zscore_Athreshold

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```
library(readr)
library(data.table)
library(HiCcompare)
library(dplyr)
library(pROC)
```

```
.calc_z <- function(hic.table, quant = 0.25) {
  threshold <- quantile((hic.table$A), 0.25, na.rm = TRUE)
  Z <- (hic.table$adj.M - mean(hic.table$adj.M)) / sd(hic.table$adj.M)
  # set z-scores where A < threshold to 0
  Z[hic.table$A < threshold] <- 0
  hic.table[, Z := Z]
  hic.table[, p.val := 2*pnorm(abs(Z), lower.tail = FALSE)]
  MD.plot2(hic.table$adj.M, hic.table$D, hic.table$p.val)
  return(hic.table)
}
```

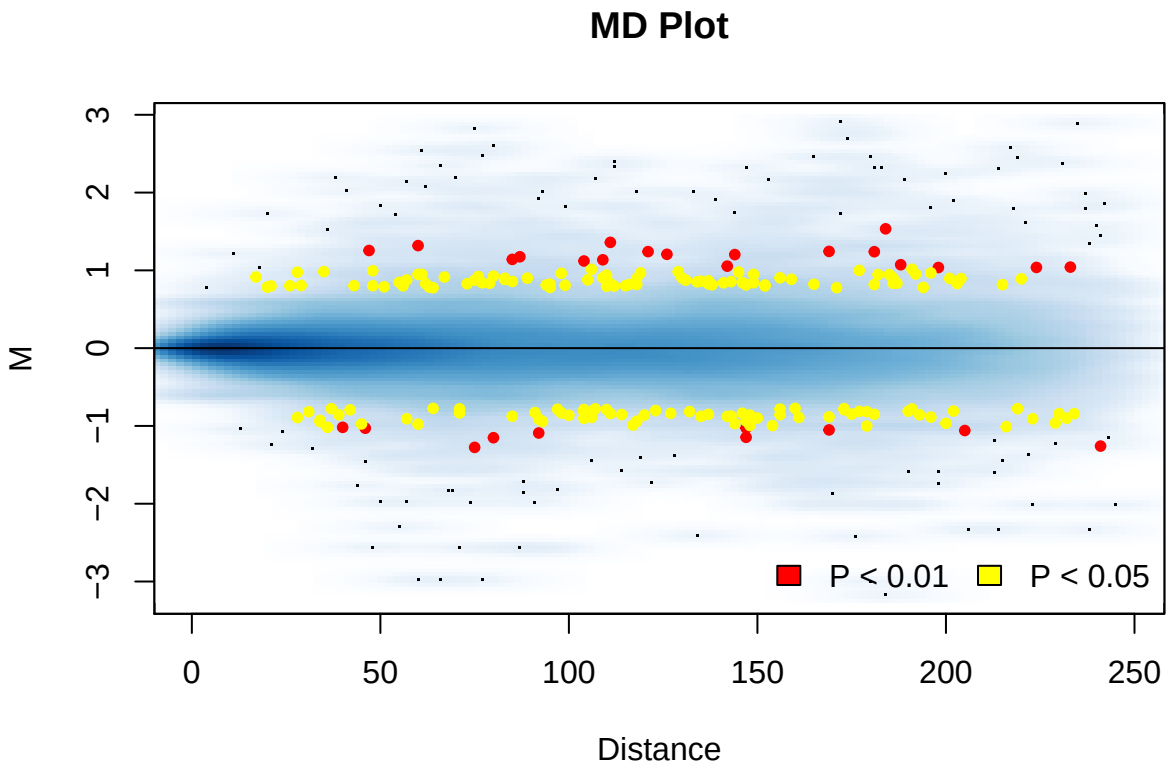
```
make_roc <- function(hic.table, N = 300, FC = 2, quant = 0.25) {
  # introduce changes
  changes <- sample(1:nrow(hic.table), size = N)
  whichIF = ifelse(hic.table[changes, ]$M < 0, -1, 1)
  newIF1 = FC^whichIF * hic.table[changes,]$IF2
  newIF1 = (round(newIF1))
  newIF1[newIF1 < 0.01] <- 1
  hic.table[changes,]$IF1 = newIF1
  hic.table = hic.table[, M := log2(IF2/IF1)]

  # make truth vector
  truth <- rep(0, nrow(hic.table))
  truth[changes] <- 1
  hic.table[, truth := truth]

  # normalize
  hic.table <- hic_loess(hic.table, Plot = FALSE)
  hic.table <- hic_diff(hic.table, Plot = FALSE)

  result <- .calc_z(hic.table, quant = quant)
  roc_result <- roc(response = result$truth, predictor = result$p.val)
  return(roc_result)
}
```

build ROC

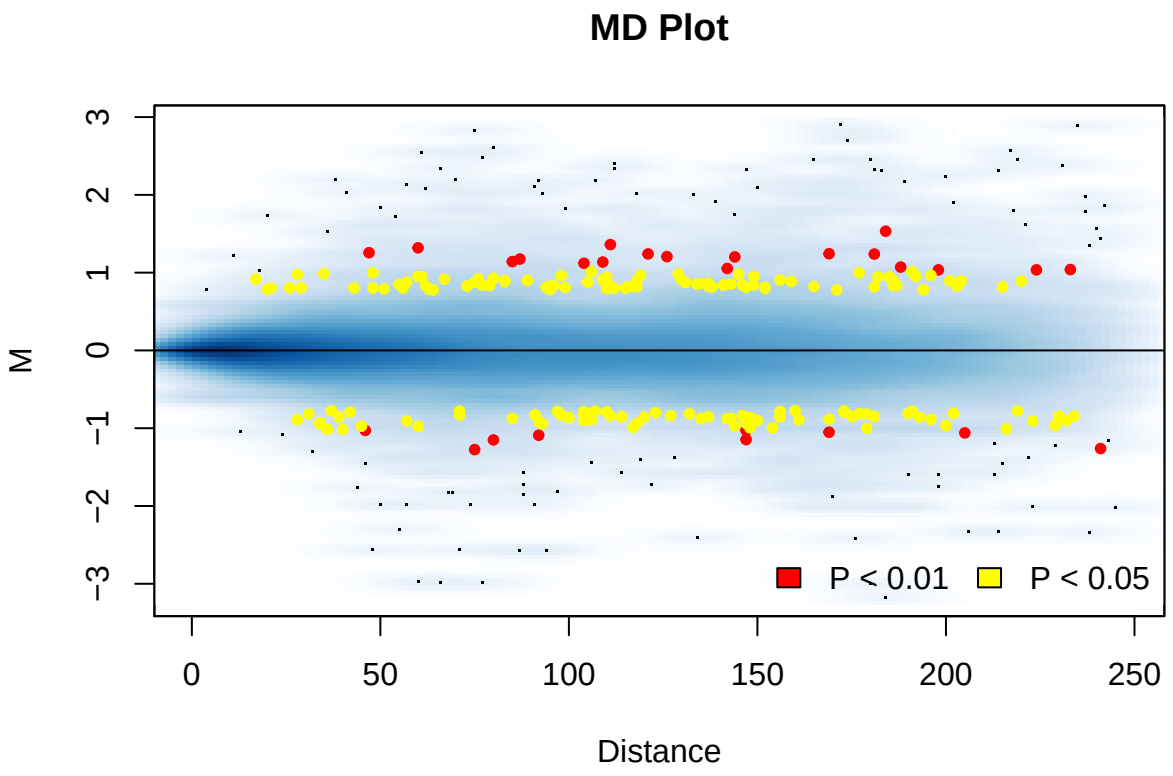
Varying fold change

Fold change = 1.5

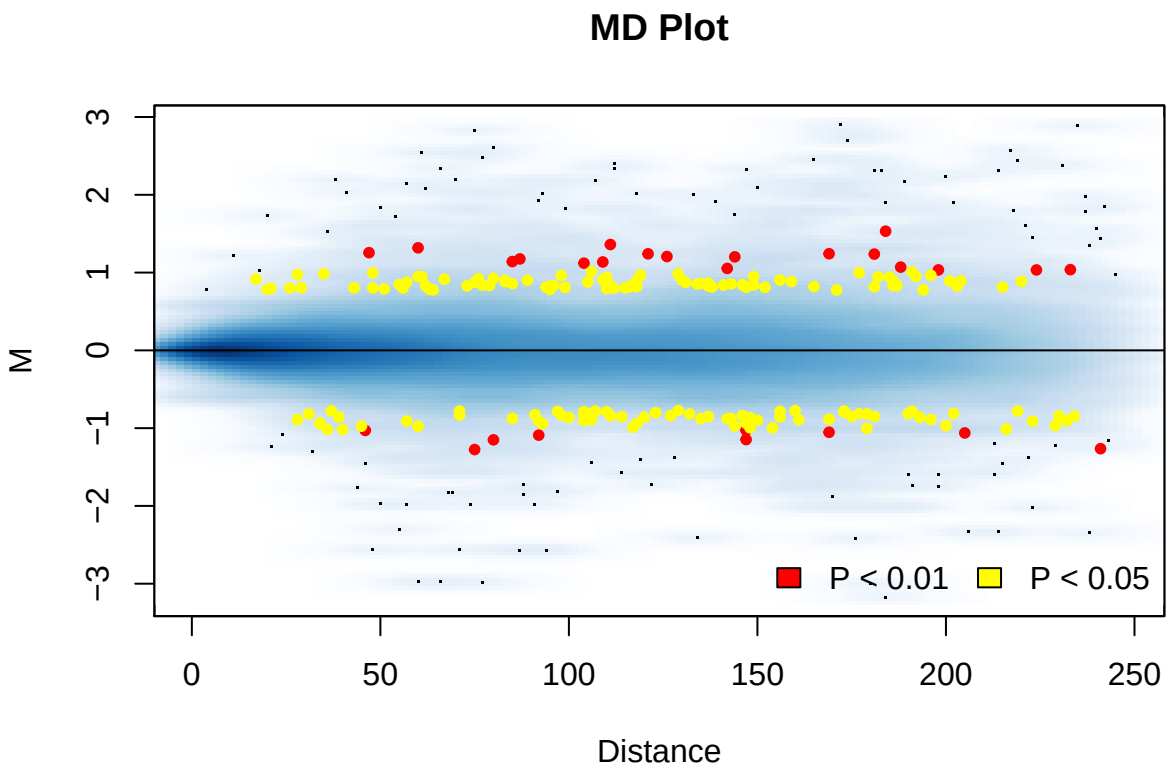
```
hic.table <- dplfc1_2[[1]]
backup.table <- hic.table

