COVID’s bitter legacy: Finicky tasters may be at higher risk

The pandemic has dealt us many curveballs, among which are the peculiar “comorbidities” that render people susceptible to bad outcomes. Count advanced age, overweight, insulin resistance or diabetes, and hypertension among the more obvious ones. Then there’s vitamin D status, and the condition of the microbiome. Genetic factors play a role, but there’s no consensus as to what constitutes the “Achilles’ heel” vs. resilient profile.

Enter our distinctive taste buds. It’s well known that humans vary in their perception of the sensation of bitter, one of the five distinctive tastes which include sweet, sour, salty, and umami. Surely you know, or you may be, someone who has an absolute aversion to the taste of green leafy vegetables. Bitter flavors are concentrated in cruciferous vegetables and such foods as radicchio, endives, and dandelion greens. For some, they prompt a “Yuck!”; for others, deep appreciation.

Moreover, sensitivity to bitter tastes changes over the life cycle. Some kids readily eat them, but others, to the dismay of their parents, shun them. Many will grow out of that. With adulthood comes a general waning of bitter taste aversion.

Additionally, pregnant women undergo changes in taste perception. Husbands who are called upon to make midnight Rocky Road ice cream runs are well-acquainted with this

phenomenon.

What's going on here? It's natural selection at work. Poisonous plants, which abounded in the environments in which our Paleolithic ancestors evolved, are rich in bitter, toxic alkaloids. Children and pregnant women—who might miscarry—are more vulnerable to their effects.

Mature adults can withstand a brush with a sketchy herb, many of which, incidentally, may have medicinal effects and were incorporated in traditional folk medicine. After all, the ability to tolerate "bitters" has a nutritional upside, as we all learned from mom when she exhorted us to eat our broccoli.

So, what does all this have to do with COVID? A recent study divided subjects into 3 groups according to their bitter taste sensitivity: super-tasters vs. tasters vs. non-tasters. They found that non-tasters (those most likely to tolerate bitter tastes) were less likely to come down with COVID, and when they did, they were less sick and far less at risk for hospitalization (by a 10:1 margin!) than their finicky counterparts.

It's tempting to postulate that persons without a bitter aversion eat more healthy greens that confer immune benefits. Or perhaps it's the bitter tea, coffee, or hops-rich beer—all laden with immune-supportive polyphenols—that they tolerate better than their peers?

Or, you might suspect that super-tasters would be fatter, because they would tend to gravitate to caloric sweeteners to mask the bitterness of foods and beverages ("A spoonful of sugar helps the medicine go down").

Paradoxically, it's been established that bitter-tasters have *lower* body mass indexes (BMIs). This is attributed to the fact that loss of taste discrimination leads people to select foods based on texture and fat content, a phenomenon seen in older individuals whose taste sensations are blunted; they'd rather sit down to an ice cream sundae than an arugula salad.

People who tolerate bitter tastes—non-tasters or tasters but not super-tasters—may be subject to the appetite-stimulating effects of bitter foods. According to one study, "bitter agonists increase hunger scores and stimulate hedonic food intake through stimulation of the gut-brain axis."

It's no coincidence that *aperitifs* and *digestifs* consumed before a meal to enhance our appetite and digestion are bitter concoctions, like Cynar, Campari, and angostura bitters. In fact, Swedish bitters are one of my go-to's for stimulating appetite and relieving dyspepsia.

So super-tasters who are intolerant of astringent tastes are, as a rule, not fatter; it may be the opposite. So, what accounts for their greater susceptibility to COVID?

The researchers turned to genetic analysis to resolve this conundrum. It turns out that a single gene determines bitter taste sensation: T2R38. It codes for taste receptors. Bitter taste receptors (TAS2Rs) are not only expressed in the tongue but in several extra-oral tissues. As anyone who's suffered a bad cold (or COVID) will attest, there's more to taste than the taste buds on your tongue.

But T2R38 governs more than just the perception of bitterness. Researchers postulate a dual role: "A growing body of literature has suggested a role for bitter taste receptors (T2Rs) in sinonasal innate immunity." Because their innate immunity was stronger, possessors of a highly expressed T2R38 gene were less likely to come down

with COVID. In fact, they accounted for a mere 5.6% of COVID cases in the study, and their symptoms were milder.

Short of a gene test, how can you tell if you're a super-taster or a non-taster? You might already have a hint, based on your affinity or aversion for bitter foods. I consider myself a lucky non-taster because I've cultivated an appreciation for all but the most astringent foods and beverages.

In the COVID study described here, researchers paired genetic tests with an innovative bitter taste test kit due to be released to the public in July 2021. There was a pretty good match between the gene results and the taste test results. The company name—Phenomune—subtly implies that you can use the *phenotype* of your bitter taste to predict your immunity.

Looks like a fun way to forecast your susceptibility to COVID (unless, of course, if you've already been vaccinated)—beats a Ouija board!