



# EAT WELL

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

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FLCCC<sup>®</sup>  
ALLIANCE



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## About this document

The question of how to remove spike protein from the body has been coming up with increasing frequency in recent months, as people are rightly concerned about its lingering effects. The FLCCC 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 has additional health benefits in that it lowers insulin levels and helps people who have become insulin-resistant to restore sensitivity.

This document should serve as a quick guide to 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 in conjunction 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 and releases. This 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 thus should rely on the judgment of your physician or qualified healthcare provider. Always seek their advice with any questions you may have regarding your medical condition or health.

## How eating became unhealthy

Humans did not evolve to eat and snack continuously; this is highly maladaptive human behavior. [1,2] Data suggests that people in Western cultures spend about 12-14 hours a day eating and snacking. Over 80% of what gets eaten is not even real food — it is highly processed food. [1,2] Contrast this to our Paleolithic ancestors, who ate real, unprocessed food once or twice a day and you begin to see the problem.

To be honest, one does not need to stretch that far back in history to see the contrast. Highly processed food as a commercial product did not appear until as recently as the 19<sup>th</sup> century. Is it any wonder that we are now seeing epidemic levels of obesity, metabolic syndrome, type II diabetes, cancer, cardiac disease, neurodegenerative disease, and autoimmune disease?

One of the most important interventions to reduce these disorders is to eat real, not processed, food in the right amounts at the right time.

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

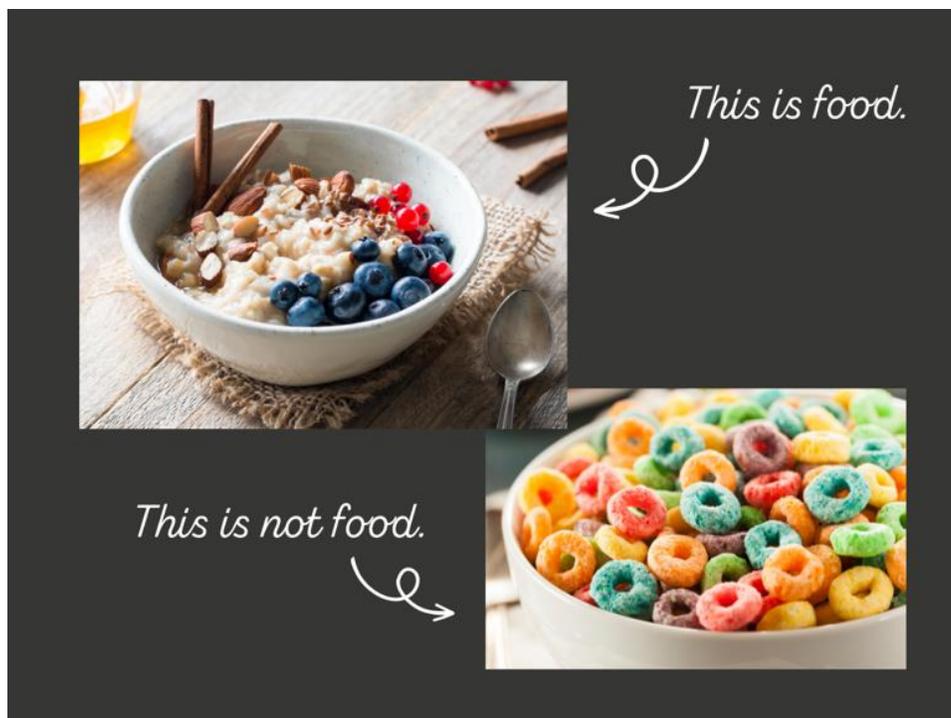


Figure 1: Real vs Processed food (Source: FLCCC)

The more ingredients listed on a product's label and the more chemicals you see with strange and unpronounceable names, the more processing the product has undergone.

The primary focus of this guide is on fasting, which is the time we spend not eating. Still, it is critical to understand what we *should* eat, what we *should not* eat, *when* and *where* we should eat, and what happens inside our bodies when we do eat (as well as what happens when we don't eat).

## What do fasting and time-restricted eating mean?

Fasting, by definition, means abstaining from eating. So technically any time you are not eating a meal, you are fasting.

Time-restricted eating is a type of fasting where food intake is limited to a short window during the day (1 to 8 hours), with only fluids such as water, tea, or coffee for the rest of the day. Intermittent fasting usually involves a longer period of fasting; the most common is alternative day fasting (24-hour fast, followed by a 24-hour eating window). However, many people fast for several days (3-7 days, or up to 14 days) followed by slow refeeding.

Time-restricted eating and intermittent fasting have many metabolic, cellular, and immunologic benefits. [3-17] It is important to emphasize that intermittent fasting/time-restricted eating are not synonymous with starvation; people who fast eat nutrient-dense food. Intermittent fasting does not activate starvation metabolic pathways.

For example, when the body is starving, it decreases the basal metabolic rate (BMR) and growth hormone (GH) levels to try to conserve energy and limit growth. Intermittent fasting, on the other hand, increases BMR and GH. This may explain why diets that advocate the traditional approach of 'eat fewer calories and exercise more' fail most of the time.



Figure 2: Mark Twain on 'starvation' (Source: FLCCC)

While a sporadic 24-hour fast (once a week or less frequently) is an efficient way to lose weight and potentiate the benefits of time-restricted eating, this is difficult for many individuals to accomplish. We, therefore, suggest time-restricted feeding as a lasting lifestyle intervention to promote health, reduce disease burden, slow aging, prevent neurodegenerative disease, prevent cardiovascular disease, and prevent cancer.

