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Bitter Taste Perception

Some people taste bitterness in foods more than others.

Charles, you're unlikely to taste certain bitter compounds

The science of bitter taste

We have five types of taste.

We have five types of taste that allow us to sense flavors in our foods. Experts think that these five tastes evolved in us to help us eat nutritious foods and avoid possibly toxic or dangerous substances.

Bitter: such as coffee, kale, and chocolate

Salty: such as pretzels, popcorn, and french fries

Sour: such as lemons, rhubarb, and sauerkraut

Sweet: such as candies, strawberries, and cakes

Umami, or savory: such as mushrooms, soy sauce, and cured meats

Humans can taste many types of bitterness.

Our tongues have very complicated taste receptors that can sense many different compounds in our food. There are at least 25 different types of bitter taste receptors. Our brains combine the messages sent by taste receptors with other senses, like smell, texture, and temperature, into flavor. Scientists have recorded more than 550 compounds that people taste as bitter.¹

Can you taste the difference?

The way we taste and respond to different foods comes from our genes, but other factors can make a difference in how we taste, too. Up to 85% of bitter taste is explained by our genes,² but characteristics such as sex^{2,3,4} and age⁴ may play a role in how strongly we taste bitter flavor. Additionally, some studies suggest that the five types of taste can all affect the intensity of bitterness that a person experiences.⁵

Culture and environment can play a role in bitterness tasting, too. Take coffee as an example: many people dislike black coffee the first time they drink it but become accustomed to it over time when it's something that everyone around them is drinking.

What about spicy?

What about spicy?

Unlike bitter, spicy isn't a type of taste receptor. The taste we associate with spicy foods is communicated to our brain through pain receptors called nociceptors. Nociceptors help us sense, respond to, and avoid danger. Pain receptors are found in and on our skin, mouth, nose, and eyes. No pain, no (spicy) gain!

Bitterness and food

Many healthy foods are bitter.

Plants produce many types of compounds. Some of them are there to help the plant grow and thrive. Bitter compounds may have developed to discourage animals from eating the plant. Many humans also find these plant ingredients icky-tasting.⁶ However, eating bitter vegetables like brussels sprouts, broccoli, and kale is good for us.⁷ Fortunately, there are ways to hide the bitter taste in how they're cooked.

Food science to the rescue

Humans have been changing their food to make it tastier for thousands of years. Roasting foods like peanuts and chocolate gives them their flavor. Roasting vegetables makes them taste less bitter.

Beer's bitter, too.



What we looked at and why

We looked at a place in your DNA that influences if you can taste a bitter compound called phenylthiocarbamide, or PTC.² While PTC itself does not exist in food, some vegetables contain a bitter compound similar to PTC.

- People who can taste PTC can taste similar bitter compounds in vegetables like raw broccoli and brussels sprouts. About 75% of people are able to taste PTC and related compounds.²
- People who can't taste PTC don't taste similar bitter compounds in food.

Bitter taste perception is also influenced by other genetic and non-genetic factors.

Scientific details

The *TAS2R38* gene makes a bitter taste receptor, which is part of our taste buds. Bitter taste receptors interact with our food and send signals to our brain that get interpreted as flavor. We analyzed your DNA for the presence of a genetic change ⓘ that alters *TAS2R38* to allow for the detection of the bitter taste associated with PTC and similar compounds.³

DNA marker ?

Gene

Your result * ?

rs713598

TAS2R38

CC

* Each of your parents provides you with a nucleotide at this position, but we don't know which parent gave you which nucleotide.

The evolution of bitter (non-)tasting



1 of 5

“I trust my bitter taste perception results shown above.” Do you agree or disagree with this statement?

Strongly agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Strongly disagree

Continue

Let us know what you think



Important Information

This test won't tell you whether you definitely can taste bitterness.

There are other things that might affect what you can taste. This information is based on science that could change over time as scientists learn more about genetics. We looked at a place in your DNA that research studies have found to be linked with the ability to taste bitterness.^{2, 3, 5, 13, 14} Scientists understand bitter taste perception better in some populations than others.

This science is based on studies of people with European and East Asian genetic ancestry.¹⁰ This information shouldn't be used to make any medical decisions.

Talk to a doctor before making any major lifestyle changes, or if you have any concerns about your health.

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Have questions or concerns?

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