THE SCIENCE-BASED NUTRITION PROGRAM FOR OPTIMAL HEALTH AND BODY COMPOSITION

NO FAD DIETS, ONLY SCIENCE

FINAL THESIS

Botanical Medicine

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Introduction

Obesity has become a global crisis. According to the World Health Organization (WHO) obesity rates has tripled since 1975. In 2016, over 1.9 billion adults were overweight, and over 650 million were obese. Being overweight not only leads to a lower quality in life, it's also associated with illnesses such as cancer, diabetes, heart disease, strokes, and poor mental health. In fact, studies have shown obesity has been reported to kill more people than smoking.

The rise in obesity is caused by many factors. However, the WHO reports two main causes of obesity in modern society:

- An increased consumption of high-fat and high-sugar food
- The lack of physical activity due to the sedentary nature of works, the advancement of easy transportation, and the increased of urbanization

Thankfully, people are starting to notice these health issues and have started to take action. Most people want to lose weight, get healthier, feel better, and generally get control of their appetites and lower their risk for chronic disease. That's why scientists and research institutions have spent countless hours and billions of dollars researching and publishing studies to answer one simple question: What is the best diet for humans? What is the real answer to the question about the best diet?

Maybe science would have uncovered an irrefutable answer by now, were it not for one increasingly unavoidable reality that science is only beginning to uncover: There is no answer to the question of the perfect diet because it is the wrong question.

The real question is what is the best diet for every different individual.

By understanding how *your body* responds to food, you will finally understand how to calibrate your diet for more energy, better health, lower disease risk, and weight loss that finally becomes easier than you ever thought it could be.

Most people that want to lose weight think about doing exercise, and while exercise helps with weight loss and is definitely recommended, having a balanced diet is actually more important. It

is proven that when comparing diet and exercise, changing your diet tends to be more effective for weight loss than exercise while diet and nutrition combines being the most effective.[1]

1: Fat Loss vs Weight Loss: What is the Difference?

You do not actually need to lose weight to be healthy, unless you have an excess of body fat. Your weight is made up of different organs and tissues in your body, such as your bone structure, muscle mass, organs, and so on. To be and stay healthy, what you want to focus on having under control your body fat tissue.

Losing weight can be easily done on one week, which is what most fad "lose weight kick in 1 week" diets do. Let me explain how: By just not eating carbs you will be able to lose a few kilograms in a week. This is because carbs absorb water. For each gram of carb, your body retains about 4 grams of water to help store glycogen in the muscles.

Another example of losing weight (but not fat) could be caused by a loss in muscle mass. This can be a problem because *muscle is a metabolic active tissue* - meaning it continues to burn calories even at rest. (This doesn't mean you have to become a bodybuilder to achieve this effect, but it implies that strength training should be included as a part of your physical activity.)

So, you see, both of these weight loss examples above don't actually mean you are losing fat. For people who are obese or overweight, know that your problem is fat.

[1] Impact of long-term lifestyle programs on weight loss and cardiovascular risk factors in overweight/obese participants: a systematic review and network meta-analysis: https://pubmed.ncbi.nlm.nih.gov/25358395/

2: Diets vs Healthy Lifestyle

Every living being in the world has a diet. As carnivores, a lion's diet will consist of solely meat. That is their diet. For cows and sheep, they are herbivores, so naturally, their diets consist of solely greens. Bears are omnivores, meaning they eat both meat and greens. These diets are based on their physical needs.

But in the modern human world, "going on a diet" often means putting yourself through periods of starvation - and the truth is, this is not a sustainable way to live a healthy lifestyle.

But people continue to go on diets because they've been misinformed by health organizations that are pushing out initiatives fueled by lobbyists and politics. The best example of this is the idea that "breakfast is the most important meal of the day." Scientifically, it isn't - it's was just an initiative pushed out by cereal and bacon companies back in the 1930s.

There is scientific evidence that diets generally do not work. True, you might lose some weight going into a diet, but you have a chance of more than 95% to gain it all back. In fact, over 95% of people who on these diets will fail in the long term, and 80% will fail in the short term. No one in their right mind would go on a diet if they knew this statistic. When you go on these types of quick-and-easy diets, it's just like buying from an online shop where 95% of the reviews are negative.