quant5 <- make_roc(hic.table, N = 300, FC = 1.5, quant = 0.05)
```



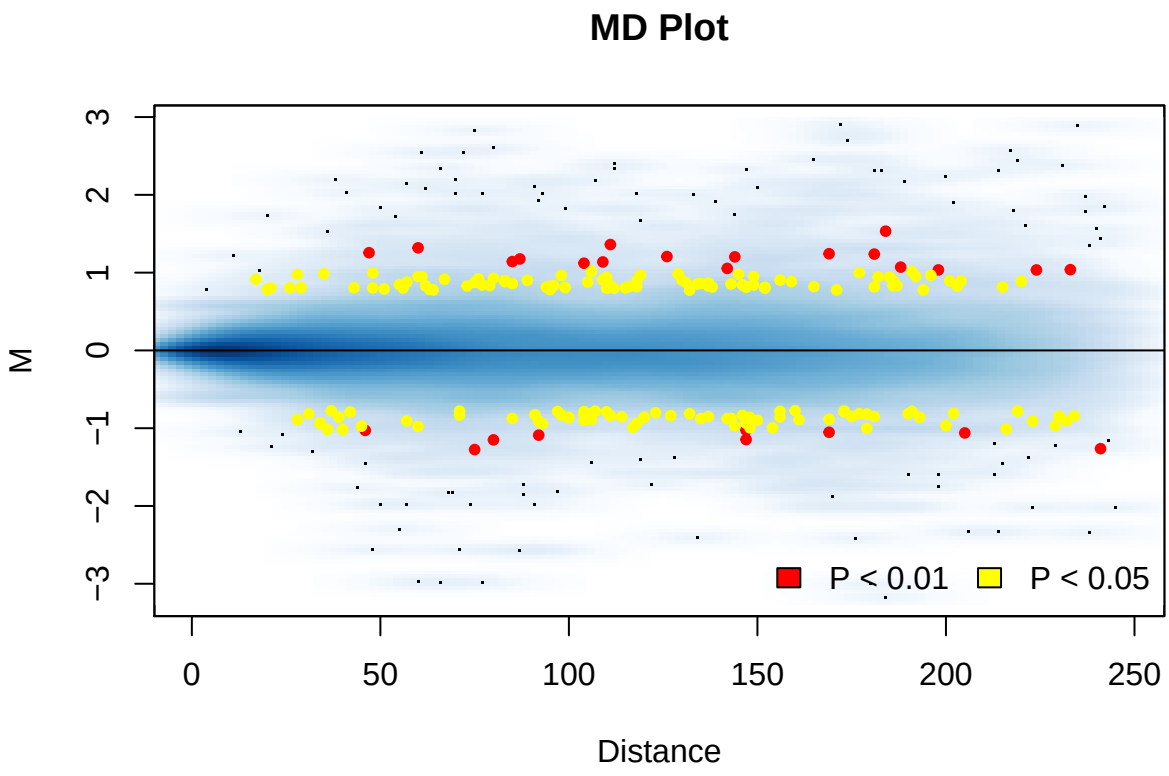

```
rm("hic.table")
hic.table <- backup.table
quant10 <- make_roc(hic.table, N = 300, FC = 1.5, quant = 0.1)
```



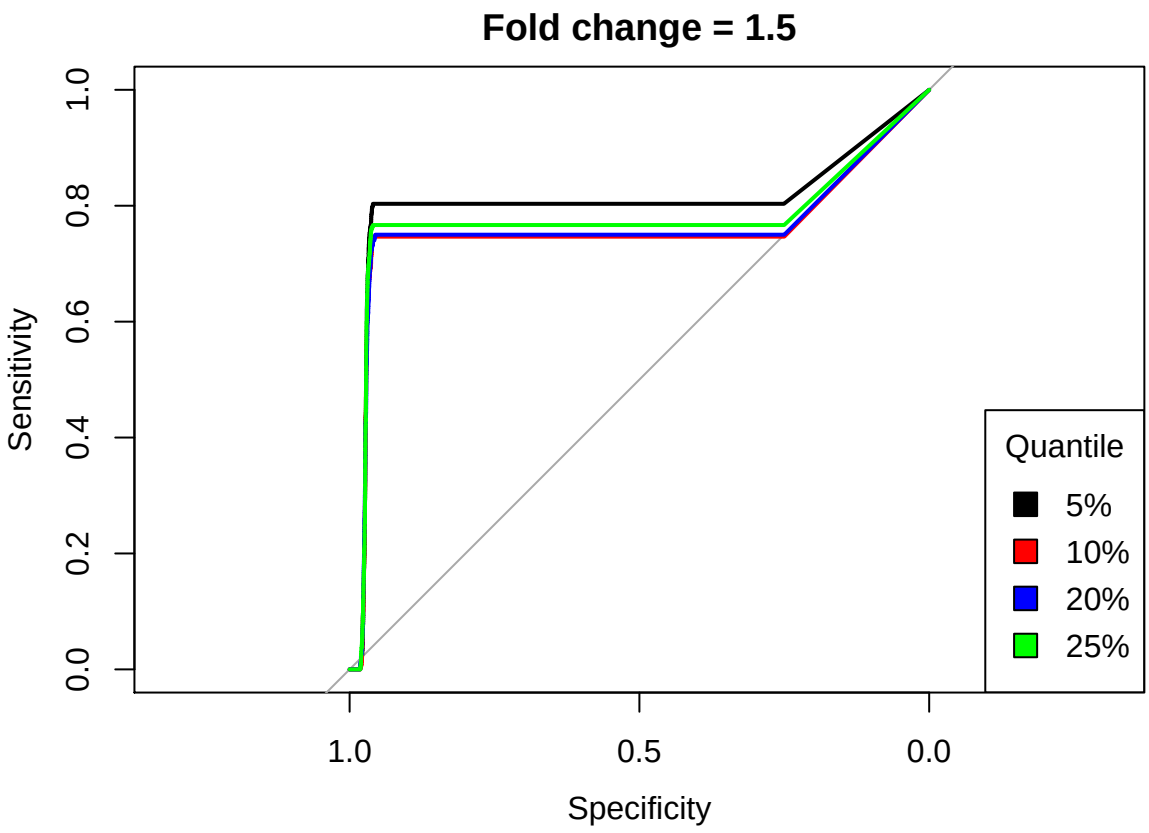

```
rm("hic.table")
hic.table <- backup.table
quant20 <- make_roc(hic.table, N = 300, FC = 1.5, quant = 0.2)
```




```
rm("hic.table")
hic.table <- backup.table
quant25 <- make_roc(hic.table, N = 300, FC = 1.5, quant = 0.25)
```

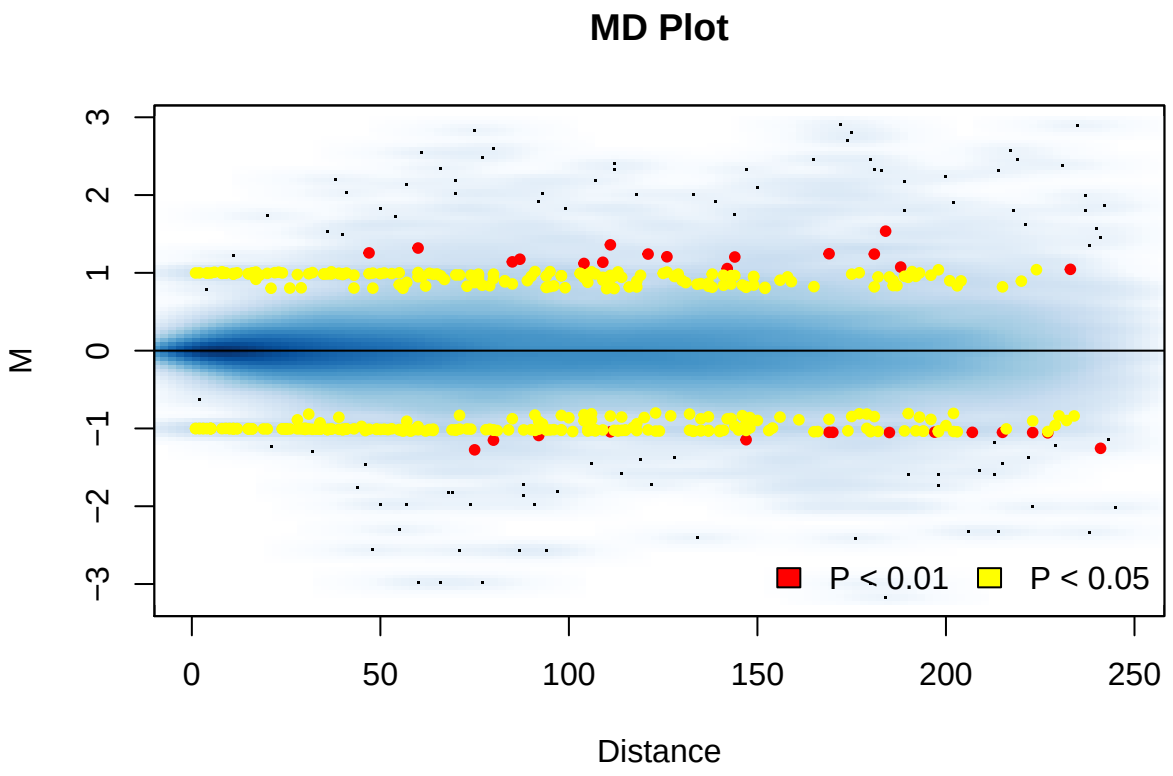



