

**Get Rid of
Sugar Cravings!**



f a s t i n g
b o o s t

**It's Time
To Break
The Sugar
Habit**

Intermittent **Fasting**

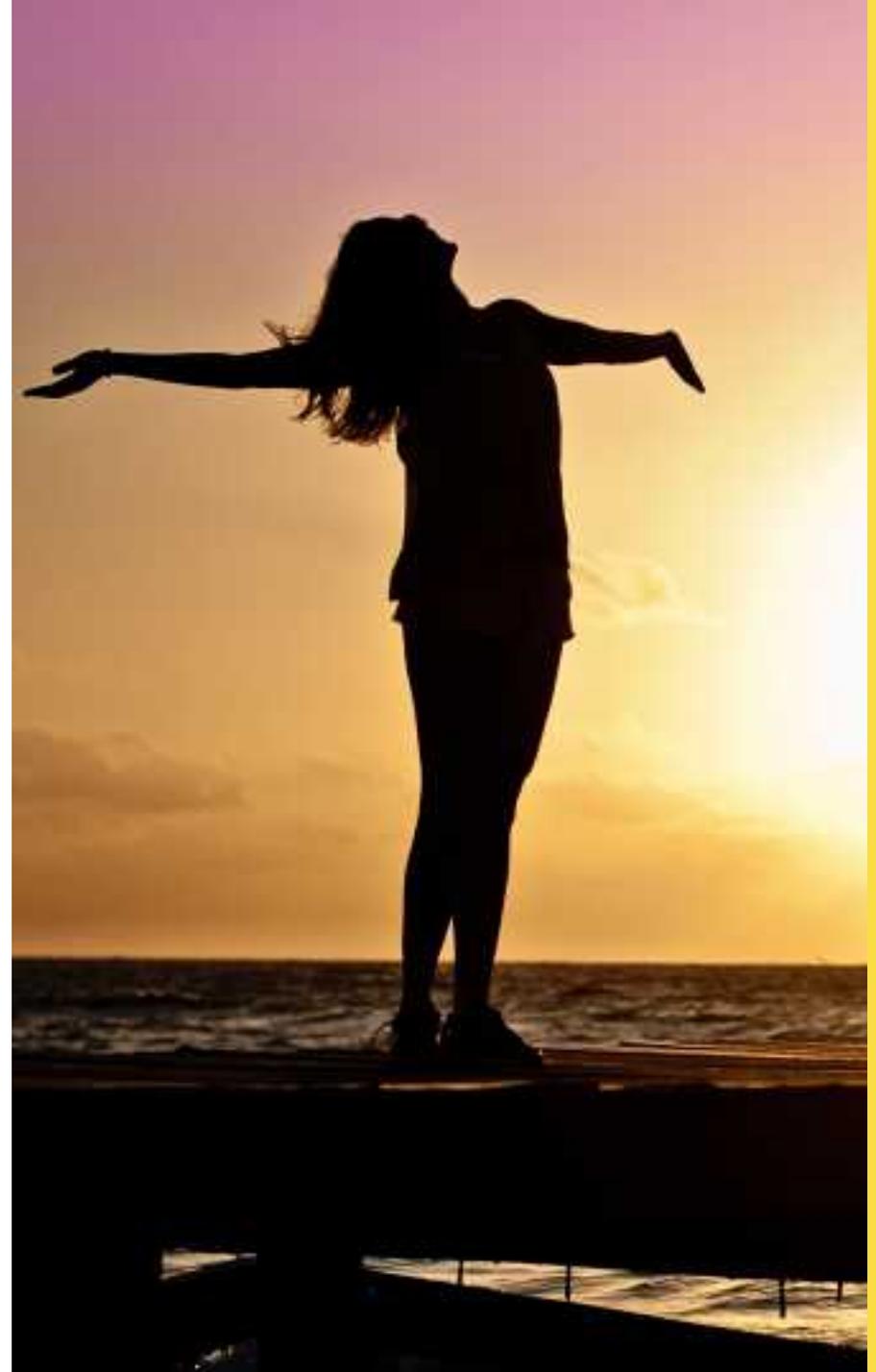


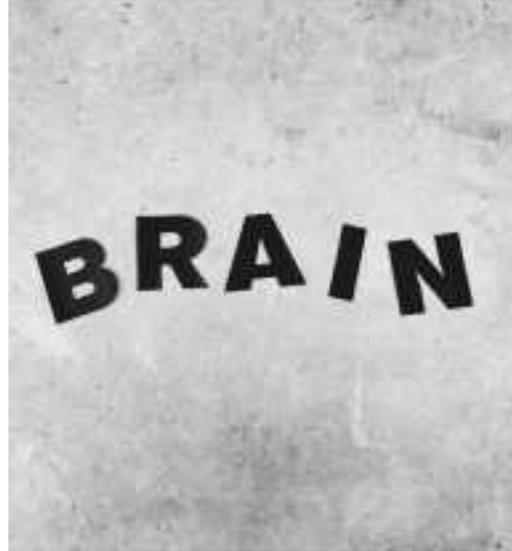
By giving your body an occasional break from calorie consumption, you can also help improve blood sugar levels and enhance the **insulin sensitivity of your cells.**

About The Emotions

Emotions are central to our entire experience of life. Whether or not we're happy or sad or depressed or angry is our life experience. With all the importance we've placed on emotions, very few people actually understand how emotions arise in our brain and body.

Emotions really capture the brain body relationship. We cannot say that emotions arise just from what happens in our head. It also involves events, biological events and chemical events within our body.





Human And Nature
Are Forever Bound
Together

How the **Brain & Body** interact To Create Emotions

Food and nutrition

Ingesting certain nutrients, both macro nutrients like proteins, fats, and carbohydrates, as well as micronutrients (vitamins & minerals) can impact the chemicals in our brain that give rise to the feelings of being happy, sad, alert or sleepy.

When we see and experience things that we don't like sometimes it's a mild aversion. We just kind of lean back or look away. Other times it's an intensive version of disgust and we tend to cringe our face.

How the Brain & Body Interact To Create Emotions

This has roots in ancient biological mechanisms that are to prevent us from ingesting things that are bad for us, chemical compounds and tastes that might be poisonous.

A big part of the foundation of any discussion about emotion has to center around this kind of push pull of attraction to things or aversion from things.

We have this “push pull” where the circuits that allow you to emphasize action and then no go circuits, the circuits and the basal ganglia that allow you to de-emphasize action and prevent action.





How the **Brain & Body** **Interact** To Create Emotions

Aversion and attraction are a push pull too. Delight or happiness or excitement are attractions to certain things and ideas, songs, people, places, foods. Aversion is a leaning out. It's a disgust, it's an avoidance. And so we can break down the discussion about emotions into these simpler versions of themselves, but at the core of that attraction or aversion is an important theme that you might realize already.

Understanding Attraction To Food

Most people tend to overlook that there's an action there, where you're either moving forward or you're moving away from something.



Motor Behaviors.

