

Your sweet tooth may really be in your brain's 'pleasure hotspot'

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What makes those holiday candies and Christmas cookies look so tempting? University of Michigan researchers have discovered a "pleasure spot" in the brains of rats, helping neuroscientists understand where and how pleasure is generated in humans.

U-M psychology researchers Susana Peciña and Kent Berridge detail their study in the latest issue of the *Journal of Neuroscience*, explaining a pleasure spot in the brains of rats that makes sweet tastes more highly 'liked' using natural heroin-like chemicals in the nucleus accumbens (lower front of the brain).

"It's basically a tiny brain pleasure cube that chemically doubles rats' liking for sweets, and makes them eat six times more," Berridge said. "It's tucked into a larger appetite cube that increases eating many times above normal, but doesn't make the sweetness any more liked."

Sweetness by itself is merely a sensation, they note, and its pleasure arises within the brain where neural systems actively paint pleasure onto the sensation to generate a "liking" reaction—as a sort of "pleasure gloss."

"These results also show how brain circuits that make you like a tasty food are different from the circuits that make you want to eat more of it," Berridge said.

The researchers wanted to learn whether that need for pleasure was also

responsible for the growing number of obese Americans. In the study, the drug microinjections caused test rats to eat more food soon afterward, increasing wanting as well as liking for food reward, but the pleasure spot was much smaller than the larger appetite-increasing zone.

The experimenters made microinjections into rats' brains of tiny droplets of drugs that stimulated opioid receptors (natural neurotransmitter receptors for heroin or morphine), which caused nearby neurons to activate particular genes that began producing proteins.

The study revealed the brain nucleus pleasure spot as an island of liking in a sea of wanting for the same reward, both of which may be also involved in causing human eating disorders and drug addictions.

The U-M study used a new mapping technique to show where microinjections of a drug activated natural heroin-type chemical systems in the brain in rats. They then mapped where the drug caused increased pleasurable taste or liking reactions.

Some drug microinjections also caused increases in the apparent pleasure of a sugar taste, reflected by facial expressions that are similar in rats, monkeys, apes and even human infants.

The researchers note that sweet tastes elicit positive liking expressions such as lip licking. In contrast, bitter tastes instead bring out disliking reactions such as gapes. The study found the pleasure hotspot in the nucleus accumbens caused a sweet taste encountered minutes later to elicit even more than the normal number of positive facial liking reactions.

Source: University of Michigan

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