

Receptor activated exclusively by glutamate discovered on tongue

October 9 2009



Ripe tomatoes and aged cheeses are high in natural MSG. Credit: SINC

One hundred years ago, Kikunae Ikeda discovered the flavour-giving properties of glutamate, a non essential amino acid traditionally used to enhance the taste of many fermented or ripe foods, such as ripe tomatoes or cheese. New research now reveals that the tongue has a receptor that is exclusively activated by glutamate.

"Although other receptors have been found on the tongue that are also aroused by glutamate, they are not specific. That is, they need to be in contact with nucleotides and many other [amino acids](#) to be activated. Our study reveals the first receptor on the tongue exclusively for glutamate," Ana San Gabriel, the main author of the article and a scientist belonging to the Spanish Network of Researchers Abroad,

based at the Institute of Life Sciences in Ajinomoto, Kawasaki (Japan), explained to SINC.

According to the study, which was published in the latest issue of the *American Journal of Clinical Nutrition*, glutamate is a non essential amino acid that is used commercially as glutamate sodium salt, monosodium glutamate (MSG) E-621, because it is stable and easy to dissolve. This added glutamate, identical to the 'natural glutamate', is sometimes used to reduce cooking and meal preparation time and to provide more flavour.

MSG is also used to reduce the sodium in meals: table salt contains 40% sodium, whereas MSG contains 13%. Many fermented or ripe foods are rich in natural MSG, such as ripe tomatoes (250-300 mg/100g), parmesan cheese (1600 mg/100g), Roquefort cheese (1600 mg/100g) and Gouda cheese (580 mg/100g). Manchego cheese and Iberian cured ham have a similar taste.

One hundred years ago, Kikunae Ikeda, a lecturer at the Imperial University of Tokyo, discovered the flavouring properties of glutamate after extracting it from the seaweed *Laminaria japonica*, calling its taste 'umami' (savoury). Since then, MSG has been one of the condiments that has received the most attention from researchers, along with its effects. All the international food safety agencies consider it safe for human consumption.

Regarding whether glutamate is possibly toxic, the researcher is categorical. "If food safety is evaluated with scientific rigor, MSG is entirely safe for human consumption. If people talk about it being toxic and MSG continues to receive negative publicity, it is because results are extrapolated from administration routes and doses that do not correspond to reality. In fact, it is less toxic than salt".

Even in breast milk

We are exposed to free glutamate from childhood. The most abundant amino acid in breast milk has 0.02% of glutamate, so a 5kg baby who takes 800 ml of [breast milk](#) a day, consumes 0.16g of glutamate. "The amount of glutamate consumed by babies that only breastfeed is equivalent to the MSG of Korea or Taiwan," the researcher concludes.

Total consumption of glutamate (both free and joined to proteins) in an adult diet amounts to around 10 grams a day (100-150mg/kg/day assuming a weight of 70kg), whereas the consumption of glutamate as a condiment in the form of MSG varies from 0.4g in the US, 1.5g in Japan and Korea and 3g in Taiwan (from 6 to 43mg/kg/day). MSG consumption in Spain has not been estimated, but the United Kingdom is calculated to consume 0.6 g on average and 2g in a minority segment of the population (three times more than average).

More information: Ana San Gabriel, Takami Maekawa, Hisayuki Uneyama, y Kunio Torii. "Metabotropic [glutamate](#) receptor type 1 in taste tissue". [American Journal of Clinical Nutrition](#), 90(3):743S-746S, Sept. 2009.

Source: FECYT - Spanish Foundation for Science and Technology

Citation: Receptor activated exclusively by glutamate discovered on tongue (2009, October 9) retrieved 23 April 2024 from <https://medicalxpress.com/news/2009-10-receptor-exclusively-glutamate-tongue.html>

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