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"Electronic Tongue" Mimics Human Taste Organ

Mark Anderson for National Geographic News September 1, 2009

An "electronic tongue" that can digitally measure the taste of sweetness has been created, a new study says.

The technique uses a postage stamp-size piece of paper dotted with colored pigments.



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A computer compares scans of the array of dots before and after the paper is wetted with an eyedropper full of liquid.

After running dozens of samples of mystery artificial sweeteners dissolved in water or tea, the research team reported that their tongue could pick out the sweetener used with with 100 percent accuracy.

But the array only works collectively: No single dot—each made of a tiny gel coated with a pigment that reacts to different sweeteners—detected any single sugar or sugar substitute, according to study leader Kenneth Suslick, a chemistry professor at the University of Illinois at Urbana-Champaign.

"It's not like a key that only fits one lock," Suslick said.

"That's not the way our tongue works—that's not the way our nose works. And that's not the way this array works."

Bitter End
The human tongue also detects saltiness, sourness, bitterness, and savoriness.

Sourness is just another word for acidity, Suslick said, which any high school chemistry student can test for using litmus paper.

Savoriness—also called "umami"—and saltiness can already be measured by handheld devices sensitive to protein levels and sodium and potassium ions.

The final dimension of taste that remains to be cracked is bitterness, which is still somewhat of an unknown.

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