Analyze RNASeq Data from G9P2 RFI Lines Using QuasiSeq Package

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July 28, 2014

Results of Model 7

```
## Covariate Set
covset <- read.csv("covset.csv")
attach(covset)

## Load the result of model 7
load("Model7_result.RData")

## To get P.values of all Line Testings, use result£P.values[[3]][,'Line] To get Q.values of
## Line Testings, use result£Q.values[[3]][,'Line]

scount <- read.table("single end uniquely mapped reads count table for Yet.txt", header = T)

## List of Genes used to find DE Genes

counts <- as.matrix(scount[rowSums(scount[, -1] > 0) > 3 & rowMeans(scount[, -1]) > 8, -1])

# dim(counts) List of Line DE Genes when FDR is controled at 0.05, 0.10, 0.15

degene05 <- which(result$Q.values[[3]][, "Line"] <= 0.05)
head(scount[rownames(counts[degene05, ]), 1])  # First 6 of the List of Line DE Genes when FDR is controled at 0.05

## [1] ENSSSCG00000000035 ENSSSCG00000000036 ENSSSCG00000000047 ENSSSCG00000000059
## [5] ENSSSCG00000000066 ENSSSCG00000000139
## 25320 Levels: ENSSSCG00000000001 ENSSSCG00000000002 ... ENSSSCG00000031070

degene10 <- which(result$Q.values[[3]][, "Line"] <= 0.1)
degene15 <- which(result$Q.values[[3]][, "Line"] <= 0.15)
degene20 <- which(result$Q.values[[3]][, "Line"] <= 0.2)

## Total number of Line DE Genes when FDR is controlled at 0.05, 0.10, 0.15

degene <- c(length(degene05), length(degene10), length(degene15), length(degene20))

## List of Line DE Genes with log2(FC) >=1 when FDR is controlled at 0.05, 0.10, 0.15

lf105 <- degene05[abs(log2(apply(counts[degene05, Line == 1] + 1, 1, mean)/apply(counts[degene05,
    Line == 2] + 1, 1, mean))) >= 1]

scount[rownames(counts[lf105, ]), 1]  # List of  Line DE Genes with log2(FC) >=1 when FDR is controled at 0.05

##  [1] ENSSSCG00000000047 ENSSSCG00000000625 ENSSSCG00000000633 ENSSSCG00000000636
##  [5] ENSSSCG00000000639 ENSSSCG00000001228 ENSSSCG00000001605 ENSSSCG00000003595
##  [9] ENSSSCG00000003753 ENSSSCG00000003965 ENSSSCG00000004902 ENSSSCG00000005094
## [13] ENSSSCG00000005134 ENSSSCG00000005287 ENSSSCG00000006183 ENSSSCG00000006398
## [17] ENSSSCG00000007529 ENSSSCG00000009051 ENSSSCG00000009347 ENSSSCG00000009578
## [21] ENSSSCG00000010411 ENSSSCG00000010634 ENSSSCG00000012100 ENSSSCG00000012141
## [25] ENSSSCG00000012150 ENSSSCG00000014034 ENSSSCG00000014066 ENSSSCG00000014123
## [29] ENSSSCG00000014562 ENSSSCG00000014599 ENSSSCG00000014832 ENSSSCG00000014871
```

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## [33] ENSSSCG00000014875 ENSSSCG00000015083 ENSSSCG00000015324 ENSSSCG00000015766
## [37] ENSSSCG00000016216 ENSSSCG00000016851 ENSSSCG00000016992 ENSSSCG00000017035
## [41] ENSSSCG00000017727 ENSSSCG00000017986 ENSSSCG00000020872 ENSSSCG00000020945
## [45] ENSSSCG00000023108 ENSSSCG00000023256 ENSSSCG00000023537 ENSSSCG00000023585
## [49] ENSSSCG00000024132 ENSSSCG00000024791 ENSSSCG00000024900 ENSSSCG00000025754
## [53] ENSSSCG00000026087 ENSSSCG00000026873 ENSSSCG00000027378 ENSSSCG00000027944
## [57] ENSSSCG00000029096 ENSSSCG00000029329 ENSSSCG00000030268 ENSSSCG00000030951
## 25320 Levels: ENSSSCG00000000001 ENSSSCG00000000002 ... ENSSSCG00000031070

lf110 <- degene10[abs(log2(apply(counts[degene10, Line == 1] + 1, 1, mean)/apply(counts[degene10,
    Line == 2] + 1, 1, mean))) >= 1]

scount[rownames(counts[lf110, ]), 1]  # List of  Line DE Genes with log2(FC) >=1 when FDR is controled at 0.10

