Gut hormone makes food look even yummier

May 6 2008

A gut hormone that causes people to eat more does so by making food appear more desirable, suggests a new report in the May issue of *Cell Metabolism*, a publication of Cell Press. In a brain imaging study of individuals, the researchers found that reward centers respond more strongly to pictures of food in subjects who had received an infusion of the hormone known as ghrelin.

The findings suggest that the two drives for feeding—metabolic signals and pleasure signals—are actually intertwined.

“When you go to the supermarket hungry, every food looks better,” said Alain Dagher of the Montreal Neurological Institute at McGill University. “Your brain assigns a cost versus benefit to every food item. Now, we’ve found that it is ghrelin that acts on the brain to make food more appealing.”

Such a hedonic feeding behavior, which can occur in the absence of nutritional or caloric deficiency, may have once provided an adaptive advantage to humans, Dagher added. In our plentiful environment, however, it is likely a significant cause of obesity and its associated diseases.

Ghrelin levels are known to rise before a meal and fall afterwards, suggesting that it causes hunger and encourages eating. Indeed, Dagher noted, both lean and obese people administered ghrelin eat significantly more calories from a free-choice buffet relative to people administered a placebo. Overall, he said, acute and chronic nutritional states seem to

influence naturally circulating levels of the hormone.

It has also been well established that ghrelin activates feeding through its effects on the hypothalamus, where ghrelin receptors are densely concentrated. However, ghrelin also has specific effects on many brain regions implicated in reward and motivation.

In the new study, the researchers investigated further using functional magnetic resonance imaging (fMRI) to measure the brain's response to food and nonfood images following single-blinded ghrelin infusions. Twelve people viewed pictures before and after ghrelin administration, and eight others viewed the same pictures in two identical blocks without receiving ghrelin. (All participants were told they might receive ghrelin.)

Ghrelin increased the response to food pictures in several brain regions involved in the salience and hedonic incentive value of visual cues, including the amygdala, orbitofrontal cortex, insula, visual areas, and striatum, the researchers found.

"Ghrelin has widespread effects," Dagher said. "It's not one or two brain regions, but the whole network. [After ghrelin infusion], food pictures become even more salient—people actually see them better. It influences not only visual processing, but also memory. People remembered the food pictures better when ghrelin was high."

Treatments that disrupt these effects of ghrelin might hold promise for fighting obesity. But because they would influence the brain's pleasure centers, Dagher suspects that they might come with side effects on mood.

Either way, the findings could have public health implications, he added.

The reward centers linked to ghrelin in the new study are also those

involved in drug addiction. “That shows it’s reasonable to think of high-calorie food as having addictive potential,” Dagher said. If so, he suggests that the results could provide the basis for new policies aimed at treating fast food more like cigarettes —for instance, banning its sale in school cafeterias.

Source: Cell Press