MSstatsTMT Analysis with Manual Format Conversion

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Block 1 - installations and data loading

```
knitr::opts_chunk$set(echo = TRUE)

# Load required libraries
if (!requireNamespace("BiocManager", quietly = TRUE)) install.packages("BiocManager")
BiocManager::install("MSstatsTMT", ask = FALSE, update = FALSE, force = TRUE)
```

```
## Bioconductor version 3.20 (BiocManager 1.30.25), R 4.4.3 (2025-02-28 ucrt)

## Installing package(s) 'MSstatsTMT'

## package 'MSstatsTMT' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\amita\AppData\Local\Temp\RtmpusKayW\downloaded_packages
```

```
if (!requireNamespace("ggrepel", quietly = TRUE)) install.packages("ggrepel")
library(ggrepel)
```

```
## Loading required package: ggplot2
```

```
library(MSstatsTMT)
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(ggplot2)
library(EnhancedVolcano)

# File list and biological conditions
```

```r
datasets <- list(
  berle = list(file = "berle/protein.tsv",
               conditions = c("Reference", "Primary", "Recurrent", "Primary", "Recurrent",
                              "Primary", "Recurrent", "Primary", "Recurrent", "Primary")),
  munro = list(file = "munro/protein.tsv",
               conditions = c("Reference", "LowGrade", "HighGrade", "LowGrade", "HighGrade",
                              "LowGrade", "HighGrade", "LowGrade", "HighGrade", "LowGrade")),
  chen = list(file = "chen/protein.tsv",
              conditions = c("Reference", "Normal", "Tumor", "Normal", "Tumor",
                             "Normal", "Tumor", "Normal", "Tumor", "Normal"))
)

# TMT channel labels (10-plex)
channels <- c("126", "127N", "127C", "128N", "128C",
              "129N", "129C", "130N", "130C", "131")

# Generate annotation files
for (name in names(datasets)) {
  conds <- datasets[[name]]$conditions
  annotation <- data.frame(
    Mixture = 1,
    TechRepMixture = 1,
    Run = 1,
    Channel = channels,
    Condition = conds,
    BioReplicate = seq_along(conds)
  )
  write.table(annotation, paste0(name, "_annotation.tsv"), sep = "\t", quote = FALSE, row.names = FALSE)
}
```

Block 2 - convert protein.tsv to MSstatsTMT format

```r
convert_from_protein_file <- function(df, conditions) {
  intensity_cols <- grep("^sample\\.", colnames(df), value = TRUE)

  stopifnot(length(intensity_cols) == length(conditions))

  channels <- c("126", "127N", "127C", "128N", "128C",
                "129N", "129C", "130N", "130C", "131")[seq_along(intensity_cols)]

  out <- do.call(rbind, lapply(seq_len(nrow(df)), function(i) {
    row <- df[i, ]
    intensities <- as.numeric(row[intensity_cols])
    if (all(is.na(intensities))) return(NULL)

    data.frame(
      ProteinName = rep(row$Protein, length(intensity_cols)),
      PeptideSequence = paste0("PEPTIDE_", i),
      PSM = paste0("PSM_", i),
      Charge = 2,
      Mixture = 1,
      TechRepMixture = 1,
      Run = 1,
```

```
      Channel = channels,
      Intensity = intensities
    )
  }))

  return(out)
}

# Convert protein.tsv into MSstatsTMT format
for (name in names(datasets)) {
  df <- read.delim(datasets[[name]]$file, sep = "\t", stringsAsFactors = FALSE)
  conds <- datasets[[name]]$conditions
  converted <- convert_from_protein_file(df, conds)
  write.table(converted, paste0(name, "_converted.tsv"), sep = "\t", quote = FALSE, row.names = FALSE)
}

results_list <- list()

for (name in names(datasets)) {
  quant_file <- paste0(name, "_converted.tsv")
  annot_file <- paste0(name, "_annotation.tsv")

  quant_data <- read.delim(quant_file, sep = "\t", stringsAsFactors = FALSE)
  annot <- read.delim(annot_file, sep = "\t", stringsAsFactors = FALSE)

  # Force matching types for merge
  force_char <- function(df, cols) {
    for (col in cols) {
      df[[col]] <- as.character(df[[col]])
    }
    return(df)
  }

  merge_keys <- c("Mixture", "TechRepMixture", "Run", "Channel")
  quant_data <- force_char(quant_data, merge_keys)
  annot <- force_char(annot, merge_keys)

  merged <- merge(
    quant_data,
    annot,
    by = merge_keys,
    all.x = TRUE
  )

  # Check if merge succeeded
  if (!all(c("Condition", "BioReplicate") %in% colnames(merged))) {
    stop("Merge failed: Condition and BioReplicate are missing.")
  }
  if (any(is.na(merged$Condition)) || any(is.na(merged$BioReplicate))) {
    warning(" Some rows in merged data are missing Condition or BioReplicate:")
    print(head(merged[is.na(merged$Condition) | is.na(merged$BioReplicate), ]))
  }
```

```r
  # Filter problematic rows
  merged <- merged %>% filter(!is.na(Intensity) & Intensity > 0)

  # Keep only proteins with at least 6 channels
  merged <- merged %>%
    group_by(ProteinName, Run) %>%
    filter(n() >= 6) %>%
    ungroup()

  # Deduplicate (one row per Protein + Run + Channel)
  merged <- merged %>%
    group_by(ProteinName, Run, Channel) %>%
    slice(1) %>%
    ungroup()

  if (nrow(merged) == 0) {
    message("Skipping dataset '", name, "' - no valid proteins after filtering.")
    next
  }

  summarization <- proteinSummarization(
    data = merged,
    method = "MedianPolish",
    global_norm = TRUE,
    reference_norm = TRUE,
    MBimpute = TRUE,
    maxQuantileforCensored = 0.95
  )

  conds <- setdiff(unique(annot$Condition), "Reference")
  contrast <- matrix(0, nrow = length(conds), ncol = length(unique(annot$Condition)))
  colnames(contrast) <- unique(annot$Condition)
  rownames(contrast) <- paste0(conds, "_vs_Reference")
  for (i in seq_along(conds)) {
    contrast[i, "Reference"] <- -1
    contrast[i, conds[i]] <- 1
  }

  group_result <- groupComparisonTMT(
    contrast.matrix = contrast,
    data = summarization
  )

  write.csv(group_result$ComparisonResult, paste0(name, "_DA_proteins.csv"), row.names = FALSE)
  results_list[[name]] <- group_result$ComparisonResult
}
```

```
## Skipping dataset 'berle' - no valid proteins after filtering.

