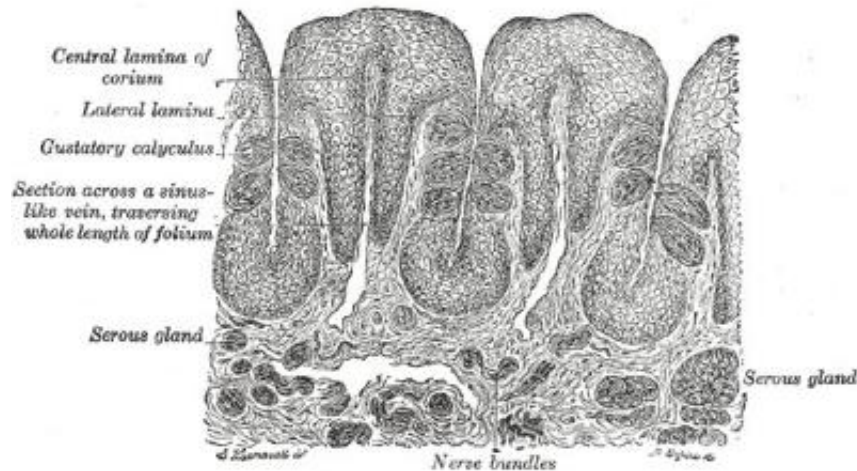


Helping the medicine go down

August 21 2008



A cross-section of a rabbit's taste buds. Credit: Henry Gray's Anatomy of the Human Body

Getting little Doug and Debbie to take a spoonful of medicine is more than just a rite of passage for frustrated parents. Children's refusal to swallow liquid medication — and their tendency to vomit it back up — is an important public health problem that means longer or more serious illness for thousands of kids each year. In the case of HIV and AIDS pediatrics, missing a dose can be a life or death scenario.

In a report presented at the 236th National Meeting of the American Chemical Society, Julie A. Mennella, Ph.D., described how knowledge from basic research on the chemical senses explains why a child's rejection of bitter medicine and nutritious but bitter-tasting foods like

spinach and other green vegetables is a reflection of their basic biology.

"Children's rejection of unpalatable medications and bitter-tasting foods is a complex product of maturing sensory systems, genetic variation, experiences and culture," says Mennella, a researcher with the Monell Chemical Senses Center in Philadelphia.

She says that children are born with a much stronger preference for sweet flavors, naturally attracting infants to mother's milk. This heightened preference for sweets continues even in their teenage years. By late adolescence, kids start to outgrow their sugary predilection.

"A better understanding of the sensory world of the child – and the scientific basis for distaste and how to ameliorate it – is a public health priority," states Mennella.

Mennella investigates the role of early experience as a child develops their unique sense of taste and smell. In the process, she ultimately hopes to find ways of creating more palatable medicines and getting kids to eat their greens more readily.

"The number one reason for non-compliance among children when taking medicine or eating vegetables is that they don't like the taste," says Mennella. "Just look at a child's face when they're eating some of these things!"

The root of this bitter problem lies in human taste buds, or taste receptors. While there are only a few receptors for sweet flavors, evolution imbued man with about 27 for bitterness. In prehistoric times, this heightened sensitivity to bitterness prevented early humans from eating toxic plants or other unsavory and possibly poisonous fare. "Bitter taste is a sensation that evolved to make you not want to ingest something," says Mennella.

Unfortunately, most of the chemicals in the pharmacist's cookbook are plant-derived and therefore inherently bitter. Some of more potent drugs like certain AIDS medications for children are even less pleasant – they often smell bad and cause mouth irritation.

For some medications, masking the bitterness is possible by encapsulating the bitter chemical in pill or tablet form, or by using special "bitter blockers" that numb the tongue's receptors. But many children have trouble swallowing pills, so liquid formulations are needed. Adding sweet tastes and flavors that children like helps the medicine go down.

Unfortunately, Mennella says it's extremely difficult to mask the flavors of some of the truly bitter liquid medicines. A better understanding of bitter taste receptors may yield new ways of overcoming these unpleasant flavors.

A recent explosion in taste and smell research led to the identification of genes that code for certain bitter taste receptors. Mennella's team showed that a variation in the TAS2R38 gene is linked to the perception of bitterness in children and their parents. The researchers found that while parents with this variation were sensitive to certain bitter compounds, their children were most sensitive of all.

"It is interesting because it may suggest that children have heightened bitter sensitivity compared to adults," states Mennella.

Babies begin developing their unique tasting profile while still in the womb. What a mother eats while pregnant and nursing enhances a newborn's acceptance of foods. "We find that the more a mother eats fruits when she's pregnant, the more a child will accept fruits and vegetables," says Mennella.

The culture that a child grows up in also plays a huge role in their development of taste and smell. For evidence, Mennella points to the flavorings found in children's medicine around the world. "In England, there is a lot of lemon flavor added to children's medicine. It's a cultural phenomenon. Bubblegum and cherry are popular in the United States," according to Mennella.

When children cannot or will not take medicines in encapsulated form, methods to reduce the bitterness in liquid medications become medically significant. Failure to consume medication may do the child harm, and in some cases, may be life threatening, according to Mennella. She says that pharmaceutical companies will benefit from more basic research on bitter taste and how to ameliorate it.

"It is one of the fundamental mysteries of human behavior – why do we grow to like these foods and flavors that we initially rejected?"

Source: American Chemical Society

Citation: Helping the medicine go down (2008, August 21) retrieved 5 May 2024 from <https://medicalxpress.com/news/2008-08-medicine.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.