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Does Temperature Affect Taste in *Manduca Sexta* Caterpillars?

In virtually all mammals, reptiles, amphibians and insects studied to date, the magnitude of the taste response to specific chemical stimuli (e.g., sucrose) changes dramatically with temperature. This indicates that the taste system does not provide an absolute measure of the concentration of a chemical stimulus in foods or fluids. We hypothesized that the herbivorous caterpillar, *Manduca sexta*, which feeds on a diet laden with toxic and aversive-tasting compounds, would require an absolute taste system so as to tolerate its noxious diet. We tested this hypothesis by manipulating the body temperature of *M. sexta* caterpillars and testing for temperature-dependent changes in taste responsiveness to three sugars (inositol, glucose and sucrose), two aversive compounds (caffeine and aristolochic acid [or AA]), and a salt (KCl). We found that the responses to all chemical stimuli, except AA, were temperature-independent. Next, we asked why AA alone was temperature-dependent. Based on studies with *Drosophila*, we hypothesized that the signaling pathway for AA utilized TrpA1, a temperature-sensitive channel. To test this idea, we asked whether the peripheral taste response to AA was blocked by specific TrpA1 antagonists (mecamylamine or HC-030031). We found that even though AA and caffeine stimulated the same taste cell, the TrpA1 antagonists merely attenuated the response to AA. These pharmacological data, together with the temperature data reported above, indicate that *M. sexta* minimized the temperature-dependence of taste system by evolving signaling pathways that do not use Trp channels like TrpA1.