# Opioid receptors as a drug target for stopping obesity

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Imagine eating all of the sugar and fat that you want without gaining a pound. Thanks to new research published in *The FASEB Journal*, the day may come when this is not too far from reality. That's because researchers from the United States and Europe have found that blocking one of three opioid receptors in your body could turn your penchant for sweets and fried treats into a weight loss strategy that actually works. By blocking the delta opioid receptor, or DOR, mice reduced their body weight despite being fed a diet high in fat and sugar. The scientists believe that the deletion of the DOR gene in mice stimulated the expression of other genes in brown adipose tissue that promoted thermogenesis.

"Our study provided further evidence that opioid receptors can control the metabolic response to diets high in fat and sugar, and raise the possibility that these gene products (or their respective pathways) can be targeted specifically to treat excess weight and obesity," said Traci A. Czyzyk, Ph.D., a researcher involved in the work from the Department of Physiology at the Mayo Clinic in Scottsdale, Arizona.

Scientists studied mice lacking the delta opioid receptor (DOR KO) and wild type (WT) control mice who were fed an energy dense diet (HED), high in fat and sugar, for three months. They found that DOR KO mice had a lean phenotype specifically when they were fed the HED. While WT mice gained significant weight and fat mass on this diet, DOR KO mice remained lean even though they consumed more food. Researchers then sought to determine how DOR might regulate energy balance and

found that DOR KO mice were able to maintain their energy expenditure levels, in part, due to an increase in non-shivering thermogenesis. This was evidenced by an increase in thermogenesis-promoting genes in brown adipose tissue, an increase in body surface temperature near major brown adipose tissue depots, and the ability of DOR KO mice to maintain higher core body temperatures in response to being in a cold environment.

"Don't reach for the ice cream and doughnuts just yet," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "We don't know how all this works in humans, and of course, a diet of junk food causes other health problems. This exciting research identifies genes that activate brown adipose tissue to increase our burning of calories from any source. It may lead to a safe diet pill in the future."

**More information:** Traci A. Czyzyk, Amparo Romero-Picó, John Pintar, Jaime H. McKinzie, Matthias H. Tschöp, Michael A. Statnick, and Ruben Nogueiras. Mice lacking δ-opioid receptors resist the development of diet-induced obesity. FASEB J. doi:10.1096/fj.12-208041

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