```
plot.colors <- c('black', 'red', 'blue', 'green', 'yellow', 'orange', 'purple', 'lightblue')
plot(quant5, main = paste0('Fold change = ', 1.5))
plot(quant10, add = TRUE, col = plot.colors[2])
plot(quant20, add = TRUE, col = plot.colors[3])
plot(quant25, add = TRUE, col = plot.colors[4])
legend('bottomright', inset = 0, legend = c('5%', '10%', '20%', '25%'), title = 'Quantile', fill = plot
```

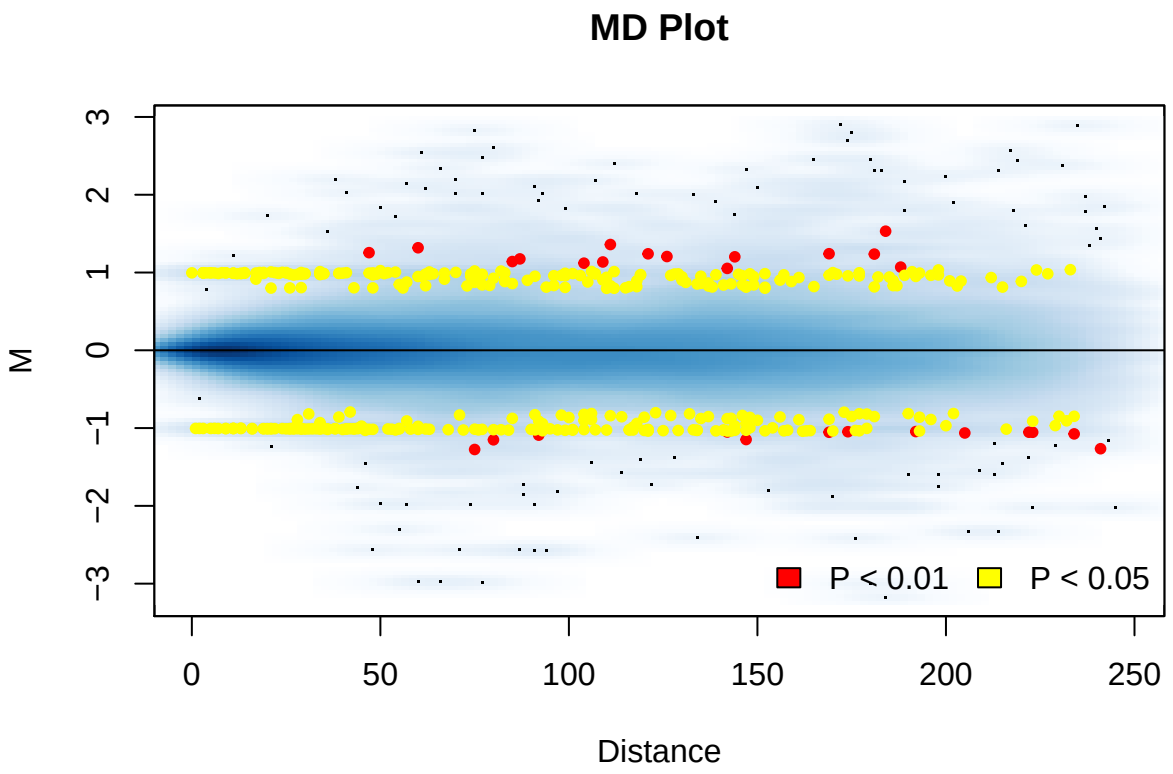


Fold change = 2

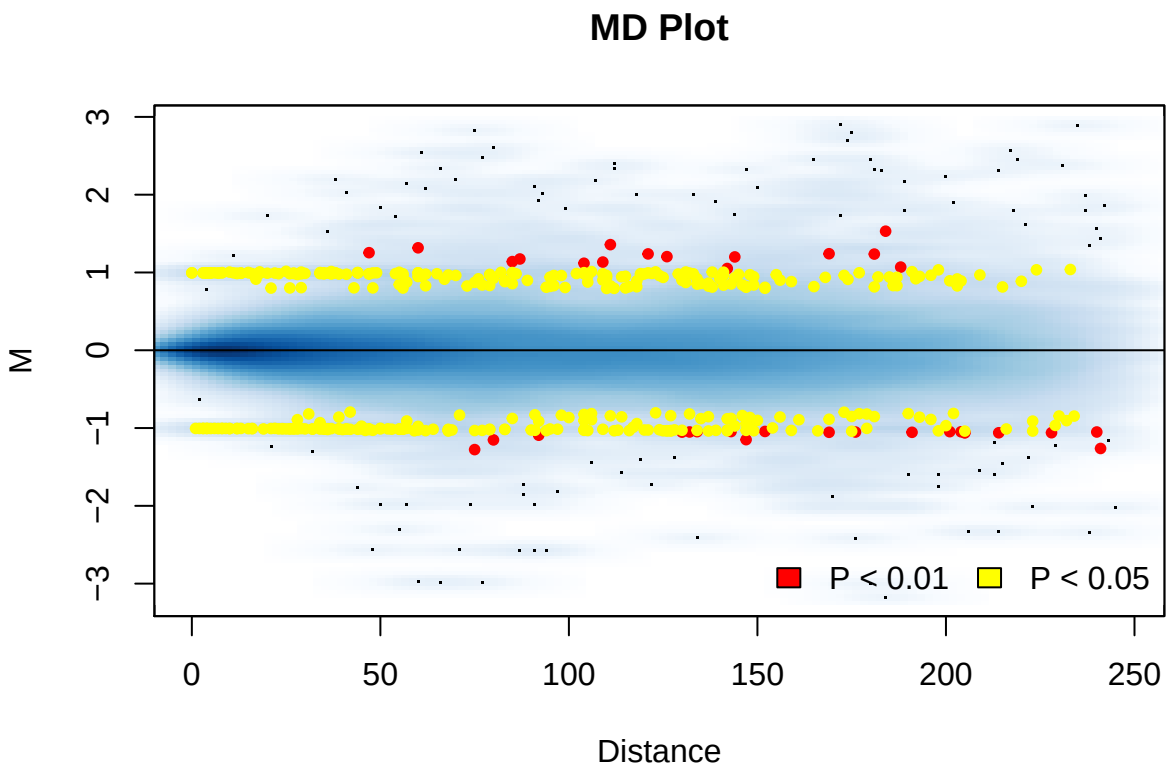
```
rm("hic.table")
hic.table <- dplfc1_2[[1]]
backup.table <- hic.table

quant5 <- make_roc(hic.table, N = 300, FC = 2, quant = 0.05)
```



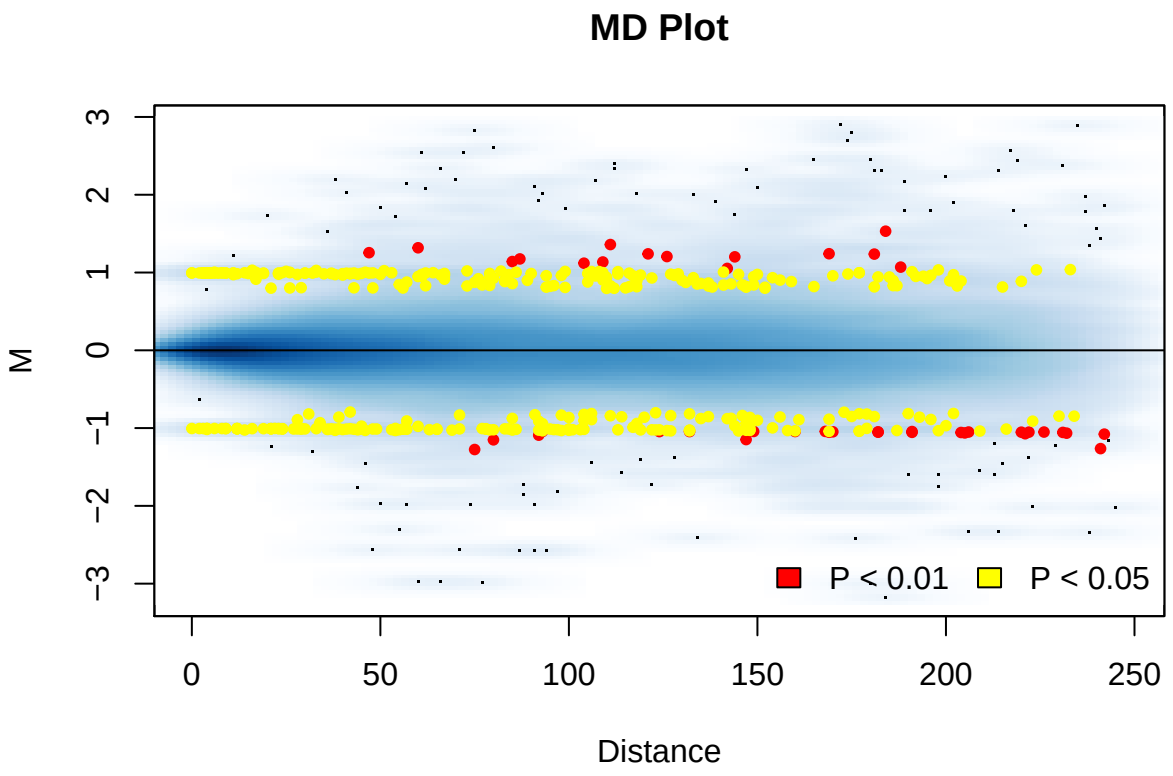