## INFO  [2025-05-19 15:15:52] ** MSstatsTMT - proteinSummarization function
## INFO  [2025-05-19 15:15:53] ** Protein-level summarization done by median polish.
## INFO  [2025-05-19 15:15:53] Design: 1 mixture.
## INFO  [2025-05-19 15:15:53] Design: 1 MS run per mixture.
```

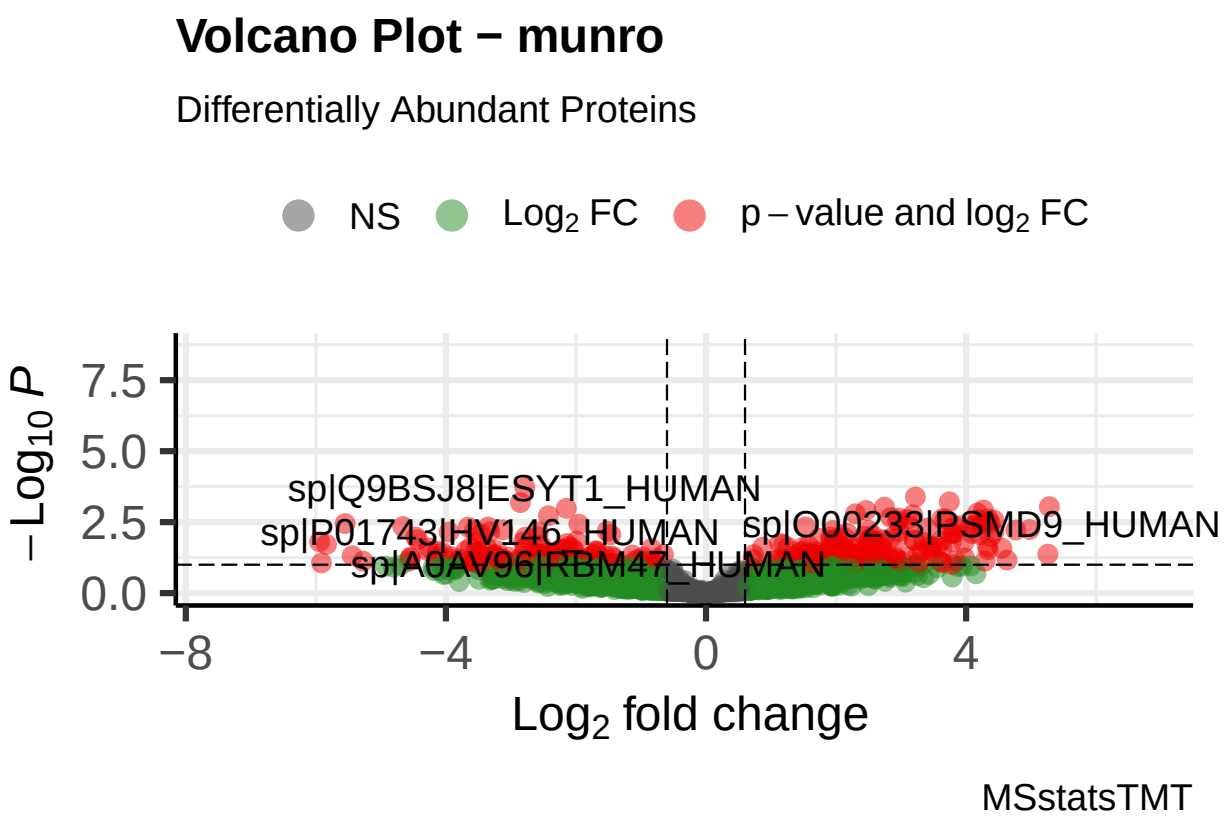
```
## INFO  [2025-05-19 15:15:53] Design: group comparison design (Different conditions contains different
## INFO  [2025-05-19 15:15:53] Model fitting for 1738 proteins.
##   |                                                                                                  |
```

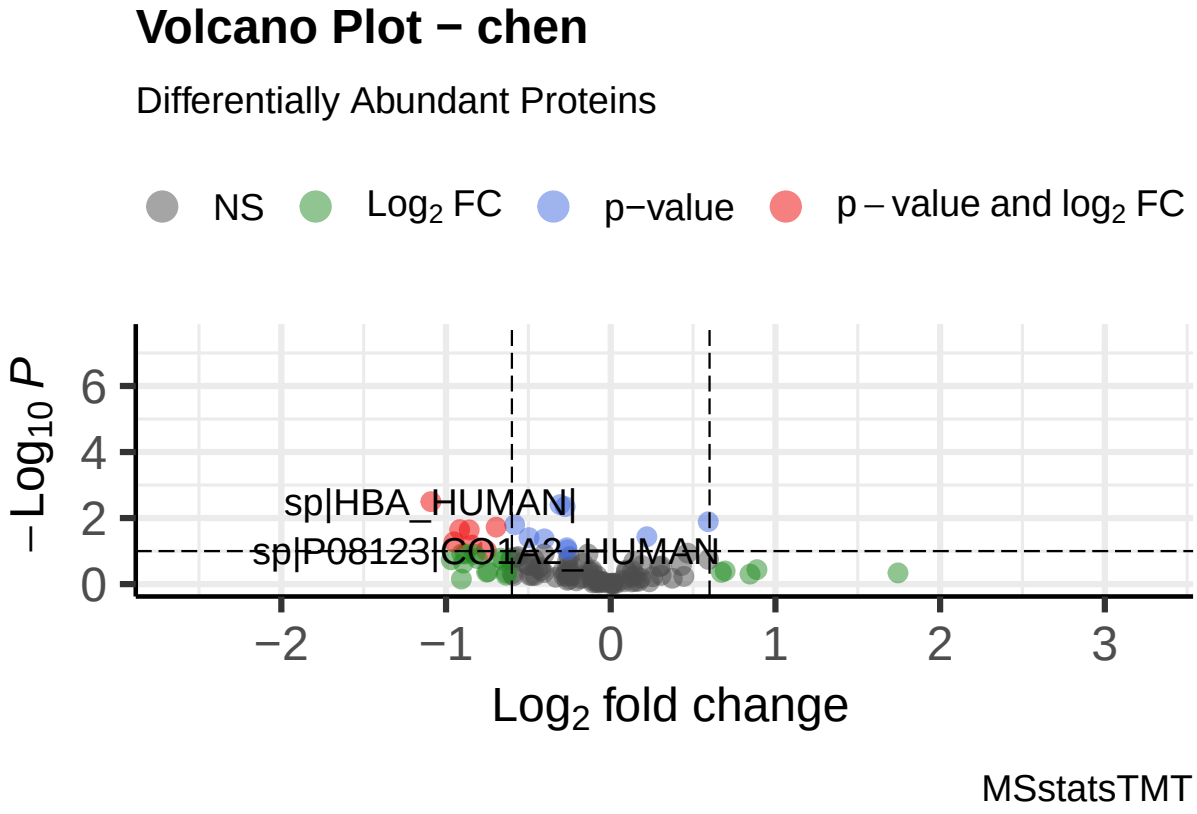
```r
# Volcano plots
for (name in names(results_list)) {
  df <- results_list[[name]]
  if (!all(c("log2FC", "adj.pvalue", "pvalue") %in% colnames(df))) next

  df <- df %>%
    filter(!is.na(log2FC), !is.na(adj.pvalue)) %>%
    mutate(Significant = ifelse(abs(log2FC) > 0.6 & pvalue < 0.1, "Significant", "Not Significant"))

  v <- EnhancedVolcano(
    df,
    lab = df$Protein,
    x = "log2FC",
    y = "pvalue",
    pCutoff = 0.1,
    FCcutoff = 0.6,
    pointSize = 3.0,
    title = paste("Volcano Plot -", name),
    subtitle = "Differentially Abundant Proteins",
    caption = "MSstatsTMT"
  )

  print(v)
}
```


Volcano Plot − munro
Differentially Abundant Proteins
NS
Log2 FC
p − value and log2 FC
−Log10 P
7.5
5.0
2.5
0.0
sp|Q9BSJ8|ESYT1_HUMAN
sp|P01743|HV146_HUMAN
sp|A0AV96|RBM47_HUMAN
sp|O00233|PSMD9_HUMAN
−8
−4
0
4
Log2 fold change
MSstatsTMT




```
# Save and display significant proteins
significant_proteins <- list()

for (name in names(results_list)) {
  df <- results_list[[name]]
  if (!all(c("log2FC", "adj.pvalue", "pvalue") %in% colnames(df))) next

  sig_df <- df %>%
    filter(!is.na(log2FC), !is.na(pvalue)) %>%
    filter(abs(log2FC) > 0.6, pvalue < 0.1)

  significant_proteins[[name]] <- sig_df

  write.csv(sig_df, paste0(name, "_significant_proteins.csv"), row.names = FALSE)
}


library(knitr)
for (name in names(significant_proteins)) {
  cat("\n\n### Significant Proteins -", name, "\n")
  df <- significant_proteins[[name]]
  if (nrow(df) > 0) {
    print(kable(df, caption = paste("Top Differential Proteins in", name)))
  } else {
    cat("No significant proteins found for this dataset.\n")
  }
```

```
}
```

```
##
##
## ### Significant Proteins - munro
##
##
## Table: Top Differential Proteins in munro
##
## |Protein                                |Label                  |     log2FC|        SE| DF|    pva
## |:--------------------------------------|:----------------------|----------:|---------:|--:|------
## |sp&#124;A0AV96&#124;RBM47_HUMAN        |LowGrade_vs_Reference  | -1.8057399| 0.8633035|  5| 0.090
## |sp&#124;CATA_HUMAN&#124;               |LowGrade_vs_Reference  |  3.6266053| 1.1107479|  7| 0.013
## |sp&#124;CATA_HUMAN&#124;               |HighGrade_vs_Reference |  2.6724951| 1.1336523|  7| 0.050
## |sp&#124;K1C9_HUMAN&#124;               |LowGrade_vs_Reference  | -3.6964781| 1.3909599|  7| 0.032
## |sp&#124;K1C9_HUMAN&#124;               |HighGrade_vs_Reference | -3.2070360| 1.4196425|  7| 0.058
## |sp&#124;O00217&#124;NDUS8_HUMAN        |LowGrade_vs_Reference  | -2.1871521| 0.9214765|  4| 0.076
## |sp&#124;O00233&#124;PSMD9_HUMAN        |LowGrade_vs_Reference  |  4.2405293| 0.9163123|  6| 0.003
## |sp&#124;O00233&#124;PSMD9_HUMAN        |HighGrade_vs_Reference |  3.7931664| 0.9658779|  6| 0.007
## |sp&#124;O00391&#124;QSOX1_HUMAN        |LowGrade_vs_Reference  | -2.0782532| 0.8716103|  5| 0.062
## |sp&#124;O00391&#124;QSOX1_HUMAN        |HighGrade_vs_Reference | -2.4560086| 0.9001952|  5| 0.041
## |sp&#124;O00410&#124;IPO5_HUMAN         |LowGrade_vs_Reference  |  2.4959199| 0.7550465|  7| 0.013
## |sp&#124;O00410&#124;IPO5_HUMAN         |HighGrade_vs_Reference |  2.1415953| 0.7706161|  7| 0.027
## |sp&#124;O00534&#124;VMA5A_HUMAN        |LowGrade_vs_Reference  | -3.5644997| 1.5288460|  4| 0.080
## |sp&#124;O14828&#124;SCAM3_HUMAN        |LowGrade_vs_Reference  | -3.9170263| 1.4258354|  4| 0.051
## |sp&#124;O14828&#124;SCAM3_HUMAN        |HighGrade_vs_Reference | -3.9385509| 1.5619244|  4| 0.065
## |sp&#124;O14950&#124;ML12B_HUMAN        |LowGrade_vs_Reference  |  1.9200264| 0.5543257|  7| 0.010
## |sp&#124;O14950&#124;ML12B_HUMAN        |HighGrade_vs_Reference |  1.4890493| 0.5657563|  7| 0.033
## |sp&#124;O15145&#124;ARPC3_HUMAN        |HighGrade_vs_Reference | -3.6981742| 1.8364112|  7| 0.083
## |sp&#124;O15305&#124;PMM2_HUMAN         |LowGrade_vs_Reference  |  2.2143868| 0.8509650|  6| 0.040
## |sp&#124;O15305&#124;PMM2_HUMAN         |HighGrade_vs_Reference |  2.2162392| 0.8509650|  6| 0.040
## |sp&#124;O15355&#124;PPM1G_HUMAN        |LowGrade_vs_Reference  | -2.6505314| 1.2743687|  5| 0.092
## |sp&#124;O43143&#124;DHX15_HUMAN        |LowGrade_vs_Reference  |  2.5940981| 1.2129107|  7| 0.069
## |sp&#124;O43681&#124;GET3_HUMAN         |LowGrade_vs_Reference  |  2.5674323| 1.0887695|  3| 0.099
## |sp&#124;O43704&#124;ST1B1_HUMAN        |HighGrade_vs_Reference | -2.5661998| 1.2289517|  6| 0.081
## |sp&#124;O43837&#124;IDH3B_HUMAN        |HighGrade_vs_Reference | -2.8858127| 1.2166163|  5| 0.063
## |sp&#124;O60237&#124;MYPT2_HUMAN        |LowGrade_vs_Reference  |  3.5598615| 1.0864198|  5| 0.022
## |sp&#124;O60237&#124;MYPT2_HUMAN        |HighGrade_vs_Reference |  3.9675558| 1.1220496|  5| 0.016
## |sp&#124;O60437&#124;PEPL_HUMAN         |LowGrade_vs_Reference  |  1.6040577| 