Comparing the significance of prot_000000001830 and prot_000000000877 to OTU_11

Benjamin Hillmann

October 20, 2015

The significance of prot_000000000877 to OTU_11

```
log_transform = function(x) {
  constant = min(x[x > 0])/2.
  x = x + constant
  x = x/sum(x)
  log(x)
}

otu_log_mat = apply(preprocess_mat(infiles[4]), 1, log_transform)
genes_log_mat = apply(preprocess_mat(infiles[1]), 1, log_transform)

prot_000000000877 = genes_log_mat['prot_000000000877',]
otu_11 = otu_log_mat['OTU_11',]

mapping_maria = load_data_table('mapping_maria_BL.txt')

dependent = as.numeric(mapping_maria$Persistence)
lm_prot_000000000877 = lm(dependent~prot_000000000877)
lm_otu_11 = lm(dependent~otu_11)

summary(lm_prot_000000000877)
```

```
##
## Call:
## lm(formula = dependent ~ prot_000000000877)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.4919 -0.1997 -0.0073  0.1252  0.7298
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)        -0.3003     0.2680  -1.121    0.276
## prot_000000000877  -0.1870     0.0293  -6.381 3.17e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2896 on 20 degrees of freedom
## Multiple R-squared:  0.6706, Adjusted R-squared:  0.6542
## F-statistic: 40.72 on 1 and 20 DF,  p-value: 3.165e-06
```

```
summary(lm_otu_11)
```

```
##
## Call:
## lm(formula = dependent ~ otu_11)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.4344 -0.3039 -0.1407  0.3911  1.0604
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.70757    0.27592   2.564   0.0185 *
## otu_11      -0.13071    0.05171  -2.528   0.0200 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4392 on 20 degrees of freedom
## Multiple R-squared:  0.2421, Adjusted R-squared:  0.2042
## F-statistic: 6.389 on 1 and 20 DF,  p-value: 0.02001
```

```
coxtest(lm_prot_000000000877, lm_otu_11)
```

```
## Cox test
##
## Model 1: dependent ~ prot_000000000877
## Model 2: dependent ~ otu_11
##                 Estimate Std. Error  z value  Pr(>|z|)
## fitted(M1) ~ M2  -2.1426    0.77234  -2.7741  0.005535 **
## fitted(M2) ~ M1 -11.8973    0.66730 -17.8291 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
jtest(lm_prot_000000000877, lm_otu_11)
```

```
## J test
##
## Model 1: dependent ~ prot_000000000877
## Model 2: dependent ~ otu_11
##                 Estimate Std. Error t value  Pr(>|t|)
## M1 + fitted(M2)  0.48557    0.26224  1.8516   0.07969 .
## M2 + fitted(M1)  0.89977    0.15757  5.7103 1.669e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

The significance of prot_000000001830 to OTU_11

```
prot_000000001830 = genes_log_mat['prot_000000001830',]
```

```
lm_prot_000000001830 = lm(dependent~prot_000000001830)

summary(prot_000000001830)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -13.830  -9.577  -7.393  -8.261  -6.772  -3.853
```

```
coxtest(lm_prot_000000001830, lm_otu_11)
```

```
## Cox test
##
## Model 1: dependent ~ prot_000000001830
## Model 2: dependent ~ otu_11
##                 Estimate Std. Error  z value  Pr(>|z|)
## fitted(M1) ~ M2  -2.5494    0.68655  -3.7134 0.0002045 ***
## fitted(M2) ~ M1  -7.8107    0.57436 -13.5991 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
jtest(lm_prot_000000001830, lm_otu_11)
```

```
## J test
##
## Model 1: dependent ~ prot_000000001830
## Model 2: dependent ~ otu_11
##                 Estimate Std. Error t value  Pr(>|t|)
## M1 + fitted(M2)  0.62513    0.30641  2.0401 0.0554847 .
## M2 + fitted(M1)  0.87495    0.20937  4.1790 0.0005092 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```