

Japanese Scientists Discover New Benefits of Fasting

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STORY AT-A-GLANCE

- › Fasting triggers the production of antioxidants and boosts age-related metabolites
- › Eating a low-carbohydrate breakfast was found to increase weight loss, while eating dinner late at night raised the risk of glucose intolerance and diabetes
- › Intermittent fasting supports weight management and reduces insulin resistance. It is not advisable to fast while eating a daily diet of processed foods

This article was previously published September 4, 2020, and has been updated with new information.

Fasting is a term that describes a variety of approaches to limiting food intake throughout a 24-hour period, or longer. One common approach is intermittent fasting, in which people limit the number of hours they eat during the day. There are a variety of approaches to intermittent fasting and no one approach is better than another.

Other people prefer doing a fast in which they do not eat for 24 hours, two or three times a month. Longer fasts are possible but they require additional support and knowledge to reduce any negative effects from a lack of preparation.

Going without food for longer periods of time was probably normal for human ancestors who did not have access to a refrigerator or restaurants on every corner. Intermittent fasting is more of a lifestyle than a diet, but ultimately, it's a way of eating that has a significant impact on your metabolism and your health.

Fasting Actively Stimulates Metabolism

In a study published in Nature, scientists revealed data from participants who underwent a 58-hour fast. A team from the Okinawa Institute of Science and Technology Graduate University in Japan evaluated the effects of fasting by analyzing the blood of the participants beginning at 10 hours and ending 58 hours into the fast.¹

During the fasting state, the body switches from burning glucose to burning fat for energy, and thus produces ketones. Other well-known by-products include butyrates, acylcarnitines and branched chain amino acids.² Four volunteers signed up for the 58-hour fast and blood was drawn at 10, 34 and 58 hours.

Some of the compounds peaked at 34 hours, while others had not yet plateaued at the end of the 58th hour of the fast. In all, they identified 44 substances that changed during the fasting period. In past studies, researchers had only identified 14.

Additionally, none of the participants was obese, since this is known to change markers during fasting. The researchers identified two butyrates that were "nearly invisible" at the 10-hour mark but had reached "major peaks after 34 and 58 hours of fasting."³ Butyrates help maintain intestinal homeostasis by protecting the intestinal barrier and mucosal immunity.⁴

The researchers also identified tricarboxylic acid (TCA) cycle-related compounds that "reflect enhanced mitochondrial activity in tissues during fasting."⁵ Past researchers who studied animals demonstrated that fasting can lengthen life.⁶ The researchers in this study were looking for "unknown health effects in human fasting."⁷

Fasting Metabolites Support Antiaging

Three metabolites that decline with age include leucine, isoleucine and ophthalmic acid. However, testing reveals that fasting individuals have higher levels of these metabolites which may help increase longevity.⁸

The data also revealed that during fasting, the metabolism of pyrimidine and purine was enhanced. These substances are vital to gene expression, which suggests that the practice may help reprogram protein cells and promote homeostasis. The metabolism of pyrimidines and purines affects the production of antioxidants, which researchers found significantly increased during the 58-hour fast.

They believe the data suggest that antioxidant production may be a marker of fasting that can "boost production of several age-related metabolites, abundant in young people, but depleted in old."⁹ Dr. Takayuki Teruya was the first author of the paper who commented:

"We have been researching aging and metabolism for many years and decided to search for unknown health effects in human fasting. Contrary to the original expectation, it turned out that fasting induced metabolic activation rather actively.

People are interested in whether human beings can enjoy the effects of prevention of metabolic diseases and prolonging life span by fasting or caloric restriction, as with model animals. Understanding the metabolic changes caused by fasting is expected to give us wisdom for maintaining health."

Low-Carb Breakfast Improves Weight Loss Efforts

As important as intermittent fasting is the time of day you eat your meals. For many, intermittent fasting is a way of attaining healthy weight loss they can maintain. In one study with 70 patients, researchers evaluated the difference in a morning meal that had restricted carbohydrate intake or had the same number of calories as in a typical Mediterranean-style diet.¹⁰

In the group of participants, 58.6% were women who were overweight or obese and nearly one-third had diabetes. The group was randomly assigned to one of the two breakfast meals, but the remainder of the foods in their daily diet were identical.

The average intake was between 1300 and 1500 calories per day. While both groups demonstrated improvements, by the end of the study, those who had been eating a restricted carbohydrate breakfast showed an impressive 3.5 kilogram (7.7 pounds) greater weight loss compared to the other group.

All participants in the carbohydrate-restricted group lost at least 5% of their body weight by the end of the study as compared to 65.7% all of the individuals in the control group.