0.6801588|  3| 0.099
## |sp&#124;O60506&#124;HNRPQ_HUMAN        |LowGrade_vs_Reference  |  2.1092852| 0.7245601|  7| 0.022
## |sp&#124;O60547&#124;GMDS_HUMAN         |HighGrade_vs_Reference | -4.5625362| 2.1112520|  6| 0.073
## |sp&#124;O60635&#124;TSN1_HUMAN         |LowGrade_vs_Reference  | -0.6544273| 0.2249556|  4| 0.043
## |sp&#124;O60841&#124;IF2P_HUMAN         |LowGrade_vs_Reference  | -3.2172388| 1.2063320|  7| 0.032
## |sp&#124;O75533&#124;SF3B1_HUMAN        |LowGrade_vs_Reference  |  2.2984006| 0.4615688|  7| 0.001
## |sp&#124;O75533&#124;SF3B1_HUMAN        |HighGrade_vs_Reference |  2.4600006| 0.4710867|  7| 0.001
## |sp&#124;O75746&#124;S2512_HUMAN        |HighGrade_vs_Reference | -3.1247431| 1.5815004|  6| 0.095
## |sp&#124;O95154&#124;ARK73_HUMAN        |LowGrade_vs_Reference  | -1.3574823| 0.6224515|  4| 0.094
## |sp&#124;O95154&#124;ARK73_HUMAN        |HighGrade_vs_Reference | -1.4844976| 0.6818614|  4| 0.095
## |sp&#124;O95197&#124;RTN3_HUMAN         |HighGrade_vs_Reference | -5.9140107| 2.3428142|  3| 0.085
## |sp&#124;O95425&#124;SVIL_HUMAN         |LowGrade_vs_Reference  | -2.1139154| 0.8965626|  6| 0.056
## |sp&#124;O95425&#124;SVIL_HUMAN         |HighGrade_vs_Reference | -2.1580102| 0.9450600|  6| 0.062
## |sp&#124;O95758&#124;PTBP3_HUMAN        |LowGrade_vs_Reference  |  2.2435328| 0.8334259|  5| 0.043
## |sp&#124;P00387&#124;NB5R3_HUMAN        |LowGrade_vs_Reference  |  2.0271341| 0.9708650|  7| 0.075
```

```
## |sp&#124;P00450&#124;CERU_HUMAN          |LowGrade_vs_Reference  | -1.1042528| 0.5290982|  7| 0.075
## |sp&#124;P01011&#124;AACT_HUMAN          |LowGrade_vs_Reference  |  4.3303027| 1.3354927|  5| 0.022
## |sp&#124;P01034&#124;CYTC_HUMAN          |LowGrade_vs_Reference  | -2.7100743| 1.0913510|  4| 0.067
## |sp&#124;P01034&#124;CYTC_HUMAN          |HighGrade_vs_Reference | -3.4577184| 1.1955151|  4| 0.044
## |sp&#124;P01743&#124;HV146_HUMAN         |LowGrade_vs_Reference  | -3.3220794| 0.8798592|  7| 0.006
## |sp&#124;P01743&#124;HV146_HUMAN         |HighGrade_vs_Reference | -3.6561676| 0.8980025|  7| 0.004
## |sp&#124;P01859&#124;IGHG2_HUMAN         |LowGrade_vs_Reference  | -2.5886333| 1.0032465|  6| 0.041
## |sp&#124;P02679&#124;FIBG_HUMAN          |LowGrade_vs_Reference  | -2.6139668| 1.0794640|  7| 0.045
## |sp&#124;P02679&#124;FIBG_HUMAN          |HighGrade_vs_Reference | -2.4555339| 1.1017233|  7| 0.061
## |sp&#124;P04083&#124;ANXA1_HUMAN         |LowGrade_vs_Reference  |  1.3435354| 0.6338807|  7| 0.071
## |sp&#124;P04083&#124;ANXA1_HUMAN         |HighGrade_vs_Reference |  1.6997727| 0.6469517|  7| 0.034
## |sp&#124;P04217&#124;A1BG_HUMAN          |LowGrade_vs_Reference  | -2.7855527| 1.0241722|  7| 0.029
## |sp&#124;P04217&#124;A1BG_HUMAN          |HighGrade_vs_Reference | -2.2548079| 1.0452914|  7| 0.067
## |sp&#124;P04732&#124;MT1E_HUMAN          |LowGrade_vs_Reference  | -3.8437576| 1.7666058|  4| 0.095
## |sp&#124;P04732&#124;MT1E_HUMAN          |HighGrade_vs_Reference | -5.4420638| 1.9352197|  4| 0.048
## |sp&#124;P05114&#124;HMGN1_HUMAN         |LowGrade_vs_Reference  | -3.3486865| 0.4396064|  3| 0.004
## |sp&#124;P05141&#124;ADT2_HUMAN          |LowGrade_vs_Reference  |  4.2675565| 0.8122145|  7| 0.001
## |sp&#124;P05141&#124;ADT2_HUMAN          |HighGrade_vs_Reference |  4.1749936| 0.8289630|  7| 0.001
## |sp&#124;P05156&#124;CFAI_HUMAN          |HighGrade_vs_Reference | -1.9274598| 0.7604610|  3| 0.085
## |sp&#124;P07195&#124;LDHB_HUMAN          |LowGrade_vs_Reference  |  2.0017343| 0.9537962|  7| 0.074
## |sp&#124;P07195&#124;LDHB_HUMAN          |HighGrade_vs_Reference |  2.3976682| 0.9734641|  7| 0.043
## |sp&#124;P07237&#124;PDIA1_HUMAN         |LowGrade_vs_Reference  |  2.0538142| 0.6914621|  7| 0.020
## |sp&#124;P07237&#124;PDIA1_HUMAN         |HighGrade_vs_Reference |  1.9109048| 0.7057206|  7| 0.030
## |sp&#124;P07355&#124;ANXA2_HUMAN         |HighGrade_vs_Reference |  1.3202112| 0.5600524|  7| 0.050
## |sp&#124;P07585&#124;PGS2_HUMAN          |LowGrade_vs_Reference  |  1.6771627| 0.8550887|  7| 0.090
## |sp&#124;P07585&#124;PGS2_HUMAN          |HighGrade_vs_Reference |  2.2248985| 0.8727213|  7| 0.038
## |sp&#124;P07900&#124;HS90A_HUMAN         |LowGrade_vs_Reference  | -1.9895578| 0.6184786|  7| 0.014
## |sp&#124;P07900&#124;HS90A_HUMAN         |HighGrade_vs_Reference | -1.6787018| 0.6312321|  7| 0.032
## |sp&#124;P07942&#124;LAMB1_HUMAN         |HighGrade_vs_Reference |  1.0450473| 0.4964893|  7| 0.073
## |sp&#124;P08123&#124;CO1A2_HUMAN         |LowGrade_vs_Reference  |  3.1061074| 0.6786690|  7| 0.002
## |sp&#124;P08123&#124;CO1A2_HUMAN         |HighGrade_vs_Reference |  2.4310930| 0.6926636|  7| 0.009
## |sp&#124;P08133&#124;ANXA6_HUMAN         |LowGrade_vs_Reference  |  1.5727665| 0.6210160|  7| 0.039
## |sp&#124;P08133&#124;ANXA6_HUMAN         |HighGrade_vs_Reference |  1.5704350| 0.6338218|  7| 0.042
## |sp&#124;P08238&#124;HS90B_HUMAN         |LowGrade_vs_Reference  |  1.1919156| 0.3973142|  7| 0.019
## |sp&#124;P08240&#124;SRPRA_HUMAN         |LowGrade_vs_Reference  |  2.8451958| 0.6409415|  4| 0.011
## |sp&#124;P08603&#124;CFAH_HUMAN          |LowGrade_vs_Reference  |  2.4995729| 0.6457995|  7| 0.006
## |sp&#124;P08603&#124;CFAH_HUMAN          |HighGrade_vs_Reference |  2.9489673| 0.6591164|  7| 0.002
## |sp&#124;P08621&#124;RU17_HUMAN          |LowGrade_vs_Reference  | -4.1281241| 1.1057774|  3| 0.033
## |sp&#124;P09382&#124;LEG1_HUMAN          |LowGrade_vs_Reference  | -1.4268018| 0.7166356|  7| 0.086
## |sp&#124;P09525&#124;ANXA4_HUMAN         |LowGrade_vs_Reference  | -0.7889919| 0.4141833|  7| 0.098
## |sp&#124;P09525&#124;ANXA4_HUMAN         |HighGrade_vs_Reference | -0.8871515| 0.4227241|  7| 0.074
## |sp&#124;P09668&#124;CATH_HUMAN          |LowGrade_vs_Reference  | -4.2742954| 1.3291455|  4| 0.032
## |sp&#124;P09668&#124;CATH_HUMAN          |HighGrade_vs_Reference | -4.0473019| 1.3291455|  4| 0.038
## |sp&#124;P0DP23&#124;CALM1_HUMAN         |LowGrade_vs_Reference  |  4.9742665| 1.0770820|  5| 0.005
## |sp&#124;P0DP23&#124;CALM1_HUMAN         |HighGrade_vs_Reference |  4.7651047| 1.0428801|  5| 0.006
## |sp&#124;P10909&#124;CLUS_HUMAN          |LowGrade_vs_Reference  |  1.8635640| 0.8798706|  6| 0.078
## |sp&#124;P11142&#124;HSP7C_HUMAN         |LowGrade_vs_Reference  |  1.1249053| 0.5092869|  7| 0.062
## |sp&#124;P11142&#124;HSP7C_HUMAN         |HighGrade_vs_Reference |  1.4810741| 0.5197888|  7| 0.024
## |sp&#124;P11532&#124;DMD_HUMAN           |HighGrade_vs_Reference |  1.2567225| 0.4405246|  7| 0.024
## |sp&#124;P11586&#124;C1TC_HUMAN          |LowGrade_vs_Reference  |  3.7420410| 0.6359165|  7| 0.000
## |sp&#124;P11586&#124;C1TC_HUMAN          |HighGrade_vs_Reference |  3.1786609| 0.6490295|  7| 0.001
## |sp&#124;P12429&#124;ANXA3_HUMAN         |LowGrade_vs_Reference  |  4.4260678| 0.9746956|  7| 0.002
## |sp&#124;P12429&#124;ANXA3_HUMAN         |HighGrade_vs_Reference |  4.1270256| 0.9947945|  7| 0.004
## |sp&#124;P13861&#124;KAP2_HUMAN          |LowGrade_vs_Reference  | -2.9035461| 1.3959823|  7| 0.076
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## |sp&#124;P14550&#124;AK1A1_HUMAN          |LowGrade_vs_Reference  |  3.3460181| 1.7198744|  7| 0.092
## |sp&#124;P14649&#124;MYL6B_HUMAN          |LowGrade_vs_Reference  | -2.2884673| 0.8286260|  6| 0.032
## |sp&#124;P14649&#124;MYL6B_HUMAN          |HighGrade_vs_Reference | -1.9017310| 0.8286260|  6| 0.061
## |sp&#124;P15090&#124;FABP4_HUMAN          |LowGrade_vs_Reference  | -2.8095594| 0.8856114|  7| 0.015
## |sp&#124;P15121&#124;ALDR_HUMAN           |LowGrade_vs_Reference  |  4.3380697| 1.5897457|  7| 0.029
## |sp&#124;P15121&#124;ALDR_HUMAN           |HighGrade_vs_Reference |  4.5516528| 1.6225274|  7| 0.026
## |sp&#124;P17655&#124;CAN2_HUMAN           |HighGrade_vs_Reference | -2.1169668| 1.0726825|  7| 0.089
## |sp&#124;P17900&#124;SAP3_HUMAN           |HighGrade_vs_Reference |  3.6134395| 1.5492678|  4| 0.080
## |sp&#124;P19404&#124;NDUV2_HUMAN          |LowGrade_vs_Reference  | -2.1419905| 0.5538157|  4| 0.018
## |sp&#124;P19404&#124;NDUV2_HUMAN          |HighGrade_vs_Reference | -2.5778400| 0.5055623|  4| 0.006
## |sp&#124;P20674&#124;COX5A_HUMAN          |LowGrade_vs_Reference  |  2.2797659| 0.8163585|  7| 0.026
## |sp&#124;P20674&#124;COX5A_HUMAN          |HighGrade_vs_Reference |  1.7967416| 0.8331924|  7| 0.067
## |sp&#124;P20774&#124;MIME_HUMAN           |LowGrade_vs_Reference  | -3.4614353| 0.9527811|  7| 0.008
## |sp&#124;P20774&#124;MIME_HUMAN           |HighGrade_vs_Reference | -2.7791079| 0.9724281|  7| 0.024
## |sp&#124;P20933&#124;ASPG_HUMAN           |LowGrade_vs_Reference  | -3.2588644| 1.0191154|  3| 0.049
## |sp&#124;P20933&#124;ASPG_HUMAN           |HighGrade_vs_Reference | -3.5501275| 0.9608312|  3| 0.034
## |sp&#124;P21266&#124;GSTM3_HUMAN          |HighGrade_vs_Reference |  3.9783208| 1.6923110|  6| 0.056
## |sp&#124;P21333&#124;FLNA_HUMAN           |LowGrade_vs_Reference  | -0.8430823| 0.3032134|  7| 0.027
## |sp&#124;P22033&#124;MUTA_HUMAN           |LowGrade_vs_Reference  | -2.5411809| 0.5636528|  3| 0.020
## |sp&#124;P22033&#124;MUTA_HUMAN           |HighGrade_vs_Reference | -3.9509358| 0.5978441|  3| 0.007
## |sp&#124;P22307&#124;SCP2_HUMAN           |LowGrade_vs_Reference  |  2.1736378| 0.5900306|  7| 0.007
## |sp&#124;P22307&#124;SCP2_HUMAN           |HighGrade_vs_Reference |  2.0183101| 0.6021975|  7| 0.012
## |sp&#124;P23434&#124;GCSH_HUMAN           |LowGrade_vs_Reference  | -3.0346529| 1.1251178|  4| 0.054
## |sp&#124;P23946&#124;CMA1_HUMAN           |LowGrade_vs_Reference  | -2.1487496| 0.3632559|  6| 0.001
## |sp&#124;P23946&#124;CMA1_HUMAN           |HighGrade_vs_Reference | -1.4629838| 0.3829054|  6| 0.008
## |sp&#124;P25685&#124;DNJB1_HUMAN          |HighGrade_vs_Reference |  2.4216752| 1.0117083|  7| 0.047
## |sp&#124;P25788&#124;PSA3_HUMAN           |LowGrade_vs_Reference  |  3.5765921| 1.6838905|  7| 0.071
## |sp&#124;P26440&#124;IVD_HUMAN            |HighGrade_vs_Reference |  2.4014966| 0.7392134|  5| 0.022
## |sp&#124;P27694&#124;RFA1_HUMAN           |HighGrade_vs_Reference |  2.7224699| 0.5146664|  3| 0.013
## |sp&#124;P28331&#124;NDUS1_HUMAN          |LowGrade_vs_Reference  | -1.9424497| 0.8751255|  7| 0.061
## |sp&#124;P29692&#124;EF1D_HUMAN           |LowGrade_vs_Reference  |  2.3863264| 0.9328473|  7| 0.037
## |sp&#124;P30041&#124;PRDX6_HUMAN          |LowGrade_vs_Reference  | -1.5536586| 0.6452143|  7| 0.046
## |sp&#124;P30041&#124;PRDX6_HUMAN          |HighGrade_vs_Reference | -1.6851877| 0.6585191|  7| 0.037
## |sp&#124;P30048&#124;PRDX3_HUMAN          |LowGrade_vs_Reference  |  1.7430163| 0.7131289|  6| 0.050
## |sp&#124;P30048&#124;PRDX3_HUMAN          |HighGrade_vs_Reference |  2.5300431| 0.7131289|  6| 0.012
## |sp&#124;P31040&#124;SDHA_HUMAN           |HighGrade_vs_Reference |  2.7427909| 1.3593908|  6| 0.090
## |sp&#124;P31942&#124;HNRH3_HUMAN          |LowGrade_vs_Reference  |  3.7752013| 1.1333717|  6| 0.015
## |sp&#124;P31942&#124;HNRH3_HUMAN          |HighGrade_vs_Reference |  3.4374270| 1.1333717|  6| 0.023
## |sp&#124;P32969&#124;RL9_HUMAN            |LowGrade_vs_Reference  |  3.4613316| 1.2877728|  7| 0.031
## |sp&#124;P32969&#124;RL9_HUMAN            |HighGrade_vs_Reference |  3.0845642| 1.3143276|  7| 0.051
## |sp&#124;P34913&#124;HYES_HUMAN           |HighGrade_vs_Reference | -1.7878190| 0.7195185|  3| 0.088
## |sp&#124;P35606&#124;COPB2_HUMAN          |LowGrade_vs_Reference  | -4.4634917| 1.2927678|  7| 0.010
## |sp&#124;P35606&#124;COPB2_HUMAN          |HighGrade_vs_Reference | -3.2433993| 1.3194256|  7| 0.043
## |sp&#124;P35914&#124;HMGCL_HUMAN          |LowGrade_vs_Reference  | -2.3988555| 0.9521612|  5| 0.053
## |sp&#124;P36269&#124;GGT5_HUMAN           |LowGrade_vs_Reference  | -1.4197426| 0.4716184|  3| 0.057
## |sp&#124;P36269&#124;GGT5_HUMAN           |HighGrade_vs_Reference | -3.1231180| 0.4446461|  3| 0.005
## |sp&#124;P36543&#124;VATE1_HUMAN          |HighGrade_vs_Reference |  3.7894243| 1.8686909|  5| 0.098
## |sp&#124;P36952&#124;SPB5_HUMAN           |HighGrade_vs_Reference |  2.7843715| 1.2095766|  7| 0.054
## |sp&#124;P36957&#124;ODO2_HUMAN           |LowGrade_vs_Reference  |  2.7451120| 0.5025997|  7| 0.000
## |sp&#124;P36957&#124;ODO2_HUMAN           |HighGrade_vs_Reference |  3.2208311| 0.5129637|  7| 0.000
## |sp&#124;P38159&#124;RBMX_HUMAN           |LowGrade_vs_Reference  |  1.8490149| 0.8548901|  4| 0.096
## |sp&#124;P38159&#124;RBMX_HUMAN           |HighGrade_vs_Reference |  2.3842744| 0.8548901|  4| 0.049
## |sp&#124;P41091&#124;IF2G_HUMAN           |LowGrade_vs_Reference  | -4.5475485| 1.9744896|  7| 0.054
## |sp&#124;P41091&#124;IF2G_HUMAN           |HighGrade_vs_Reference | -4.5465171| 2.0152050|  7| 0.058
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## |sp&#124;P42330&#124;AK1C3_HUMAN          |LowGrade_vs_Reference  |  2.5716978| 0.6867363|  6| 0.009
## |sp&#124;P42330&#124;AK1C3_HUMAN          |HighGrade_vs_Reference |  3.6266134| 0.7238836|  6| 0.002
## |sp&#124;P43243&#124;MATR3_HUMAN          |HighGrade_vs_Reference |  2.1763411| 0.9982869|  7| 0.065
## |sp&#124;P43304&#124;GPDM_HUMAN           |LowGrade_vs_Reference  |  2.7349930| 1.2788209|  6| 0.076
## |sp&#124;P45880&#124;VDAC2_HUMAN          |HighGrade_vs_Reference | -2.0641637| 1.0793977|  7| 0.097
## |sp&#124;P46108&#124;CRK_HUMAN            |HighGrade_vs_Reference | -3.3775381| 1.1833889|  7| 0.024
## |sp&#124;P46781&#124;RS9_HUMAN            |LowGrade_vs_Reference  |  2.4757871| 0.7570525|  3| 0.046
## |sp&#124;P48147&#124;PPCE_HUMAN           |LowGrade_vs_Reference  |  1.6147932| 0.7412772|  7| 0.065
## |sp&#124;P48147&#124;PPCE_HUMAN           |HighGrade_vs_Reference |  3.1202147| 0.7565629|  7| 0.004
## |sp&#124;P48643&#124;TCPE_HUMAN           |LowGrade_vs_Reference  |  1.7372843| 0.6929049|  7| 0.040
## |sp&#124;P48643&#124;TCPE_HUMAN           |HighGrade_vs_Reference |  1.3710880| 0.7071931|  7| 0.093
## |sp&#124;P49006&#124;MRP_HUMAN            |LowGrade_vs_Reference  | -1.7020969| 0.4531946|  3| 0.032
## |sp&#124;P49419&#124;AL7A1_HUMAN          |LowGrade_vs_Reference  |  1.3049826| 0.6308372|  7| 0.077
## |sp&#124;P49591&#124;SYSC_HUMAN           |LowGrade_vs_Reference  |  1.5302777| 0.3487951|  6| 0.004
## |sp&#124;P49591&#124;SYSC_HUMAN           |HighGrade_vs_Reference |  1.1318922| 0.3487951|  6| 0.017
## |sp&#124;P49720&#124;PSB3_HUMAN           |LowGrade_vs_Reference  |  2.0521670| 1.0547774|  6| 0.099
## |sp&#124;P49748&#124;ACADV_HUMAN          |HighGrade_vs_Reference | -1.7791456| 0.8958916|  7| 0.087
## |sp&#124;P49902&#124;5NTC_HUMAN           |HighGrade_vs_Reference | -2.4038472| 0.8648109|  4| 0.049
## |sp&#124;P50135&#124;HNMT_HUMAN           |LowGrade_vs_Reference  |  1.7288483| 0.5947111|  3| 0.062
## |sp&#124;P50991&#124;TCPD_HUMAN           |LowGrade_vs_Reference  |  2.7042792| 0.9564988|  7| 0.025
## |sp&#124;P50991&#124;TCPD_HUMAN           |HighGrade_vs_Reference |  3.2048815| 0.9762225|  7| 0.013
## |sp&#124;P51665&#124;PSMD7_HUMAN          |LowGrade_vs_Reference  | -2.5219888| 1.0531992|  4| 0.074
## |sp&#124;P52272&#124;HNRPM_HUMAN          |LowGrade_vs_Reference  |  1.9169109| 0.5913761|  7| 0.014
## |sp&#124;P52272&#124;HNRPM_HUMAN          |HighGrade_vs_Reference |  1.9786906| 0.6035707|  7| 0.013
## |sp&#124;P53007&#124;TXTP_HUMAN           |LowGrade_vs_Reference  |  3.7578373| 0.9609221|  6| 0.007
## |sp&#124;P53007&#124;TXTP_HUMAN           |HighGrade_vs_Reference |  3.3483693| 1.0129008|  6| 0.016
## |sp&#124;P54652&#124;HSP72_HUMAN          |HighGrade_vs_Reference |  2.4360541| 1.2189274|  7| 0.085
## |sp&#124;P54920&#124;SNAA_HUMAN           |HighGrade_vs_Reference |  1.6679001| 0.8534980|  7| 0.091
## |sp&#124;P55265&#124;DSRAD_HUMAN          |LowGrade_vs_Reference  |  2.6591443| 0.8661592|  4| 0.037
## |sp&#124;P55786&#124;PSA_HUMAN            |HighGrade_vs_Reference |  2.0362404| 1.0157320|  7| 0.085
## |sp&#124;P55795&#124;HNRH2_HUMAN          |LowGrade_vs_Reference  |  2.8079758| 1.0837279|  5| 0.048
## |sp&#124;P55884&#124;EIF3B_HUMAN          |LowGrade_vs_Reference  | -1.9355764| 0.9957683|  7| 0.093
## |sp&#124;P58876&#124;H2B1D_HUMAN          |LowGrade_vs_Reference  |  1.2065074| 0.5527438|  7| 0.065
## |sp&#124;P58876&#124;H2B1D_HUMAN          |HighGrade_vs_Reference |  1.4428904| 0.5641417|  7| 0.037
## |sp&#124;P61088&#124;UBE2N_HUMAN          |LowGrade_vs_Reference  |  3.6309045| 1.6951514|  5| 0.085
## |sp&#124;P61224&#124;RAP1B_HUMAN          |HighGrade_vs_Reference |  2.6439106| 1.2119002|  6| 0.071
## |sp&#124;P61960&#124;UFM1_HUMAN           |LowGrade_vs_Reference  | -2.4382717| 0.7011058|  3| 0.040
## |sp&#124;P61960&#124;UFM1_HUMAN           |HighGrade_vs_Reference | -5.5503813| 0.6610089|  3| 0.003
## |sp&#124;P62140&#124;PP1B_HUMAN           |LowGrade_vs_Reference  |  2.8891152| 1.3309274|  7| 0.066
## |sp&#124;P62913&#124;RL11_HUMAN           |LowGrade_vs_Reference  |  4.3805986| 0.9554177|  4| 0.010
## |sp&#124;P62913&#124;RL11_HUMAN           |HighGrade_vs_Reference |  4.4288061| 0.8721730|  4| 0.007
## |sp&#124;P63104&#124;1433Z_HUMAN          |LowGrade_vs_Reference  |  2.1186780| 0.9157112|  7| 0.053
## |sp&#124;P63244&#124;RACK1_HUMAN          |LowGrade_vs_Reference  | -2.0666120| 0.7286895|  7| 0.025
## |sp&#124;P63244&#124;RACK1_HUMAN          |HighGrade_vs_Reference | -2.5959391| 0.7437156|  7| 0.010
## |sp&#124;P63313&#124;TYB10_HUMAN          |LowGrade_vs_Reference  |  5.2579836| 1.9387569|  5| 0.042
## |sp&#124;P63313&#124;TYB10_HUMAN          |HighGrade_vs_Reference |  4.6300618| 2.0023396|  5| 0.068
## |sp&#124;P67936&#124;TPM4_HUMAN           |LowGrade_vs_Reference  |  1.7525327| 0.7260183|  7| 0.046
## |sp&#124;P68431&#124;H31_HUMAN            |LowGrade_vs_Reference  | -2.1198460| 0.4902778|  3| 0.022
## |sp&#124;P68431&#124;H31_HUMAN            |HighGrade_vs_Reference | -3.5627726| 0.5200182|  3| 0.006
## |sp&#124;P78344&#124;IF4G2_HUMAN          |HighGrade_vs_Reference | -2.3024131| 1.1803075|  6| 0.098
## |sp&#124;P98160&#124;PGBM_HUMAN           |LowGrade_vs_Reference  | -1.0427661| 0.4760742|  7| 0.064
## |sp&#124;Q01130&#124;SRSF2_HUMAN          |LowGrade_vs_Reference  | -3.7856170| 1.4909807|  4| 0.064
## |sp&#124;Q01130&#124;SRSF2_HUMAN          |HighGrade_vs_Reference | -3.5478875| 1.4909807|  4| 0.076
## |sp&#124;Q01469&#124;FABP5_HUMAN          |LowGrade_vs_Reference  |  2.5595944| 0.8459122|  7| 0.019
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## |sp&#124;Q01469&#124;FABP5_HUMAN          |HighGrade_vs_Reference |  2.5029379| 0.8633555|  7| 0.023
## |sp&#124;Q02218&#124;ODO1_HUMAN           |HighGrade_vs_Reference |  1.8679981| 0.7963382|  7| 0.051
## |sp&#124;Q02252&#124;MMSA_HUMAN           |LowGrade_vs_Reference  |  2.2803874| 1.0959168|  7| 0.075
## |sp&#124;Q02252&#124;MMSA_HUMAN           |HighGrade_vs_Reference |  2.1964225| 1.1185154|  7| 0.090
## |sp&#124;Q02817&#124;MUC2_HUMAN           |HighGrade_vs_Reference | -0.7596258| 0.3450421|  7| 0.063
## |sp&#124;Q02818&#124;NUCB1_HUMAN          |HighGrade_vs_Reference | -1.4784313| 0.7581914|  6| 0.099
## |sp&#124;Q03252&#124;LMNB2_HUMAN          |HighGrade_vs_Reference |  1.8166124| 0.8116583|  7| 0.060
## |sp&#124;Q04837&#124;SSBP_HUMAN           |LowGrade_vs_Reference  | -2.1170855| 0.9090012|  5| 0.067
## |sp&#124;Q04837&#124;SSBP_HUMAN           |HighGrade_vs_Reference | -2.6042955| 0.9388124|  5| 0.039
## |sp&#124;Q06210&#124;GFPT1_HUMAN          |HighGrade_vs_Reference |  1.0825495| 0.5555385|  7| 0.092
## |sp&#124;Q07021&#124;C1QBP_HUMAN          |LowGrade_vs_Reference  | -1.7995821| 0.7968883|  7| 0.058
## |sp&#124;Q07021&#124;C1QBP_HUMAN          |HighGrade_vs_Reference | -2.2221896| 0.8133208|  7| 0.029
## |sp&#124;Q07065&#124;CKAP4_HUMAN          |LowGrade_vs_Reference  |  2.9673701| 0.7805393|  7| 0.006
## |sp&#124;Q07065&#124;CKAP4_HUMAN          |HighGrade_vs_Reference |  3.6828736| 0.7966346|  7| 0.002
## |sp&#124;Q08211&#124;DHX9_HUMAN           |LowGrade_vs_Reference  | -0.7945188| 0.4083577|  7| 0.092
## |sp&#124;Q08211&#124;DHX9_HUMAN           |HighGrade_vs_Reference | -0.9662393| 0.4167783|  7| 0.053
## |sp&#124;Q08380&#124;LG3BP_HUMAN          |HighGrade_vs_Reference | -4.6635601| 1.1346685|  7| 0.004
## |sp&#124;Q12904&#124;AIMP1_HUMAN          |LowGrade_vs_Reference  |  1.4285129| 0.6779417|  7| 0.073
## |sp&#124;Q12907&#124;LMAN2_HUMAN          |HighGrade_vs_Reference |  2.7525911| 1.3672390|  6| 0.090
## |sp&#124;Q13011&#124;ECH1_HUMAN           |LowGrade_vs_Reference  |  4.3376432| 0.9394423|  7| 0.002
## |sp&#124;Q13011&#124;ECH1_HUMAN           |HighGrade_vs_Reference |  5.2799847| 0.9588143|  7| 0.000
## |sp&#124;Q13162&#124;PRDX4_HUMAN          |LowGrade_vs_Reference  |  4.2900389| 2.0524200|  7| 0.074
## |sp&#124;Q13423&#124;NNTM_HUMAN           |LowGrade_vs_Reference  |  1.5697591| 0.6905670|  7| 0.057
## |sp&#124;Q13492&#124;PICAL_HUMAN          |HighGrade_vs_Reference | -3.2647304| 1.1383152|  4| 0.045
## |sp&#124;Q13564&#124;ULA1_HUMAN           |LowGrade_vs_Reference  |  2.1499564| 0.7977609|  4| 0.054
## |sp&#124;Q13630&#124;FCL_HUMAN            |LowGrade_vs_Reference  |  1.5782167| 0.5352038|  7| 0.021
## |sp&#124;Q13838&#124;DX39B_HUMAN          |LowGrade_vs_Reference  |  1.9484986| 0.5048544|  7| 0.006
## |sp&#124;Q13838&#124;DX39B_HUMAN          |HighGrade_vs_Reference |  1.7420051| 0.5152649|  7| 0.011
## |sp&#124;Q13885&#124;TBB2A_HUMAN          |LowGrade_vs_Reference  | -1.7429997| 0.8392794|  5| 0.092
## |sp&#124;Q13885&#124;TBB2A_HUMAN          |HighGrade_vs_Reference | -2.3279887| 0.8668040|  5| 0.043
## |sp&#124;Q14118&#124;DAG1_HUMAN           |LowGrade_vs_Reference  | -1.8777492| 0.8515753|  6| 0.069
## |sp&#124;Q14118&#124;DAG1_HUMAN           |HighGrade_vs_Reference | -2.1797796| 0.8515753|  6| 0.042
## |sp&#124;Q14152&#124;EIF3A_HUMAN          |LowGrade_vs_Reference  |  1.5011824| 0.6437259|  7| 0.052
## |sp&#124;Q14152&#124;EIF3A_HUMAN          |HighGrade_vs_Reference |  1.4353177| 0.6570000|  7| 0.065
## |sp&#124;Q14247&#124;SRC8_HUMAN           |LowGrade_vs_Reference  | -2.3915295| 0.9813117|  7| 0.044
## |sp&#124;Q14315&#124;FLNC_HUMAN           |LowGrade_vs_Reference  |  0.7300012| 0.2975424|  7| 0.043
## |sp&#124;Q14315&#124;FLNC_HUMAN           |HighGrade_vs_Reference |  0.8695268| 0.3036779|  7| 0.024
## |sp&#124;Q14739&#124;LBR_HUMAN            |LowGrade_vs_Reference  | -5.9428264| 1.1924184|  3| 0.015
## |sp&#124;Q14739&#124;LBR_HUMAN            |HighGrade_vs_Reference | -5.8361872| 1.2647507|  3| 0.019
## |sp&#124;Q14839&#124;CHD4_HUMAN           |LowGrade_vs_Reference  |  2.5586211| 1.1010399|  5| 0.067
## |sp&#124;Q14978&#124;NOLC1_HUMAN          |LowGrade_vs_Reference  | -2.1835053| 0.6576114|  4| 0.029
## |sp&#124;Q15008&#124;PSMD6_HUMAN          |HighGrade_vs_Reference |  2.9186803| 1.2621729|  7| 0.053
## |sp&#124;Q15063&#124;POSTN_HUMAN          |HighGrade_vs_Reference |  1.2480259| 0.6298167|  7| 0.087
## |sp&#124;Q15075&#124;EEA1_HUMAN           |LowGrade_vs_Reference  |  2.8414039| 0.5541544|  6| 0.002
## |sp&#124;Q15075&#124;EEA1_HUMAN           |HighGrade_vs_Reference |  2.9662691| 0.5841300|  6| 0.002
## |sp&#124;Q15102&#124;PA1B3_HUMAN          |HighGrade_vs_Reference | -3.5644661| 1.7217681|  6| 0.083
## |sp&#124;Q15149&#124;PLEC_HUMAN           |LowGrade_vs_Reference  |  0.7245471| 0.3310661|  7| 0.064
## |sp&#124;Q15437&#124;SC23B_HUMAN          |LowGrade_vs_Reference  | -1.7416896| 0.7160695|  7| 0.045
## |sp&#124;Q15942&#124;ZYX_HUMAN            |HighGrade_vs_Reference | -1.7865820| 0.8865023|  7| 0.083
## |sp&#124;Q16531&#124;DDB1_HUMAN           |LowGrade_vs_Reference  |  3.3204057| 1.1965674|  6| 0.032
## |sp&#124;Q16531&#124;DDB1_HUMAN           |HighGrade_vs_Reference |  2.9183887| 1.2612927|  6| 0.059
## |sp&#124;Q16762&#124;THTR_HUMAN           |HighGrade_vs_Reference | -2.5062696| 0.9966468|  7| 0.040
## |sp&#124;Q6P996&#124;PDXD1_HUMAN          |HighGrade_vs_Reference | -2.0948948| 1.0412829|  7| 0.084
## |sp&#124;Q7KZF4&#124;SND1_HUMAN           |LowGrade_vs_Reference  |  1.5059318| 0.6330235|  7| 0.048
```

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## |sp&#124;Q7KZF4&#124;SND1_HUMAN          |HighGrade_vs_Reference |  1.9315146| 0.6460770|  7| 0.020
## |sp&#124;Q7Z434&#124;MAVS_HUMAN          |HighGrade_vs_Reference | -2.6491825| 0.8771258|  4| 0.039
## |sp&#124;Q7Z4W1&#124;DCXR_HUMAN          |HighGrade_vs_Reference | -3.4805533| 1.8178732|  7| 0.097
## |sp&#124;Q7Z5L9&#124;I2BP2_HUMAN         |LowGrade_vs_Reference  |  3.8426326| 1.6978808|  5| 0.073
## |sp&#124;Q8N163&#124;CCAR2_HUMAN         |LowGrade_vs_Reference  | -1.8154866| 0.9283379|  7| 0.091
## |sp&#124;Q8N163&#124;CCAR2_HUMAN         |HighGrade_vs_Reference | -2.2922606| 0.9474809|  7| 0.046
## |sp&#124;Q8N335&#124;GPD1L_HUMAN         |LowGrade_vs_Reference  | -1.6670088| 0.6736229|  4| 0.068
## |sp&#124;Q8N335&#124;GPD1L_HUMAN         |HighGrade_vs_Reference | -2.7783032| 0.6149307|  4| 0.010
## |sp&#124;Q8NBJ7&#124;SUMF2_HUMAN         |LowGrade_vs_Reference  |  2.1276761| 0.4761280|  4| 0.011
## |sp&#124;Q8NC51&#124;SERB1_HUMAN         |HighGrade_vs_Reference | -3.5533406| 1.6799122|  7| 0.072
## |sp&#124;Q8TD06&#124;AGR3_HUMAN          |LowGrade_vs_Reference  |  1.9323464| 0.7801310|  7| 0.042
## |sp&#124;Q8WX93&#124;PALLD_HUMAN         |LowGrade_vs_Reference  |  2.0758195| 0.8390547|  7| 0.042
## |sp&#124;Q8WX93&#124;PALLD_HUMAN         |HighGrade_vs_Reference |  1.6305270| 0.8563567|  7| 0.098
## |sp&#124;Q92499&#124;DDX1_HUMAN          |LowGrade_vs_Reference  |  4.0714573| 0.9860857|  7| 0.004
## |sp&#124;Q92499&#124;DDX1_HUMAN          |HighGrade_vs_Reference |  4.3725360| 1.0064195|  7| 0.003
## |sp&#124;Q92597&#124;NDRG1_HUMAN         |LowGrade_vs_Reference  |  2.6525465| 0.8513291|  7| 0.016
## |sp&#124;Q92597&#124;NDRG1_HUMAN         |HighGrade_vs_Reference |  2.9503531| 0.8688841|  7| 0.011
## |sp&#124;Q92734&#124;TFG_HUMAN           |LowGrade_vs_Reference  | -3.0914441| 1.4538376|  7| 0.071
## |sp&#124;Q92890&#124;UFD1_HUMAN          |HighGrade_vs_Reference | -3.5002496| 1.1156301|  4| 0.034
## |sp&#124;Q93009&#124;UBP7_HUMAN          |LowGrade_vs_Reference  | -2.7239592| 1.3875249|  6| 0.097
## |sp&#124;Q969H8&#124;MYDGF_HUMAN         |HighGrade_vs_Reference | -5.2741461| 2.4534570|  6| 0.075
## |sp&#124;Q96FV2&#124;SCRN2_HUMAN         |LowGrade_vs_Reference  | -4.1490681| 1.5613693|  4| 0.056
## |sp&#124;Q96LJ7&#124;DHRS1_HUMAN         |HighGrade_vs_Reference | -2.0252177| 0.5310506|  3| 0.031
## |sp&#124;Q99613&#124;EIF3C_HUMAN         |HighGrade_vs_Reference |  3.0119456| 1.4495857|  7| 0.076
## |sp&#124;Q9BQA1&#124;MEP50_HUMAN         |HighGrade_vs_Reference |  3.8185703| 0.4928050|  3| 0.004
## |sp&#124;Q9BRR6&#124;ADPGK_HUMAN         |LowGrade_vs_Reference  |  3.4790456| 1.0753597|  5| 0.023
## |sp&#124;Q9BSJ8&#124;ESYT1_HUMAN         |LowGrade_vs_Reference  | -2.7861124| 0.3913057|  7| 0.000
## |sp&#124;Q9BSJ8&#124;ESYT1_HUMAN         |HighGrade_vs_Reference | -1.5228514| 0.3993747|  7| 0.006
## |sp&#124;Q9BUT1&#124;DHRS6_HUMAN         |LowGrade_vs_Reference  |  1.7171376| 0.7188748|  4| 0.075
## |sp&#124;Q9BUT1&#124;DHRS6_HUMAN         |HighGrade_vs_Reference |  2.4883813| 0.7188748|  4| 0.025
## |sp&#124;Q9BXN1&#124;ASPN_HUMAN          |LowGrade_vs_Reference  | -1.9553966| 0.4586510|  7| 0.003
## |sp&#124;Q9BXN1&#124;ASPN_HUMAN          |HighGrade_vs_Reference | -1.1346923| 0.4681087|  7| 0.045
## |sp&#124;Q9BZQ8&#124;NIBA1_HUMAN         |LowGrade_vs_Reference  |  1.5106298| 0.6895738|  7| 0.064
## |sp&#124;Q9BZZ5&#124;API5_HUMAN          |LowGrade_vs_Reference  |  2.2843081| 1.0818288|  5| 0.088
## |sp&#124;Q9GZM7&#124;TINAL_HUMAN         |LowGrade_vs_Reference  |  2.5620549| 1.0662303|  7| 0.047
## |sp&#124;Q9GZM7&#124;TINAL_HUMAN         |HighGrade_vs_Reference |  2.6762614| 1.0882167|  7| 0.043
## |sp&#124;Q9H3P7&#124;GCP60_HUMAN         |LowGrade_vs_Reference  | -3.1026199| 1.2432494|  4| 0.067
## |sp&#124;Q9H3P7&#124;GCP60_HUMAN         |HighGrade_vs_Reference | -3.1637031| 1.3619115|  4| 0.080
## |sp&#124;Q9H4G4&#124;GAPR1_HUMAN         |LowGrade_vs_Reference  | -1.5336948| 0.6811614|  4| 0.087
## |sp&#124;Q9H4M9&#124;EHD1_HUMAN          |LowGrade_vs_Reference  |  2.2525604| 0.9691597|  7| 0.053
## |sp&#124;Q9H4M9&#124;EHD1_HUMAN          |HighGrade_vs_Reference |  2.6965406| 0.9891445|  7| 0.029
## |sp&#124;Q9HA64&#124;KT3K_HUMAN          |LowGrade_vs_Reference  |  3.2765030| 1.4158513|  4| 0.081
## |sp&#124;Q9NRV9&#124;HEBP1_HUMAN         |LowGrade_vs_Reference  | -2.7664861| 1.4257385|  7| 0.093
## |sp&#124;Q9NVI7&#124;ATD3A_HUMAN         |LowGrade_vs_Reference  |  3.4005981| 0.6120374|  4| 0.005
## |sp&#124;Q9NVI7&#124;ATD3A_HUMAN         |HighGrade_vs_Reference |  2.0804628| 0.6704533|  4| 0.036
## |sp&#124;Q9NYL9&#124;TMOD3_HUMAN         |LowGrade_vs_Reference  |  2.5817739| 0.9541224|  7| 0.030
## |sp&#124;Q9NYL9&#124;TMOD3_HUMAN         |HighGrade_vs_Reference |  2.3014706| 0.9737971|  7| 0.050
## |sp&#124;Q9UHB6&#124;LIMA1_HUMAN         |LowGrade_vs_Reference  |  4.0912483| 1.0481659|  6| 0.007
## |sp&#124;Q9UHB6&#124;LIMA1_HUMAN         |HighGrade_vs_Reference |  4.2133987| 1.1048639|  6| 0.008
## |sp&#124;Q9UHD8&#124;SEPT9_HUMAN         |LowGrade_vs_Reference  |  1.5586667| 0.6454086|  7| 0.046
## |sp&#124;Q9UHD8&#124;SEPT9_HUMAN         |HighGrade_vs_Reference |  1.6322078| 0.6587174|  7| 0.042
## |sp&#124;Q9UKK3&#124;PARP4_HUMAN         |LowGrade_vs_Reference  | -4.4361081| 1.1797268|  5| 0.013
## |sp&#124;Q9UKK3&#124;PARP4_HUMAN         |HighGrade_vs_Reference | -3.6262901| 1.1422655|  5| 0.024
## |sp&#124;Q9ULV4&#124;COR1C_HUMAN         |LowGrade_vs_Reference  |  4.1941975| 0.9162370|  7| 0.002
```

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## |sp&#124;Q9ULV4&#124;COR1C_HUMAN          |HighGrade_vs_Reference |  3.8955443| 0.9351304|  7| 0.004
## |sp&#124;Q9UMX0&#124;UBQL1_HUMAN          |HighGrade_vs_Reference | -3.0978649| 1.2819580|  4| 0.073
## |sp&#124;Q9UQ80&#124;PA2G4_HUMAN          |LowGrade_vs_Reference  | -2.8549164| 0.4903347|  7| 0.000
## |sp&#124;Q9UQ80&#124;PA2G4_HUMAN          |HighGrade_vs_Reference | -2.4235025| 0.5004458|  7| 0.001
## |sp&#124;Q9Y285&#124;SYFA_HUMAN           |HighGrade_vs_Reference | -2.4253035| 0.9589756|  5| 0.052
## |sp&#124;Q9Y6M1&#124;IF2B2_HUMAN          |LowGrade_vs_Reference  | -2.5793652| 0.9526294|  4| 0.053
## |sp&#124;Q9Y6M1&#124;IF2B2_HUMAN          |HighGrade_vs_Reference | -4.2557303| 1.2298393|  4| 0.025
## |sp&#124;TRFE_HUMAN&#124;                 |HighGrade_vs_Reference | -1.4423942| 0.6110715|  7| 0.050
## |tr&#124;A0A0J9YY99&#124;A0A0J9YY99_HUMAN |LowGrade_vs_Reference  |  3.2691282| 1.1844242|  5| 0.039
## |tr&#124;A0A0J9YY99&#124;A0A0J9YY99_HUMAN |HighGrade_vs_Reference |  3.6301467| 1.1468138|  5| 0.024
## |tr&#124;A0A3B3IUA2&#124;A0A3B3IUA2_HUMAN |HighGrade_vs_Reference |  2.7091100| 0.9549399|  4| 0.047
## |tr&#124;A0AAA9YHQ8&#124;A0AAA9YHQ8_HUMAN |LowGrade_vs_Reference  |  3.8094853| 0.8906742|  5| 0.007
## |tr&#124;A0AAA9YHQ8&#124;A0AAA9YHQ8_HUMAN |HighGrade_vs_Reference |  3.2027308| 0.8623915|  5| 0.013
## |tr&#124;G3V4C1&#124;G3V4C1_HUMAN         |LowGrade_vs_Reference  | -3.5146109| 1.1096765|  7| 0.015
## |tr&#124;G3V4C1&#124;G3V4C1_HUMAN         |HighGrade_vs_Reference | -2.4271955| 1.1325588|  7| 0.069
## |tr&#124;Q6ZN40&#124;Q6ZN40_HUMAN         |LowGrade_vs_Reference  |  2.5851073| 0.8091163|  7| 0.015
## |tr&#124;Q6ZN40&#124;Q6ZN40_HUMAN         |HighGrade_vs_Reference |  1.6406124| 0.8258008|  7| 0.087
##
##
## ### Significant Proteins - chen
##
##
## Table: Top Differential Proteins in chen
##
## |Protein                                  |Label               |     log2FC|        SE| DF|    pvalu
## |:----------------------------------------|:-------------------|----------:|---------:|--:|---------
## |sp&#124;HBA_HUMAN&#124;                  |Normal_vs_Reference | -1.0919500| 0.1252342|  3| 0.003175
## |sp&#124;P08123&#124;CO1A2_HUMAN          |Normal_vs_Reference | -0.7549034| 0.3152677|  3| 0.096351
## |sp&#124;P08123&#124;CO1A2_HUMAN          |Tumor_vs_Reference  | -0.8426263| 0.2972372|  3| 0.065925
## |sp&#124;P48735&#124;IDHP_HUMAN           |Normal_vs_Reference | -0.6957816| 0.1498124|  3| 0.018818
## |sp&#124;Q9Y6C2&#124;EMIL1_HUMAN          |Normal_vs_Reference | -0.9519876| 0.3053484|  3| 0.052565
## |tr&#124;A0A994J5K6&#124;A0A994J5K6_HUMAN |Normal_vs_Reference | -0.9173800| 0.2105343|  3| 0.022336
## |tr&#124;A0A994J5K6&#124;A0A994J5K6_HUMAN |Tumor_vs_Reference  | -0.8590560| 0.1984937|  3| 0.022745

## ### Final Summary:
##   Dataset 'munro' - 418 differentially abundant proteins.
##  Dataset 'chen' - 102 differentially abundant proteins.
```