

**Ice cream may target the brain before your hips,  
UT Southwestern study suggests**

DALLAS – Sept. 14, 2009 – Blame your brain for sabotaging your efforts to get back on track after splurging on an extra scoop of ice cream or that second burger during Friday night's football game.

Findings from a new UT Southwestern Medical Center study suggest that fat from certain foods we eat makes its way to the brain. Once there, the fat molecules cause the brain to send messages to the body's cells, warning them to ignore the appetite-suppressing signals from leptin and insulin, hormones involved in weight regulation.

The researchers also found that one particular type of fat – palmitic acid – is particularly effective at instigating this mechanism.

"Normally, our body is primed to say when we've had enough, but that doesn't always happen when we're eating something good," said Dr. Deborah Clegg, assistant professor of internal medicine at UT Southwestern and senior author of the rodent study appearing in the September issue of *The Journal of Clinical Investigation*.

"What we've shown in this study is that someone's entire brain chemistry can change in a very short period of time. Our findings suggest that when you eat something high in fat, your brain gets 'hit' with the fatty acids, and you become resistant to insulin and leptin," Dr. Clegg said. "Since you're not being told by the brain to stop eating, you overeat."

Dr. Clegg said that in the animals, the effect lasts about three days, potentially explaining why many people who splurge on Friday or Saturday say they're hungrier than normal on Monday.

Though scientists have known that eating a high-fat diet can cause insulin resistance, little has been known about the mechanism that triggers this resistance or whether specific types of fat are more likely to cause increased insulin resistance. Dr. Clegg said she suspected the brain might play a role because it incorporates some of the fat we eat – whether it is from healthy oils or the not-so-healthy saturated fat found in butter and beef – into its structure.

Based on this suspicion, her team attempted to isolate the effects of fat on the animals' brains. Researchers did this by exposing the animals to fat in different ways: by injecting various types of fat directly into the brain, infusing fat through the carotid artery or feeding the animals through a stomach tube three times a day. The animals received the same amount of calories and fat; only the type of fat

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differed. The types included palmitic acid, monounsaturated fatty acid and oleic acid.

Palmitic acid is a common saturated fatty acid occurring in foods such as butter, cheese, milk and beef. Oleic acid, on the other hand, is one of the most common unsaturated fatty acids. Olive and grapeseed oils are rich in oleic acid.

“We found that the palmitic acid specifically reduced the ability of leptin and insulin to activate their intracellular signaling cascades,” Dr. Clegg said. “The oleic fat did not do this. The action was very specific to palmitic acid, which is very high in foods that are rich in saturated-fat.”

Dr. Clegg said that even though the findings are in animals, they reinforce the common dietary recommendation that individuals limit their saturated fat intake. “It causes you to eat more,” she said.

The other key finding, she said, is that this mechanism is triggered in the brain – long before there might be signs of obesity anywhere else in the body.

The next step, Dr. Clegg said, is to determine how long it takes to reverse completely the effects of short-term exposure to high-fat food.

Other UT Southwestern researchers involved in the study included Dr. Carol Elias, assistant professor of internal medicine, and Drs. Boman Irani and William Holland, postdoctoral research fellows in internal medicine. Researchers from the University of Cincinnati, Tennessee Valley Healthcare System, Vanderbilt University School of Medicine and the University of Paris also contributed to the study.

The study was supported by the National Institute of Diabetes and Digestive and Kidney Diseases.

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