Intermittent fasting is the most effective method to achieve sustained weight loss (one should aim for a healthy weight). In addition, intermittent fasting has a profound effect on promoting immune system homeostasis, partly by stimulating the clearing of damaged cells (autophagy), damaged mitochondria (mitophagy), and misfolded and foreign proteins. Fasting improves mitochondrial health and increases stem cell production. Intermittent fasting is the most effective therapy for the treatment of insulin resistance, metabolic syndrome, and type II diabetes. In addition, Intermittent fasting has additional benefits in prolonging health span, alleviating the symptoms/curing many chronic diseases, as well as preventing cardiovascular disease, neurodegenerative diseases (Alzheimer's Disease), and cancer. [3-17]

The metabolic effects of intermittent fasting are numerous and include decreasing blood glucose levels, increasing insulin sensitivity, decreasing insulin levels, decreasing insulin-like growth factor, activating the sirtuin pathway, and activating autophagy. Intermittent fasting is the most effective means of activating autophagy and accounts for many of its beneficial effects.

## Autophagy and intermittent fasting

The 2016 Nobel Prize in Physiology or Medicine was awarded to Yoshinori Ohsumi for his initial description of the morphological and molecular 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 (damaged organelles, misfolded or mutant proteins, and macromolecules) and exogenous (viruses and bacteria) components to maintain cellular homeostasis. [20-22] Dysfunctional autophagy contributes to many diseases, including cancer and neurodegenerative diseases.

The specificity of the cargo and the delivery route to lysosomes distinguishes the three major types of autophagy. Microautophagy involves the direct engulfment of cargo in endosomal/lysosomal membrane invaginations. 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]

Macroautophagy (henceforth referred to as autophagy) is the best-characterized process; in this process, cytoplasmic constituents are engulfed within double-membrane vesicles called autophagosomes, which subsequently fuse with lysosomes to form autolysosomes, where the cargo are 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] 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.

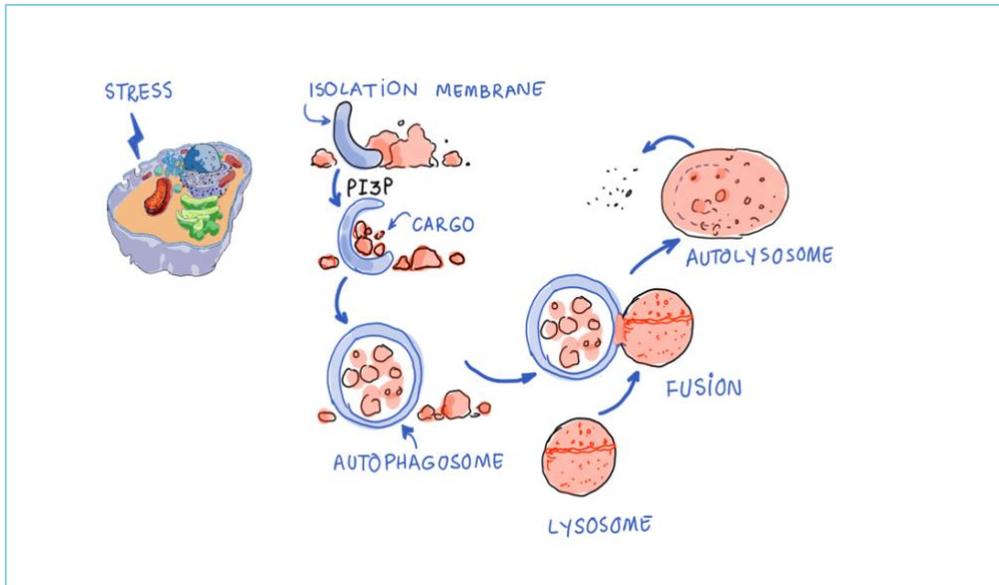


Figure 3: Autophagy pathway (Source: Dr. Mobeen Syed)

Each stage is controlled by different protein complexes regulated by the activation or inactivation of several stress-responsive pathways, such as those involving mammalian target of rapamycin (mTOR—nutrient), AMP-activated protein kinase (AMPK—energy), and hypoxia-inducible factors (HIFs—stress). [6]

Intermittent fasting is the most effective means of activating autophagy and accounts for many of autophagy's beneficial effects. Additional activators of autophagy include resveratrol (a naturally occurring phytochemical found in grapes, berries, wines, pistachio, etc.), spermidine (a naturally occurring polyamine found in wheat germ, mushrooms, grapefruit, etc.), ivermectin, melatonin, coffee, and red light/near-infrared radiation.

## Healthy eating

### What happens when we eat: all about insulin and insulin resistance?

Before we get into the details of how to safely and effectively fast, 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 makes insulin, a hormone that moves glucose into our cells to use for energy. When the body doesn't have enough carbohydrates to burn it burns fat instead, producing something called ketones, which it then uses for fuel.

As we gain weight, our bodies become less sensitive to insulin. 'Insulin resistance' happens when cells in muscles, fat, and liver don't respond well to insulin and can't use glucose from the blood for energy. The pancreas then makes more insulin, which causes blood sugar levels to rise and can lead to type II diabetes.

To read more about insulin resistance and how to correct it, see [I-CARE: Insulin Resistance](#).

