Optogenetic Regulation of 5-HT1A Autoreceptors Programming the Latency Period of Antidepressant Treatment in *Drosophila Melanogaster*

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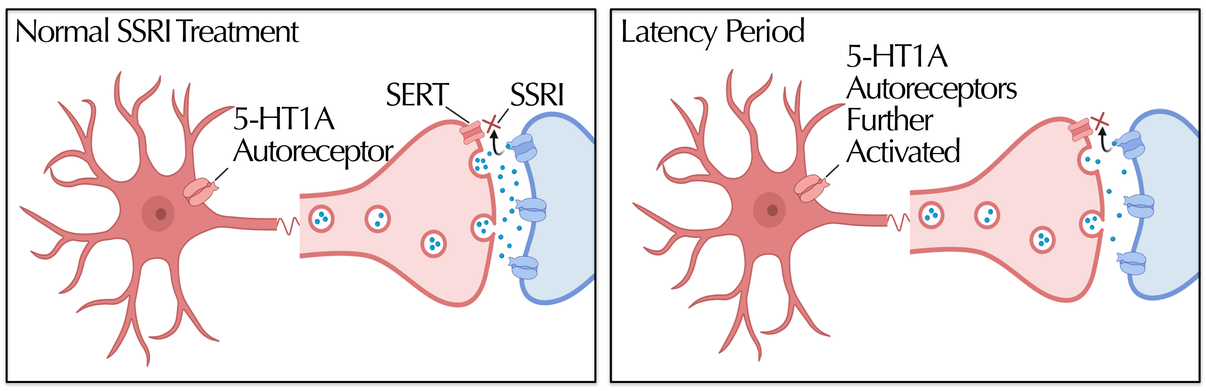
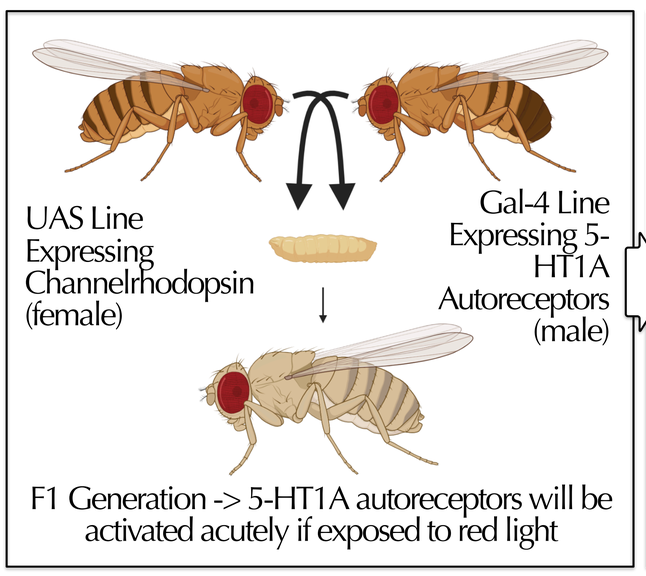
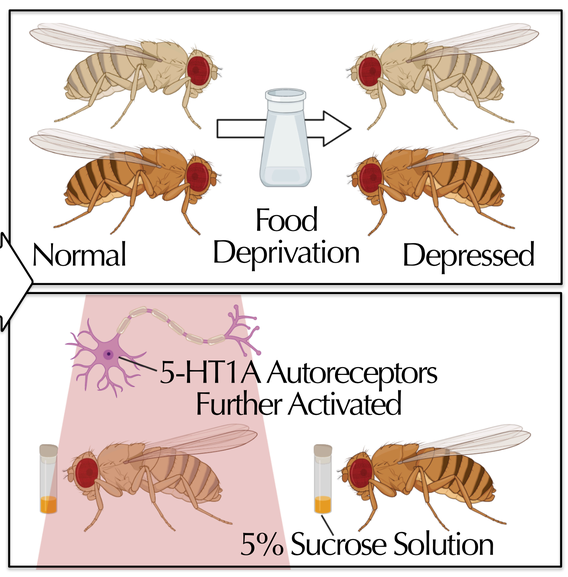
Introduction

