFD
## 100 -0.100000000 -0.090000000 #FDFDFE
## 101 -0.090000000 -0.068888889 #FDFDFE
## 102 -0.068888889 -0.047777778 #FDFDFE
## 103 -0.047777778 -0.026666667 #FEFEFE
## 104 -0.026666667 -0.005555556 #FEFEFE
## 105 -0.005555556 0.015555556 #FFFFFF
## 106 0.015555556 0.036666667 #FDFCFD
## 107 0.036666667 0.057777778 #FBFAFC
## 108 0.057777778 0.078888889 #FAF8FB
## 109 0.078888889 0.100000000 #F8F6FA
## 110 0.100000000 0.110000000 #F6F4F9
## 111 0.110000000 0.290707071 #F5F2F8
## 112 0.290707071 0.471414141 #F3F0F6
## 113 0.471414141 0.652121212 #F1EEF5
## 114 0.652121212 0.832828283 #FOECF4
## 115 0.832828283 1.013535354 #EEEEAF3
## 116 1.013535354 1.194242424 #ECE8F2
## 117 1.194242424 1.374949495 #EBE6F1
## 118 1.374949495 1.555656566 #E9E4F0
## 119 1.555656566 1.736363636 #E7E1EE
## 120 1.736363636 1.917070707 #E6DFED
## 121 1.917070707 2.097777778 #E4DDEC
## 122 2.097777778 2.278484848 #E3DBEB
## 123 2.278484848 2.459191919 #E1D9EA
## 124 2.459191919 2.639898990 #DFD7E9
## 125 2.639898990 2.820606061 #DED5E8
## 126 2.820606061 3.001313131 #DCD3E6
## 127 3.001313131 3.182020202 #DAD1E5

```

## 128	3.182020202	3.362727273	#D9CFE4
## 129	3.362727273	3.543434343	#D7CDE3
## 130	3.543434343	3.724141414	#D5CBE2
## 131	3.724141414	3.904848485	#D4C9E1
## 132	3.904848485	4.085555556	#D2C6E0
## 133	4.085555556	4.266262626	#D0C4DE
## 134	4.266262626	4.446969697	#CFC2DD
## 135	4.446969697	4.627676768	#CDC0DC
## 136	4.627676768	4.808383838	#CCBEDB
## 137	4.808383838	4.989090909	#CABCD A
## 138	4.989090909	5.169797980	#C8BAD9
## 139	5.169797980	5.350505051	#C7B8D8
## 140	5.350505051	5.531212121	#C5B6D6
## 141	5.531212121	5.711919192	#C3B4D5
## 142	5.711919192	5.892626263	#C2B2D4
## 143	5.892626263	6.073333333	#C0B0D3
## 144	6.073333333	6.254040404	#BEAED2
## 145	6.254040404	6.434747475	#BDABD1
## 146	6.434747475	6.615454545	#BBA9D0
## 147	6.615454545	6.796161616	#B9A7CE
## 148	6.796161616	6.976868687	#B8A5CD
## 149	6.976868687	7.157575758	#B6A3CC
## 150	7.157575758	7.338282828	#B5A1CB
## 151	7.338282828	7.518989899	#B39FCA
## 152	7.518989899	7.699696970	#B19DC9
## 153	7.699696970	7.880404040	#B09BC8
## 154	7.880404040	8.061111111	#AE99C6
## 155	8.061111111	8.241818182	#AC97C5
## 156	8.241818182	8.422525253	#AB95C4
## 157	8.422525253	8.603232323	#A993C3
## 158	8.603232323	8.783939394	#A790C2
## 159	8.783939394	8.964646465	#A68EC1
## 160	8.964646465	9.145353535	#A48CC0
## 161	9.145353535	9.326060606	#A28ABE
## 162	9.326060606	9.506767677	#A188BD
## 163	9.506767677	9.687474747	#9F86BC
## 164	9.687474747	9.868181818	#9D84BB
## 165	9.868181818	10.048888889	#9C82BA
## 166	10.048888889	10.229595960	#9A80B9
## 167	10.229595960	10.410303030	#997EB8
## 168	10.410303030	10.591010101	#977CB6
## 169	10.591010101	10.771717172	#957AB5
## 170	10.771717172	10.952424242	#9478B4
## 171	10.952424242	11.133131313	#9275B3
## 172	11.133131313	11.313838384	#9073B2
## 173	11.313838384	11.494545455	#8F71B1
## 174	11.494545455	11.675252525	#8D6FB0
## 175	11.675252525	11.855959596	#8B6DAE
## 176	11.855959596	12.036666667	#8A6BAD
## 177	12.036666667	12.217373737	#8869AC
## 178	12.217373737	12.398080808	#8667AB
## 179	12.398080808	12.578787879	#8565AA
## 180	12.578787879	12.759494949	#8363A9
## 181	12.759494949	12.940202020	#8261A8



