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MEDICAL ALLIANCE

# EAT WELL

## A GUIDE TO INTERMITTENT FASTING, TIME-RESTRICTED EATING, AND HEALTHY HABITS

*Updated March 24th, 2026*

# About This Document

Many people are concerned about the lingering effects of spike protein produced in the body after COVID-19 infection or vaccination and are wondering how to eliminate it. The IMA recommends intermittent fasting as one of the most effective ways to induce autophagy, the process by which the body clears out damaged and misfolded cells. Fasting also offers additional health benefits: it lowers insulin levels and helps people with insulin resistance restore sensitivity.

This document serves as a quick guide for anyone interested in exploring the beneficial effects of intermittent fasting and time-restricted eating. It is not an exhaustive resource, and we will continue to evolve and develop it over time. Please read this guide along with our prevention, treatment, and recovery protocols, which contain further details and recommendations specific to particular health states.

**Disclaimer**

This guide is meant solely for educational purposes. Never disregard professional medical advice because of something you have read on our website or in our publications. This guide is not intended to be a substitute for professional medical advice, diagnosis, or treatment regarding any patient. Treatment for an individual patient is determined by many factors and should rely on the judgment of a physician or qualified healthcare provider. Always seek their advice on any questions you may have about your medical condition or health.

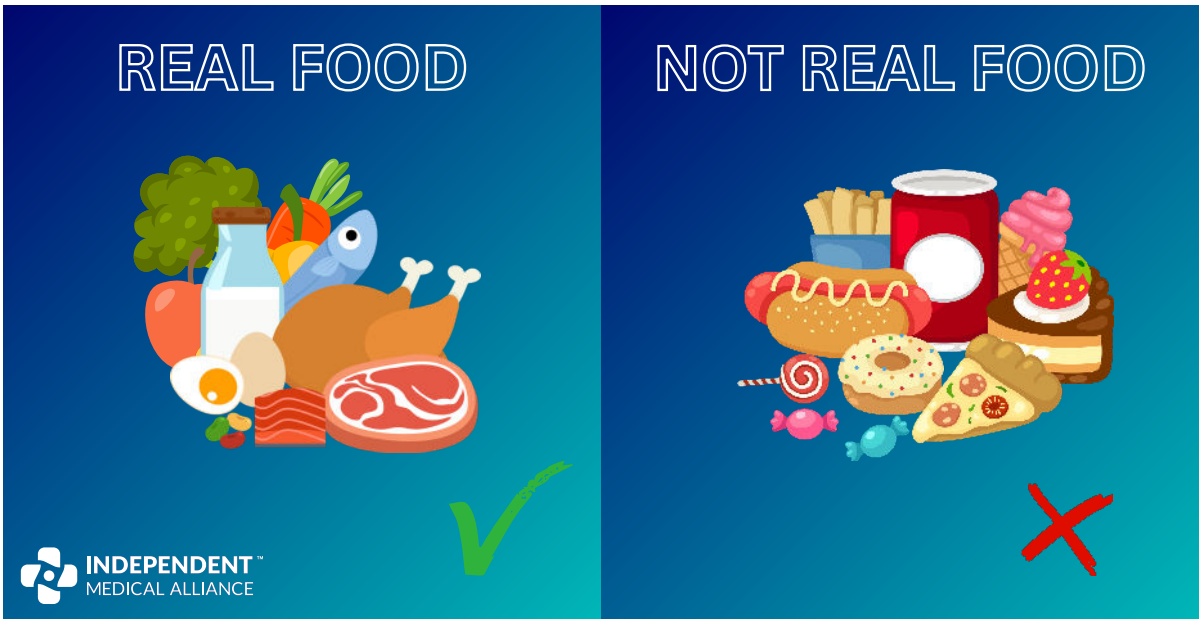
# How Eating Became Unhealthy

Humans did not evolve to eat and snack continuously. This pattern is highly maladaptive.(1, 2) Data suggest that people in Western cultures spend about 12 to 14 hours a day eating and snacking. More than 80% of what we eat is not even real food — it is highly processed.(1, 2) Contrast this with our Paleolithic ancestors, who ate real, unprocessed food once or twice a day, and you begin to see the problem.

You do not have to go that far back in history to see the contrast. Highly processed foods, as commercial products, did not appear until the 19th century. It is no surprise that we are now seeing epidemic levels of obesity, metabolic syndrome, Type 2 diabetes, cancer, cardiovascular disease, neurodegenerative diseases, and autoimmune diseases.

One of the most important interventions for reducing these disorders is eating real, unprocessed food in appropriate amounts at the right times.

How do you know the difference between real food and processed food? It is quite simple. If it looks like food, it probably is food. If it comes in a box or has a food label, it's likely processed.




*Real vs. Processed food (Source: IMA)*

The more ingredients listed on a product's label — especially chemicals with unfamiliar or unpronounceable names — the more processed the product is likely to be.

The primary focus of this guide is on fasting — the time we spend not eating. Still, it is critical to understand what we should eat, what we should avoid eating, when and where we should eat, and what happens inside our bodies when we do eat, as well as when we do not.

## What Do Fasting and Time-Restricted Eating Mean?

Fasting, by definition, means abstaining from eating. Technically, any time you are not eating, you are fasting.

Time-restricted eating is a type of fasting in which food intake is limited to a short window during the day (one to eight hours), with only fluids such as water, tea, or coffee consumed during the remaining hours. Intermittent fasting usually involves a longer fasting period. One common method is alternate-day fasting (a 24-hour fast followed by a 24-hour eating window). Some people fast for several days (three to seven days, or up to 14 days), followed by gradual refeeding.

Time-restricted eating and intermittent fasting have many metabolic, cellular, and immunologic benefits.(3-17) It is important to emphasize that intermittent fasting and time-restricted eating are not synonymous with starvation. People who fast still consume nutrient-dense foods. Intermittent fasting does not activate the metabolic pathways associated with starvation.

When the body is starving, it decreases the basal metabolic rate (BMR) and growth hormone (GH) levels to conserve energy and limit growth. In contrast, intermittent fasting has been shown to increase BMR and GH levels. This may help explain why diets that advocate the traditional approach of "eat fewer calories and exercise more" often fail.


*Mark Twain on “starvation” (Source: IMA)*

A sporadic 24-hour fast (once a week or less often) can be an efficient way to lose weight and enhance the benefits of time-restricted eating, but it is difficult for many people to maintain. Therefore, we suggest time-restricted eating as a sustainable lifestyle intervention to promote health, reduce disease burden, slow aging, and help prevent neurodegenerative diseases, cardiovascular disease, and cancer.

