Our sense of taste helps pace our eating. Understanding how may lead to new avenues for weight loss

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As a scientist who investigates hunger and weight control, I'm interested in the way our brains let us know we've had enough.

As we begin to feel full, we slow down how quickly we eat. For decades, scientists have thought that this change in pace was driven solely by signals from the stomach and intestines to the brain. But a new study from my lab at UC San Francisco shows that, in fact, there is another process at work, and it begins as soon as we taste our food.

This process has remained unknown until now because we haven't been able to observe the relevant brain activity in an animal while it was eating. The neurons involved are deep in the brainstem. A graduate student in my lab, Truong Ly, developed new techniques that allowed us to see the activity of these neurons for the first time, in mice.

We discovered that there are two parallel pathways that control our eating—one that restrains how fast you eat and another that limits how much. The taste of food activates the first pathway. This may seem counterintuitive: We usually want to eat more of food that tastes good. But although we may not be consciously aware of it, the sensation of taste also paces our eating.

This first pathway, as scientists have long thought, involves signals from the gut, but our study shows that those cues may also be overridden when the brain receives signals from taste receptors in the mouth, saying "There's food here." We're working on figuring out how this sensory filtering works, in an effort to uncover new strategies for treating obesity.

Neurons involved in the second pathway we studied, the one responsible for limiting how much you eat, do so by releasing the hormone GLP-1, which creates a long-lasting feeling of being full. New drugs for obesity, such as Ozempic and Mounjaro, mimic the activity of GLP-1. My team is now trying to understand how this enduring satiety works, to gain a deeper understanding of these new drugs and possibly identify new avenues for controlling weight.

More information: Zachary Knight, Sequential appetite suppression by oral and visceral feedback to the brainstem, *Nature* (2023). DOI: 10.1038/s41586-023-06758-2.
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