```
## 182 12.940202020 13.120909091 #805FA6
## 183 13.120909091 13.301616162 #7E5DA5
## 184 13.301616162 13.482323232 #7D5AA4
## 185 13.482323232 13.663030303 #7B58A3
## 186 13.663030303 13.843737374 #7956A2
## 187 13.843737374 14.024444444 #7854A1
## 188 14.024444444 14.205151515 #7652A0
## 189 14.205151515 14.385858586 #74509E
## 190 14.385858586 14.566565657 #734E9D
## 191 14.566565657 14.747272727 #714C9C
## 192 14.747272727 14.927979798 #6F4A9B
## 193 14.927979798 15.108686869 #6E489A
## 194 15.108686869 15.289393939 #6C4699
## 195 15.289393939 15.470101010 #6B4498
## 196 15.470101010 15.650808081 #694196
## 197 15.650808081 15.831515152 #673F95
## 198 15.831515152 16.012222222 #663D94
## 199 16.012222222 16.192929293 #643B93
## 200 16.192929293 16.373636364 #623992
## 201 16.373636364 16.554343434 #613791
## 202 16.554343434 16.735050505 #5F3590
## 203 16.735050505 16.915757576 #5D338E
## 204 16.915757576 17.096464646 #5C318D
## 205 17.096464646 17.277171717 #5A2F8C
## 206 17.277171717 17.457878788 #582D8B
## 207 17.457878788 17.638585859 #572B8A
## 208 17.638585859 17.819292929 #552989
## 209 17.819292929 18.000000000 #542788
```

```
##
## $layout
## $layout$lmat
##      [,1] [,2]
## [1,]    4    3
## [2,]    2    1
##
## $layout$lhei
## [1] 0.7 4.0
##
## $layout$lwid
## [1] 0.7 4.0
```

```
dev.off()
```

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

Session Info

```
sessionInfo()
```

```
## R version 3.3.3 (2017-03-06)
## Platform: x86_64-apple-darwin13.4.0 (64-bit)
## Running under: macOS Sierra 10.12.6
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
```

```

##
## attached base packages:
## [1] parallel stats4 stats graphics grDevices utils datasets
## [8] methods base
##
## other attached packages:
## [1] org.Hs.eg.db_3.4.0 AnnotationDbi_1.36.2
## [3] gtools_3.5.0 tidyr_0.8.0
## [5] ggrepel_0.7.0 data.table_1.11.0
## [7] genefilter_1.56.0 RColorBrewer_1.1-2
## [9] tibble_1.4.2 gplots_3.0.1
## [11] DESeq2_1.14.1 SummarizedExperiment_1.4.0
## [13] Biobase_2.34.0 GenomicRanges_1.26.4
## [15] GenomeInfoDb_1.10.3 IRanges_2.8.2
## [17] S4Vectors_0.12.2 BiocGenerics_0.20.0
## [19] openxlsx_4.0.17 reshape2_1.4.3
## [21] ggplot2_2.2.1 stringr_1.3.0
## [23] dplyr_0.7.4 gageData_2.12.0
## [25] gage_2.24.0
##
## loaded via a namespace (and not attached):
## [1] httr_1.3.1 bit64_0.9-7 splines_3.3.3
## [4] Formula_1.2-2 assertthat_0.2.0 latticeExtra_0.6-28
## [7] blob_1.1.1 yaml_2.1.19 pillar_1.2.2
## [10] RSQLite_2.1.0 backports_1.1.2 lattice_0.20-34
## [13] glue_1.2.0 digest_0.6.15 XVector_0.14.1
## [16] checkmate_1.8.5 colorspace_1.3-2 htmltools_0.3.6
## [19] Matrix_1.2-8 plyr_1.8.4 XML_3.98-1.11
## [22] pkgconfig_2.0.1 zlibbioc_1.20.0 purrr_0.2.4
## [25] xtable_1.8-2 scales_0.5.0 gdata_2.18.0
## [28] BiocParallel_1.8.2 annotate_1.52.1 htmlTable_1.11.2
## [31] KEGGREST_1.14.1 nnet_7.3-12 lazyeval_0.2.1
## [34] survival_2.40-1 magrittr_1.5 memoise_1.1.0
## [37] evaluate_0.10.1 foreign_0.8-67 graph_1.52.0
## [40] tools_3.3.3 locfit_1.5-9.1 munsell_0.4.3
## [43] cluster_2.0.5 bindrcpp_0.2.2 Biostrings_2.42.1
## [46] caTools_1.17.1 rlang_0.2.0 grid_3.3.3
## [49] RCurl_1.95-4.10 rstudioapi_0.7 htmlwidgets_1.2
## [52] bitops_1.0-6 base64enc_0.1-3 rmarkdown_1.9
## [55] gtable_0.2.0 DBI_0.8 R6_2.2.2
## [58] gridExtra_2.3 knitr_1.20 bit_1.1-12
## [61] bindr_0.1.1 Hmisc_4.1-1 rprojroot_1.3-2
## [64] KernSmooth_2.23-15 stringi_1.1.7 Rcpp_0.12.16
## [67] geneplotter_1.52.0 rpart_4.1-10 acepack_1.4.1
## [70] png_0.1-7

```