Probing Question: What is umami?

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Credit: AI-generated image (disclaimer)

The next time you're at a dinner party and want to spice up the conversation, you might compliment the hosts on their umami-rich appetizers. Then wait a moment until someone invariably asks, "What's umami?"

While most people have no trouble identifying sweet, salty, sour and bitter tastes in food, the fifth taste—umami—is the one many of us

stumble over.

"I find about a third or half of the people I speak to have heard of umami, but it certainly isn't as accessible to most people as the other prototypical tastes," says John Hayes, assistant professor of food science at Penn State. "I've also noticed that some fraction know about it, but are unwilling to voice it aloud because they are unsure of the pronunciation, which is 'oo-mom-eee.'"

The term umami was coined in 1908 by Japanese chemist Kikunae Ikeda, who identified the chemical basis for the flavor. "The French food writer Brillat-Savarin had identified the same sensation, calling it osmazome, 80 years before," says Hayes.

The taste itself "is the meaty, brothy, savory sensation we perceive from certain amino acids, including glutamate," he says. Chinese food, for instance, often gets a taste boost from the added glutamate in the flavoring agent MSG. However, many of the ingredients in Asian foods are already naturally rich in umami. The Japanese fish stock called dashi—the basis of many dishes in Japanese cuisine—is made with some of the world's most umami-rich ingredients, including kombu, a type of kelp seaweed; bonito fish flakes; and shiitake mushrooms.

Hayes, the director of Penn State's Sensory Evaluation Center, is quick to point out that "it's a mistake to conclude that umami is an 'eastern' flavor, as it's ubiquitous in western cuisine as well." Parmesan cheese from Italy, ketchup from the United States, sauerkraut and sausage from Germany, and Vegemite from Australia are all examples of umami-rich foods. "Think of the most die-hard meat eater you know, and the disappointed face they make when you tell them dinner will be meatless," says Hayes. "Yet this person probably tucks in enthusiastically to a plate of vegetarian lasagna. This is because the tomato and cheese both contribute loads of meaty, savory, 'umaminess' even if we don't

readily use this word for it in everyday language."

Likewise, says Hayes, though we think of soy sauce as a classic source of umami, "Worcestershire sauce is, too, as it contains umami-rich ingredients like tamarind and anchovies. In fact, in 1912, when Kikunae Ikeda addressed the International Congress of Applied Chemistry in Chicago, he noted, 'An attentive taster will find out something common in the complicated taste of asparagus, tomatoes, cheese and meat, which is quite peculiar and cannot be classed under any of the well defined four taste qualities, sweet, sour, salty and bitter.'"

Although we all have our individual taste preferences, says Hayes, "liking and disliking certain tastes is evolutionarily hardwired, and this is conserved across species. If you give newborn human and non-human primates sugar, you will get the same stereotypical facial responses. Remarkably, this liking even predates birth, because if you inject sweet substances into the amniotic sac, the swallowing rate of the fetus increases. Conversely, bitterness is disliked, and bitter substances trigger a different stereotypical set of facial responses that are common across species. Jacob Steiner found that straight glutamate in water does not trigger positive facial reactions in human babies, but when you compare soup with added glutamate to soup without, the glutamate containing soup is preferred, which is taken as evidence that preference for umami is also innate."

With that said, adds Hayes, "we certainly learn to override innate aversions with experience. Otherwise, we wouldn't come to like black coffee or deliciously bitter hoppy beer such as I had last weekend."

While science has unlocked some of the mysteries of our biologically—and culturally—influenced taste preferences, "the canon of prototypical tastes is not quite as cut and dried as middle school textbook writers wish to imply," says Hayes. "'Hot' [spicy] and 'astringent' were

also believed to be tastes for many years, but in the 20th century, they were reclassified as touch sensations, rather than true tastes. Nonetheless, this change does not decrease their relevance in foods. Even if we discount these two, current evidence suggests 'metallic' may be both a smell and a taste, which would bring us up to at least six tastes. Whether kokumi ('mouthfulness') and a fatty acid taste are tastes number seven and eight is an area of active debate and remains to be seen."

Sounds like more intensive tasting experimentation is needed. Is it time for dinner yet?

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