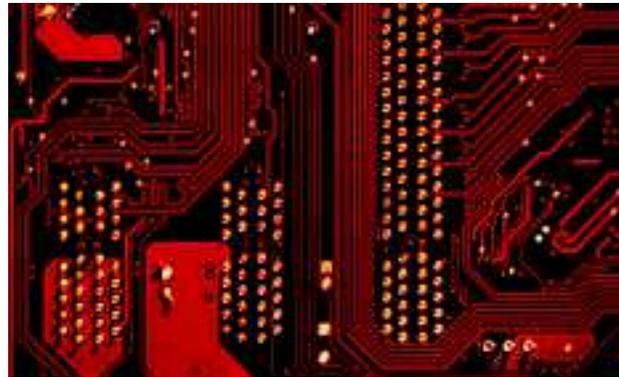
Action in the nervous system: The contraction of muscles to move you toward or away from things. And any time you're talking about nerve to muscle and action, you're talking about the brain and the body, because the brain can't move itself, the brain has a body so that the organism can move.

And the body has a brain so that the organism, you, can move toward or away from things that you deem to be good or bad for you.

Be Smart And Eat Smart

The Brain & Body

You can move toward or away from things that you deem to be good or bad for you. Now, some of these things that we're attracted to and some of them that we avoid are what we call innate or hardwired.



⇒ Innate/Hardwired

For example, when we taste very bitter compounds we tend to avoid those because they're associated with poisons. When we taste things that are sweet or that are savory we tend to pursue more of those.

We tend to lean toward those so to speak and we tend to not avoid them. So there are circuits in the brain for aversion and for attraction toward things. And the body is governing a lot of that.



The Importance Of The **Vagus Nerve**

The vagus is the way in which you can govern the brain body connection.

So what is the vagus nerve? Vagus is the 10th cranial nerve which basically means that the neurons, the control center of each of those neurons in the vagus lives just kind of near the neck, and a branch of the vagus goes into the brain.

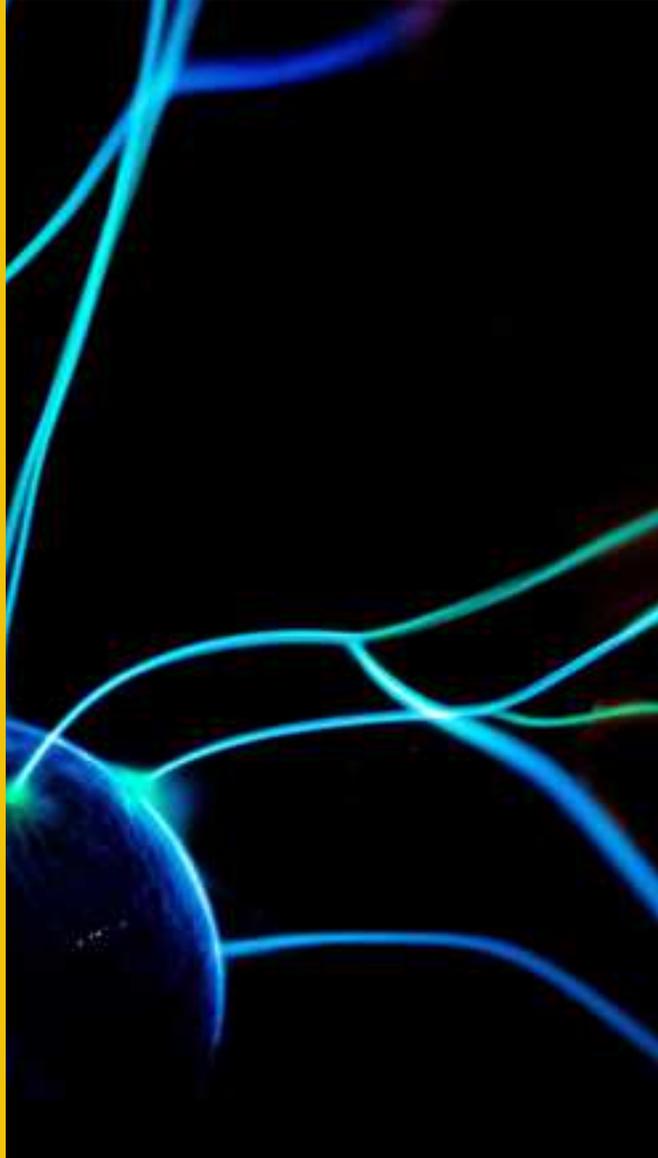
They send a little wire into the brain. The other branch goes into the periphery but not just the gut. It goes into the stomach, the intestines, the heart, the lungs, and the immune system. So this vagus nerve is incredible - because it's taking information from the body and it has two directions.

The Importance Of The **Vagus Nerve**

The first is what we call sensory.

It's sensing things that are happening in the gut, in the lungs, everything. For example, when our lungs are distended, the vagus nerve senses that and sends that information up into the brain. It also consents things in the gut like how distended or empty your stomach happens to be, it can sense heart rate.

It can sense your immune system, whether or not you have bacteria or things invading you in your body. So it sends that information up to the brain. So it's a two-way street and sensory information is going up to the brain.



The Importance Of The **Vagus Nerve**

The vagus is not just for sensing things. It's actually for *controlling things*.

It's got a sensory pathway and a motor pathway. The vagus is the way in which you can govern the brain-body connection, and in which you can steer various aspects of your mood and wellbeing, but most people just don't understand how to use it. First, you got to understand what it is.

You've got sensory information coming from all these different organs of the body up to the brain. You've got motor information going from the brain back to the body. And so you've got this super highway within you.

First of all, you have sensory information the same way that you detect light with your eyes or you hear sounds with your ears, you have sensors in your gut that sense how full or empty your gut is.



The Importance Of The **Vagus Nerve**

It can also sense how acidic your gut is. It can sense various things within your gut. Your heart is doing the same. It's informing the brain how fast your heart is beating, how full your lungs are has been communicated and then the status of your immune system.

The eyes are looking at colors, they're looking at motion, they're looking how bright it is. And each one of those features is telling the brain something different, so the brain can decide when to be awake or asleep, whether or not it's looking at somebody's attractive or unattractive.

The vagus nerve is also analyzing many features within the body and informing the brain of how to feel about that and what to do.



Neurons send information up the
vagus to your brain then you
release dopamine.



How The Vagus Relates to Sugar

Sweet things generally tastes good and most people find sweet foods to be attractive.

They might or they might not be able to regulate their behavior around them, but they want them. And what's really interesting is that for hundreds of years people have thought that that's because of the way that sweet foods taste.

Well, it turns out that when you eat something sweet within your stomach, you have cells, neurons, that sense the presence of sugary foods independent of their taste and signal to the brain.

Those sensors, those neurons send information up the vagus to your brain then it goes through a series of stations and then you release dopamine.



Neurons send information up the
vagus to your brain then you
release dopamine.



How The Vagus Relates to Sugar

This molecule that makes you want more of whatever it is that you just ingested.