Intermittent fasting is one of the most effective strategies for achieving sustained weight loss and reaching a healthy weight. In addition, intermittent fasting may help promote immune system homeostasis, partly by stimulating the clearing of damaged cells (autophagy), damaged mitochondria (mitophagy), and misfolded and foreign proteins. Fasting may improve mitochondrial function and stimulate stem cell production. Intermittent fasting has also been shown to improve insulin resistance and metabolic syndrome and may help manage Type 2 diabetes. It may extend health span, alleviate symptoms of many chronic diseases, and reduce the risk of cardiovascular disease, neurodegenerative diseases such as Alzheimer's disease, and cancer.(3-17)

The metabolic effects of intermittent fasting are numerous and include lowering blood glucose and insulin levels, increasing insulin sensitivity, reducing insulin-like growth factor levels, activating the sirtuin pathway, and stimulating autophagy. Intermittent fasting is one of the most effective ways to activate autophagy and may account for many of its beneficial effects

To read more about the metabolic theory of cancer prevention and treatment, see Cancer Care guide here: https://imahealth.org/cancer-care

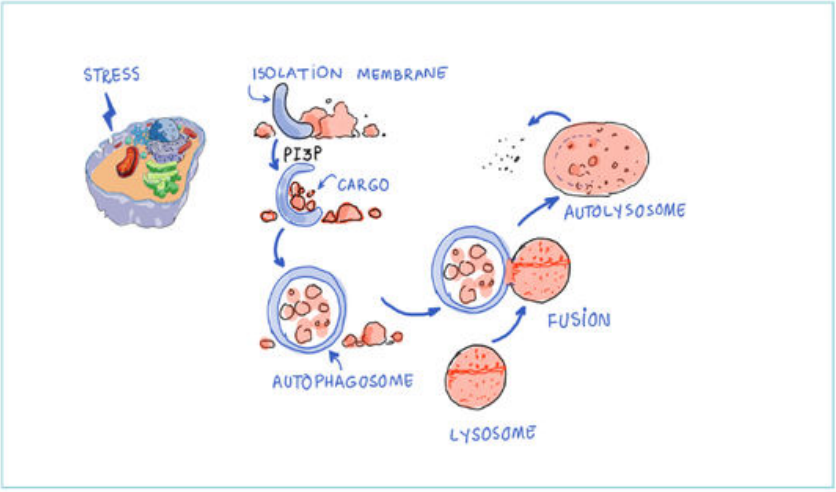
# Autophagy and Intermittent Fasting

The 2016 Nobel Prize in physiology or medicine was awarded to Yoshinori Ohsumi for his discovery of the mechanisms of autophagy in the 1990s.(18, 19)

Let's get a little scientific for a minute. Autophagy is an evolutionarily conserved lysosomal catabolic process by which cells degrade and recycle intracellular endogenous components (damaged organelles, misfolded or mutant proteins, and macromolecules) and exogenous components (such as viruses and bacteria) to maintain cellular homeostasis.(20-22) In other words, it is a controlled way for cells to break down and reuse worn-out or damaged material so they can keep working properly. Dysfunctional autophagy contributes to many diseases, including cancer and neurodegenerative diseases.(20-22)

The cargo specificity and the delivery route to lysosomes distinguish the three major types of autophagy. Microautophagy involves the direct engulfment of cargo by invaginations of the endosomal or lysosomal membrane. Chaperone-mediated autophagy (CMA) recycles soluble proteins with an exposed amino acid motif that is recognized by the heat shock protein Hsc70; these proteins are internalized by binding to lysosomal receptors.(23) Put more simply, cells use a few different routes to deliver "waste" into their recycling centers, depending on what needs to be broken down.

Macroautophagy (hereafter referred to as autophagy) is the best-characterized process; during this process, cytoplasmic constituents are engulfed within double-membrane vesicles called autophagosomes, which subsequently fuse with lysosomes to form autolysosomes, where the cargo is degraded or recycled. Autophagy occurs at basal levels under physiological conditions and can also be upregulated in response to stressful stimuli, such as hypoxia, nutritional deprivation, DNA damage, and cytotoxic agents.(6) In simpler terms, cells are always doing a low level of cleanup, but when they are stressed or short on nutrients, they ramp up this recycling system to protect themselves. The molecular machinery that mediates the autophagic process is evolutionarily conserved in higher eukaryotes and regulated by specific genes (ATG genes), which were initially characterized in yeast.




*Autophagy pathway (Source: Dr. Mobeen Syed)*

Each stage is controlled by different protein complexes regulated by the activation or inactivation of several stress-responsive pathways, including those involving mammalian target of rapamycin (mTOR — nutrient sensing), AMP-activated protein kinase (AMPK — energy sensing), and hypoxia-inducible factors (HIFs — stress response).(6) In other words, cells use internal "sensors" to detect nutrient levels, energy status, and oxygen levels and then adjust autophagy up or down as needed.

Intermittent fasting is one of the most effective ways to activate autophagy and may account for many of its beneficial effects. Additional activators of autophagy include resveratrol (a naturally occurring phytochemical found in grapes, berries, wine, and pistachios), spermidine (a naturally occurring polyamine found in wheat germ, mushrooms, and grapefruit), ivermectin, melatonin, coffee, and red light or near-infrared radiation.

In simple terms, autophagy is your cells' built-in cleanup and recycling system. It helps clear out damaged parts, misfolded proteins, and some invaders such as viruses and bacteria, then reuses the raw materials so cells function better. Fasting is one of the strongest natural triggers of this process and may be an important way to support healthier aging and metabolic health.

If you find the detailed science in this section overwhelming, you can simply remember that fasting helps your cells "clean house," which may contribute to many of the health benefits described in this guide.

# Healthy Eating

## What happens when we eat: insulin and insulin resistance

Before we get into the details of how to fast safely and effectively, let's talk about what happens when we eat.

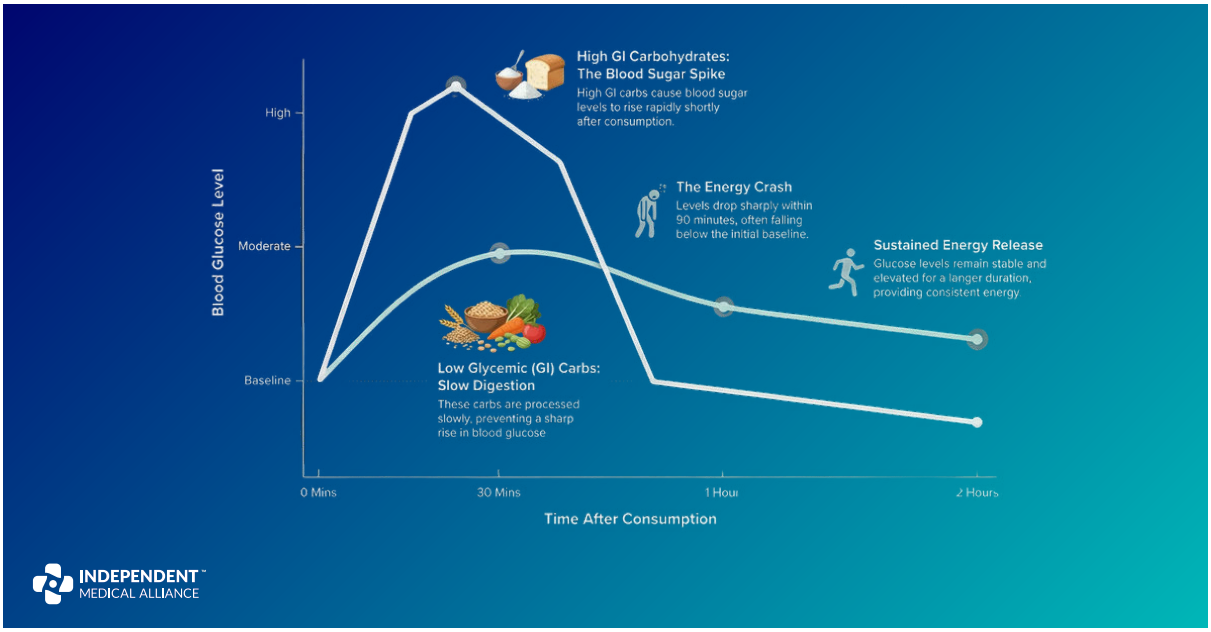
When we eat or drink foods containing carbohydrates, the body breaks these down into glucose (a type of sugar) that then enters the bloodstream. As blood sugar rises, the pancreas releases insulin, a hormone that moves glucose into our cells, where it is used for energy. When the body does not have enough carbohydrates for energy, it burns fat instead, producing ketones, which are then used for fuel.

As we gain weight, our bodies become less sensitive to insulin. Insulin resistance occurs when cells in the muscles, fat, and liver do not respond well to insulin and cannot use glucose from the blood for energy. The pancreas then produces more insulin, which can cause blood sugar levels to rise and may eventually lead to Type 2 diabetes.

