INTERMITTENT FASTING

MASTERING DIABETES

What is Intermittent Fasting?

Intermittent fasting is term coined by the research world that refers to consciously not eating for an extended period of time. Believe it or not, humans are evolutionarily adapted to performing intermittent fasts – our ancestors performed extended fasts whenever food was unavailable, and feasted only when they could procure enough food to eat.

However, in our modern world of abundance, deliberately fasting for an extended period of time is anything but "normal."

Fasting goes against every morsel of modern life, and is in direct opposition to the abundance-based food culture that we have worked so hard to create. In our world of fast food, on-demand food delivery and 24-hour convenience stores, choosing not to eat food can seem strange indeed.

I spent my entire graduate career investigating the effects of intermittent fasting in rodents, in order to understand why fasting is considered the gold standard for improving one's responsiveness to insulin. As a result of this active body of research, tens of thousands of people across the world engage in intermittent fasting on a weekly basis, as a means of improving their body composition, losing fat mass, shedding pounds or observing a religious holiday.

The research world has taken a large interest in calorie restriction and intermittent fasting, for the explicit purpose of identifying cellular mechanisms that may retard the aging process. And in the process of studying intermittent fasting, researchers have uncovered a laundry list of health benefits that confuse even the most educated professors.

The truth is that humans have been fasting for thousands of years. Modern research is playing catch-up, in order to understand why the health benefits are so impressive.

The Health Benefits of Intermittent Fasting

There is only one way to increase your lifespan: reduce your calorie intake.

Restrict your calorie intake by 25%, and you may add years to your life. Simply stated, there is no pill you can take, no amount of exercise you can perform, and no food you can eat that can actually make you live longer (1–9). All you have to do is reduce your food intake, and watch as your longevity actually increases.

How does this work? It turns out that restricting your calorie intake delays the onset of many age-related diseases, including heart disease, diabetes, hypertension and cancer. Over 75 years of research has uncovered some amazing benefits of calorie restriction and intermittent fasting, and the results are summarized below:

- Reduced LDL (the bad cholesterol) (10,11)
- Increased HDL cholesterol (the good cholesterol)
- Reduced triglycerides
- Reduced blood pressure
- Reduced inflammation
- Reduced cancer risk (tumor growth and progression) (12)
- Increased fat burning and fat loss
- Improved body composition

Improved Insulin Sensitivity

As far as glucose metabolism is concerned, intermittent fasting is an absolute goldmine. Intermittent fasting is an incredibly powerful tool for normalizing glucose and improving glucose variability.

Apart from exercise, intermittent fasting is the most powerful natural insulin sensitizer known to man.

The specific effects of intermittent fasting on diabetes are listed here (13–24):

- Reduced fasting blood glucose
- Reduced post-prandial (after meal) blood glucose
- Reduced glucose variability
- Increased insulin sensitivity

On a molecular level, why does intermittent fasting improve insulin sensitivity? Our current understanding filters down to the following critically important puzzle pieces.

Enhanced Fat Clearance in Muscle and Liver

Insulin resistance is defined as the accumulation in tissues that are not designed to store fat (mainly the muscle and liver).

When you restrict intake of all carbohydrates, fat and protein, tissues all across your body have no choice but to burn their stored onboard fuel for energy. When you fast for an extended period of time, the fat deposits that have accumulated over time become the fuel that cells need to operate. As a result, the size of the *excess* fat droplet gets smaller over time.

Interestingly, as the size of the lipid droplet in muscle and liver cells decreases, those cells become more responsive to insulin. In other words, by reducing the size of the fat droplet, insulin becomes more powerful (13–24).

Clearance of Oxidized Cholesterol Deposits in Blood Vessels

As far as glucose metabolism is concerned, the elasticity of your vasculature is as important as the health of body tissues. Given that glucose and insulin circulate in the blood, the easier they can cross the walls of blood vessels the more infrequent high blood glucose becomes.

Lipid deposits accumulate on the inside wall of blood vessels with age, and over time these lipid and cholesterol deposits become *oxidized*. Oxidized deposits harden and form blood clots, occluding blood vessels, increasing blood pressure, hardening vessel walls and increasing the risk for a heart attack.

Studies have shown that calorie restriction and intermittent fasting are both beneficial for reducing these vascular consequences of aging, resulting in reduced LDL cholesterol, increased HDL, reduced arterial blockage, reduced blood pressure and improved transport of glucose and insulin across the vessel walls.

Think of intermittent fasting as your one-stop-shop for attaining excellent vascular health, for reducing cholesterol, reducing blood pressure, and preventing against vascular complications in the long term. A metabolic triple whammy indeed.

Are You Really Hungry?

Let's face it, we eat when we're feeling lonely. And sad. And frustrated. And angry. And happy. And confused. And excited. We eat in response to our emotions, and this direct connection usually results in…overeating. There are two types of hunger, and understanding the true difference between them is important in determining exactly *when* to eat food.

