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New insight into links between obesity and activity in the brain

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Scientists have revealed that an anti-obesity drug changes the way the brain responds to appetising, high-calorie foods in obese individuals. This insight may aid the development of new anti-obesity drugs which reduce the activity in the regions of the brain stimulated by the sight of tasty foods.

Researchers at the University of Cambridge discovered that the anti-obesity drug sibutramine reduced brain responses in two regions of the brain, the hypothalamus and the amygdala, both of which are known to be important in appetite control and eating behaviour. Their findings are reported today in The Journal of Neuroscience.

Professor Paul Fletcher, from the Department of Psychiatry and the Behavioural & Clinical Neuroscience Institute at the University of Cambridge and one of the paper's authors, said: "Currently, there are few drugs that effectively help patients to lose weight. Developing new pharmaceuticals is expensive and risky. However, our findings suggest that we may be able to use brain imaging and psychological tests to make better predictions of which drugs are likely to work."

Using functional magnetic resonance imaging (fMRI), the researchers measured brain activity while obese volunteers viewed pictures of appetising high-calorie foods – like chocolate cake – or pictures of low-calorie foods – like broccoli. The brain scanning was carried out both after two weeks of treatment with the anti-obesity drug, sibutramine, and two weeks of placebo treatment.

On placebo, it was shown that simply seeing pictures of appetising foods caused greater activation of many regions of the brain that are known to be important for reward processing. On sibutramine, however, they found that the anti-obesity drug reduced brain responses to the appetising foods in two regions of the volunteers' brain - the hypothalamus and the amygdala. These two regions are known to be important in appetite control and eating behaviour. Additionally, people who had the greatest reduction of brain activation following drug treatment tended to eat less and to lose more weight.

Professor Ed Bullmore, from the Department of Psychiatry at the University of Cambridge and director of the GlaxoSmithKline (GSK) Clinical Unit in Cambridge (CUC), said: "Our results help us to understand more precisely how anti-obesity drugs work in the brain to change eating behaviour and hence, ultimately, to assist people in losing weight.

"The most exciting aspect of these results is that they help us to see that brain and behaviour are fundamental to understanding and treating obesity. Simply because obesity involves major changes in body weight and body composition, it is easy to imagine that it is entirely 'a body problem'. These results remind us that the major cause of obesity in the West is over-eating, and this behaviour is regulated by reward and satiety processing circuits in the brain."

More information: The paper 'Distinct modulatory effects of satiety and sibutramine on brain responses to food images in humans: a double dissociation across hypothalamus, amygdala and ventral striatum' will be published on 26 October 2010 in *The Journal of Neuroscience.*

Provided by University of Cambridge