In fact, this pathway is so powerful that they've done experiments where they completely numb all the taste and feeling in somebody's mouth, they're blindfolded. They don't know what they're eating and they're eating a food. That's either sugary or not sugary. What they find is that even though people can't taste the sugary food they crave more of the food that contains sugar because of the sensors in the gut that sense sugar.

By laying the foundation for new ways to modify this gut-brain circuit, this research offers promising new paths to reducing sugar overconsumption.

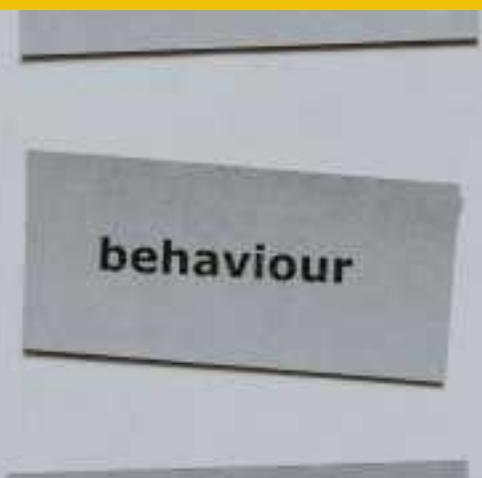


A gut-to-brain axis mediated by the vagus nerve may drive sugar cravings.

To put this differently, you actually have sensors within your body that make you crave sugar independent of the sweet taste of those things. What it does and what it tells us is that we have circuits in our body that are driving us towards certain behaviors and making us feel good even though we can't perceive them.

For those of you that are really interested in gut intuition, this is a gut feeling, except this is a chemical gut feeling. This is a particular set of neurons detecting that something in your body has a particular feature, in this case the presence of sugars, and sending information to the brain essentially to control your behavior. Remarkable!

What it means is that what we call attractive isn't always coming from our thoughts or our feelings, or even our perception. We are drawn to particular foods and we're drawn perhaps also to particular people, places and other things because of information that's coming from our body.



Stop Sugar **Live Better**

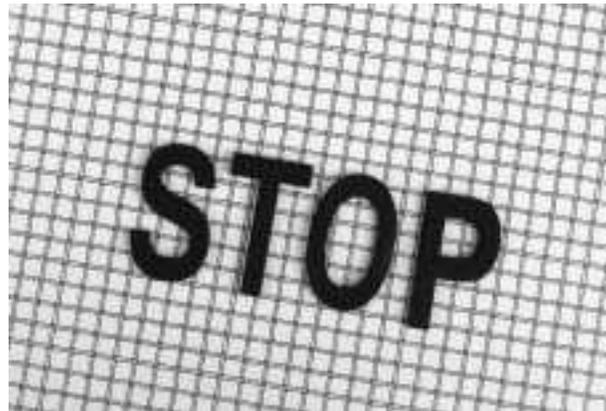
The Sugar

Many people are thoughtful or concerned about sugars these days thinking we all ingest too much sugar. There's sugar snuck into all the things we eat. And indeed, that's true. This should completely reframe the way that we think about the sort of so-called hidden sugars in foods.



Hidden Sugars

What this means is that even if a food is very savory, a slice of pizza or a piece of bread or a salad dressing, if there's sugar snuck into that and you can't taste it, you will still crave more of that thing without knowing that you crave it because it has sugar.



You might find yourself wanting certain foods and not knowing why you want those foods.

Intermittent **Fasting**



By giving your body an occasional break from calorie consumption, you can also help improve blood sugar levels and enhance the **insulin sensitivity of your cells.**



Why Do We Eat Certain Things?

Serotonin

all of your moods and feelings of wellbeing are anchored on this continuum of alertness versus calmness. And we hear so often about rest and digest. You know that, after we eat, we feel really nice and full, hopefully comfortably full and not too full. And we're relaxing. And we feel satiated, it's associated with serotonin, this molecule of satiation.



Areas In The Brain

Area of the Hypothalamus

The lateral hypothalamus is really interesting because it controls feeding, but it inhibits feeding. It stops us from feeding.

Area of the Locus Coeruleus

The locus coeruleus sits back further in the brains and it releases norepinephrine which is essentially adrenaline. It makes us feel alert. Let's say we walk into a restaurant, we sit down or we're preparing a meal. It's creating a kind of alertness. This has ancient utility, but it's creating this alertness. And for many people, they experience that as they approach food as stress and anxiety.

