

High-fat diet alters behavior and produces signs of brain inflammation

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Can the consumption of fatty foods change your behavior and your brain?

High-fat diets have long been known to increase the risk for [medical problems](#), including heart disease and stroke, but there is growing concern that diets high in fat might also increase the risk for depression and other psychiatric disorders.

A new study published in the current issue of *Biological Psychiatry* raises the possibility that a high-fat diet produces changes in health and behavior, in part, by changing the mix of bacteria in the gut, also known as the gut microbiome.

The human microbiome consists of trillions of microorganisms, many of which reside in the [intestinal tract](#). These microbiota are essential for normal physiological functioning. However, research has suggested that alterations in the microbiome may underlie the host's susceptibility to illness, including neuropsychiatric impairment.

This led researchers at Louisiana State University to test whether an obesity-related microbiome alters behavior and cognition even in the absence of obesity.

Non-obese adult mice were conventionally housed and maintained on a normal diet, but received a transplant of gut microbiota from donor mice that had been fed either a high-fat diet or control diet. The recipient

mice were then evaluated for changes in behavior and cognition.

The animals who received the microbiota shaped by a high-fat diet showed multiple disruptions in behavior, including increased anxiety, impaired memory, and repetitive behaviors. Further, they showed many detrimental effects in the body, including increased intestinal permeability and markers of inflammation. Signs of inflammation in the brain were also evident and may have contributed to the behavioral changes.

"This paper suggests that high-fat diets impair brain health, in part, by disrupting the symbiotic relationship between humans and the microorganisms that occupy our gastrointestinal tracts," commented Dr. John Krystal, Editor of *Biological Psychiatry*.

Indeed, these findings provide evidence that diet-induced changes to the gut microbiome are sufficient to alter brain function even in the absence of obesity. This is consistent with prior research, which has established an association between numerous psychiatric conditions and gastrointestinal symptoms, but unfortunately, the mechanisms by which [gut microbiota](#) affect [behavior](#) are still not well understood.

Further research is necessary, but these findings suggest that the [gut microbiome](#) has the eventual potential to serve as a therapeutic target for neuropsychiatric disorders.

More information: The article is "Obese-type Gut Microbiota Induce Neurobehavioral Changes in the Absence of Obesity" by Annadora J. Bruce-Keller, J. Michael Salbaum, Meng Luo, Eugene Blanchard IV, Christopher M. Taylor, David A. Welsh, and Hans-Rudolf Berthoud ([DOI: 10.1016/j.biopsych.2014.07.012](https://doi.org/10.1016/j.biopsych.2014.07.012)). The article appears in *Biological Psychiatry*, Volume 77, Issue 7 (April 1, 2015)

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