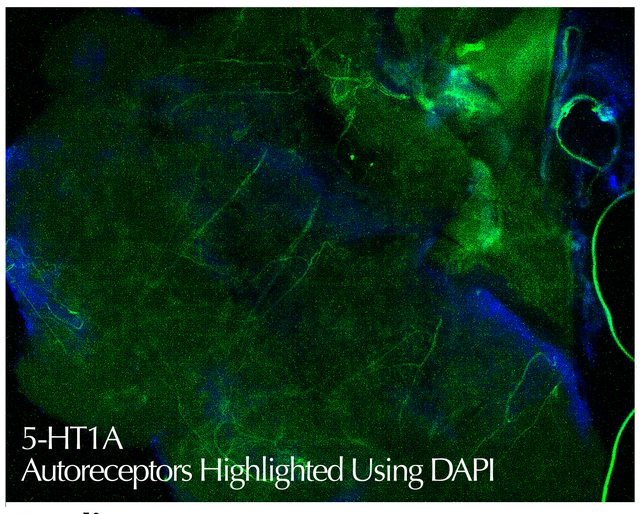
- Antidepressant treatment often takes 2-3 weeks before becoming effective, a phenomenon known as the latency period
- 5-HT1A cell body autoreceptors are structures located on the main body of a serotonergic neuron that send inhibitory feedback to said cells, stopping them from firing when extracellular serotonin levels are too high
- Recent studies suggest that the activation of the 5-HT1A autoreceptors during antidepressant treatment is the primary cause of the latency period
- 5-HT1A autoreceptors observe levels of extracellular serotonin and send inhibitory feedback to serotonergic cells to control cell firing
- This study uses *drosophila melanogaster,* or fruit flies, to propose a 5-HT1A autoreceptor-based model of the latency period in antidepressant treatment

