Summary of: RNAseq Analysis of the Response of Arabidopsis thaliana to Fractional Gravity Under Blue-Light Stimulation During Spaceflight

Key findings and quantitative results:

1. **RNAseq Analysis**: - RNA was extracted from 20 samples for subsequent RNAseq analysis. - Transcriptomic analysis was performed using the HISAT2-Stringtie-DESeq pipeline. - DESeq2 was used to conduct differential gene expression analysis.

2. **Differential Gene Expression**: - A total of 296 genes were identified as differentially expressed between microgravity and 1g conditions. - 2552 genes were identified as differentially expressed between low gravity (<0.1g) and 1g conditions. - 2088 genes were identified as differentially expressed between Moon g-level and 1g conditions. - 978 genes were identified as differentially expressed between Mars g-level and 1g conditions. - 411 genes were identified as differentially expressed between reduced Earth g-level (0.57g) and 1g conditions.

3. **Gene Ontology (GO) Enrichment**: - GO terms were identified as enriched in the DEGs. - The ten most significant GO terms were identified for each g-level comparison.

4. **Transcriptional Response**: - The blue-light phototropic response was observed in microgravity samples. - The phototropic response to blue light was noted to be more effective at lower g-levels. - The phototropic response to blue light was noted to be less effective at higher g-levels.

5. **Cellular Response**: - The cell wall and membrane structures were enriched at the Moon g-level. - The general stress response was enriched at the low g-level.

6. **Comparison**: - The number of differentially expressed genes increased as the g-level decreased. - The number of differentially expressed genes decreased as the g-level increased.

7. **Statistical Analysis**: - The p-value was corrected for multiple comparisons using the Benjamini-Hochberg procedure. - The q-value was used to control the false discovery rate.

8. **Additional Findings**: - The F-box/RMI-like/FDB-like domain proteins were identified as candidate genes. - The statolith in the root cells was noted to be a potential sensor of gravitropism.

9. **Conclusions**: - The blue-light phototropic response is sufficient to reduce the gravitational stress response. - The gravitropic response is more effective at higher g-levels. - The graviresistance signal is observed at the Moon g-level.

These findings highlight the complex interactions between tropisms, phototropism, and gravitropism in spaceflight conditions, with the blue-light phototropic response being a significant factor in mitigating the effects of microgravity.