##   [1] ENSSSCG00000000047 ENSSSCG00000000625 ENSSSCG00000000633 ENSSSCG00000000636
##   [5] ENSSSCG00000000639 ENSSSCG00000000651 ENSSSCG00000000959 ENSSSCG00000000961
##   [9] ENSSSCG00000001050 ENSSSCG00000001228 ENSSSCG00000001605 ENSSSCG00000001942
##  [13] ENSSSCG00000001978 ENSSSCG00000002620 ENSSSCG00000003595 ENSSSCG00000003753
##  [17] ENSSSCG00000003965 ENSSSCG00000004902 ENSSSCG00000005094 ENSSSCG00000005134
##  [21] ENSSSCG00000005287 ENSSSCG00000005494 ENSSSCG00000006140 ENSSSCG00000006142
##  [25] ENSSSCG00000006183 ENSSSCG00000006398 ENSSSCG00000007463 ENSSSCG00000007529
##  [29] ENSSSCG00000007909 ENSSSCG00000009051 ENSSSCG00000009347 ENSSSCG00000009497
##  [33] ENSSSCG00000009578 ENSSSCG00000009636 ENSSSCG00000010411 ENSSSCG00000010634
##  [37] ENSSSCG00000012100 ENSSSCG00000012141 ENSSSCG00000012150 ENSSSCG00000012911
##  [41] ENSSSCG00000013497 ENSSSCG00000013575 ENSSSCG00000014034 ENSSSCG00000014066
##  [45] ENSSSCG00000014123 ENSSSCG00000014562 ENSSSCG00000014565 ENSSSCG00000014599
##  [49] ENSSSCG00000014832 ENSSSCG00000014871 ENSSSCG00000014875 ENSSSCG00000015083
##  [53] ENSSSCG00000015324 ENSSSCG00000015766 ENSSSCG00000016216 ENSSSCG00000016599
##  [57] ENSSSCG00000016851 ENSSSCG00000016992 ENSSSCG00000017035 ENSSSCG00000017727
##  [61] ENSSSCG00000017986 ENSSSCG00000020872 ENSSSCG00000020945 ENSSSCG00000021283
##  [65] ENSSSCG00000022500 ENSSSCG00000023108 ENSSSCG00000023127 ENSSSCG00000023256
##  [69] ENSSSCG00000023537 ENSSSCG00000023585 ENSSSCG00000023987 ENSSSCG00000024132
##  [73] ENSSSCG00000024791 ENSSSCG00000024900 ENSSSCG00000025094 ENSSSCG00000025631
##  [77] ENSSSCG00000025754 ENSSSCG00000026087 ENSSSCG00000026873 ENSSSCG00000027378
##  [81] ENSSSCG00000027611 ENSSSCG00000027944 ENSSSCG00000028095 ENSSSCG00000028911
##  [85] ENSSSCG00000029096 ENSSSCG00000029147 ENSSSCG00000029329 ENSSSCG00000030268
##  [89] ENSSSCG00000030951
## 25320 Levels: ENSSSCG00000000001 ENSSSCG00000000002 ... ENSSSCG00000031070

lf115 <- degene15[abs(log2(apply(counts[degene15, Line == 1] + 1, 1, mean)/apply(counts[degene15,
    Line == 2] + 1, 1, mean))) >= 1]
scount[rownames(counts[lf115, ]), 1]  # List of  Line DE Genes with log2(FC) >=1 when FDR is controled at 0.15