To read more about insulin resistance and how to correct it, see I-CARE: Insulin Resistance here: https://imahealth.org/protocol/i-care-insulin-resistance/

## The glycemic index

The glycemic index is a value assigned to foods based on how quickly they raise blood glucose levels and how high those levels rise. The glycemic index ranks foods on a scale from 0 to 100. Pure glucose is arbitrarily assigned a value of 100, representing the relative rise in blood glucose after two hours. The glycemic index of a specific food depends primarily on the amount and type of carbohydrate it contains.




*The blood glucose profile of high and low glycemic index foods (Source: adapted from Glycemic Index Foundation)*

Foods that are low on the glycemic index (GI) scale tend to release glucose slowly and steadily. Foods that are high on the glycemic index release glucose rapidly.

Note that the glycemic index varies from person to person.(24, 25) A continuous glucose monitor allows individual assessment of the glycemic response to different foods. In other words, the same food can cause very different blood sugar responses in different people, and a monitor lets you see how your own body reacts.

## Flattening The Glucose Curve

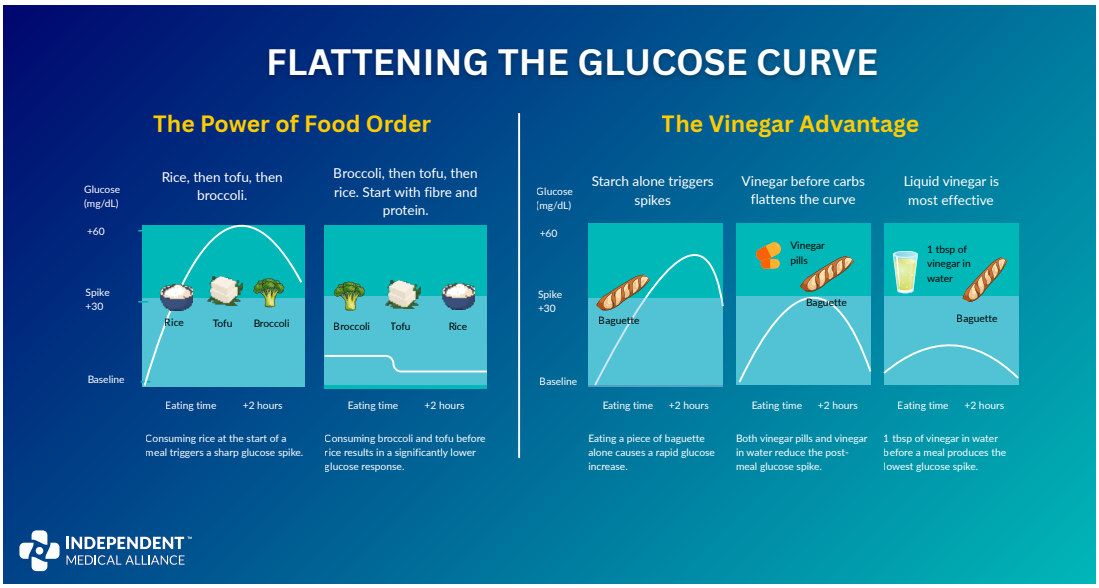
Time-restricted eating, carbohydrate restriction, and ketogenic diets are effective ways to reduce glucose spikes. But there are many other simple interventions that may help prevent large glucose spikes. In her book "Glucose Revolution," Jessie Inchauspé, known as “the Glucose Goddess,” describes many of these “hacks.”(26)

Her first recommendation is to eat food in the right order to slow gastric emptying and reduce the breakdown and absorption of glucose. We often begin a meal with bread, which is exactly the wrong way around. It is better to begin with vegetables and fiber, then protein and fat, and then, if you choose to eat starchy foods, make sure they include fiber and eat them last. Eat fruit after a meal and make sure it is preceded by fiber.

| Food Item | Glycemic Index |
|---|---|
| White rice | 87 |
| Watermelon | 76 |
| White bread | 75 |
| Pineapple | 66 |
| Papaya | 60 |
| Orange juice | 53 |
| Banana | 51 |
| Grape | 46 |
| Orange | 42 |
| Strawberry | 40 |
| Apple | 34 |
| Grapefruit | 25 |
| Fresh berries | 25 |
| Peanuts | 7 |
| Most vegetables | <20 |

*The glycemic index of certain foods (Source: IMA)*

Here's what that looks like visualized:




*Based on the work of Jessie Inchauspé (@glucosegoddess)*

Another suggestion is to drink a tablespoon of vinegar (preferably apple cider vinegar) stirred into a tall glass of water before eating starch or something sweet. Vinegar, which contains acetic acid, may reduce glucose spikes and insulin release.

Vinegar may decrease the enzymatic breakdown of starch, increase glycogen synthesis and glucose uptake, and increase fatty acid oxidation.(27-30) Vinegar may be beneficial even if consumed up to 20 minutes after a starchy food. Note that apple cider vinegar is usually unpasteurized and should be avoided during pregnancy. If vinegar is not readily available, try taking a few fiber tablets (especially glucomannan tablets) before eating a starchy or sweet treat. This may help flatten the glucose curve.

Finally, make sure you move after you eat. Go for a 20-minute walk within an hour of eating (especially after consuming starchy foods). During exercise, muscles take up glucose for energy while increasing mitochondrial oxidative capacity.(31-33) In simple terms, your muscle cells become better at using oxygen to burn fuel, which helps lower blood sugar and improve metabolic health. This is an effective way to help flatten the glucose curve.

Going to the gym or doing resistance exercises is another option. If you're at the office, climb a few stairs. If you're largely sedentary, try doing seated calf raises (sometimes called "soleus pushups"). This simple act of raising the heel and contracting the calf, which resembles walking, has been shown to reduce post-meal glucose by about 50%, reduce hyperinsulinemia, and improve lipid metabolism.(34)

When you exercise in a fasted state (when you have not eaten), your liver releases glucose into the bloodstream to fuel the mitochondria in your muscles, which can temporarily raise blood glucose. This response is mediated by increased release of cortisol, epinephrine, and norepinephrine (with decreased glucagon) — hormones involved in the body's normal stress response that help mobilize energy during exercise. If you exercise before eating, consider consuming a shake containing nutrient-dense ingredients such as plant protein, super greens, omega-3 fatty acids, vitamins,  adaptogenic herbs, probiotics, fiber, mushrooms, and berries (for example, Ka'Chava™ https://www.kachava.com/ and 310 Shakes™ https://310nutrition.com/). This may be preferable to a standard protein shake.

A couple of other things to note:

- Avoid fruit juices and smoothies, which can cause large spikes in blood glucose.
- Despite what your mother told you, it may be beneficial to skip breakfast. If you do eat breakfast, avoid sugar, starches, and cereal, which can cause rapid increases in blood glucose.
- Avoid snacking throughout the day.

## Why your gut microbiome matters

The trillions of bacteria, fungi, and other microscopic organisms that live and work in your intestinal system are commonly referred to as your “gut microbiome.” These organisms help digest food, regulate the immune system, and influence brain function.

The microbiome also affects blood sugar levels and insulin sensitivity.(35-41) That is why establishing a healthy microbiome is important for regulating blood glucose levels and ensuring our bodies remain appropriately sensitive to insulin.

