Department of Biology

Anika Afroz

Mentor: John I. Glendinning

Temperature Effects on Taste in *Manduca sexta*

As temperature increases, mammals experience an intensification of sweet taste, but not of bitter, sour, salty or umami taste. The question of whether insects also experience temperature-dependent changes in taste intensity is largely unresolved. In this study, we tested for an effect of temperature on sweet and bitter taste in caterpillars of *Manduca sexta*. These caterpillars generate strong peripheral taste responses to inositol (a sugar alcohol) and aristolochic acid and caffeine (aversive "bitter" compounds). We postulated that in insects, like mammals, some but not all compounds will elicit a temperature-sensitive response. We examined the effect of temperature on two classes of taste sensilla: the lateral and medial styloconica. Prior to each recording, we manipulated the temperature of the caterpillar in a thermostat-controlled water bath. For each stimulus and temperature condition, we made a series of three recordings. For the low temperature condition, we made recordings at 25°, 15° and then 25°C. For the high temperature condition, we made recordings at 25°, 35° and then 25°C. We found that the responses to caffeine and inositol were temperature-insensitive, while those to aristolochic acid were temperature-sensitive (i.e., they decreased at the low temperature, and increased at the high temperature). The reason why the response to aristolochic acid alone was temperature-sensitive is unknown, but it may reflect the presence of a temperature-sensitive Trp channel in the intracellular signaling pathway.