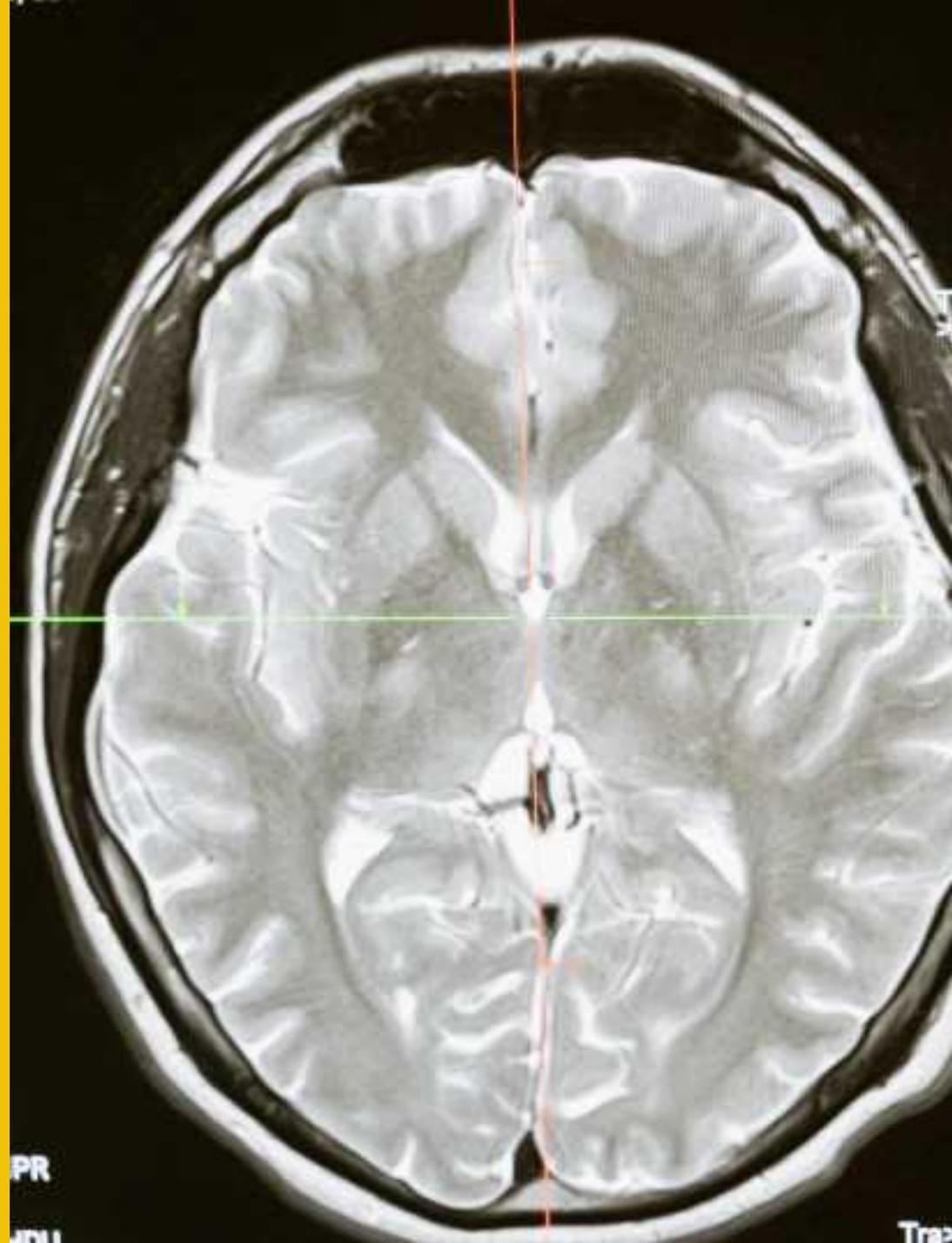


Areas In The Brain

Area of the Hypothalamus

As we approach food locus coeruleus is releasing all these molecules that make us feel more anxious and alert, sometimes it's felt as excitement. And that has probably to do with how we feel about food generally, are we happy with our relationship with food? Are we trying to restrict our relationship to food, are people coming over for dinner, all that will play in of course, but there's a certain stress and anxiety upon approach to food. And as we approach food and we feel that anxiety locus coeruleus activates the lateral hypothalamus in a way that inhibits feeding that makes us not want to eat.

Stop Sugar Cravings



The Mechanisms For Satiation

Is there sugar? Are there fats? Are there contaminants? There are a lot of information. These so-called parallel pathways that are going up into our brain that regulate whether or not we want to eat more of something or not.

As we eat, the mechanisms for calming and satiation are supposed to kick in and those mechanisms involve two things:

Taste & accelerators.



The Mechanisms For Satiety

One is how things taste, digestion starts in the mouth. Of course, we taste our food. Everyone tells us we should chew our food more. Yes, that can improve digestion. We're not supposed to drink too many fluids as we eat. That's true too, but a lot of how we feel while we eat and after we eat is because of this vagus sensing of what's in our gut. It's sending information all the time.

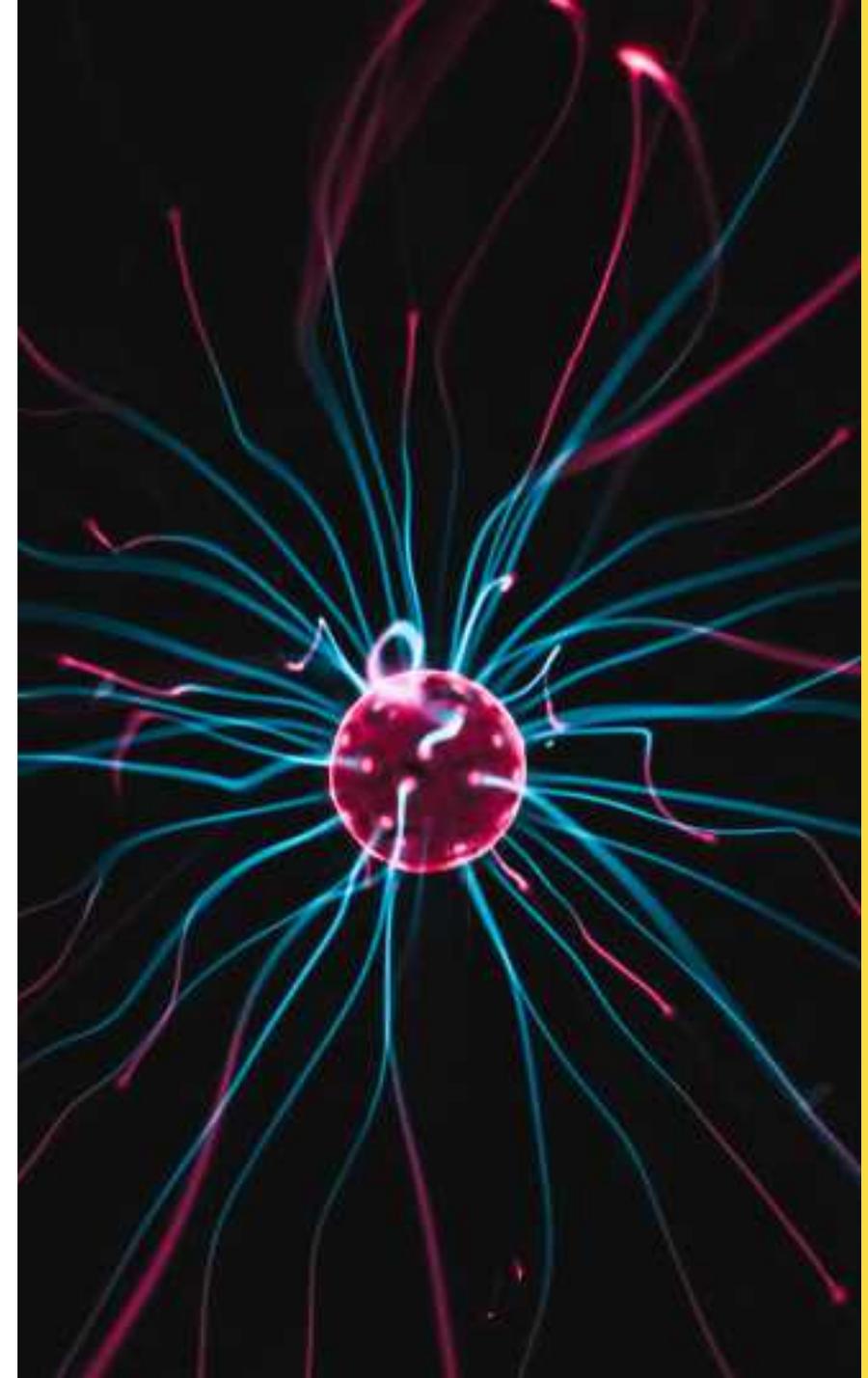
Then there are accelerators, things that make us want to eat more, like sugar and fats but also amino acids. This is very important.

There are a lot of data, but much of what comes from the data on what people eat and how much they eat is from a subconscious detection of how many amino acids and what the array, meaning the constellation of amino acids is in a given food.

The Mechanisms For Satiation

It's fair to say that the sum total of these studies pointing in a direction where people will basically eat, not until their stomach is full but until the brain perceives that they have adequate intake of amino acids.

Amino acids of course are important because they are the building blocks of muscle, and the other things in our body that need repair. What most people don't realize is that amino acids are what the neurochemicals in the brain are made from.





