MedicalXpress

New brain imaging study provides support for the notion of food addiction

June 26 2013

Consuming highly processed carbohydrates can cause excess hunger and stimulate brain regions involved in reward and cravings, according to a Boston Children's Hospital research team led by David Ludwig, MD, PhD director, New Balance Foundation Obesity Prevention Center. These findings suggest that limiting these "high-glycemic index" foods could help obese individuals avoid overeating.

The study, published in the *American Journal of Clinical Nutrition* on June 26, 2013, investigates how food intake is regulated by dopamine-containing pleasure centers of the brain.

"Beyond reward and craving, this part of the brain is also linked to substance abuse and dependence, which raises the question as to whether certain foods might be addictive," says Ludwig.

To examine the link, researchers measured blood glucose levels and hunger, while also using functional magnetic resonance imaging (MRI) to observe brain activity during the crucial four-hour period after a meal, which influences eating behavior at the next meal. Evaluating patients in this time frame is one novel aspect of this study, whereas previous studies have evaluated patients with an MRI soon after eating.

Twelve overweight or obese men consumed test meals designed as milkshakes with the same calories, taste and sweetness. The two milkshakes were essentially the same; the only difference was that one contained rapidly digesting (high-glycemic index) carbohydrates and the

other slowly digesting (low-glycemic index) carbohydrates.

After participants consumed the high-glycemic index milkshake, they experienced an initial surge in blood sugar levels, followed by sharp crash four hours later.

This decrease in blood glucose was associated with excessive hunger and intense activation of the nucleus accumbens, a critical brain region involved in addictive behaviors.

Prior studies of food addiction have compared patient reactions to drastically different types of foods, such as high-calorie cheesecake versus boiled vegetables.

Another novel aspect of this study is how a specific dietary factor that is distinct from calories or sweetness, could alter brain function and promote overeating.

"These findings suggest that limiting high-glycemic index carbohydrates like white bread and potatoes could help obese individuals reduce cravings and control the urge to overeat," says Ludwig.

Though the concept of food addiction remains provocative, the findings suggest that more interventional and observational studies be done. Additional research will hopefully inform clinicians about the subjective experience of food addiction, and how we can potentially treat these patients and regulate their weight.

Provided by Children's Hospital Boston

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