

Does intermittent fasting have benefits for our brain?

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Intermittent fasting has become a popular dietary approach to help people lose or manage their [weight](#). It has also been promoted as a way to reset metabolism, control chronic disease, slow aging and [improve overall health](#).

Meanwhile, some research suggests intermittent fasting may offer a different way for the brain to access energy and provide protection against neurodegenerative diseases like [Alzheimer's disease](#).

This is not a new idea—the ancient Greeks believed fasting [enhanced thinking](#). But what does the modern-day evidence say?

First, what is intermittent fasting?

Our [diets](#)—including calories consumed, macronutrient composition (the ratios of fats, protein and carbohydrates we eat) and when meals are consumed—are factors in our lifestyle we can change. People do this for cultural reasons, desired weight loss or potential health gains.

Intermittent fasting consists of short periods of calorie (energy) restriction where food intake is limited for 12 to 48 hours (usually 12 to 16 hours per day), followed by periods of normal food intake. The intermittent component means a re-occurrence of the pattern rather than a "one off" fast.

Food deprivation beyond 24 hours typically constitutes starvation. This is distinct from fasting due to its specific and potentially harmful biochemical alterations and nutrient deficiencies if continued for long periods.

4 ways fasting works and how it might affect the brain

The brain accounts for about 20% of the body's energy consumption.

Here are four ways intermittent fasting can act on the body which could help explain its potential effects on the brain.

1. Ketosis

The goal of many intermittent fasting routines is to flip a "[metabolic switch](#)" to go from burning predominately carbohydrates to burning fat. This is called ketosis and typically occurs after 12–16 hours of fasting, when liver and glycogen stores are depleted. [Ketones](#)—chemicals produced by this metabolic process—become the preferred energy source for the brain.

Due to this being a slower metabolic process to produce energy and potential for lowering blood sugar levels, ketosis can [cause symptoms](#) of hunger, fatigue, nausea, [low mood](#), irritability, constipation, headaches, and brain "fog".

At the same time, as [glucose metabolism](#) in the brain declines with aging, studies have shown ketones could provide an alternative energy source to [preserve brain function](#) and prevent [age-related neurodegeneration disorders and cognitive decline](#).

Consistent with this, increasing ketones through [supplementation](#) or [diet](#) has been shown to improve cognition in adults with mild [cognitive decline](#) and those at risk of Alzheimer's disease respectively.

2. Circadian syncing

Eating at times that [don't match our body's natural daily rhythms](#) can disrupt how our organs work. Studies in shift workers have suggested this might also make us more prone to [chronic disease](#).

Time-restricted eating is when you eat your meals within a six to ten-hour window during the day when you're most active. Time-restricted eating causes changes in [expression of genes in tissue](#) and helps the body during rest and activity.

A 2021 [study of 883 adults](#) in Italy indicated those who restricted their [food intake](#) to ten hours a day were less likely to have cognitive impairment compared to those eating without time restrictions.

3. Mitochondria

Intermittent fasting may provide [brain protection](#) through improving mitochondrial function, metabolism and reducing oxidants.

Mitochondria's [main role is to produce energy](#) and they are crucial to brain health. Many age-related diseases are closely related to an energy supply and demand imbalance, likely attributed to [mitochondrial dysfunction during aging](#).

Rodent studies suggest alternate day fasting or reducing calories [by up to 40%](#) might protect or improve [brain mitochondrial function](#). But not all studies support this theory.

4. The gut-brain axis

The [gut and the brain communicate with each other](#) via the body's nervous systems. The brain can influence how the gut feels (think about how you get "butterflies" in your tummy when nervous) and the gut can

affect mood, cognition and mental health.

In mice, intermittent fasting has shown promise for [improving brain health](#) by increasing survival and [formation of neurons](#) (nerve cells) in the hippocampus brain region, which is involved in memory, learning and emotion.

There's [no clear evidence](#) on the effects of intermittent fasting on cognition in healthy adults. However one 2022 study interviewed 411 older adults and found [lower meal frequency](#) (less than three meals a day) was associated with reduced evidence of Alzheimer's disease on brain imaging.

Some research has suggested calorie restriction may have a protective effect against [Alzheimer's disease](#) by reducing oxidative stress and inflammation and promoting vascular health.

When we look at the effects of overall energy restriction (rather than intermittent fasting specifically) the evidence is mixed. Among people with mild cognitive impairment, one study showed [cognitive improvement](#) when participants followed a calorie restricted diet for 12 months.

Another study found a 25% calorie restriction was associated with [slightly improved working memory](#) in healthy adults. But a [recent study](#), which looked at the impact of calorie restriction on spatial working memory, found no significant effect.

Bottom line

Studies in [mice](#) support a role for intermittent fasting in improving brain health and aging, but few studies in humans exist, and the evidence we have is mixed.

Rapid [weight loss](#) associated with [calorie restriction](#) and intermittent fasting can lead to nutrient deficiencies, muscle loss, and decreased immune function, particularly in [older adults](#) whose nutritional needs may be higher.

Further, [prolonged fasting](#) or [severe calorie restriction](#) may pose risks such as fatigue, dizziness, and electrolyte imbalances, which could exacerbate existing health conditions.

If you're considering [intermittent fasting](#), it's best to seek advice from a health professional such as a dietitian who can provide guidance on structuring fasting periods, meal timing, and nutrient intake. This ensures [intermittent fasting](#) is approached in a safe, sustainable way, tailored to individual needs and goals.

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