# Sour taste make you pucker? It may be in your genes

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Scientists at the Monell Chemical Senses Center report that genes play a large role in determining individual differences in sour taste perception. The findings may help researchers identify the still-elusive taste receptor that detects sourness in foods and beverages, just as recent gene studies helped uncover receptors for sweet and bitter taste.

Scientists have long known that sour taste is stimulated by acids in foods and beverages. In fact, the word acid is derived from the Latin 'acidus,' meaning sour. However, we still do not completely understand how the taste system is able to detect and translate acidic molecules on the tongue into a neural signal that the brain perceives as 'sour.'

"Demonstrating a genetic component to individual differences in sour taste is the first step in pinpointing the genes that determine sensitivity. The products of those genes, in turn, are likely to be involved in sour taste perception," says study lead author Paul M. Wise, PhD, a Monell sensory psychologist.

In the study, published online in advance of print in the journal *Chemical Senses*, researchers tested 74 pairs of monozygotic (MZ, identical) twins and 35 pairs of dizygotic (DZ, fraternal) twins to determine the lowest concentration needed for each twin to correctly identify a citric acid solution as 'sour.'

Because MZ twins have nearly identical genes while DZ twins share only about 50% of their genes, more similar responses in MZ than DZ pairs suggests that genes help determine sensitivity to the taste in question.

Responses were compared within the twin pairs, and then entered into a computer model to determine the relative contributions of genetic and environmental influences on sour taste sensitivity.

The models estimated that genes played a more important role than environment in determining individual differences in sour taste sensitivity, accounting for 53 percent of the variation.

The finding that genes influence sour taste perception suggest that genetic analyses could potentially help identify sour receptors. Future studies will evaluate possible receptors by determining whether individual differences in genes for these structures – such as the recently-discovered PKD ion channel – are correlated with individual differences in sensitivity to sourness. For any given candidate receptor, a strong association of genetic with perceptual variation would support the likelihood that the receptor detects sour taste.

The findings, in conjunction with previous work on sweet, bitter, and umami (savory) taste, suggest that people differ in how they perceive the taste of foods, and that these differences are determined in part by their taste genes. So someone who inherited a high sensitivity to sour taste may find foods containing lemons or vinegar off-putting, whereas the same foods may be better accepted by a person whose genes make them less sensitive.

Wise comments, "These taste perceptions presumably evolved because they have a significant impact on food choice and therefore nutrition. If we can understand how and why people differ in their taste perception, we might eventually be able to manipulate the taste of individual diets to help encourage healthy eating."

Source: Monell Chemical Senses Center

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