```
rm("hic.table")
hic.table <- backup.table
quant10 <- make_roc(hic.table, N = 300, FC = 2, quant = 0.1)
```



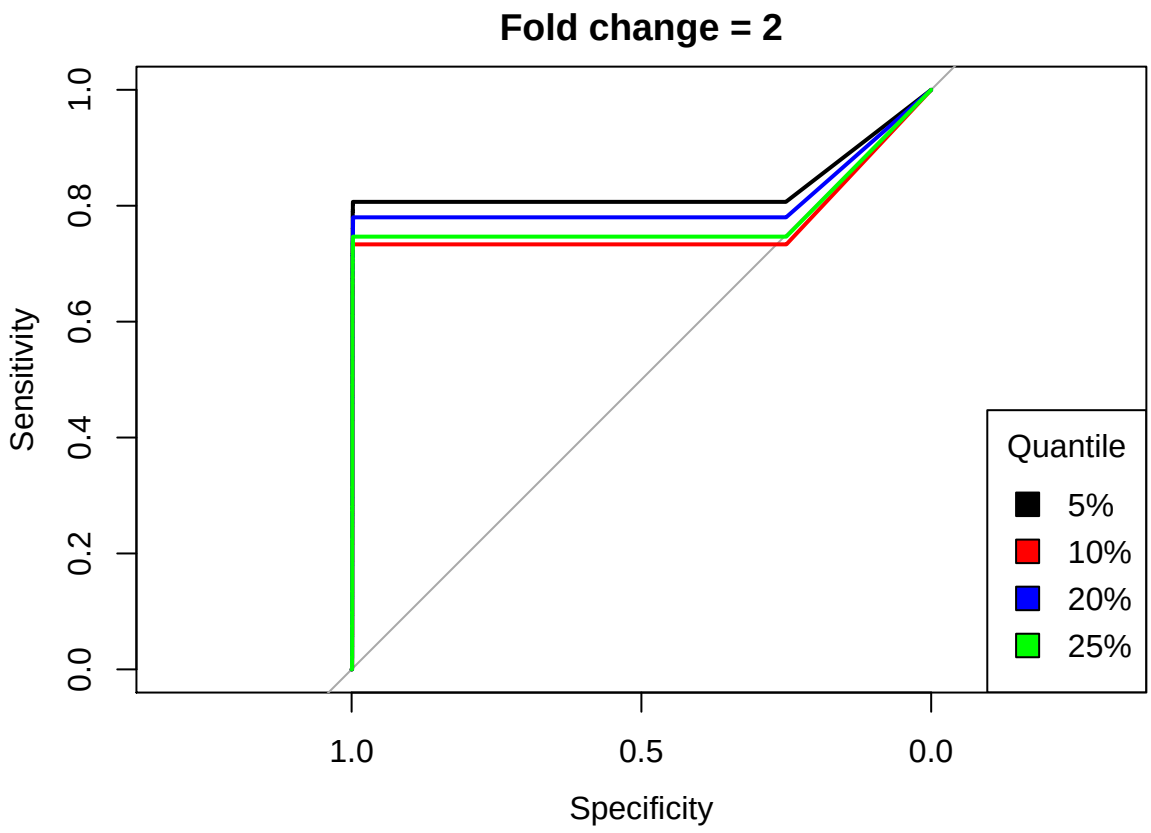

```
rm("hic.table")
hic.table <- backup.table
quant20 <- make_roc(hic.table, N = 300, FC = 2, quant = 0.2)
```




```
rm("hic.table")
hic.table <- backup.table
quant25 <- make_roc(hic.table, N = 300, FC = 2, quant = 0.25)
```

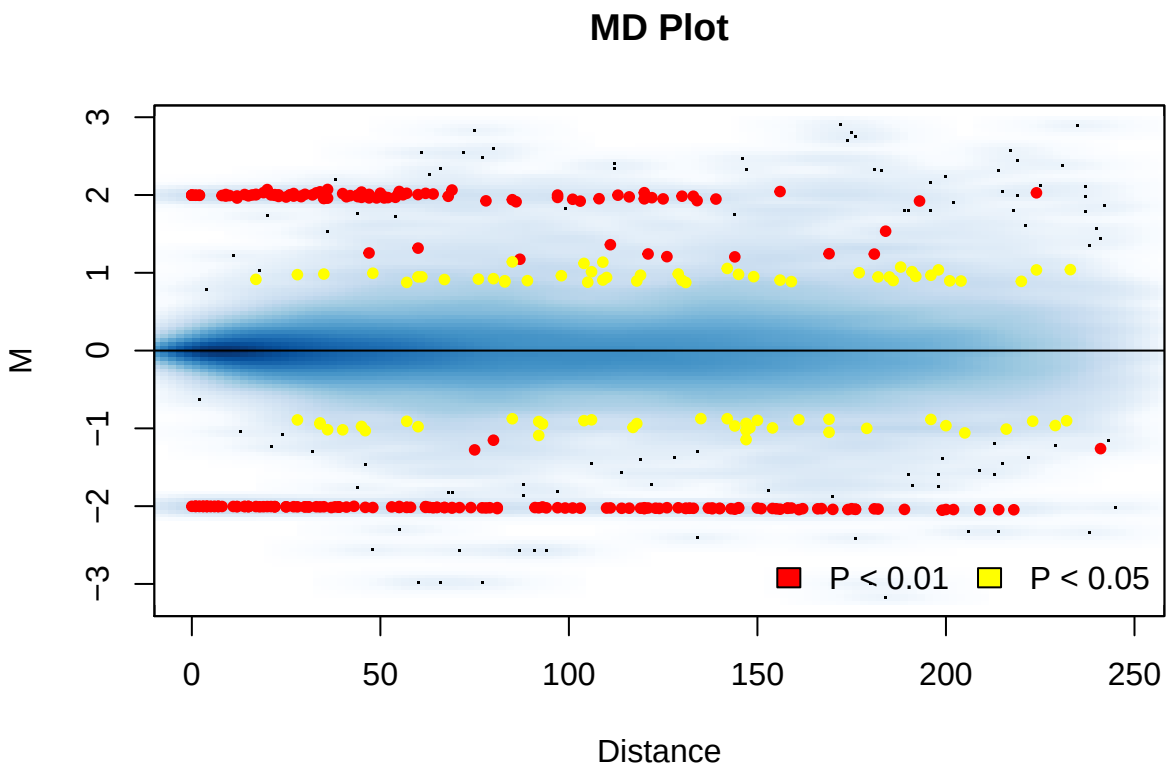



```
plot.colors <- c('black', 'red', 'blue', 'green', 'yellow', 'orange', 'purple', 'lightblue')
plot(quant5, main = paste0('Fold change = ', 2))
plot(quant10, add = TRUE, col = plot.colors[2])
plot(quant20, add = TRUE, col = plot.colors[3])
plot(quant25, add = TRUE, col = plot.colors[4])
legend('bottomright', inset = 0, legend = c('5%', '10%', '20%', '25%'), title = 'Quantile', fill = plot
```

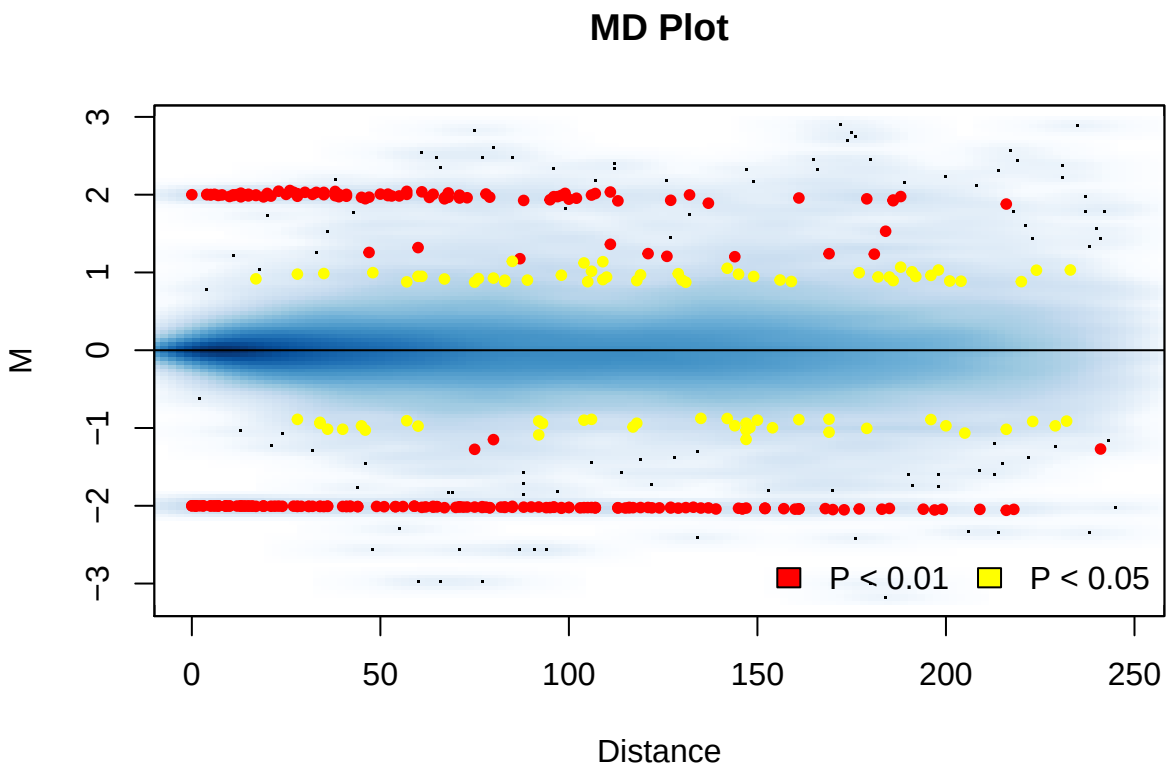


Fold change = 4

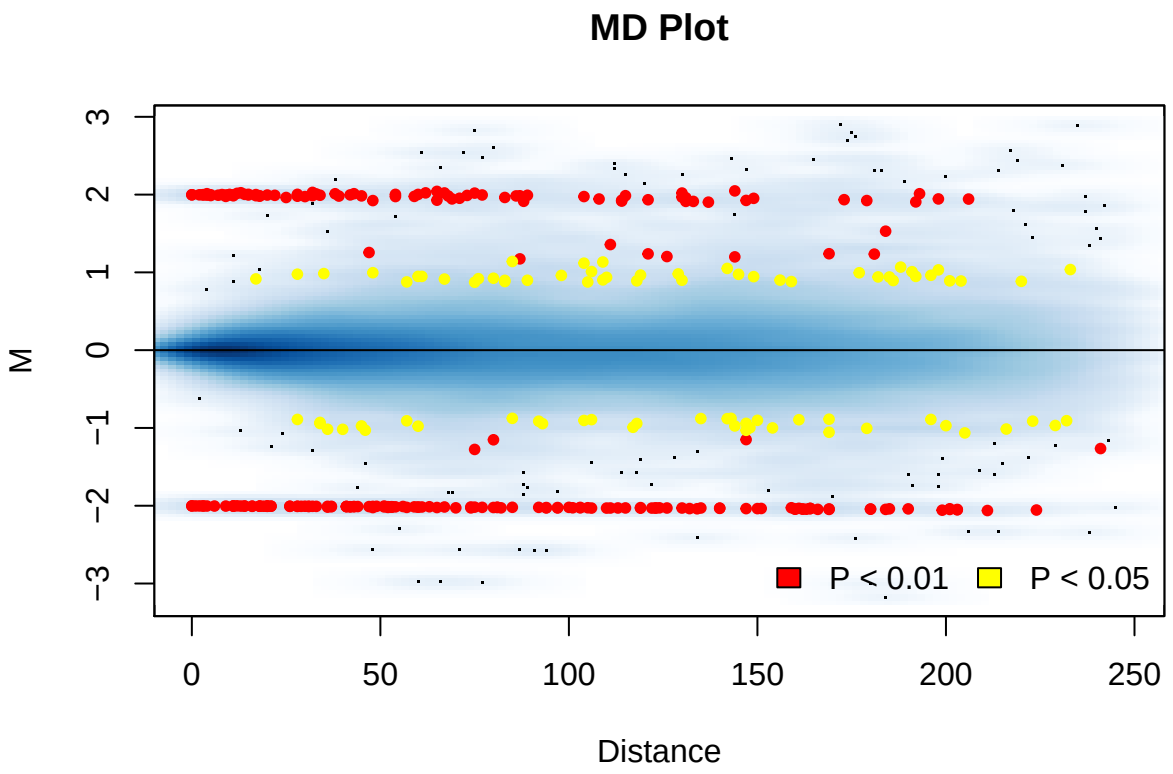
```
rm("hic.table")
hic.table <- dplfc1_2[[1]]
backup.table <- hic.table