Some ways to establish a healthy microbiome include:

- Eat a diverse range of foods, including vegetables, legumes, and beans.
- Eat fermented foods such as yogurt, kefir, apple cider vinegar, kombucha, pickles, sauerkraut, tempeh, and kimchi.
- Eat foods rich in polyphenols such as berries, coffee, tea, nuts, seeds, olives, and beans; red wine also has a high polyphenol content, as do resveratrol supplements.
- Eat prebiotic fiber-rich foods such as chicory root, dandelion greens, asparagus, onions, and garlic; supplementation with galactomannan, a product derived from the konjac root that contains both soluble and insoluble fiber, is an option.
- Eat less sugar and sweeteners.
- Reduce stress.
- Avoid unnecessary antibiotics.
- Exercise regularly.
- Spend time outdoors in the natural world to expose yourself to millions of microbes that can benefit microbiome diversity.
- Get enough sleep.

**Avoid distracted eating**

You may not realize it, but where you eat can also influence how much you eat. Studies have shown that eating on the sofa or at your desk can contribute to weight gain because we tend to be less aware of how much we are consuming. Researchers distinguish between "attentive" (or mindful) eating and "distracted" eating and have found that attentive eating can support weight loss without the need to count calories.(42)

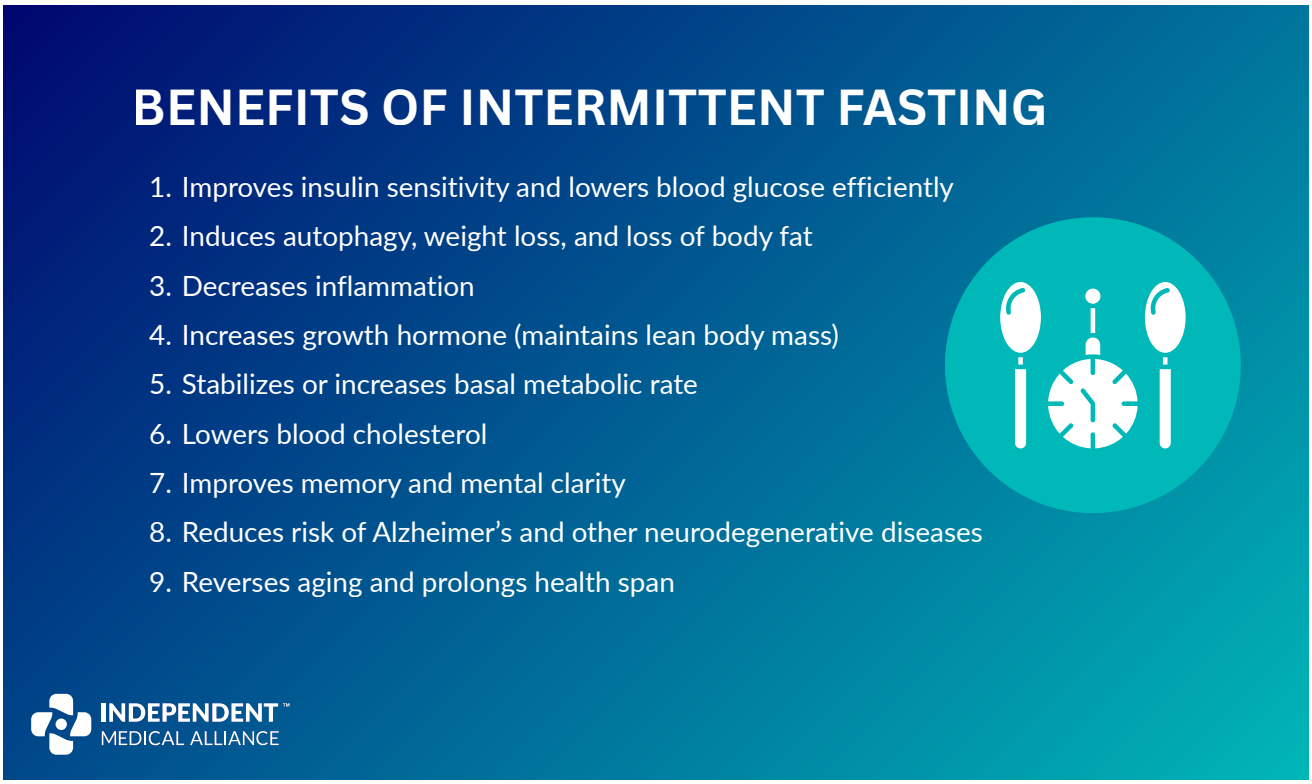

*It's not just what you eat, but where you eat (Source: IMA)*

# A Brief Guide to Intermittent Fasting/Time-Restricted Eating

Fasting is one of the most powerful things you can do for your health. It is simple, free, flexible, and can be adapted to many different dietary approaches. You can still enjoy food and maintain social eating habits, and fasting can be combined with a wide range of dietary patterns, including vegan, carnivore, low-carbohydrate, and Mediterranean diets.

That said, many experts consider a low-carbohydrate, high-fat diet to be a particularly effective approach when combined with intermittent fasting. Saturated fats and omega-3 fatty acids can both be part of a healthy diet when consumed as part of whole, minimally processed foods. Focus on eating real foods rather than processed products. Avoid foods that may seem healthy but contain large amounts of sugar (such as fruit juice), and keep your meals diverse with plenty of leafy greens and cruciferous vegetables (broccoli, cauliflower, cabbage, kale, arugula, bok choy, and others).

Avoid eating or snacking within three to four hours of going to bed. This allows metabolic processes such as autophagy to occur more effectively during sleep, which is vital for brain health and glymphatic clearance — the process by which the brain removes metabolic waste. Eliminating frequent snacking and aiming for 20 to 30 minutes of daily physical activity, including aerobic or resistance exercise, can further support metabolic health.




*Nine reasons to try intermittent fasting (Source: IMA)*

## How to get started

Preparing mentally for intermittent fasting or time-restricted eating is half the challenge. The goal is not to obsess over calories or food choices, but to adopt a sustainable eating pattern that gives your body regular breaks from eating. Intermittent fasting does not involve starving yourself or severely restricting calories.

One of the advantages of intermittent fasting is its flexibility. There are many approaches that can be adapted to different lifestyles. The 2016 book "The Complete Guide to Fasting" by Jason Fung, MD provides an accessible overview of several fasting strategies.(2)

Time-restricted eating is often the most practical place to start. Begin gradually by allowing yourself a 12-hour eating window five days a week — for example, eating between 8 a.m. and 8 p.m., Monday through Friday. After a week or two, reduce the eating window by one or two hours and eventually apply the schedule seven days a week. Many people aim for an eight-hour eating window each day, while others shorten it to four hours or less.

Some people eventually work toward one meal a day, which typically results in a one- to two-hour eating window. For some, this may become a long-term goal. Timed fasting can be interspersed with daylong, 36-hour, or 48-hour fasts.

Another approach is called “5:2 fasting,” which means you eat normally for five days and fast for two days by restricting caloric intake to about 500 calories on those days. Alternate-day fasting is another popular technique that entails consuming only liquids for a 24-hour period, followed by a 24-hour eating period, and repeating this cycle indefinitely. Other people fast Monday, Tuesday, Wednesday, and Friday and eat “normally” the other days.

Whatever approach you choose, remember that the goal is to adopt this as a healthy, sustainable lifestyle, so think of it as a marathon, not a sprint. Set achievable goals and listen to your body. Avoid pills and potions.

A continuous glucose monitor (CGM) provides instant metabolic feedback and is strongly recommended when first initiating time-restricted eating and until metabolic stability is achieved (for example, Abbott FreeStyle Libre 3). The glucose response to various foods is highly variable; a CGM allows an individual to determine their glucose response to a particular food group (see the section on the glycemic index and the glucose curve).

**Remember, (almost) anyone can fast**

Some people ask what they should do if they are unable to fast. In truth, only a few groups of people should avoid intermittent fasting. These include children under age 18, as it can impair their growth, and those who are malnourished or underweight (BMI < 20). Women who are pregnant or breastfeeding should also not try intermittent fasting. Some premenopausal women seem to be less tolerant of time-restricted eating and should therefore restrict the eating window slowly (see section below).

