Supertasters: Why Your Tongue Shapes Your Mind

Authored by

mohammad looti

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A supertaster is a person who experiences the sense of taste with far greater intensity than average, with some studies showing an increased sensitivity to bitter tastes. It may be a cause of selective eating, but selective eaters are not necessarily supertasters, and vice versa.

History

The term originates with experimental psychologist Linda Bartoshuk who has spent much of her career studying genetic variation in taste perception. In the early 1990s, Bartoshuk and her colleagues noticed some individuals tested in the laboratory seemed to have an elevated taste response and took to calling them supertasters. This increased taste response is not the result of response bias or a scaling artifact, but appears to have an anatomical/biological basis.

PTC

In 1931, Arthur L. Fox, a DuPont chemist, discovered that some persons found phenylthiocarbamide (PTC) to be bitter while others found it tasteless. At the 1931 meeting of the American Association for the Advancement of Science, Fox collaborated with Albert F. Blakeslee, a geneticist, to have attendees taste PTC: 65% found it bitter, 28% found it tasteless, and 6% described other taste qualities. Subsequent work revealed that the ability to taste PTC was genetic.

PROP

In the 1960s, Roland Fischer was the first to link the ability to taste PTC, and the related compound propylthiouracil (PROP), to food preference and body type. Today, PROP has replaced PTC in taste research because of a faint sulfurous odor and safety concerns with PTC. As described above, Bartoshuk and colleagues discovered that the taster group could be further divided into medium tasters and supertasters. Most estimates suggest 25% of the population are nontasters, 50% are medium tasters, and 25% are supertasters.

Cause

The cause of this heightened response is unknown, although it is thought to be related to the presence of the TAS2R38 gene, the ability to taste PROP and PTC, and, at least in part, due to an increased number of fungiform papillae. Any evolutionary advantage to supertasting is unclear. In some environments, heightened taste response, particularly to bitterness, would represent an important advantage in avoiding potentially toxic plant alkaloids. In other environments, increased response to bitterness may have limited the range of palatable foods.

TAS2R38

The bitter-taste-receptor gene TAS2R38 has been associated with the ability to taste PROP and PTC; but it cannot completely explain supertasting. Still, the T2R38 genotype has been linked to a

preference for sweetness in children, avoidance of alcoholic beverages, increased prevalence of colon cancer (because of inadequate vegetable consumption) and avoidance of cigarette smoking.

Identifying a supertaster

Tongue's fungiform papillae revealed with blue food dye.

Supertasters were initially identified on the basis of the perceived intensity of propylthiouracil (PROP) compared to a reference salt solution. However, because supertasters have a larger sense of taste than medium or nontasters, this can cause scaling artifacts. Subsequently, salt has been replaced with a non-oral auditory standard. That is, if two individuals rate the same physical stimulus at a comparable perceptual intensity, but one gives a rating twice as large for the bitterness of a PROP solution, the experimenter can be confident the difference is real and not merely the result of how the person is using the scale. Today, there is a phenylalanine test strip. The general population tastes this as bitter about 5% of the time.

Many studies do not include a cross-modal reference and simply categorize individuals on the basis of the bitterness of a concentrated PROP solution or PROP impregnated paper. It is also possible to make a reasonably accurate self-diagnosis at home by careful examination of the tongue and looking for the number of fungiform papillae. Blue food dye can make this easier. Being a supertaster or nontaster is part of normal variation in the human population, as are eye color and hair color, so no treatment is needed.

Specific food sensitivities

Although individual food preference for supertasters cannot be typified, documented examples for either lessened preference or consumption include:

Certain alcoholic beverages (gins, tequilas, and hoppy beers)
Brassica oleracea cultivars (become very sulfurous, especially if overcooked)

Brussels sprouts
Cabbage
Kale

Coffee
Grapefruit juice
Cilantro
Green tea

Watercress, mustard greens, horseradish, dandelion greens, rutabaga and turnip
Soy products
Carbonated water
Mushrooms
Anise and licorice
Lower-sodium foods

Other foods may also show altered patterns of preference and consumption, but only indirect evidence exists:

Tonic water - Quinine is more bitter to supertasters
Olives - for a given concentration, salt is more intense in supertasters