quant5 <- make_roc(hic.table, N = 300, FC = 4, quant = 0.05)
```



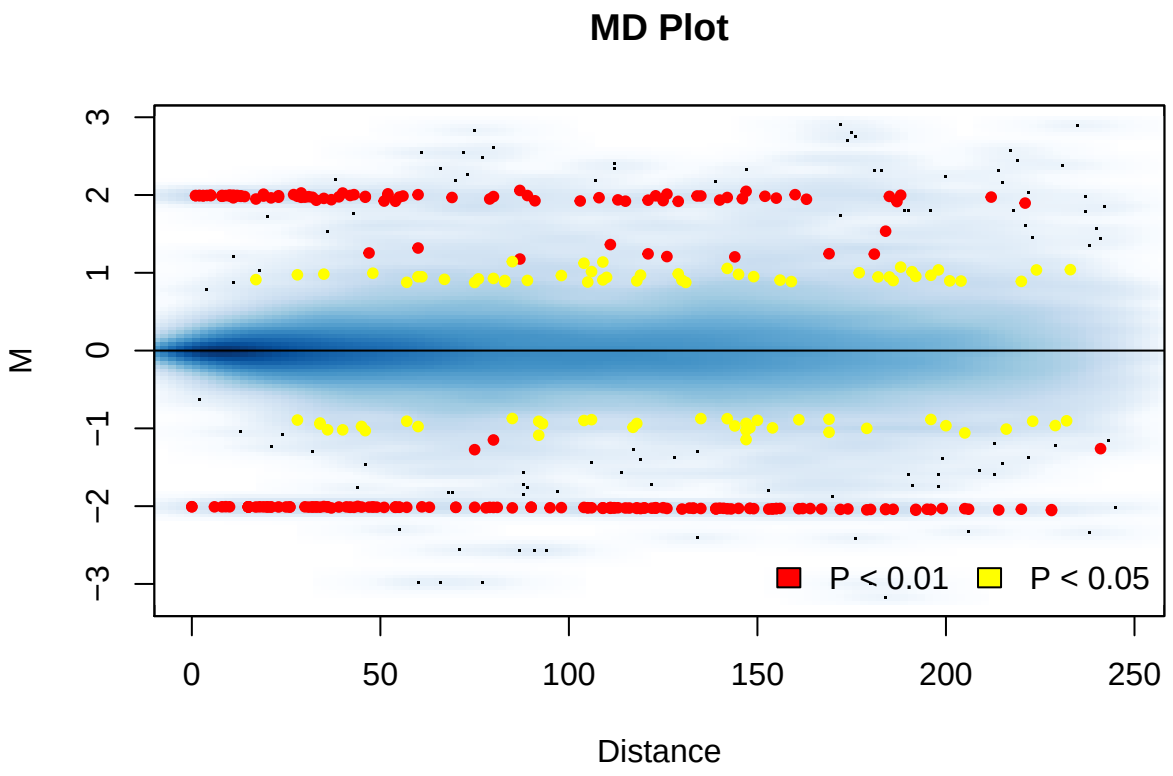

```
rm("hic.table")
hic.table <- backup.table
quant10 <- make_roc(hic.table, N = 300, FC = 4, quant = 0.1)
```



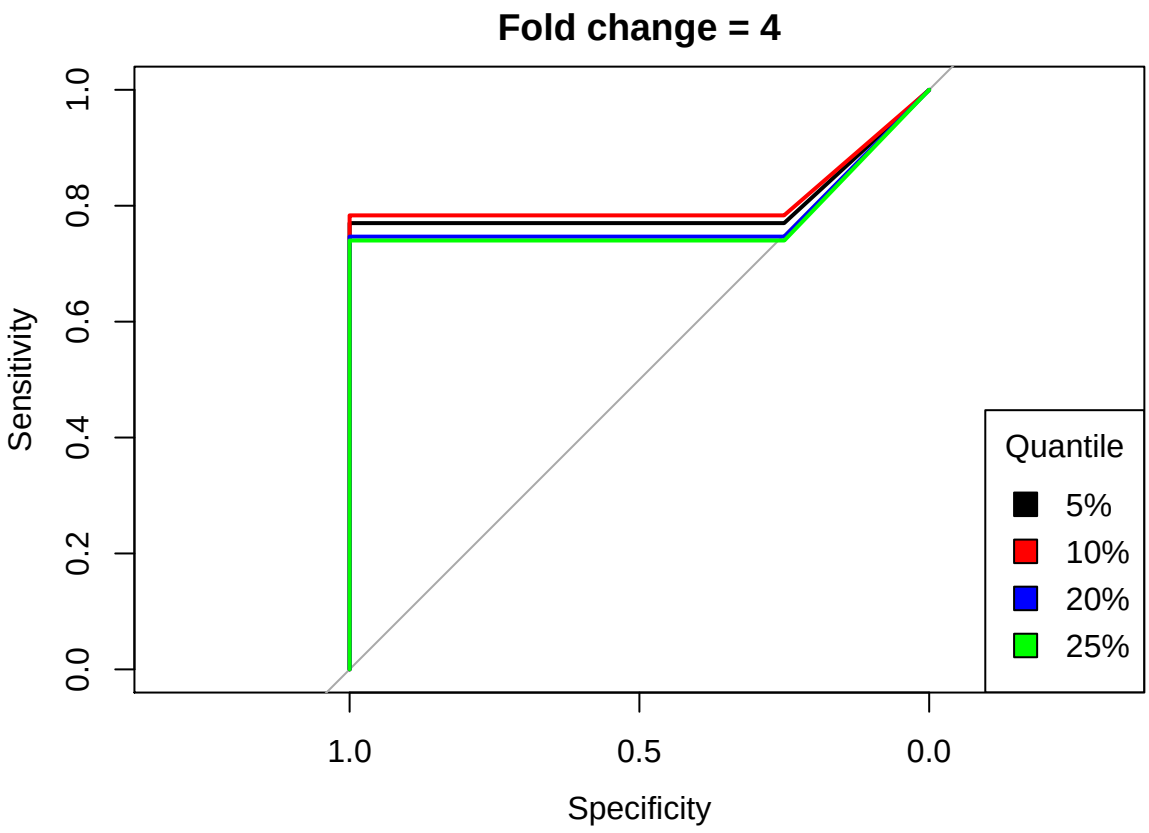

```
rm("hic.table")
hic.table <- backup.table
quant20 <- make_roc(hic.table, N = 300, FC = 4, quant = 0.2)
```




```
rm("hic.table")
hic.table <- backup.table
quant25 <- make_roc(hic.table, N = 300, FC = 4, quant = 0.25)
```



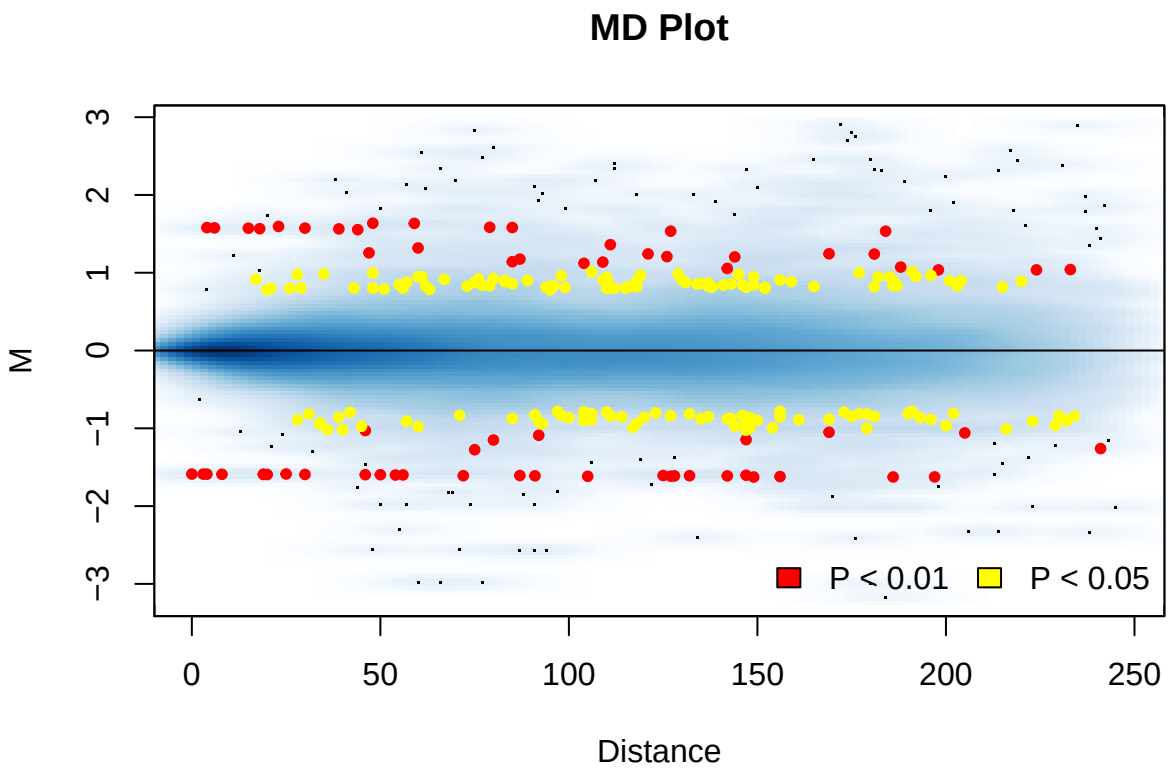

