

Sex Differences in Sucrose Sensitivity in *Drosophila melanogaster*

Abby Rader and Anushka Sukhramani

Physiological states affect animal behavior, emotion, and perception of external stimuli. Hunger changes behavioral responses in a variety of species, including *Drosophila melanogaster*, the common fruit fly. Despite known anatomical differences between male and female flies, many studies exclusively focus on one sex, which may overgeneralize findings to the entire species. We sought to explore sex differences in feeding behavior using an assay known as the Proboscis Extension Reflex (PER). PER is a feeding-related behavior that occurs when a fly senses an appetitive stimulus, such as sucrose. Under fed conditions, a greater fraction of female flies exhibit PER at lower sucrose concentrations than male flies. This finding suggests a sex difference in sucrose sensitivity. We also measured PER under starved conditions, which is known to increase sucrose sensitivity. Our results indicate that when both male and female flies are starved, they exhibit increased sucrose sensitivity compared to fed flies. We did not see significant differences between the sucrose sensitivity of starved male and female flies. These findings imply that studies exploring behavioral responses of fruit flies should include sex as a biological variable. Additionally, they support the need for investigation of the mechanisms underlying these sex differences. Pilot experiments are underway to investigate how L-DOPA affects sucrose sensitivity in male and female fruit flies. Previous studies have demonstrated that L-DOPA treatment increases sucrose sensitivity in female flies, and this treatment would allow us to determine if differences in dopamine neuromodulation are involved in the sex differences in sucrose sensitivity observed.