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Super sweet

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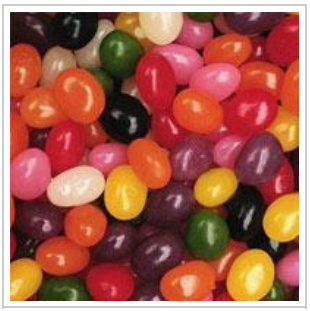
Mice prefer sweet treats, even if they cannot taste them.



If cake and radishes tasted the same, could you stick to your diet? Most sweet treats not only taste good but are also calorically dense. de Araujo *et al.* questioned whether taste alone motivates the sweet tooth. They report that mice that cannot taste sweet foods show a preference for sugar solutions based on caloric content in a recent article in *Neuron*.

Animals and people prefer sweet to flavorless beverages. The transient receptor potential channel 5 (TRPM5) is important in the transduction of sweet, bitter and amino acid tastes. The authors generated TRPM5 knockout mice. Wild-type mice drank more sucrose solution than water in 5-second trials. In contrast, TRPM5 knockout mice drank equivalent amounts of water and sucrose, suggesting that they were 'blind' to sweet tastes.

Mice prefer to sip from bottles they associate with sweet drinks. The authors placed sucrose and water in adjacent bottles and alternated which bottle the mice could access during 30-minute conditioning trials. During these trials, both wild-type and TRPM5 knockout mice drank more sucrose than water. After conditioning, the authors replaced the sucrose solution with water. Both wild-type and TRPM5 knockout mice drank more water from bottles that contained sucrose during conditioning sessions.

Do these data suggest that TRPM5 knockout mice can detect sweetness? Sucralose (Splenda®) is a low-calorie sugar substitute. Wild-type mice drank more sucralose than water during conditioning trials and drank more water from bottles that contained sucralose during conditioning trials. In contrast, TRPM5 knockout mice did not develop a preference for sucralose relative to water, suggesting that their preference for sucrose is not based on its sweetness but on its caloric content.

Like drugs of abuse, sucrose activates brain regions involved in reward. In both wild-type and TRPM5 knockout mice, sucrose increased dopamine in nucleus accumbens, as shown by microdialysis. In contrast, sucralose increased nucleus accumbens dopamine in wild-type but not TRPM5 knockout mice. Sucrose but not sucralose altered the firing pattern of nucleus accumbens neurons. These data suggest that metabolic aspects of sucrose consumption are rewarding.

Together, these data suggest that animals and people prefer sweet foods at least in part because of their association with caloric and nutrient enrichment. Recent research suggests an increased risk of obesity in people who drink diet relative to regular sodas. Unfortunately for dieters, these data suggest that sugar-free foods do not fool the brain and may instead encourage calorie consumption.

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1. de Araujo, I. E. *et al.* Food reward in the absence of taste receptor signaling. *Neuron* **57**, 930–941 (2008). | Article | PubMed | ChemPort |