## The glycemic index

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

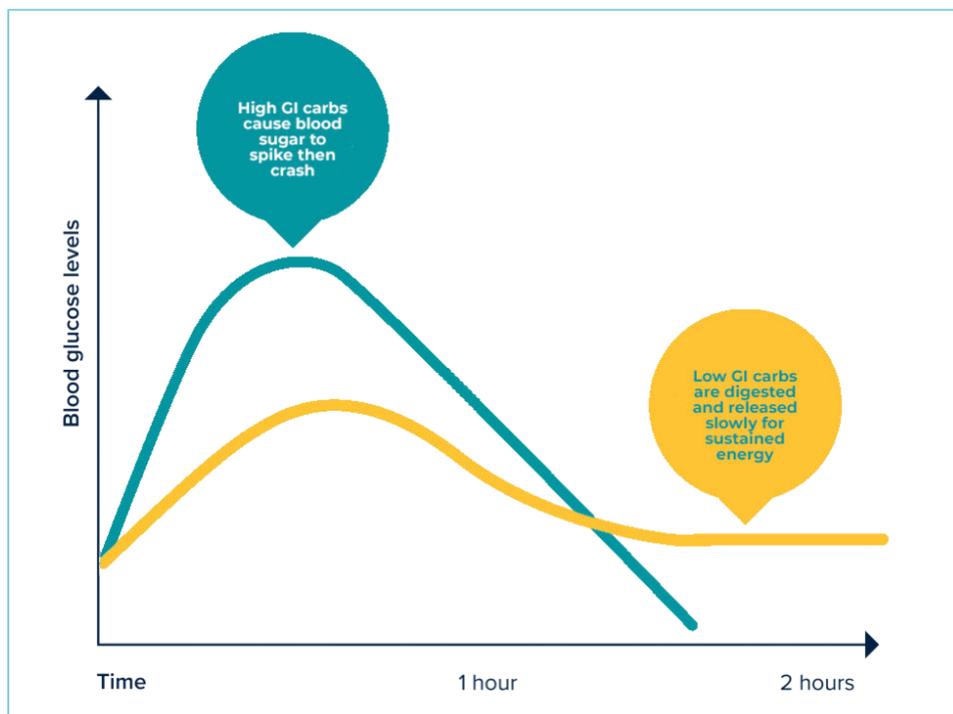


Figure 4: The blood glucose profile of high and low glycemic index foods (Source: adapted from Glycemic Index Foundation)

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.

It should be noted that the glycemic index varies from person to person. [24,25] A continuous glucose monitor allows for the individual assessment of the glycemic index of various foods.

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

Figure 5: The glycemic index of certain foods (Source: FLCCC)

### Flattening the glucose curve

Time-restricted eating and carbohydrate restriction/ketogenic diet are good ways to reduce spikes in glucose. But there are many other simple interventions to prevent high glucose spikes. In her book *Glucose Revolution*, Jessie Inchauspe (aka “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 slow 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 greens and fiber, then protein and fat and then — if you must eat starchy foods, make sure they include fiber and make them the last thing you eat. Eat fruit after a meal and always make sure it is preceded by fiber.

Here's what that looks like visualized:

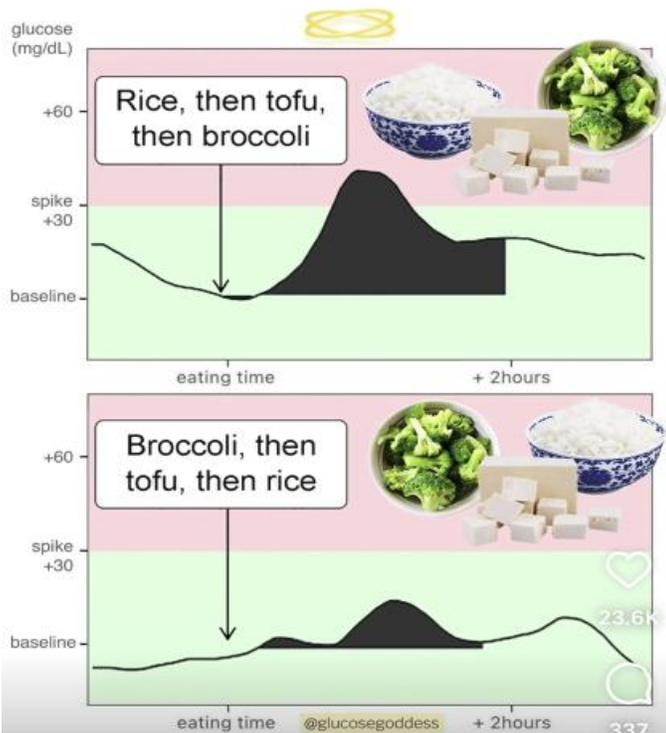


Figure 6: Eating food in the right order (Source: Jesse Inchauspe)

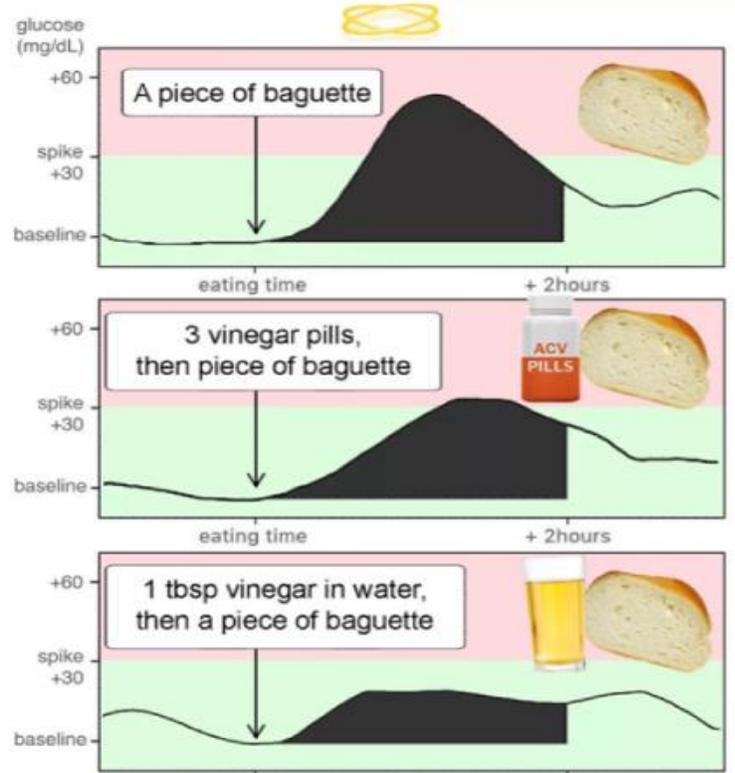


Figure 7: Add vinegar before starch (Source: Jesse Inchauspe)

