

A role for calcium in taste perception

January 8 2010



Kokumi taste foods contain various compounds that have no taste themselves, but can enhance the basic sweet, salty and umami taste sensation they co-exist with. Kokumi compounds, such as calcium, protamine (found in milt), L-histidine (an amino acid) and glutathione (found in yeast extract) have now been shown to activate calcium-sensing channels in humans. Credit: Ajinomoto Co. Inc.

Calcium may not come to mind when you think of tasty foods, but in a study appearing in the January 8 issue of JBC, Japanese researchers have provided the first demonstration that calcium channels on the tongue are the targets of compounds that can enhance taste.

In addition to [molecules](#) that directly trigger specific taste buds (salty, sweet etc.), there are other substances which have no flavor of their own but can enhance the flavors they are paired with (known as kokumi taste in Japanese cuisine).

Exploiting this enhancement could have practical uses in food

modulation; for example, creating healthy foods that contain minimal sugar or salt but still elicit strong taste. At the moment, though, the mode of action for these substances is poorly understood.

However, Yuzuru Eto and colleagues examined whether calcium channels -which sense and regulate the levels of calcium in the body -- might be the mechanism involved; they noted that calcium channels are closely related to the [receptors](#) that sense sweet and umami (savory) tastes and that glutathione (a common kokumi taste element) is known to interact with calcium channels.

To test their possibility, they created several small molecules that resembled glutathione and analyzed how well these compounds activated calcium channels in cell samples. Next, they diluted the same test substances in flavored water ([salt water](#), sugar water, etc.) and asked volunteers (all trained in discriminating tastes) to rate how strong the flavors were.

The results provided a strong correlation; the molecules that induced the largest activity in calcium receptors also elicited the strongest flavor enhancement in the taste tests.

For further confirmation, the researchers tested several other known calcium channel activators, including calcium, and found all exhibited some degree of flavor enhancement, while a synthetic [calcium channel](#) blocker could suppress flavors.

This study provides new of insight into the areas of taste biology; the authors also note that calcium channels are found in the gastro-intestinal tract as well, suggesting they may be important in other aspects of eating, such as food digestion and absorption.

More information: "Involvement of the Calcium-sensing Receptor in

Human Taste Perception" by Takeaki Ohsu, Yusuke Amino, Hiroaki Nagasaki, Tomohiko Yamanaka, Sen Takeshita, Toshihiro Hatanaka, Yutaka Maruyama, Naohiro Miyamura and Yuzuru Eto, *Journal of Biological Chemistry*. Article link:

www.jbc.org/content/285/2/1016.abstract

Provided by American Society for Biochemistry and Molecular Biology

Citation: A role for calcium in taste perception (2010, January 8) retrieved 26 April 2024 from <https://phys.org/news/2010-01-role-calcium-perception.html>

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