

Scientists find hormone influences sensitivity to sweetness

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A hormone that helps to regulate blood sugar levels may also influence a person's sensitivity to sweet-tasting foods, according to a new study from researchers at the University of Maryland School of Medicine. They found that blocking the tongue's ability to respond to the hormone known as glucagon decreases the taste system's sensitivity to sweetness. That is, changing the actions of the hormone glucagon could control how foods taste, according to the study published online June 14 in the *Federation for American Societies for Experimental Biology (FASEB) Journal*.

"An interesting possibility resulting from our research is that the development of new food additives could change the way you perceive your food, making it taste more or less sweet," said senior author Steven D. Munger, Ph.D., associate professor of anatomy and neurobiology at the University of Maryland School of Medicine. "From a food industry perspective, such additives could be used to enhance flavor. From a therapeutic perspective, they could be used to treat patients who under-eat or overeat."

Glucagon, a [hormone](#) secreted by the pancreas, acts in opposition to insulin. Glucagon raises blood glucose levels, while insulin lowers those levels. Dr. Munger and his colleagues found that glucagon and its receptor are expressed in mouse taste receptor cells that are associated with the detection of sugars and sweetness. The scientists also found that blocking glucagon's actions using a specific drug made mice less responsive to a sweet solution they were offered. Mice are often used as

models for humans in such research, since the mechanisms that regulate taste are similar in both species. "The data suggest that a person's susceptibility to sweetness might have to do with their metabolic state or nutritional needs," says Dr. Munger.

Funding for the study came from the National Institute on Deafness and Other Communication Disorders (NIDCD) and the National Institute on Aging, both part of the National Institutes of Health, and the Ajinomoto Amino Acid Research Program. The study was coauthored by School of Medicine Program in Neuroscience graduate student Amanda Elson, postdoctoral fellow Shawn Dotson, Ph.D., and Josephine Egan, M.D., of the National Institute on Aging.

A previous study by the same research team found that another hormone, similar to glucagon, also plays a role in taste. The current study now shows that the actions of these hormones can be directly manipulated in the mouth. "When we blocked glucagon in this study, the mice were less sensitive to sugar," Dr. Munger says. "That leaves open the possibility that we could also enhance sensitivity to sugars by manipulating glucagon in the other direction. That could open doors for food additives to make what we eat taste sweeter without adding more sugar."

"The taste system plays a non-traditional role in glucose metabolism and brings a new perspective into the control of diabetes and obesity," says James F. Battey Jr., M.D., Ph.D., director of the NIDCD.

Dr. Munger and his colleagues now are pursuing the next step in their research, examining how glucagon works together with other hormones to regulate the tongue's sensitivity to sweet and savory tastes. They also are exploring how the hormones affect how much one eats — if a subject is less sensitive to sweet tastes, does that increase or decrease the size of their meal?

"Dr. Munger's findings could have great significance for patients who suffer from diabetes, metabolic disorders or obesity," says E. Albert Reece, M.D., Ph.D., M.B.A., acting president of the University of Maryland, Baltimore and John Z. and Akiko K. Bowers Distinguished Professor and dean, University of Maryland School of Medicine. "This is an example of how our world-class basic scientists are making groundbreaking discoveries that could directly impact human health down the line."

Provided by University of Maryland Medical Center

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