Performing a single intermittent fast is a great way to experience the difference between our two types of hunger: *physiological hunger* and *emotional hunger*.

Physiological hunger is the type of hunger you experience when your brain, muscles and internal organs are in a low-energy state. This is the type of hunger that you experience following a demanding workout. It's the type of hunger you experience when you have exerted significant physical or mental energy, and are in need of fuel to replenish your energy needs.

Physiological hunger is the signal to intake carbohydrates, fats, and protein in order to meet the energy requirements of repairing and growing tissues.

Emotional hunger is the type of hunger you experience when a situation or thought process dictates your desire to eat.

As opposed to physiological hunger, emotional hunger creates a feeling of true hunger even though the biological requirement for fuel is low or nonexistent.

Understanding the difference between the two of these types of hunger can make a huge difference to your overall health. Do you eat when you're only physiologically hungry? Do you eat when you're emotionally hungry? Do you eat in both situations? Performing a single intermittent fast can help you determine the difference between the two very rapidly.

Sample Intermittent Fasting Regimens

No matter how you slice it, intermittent fasting isn't just good for you, it's GREAT for you. In addition to the physical benefits described above, consciously restricting food intake even for a single 24-hour period can be quite challenging, and helps you establish a true independence from food.

There are endless permutations of intermittent fasting regimens, so I'll present only the ones that are achievable and boast significant short term benefits. There is no sense in doing intermittent fasting if the direct benefit takes months or years to achieve. Lucky for you, performing a single intermittent fast is a fun experience that can make a noticeable and measurable difference in your health.

The most achievable intermittent fasting regimen is the once-per-week 24-hour intermittent fast, as described below:

The Weekly 24-Hour Intermittent Fast

Just as the name implies, choose one day of the week and don't eat.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Eat Normally	Eat Normally	Eat Normally	**24-Hour Fast**	Eat Normally	Eat Normally	Eat Normally

The Twice Per Week 24-Hour Intermittent Fast

Similar to the weekly 24-hour intermittent fast, this one involves a second 24-hour period of fasting for added bonus.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Eat Normally	**24-Hour Fast**	Eat Normally	Eat Normally	**24-Hour Fast**	Eat Normally	Eat Normally

The Magic of Negative Energy Balance

Each of the above intermittent fasting regimens detailed above, during the period of fasting you enter **negative energy balance** in which your rate of energy expenditure exceeds your rate of energy intake. In other words, you are losing energy throughout the fasting period.

You may think that it's possible to eat twice as much food immediately afterwards, in order to compensate for the amount of food that you didn't eat during your fast. In reality however, it is very difficult to eat enough to compensate for your fasting period, which results in a continuation of negative energy balance even after the fasting period is over.

Negative energy balance is exactly the hidden "magic" of the intermittent fast.

As opposed to calorie restriction in which you are hungry every day, performing intermittent fasts on a specified day of the week allows you a mental and physical break from fasting, which is vital for long-term success.

The 24-Hour Intermittent Fast

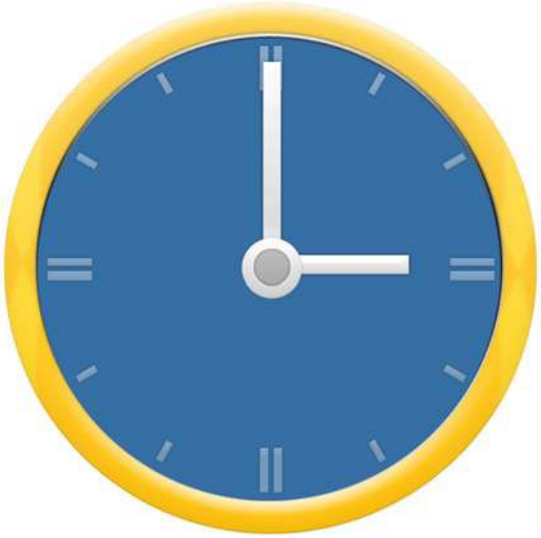
Let's assume that you do a Thursday fast. Here is an example 24-hour protocol:

7pm Wednesday:

Eat your last meal of the day

Drink 500 mL (2 cups) of water

Go to sleep



8pm Wednesday:

START FAST

8am Thursday:

Drink 1 L (4 cups) of water, or…

Drink 250 mL (1 cup) of green tea

12pm Thursday:

Drink 1 L (4 cups) of water, or…

Drink 250 mL (1 cup) of green tea

3pm Thursday:

Drink 1 L (4 cups) of water, or…

Drink 250 mL (1 cup) green tea

7pm Thursday:

UNOFFICIALLY END FAST

Eat a *small* dinner before bed, complete with plenty of real carbohydrates

Drink 500 mL (2 cups) of water

7am Friday:

OFFICIALLY END FAST

Return to your normal eating schedule

Meal Time Liquid Options

2-3 Cups of Water

Drink 2-3 cups of water at meal time to help distend your stomach and "fake" the feeling of being full. When your stomach distends, it sends a signal to your brain which can curb your feelings of hunger.