The researchers did not find other improvements in the low-carbohydrate breakfast group, including those related to glycemic outcomes. Dr. Dimitrios Tsilingiris presented the findings at the 2018 meeting of the European Association for the Study of Diabetes. In commenting on the results, he said:¹¹

"The morning carbohydrate-restricted diet might offer certain benefits by favoring compliance...and the rapid weight lowering seen with this diet might be used in the induction of longer-term diets, or be an add-on feature in weight maintenance, even though it wasn't tested for this.

As such, they might be helpful in the management of obesity-related type 2 diabetes. However, these diets often have limited versatility and the availability of low-carbohydrate food can impair compliance. Normally, overnight we fast and in the morning, with breakfast, our insulin rises and then drops again towards lunchtime.

As insulin drops, the fat stores tend to mobilize and act as energy substrates. Theoretically, inducing a lower insulin response after a low carbohydrate breakfast should mean we can prolong the low [overnight] insulin and fat mobilization state, resulting in a net effect on weight and fat loss."

Eating a Late Dinner May Raise the Risk of Diabetes

What you eat and what time you eat has a significant effect on your health, specifically your risk for obesity and diabetes. A recent study published in the Journal of Clinical Endocrinology and Metabolism was led by a team from John Hopkins University.¹² The

researchers engaged 20 healthy young adults who spent two time periods in a clinical research unit where scientists structured the participants' meals and sleep times.

The objective was to analyze the metabolic impact of eating a late dinner. During one time period, the participants ate a regular dinner at 6 p.m. and in the second time period they ate at 10 p.m. The caloric intake of the meals was the same on both visits.¹³

The researchers measured hourly insulin, plasma glucose, triglycerides and dietary fatty acid oxidation throughout the night and first thing in the morning. The participants also underwent a sleep study.

The results showed that eating a dinner late at night induced higher glucose and reduced fatty acid oxidation. Senior study author Dr. Jonathan Jun said the study:¹⁴

"... sheds new light on how eating a late dinner worsens glucose tolerance and reduces the amount of fat burned. If the metabolic effects we observed with a single meal keep occurring chronically, then late eating could lead to consequences such as diabetes or obesity.

We still need to do more experiments to see if these effects continue over time, and if they are caused more by behavior (such as sleeping soon after a meal) or by the body's circadian rhythms."

Intermittent Fasting Improves Metabolic Health

Mounting evidence continues to reveal that what you eat and when you eat have an impact on your health. Intermittent fasting influences immunometabolism, which is the connection between metabolic health and the immune system.¹⁵

I believe it's easily one of the most important fields in emerging medicine and supports what researchers have known – metabolic health is crucial for robust immune function.

In my interview with Dr. Paul Saladino, board-certified psychiatrist and board certified in nutrition, we discussed the importance of insulin resistance which Saladino believes underlies many of the comorbidities responsible for severe COVID-19 disease. The

overarching principle is that what matters most to your longevity is your immune and metabolic age, rather than your biological age.

While the focus of that article was on supporting your metabolic health to lower your risk for severe COVID-19, realistically, these principles are important in supporting overall good health that helps protect you against chronic and infectious diseases.

By ditching the idea of eating three meals a day in favor of trying the intermittent fasting approach, you accommodate a body that is simply not designed to be continuously fed. When you eat throughout the day, your body adapts to using glucose as a primary fuel. This encourages energy to be stored as fat and increases the risk you become progressively more insulin resistant.

Although many consider intermittent fasting as a way of losing weight, it also improves insulin resistance, increases human growth hormone production, boosts fat burning, lowers blood pressure and boosts mitochondrial energy, efficiency and biosynthesis.

Take Control of Your Health With Intermittent Fasting

While it is likely that intermittent fasting is beneficial for most people, it's important to remember a few points:

- **Intermittent fasting does not have to involve restricting calories** — Fasting should not make you feel weak and lethargic. The objective is to limit the number of hours that you eat.
- **Sugar cravings will be temporary** — As your body starts to burn fat for primary fuel, it'll be easier to fast for as long as 18 hours and your hunger and craving for sugar will dissipate.
- **Intermittent fasting is not advisable with a daily diet of processed foods** — Although the process may sound like a panacea against ill health, by itself it does not provide you with all the benefits. The quality of your diet plays a vital role.

If you're new to the idea of intermittent fasting, consider starting by skipping breakfast and eating lunch and dinner within an eight-hour time frame. Make sure you stop eating three hours before you go to sleep. As demonstrated in the study mentioned earlier, eating close to bedtime can raise your glucose intolerance at night and increase your risk for weight gain.

Focus on a diet with moderate amounts of healthy protein and minimize your net carbohydrate intake by exchanging them for healthy fats like butter, coconut oil and raw nuts. Overall, these strategies can help your body go into fat burning mode.

It may take a few weeks, after which you'll likely be able to fast for 18 hours and not feel hungry. By adapting to a diet of whole foods and incorporating intermittent fasting, nearly every aspect of your health will also begin to improve.

Sources and References

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