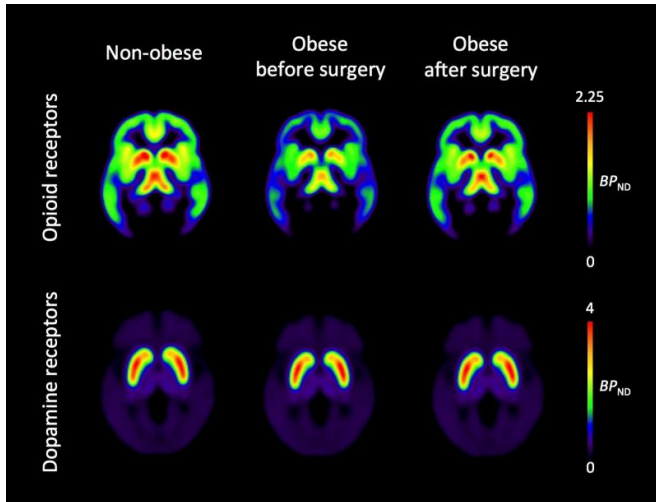


# Obesity surgery normalizes brain opioids

13 October 2015



Obesity is associated with lowered opioid receptor availability (top row) whereas availability of dopamine receptors is unchanged. Bariatric surgery recovers the opioid system but does not influence the dopamine system.

Researchers at Aalto University and University of Turku have revealed how obesity surgery recovers opioid neurotransmission in the brain.

Finnish researchers found that [obesity surgery](#) and concomitant weight loss normalized brain's opioid neurotransmission, which is involved in generating pleasurable sensations. Obesity surgery provides an effective means for rapid weight loss, and the research also shows that obesity surgery also normalizes brain circuits triggering pleasurable sensations when eating. The research outcome was recently published in *Molecular Psychiatry* journal.

"Our findings highlight how obesity is associated with brain-level molecular changes, and how weight loss influences appetite control at the molecular level in the brain. It is possible that the lack of brain's [opioid receptors](#) predisposes the [obese individuals](#) to overeating to compensate

decreased hedonic responses in this system.

Obesity surgery however recovers this bias in the brain," says Professor Lauri Nummenmaa from Aalto University.

"Because brain's opioid system recovers following weight loss, it is likely that their lower levels in the obese are due to weight gain. Altered neurotransmitter levels are thus a consequence rather than a cause of obesity. These results help us to understand the mechanisms involved in [weight loss](#) and appetite, and provide new insight into behavioural and pharmacological treatment," says researcher Henry Karlsson from Turku PET Centre.

Obesity is a great challenge to human health worldwide because it is associated with serious medical conditions such as type 2 diabetes, coronary heart disease, and stroke. Obesity is also associated with alterations in the brain circuits that generate pleasurable sensations when eating, thus predisposing individuals to overeating.

The researchers measured availability of mu-opioid and type 2 dopamine receptors in normal-weight and obese individuals' brains using [positron emission tomography](#) at the Turku PET Centre. The obese subjects underwent bariatric surgery, after which their brains were scanned again.

**More information:** H K Karlsson et al. "Weight loss after bariatric surgery normalizes brain opioid receptors in morbid obesity," *Molecular Psychiatry* (2015). [DOI: 10.1038/mp.2015.153](https://doi.org/10.1038/mp.2015.153)

Provided by Aalto University

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