##   [1] ENSSSCG00000000047 ENSSSCG00000000625 ENSSSCG00000000633 ENSSSCG00000000636
##   [5] ENSSSCG00000000639 ENSSSCG00000000651 ENSSSCG00000000959 ENSSSCG00000000961
##   [9] ENSSSCG00000001050 ENSSSCG00000001228 ENSSSCG00000001605 ENSSSCG00000001942
##  [13] ENSSSCG00000001978 ENSSSCG00000002620 ENSSSCG00000003595 ENSSSCG00000003753
##  [17] ENSSSCG00000003965 ENSSSCG00000004902 ENSSSCG00000005094 ENSSSCG00000005134
##  [21] ENSSSCG00000005211 ENSSSCG00000005287 ENSSSCG00000005494 ENSSSCG00000006140
##  [25] ENSSSCG00000006142 ENSSSCG00000006183 ENSSSCG00000006398 ENSSSCG00000007405
##  [29] ENSSSCG00000007463 ENSSSCG00000007529 ENSSSCG00000007909 ENSSSCG00000008771
##  [33] ENSSSCG00000008991 ENSSSCG00000009051 ENSSSCG00000009347 ENSSSCG00000009497
##  [37] ENSSSCG00000009578 ENSSSCG00000009636 ENSSSCG00000009965 ENSSSCG00000010411
##  [41] ENSSSCG00000010634 ENSSSCG00000012100 ENSSSCG00000012141 ENSSSCG00000012150
##  [45] ENSSSCG00000012911 ENSSSCG00000013497 ENSSSCG00000013575 ENSSSCG00000014034
##  [49] ENSSSCG00000014066 ENSSSCG00000014123 ENSSSCG00000014562 ENSSSCG00000014565
##  [53] ENSSSCG00000014599 ENSSSCG00000014832 ENSSSCG00000014871 ENSSSCG00000014875
##  [57] ENSSSCG00000015083 ENSSSCG00000015324 ENSSSCG00000015706 ENSSSCG00000015707
##  [61] ENSSSCG00000015766 ENSSSCG00000016216 ENSSSCG00000016599 ENSSSCG00000016851
##  [65] ENSSSCG00000016992 ENSSSCG00000017035 ENSSSCG00000017220 ENSSSCG00000017300
##  [69] ENSSSCG00000017727 ENSSSCG00000017986 ENSSSCG00000020872 ENSSSCG00000020945
##  [73] ENSSSCG00000021283 ENSSSCG00000021368 ENSSSCG00000022500 ENSSSCG00000023108
##  [77] ENSSSCG00000023127 ENSSSCG00000023256 ENSSSCG00000023537 ENSSSCG00000023585
##  [81] ENSSSCG00000023987 ENSSSCG00000024132 ENSSSCG00000024136 ENSSSCG00000024791
##  [85] ENSSSCG00000024900 ENSSSCG00000025094 ENSSSCG00000025631 ENSSSCG00000025754
##  [89] ENSSSCG00000026087 ENSSSCG00000026873 ENSSSCG00000027378 ENSSSCG00000027611
##  [93] ENSSSCG00000027944 ENSSSCG00000028095 ENSSSCG00000028664 ENSSSCG00000028911
##  [97] ENSSSCG00000029096 ENSSSCG00000029147 ENSSSCG00000029329 ENSSSCG00000030268
```

```
## [101] ENSSSCG00000030644 ENSSSCG00000030951
## 25320 Levels: ENSSSCG00000000001 ENSSSCG00000000002 ... ENSSSCG00000031070

lf120 <- degene20[abs(log2(apply(counts[degene20, Line == 1] + 1, 1, mean)/apply(counts[degene20,
    Line == 2] + 1, 1, mean))) >= 1]
scount[rownames(counts[lf120, ]), 1]  # List of  Line DE Genes with log2(FC) >=1 when FDR is controled at 0.20

