

Investigational obesity drug, oxytocin, weakens brain's reward signals for food

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The hormone oxytocin reduces the communication between different brain areas involved in the cognitive, sensory and emotional processing of food cues that people with obesity demonstrate when they look at high-calorie foods, according to research being presented Monday at ENDO 2019, the Endocrine Society's annual meeting in New Orleans, La.

The work may bring the synthetic nasal formulation of [oxytocin](#) a step closer to possible use as a new obesity treatment. Known more for its role in social bonding, childbirth and breastfeeding, oxytocin is a naturally occurring hormone in the body that is also important for controlling [food intake](#) and weight. Past research shows that oxytocin nasal spray, which is not yet approved in the United States, acts on brain pathways involved in eating behavior and decreases food consumption in men.

"Knowing how the drug exerts its effects is a critical step toward establishing oxytocin as a [drug treatment](#) for overeating and obesity," said the study's lead investigator, Liya Kerem, M.D., M.Sc., a pediatric endocrinology fellow at MassGeneral Hospital for Children and a research fellow at Massachusetts General Hospital in Boston, Mass. "This study is exciting because it shows that oxytocin modulates the pathways in the brain specifically during their responses to highly palatable, rewarding foods."

The goal of the new study, according to Kerem, was to examine the

network of reward brain regions that oxytocin affects. Building on their prior findings demonstrating that oxytocin reduces activation of the ventral tegmental area (VTA), a core region of the brain's reward system, the investigators used [functional magnetic resonance](#) imaging (fMRI), a neuroimaging technique used in research that measures brain activity by detecting changes associated with blood flow, to investigate how oxytocin impacts the functional connectivity between the VTA and the rest of the brain.

In this study, 10 healthy but overweight or obese young men randomly received a different treatment during two visits to the research lab. At each visit, the men self-administered a single dose of either oxytocin [nasal spray](#) or a placebo dummy drug after fasting. All were unaware of which treatment they received. Oxytocin reportedly had no side effects in this study, which was funded by the Nutrition Obesity Research Center at Harvard, the Boston Nutrition Obesity Research Center and the National Institutes of Health.

An hour after drug administration, the men underwent fMRI while they viewed images of [high-calorie foods](#) as well as pictures of low-calorie foods and nonfood objects.

"Individuals with obesity, compared to lean people, have abnormally hyperactivated brain reward areas when viewing high-calorie food images, even when they are full, suggesting an explanation for the observed behavior of overeating and a potential target for treatment with medications such as oxytocin," Kerem said.

Compared to placebo, oxytocin weakened the functional connectivity—the effective coordination between neural systems in response to a task—between the VTA and associated food motivation brain areas when participants viewed pictures of high-calorie [food](#).

Provided by The Endocrine Society

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