GET RID OF SUGAR CRAVINGS

Stop Your Sugar Cravings

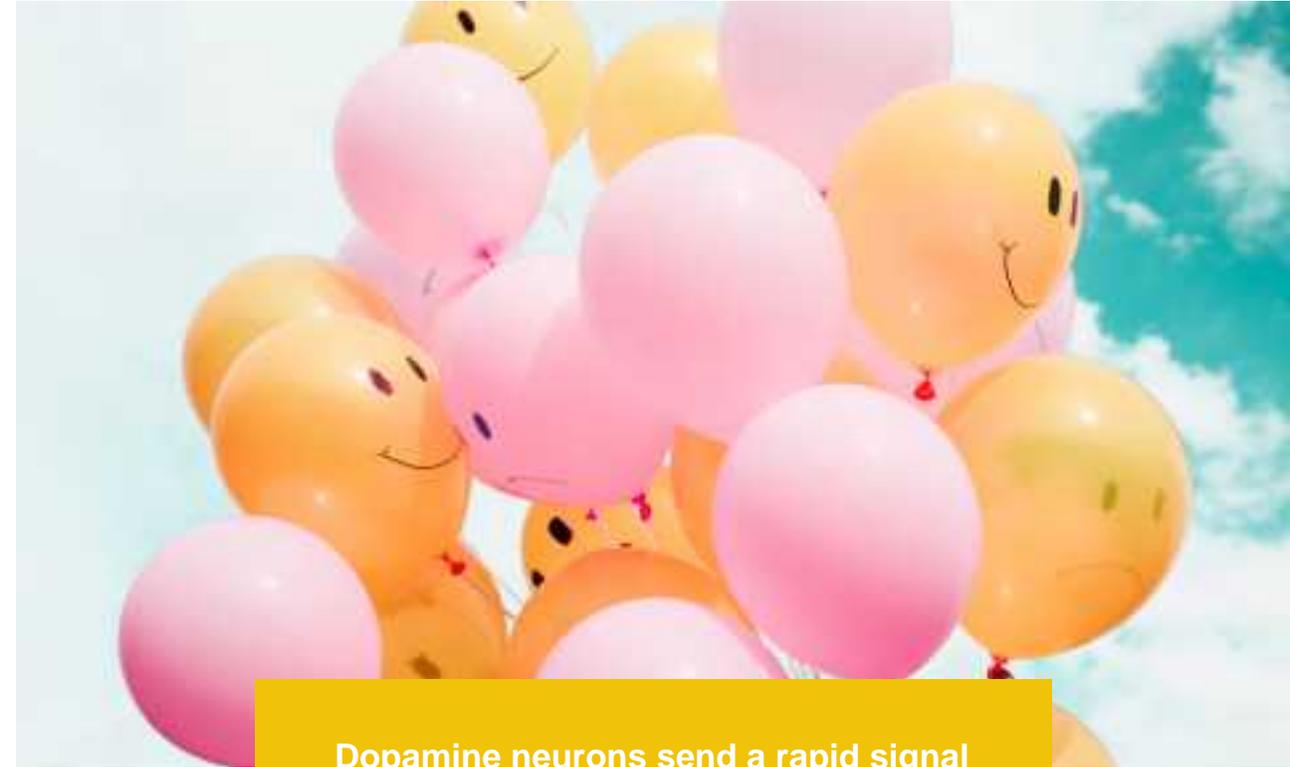
Eat Right For A Balanced Life

Healthy Food

The Dopamine

We've heard dopamine is this molecule that makes you feel good. It's released within the brain. And it does feel very good when you have dopamine release caused by surprise, excitement, events that you're looking forward to and they turn out well. It is inhibited by events you're looking forward to that don't work out when someone says they're going to call that you're really really excited to talk to, and then they don't, or you thought a movie was gonna be really great and it's not, or you expect a meal to be really delicious and it's kind of, eh, and actually there's a name for that. It's called **reward prediction error**.

You can actually use this in the context of meals and plans in a way that's very useful with yourself and people you know, essentially if you expect something to be really terrific it really does place a higher expectation at the chemical level.



Dopamine neurons send a rapid signal that covers possible errors in predicting a reward.

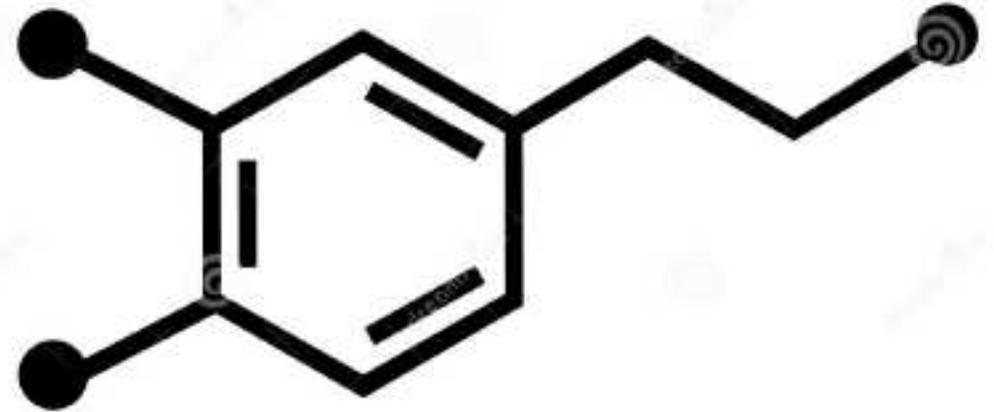
The Dopamine

So if you don't get as much dopamine as you're expecting from something, that's because of this reward prediction error, your expectation of something releases dopamine and the actual event releases dopamine.

And if the event related dopamine does not exceed the expectation or at least match it, there's a much higher tendency that you won't pursue that thing again.

Dopamine is really powerful and it's not just the molecule of reward. It is the molecule of desire. It's the molecule of wanting not just the molecule of having.

Dopamine is what's going to lead us to want to eat more of something or to not want more of something, because dopamine really is about craving. It's about motivation and it's about desire.



dopamine

**“Do you want to eat more
or no? Because dopamine
really is about craving.”**

The Dopamine

Dopamine is synthesized from the amino acids that you eat. However, the dopamine neurons that give rise to these feelings of good or wanting more or desire and motivation, those reside in the brain.

So we don't want to get too confused. We want to respect and honor the power of the gut and this vagal pathway, but it's really neurons within your brain that drive the pursuit and decision-making, so what does this mean? Well, some people make too little dopamine. Some people make so little dopamine that they need prescription dopamine.

We have a brain body connection. There are many of them, but one of the main ones is the vagus nerve. The vagus collects information about a lot of things, breathing, heart rate stuff that's happening in the gut, et cetera, and gut by the way, includes the stomach and the intestines, sends that information up to the brain. The brain is using that information to decide one of two things, move toward something or move away. It can also pause, but essentially pausing is not moving toward.