```
plot.colors <- c('black', 'red', 'blue', 'green', 'yellow', 'orange', 'purple', 'lightblue')
plot(quant5, main = paste0('Fold change = ', 4))
plot(quant10, add = TRUE, col = plot.colors[2])
plot(quant20, add = TRUE, col = plot.colors[3])
plot(quant25, add = TRUE, col = plot.colors[4])
legend('bottomright', inset = 0, legend = c('5%', '10%', '20%', '25%'), title = 'Quantile', fill = plot
```



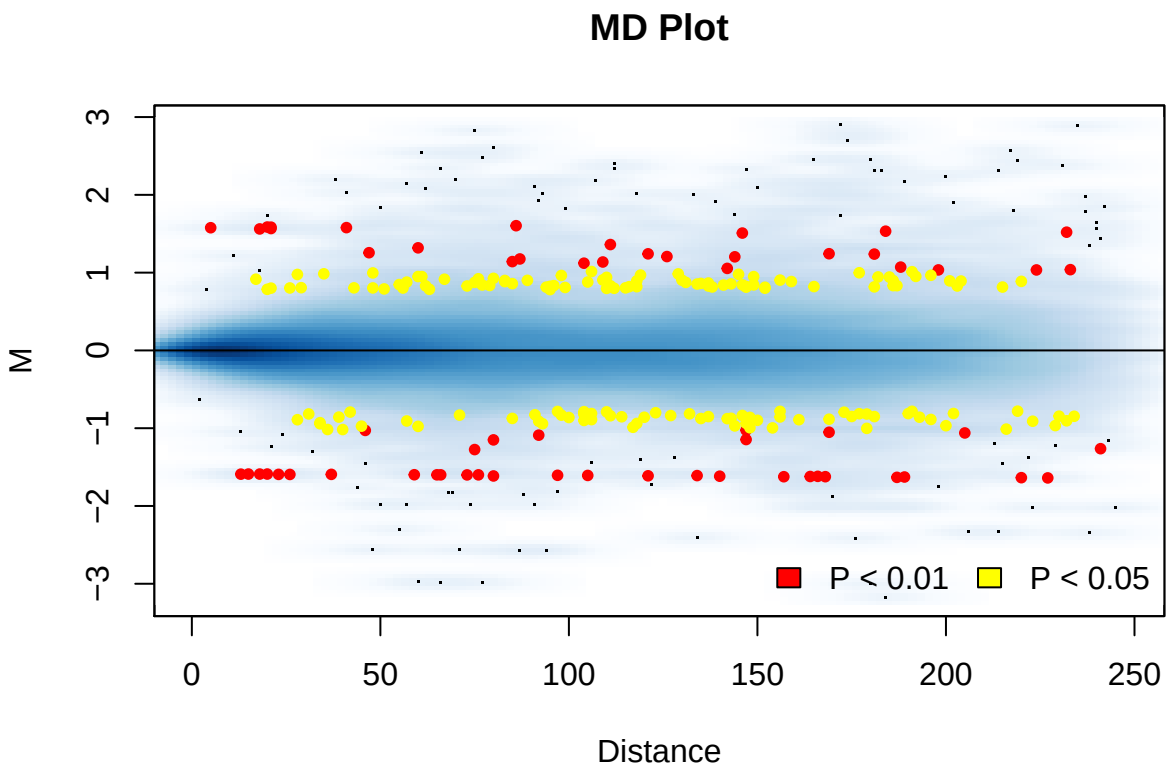
Varying number differences

50 changes 3 FC

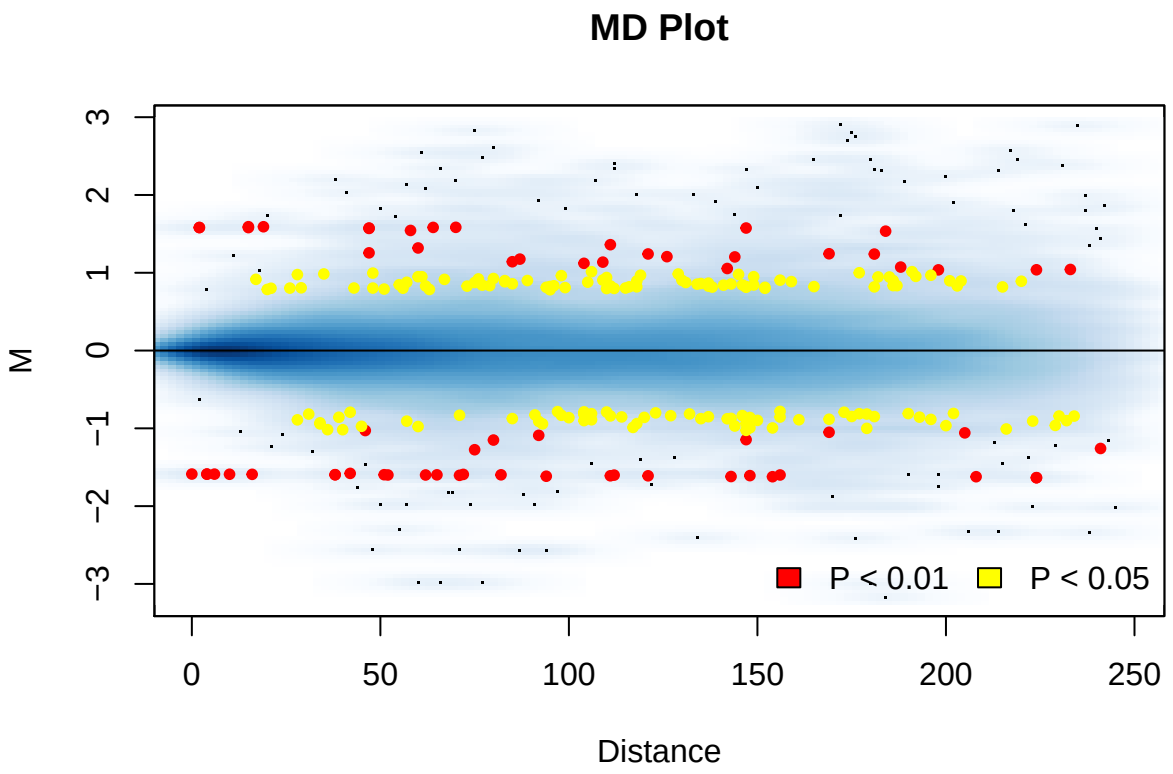
```
rm("hic.table")
hic.table <- dplfc1_2[[1]]
backup.table <- hic.table

quant5 <- make_roc(hic.table, N = 50, FC = 3, quant = 0.05)
```



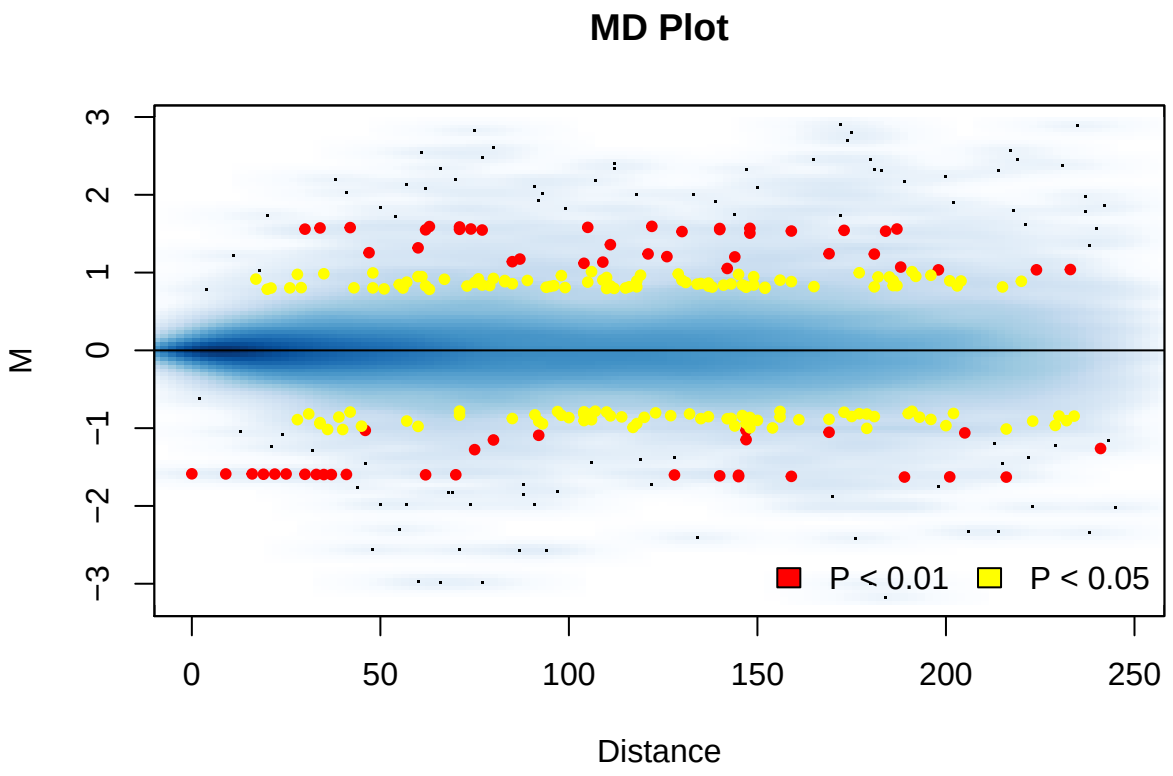