Another suggestion is to drink a tablespoon of vinegar (apple cider vinegar, preferably) stirred into a tall glass of water before eating starch or something sweet. Vinegar, which contains acetic acid, decreases the glucose spike as well as the release of insulin. Vinegar decreases the enzymatic breakdown of starch, increases glycogen synthesis (and glucose uptake), and increases 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 consuming a few fiber tablets (esp. glucomannan tablets) prior to eating a starchy or sweet treat. This should flatten the curve.

Finally, make sure you move after you eat. Go for a 20-minute walk within an hour of eating (especially starchy food). During exercise, muscles take up glucose for energy while increasing mitochondrial oxidative capacity. [31-33] This is a very effective method to flatten the curve.

Going to the gym or doing resistance exercises is an alternative. If you're at the office, climb a few stairs. If you're largely sedentary, try doing sitting calf raises (look up "soleus pushups"). This simple act of raising the heel and contracting the calf, which resembles walking, has been demonstrated to reduce glucose after a meal by about 50%, reduce hyperinsulinemia, and improve lipid metabolism. [34]

When you exercise in a fasting state (exercising when you have not eaten), your liver releases glucose into the bloodstream to fuel the mitochondria in your muscles; this causes a glucose spike. This is mediated by increased release of cortisol, epinephrine, and norepinephrine (with decreased glucagon); i.e., the release of harmful stress hormones. If you exercise prior to eating, we would suggest a shake

containing powerful superfoods such as plant protein, super green, Omega-3 fatty acids, vitamins and adaptogenic herbs, probiotics, and fiber, super mushrooms and berries (e.g. Ka'Chava™ <https://www.kachava.com/> and 310 Shakes™ <https://310nutrition.com/>). This is preferred to a regular protein shake.

A couple of other things to note:

- Avoid fruit juices and smoothies, which cause a large glucose spike.
- Despite what your mother told you, it is good to skip breakfast. If you do eat breakfast, avoid sugar, starches, and cereal, which all cause a rapid spike in 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 our food, control our immune system, and even manage our brain function.

The microbiome affects blood sugar levels and insulin sensitivity too. [35-41] That is why establishing a healthy microbiome is important for regulating blood glucose levels and ensuring our bodies are appropriately sensitive to insulin. Some ways to establish a “normal” microbiome include:

- Eating a diverse range of foods, including lots of vegetables, legumes, and beans.
- Eating fermented foods like yogurt, kefir, apple cider vinegar, kombucha, pickles, sauerkraut, tempeh, and kimchi.
- Eating foods rich in polyphenols, like berries, coffee and tea, nuts and seeds, olives, and beans. Red wine also has a high polyphenol content, as do resveratrol supplements.
- Eating prebiotic fiber foods like chicory root, dandelion greens, asparagus, onions, and garlic. Supplementation with galactomannan, a product made from the root of the konjac plant, and which contains both soluble and insoluble fiber, is an option.
- Eating less sugar and sweeteners.
- Reducing stress.
- Avoiding unnecessary antibiotics.
- Exercising regularly.
- Spending time outdoors in the natural world to expose yourself to millions of microbes, many of which can benefit microbiome diversity.
- Getting enough sleep.

## Avoid distracted eating

You may not realize it, but where you eat also matters. Studies have shown that eating on the sofa or at your desk can lead to excess weight gain because we are not as aware of how much we have eaten. Researchers distinguish between 'attentive' and 'distracted' eating and have found that attentive eating aids weight loss without the need for counting calories. [42]



Figure 8: It's not just what you eat, but where you eat (Source: FLCCC)

## A brief guide to intermittent fasting/time-restricted eating

Fasting is one of the best things you can do for your health. It's a wonder why more people are not doing it. It's simple, it's free, it's powerful, and it's flexible. You can still enjoy life's little pleasures. And it works with any diet — whether you're vegan, carnivore, low-carb, or follow a Mediterranean diet.

That said, a low-carbohydrate, high-fat diet is the optimum choice. (Saturated fats and Omega 3-fatty acids are both healthy fats; don't be fooled!) Just remember to eat real rather than processed foods, avoid seemingly healthy foods that may be high in sugar (such as fruit juice), and keep your meals diverse with lots of leafy greens and cruciferous vegetables (broccoli, cauliflower, cabbage, kale, arugula, bok choy, etc.) Also, don't eat (or snack) within 3-4 hours of going to bed. This limits autophagy while sleeping, which is vital for brain health and glymphatic flow. Cut out snacking and get between 20 and 30 minutes of exercise (aerobic or resistance training) per day.

