

Bitterness induces nausea, swallowing not required

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The mere taste of something extremely bitter—even if you don't swallow it at all—is enough to cause that dreaded feeling of nausea and to set your stomach churning, according to a new study reported in the April 12th issue of *Current Biology*, a Cell Press publication.

"This work shows that our body and our physiology anticipate the consequences of foods we might eat, even if those foods contain toxins or anti-nutrients," said Paul Breslin of the Monell Chemical Senses Center and Rutgers University.

Of course, it is well known that the promise of something tempting to eat can cause a physiological response. Think Pavlov and his salivating dog. It also seems intuitive that bitterness, a taste associated with most plant-derived toxins, might be linked to [nausea](#). However, Breslin says, the evidence was lacking.

In the current study, Breslin and the study's first author, Catherine Peyrot des Gachons, asked 63 healthy (and brave) individuals to sample an intensely [bitter](#) but non-toxic solution. He says the flavor could be compared to a typical concoction of liquid cold and flu medication on the bitterness scale. Participants held the bitter solution in their mouths for 3 minutes before spitting it back out. The experience led most people to report feelings of nausea that were either mild to moderate or strong. A second bitter solution had the same effect on people, unlike sweet, salty, or umami tastes.

During the taste-testing sessions, the researchers also recorded the electrical activity in the stomach using electrodes. Certain irregular patterns of stomach muscle activity are a hallmark of nausea, Breslin explained.

Those results made it clear that the self-reported nausea wasn't all in the study participants' heads. The exposure to bitter solutions produced responses in the stomach that were comparable to those caused by extreme motion sickness, the researchers report.

"It was known that our body can anticipate the ingestion of nutrients and prepare for them," Breslin said. "It was not known if our bodies anticipated the ingestion of toxins or anti-nutrients and prepared for this. Here we show that our bodies punish us for holding strong toxins in the mouth and that our stomachs respond so as to trap them and likely vomit them back up if swallowed."

The findings suggest that those already prone to nausea—including pregnant women and patients undergoing chemotherapy—should take particular care to avoid bitter tastes. "In some instances, extreme nausea is worse than extreme pain, and anything we can do to help manage this is important," Breslin said.

Provided by Cell Press

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