If you have diabetes, gout, or a serious underlying medical condition, you should consult your primary care physician before trying to fast, as changes in your medications and close monitoring may be required.

Humans have evolved over millions of years to be well-adapted to fasting. Indeed, fasting has long been an integral component of many religious traditions.(43-45)

People who have tried and failed are often severely insulin-resistant and may be addicted to carbohydrates and sugar. Ironically, fasting can be a powerful tool for these people. We suggest a slow, progressive approach to time-restricted eating: Start by skipping breakfast, then gradually increase the duration of your fasting window.

**Dealing with hunger while fasting**

First, remember that — like most things — fasting becomes easier the more you do it. Over time, insulin sensitivity improves, and the insulin spikes that increase feelings of hunger are reduced. Ketosis, the metabolic state in which the body begins burning fat instead of sugar, can also suppress appetite. This metabolic shift is often supported by combining intermittent fasting with a low-carbohydrate or ketogenic diet. Over time, many people notice that hunger diminishes.

Until you reach that stage, try removing yourself from food stimuli. Break the habit of eating at specific times of the day. It is important to stay well hydrated during fasting periods; drink plenty of water and/or an electrolyte. When you do eat, try to follow a ketogenic diet; ketones suppress the appetite.

If you do feel hungry, try having a cup of protein-rich bone broth, tea, or coffee. Don't add sugar. Instead, try stevia, which itself can offer metabolic benefits.(46) Make sure your stevia does not contain erythritol, which has been associated with increased cardiovascular complications.(47)

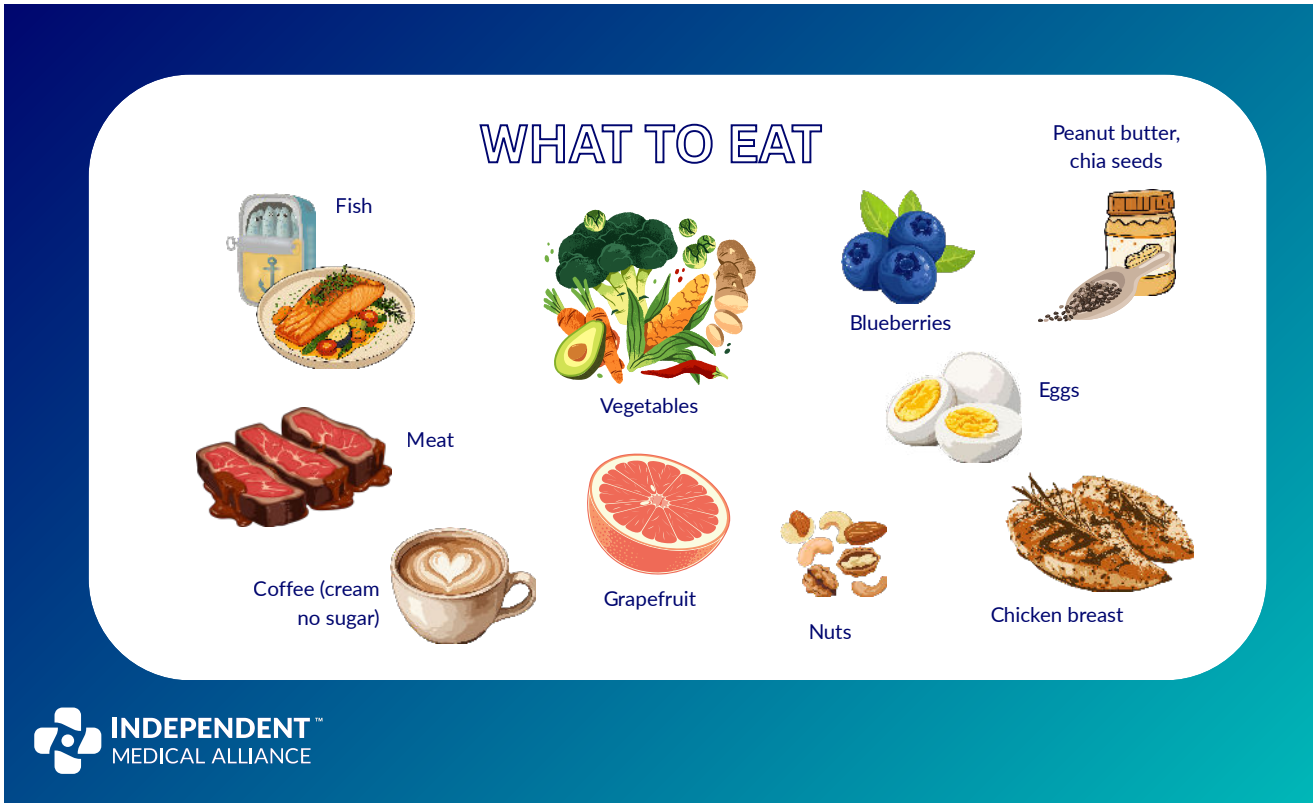
In his book, Jason Fung, MD recommends drinking coffee with added coconut oil (medium-chain triglycerides) or heavy cream and avoiding all carbohydrates and protein during fasting. (2) Remarkably, caffeine stimulates autophagy (48-50), while coconut oil has numerous health benefits.(51-53)

**What to eat and what not to eat**

To help stabilize blood glucose and improve insulin sensitivity — especially if you have insulin resistance, metabolic syndrome, or Type 2 diabetes — focus on the following foods and try to limit those that cause rapid blood sugar spikes.

Healthy foods include (but are not limited to):

- All vegetables (especially avocado, cruciferous vegetables, and leafy greens)
- Nuts (almonds, Brazil nuts, cashews, and pistachios)
- Peanut butter (but avoid white bread and grape jelly) and chia seeds
- Fish (especially Alaskan salmon and sardines)
- Chicken breast (free-range, no hormones or antibiotics)
- Eggs (they have been given a bad rap)
- Meat (grass-fed, no hormones; avoid processed meats)
- Blueberries (limit intake if highly insulin resistant)
- Coffee with heavy cream or coconut oil; choose stevia (without erythritol) instead of sugar or artificial sweeteners
- Grapefruit (limit intake if highly insulin resistant) Note: Grapefruit juice decreases the activity of the cytochrome P450 3A4 (CYP3A4), an enzyme responsible for metabolizing many drugs and toxins. When grapefruit juice is consumed, the enzyme's ability to break down certain drugs decreases, which can raise blood levels of the drug and increase the risk of side effects. Check for interactions between grapefruit and any medications you are taking.