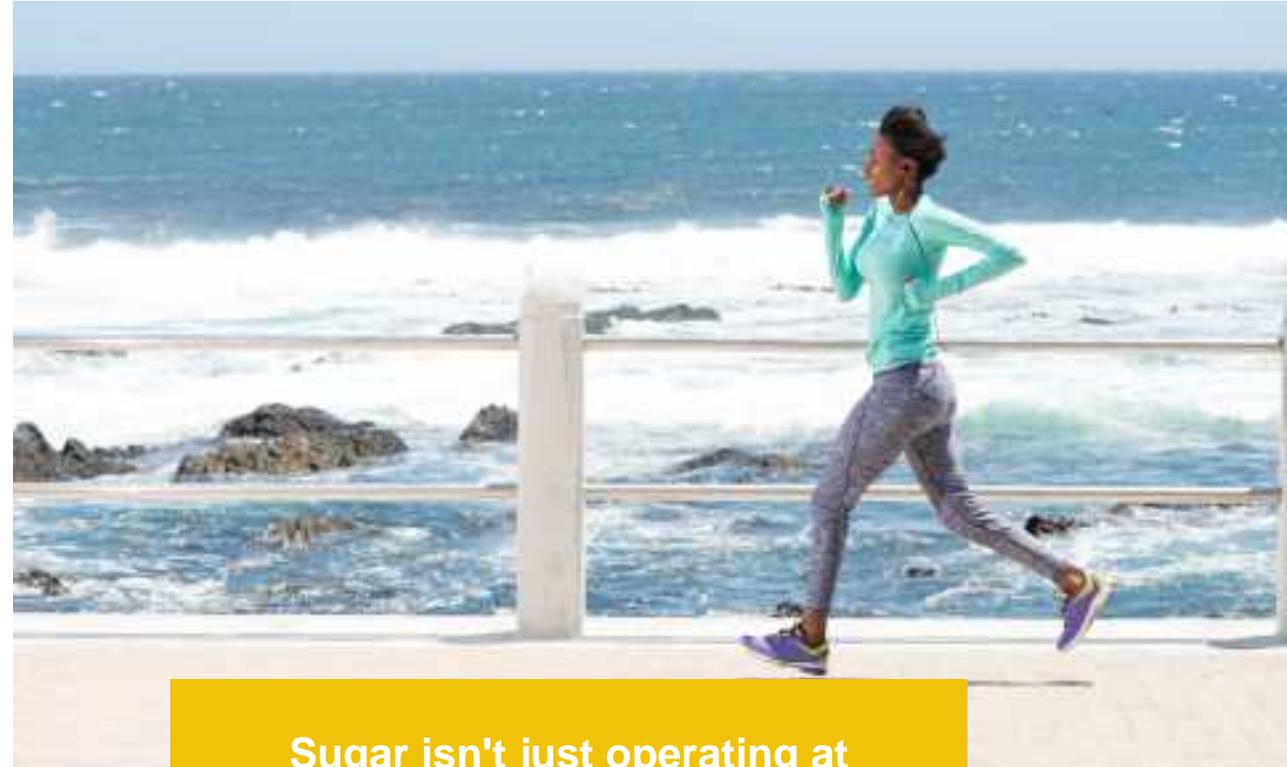
**Dopamine neurons that
give rise to these feelings
of good or wanting more.**

The Dopamine

So that's the dopamine pathway and foods rich in L-tyrosine generally give us an elevated mood and make us want to do more of whatever it is that we happen to be doing as well as other things, motivation, generalizes to other things, it's not unique to just ingesting foods but foods that give us a big pulse of dopamine will make us crave more of that food.

It will make us crave more of the activity that led to the ingestion of that food. And as we mentioned earlier, a lot of that is happening at a subconscious level that you're not even aware of. And this is why the concern about hidden sugars and over ingestion of sugars is serious because it's not just that the sugars are impacting our blood glucose in negative ways. Although often it is, it's not just the obesity crisis that's happening. It's also the fact that it's disrupting our dopamine systems.

Now that doesn't mean all sugar is bad. Some people have a healthy relationship to sugar but most people are just not aware that sugar isn't just operating at the level of taste it's operating at the level of neurochemicals and it's doing it subconsciously.



Sugar isn't just operating at the level of taste it's operating at the level of neurochemicals.

Food Choices & Serotonin



Serotonin is more about feeling really comfy where we are. Some people feel they're too anxious or they're always in a unmotivated state and they're trying to adjust their serotonin. Many people adjust their serotonin by just eating more food and carbohydrate rich foods will increase serotonin.

We recommend Intermittent Fasting and exercise in the early part of the day then having a relatively high protein and moderate fat, zero carb or low carb meal to stay alert because those foods tend to favor dopamine production, acetylcholine production, epinephrin production and alertness.

Food Choices & Serotonin

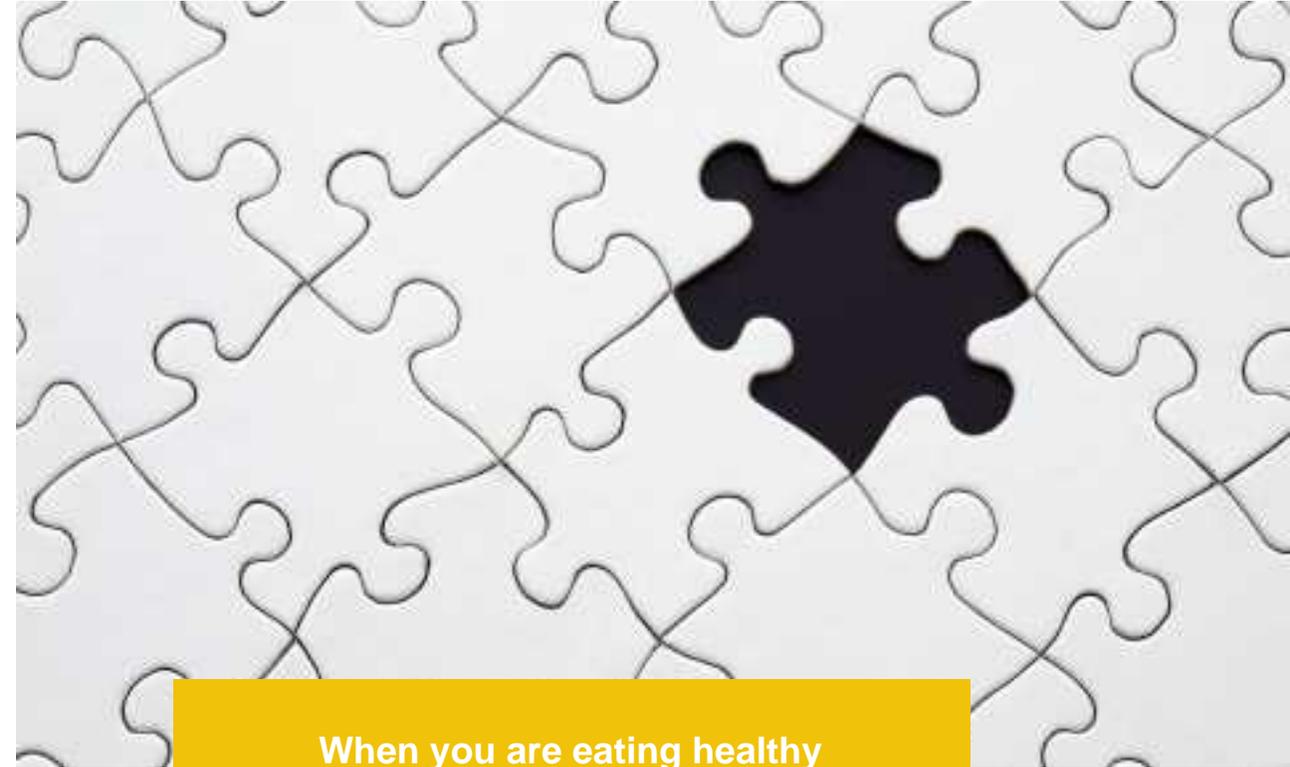
Some people are interested in taking serotonin to get some of the more blissed out effects. You can achieve that with foods that are carbohydrate rich.