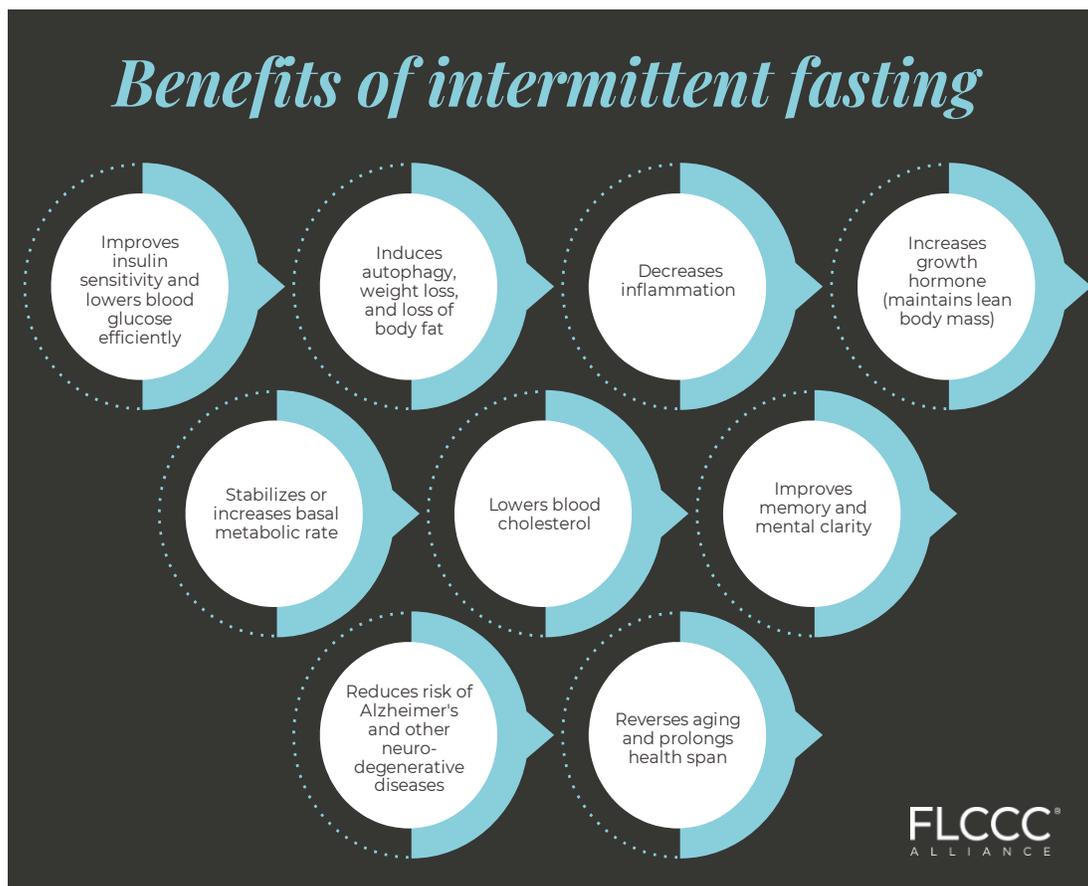


Figure 9: Nine reasons to try intermittent fasting (Source: FLCCC)

## How to get started

Preparing yourself mentally for intermittent fasting or time-restricted eating is half the battle. Don't calorie count or obsess about eating and food choices. Remember you will not be starving yourself or severely restricting caloric intake.

There is pretty much an intermittent fasting plan that can be adapted and modified for any lifestyle. Check out the 2016 book by Dr. Jason Fung, *The Complete Guide to Fasting*, for some excellent guidance on approaches to intermittent fasting. [2]

Time-restricted eating seems to be a particularly effective and practical approach. For timed fasting, begin slowly: start by allowing yourself a 12-hour eating window 5 days a week. This could mean eating between 8:00 in the morning and 8:00 in the evening Monday through Friday. After a week or two, reduce the eating window by an hour or two, and then start doing it 7 days a week. You should aim for no more than an 8-hour eating window every day. This can be further shortened to 4 hours or less in time.

The ideal goal is a 1-2 hour eating window, restricted to one meal a day. Timed fasting can be interspersed with day-long, 36-hour, or 48-hour fasts.

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

Whatever approach you do, 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 provides instant metabolic feedback and is strongly recommended when first initiating time-restricted feeding and until metabolic stability is achieved (e.g., 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 section on glycemic index and flattening the curve).

## Remember, (almost) anyone can fast

Some people ask what they should do if they are unable to fast. In truth, there are only a few groups of people who should avoid intermittent fasting. These include children under age 18, as it can impair their growth, and people 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). Other approaches to intermittent fasting should probably be avoided in women.

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

Otherwise, humans have evolved over millions of years to be well-adapted to fasting. All humans can fast; indeed, it is an integral component of many religious lifestyles. [43-45] People who have tried and failed are likely severely insulin resistant and may be addicted to carbohydrates and sugar. Ironically, fasting is the best remedy for these people. We suggest a slow and progressive approach to time-restricted feeding; start by skipping breakfast and then slowly increase the time of your fasting window.

### **Dealing with hunger while fasting**

First, remember that — like with everything — fasting becomes easier the more you do it. As you fast, you will improve your insulin sensitivity and do away with the insulin spike that increases the feeling of hunger. Ketosis, the state that occurs when the body starts burning fat instead of sugar, also reduces the feeling of hunger; with prolonged fasting, you will stop feeling hungry.

