1. PTC Paper Tasting

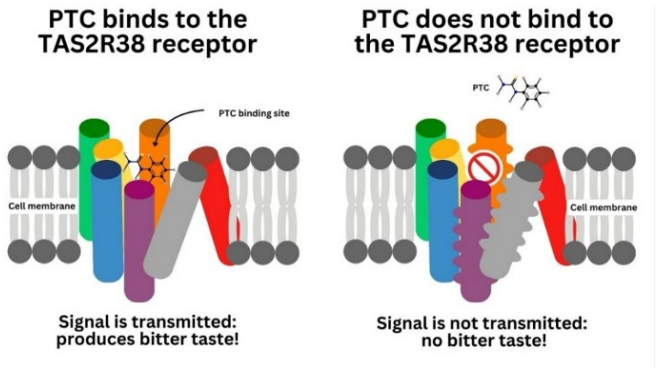
Overview

Most likely, you know people with different taste preferences. For example, some people love Brussels sprouts, whereas others think they are too bitter. But did you know that the ability to taste certain chemical compounds is genetic? **Genes** are regions of your DNA that your body's cellular machinery can read, like software code, then translate into **proteins**, which are complex molecules with specialized tasks. People's genetic code can differ just a little bit (or a lot). Your personal DNA variation makes up your **genotype**, and how your proteins make up your body is your **phenotype**. One of these hundreds of thousands of proteins is a bitter-taste receptor called **Taste Receptor 2 Member 38** (or **TAS2R38**) that resides in cells of your taste buds. When one especially bitter chemical—**PTC**—binds to this receptor, you experience a nasty bitter taste—but only if you inherited a version (**allele**) of the bitter-taste gene that lets PTC bind to the TAS2R38 receptor! Some people have the bitter-taster variant and some do not. Will you be a bitter taster? Let's find out!

How it works

Humans can recognize five basic tastes: bitter, salty, sweet, sour, and umami (meaty/savory). On your tongue, food taste chemicals meet taste receptors at the surface of receptor cells. Each taste has its own type of receptor cell. If the taste chemical binds to the right receptor, those cells send signals to your brain. Then your brain interprets the signal, and you taste the corresponding flavor. If the taste chemical doesn't bind to the receptor cell, you won't taste the chemical.

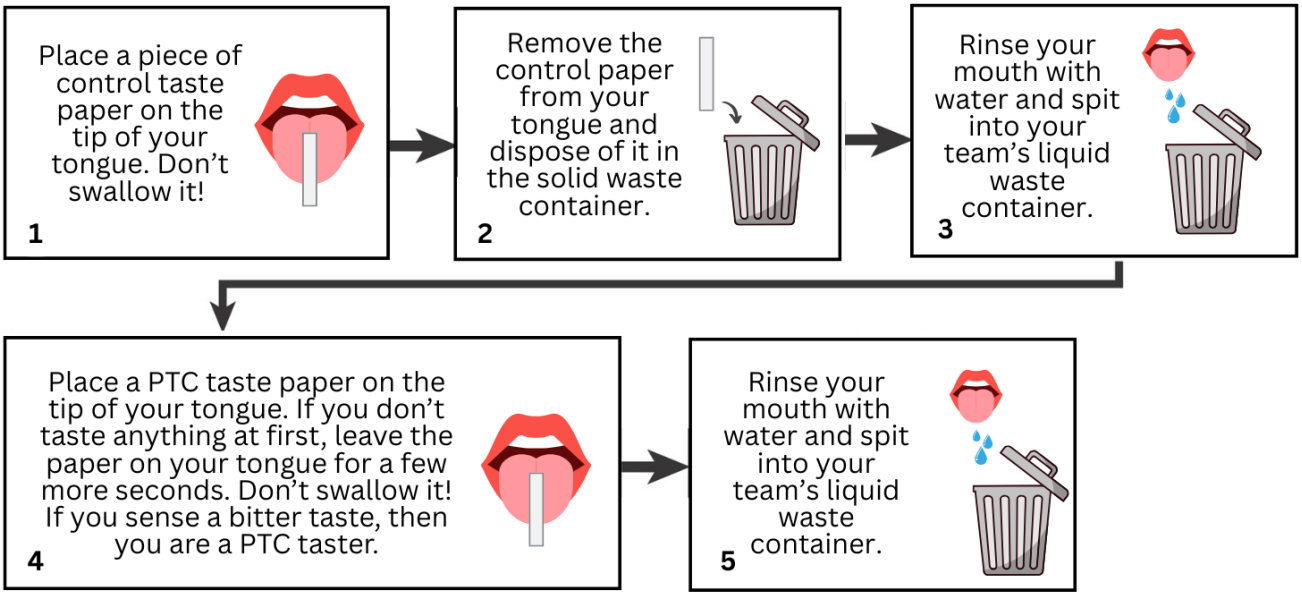
One of these taste genes—called TAS2R38—allows you to taste bitter foods. This gene has two variations, or alleles. Depending on which alleles they have, people can taste PTC strongly, somewhat, or not at all. If you can taste bitter flavors in foods, it is likely you can also taste PTC. If you are a bitter taster, PTC binds to the bitter taste receptor on your tongue and sends a signal to your brain and YUCK! While you will not know your genotype for certain just yet, you will learn your bitter-tasting phenotype after tasting PTC.



What you will explore today

The lab activity is quite simple. You will taste two pieces of paper and note your results. One piece of paper is the control and should taste like nothing. The taste of the PTC paper will depend on your genetic makeup. You will either taste a strong, bitter flavor, a slight bitter taste, or nothing.

PTC PAPER TASTING PROCEDURE



Note: Due to genetics, there is a gradient of PTC-tasting ability:

- If the paper tastes awful, you are a **strong taster**.
- If you perceive only a slight bitter taste, you are a **weak taster**.
- If it tastes like the control paper, you are a **nontaster**.