By now you understand the relationship between foods and dopamine, foods and serotonin and that they're both being communicated to the brain via the vagus, right?



The Solution

Cravings have to do with our consumption of these highly processed, "fast-acting" carbs, which are not fundamentally different from sugar, in the biological sense. White bread or any other processed carbohydrate will melt into glucose very quickly -- and so like sugar, it raises blood sugar at a faster rate than slower-digesting carbs that are less processed and higher in fiber. The problem is, that rapid spike in blood sugar is eventually followed by a crash. What's the solution?



**When you are eating healthy
fats and protein, you don't miss
the processed carbs at all!**



Processed carbs are Problem Carbs

Highly processed carbs -- white bread, sugary cereal, white rice, regular pasta and bagels, for example -- produce rapid rises and drops in blood sugar, which can lead to weight gain.

The tricky part is that the more processed, refined carbs we eat, the more we crave. And so it seems almost impossible to get off the carb-craving hamster wheel.

To stop your sugar craving cutting back on highly processed fast-acting carbs is a must. Eating more healthy fats (1) can help reduce cravings for unhealthy carbohydrates.

The Solution

To stop your sugar craving cutting back on highly processed fast-acting carbs is a must.

Cut out all starchy carbs for one week. This includes all pasta, bread, rice, bagels and potatoes, as well as pizza, crackers, pretzels, chips, cookies and cake. Slash the sugary carbs too, including candy and sugar-sweetened beverages. These sugary carbs rapidly flood the bloodstream, providing lots of sugar without any added nutrition.

By cutting starchy carbs and replacing them with foods that have a more modest impact on blood sugar, you can achieve more steady blood sugar control and better manage your cravings.



**Healthy fats help curb
cravings for unhealthy carbs.**

Foods to Stop Cravings

Healthy Fats

Keep you satiated

You should eat lots of low carb vegetables, nuts, seeds, fruit, whole foods and we need a lot of good fats (there are a few outliers who still are holding on to low-fat dogma but the train has left the station on that one.)

Healthy

Healthy Food Healthy Life

Avocados, olive oil, low starch and low sugar plant-rich foods and stay away from processed foods, nobody thinks we should be eating a lot of starch and sugar. Eat animal protein sustainably raised or harvested or grass-fed protein, we should eat fish (no mercury and toxins) if it's farm-raised it should be sustainable.



Omega-3s

Keep in mind also that sugar cravings can signal that you aren't feeding your body properly in other ways.

Lack of sleep, stress, dehydration, caffeine crashes and plain hunger go hand in hand with sugar cravings.

Research has shown that a deficiency in alpha-linolenic acid (those handy little omega-3s) can dull a person's perception of sweetness, encouraging him/her to crave more sugar to satisfy the natural taste. You gotta love those ALAs!



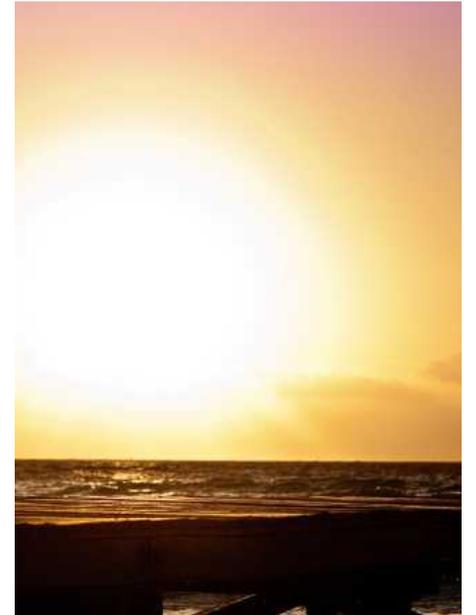
Omega-3s

Omega-3 dietary supplements available: Fish oil, krill oil, cod liver oil, and algal oil (a vegetarian source that comes from algae).

Fight Inflammation: omega-3 fatty acids can reduce the production of molecules and substances linked to inflammation, such as inflammatory eicosanoids and cytokines.

Reduce Fat in Your Liver: supplementing with omega-3 fatty acids effectively reduces liver fat and inflammation in people with Non-alcoholic fatty liver(4) disease (NAFLD).

Foods With Fatty Acids: Salmon, herring, sardines, and other fatty fish, flaxseed Oil, extra-virgin olive oil, chia seeds, walnuts, avocados etc.



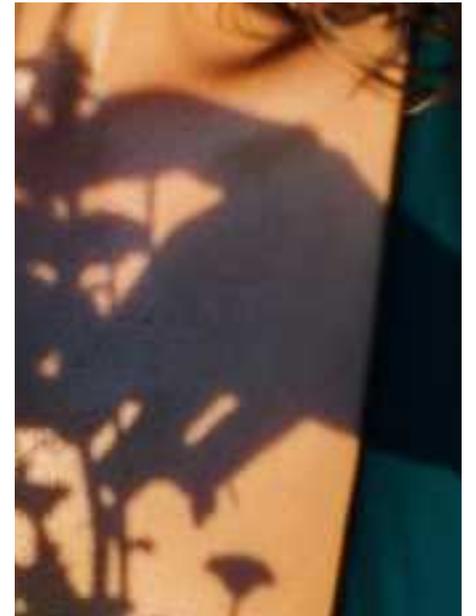
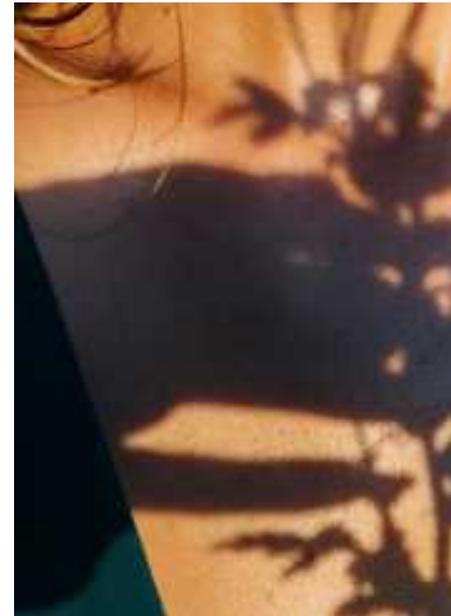
Omega-3s & Omega-6s

The omega-3s and omega-6s are especially important. They are known as essential fatty acids because the body cannot manufacture them. They must be consumed in food. The benefits of fatty acids are:

Heart Health: Healthier fats reduce your cholesterol levels and cut your risk of heart attack and stroke.