Until you reach that state, try doing things like removing yourself from all food stimuli. Break the habit of eating at specific times of the day. It is important to stay well-hydrated during fasting periods; drink lots of water and/or an electrolyte solution. 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 though. Instead try Stevia, which in itself has important metabolic benefits. [46] Make sure your stevia product does not contain erythritol, which has been shown to increase cardiovascular complications. [47]

In his book, Dr. Jason Fung recommends drinking coffee with added coconut oil (medium chain triglycerides) or heavy cream and to avoid 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 eat**

Healthy foods include (but are not limited to):

- All vegetables (especially avocado, cruciferous, and leafy vegetables)
- Nuts (almonds, brazil nuts, cashews, and pistachios)
- Peanut butter (but avoid the white bread and grape jelly!) and chia seeds.
- Fish (especially Alaskan salmon and sardines)
- Chicken breast (free range, no hormones, no antibiotics)
- Eggs (they've been giving a bad rap!)
- Meat (grass-fed, no hormones, avoid processed meats)
- Blueberries (limit volume if highly insulin resistant)
- Grapefruit (limit volume if highly insulin resistant). Note: Grapefruit juice decreases the activity of the cytochrome P450 3A4 (CYP3A4) enzymes that are responsible for breaking down many drugs and toxins. When grapefruit juice is consumed, the enzyme's ability to break down the drug for elimination is decreased. Blood levels of the drug may rise, resulting in a risk for new or worsened side effects. Therefore, check interactions between grapefruit and the drugs you are taking.
- Coffee with heavy cream or coconut oil; choose Stevia (without erythritol) over sugar or artificial sweeteners.



Figure 10: Top 10 best foods (Source: FLCCC)

Say goodbye to:

- Donuts
- Bagels, bread, pretzels, tortillas
- Sweetened low-fat yogurt.
- Cereal bars
- Cookies, muffins, baked products
- Chips
- French fries
- Rice and pasta
- Potatoes
- Canned fruits/fruit juices
- Watermelon and bananas
- "Fake health foods"



Figure 11: Top 10 worst foods (Source: FLCCC)

Healthy and unhealthy oils



Figure 12: Healthy and unhealthy cooking oils (Source: FLCCC)

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 eat up to 10 times the desired amount of linoleic acid, because of excess consumption of foods made with seed oils. Too much linoleic acid is associated with inflammation, obesity, heart disease and other unfavorable conditions. Therefore, avoid:

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

Instead, opt for healthy oils and fats such as the ones listed below. Use only high-quality products and check production and expiration dates.

- Olive oil (oleic acid, Omega-9 monounsaturated fatty acids); never heat olive oil to the point where it produces smoke
- Avocado oil (oleic acid, Omega-9 monounsaturated fatty acids)
- Coconut oil (medium chain fatty acid)
- Flaxseed oil (alpha-linolenic acid, ALA Omega-3)
- Walnut and Pecan oils; these oils should be refrigerated to avoid spoilage
- Butter (saturated fat)

### **Fasting while on medication**

Some medications are contraindicated with intermittent fasting. For example, proton pump inhibitors (PPI), which reduce stomach acid, should be avoided as they block autophagy. Suddenly discontinuing a PPI can cause rebound esophagitis, so an H2-blocker like famotidine or ranitidine may be an alternative. An aloe vera stomach formula or diluted apple cider vinegar have been suggested as alternatives to a PPI; however, there is limited data to support these interventions.

Hydroxychloroquine (HCQ), which is recommended in some COVID-19 protocols, can interfere with the autophagy process, and therefore may limit the benefits of intermittent fasting. Generally, it is fine to continue taking vitamins and supplements while fasting and these do not break your fast.

### **Intermittent fasting and cancer**

While autophagy may prevent cancers from occurring in the first place, once cells have begun a malignant transformation, autophagy may promote their growth. Cancer cells have an increased metabolic demand for energy and macromolecular building blocks to proliferate, and they have shown elevated levels of autophagy to recycle nutrients. Therefore, patients with cancer should use caution in activating autophagy (fasting) and should discuss fasting and fasting protocols with their treating oncologist.

## Women and fasting

Several studies have suggested that intermittent fasting may not be as beneficial for pre-menopausal women as it is 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] While men have a hormone profile that is relatively similar from day to day, women's hormones (at least until after menopause) shift cyclically. The response to fasting differs depending on the day of their cycle.

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

Women may respond differently to decreases in specific macronutrients, such as protein or carbohydrates. If women do not eat adequate protein for their body weight and activity levels, the body will sense that amino acids (the building blocks of protein) are low, which can negatively impact estrogen binding and a hormone called 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, they need 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 one of the menstrual cycle is the first full bleeding day of the period. A typical cycle is approximately 24 to 35 days (on average, 28 days for most women). It is not abnormal 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 of the cycle is considered the luteal phase. Midway through the cycle — between days 12 and 16 — ovulation occurs, and this is known as the ovulatory phase.

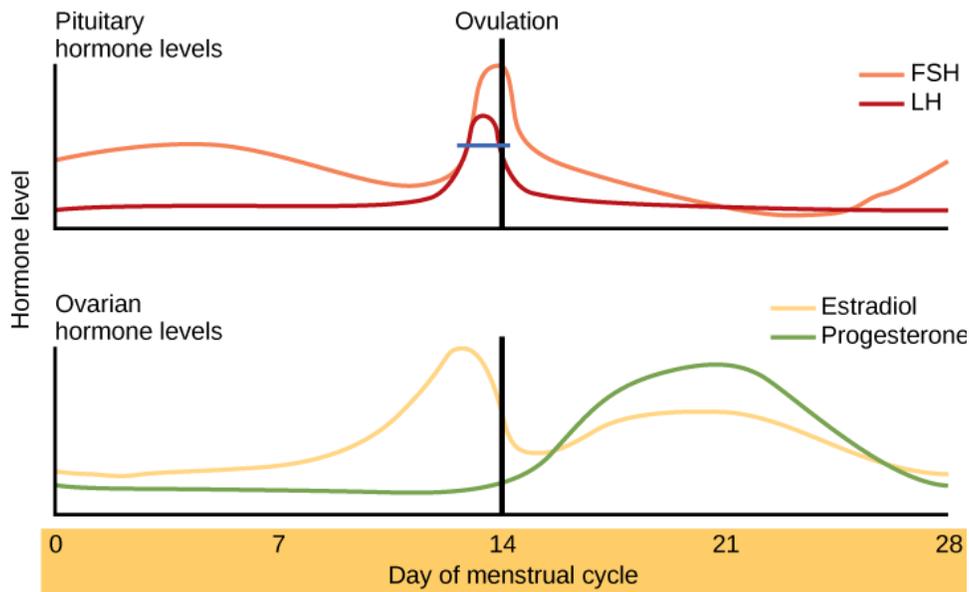


Figure 13: Hormone levels and phases of the menstrual cycle (Source: [Human Biology](#))

