Ghrelin Increased Desire for High-Calorie Foods

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SAN DIEGO — The hormone ghrelin, a circulating hormone created mainly in the stomach, mimicked fasting in biasing food appeal toward high-calorie foods, results from a small study showed.

The finding suggests that "changes in the hedonics of food—how pleasurable we find food when either missing meals or eating meals—may be explained by changes in the levels of ghrelin circulating in the blood," Dr. Anthony Goldstone said during a press briefing.

"Given that ghrelin increases the rewarding value of food, it suggests that drugs that block the action of ghrelin may have a potential role in treating obesity—particularly craving for high-calorie foods—and also binge-eating disorder."

Previous work by Dr. Goldstone and his associates has shown that fasting biases activation in reward systems and food appeal toward high-calorie foods in humans (Eur. J. Neurosci. 2009;30:1625-35), but the processes that regulate how

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DR. GOLDSTONE

we choose the sorts of foods we want to eat remain unclear. Findings from various animal studies have suggested that ghrelin may stimulate dopaminergic brain reward systems, "which regulate how rewarding we find food," said Dr. Goldstone, a consultant endocrinologist with the MRC Clinical Sciences Center at Imperial College London.

"We wanted to ask a simple question: whether the effects of fasting on food reward could be mimicked by giving ghrelin to fed subjects, to switch them into a hormonally fasted state."

To find out, the researchers recruited 18 nonobese adults with a mean age of 23 years and mean body mass index of 24 kg/m^2. The participants fasted overnight before each of three randomized, blinded study visits, which took place on separate days at least 1 week apart. At each visit, subjects remained fasted or ate a fixed, 750-calorie breakfast, and 55 minutes later they received a subcutaneous injection of either saline or the hormone ghrelin at a dose of 3.6 nmol/kg.

The subjects underwent functional MRI 40 minutes later and were asked to view blocks of photographs that showed high-calorie foods (such as chocolate, cake, and pizza), or low-calorie foods (such as vegetables, fish, and salads). Each picture was shown for about 2.5 seconds; subjects used a handheld key pad to rate the appeal of each food on a scale of 1-5, with 5 being most desirable.

Both fasting and the administration of ghrelin significantly increased the appeal of high-calorie but not low-calorie foods. "This was particularly seen for sweet high-calorie foods," he said.

MRI imaging showed that fasting and the administration of ghrelin "increased activation of the orbitofrontal cortex, which is known to be involved in encoding the reward value of food," Dr. Goldstone said. "Ghrelin is able to mimic the effects of fasting to bias our brain reward system toward high-calorie foods." ■

VITALS

Major Finding: Subcutaneous administration of the hormone ghrelin mimicked fasting in biasing food appeal toward high-calorie foods.

Data Source: A randomized study of 18 healthy, nonobese patients with a mean age of 23 years.

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