*Top foods to eat during intermittent fasting (Source: IMA)*

**Foods to avoid (especially if insulin resistant):**

- Donuts
- Bagels, bread, pretzels, tortillas
- Sweetened low-fat yogurt
- Cereal bars
- Cookies, muffins, baked goods
- Chips
- French fries
- Rice and pasta
- Potatoes
- Canned fruit and fruit juice
- Watermelon, bananas, and other high-sugar fruits
- Fake "health" foods

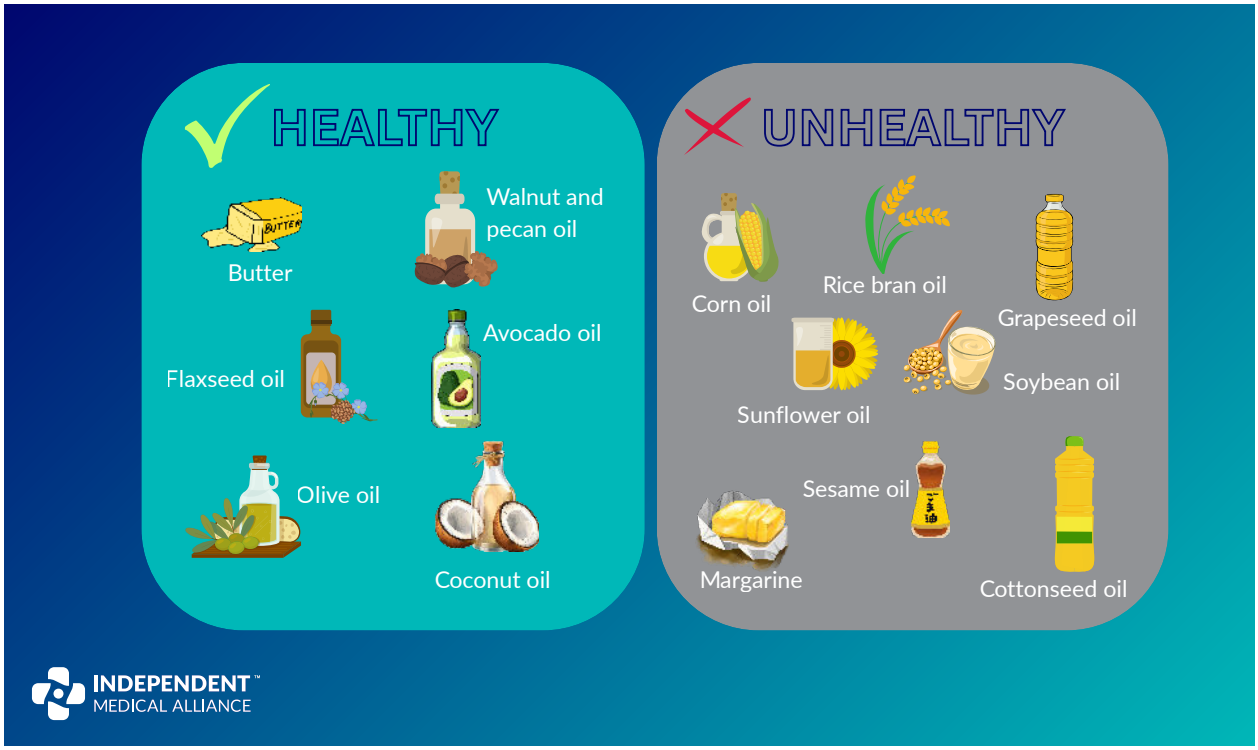

*Foods to avoid during intermittent fasting (Source: IMA)*

**Healthy and unhealthy oils**

When cooking, avoid seed oils high in linoleic acid. Linoleic acid is an essential omega-6 fatty acid that our bodies require in small amounts. Unfortunately, many people consume far more than needed because of the widespread use of seed oils in processed foods. Excess intake of linoleic acid has been associated with inflammation, obesity, heart disease, and other adverse health conditions.

Oils to avoid include:

- Soybean oil
- Corn oil
- Cottonseed oil
- Sunflower oil
- Sesame oil
- Grapeseed oil
- Safflower oil
- Rice bran oil
- Margarine




*Healthy and unhealthy cooking oils (Source: IMA)*

Instead, choose healthier fats and oils such as those listed below. Use high-quality products and check production and expiration dates.

Healthier oils and fats include:

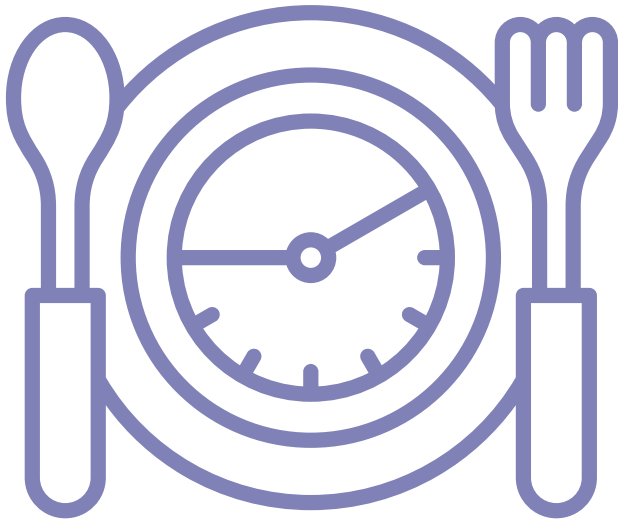
- Olive oil (oleic acid, omega-9 monounsaturated fatty acids); avoid heating to the smoking point
- Avocado oil (oleic acid, omega-9 monounsaturated fatty acids)
- Coconut oil (medium-chain fatty acids)
- Flaxseed oil (alpha-linolenic acid, ALA omega-3)
- Walnut and pecan oils (refrigerate to avoid spoilage)
- Butter (saturated fat)

**Fasting while on medication**

Some medications may be contraindicated during intermittent fasting. For example, proton pump inhibitors (PPIs), which reduce stomach acid, may interfere with autophagy. However, suddenly discontinuing a PPI can cause rebound esophagitis. In some cases, an H2-blocker such as famotidine or ranitidine may be considered as an alternative.

Other approaches, such as aloe vera stomach formulas or diluted apple cider vinegar, have been suggested as alternatives to PPIs; however, there is limited evidence to support these interventions.

Hydroxychloroquine (HCQ), which is recommended in some COVID-19 protocols, may interfere with autophagy and, therefore, limit the benefits of intermittent fasting. In general, most vitamins and supplements can be continued while fasting and typically do not break a fast.



# Women and Fasting

Several studies have suggested that intermittent fasting may be less beneficial for premenopausal women than for men. This is likely because calorie restriction in females is associated with changes in the release of hypothalamic hormones, which may impact the menstrual cycle.

## Why men and women respond differently to intermittent fasting

Women have different hormone profiles than men, and their hormones are constantly in flux.(54) Men tend to have relatively stable hormone levels from day to day, whereas women's hormones—at least until after menopause—shift cyclically. The response to fasting may therefore differ depending on the phase of the menstrual cycle.

Women may be more sensitive to changes in nutrient balance than men due to a molecule called kisspeptin.(55) Kisspeptin regulates an integral part of the reproductive pathway and is sensitive to hormones such as insulin and leptin, which regulate hunger and satiety. Because women have higher kisspeptin levels, this may affect their ability to fast.

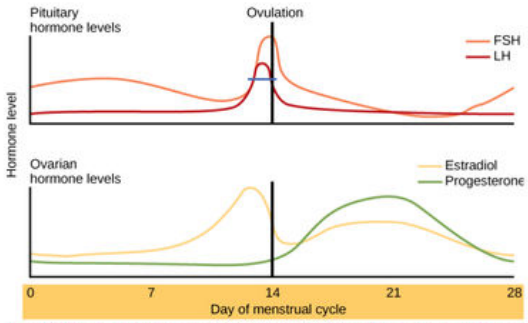
Women may also respond differently to decreases in specific macronutrients, such as protein or carbohydrates. If women do not consume adequate protein relative to their body weight and activity levels, the body may sense low amino acid levels (the building blocks of protein), which can negatively affect estrogen binding and the hormone insulin-like growth factor 1. Both are important for thickening the lining of the uterus during the menstrual cycle.

For women to develop a fasting strategy, it is important to understand the hormonal changes that occur with the menstrual cycle.

## The menstrual cycle

A menstrual cycle is determined by the number of days from the first day of one period to the first day of the next. Day 1 of the menstrual cycle is the first full day of menstrual bleeding. A typical cycle lasts approximately 24 to 35 days (with an average of about 28 days for most women). It is not unusual for a woman's cycle to occasionally be shorter or longer.

The menstrual cycle occurs in three phases: follicular, ovulatory, and luteal. The first half of the cycle is known as the follicular phase, and the second half is considered the luteal phase. Midway through the cycle—between Days 12 and 16—ovulation occurs; this is known as the ovulatory phase.




