Medical Xpress

Hunger hormone: Makes food more attractive

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A new brain-imaging study by researchers at the Montreal Neurological Institute, McGill University reveals that ghrelin - a stomach hormone, acts on specific regions of the brain to enhance our response to food related cues and eating for pleasure. This study, published in the May 7 issue of *Cell Metabolism*, is critical to advance understanding and treating obesity, a condition affecting millions world-wide.

Appetite was previously thought of as being controlled by two separate mechanisms: homeostatic and non-homeostatic or hedonic food consumption. Homeostatic feeding is controlled by hormones such as ghrelin, that act on the brain to tell the body when to eat in an attempt to keep a constant body weight. Hedonic consumption is triggered by visual or smell cues. For example, wanting to eat a piece of cake just because it looks good and will bring pleasure when eaten. This study demonstrates that both food consumption behaviours are inter-connected and a key player in their regulation is the stomach hormone ghrelin.

“Our study demonstrates that ghrelin actually activates certain regions of the brain to be more responsive to visual food cues, thereby enhancing the hedonic and incentive responses to food-related cues,’ says Dr. Alain Dagher, neurologist at the Montreal Neurological Institute, McGill University and principal investigator in the study. “Ghrelin is a hormone that triggers hunger, and is secreted by the stomach [when it is empty]. An easy analogy would be to think about when you go shopping on an empty stomach, you tend to buy more food and products higher in calories. The reason is that your brain views the food as more appealing,

largely due to the action of ghrelin on the brain."

The study supports the view that obesity must be understood as a brain disease and that hunger should also be looked at as a kind of food addiction. Obese individuals may eat too much largely due to excess hunger. Dr. Dagher and colleagues found that ghrelin worked on regions of the brain known to be involved with reward and motivation, the same regions implicated in drug addiction – the amygdala, insula, the orbitofrontal cortex (OFC) and striatum. "These areas work together to assign incentive value to objects in the world and to actions, and exert very powerful control over our behavior. They are all targets of addictive drugs (like cocaine and nicotine), and are also targets of feeding signals like ghrelin," explains Dr. Dagher.

Participants in the study were shown images of food and scenery [as a control] before and after receiving ghrelin intravenously during functional magnetic resonance imaging (fMRI). In addition to analyzing the activation of different brain regions, subjects also answered questions about their mood and appetite before and after seeing sets of images. The effects of ghrelin on the amygdala and OFC correlated with the self-rated hunger ratings.

This study has shown that ghrelin action is more complex than previously thought and furthers our understanding of how drug treatment might be used to combat obesity. This research may also inform public policy. If food is thought of as potentially 'addictive,' this would support action to limit or ban fast food from schools and junk food advertisements geared towards children, in the same way that results proving nicotine to be addictive spurred the current public policy towards nicotine

Source: Montreal Neurological Institute and Hospital