Most weight-loss strategies will have a dramatic effect in the beginning. But after several months, the effect levels out. For example, drastically cutting food intake (such as with a very-low-calorie diet) often has the most dramatic initial effect. But in most cases, the weight comes back in less than 1 year. Scientifically, going on a diet is a predictor of weight gain. Studies have shown that if non-obese individuals go on diets, they are more likely to gain weight instead of losing weight.

Diets are bound to fail. And when it fails, we blame ourselves. We keep pushing ourselves thinking that we lack willpower, when the truth is, we actually lack the scientific knowledge to create a sustainable lifestyle for ourselves.

Know that there is no one-size-fits-all diet. Different people respond differently to different foods. Of course, there are certain foods that are just bad for everyone, foods that should be eaten in moderation, and foods that are healthy for everyone.

A randomized control trial published in the New England journal of medicine[2] , was confirmed that, despite differences in carbohydrate, fat and protein content, albeit relatively minor, weight loss was the same. Maximum weight loss occurred at six months, with gradual regain thereafter. A 2014 meta-analysis of dietary trials[3] reached much the same conclusion. Weight loss differences between individual diets were minimal. Sure, sometimes one diet comes off as slightly better than another. The difference is usually less than 2 pounds (about 1 kilogram) and often fades within a year.

[2] Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates: https://pubmed.ncbi.nlm.nih.gov/19246357/

[3] Comparison of weight loss among named diet programs in overweight and obese adults: a meta-analysis: https://pubmed.ncbi.nlm.nih.gov/25182101/

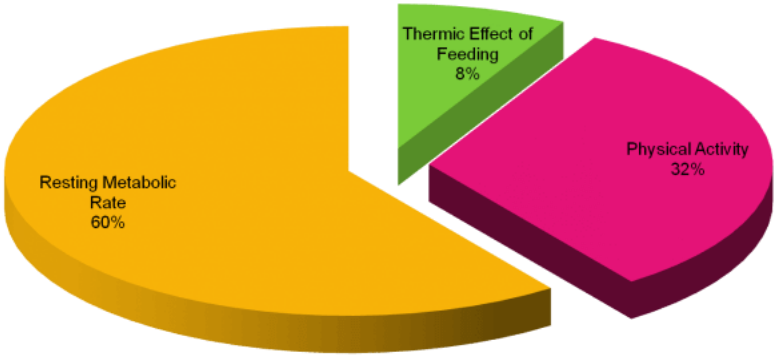
3: Metabolism

Another important biological element to understand before we move on to a more in-depth learning of nutrition, is metabolism. By first knowing the basic functions of our metabolism and why it's important, will provide a better understanding on how nutrition and hormones can affect it in later chapters.

Metabolism refers to all the chemical processes in your body. The faster your metabolism, the more calories your body needs. It's the reason some people can eat a lot without gaining weight, while others seem to need less to accumulate fat. The speed of your metabolism is commonly known as *metabolic rate*. It's the number of calories you burn in a given amount of time, also known as calorie expenditure.

Your metabolic rate can be divided into several categories:

- **Basal metabolic rate (BMR):** Your metabolic rate during sleep or deep rest. It is the minimum metabolic rate needed to keep your lungs breathing, heart pumping, brain ticking, and body warm.
- **Resting metabolic rate (RMR):** The minimum metabolic rate required to keep you alive and functioning while at rest. On average, it accounts for up to 50–75% of total calorie expenditure (1 Trusted Source).
- **Thermic effect of food (TEF):** The number of calories burned while your body is digesting and processing food. TEF usually represents about 10% of your total energy expenditure (2 Trusted Source).
- **Thermic effect of exercise (TEE):** The increase in calories burned during exercise.
- **Non-exercise activity thermogenesis (NEAT):** The number of calories required for activities other than exercise. This includes fidgeting, changing posture, standing, and walking around (3 Trusted Source).