```
rm("hic.table")
hic.table <- backup.table
quant10 <- make_roc(hic.table, N = 50, FC = 3, quant = 0.1)
```



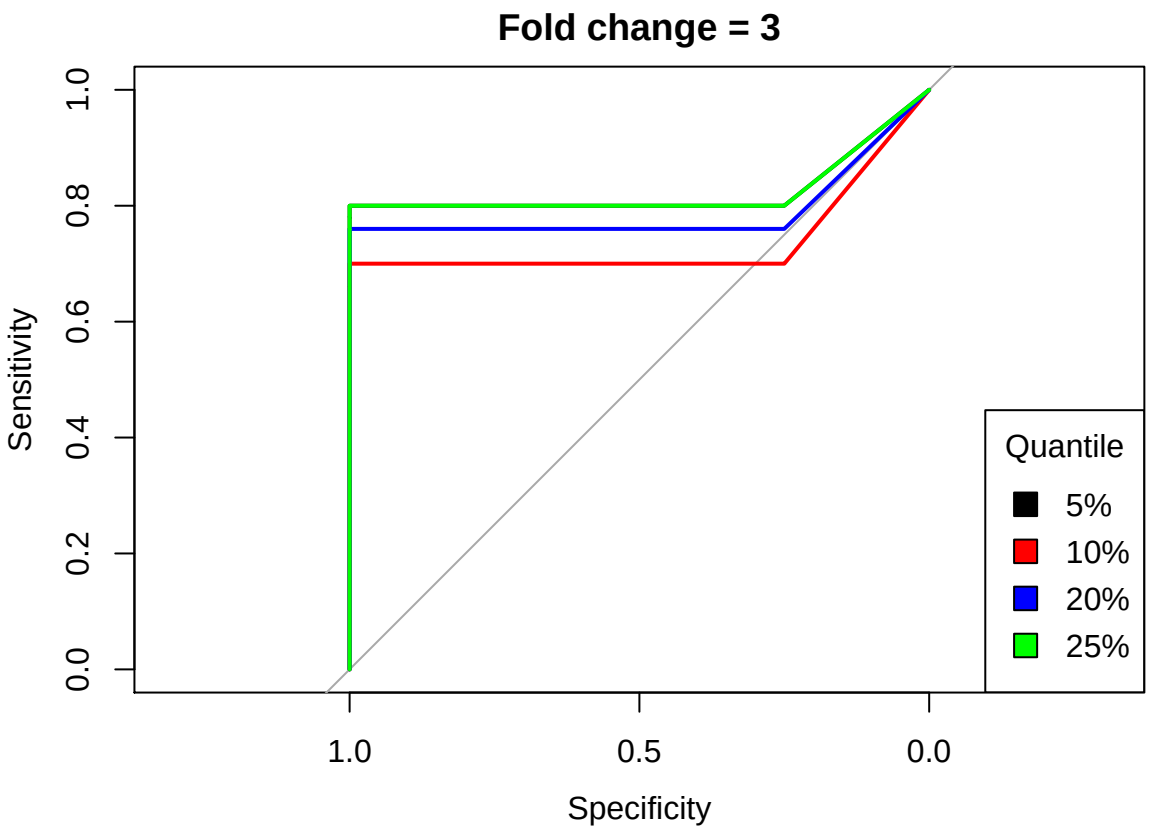

```
rm("hic.table")
hic.table <- backup.table
quant20 <- make_roc(hic.table, N = 50, FC = 3, quant = 0.2)
```




```
rm("hic.table")
hic.table <- backup.table
quant25 <- make_roc(hic.table, N = 50, FC = 3, quant = 0.25)
```

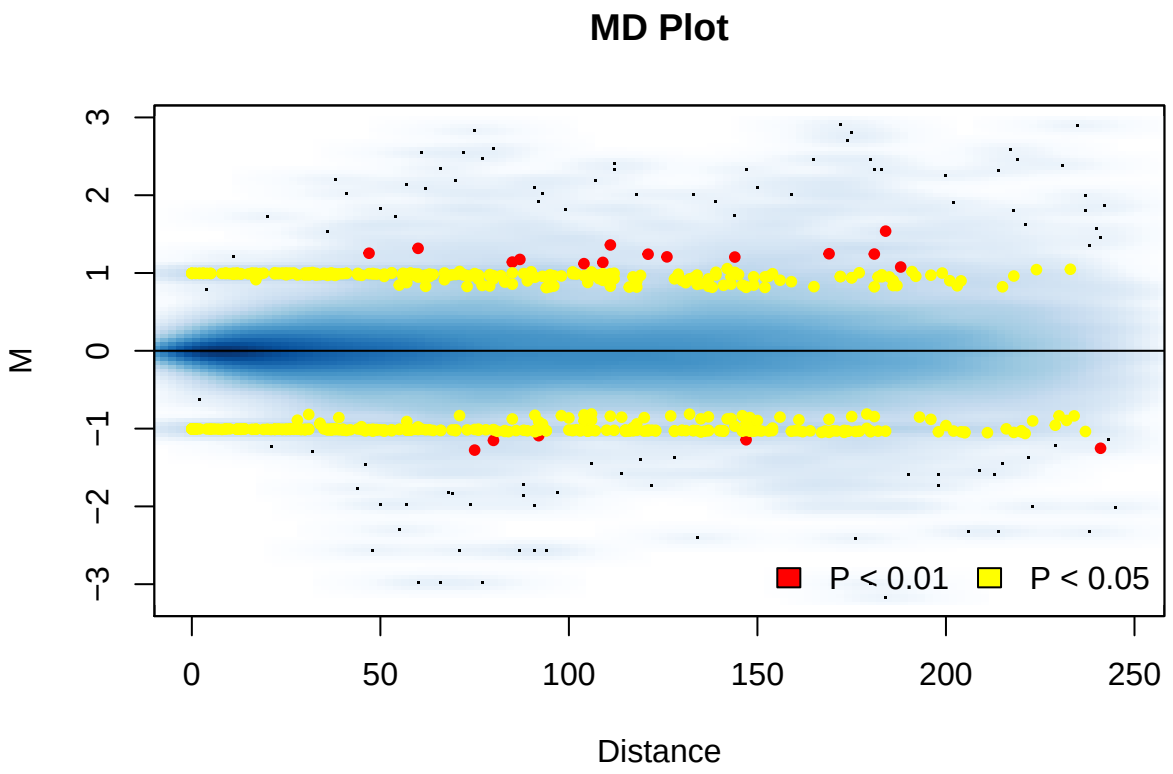



```
plot.colors <- c('black', 'red', 'blue', 'green', 'yellow', 'orange', 'purple', 'lightblue')
plot(quant5, main = paste0('Fold change = ', 3))
plot(quant10, add = TRUE, col = plot.colors[2])
plot(quant20, add = TRUE, col = plot.colors[3])
plot(quant25, add = TRUE, col = plot.colors[4])
legend('bottomright', inset = 0, legend = c('5%', '10%', '20%', '25%'), title = 'Quantile', fill = plot
```

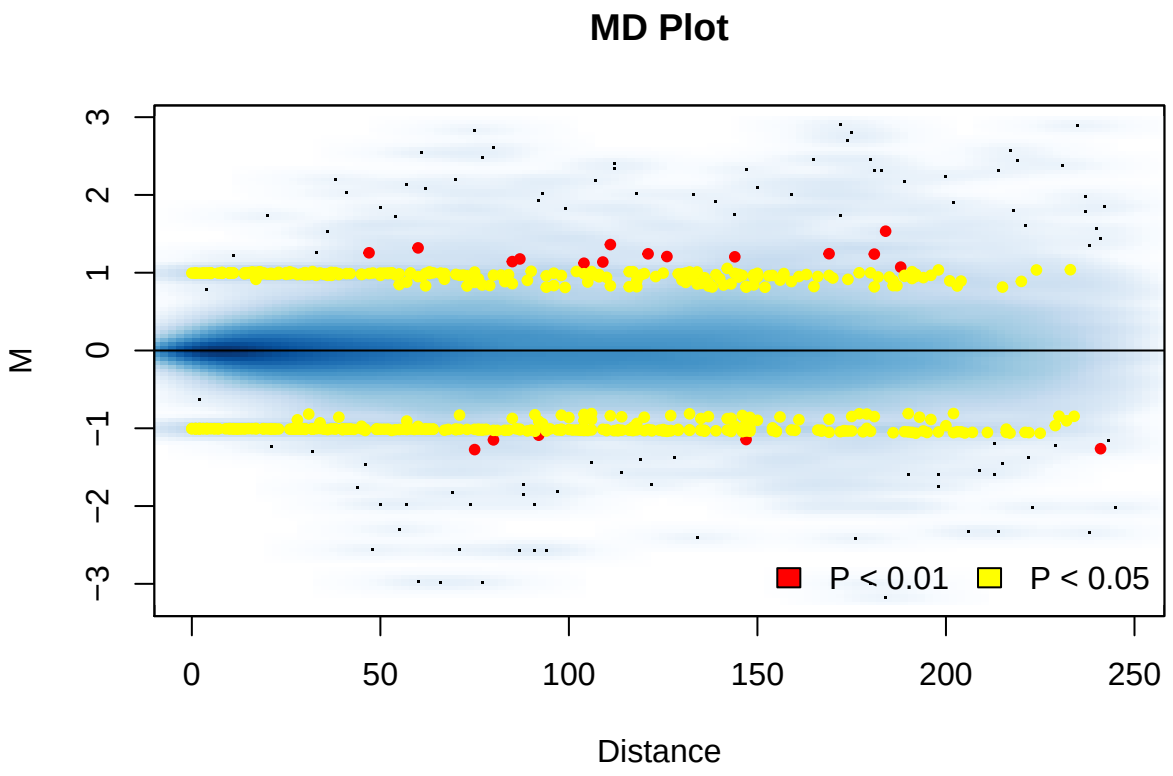


500 changes 2 FC

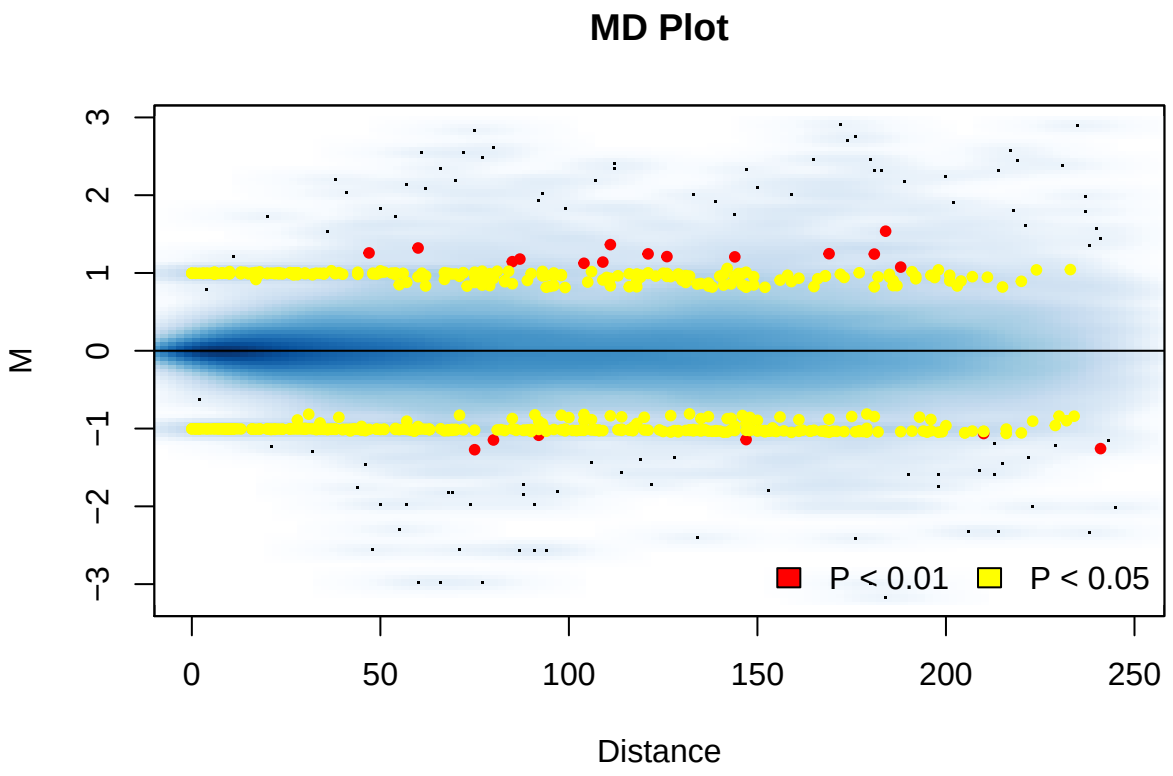
```
rm("hic.table")
hic.table <- dplfc1_2[[1]]
backup.table <- hic.table