On Day 1 of the menstrual cycle, estrogen and progesterone levels are low. Low levels of estrogen and progesterone signal the pituitary gland to produce Follicle Stimulating Hormone (FSH). FSH begins the process of maturing a follicle (fluid-filled sac in the ovary containing an egg). The follicle produces more estrogen to prepare the uterus for pregnancy. At ovulation, usually around day 12-14, 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) now secretes progesterone and estrogen to continue to prepare the uterus for pregnancy. If the egg is not fertilized, estrogen and progesterone levels drop and, on day 28, the menses begin.

Days 1-10 of the menstrual cycle are great days for fasting and eating a more keto or lower carbohydrate diet. This is a hormonally resilient time. During days 1-7, there is a subsequent rise in testosterone, which supports body mass. This is a great time for fat-burning and resistance training.

Right after ovulation, which varies around day 14, the body becomes less insulin-sensitive, and it is therefore important to reduce complex carbohydrate intake as insulin sensitivity is at its lowest during this phase. Consider intermittent fasting and following a lower complex carbohydrate diet while increasing fiber, healthy fats, and protein.

The third and fourth weeks of the menstrual cycle are the luteal phase; post-ovulation. Here progesterone levels are highest and metabolism changes yet again. Progesterone is a potent appetite stimulant but slows digestion. This a great time to add green juicing, bone broths, increasing hydration, and increasing fiber to keep bowel movements regular.

Week 4 is the final week of the luteal phase, when the body begins to build hormones to prepare for menstruation. This is a great time to bring in healthy carbohydrates with a wide variety of vegetables and grains to support menstruation.

## **Fasting and the menstrual cycle**

Although there are no comparable human studies, experiments in rats have shown that three to six months of alternate-day fasting caused a reduction in ovary size and 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 aged 9 years old. [54] In addition, rats have a much higher high basal metabolic rate than humans and are metabolically very different from humans.

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

Chennaoui et al., did not observe any difference in testosterone and PRL levels before, during, and 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) followed by an 8-hour time-restricted eating regimen for 5 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. In addition, the timing of time-restricted eating may be important. Jakubowicz et al., demonstrated that a large meal later in the day (at dinner) augmented estrogen levels in women with PCOS, as compared to eating earlier in the day. [14]

There are many anecdotal stories of women who have experienced changes to their menstrual cycles after starting intermittent fasting (likely alternate-day or fasting for more than 24 hours). For this reason, pre-menopausal women may need to follow a modified approach. [60]

The first step is to adopt healthy eating habits and reduce the intake of processed foods and high carbohydrates; saturated fats, cholesterol-rich foods, and Omega-3 fatty acids are healthy fats. To reduce any adverse effects, women should take a mild approach to fasting: shorter fasts and fewer fasting days. We would suggest beginning a program of time-restricted eating consisting of fasting for 12 hours for two to three days a week and increasing from there. Furthermore, the fasting window should begin at least 4 hours before going to sleep.

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

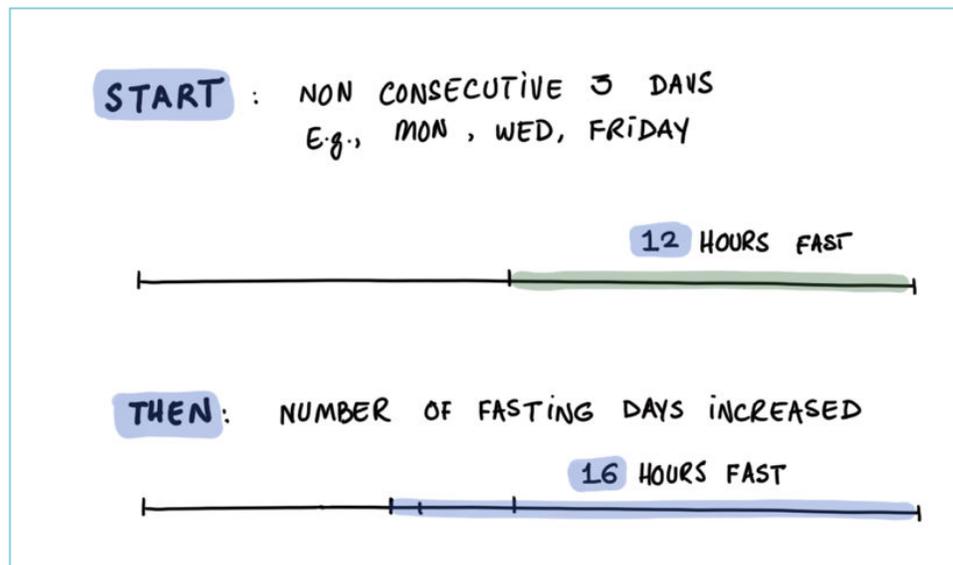


Figure 14: A modified approach to fasting for pre-menopausal women (Source: Dr. Mobeen Syed)

With time, the fasting window can slowly (over weeks) be increased to 16 hours and the number of fasting days per week increased; the increase in the duration and frequency of fasting should be based on the individual woman's response to fasting. It has been suggested that the cycle of intermittent fasting be linked to the phases of the menstrual cycle (see table below). [60]

