**Results for AvsB File**

The dataset appears to be from the yeast species *Saccharomyces cerevisiae*. Upregulation of YMR186W would suggest sample B has been subject to heat stress, as this protein is known to be upregulated 2-3 fold under thermal stress ([www.yeastgenome.org](http://www.yeastgenome.org)). YJL092W has also been upregulated which is a DNA-helicase and known to aid in DNA repair ([www.yeastgenome.org](http://www.yeastgenome.org)). There may also be oxidative stress due to the downregulation of YLR034C, a metal ion transporter ([www.yeastgenome.org](http://www.yeastgenome.org)). Reduced action of which would help reduce the amount of reactive oxygen species produced which contributes to oxidative stress (Stohs et al, 1995).

**Table 1:** Summary Statistics for AvsB File

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Base Mean | Log2Fold Change | lfcSE | P-Value | Adjusted P-Value |
| Count | 6397.0 | 6397.0 | 6397.0 | N/A | N/A |
| Mean | 249.4 | -0.075 | 0.3538 | 0.3136 | 0.4119 |
| St Dev. | 2500.0 | 1.1221 | 0.5211 | 0.3219 | 0.3406 |
| Min | 0.0245 | -25.53 | 0.1071 | 9.16 x10-16 | 5.70 x10-12 |
| 25% | 26.06 | -0.308 | 0.2246 | 1.91 x10-2 | 7.13 x10-2 |
| 50% | 69.49 | -0.013 | 0.287 | 0.190 | 0.358 |
| 75% | 171.8 | 0.258 | 0.374 | 0.567 | 0.728 |
| Max | 122131 | 20.90 | 11.28 | 1 | 1 |

Total number of genes where gene expression is significantly altered: 2081

Total number of significantly upregulated genes: 1012

Total number of significantly downregulated genes: 1069

**Table 1:** Significantly Altered Genes for AvsB File

|  |  |  |  |
| --- | --- | --- | --- |
| Gene ID | Log2Fold Change | P-Value | Adjusted P-Value |
| YLR034C | -1.532 | 9.16 x10-16 | 5.70 x10-12 |
| YNCG0005W | -25.53 | 1.59 x10-12 | 4.93 x10-9 |
| YJL221C | -21.57 | 2.54 x10-12 | 5.26 x10-12 |
| YJL092W | 0.885 | 3.83 x10-12 | 5.26 x10-12 |
| YMR186W | 1.069 | 4.23 x10-2 | 5.26 x10-12 |

Displaying top 5 genes based off of p-value. Full table available from script.

A graph of a volcano plot

Description automatically generated

***Figure 1:*** Volcano plot showing Log 2-Fold Change vs p-value for AvsB file.

A graph of a graph of values

Description automatically generated

***Figure 2:*** Volcano plot showing distribution of p-values for AvsB file.

A graph showing the number of change

Description automatically generated with medium confidence

***Figure 3:*** Heatmap showing Log 2-Fold Change for top 10 significantly altered genes for AvsB file.

A green dotted line graph

Description automatically generated

***Figure 4:*** MA plot showing Base Mean Expression vs Log 2-Fold Change for AvsB file.

**Results for AvsD File**

Functions of YNL193W and Q0075 are not well known ([www.yeastgenome.org](http://www.yeastgenome.org)). Q0075 and Q0055 are both linked to the COX1 gene which is involved in the mitochondrial transport chain ([www.yeastgenome.org](http://www.yeastgenome.org)). Downregulation of these genes suggests sample D may be under oxidative stress in anaerobic conditions. YKL108W is required for initiation of DNA replication, it’s downregulation suggests that sample D is not undergoing DNA replication ([www.yeastgenome.org](http://www.yeastgenome.org)).

**Table 3:** Summary Statistics for AvsD File

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Base Mean | Log2Fold Change | lfcSE | P-Value | Adjusted P-Value |
| Count | 6397.0 | 6397.0 | 6397.0 | N/A | N/A |
| Mean | 249.4 | -0.1070 | 0.4147 | 0.2546 | 0.2946 |
| St Dev. | 2500.0 | 1.405 | 0.5774 | 0.3125 | 0.3241 |
| Min | 0.0245 | -25.33 | 0.1106 | 2.89 x10-210 | 1.758 x10-206 |
| 25% | 26.06 | -0.474 | 0.2363 | 2.09 x10-3 | 6.65 x10-3 |
| 50% | 69.49 | -1.08 x10-3 | 0.3116 | 0.0900 | 0.1494 |
| 75% | 171.8 | 0.417 | 0.4263 | 0.4635 | 0.5537 |
| Max | 122131 | 22.00 | 10.52 | 1 | 1 |

Total number of genes where gene expression is significantly altered: 2804

Total number of significantly upregulated genes: 1352

Total number of significantly downregulated genes: 1452

**Table 4:** Significantly Altered Genes for AvsD File

|  |  |  |  |
| --- | --- | --- | --- |
| Gene ID | Log2Fold Change | P-Value | Adjusted P-Value |
| Q0055 | -11.10 | 2.89 x10-210 | 1.76 x10-206 |
| Q0070 | 8.39 | 8.39 x10-102 | 8.10 x10-99 |
| YNL193W | -6.81 | 2.33 x10-93 | 4.74 x10-90 |
| YKL108W | -6.16 | 5.42 x10-87 | 8.26 x10-84 |
| Q0075 | -9.40 | 9.46 x10-78 | 1.15 x10-74 |

Displaying top 5 genes based off of p-value. Full table available from script.

A graph of a volcano plot

Description automatically generated

***Figure 5:*** Volcano plot showing Log 2-Fold Change vs p-value for AvsD file.

A graph of a person with histogram

Description automatically generated

***Figure 6:*** Volcano plot showing distribution of p-values for AvsD file.

A graph of different colors

Description automatically generated with medium confidence

***Figure 7:*** Heatmap showing Log 2-Fold Change for top 10 significantly altered genes for AvsD file.

A green dotted graph with white text

Description automatically generated with medium confidence

***Figure 8:*** MA plot showing Base Mean Expression vs Log 2-Fold Change for AvsD file.

**References**

S.J. Stohs, D. Bagchi. Oxidative mechanisms in the toxicity of metal ions, 1995. ***Free Radical Biology and Medicine.*** Volume 18, Issue 2, Pages 321-336, ISSN 0891-5849.

[www.yeastgenome.org](http://www.yeastgenome.org)