##   [1] ENSSSCG00000000047 ENSSSCG00000000625 ENSSSCG00000000633 ENSSSCG00000000636
##   [5] ENSSSCG00000000639 ENSSSCG00000000651 ENSSSCG00000000959 ENSSSCG00000000961
##   [9] ENSSSCG00000001050 ENSSSCG00000001228 ENSSSCG00000001605 ENSSSCG00000001942
##  [13] ENSSSCG00000001978 ENSSSCG00000002620 ENSSSCG00000003595 ENSSSCG00000003753
##  [17] ENSSSCG00000003965 ENSSSCG00000004902 ENSSSCG00000005094 ENSSSCG00000005134
##  [21] ENSSSCG00000005211 ENSSSCG00000005287 ENSSSCG00000005494 ENSSSCG00000006140
##  [25] ENSSSCG00000006142 ENSSSCG00000006183 ENSSSCG00000006398 ENSSSCG00000007405
##  [29] ENSSSCG00000007463 ENSSSCG00000007529 ENSSSCG00000007909 ENSSSCG00000008771
##  [33] ENSSSCG00000008991 ENSSSCG00000009051 ENSSSCG00000009347 ENSSSCG00000009497
##  [37] ENSSSCG00000009578 ENSSSCG00000009636 ENSSSCG00000009965 ENSSSCG00000010411
##  [41] ENSSSCG00000010634 ENSSSCG00000012100 ENSSSCG00000012141 ENSSSCG00000012150
##  [45] ENSSSCG00000012911 ENSSSCG00000013497 ENSSSCG00000013575 ENSSSCG00000014034
##  [49] ENSSSCG00000014066 ENSSSCG00000014123 ENSSSCG00000014562 ENSSSCG00000014565
##  [53] ENSSSCG00000014599 ENSSSCG00000014727 ENSSSCG00000014832 ENSSSCG00000014871
##  [57] ENSSSCG00000014875 ENSSSCG00000015083 ENSSSCG00000015324 ENSSSCG00000015706
##  [61] ENSSSCG00000015707 ENSSSCG00000015766 ENSSSCG00000016216 ENSSSCG00000016503
##  [65] ENSSSCG00000016599 ENSSSCG00000016851 ENSSSCG00000016992 ENSSSCG00000017035
##  [69] ENSSSCG00000017220 ENSSSCG00000017300 ENSSSCG00000017727 ENSSSCG00000017986
##  [73] ENSSSCG00000020667 ENSSSCG00000020872 ENSSSCG00000020945 ENSSSCG00000021283
##  [77] ENSSSCG00000021368 ENSSSCG00000022500 ENSSSCG00000023108 ENSSSCG00000023127
##  [81] ENSSSCG00000023256 ENSSSCG00000023537 ENSSSCG00000023585 ENSSSCG00000023733
##  [85] ENSSSCG00000023987 ENSSSCG00000024132 ENSSSCG00000024136 ENSSSCG00000024791
##  [89] ENSSSCG00000024900 ENSSSCG00000025094 ENSSSCG00000025631 ENSSSCG00000025704
##  [93] ENSSSCG00000025754 ENSSSCG00000026087 ENSSSCG00000026873 ENSSSCG00000027378
##  [97] ENSSSCG00000027611 ENSSSCG00000027944 ENSSSCG00000028095 ENSSSCG00000028664
## [101] ENSSSCG00000028911 ENSSSCG00000029096 ENSSSCG00000029147 ENSSSCG00000029329
## [105] ENSSSCG00000030268 ENSSSCG00000030644 ENSSSCG00000030951
## 25320 Levels: ENSSSCG00000000001 ENSSSCG00000000002 ... ENSSSCG00000031070

## Total number of Line DE Genes with log2(FC) >=1 when FDR is controlled at 0.05, 0.10,
## 0.15

lf1 <- c(length(lf105), length(lf110), length(lf115), length(lf120))
```

```
# Summary table
out <- data.frame(FDR = c(0.05, 0.1, 0.15, 0.2), degene = degene, lf1 = lf1)
colnames(out) <- c("FDR", "DEGs", "log2(FC)>=1")
xtable(out)
```

	FDR	DEGs	log2(FC)>=1
1	0.05	649	60
2	0.10	1680	89
3	0.15	2595	102
4	0.20	3610	107

1 List of Gene in Analysis and List of Pvalues, Qvalues, logFC