How our bodies actually burn calories

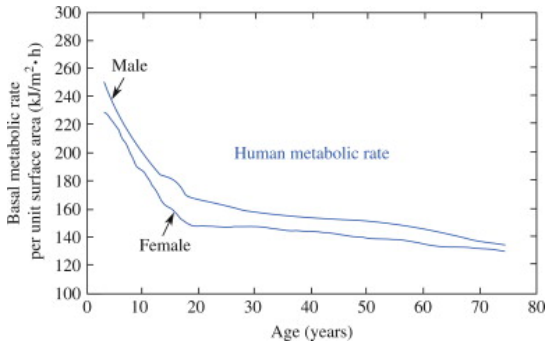
Metabolic Adaptation refers to the slow-down of our metabolism when we restrict our calories, and some studies have proven that metabolism can be slowed down for 6 years after severe weight loss and calorie restriction.[4]

Does losing weight slow down metabolism? Absolutely. Does metabolism decrease more than expected? It depends on how you set your expectations.

Metabolism and Aging

Inactive adults experience a 3% to 8% loss of muscle mass per decade, accompanied by resting metabolic rate reduction and fat accumulation. In numbers, and having a base of 2000kcal, it means that every decade our body burns somewhere from 60 to 160kcal less every day, mainly due to muscle loss. To overcome this, resistance training is advised, and it's proven to increase lean body mass, increase resting metabolic rate, and reduce fat weight.[5]

[4] Metabolic adaptations to weight loss: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6086582/
[5] Resistance training is medicine: effects of strength training on health: https://pubmed.ncbi.nlm.nih.gov/22777332/



Both male and female metabolism slows down with age

Benefits of resistance training may include:[6]

- improved physical performance
- movement control, walking speed
- functional independence
- cognitive abilities
- self-esteem
- prevention and management of type 2 diabetes
- improving insulin sensitivity
- enhance cardiovascular health
- reducing resting blood pressure
- decreasing low-density lipoprotein cholesterol and triglycerides, and increasing high-density lipoprotein cholesterol
- promote bone development, with studies showing 1% to 3% increase in bone mineral density effective for reducing low back pain
- easing discomfort associated with arthritis and fibromyalgia
- reverse specific aging factors in skeletal muscle

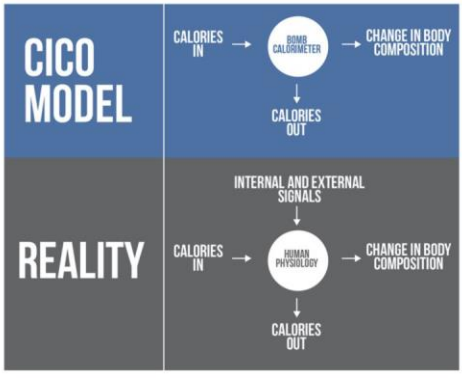
[6] Skeletal muscle metabolism is a major determinant of resting energy expenditure: https://pubmed.ncbi.nlm.nih.gov/2243122/

Calories In vs Calories Out Model (CICO)

Counting calories is common in many approaches to weight loss and operates on the idea that if you eat 100 calories and then burn 100 calories, you will "come out even" and not gain weight. However, the objective assessment of calories in a serving of any given food is quite different from the way an individual human body will digest and utilize those calories.

The CICO model is still used as a weight-loss method (we are always surprised when we see that it is still repeated so often), science has debunked this oversimplified notion that all calories operate the same in the human body. For example, one randomized clinical trial showed that people achieved the same weight loss and similar improvements in many aspects of metabolic syndrome (like blood sugar and cholesterol levels) when they were on either a high-fat diet or a high-carb diet.[7] However, what was most interesting about this study was that the people on the high-fat diet ate significantly more calories than the people on the low-fat diet. If a calorie is always a calorie no matter the food source, then the people on the low-fat diet should have lost more weight, but they did not. This is just one of many studies that have called into question the notion of calorie counting solely for weight loss.

The calories in vs calories out model is based on the idea that in order to lose weight calories in must be lower than Calories out, and while this is true and legitimate, it is incomplete because the variables are not constant since body will adapt and at the end. We cannot control the exact amount of output energy (calorie) we actually use on a daily basis.



