

# Could ending your fatty food habit cause withdrawal symptoms and depression?

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Even before obesity occurs, eating fatty and sugary foods causes chemical changes in the brain, meaning that going on a diet might feel similar to going through drug withdrawal, according to a study published today by Dr. Stephanie Fulton of the University of Montreal's Faculty of Medicine and its affiliated CRCHUM Hospital Research Centre. "By working with mice, whose brains are in many ways comparable to our own, we discovered that the neurochemistry of the animals who had been fed a high fat, sugary diet were different from those who had been fed a healthy diet," Fulton explained. "The chemicals changed by the diet are associated with depression. A change of diet then causes withdrawal symptoms and a greater sensitivity to stressful situations, launching a vicious cycle of poor eating."

The research team feed one group of mice a low-fat diet and a high fat diet to a second group over six weeks, monitoring how the different food affected the way the animals behave. Fat represented 11% of the calories in the low-fat diet and 58% in the high-fat diet, causing the [waist size](#) in the latter group to increase by 11% – not yet obese. Next, Fulton and her colleagues use a variety of scientifically validated techniques to evaluate the relationship between rewarding mice with food and their resulting behaviour and emotions. They also actually looked at the brains of the mice to see how they had changed.

Mice that had been fed the higher-fat diet exhibited signs of being anxious, such as an avoidance of open areas. Moreover, their brains have been physically altered by their experiences. One of molecules in the

brain that the researchers looked at is dopamine. It enables the brain to reward us with good feelings, thereby encouraging us to learn certain kinds of behaviour. This chemical is the same in humans as it is in mice and other animals. In turn, CREB is a molecule that controls the activation of genes involved in the functioning of our brains, including those that cause the production of dopamine. It contributes to memory formation. "CREB is much more activated in the brains of higher-fat diet mice and these mice also have higher levels of corticosterone, a hormone that is associated with stress. This explains both the depression and the negative behaviour cycle," Fulton said. "It's interesting that these changes occur before obesity. These findings challenge our understanding of the relationship between diet, the body and the mind. It is food for thought about how we might support people psychologically as they strive to adopt healthy eating habits, regardless of their current corpulence."

## **About the study**

The *International Journal of Obesity* issued the study via advanced online publication on December 11, 2012. The research was funded by the Natural Sciences and Engineering Research Council of Canada, the Canadian Diabetes Association and the Canada Foundation for Innovation. Fulton and her team are part of a research network that is working together to address the biological reasons for obesity and its related diseases, such as cardiovascular diseases, type 2 diabetes, some cancers, and of course depression. She is based at the Montreal Diabetes Centre, an institution associated with the CRCHUM and four Montreal universities that brings together facilities for clinical research, cell biology and microscopy research, and rodent physiology research

Provided by University of Montreal

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