

## Department of Biological Sciences

Sabrina Cheng

Mentor: John Glendinning

### Oral and Post-Oral Controls of Sweetener Intake

Obesity is a growing problem in the United States, and has been largely attributed to fats. However, recent studies have shown a correlation between obesity and the intake of sugar-sweetened beverages like soda. While it is known that the sweet taste of sugar can stimulate intake, recent work indicates that sugars can also stimulate intake through a post-oral mechanism. The goal of this experiment was to examine the interaction between oral and post-oral factors in controlling sweetener intake. I used C57BL/6J mice because they are important model systems for studying sugar intake. My strategy was to compare short- and long-term ingestive responses. Because short-term licking responses are controlled by oral mechanisms (e.g., taste, odor, and mouth-feel), whereas the long-term ingestive responses are controlled by a combination of oral and post-oral mechanisms, I attributed any difference in sweetener response between the short- and long-term studies to the contribution of post-oral stimulation. I offered mice a variety of solutions in both short- and long-term tests: water, saccharin (38mM), glucose (170, 250, and 330 mM), and binary mixtures of the sweeteners. I found that the mice responded similarly to the saccharin (a non-caloric sweetener), 170 mM glucose, and saccharin + 170 mM glucose solutions in both the short- and long-term tests; this indicates that intake of the solutions was controlled primarily by oral factors. In contrast, the mice responded differently to the solutions containing high concentrations of glucose in the short- and long-term intake tests. They consumed disproportionately more of the concentrated glucose solutions in the long-term test, which indicates that post-oral stimulation was a major factor controlling the intake of more concentrated sugar solutions (such as those founding sodas). These results have important implications for our understanding of the factors that lead to the over-consumption of sugar-sweetened beverages.