quant5 <- make_roc(hic.table, N = 500, FC = 2, quant = 0.05)
```



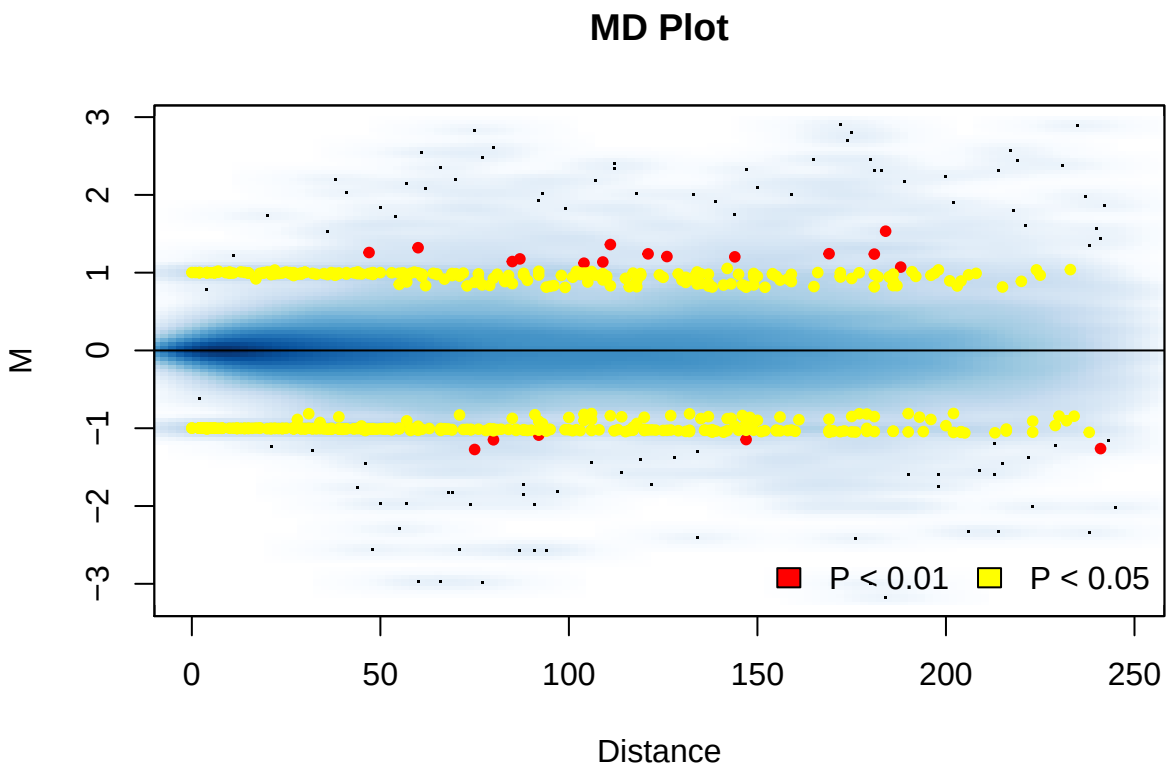

```
rm("hic.table")
hic.table <- backup.table
quant10 <- make_roc(hic.table, N = 500, FC = 2, quant = 0.1)
```



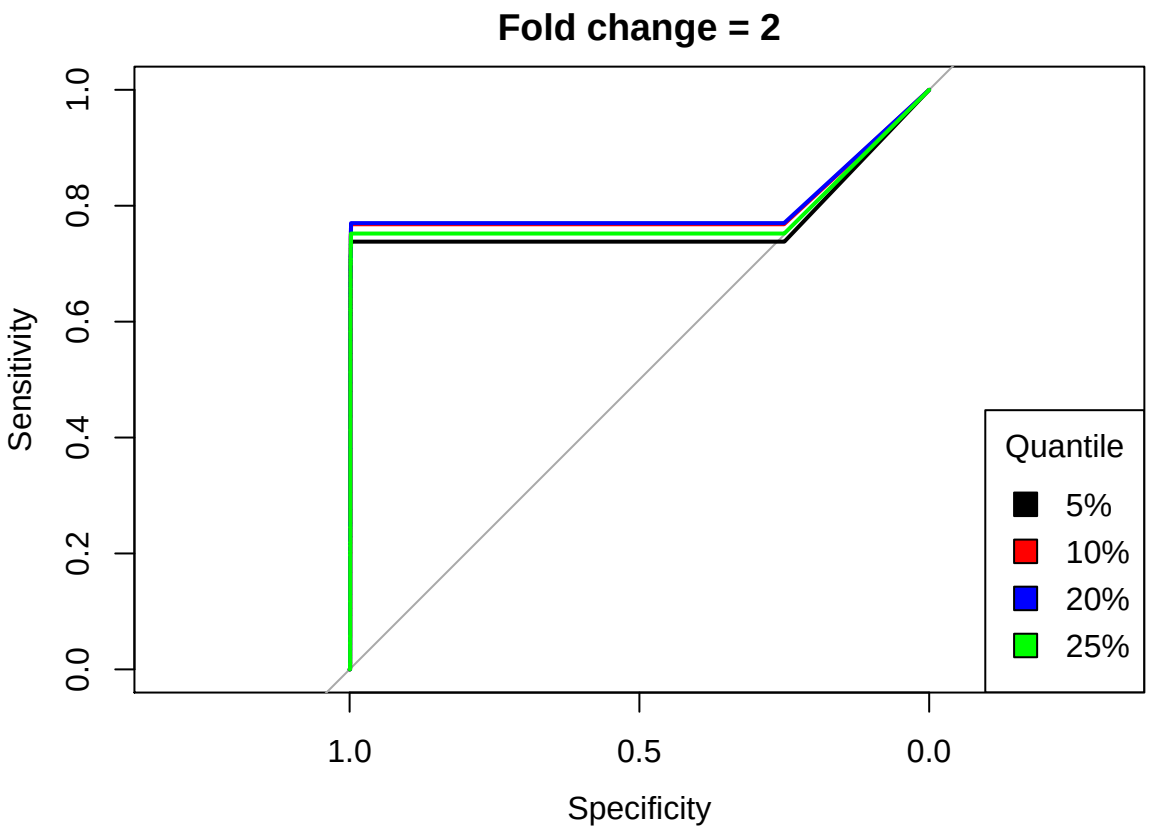

```
rm("hic.table")
hic.table <- backup.table
quant20 <- make_roc(hic.table, N = 500, FC = 2, quant = 0.2)
```




```
rm("hic.table")
hic.table <- backup.table
quant25 <- make_roc(hic.table, N = 500, FC = 2, quant = 0.25)
```




```
plot.colors <- c('black', 'red', 'blue', 'green', 'yellow', 'orange', 'purple', 'lightblue')
plot(quant5, main = paste0('Fold change = ', 2))
plot(quant10, add = TRUE, col = plot.colors[2])
plot(quant20, add = TRUE, col = plot.colors[3])
plot(quant25, add = TRUE, col = plot.colors[4])
legend('bottomright', inset = 0, legend = c('5%', '10%', '20%', '25%'), title = 'Quantile', fill = plot
```


Fold change = 2
Sensitivity
0.0
0.2
0.4
0.6
0.8
1.0
1.0
0.5
0.0
Specificity
Quantile
5%
10%
20%
25%