1-2 Cups of Green Tea

Drink 1-2 cups of green tea at meal time, to help curb your feelings of hunger. Green tea can often act as an appetite suppressant to curb your feelings of hunger, and it does it remarkably well.

Tips and Strategies for Easing Through the Intermittent Fast

- The green tea is not essential to fasting, but it can make the experience easier. Green tea can act as an appetite suppressant and curb your feelings of hunger.
- Drinking water in particular helps to mitigate feelings of hunger, by filling your stomach. This sends a signal to your brain and often results in you feeling less hungry.
- Be aware of your body cues. Feeling stressed out or "upset" during your fast? Relax.
- Take a few deep breaths, and pay close attention — this is what true hunger can feel like.
- Have healthy food (lean protein, veggies, etc.) in the house and ready to go when you "break" the fast on Sunday night with a small meal.
- Also, having healthy food in the house is good insurance that you won't binge the following day when you return to normal eating.

The *Modified* 24-Hour Intermittent Fast

Why do a Modified Intermittent Fast?

For some people, performing a full 24-hour fast is very difficult. Especially for people with diabetes, fasting for extended periods of time can increase the risk for hypoglycemia (low blood glucose), so it is very important to counteract this risk by having food on hand.

If you fall into one of these categories, consider performing a modified 24-hour fast:

- You have type 1 diabetes
- You have type 2 diabetes
- You are prone to hypoglycemia (low blood glucose)
- You have a very difficult time concentrating when hungry
- You experience violent mood swings when fasting

What is Hypoglycemia (Low Blood Glucose)?

The main reason why it is difficult to perform a true 24-hour intermittent fast for some people is because when you consume no calories for an extended period of time, your brain can often become starved for fuel, resulting in any of the following feelings:

- Mood swings
- Frustration
- Anger
- Inability to concentrate
- Shaky hands
- Slurred speech

How is a Modified Intermittent Fast Different than a True Intermittent Fast?

The major difference between a true and modified intermittent fast is the amount of calories that you take in at meal time. In a true intermittent fast, you consume 0 calories at meal times, whereas in a modified intermittent fast, you consume a small number of calories (about 100-200 calories) at meal time. Even with a small intake of calories, you still get some exceptional health benefits!

Example Protocol

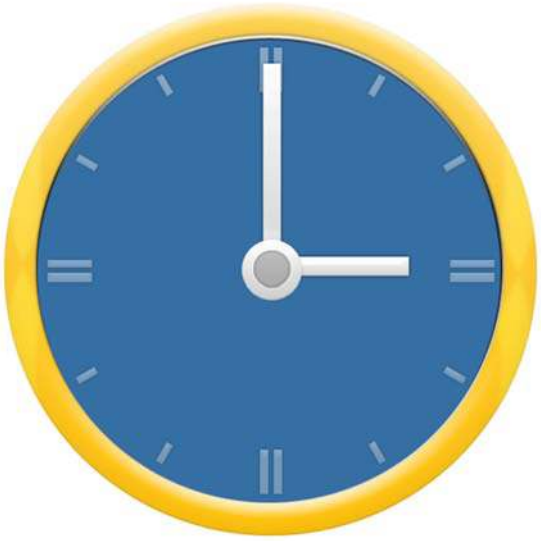
Let's assume that you do a Thursday fast. Here is an example 24-hour modified protocol:

7pm Wednesday:

Eat your last meal of the day

Drink 500 mL (2 cups) of water

Go to sleep



8pm Wednesday:

START FAST

8am Thursday:

Drink 1 L (4 cups) of water, or…

Drink 250 mL (1 cup) of vegetable juice

12pm Thursday:

Drink 1 L (4 cups) of water, or…

Drink 250 mL (1 cup) of green tea

3pm Thursday:

Drink 1 L (4 cups) of water, or…

Eat a vegetable snack or 1-2 pieces of fruit

7pm Thursday:

UNOFFICIALLY END FAST

Eat a *small* dinner before bed, complete with plenty of real carbohydrates

Drink 500 mL (2 cups) of water

7am Friday:

OFFICIALLY END FAST

Return to your normal eating schedule

100-200 Calorie Meal Options

1 Cup of Vegetable Juice

Drink 1 8 oz. cup of vegetable juice, made from any combination of tomatoes, beets, celery, carrots, cucumbers, mint, parsley, arugula, kale

1-2 Pieces of Your Favorite Fruit

Eat 1-2 piece of your favorite fruit (banana, apple, pear, persimmon, orange, a handful of berries etc.)

1-2 Servings of Vegetables

Eat 1-2 servings of vegetables (cauliflower, tomatoes, carrots, broccoli, brussels sprouts, okra etc.)

8-10 of Your Favorite Nuts

Eat 8-10 nuts (cashews, walnuts, almonds, brazil nuts etc.)

A Small Bowl of Salad

Eat a small salad containing 1 serving of vegetables (salad base is made from any combination of cabbage, spinach, lettuce, arugula, kale)

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