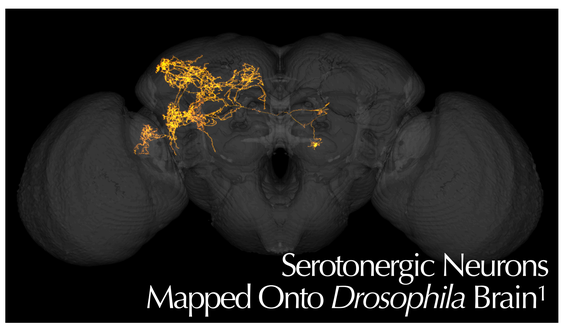


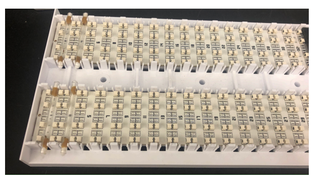
Methodology





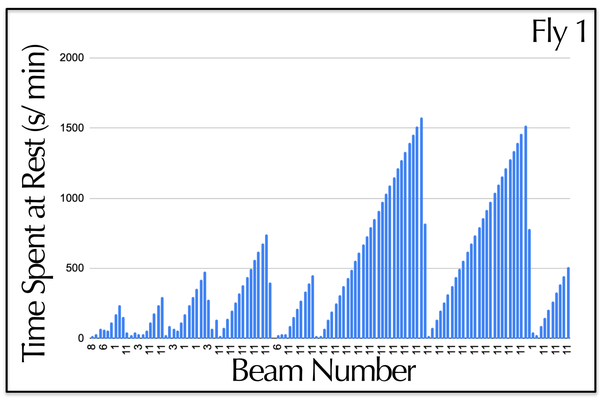


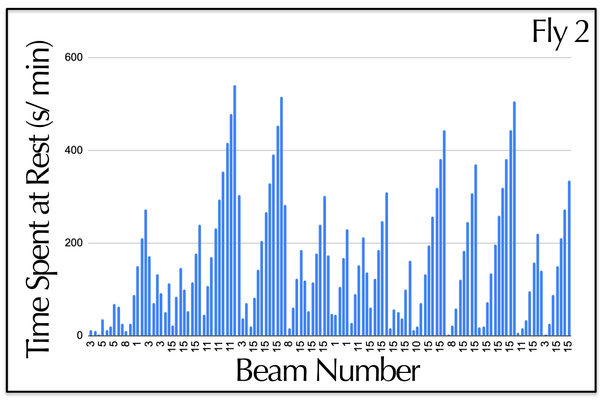


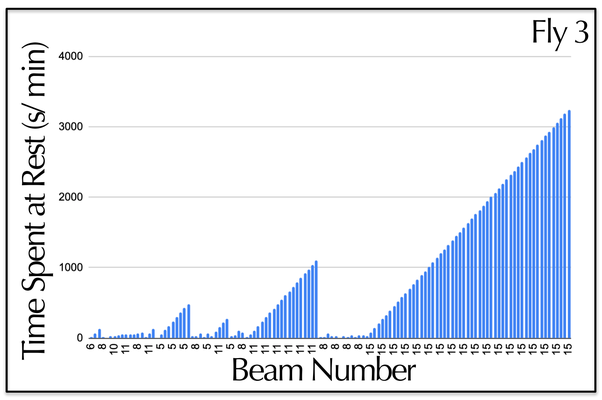


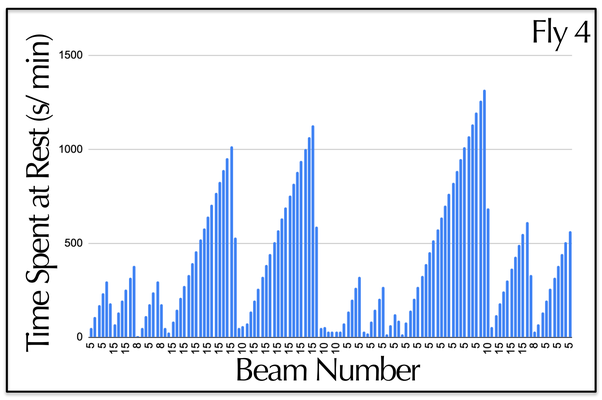
Drosophila Activity Monitoring System (DAMS) Protocol

