

Fake Sweet

By Dr. Nicholas Leadbeater

Be it in coffee, soft drinks or baked goods, we all like the sweet taste of sugar. However, alongside the sweetness that sugar brings to food, it also piles on the calories. In an attempt to have the best of both worlds, food manufacturers have turned to making and using artificial sweeteners.

All sweet-tasting chemicals are perceived by a receptor found on the surfaces of cells all over the tongue and inside the mouth. Sugar and artificial sweeteners bind to this receptor, creating the sweet sensation that we get when we eat them. The reason that sucralose, a common component of artificial sweeteners, tastes so much sweeter than sugar is because it binds much more effectively to the sweet receptor. It is like putting fingers in to a glove. Sucralose fits into the glove more snugly than sugar. Knowing what the receptor looks like, chemists can think about designing compounds that fit even better into it. Take for example neotame, the next generation of aspartame. It fits so well into the receptor that it tastes 13,000 times as sweet as sugar. Indeed, for commercial use, artificial sweeteners have to be mixed with filler to "dilute" them so they approximate a natural sweetness, teaspoon for teaspoon.

Not so sweet is the controversy that has come with the development of artificial sweeteners. Many of them have been both on and off the regulatory lists of chemicals safe for human consumption. And while artificial sweeteners may be calorie free, the fillers that are used still add a few per teaspoon. So for many people, the jury is still out.

From:

<http://www.publicbroadcasting.net/wamc/news.newsmain/article/0/7288/1898233/Academic.Minute/Dr..Nicholas.Leadbeater..University.of.Connecticut.-.Chemistry.of.Artificial.Sweeteners>

Directions: Answer the following questions in the space provided:

1. What structure on a cell is detecting "sweetness"?
2. Briefly describe how detection works
3. Compare this taste detection system to the mechanism of enzyme action. What do they have in common?

