

## Research suggests intermittent fasting provides health benefits

November 18 2014, by Marcia Malory

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Credit: Jm Verastigue/public domain

(Medical Xpress)—Intermittently restricting food intake could help prevent obesity and associated diseases prevalent in modern society, according to an analysis by Mark P. Mattson of the National Institute on Aging in Baltimore and colleagues. The researchers, who also included the BBC's Michael Mosley, a proponent of the 5:2 intermittent fasting diet, reviewed previous studies on intermittent fasting and concluded

that this eating pattern could be healthier than eating three meals per day or eating at will. The review appears in the *Proceedings of the National Academy of Sciences*.

Obesity, as well as conditions like diabetes, [cardiovascular disease](#), cancer and Alzheimer's disease, have become prevalent in [modern society](#). To understand why, Mattson and his team studied the behavior of wild mammals and human hunter-gatherers. They found that, unlike [modern humans](#) and domestic animals, wild carnivores kill and eat prey a maximum of a few times each week. Human hunter-gatherers eat intermittently, based on when they can obtain [food](#).

While obesity, heart disease and diabetes are rare among wild mammals and hunter-gatherers, they are common in modern humans in industrial societies and becoming increasingly common in pets. The researchers suggest that behaviors that developed after the agricultural and industrial revolutions caused changes in our bodies that affected our ability to metabolize food.

According to Mattson's team, mammals have adaptations for surviving when food is scarce. For example, our livers can store and release glucose for quick energy. We can use adipose tissue for long-term energy storage.

Our circadian rhythms, which respond to light as well as [food intake](#), affect liver and adipose tissue. The change to eating three meals per day, which occurred after the agricultural revolution, when food became available continually, disturbed our circadian clocks. The industrial revolution and the invention of artificial lighting, which changed our sleep-wake cycles, magnified this disruption, making it harder for us to metabolize food efficiently. Night shift workers, with a particularly high risk of developing metabolic diseases, illustrate this effect.

To provide evidence that intermittent fasting is healthier than eating three times a day or eating at will, the team looked at research on animals and humans. They found that mice allowed to eat high fat food at any time become obese. However, mice allowed to [eat](#) high fat food, but only at night, do not. Studies on worms, mice and monkeys show an association between intermittent food restriction and increased lifespan. Some animal models indicate that intermittent feeding can forestall or even reverse diabetes and cancer. The researchers found that when people switch from eating three meals a day to an intermittent fasting regime, they experience positive metabolic changes, including increased insulin sensitivity.

**More information:** Meal frequency and timing in health and disease, Mark P. Mattson, *PNAS*, [DOI: 10.1073/pnas.1413965111](https://doi.org/10.1073/pnas.1413965111)

### **Abstract**

Although major research efforts have focused on how specific components of foodstuffs affect health, relatively little is known about a more fundamental aspect of diet, the frequency and circadian timing of meals, and potential benefits of intermittent periods with no or very low energy intakes. The most common eating pattern in modern societies, three meals plus snacks every day, is abnormal from an evolutionary perspective. Emerging findings from studies of animal models and human subjects suggest that intermittent energy restriction periods of as little as 16 h can improve health indicators and counteract disease processes. The mechanisms involve a metabolic shift to fat metabolism and ketone production, and stimulation of adaptive cellular stress responses that prevent and repair molecular damage. As data on the optimal frequency and timing of meals crystalizes, it will be critical to develop strategies to incorporate those eating patterns into health care policy and practice, and the lifestyles of the population.

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Citation: Research suggests intermittent fasting provides health benefits (2014, November 18)  
retrieved 15 July 2023 from <https://medicalxpress.com/news/2014-11-intermittent-fasting-health-benefits.html>

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