Skin Health: Omega-3s and omega-6s are both necessary for skin health. They keep skin elastic and reduce the effect of UV rays on the skin (safeguarding against sun damage).

Fight Autoimmune Diseases: Omega-3 fatty acids can help fight several autoimmune diseases, including type 1 diabetes, rheumatoid arthritis, ulcerative colitis, Crohn's disease and psoriasis.



Intermittent **Fasting**



Intermittent fasting works to break your body's dependence on sugar, and it retrains your body to burn fat. When you are in the fasting period your body has to use up its stores of glucose (sugar). When glucose runs low, your body will burn fat for energy. Intermittent Fasting is One of the Best Ways to Eliminate Sugar Cravings



Cravings & The Role of Intermittent Fasting

Intermittent fasting is a tool we can use to help with our sugar cravings. Leptin, the body's satiety hormone, primarily controls your appetite and how much of your food's energy is stored as fat. Leptin works by a negative feedback loop. So basically, MORE LEPTIN, DECREASED APPETITE.

Leptin has also shown to be a suppressor of sweet taste perception. So as you have more leptin levels, you have a decreased sweet taste perception. This negative feedback loop is enhanced with intermittent fasting.



Fasting & Fat Burning Mode

One of the most effective ways to eliminate sugar cravings and shed unwanted weight is intermittent fasting, as this will help reset your body to burning fat instead of sugar as its primary fuel.

When sugar is not needed for your primary fuel and when your sugar stores run low, your body will crave it less.

Intermittent Fasting & Hormones



When you fast, your LEPTIN levels rise and GHRELIN (your hunger hormone) is lowered. As more and more leptin is secreted in the body, it will signal your taste receptors to crave less and less super sweet food!

Reestablishing your body's response to normal levels of leptin may be a two in one approach to weight loss and reducing sugar consumption and cravings.

Ketogenic Diet & Sugar Cravings

One reason you might crave sugar is simply that you've trained your body to rely on sugar for energy—you're carb-dependent.

Perhaps it's not the sugar you crave specifically, so much as the energy it provides. In that case, you should notice your desire for sugar is significantly reduced as soon as your body starts to produce ketones. Moreover, it gets easier and easier to avoid sugary treats as you become more keto-adapted.

The complicating factor here is that sugar is not just pleasant or fun to eat, it's also *physiologically* rewarding. Sugar activates neurological reward pathways as we explained (3), creating a physiological drive for more sugar.





Ketogenic Diet & Sugar Cravings

It takes two to three days of very-low-carb eating for the liver to start pumping out ketones, and research shows(2) that cravings are significantly reduced almost immediately as people get into ketosis. The “expert” consensus seems to be that cravings will decrease noticeably within three to ten days.



Ketogenic Diet & Sugar Cravings

Sugar cravings can also be conditioned (learned) responses. Decades of experience have taught you that eating sugary treats is comforting and enjoyable. You've come to have a strong positive association with sugar.

In some ways, you might think of eating sugar as a very entrenched, reinforced habit you need to break. Habits can be broken, but it takes weeks or months, not days.

Not About **The Food**

In addition to plenty of rest, hydration and solid nutrition, exercise is absolutely essential in combating serious and chronic cravings. As mentioned above, sugar raises serotonin levels, and that boost can easily figure into cravings. But guess what?

Exercise raises serotonin as well. If you can, plan your workouts around the time of day when cravings tend to hit. If the cravings descend in the middle of the afternoon (as is common for many people) find an excuse to step away and run up a few flight of stairs.



**Using Exercise to Fight and
Conquer Food Cravings.**

Not About **The Food**

Studies have also demonstrated that after intense workouts, your body can have lower levels of the hormone ghrelin, which stimulates appetite (6). It also increases blood glucose and lactate, both of which can make you want food when they are low. So, working out works for you in many ways when it comes to curbing those cravings.

There are all sorts of different types of exercise routines you can do to avoid bad foods. The following are just a few intense ways to kill those calories: Cycling, Pilates, Boxing, Burpees, Running.



**Using Exercise to Fight and
Conquer Food Cravings.**

Not About **The Food**

If you want to get rid of sugar cravings, you need to practice good self-care. Dig deep and look at what really underlies these sugar cravings. We suggest you start journaling about your cravings. Each time a sugar craving hits, make a note of the following:

- How you're feeling (bored, anxious, nervous, angry, etc.)
- Time of day
- Hunger: what time you last ate, and what you ate
- Where you are
- Who's around
- Any other clues to possible triggers.



If you're using sugar to self-soothe, you also need to develop better coping mechanisms.

Not About **The Food**

Reflect on and identify the excuse. Be honest with yourself and dig deep! Ask yourself:

- Why do I want to eat this?
- How am I feeling? Is something bothering me or is there something I need to do or face that I'm avoiding? What's triggering my desire to eat? Are there emotions behind my craving?
- Am I truly hungry? Think about the cues of emotional eating versus physical hunger. The more aware you are of your hunger cues, the more in tune you become with what your body is telling you.



Not About **The Food**

If you're bored, anxious or stressed:

- Chew some minty gum. (This may sound silly, but it can have a similar effect on your psyche as eating and can alleviate stress.)
- Pamper yourself! Treat yourself to some hot tea, a face mask, a manicure or meditation to let some feel-good vibes flow.
- If you're bored, do something to keep your mind busy, such as a project, hobby or even cleaning!



Not About **The Food**

If you're sad or lonely:

- Call someone who uplifts you.
- Read a few pages of an uplifting or funny book.
- Write an encouraging card to someone special. It's not just a saying, gratitude truly does encourage a positive attitude.
- Journal about it.

If you're tired:

- Brush your teeth. (Again, this may sound silly, but it may just do the trick.)
- Get up, take a walk, work out, just get moving! Fitness releases feel-good endorphins.
- Listen to some of your favorite feel-good music.

Not About The Food

If you struggle at work:

- Avoid trigger areas as much as possible, such as vending machines, the break room or cafeteria.
- Keep a healthy alternative around that you can eat instead.
- Finally, if you still struggle with control, get rid of your favorite comfort foods.



The Action Steps



- Familiarize yourself with and follow the steps listed above any time a craving comes on.
- Create a list of healthy alternatives that you can try next time you have a craving. Consider different environments and emotions.
- Contemplate removing your go-to comfort foods from the house while you're working on your emotional eating.
- Track your patterns over the next 2 weeks and evaluate your progress after reading this.
- Remind yourself that it's okay to eat out of emotion occasionally, but not in excess or on a consistent basis.



Thanks

See You Next Time



Stop Sugar Cravings

References

- (1) <https://www.hsph.harvard.edu/news/topic/fats/>
- (2) <https://www.mdpi.com/2072-6643/10/10/1348/htm>
- (3) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5003688/>
- (4) <https://www.healthline.com/nutrition/fatty-liver>
- (5) <https://www.nature.com/articles/ijo200898>
- (6) <https://www.ncbi.nlm.nih.gov/pubmed/23835594>

