**Bioscreen Experiment Worksheet**

Congrats! You’ve set up your first high-throughput growth assay using a Bioscreen C machine. Work though the following questions to check your understanding of the experimental design, set up process, and to begin thinking about how you might analyze data from this experiment. You are welcome to talk through these questions with a partner or group, but please write you answers using your own words.

1. What is the starting OD of the bioscreen experiment? What is the glucose concentration?
2. Define biological replicates. Define technical replicates. What are each designed to capture, and why is it important to have both?
3. State whether each cause of experimental variation is best categorized as biological or technical. If you feel strongly that it could be both, justify your response.

|  |  |
| --- | --- |
| Cause of variation | Type of variation |
| Some cells have accumulated unique mutations over time |  |
| Machine temperature varies slightly across each plate |  |
| Optical density of the precultures are different from each other |  |
| Precultures are in different growth stages |  |
| Some wells are inoculated with slightly more cells than others |  |

1. What is the purpose of putting blank media in the outer/border wells?
2. What is the hypothesis your experiment is testing? How does it test the hypothesis?
3. Why was it important that we washed the cells and diluted them before adding them to the bioscreen plate?
4. Based on the hypothesis, previously collected data on the function of TrmB in *Hbt. salinarum[[1]](#footnote-1)*, what do you predict the growth curves with and without glucose will look like? Draw a sketch. Typically, growth curves are plotted with time (the independent variable) on the x-axis and OD (the dependent variable) on the y-axis.
5. Brainstorm and sketch some other graphs you might want to create in order to evaluate the experiment results? Are they any questions you might ask to check that the data is high quality before analyzing it?

**Bonus question:**

1. In addition to glucose, we also tested the effects of galactose, xylose, and glycerol on *Haloferax volcanii* growth. The metabolism, or regulation of metabolism, for each of these compounds has been previously published in this system. Use NCBI/PubMed to search and fine at least one relevant article, and write the citation below *(might be useful for you discussion section!)*

1. Schmid, A. K., Reiss, D. J., Pan, M., Koide, T., & Baliga, N. S. (2009). A single transcription factor regulates evolutionarily diverse but functionally linked metabolic pathways in response to nutrient availability. Molecular systems biology, 5, 282. https://doi.org/10.1038/msb.2009.40 [↑](#footnote-ref-1)