Baseline Movements

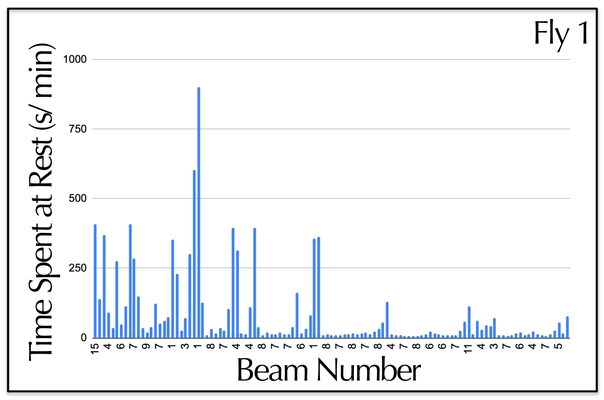


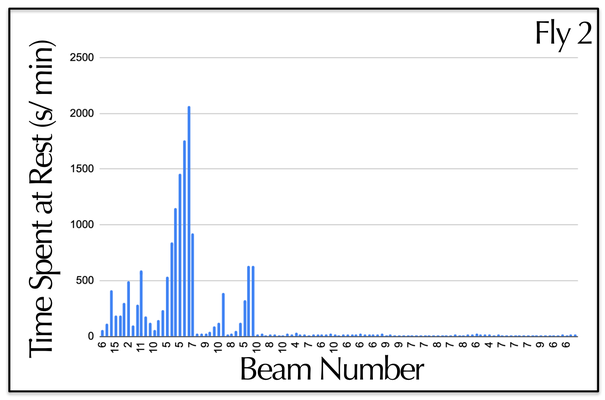


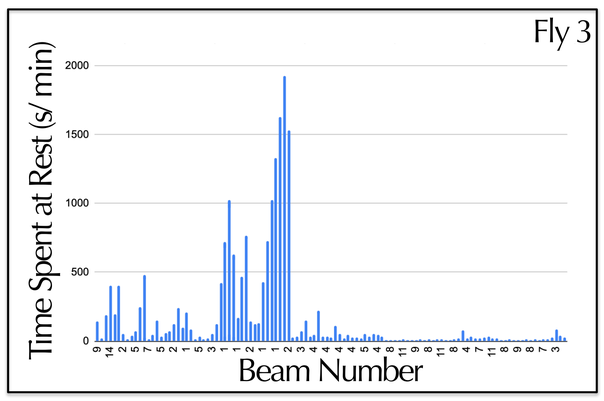


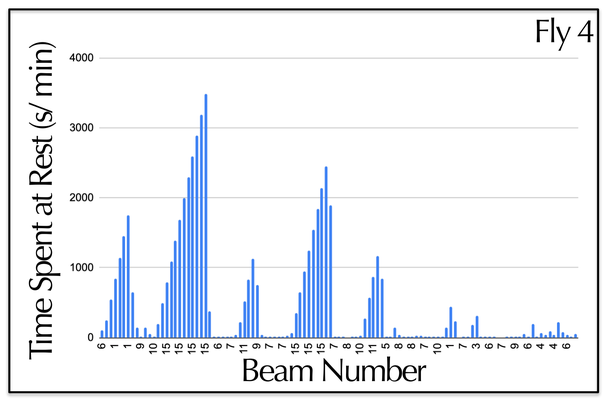


Depressed State Through Food Deprivation

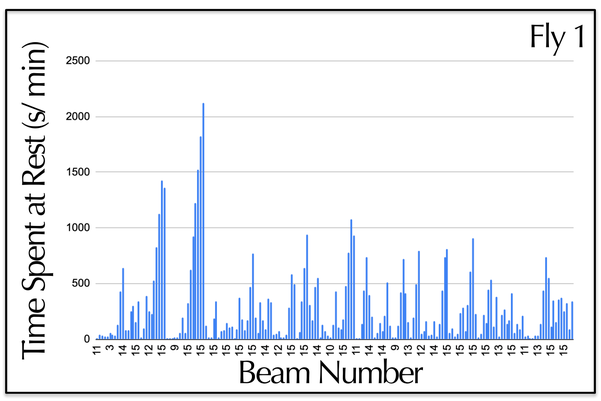


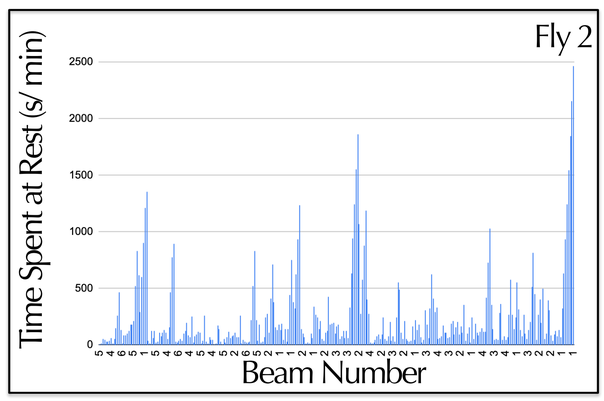


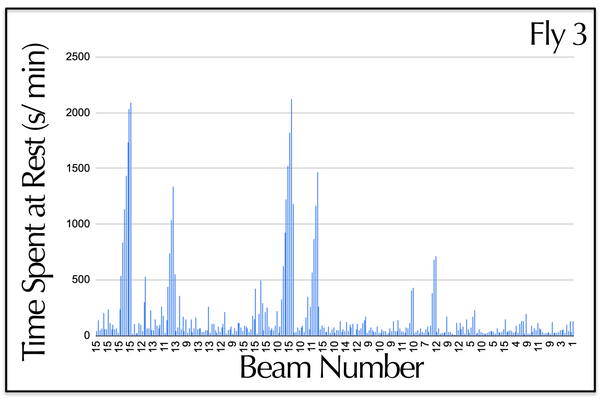


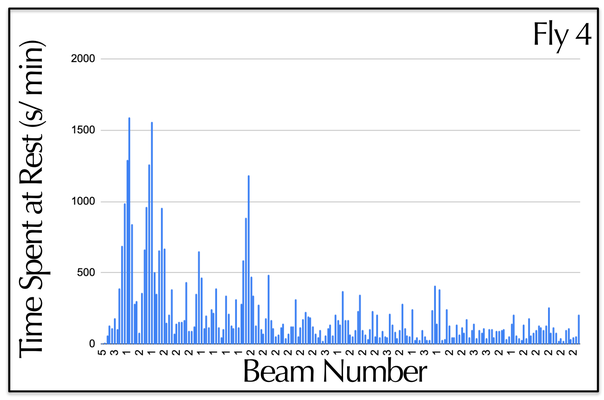


Sucrose Treatment and Observed Recovery Period









Future Implications

In *drosophila:*
- Being able to correctly model and observe depressive behaviors in *D. melanogaster* is critical to any future attempts to replicate this experiment
- Understanding if sucrose uses a similar mechanism to antidepressants in people to determine how mental illness is modeled in flies in the future

In people:
- Further studies should be conducted on 5-HT1A knockout mice, or using the GAL-4/UAS system to optogenetically inhibit 5-HT1A autoreceptor expression

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Acknowledgements

I would like to thank my mentor, Dr. Kyle Gobrogge, for introducing me to *drosophila melanogaster* and their implications in neuroscience research, as well as for all of his advice and support in guiding me through this project. I would also like to thank my labmates, Laya Palutla and Julia Banuelos, for helping with late-night brainstorming and data collection. Special thanks to Sehjin Jo for the flies, and thank you to the RISE program for organizing this incredible summer experience.