*Hormone Levels during the phases of the menstrual cycle (Source: Human Biology)*

On Day 1 of the menstrual cycle, estrogen and progesterone levels are low. These low hormone levels signal the pituitary gland to produce follicle-stimulating hormone (FSH). FSH begins the process of maturing a follicle (a fluid-filled sac in the ovary containing an egg). The follicle produces more estrogen to prepare the uterus for pregnancy.

At ovulation, usually around Days 12 to 14, increased estrogen levels trigger a sharp rise in luteinizing hormone (LH) from the pituitary gland, causing the release of the egg from the follicle. The ruptured follicle (corpus luteum) then secretes progesterone and estrogen to continue to prepare the uterus for pregnancy. If the egg is not fertilized, estrogen and progesterone levels fall and, around Day 28, menses begin.

Days 1 to 10 of the menstrual cycle may be a favorable time to fast and follow a ketogenic or lower-carbohydrate diet. This is a hormonally resilient time. During days 1 to 7, testosterone levels rise, supporting muscle mass. This is a good time for fat-burning and resistance training.

Right after ovulation, which typically occurs around Day 14, the body may become less insulin- sensitive. During this phase, it may therefore be helpful to reduce complex carbohydrate intake and increase fiber, healthy fats, and protein while practicing intermittent fasting.

The third and fourth weeks of the menstrual cycle correspond to the luteal phase, which occurs after ovulation. During this phase, progesterone levels are highest and metabolism changes again. Progesterone is a potent appetite stimulant, but it also slows digestion. This may be a useful time to increase hydration, fiber intake, and foods such as green juices or bone broth to support digestion and regular bowel movements.

Week 4 is the final week of the luteal phase, when the body begins preparing hormonally for menstruation. This is a great time to incorporate healthy carbohydrates, along with a wide variety of vegetables and grains, to support menstruation.

**Fasting and the menstrual cycle**

Although comparable human studies are limited, experiments in rats have shown that three to six months of alternate-day fasting reduced ovarian size and caused irregular reproductive cycles in female rats.(56) Similarly, in a murine model, Kumar and Kaur demonstrated that intermittent fasting negatively influences reproduction in young animals due to its adverse effects on the complete hypothalamus-hypophysial-gonadal axis.(57)

However, it should be noted that in this study, the female rats were very young (3 months old), which corresponds to a human age of 9 years.(54) In addition, rats have a much higher basal metabolic rate than humans and differ metabolically in several important ways. In simple terms, results from very young, rapidly growing animals do not directly predict what will happen in adult women, but they raise
important safety questions.

There are limited human data on changes in sex hormone levels and gonadotropins during fasting. In patients practicing intermittent fasting during the Muslim observance of Ramadan (no eating from sunrise to sunset for one month), Caglayan et al. measured levels of FSH, LH, estradiol (E2), testosterone, and prolactin (PRL) during and after the menstrual period.(43) In this study, hormone levels were not statistically different before and during fasting.

Chennaoui et al. did not observe any difference in testosterone or PRL levels before, during, or one week after Ramadan in eight middle-distance athletes.(45) Similarly, Li et al. measured LH and FSH in young women with obesity and polycystic ovarian syndrome (PCOS) who followed an eight-hour time- restricted eating regimen for five weeks.(58) At the conclusion of the study, LH and FSH remained unchanged. However, Heilbronn et al. reported that alternate-day fasting adversely affected glucose tolerance in nonobese women but not in nonobese men.(59)

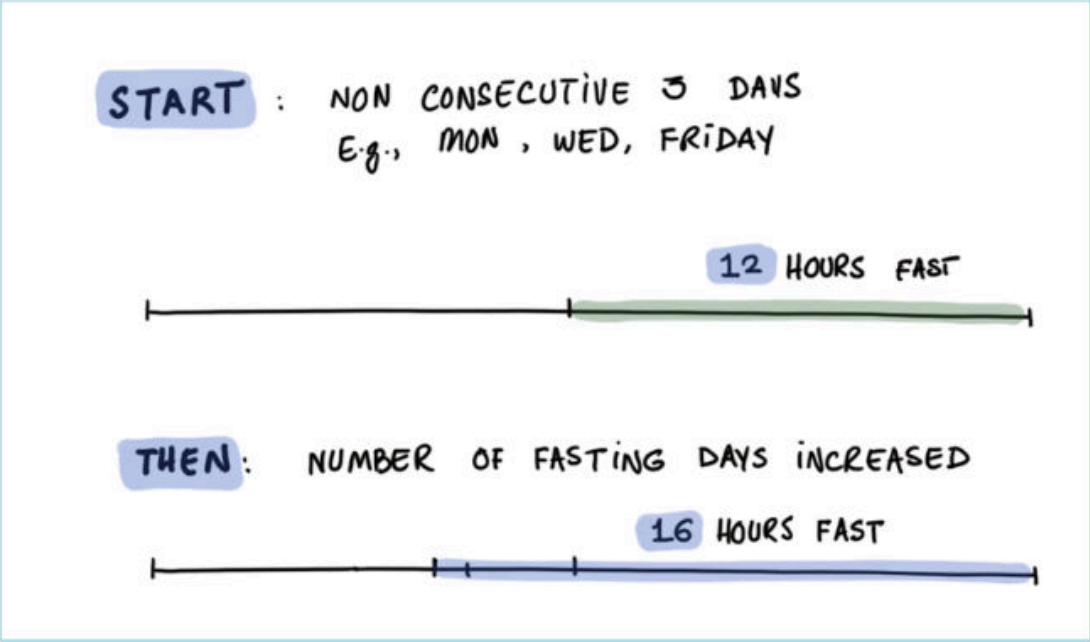
It is possible that alternate-day fasting results in greater disruption of the hypothalamus-hypophysial-gonadal axis than does 8- to 12-hour time-restricted eating. The timing of food intake may also be important. Jakubowicz et al. demonstrated that consuming a large meal later in the day (at dinner) increased estrogen levels in women with PCOS compared with eating earlier in the day.(14)

There are many anecdotal reports of women experiencing changes to their menstrual cycles after beginning intermittent fasting, particularly with alternate-day fasting or fasting periods longer than 24 hours. For this reason, premenopausal women may need to follow a modified approach.(60)

The first step is to adopt healthy eating habits and reduce processed foods and refined carbohydrates. Healthy fats may include sources of saturated fat, cholesterol-containing foods, and omega-3 fatty acids when eaten as part of whole, minimally processed foods and an overall healthy eating pattern.

To reduce potential adverse effects, women may benefit from taking a milder approach to fasting—using shorter fasting periods and fewer fasting days. One suggested approach is to begin with 12-hour fasting periods two to three days per week and gradually increase from there. In addition, the fasting window should begin at least four hours before going to sleep.

Fasting days should be nonconsecutive and evenly spaced throughout the week (for example, Monday, Wednesday, and Friday).




*A modified approach to fasting for premenopausal women (Source: Dr. Mobeen Syed)*

With time, the fasting window can be gradually extended — over weeks — to 16 hours, and the number of fasting days per week may increase. The duration and frequency of fasting should be adjusted based on the individual woman's response. Some experts suggest linking intermittent fasting patterns to the phases of the menstrual cycle (see table below).(60)

In women who follow a more conservative intermittent fasting regimen, supplementation with resveratrol and spermidine may help support autophagy.(61-65)

**Table 1. An approach to fasting linked to phases of the menstrual cycle**

| Day | Phase | Type of Fast | Type of Food | Comment |
|---|---|---|---|---|
| 1 – 10 | Follicular | 12-72 hours | Keto | Insulin sensitive;(66) Aerobic exercise |
| 11-15 | Ovulation | 12-15 hours | Keto | Testosterone peaks; weight training |
| 16-19 | Early Luteal | 12-72 hours | Keto | Declining hormones; less intense exercise |
| 20-bleed | Late Luteal | No fasting | Complex CHO | Insulin resistant; less exercise-walking, yoga |

*Source: Adapted from Fast Like a Girl (60)*

**Fasting during perimenopause and menopause**

During perimenopause, hormone levels fluctuate because ovulation occurs less frequently, resulting in lower progesterone production during the second half of the menstrual cycle. Periods can become erratic, skipped, or heavy. Many symptoms result from changes in the ratio of estrogen to progesterone.