In women who follow a more conservative intermittent fasting regimen, the addition of resveratrol and spermidine may augment 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	12-15 hours	Keto	Insulin sensitive;[66] Aerobic exercise
11-15	Ovulation	12-15 hours	Keto	Testosterone peaks; weight training
16-19	Early Luteal	12-15 hours	Keto	Declining hormones; less intense exercise
20-bleed walking, yoga	Late luteal	No fasting	Complex CHO	Insulin resistant; less exercise-

Source: Adapted from *Fast Like a Girl* [60]

## Fasting during perimenopause and menopause

During perimenopause, hormone levels fluctuate because of fewer ovulations, which means less progesterone is produced in the second half of the menstrual cycle. Periods can be erratic, skipped, or heavy. Symptoms result from the change in the ratio of estrogen to progesterone, and the imbalance creates the symptoms.

During menopause, estrogen is no longer produced by the ovaries and is made in smaller amounts by the adrenal glands and in fat tissue. Estrogen is still produced in the body, but in lower amounts than in younger, menstruating women.

The most significant hormone change of menopause is the lack of progesterone, creating a period of estrogen dominance and low progesterone. Menopause is associated with low estrogen levels, insulin resistance, and features of the “metabolic syndrome”; [66-69] therefore, intermittent fasting/time restricted eating combined with a ketogenic diet may increase estrogen levels and “rebalance” hormonal levels.

In addition, berberine (600 mg once or twice a day) is suggested, as this natural herb increases insulin sensitivity, improves the lipid profile, and has beneficial effects on the microbiome. [70-73] Taking melatonin (0.75-5 mg at night; extended-release tablets) is another promising strategy to manage postmenopausal patients via restoring the osteoporosis-impaired osteogenic potential of bone marrow mesenchymal stem cells. [74]

## Increasing estrogen through diet and lifestyle

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

- **Aim for a healthy body weight:** Being underweight is a risk factor for low hormone levels.
- **Moderate exercise:** Overexercising can contribute to low estrogen levels. Exercise in moderation.
- **Reduce stress:** Too many stress hormones can cause the hormones that regulate your reproductive system to become imbalanced. Incorporating stress-reduction techniques into your daily routine is good for your overall well-being and your hormones, too. Engage in pleasurable activities (intimacy, hugging, kissing, sex, etc.) to induce the release of oxytocin, which decreases cortisol release and rebalances the hormonal profile.
- **Get enough sleep:** Sleep recharges your body so your hormones can function properly. On average, adults need between seven and nine hours of sleep each night.

## **Foods containing phytoestrogens**

Phytoestrogens are plant-based estrogens. Some studies suggest that eating foods containing phytoestrogens helps with menopause symptoms like hot flashes. Some phytoestrogens may help promote heart health, bone health, and skin elasticity. More research is needed to know for sure.

Some foods that contain phytoestrogens include:

- Legumes (soybeans, lentils, chickpeas, peanuts). Consider soy isoflavones (60 mg daily) [73] but avoid them in patients with a history of breast or ovarian cancer.
- Seeds (flaxseed, sunflower seed).
- Berries (strawberries, raspberries, blueberries).
- Fruits (plums, pears, apples, grapes, and berries).

## **Exercise and Menopause**

During menopause, when the body's estrogen levels decrease, bone loss can increase and calcium absorption decreases. However, regular exercise can help support calcium absorption and reduce the risk of osteoporosis. Here are some exercises that can help:

- **Weight-bearing exercises:** Weight-bearing exercises involve bearing your body weight through your feet and legs, and they can help to build bone density and support calcium absorption. Examples include walking, jogging, dancing, and weightlifting.
- **Resistance training:** Resistance training, such as weightlifting, can help to stimulate bone growth and improve bone density. It can also help to increase muscle mass, which can support the bones and reduce the risk of falls.
- **Yoga and Pilates:** Yoga and Pilates can help to improve balance, flexibility, and posture, which can reduce the risk of falls and fractures.
- **Outdoor activities:** Getting outside and engaging in activities such as gardening, hiking, and cycling can help to increase vitamin D levels, which is important for calcium absorption and bone health.

In addition to exercise, it's also important in menopause to maintain a healthy diet that includes calcium-rich foods such as leafy green vegetables, nuts and seeds, and fortified foods. It's also important to get enough Vitamin D, either through sun exposure or supplementation, as this helps the body absorb calcium. Overall, regular exercise can have a positive impact on hormones, cortisol, and glucose levels, leading to improved health and well-being.

### How can I learn more about intermittent fasting?

- Get Dr. Jason Fung's book "[The Complete Guide to Fasting](#)"
- FLCCC videos
  - [Intermittent Fasting for Women](#)
  - [How to Maximize Autophagy](#)
  - [How to Make Bulletproof Coffee](#)
  - [Coffee Induces Autophagy](#)
- YouTube videos
  - Amazing fasting benefits by Pradip Jamnadas, MD. <https://www.youtube.com/watch?v=RuOvn4UqznU>
  - Fasting for health and longevity with Dr. 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, Eric Berg, DC. [https://www.youtube.com/watch?v=l7s8K\\_CLOrs](https://www.youtube.com/watch?v=l7s8K_CLOrs)
  - The MOST Important Intermittent Fasting Basics for Beginners, Eric Berg, DC. <https://www.youtube.com/watch?v=1rfzjRoalWM>
  - The COMPLETE GUIDE To Intermittent Fasting For WOMEN (How To Do It Correctly!) by Mindy Pelz, DC. <https://www.youtube.com/watch?v=ulToWSXziWI>
- Read this blog post
  - [How I Reversed Type II Diabetes](#)

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