

Dietary fats trigger long-term memory formation

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Having strong memories of that rich, delicious dessert you ate last night? If so, you shouldn't feel like a glutton. It's only natural.

UC Irvine researchers have found that eating fat-rich foods triggers the formation of long-term memories of that activity. The study adds to their recent work linking dietary fats to appetite control and may herald new approaches for treating obesity and other eating disorders.

Study results appear this week in the early online edition of the [Proceedings of the National Academy of Sciences](#).

Daniele Piomelli, the Louise Turner Arnold Chair in Neurosciences, teamed with UCI's James McGaugh, one of the world's leading learning and memory researchers, to examine how dietary fats facilitate memory retention.

Piomelli's previous studies identified how oleic acids from fats are transformed into a compound called oleoylethanolamide (OEA) in the upper region of the small intestine. OEA sends hunger-curbing messages to the brain to increase feelings of fullness. In elevated levels, OEA can reduce appetite, produce weight loss and lower blood cholesterol and [triglyceride levels](#).

Piomelli and McGaugh discovered that OEA also causes memory consolidation, the process by which superficial, short-term memories are transformed into meaningful, long-term ones. It does this, Piomelli said, by activating memory-enhancing signals in the amygdala, part of the brain involved in the consolidation of memories of emotional events.

The researchers found that administering OEA to rodents improved memory retention in two different tests. When [cell receptors](#) activated by OEA were blocked, memory retention effects decreased.

"OEA is part of the molecular glue that makes memories stick," Piomelli said. "By helping mammals remember where and when they have eaten a fatty meal, OEA's memory-enhancing activity seems to have been an important evolutionary tool for early humans and other mammals."

Dietary fats are important for overall health, helping with the absorption of vitamins and the protection of vital organs. While the human diet is now rich in fats, this was not the case for early humans. In fact, fat-rich foods in nature are quite rare.

"Remembering the location and context of a fatty meal was probably an important survival mechanism for [early humans](#)," Piomelli said. "It makes sense that mammals have this capability."

Today, he noted, such memory enhancement may not be so beneficial. While OEA contributes to feelings of fullness after a meal, it could also engender long-term cravings for fatty foods that, when eaten in excess, can cause obesity.

Currently, Piomelli said, drugs that mimic OEA are in clinical trials for triglyceride control. He is interested in learning whether they could improve consolidation in people with memory problems.

Source: University of California - Irvine

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