During menopause, the ovaries stop producing estrogen. Smaller amounts are made instead by the adrenal glands and fat tissue. Although estrogen is still produced in the body, levels are much lower than in younger, menstruating women.

One of the most significant hormonal changes during menopause is the decline in progesterone, creating a period of estrogen dominance and low progesterone. Menopause is associated with lower estrogen levels, insulin resistance, and features of metabolic syndrome.(66-69) Therefore, intermittent fasting or time-restricted eating, combined with a ketogenic diet, may help improve metabolic health
and support hormone balance.

In addition, berberine (600 mg once or twice daily) is recommended in some protocols, as this natural compound may increase insulin sensitivity, improve lipid profiles, and benefit the microbiome.(70-73)

Taking melatonin (0.75-5 mg at night; extended-release tablets) may also support bone health in postmenopausal women and may help improve the osteogenic potential of bone marrow mesenchymal stem cells impaired by osteoporosis.(74)

**Increasing estrogen through diet and lifestyle**

Certain behaviors and lifestyle adjustments may help address low estrogen levels:

- Aim for a healthy weight: Being underweight is a risk factor for low hormone levels.
- Exercise in moderation: Excessive exercise may contribute to low estrogen levels; moderate activity is recommended
- Reduce stress: Chronic stress hormones can disrupt the hormones that regulate the reproductive system. Incorporating stress-reduction and pleasurable activities (such as intimacy, hugging, kissing, or sexual activity) may promote oxytocin release, which can reduce cortisol levels.
- Get enough sleep: Sleep allows the body to regulate hormones effectively. Most adults need seven to nine hours of sleep per night.

**Foods containing phytoestrogens**

Phytoestrogens are plant-based compounds that mimic some effects of estrogen. Some studies suggest that eating foods containing phytoestrogens may help reduce menopause symptoms such as hot flashes. They may also support heart health, bone health, and skin elasticity, although more research is needed.

Foods that contain phytoestrogens include:

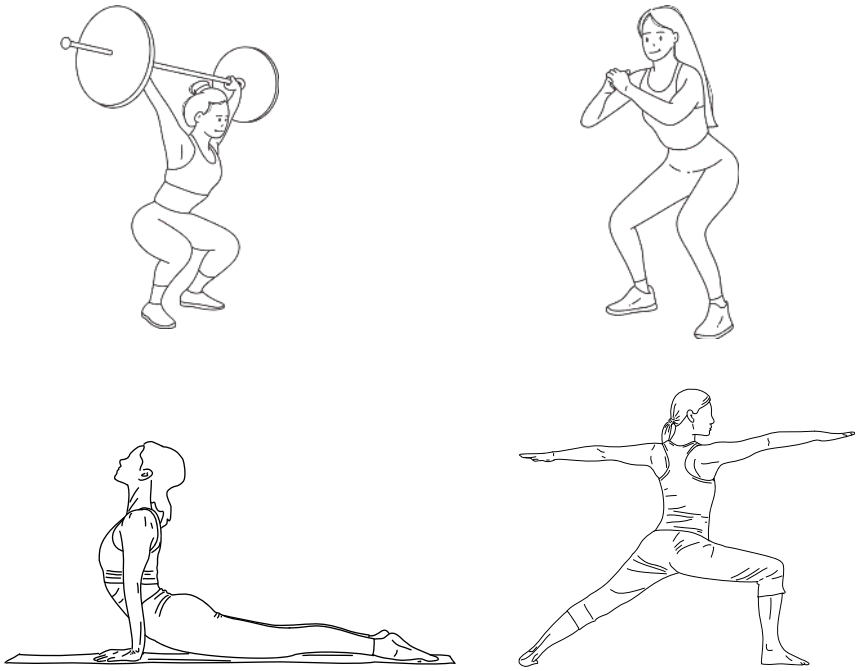
- Legumes (soybeans, lentils, chickpeas, peanuts; soy isoflavones 60 mg daily may be considered if no history of breast or ovarian cancer (73))
- Seeds (flaxseed, sunflower seeds)
- Berries (strawberries, raspberries, blueberries)
- Other fruits (plums, pears, apples, grapes)

**Exercise and menopause**

During menopause, as estrogen levels decrease, bone loss may increase and calcium absorption may decrease. However, regular exercise can help support calcium absorption and reduce the risk of osteoporosis. Exercises that can help include:

- Weight-bearing exercise: Activities such as walking, jogging, dancing, and weightlifting help build bone density.
- Resistance training: Strength training stimulates bone growth, improves bone density, and increases muscle mass, which supports the skeleton and reduces the risk of falls.
- Yoga and Pilates: These activities improve balance, flexibility, and posture, helping reduce the risk of falls and fractures.
- Outdoor activities: Gardening, hiking, and cycling can increase vitamin D exposure, which supports calcium absorption and bone health.

In addition to exercise, maintaining a healthy diet that includes calcium-rich foods — such as leafy green vegetables, nuts and seeds, and fortified foods — is important. Adequate vitamin D intake, through sun exposure or supplementation, also helps the body absorb calcium. Regular exercise may also support healthy hormone balance, cortisol regulation, and glucose metabolism, contributing to overall health and well-being.



# Learn More About Intermittent Fasting

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- "I-CARE Insulin Resistance: A Guide to Managing Insulin Resistance, Metabolic Syndrome, and Type 2 Diabetes" — https://imahealth.org/protocol/i-care-insulin-resistance/
- "The Complete Guide to Fasting" by Jason Fung, MD — https://www.goodreads.com/en/book/show/32670670-the-complete-guide-to-fasting
- "The Real Meal Revolution" by Tim Noakes, MD — https://www.goodreads.com/book/show/20436818-the-real-meal-revolution
- "How I Reversed Type 2 Diabetes," by Paul Marik, MD — https://imahealth.org/dr-marik-how-i-cured-myself-of-type-2-diabetes-while-searching-for-long-covid-treatments/

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IMA videos:

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- Guide: "How to Make Bulletproof Coffee" — https://imahealth.org/tools-and-guides/how-to-make-bulletproof-coffee/
- Guide: "Let's Talk About Resveratrol"— https://imahealth.org/tools-and-guides/lets-talk-about-resveratrol/

YouTube videos:

- "Fasting For Survival" lecture by Pradip Jamnadas, MD — https://www.youtube.com/watch?v=RuOvn4UqznU
- "Fasting for Health and Longevity" by Jason Fung, MD — https://www.youtube.com/watch?v=rQsMRjAwcFo
- "Reversing Type 2 Diabetes" by Jason Fung, MD — https://www.youtube.com/watch?v=6KS7M0s2fJM
- "The 7 Important Intermittent Fasting Rules," by Eric Berg, DC — https://www.youtube.com/watch?v=I7s8K_CLOrs
- "The Most Important Intermittent Fasting Basics for Beginners," by Eric Berg, DC — https://www.youtube.com/watch?v=1rfzjRoalWM
- "The Complete Guide to Intermittent Fasting for Women — Do It Correctly" by Mindy Pelz, DC — https://www.youtube.com/watch?v=hh1z0tJuMJA

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