[7] Visceral adiposity and metabolic syndrome after very high-fat and low-fat isocaloric diets: a randomized controlled trial: https://pubmed.ncbi.nlm.nih.gov/27903520/

Eating less vs Fasting: Experimenting with Food Partial or Total Food Restriction

Common sense dictates that eating some food, even if it's not enough will be better than not eating at all. I think pretty much everyone will agree in this, and during the past 7 years that I have been personally asking this question to more than 1000 people, and the answer was always the same "of course, eating something is better than nothing." *Note that I included a specific time frame from 1 week to 4 weeks.*

Let us put aside common sense and conventional wisdom, which is terms of nutrition and exercise is usually more wrong than right, and let's see what the research has to say about it. To answer this question, we will be looking into a few different research.

Research 1. This study was designed to have the participants lose 25% of their normal weight over an eight-week period by the following formula: For the first three months, participants ate 3200 calories a day and were quite well fed and comfortable. Then, for the next six months, participants were restricted to an uncomfortable low calorie diet of 1570 calories a day. After this period of calorie restriction, the men were then fed 2000-3000 calories a day. Finally, the study was concluded with the participants being allowed to eat an unlimited number of calories a day.

The results showed they lost weight with a high degree of side effects, both physical and psychological. Physically, all participants became weaker, had a low body temperature and always felt cold (- one reported being wearing a sweater in summer), and had low libido. The psychological part was even worse. They became obsessed with food, they had sign of depression, high irritability, and chronic fatigue.

Research 2. This study is a medically supervised water-only fasting (10-111 days) for the treatment of hypertension.[8] One hundred seventy-four consecutive hypertensive patients in excess of 140 mm Hg systolic, 90 mm Hg diastolic (140/90 mm Hg), followed by medically supervised water-only fasting (approximately 10 to 11 days on average).

The results showed all of the subjects who were taking antihypertensive medication at entry (6.3% of the total sample) successfully discontinued the use of medication. This concludes that medically supervised water-only fasting appears to be a safe and effective means of normalizing blood pressure and may assist in motivating health-promoting diet and lifestyle changes.

Research 3. Scientists studied the effects of Periodic Fasting on Fatty Liver over the range of 6–38 days. 697 subjects completed the study and were analyzed. Periodic fasting induced a significant weight loss in the overall population (−4.37 ± 2.42 kg). In non-diabetic subjects, the BMI decreased by −1.50 ± 0.81 kg/m2 ($p < 0.001$), and in T2DM patients by −1.75 ± 0.85 kg/m2 ($p < 0.001$). The waist circumference decreased overall by −5.39 ± 3.28 cm ($p < 0.001$), in non-diabetic subjects by −5.34 ± 3.27 cm ($p < 0.001$), and in T2DM patients by −6.32 ± 3.37 cm ($p < 0.001$). Fasting plasma glucose and HbA1c levels significantly decreased in all groups, and only 1.4% presented light adverse events like dizziness and headache. Our study supports the hypothesis that fasting therapy provided in a controlled clinical setting is a safe intervention.

Research 4. This study shows the features of a successful therapeutic fast over a 382 days duration.[9] In the study, a 27-year-old male patient fasted under supervision for 382 days and has subsequently maintained his normal weight. This shows that prolonged fasting in this patient had no ill-effects.

[8] https://pubmed.ncbi.nlm.nih.gov/12470446/
[9] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2495396/

Fat-burning vs Sugar-burning Metabolism

There are two primary types of metabolism that is activated based on our diet. When we have a sugar-burning metabolism, it means that our body is primarily burning carbs (sugar) for energy. This process it's called glycolysis, which is the breakdown of stored glycogen to glucose.

High-intensity exercise also promotes glycogenolysis—the breakdown of glycogen for use as energy—within skeletal muscle. This is important for several reasons, the biggest of which is that it restores insulin sensitivity on muscle cells, which are the greatest glycogen depot in the body. The average male human stores roughly 70 grams of glycogen in his liver and 210 to 220 grams in his skeletal muscles. (Females store about 20 percent less.)

The glycogen that is stored in the muscles is for on-site use only, whereas the glycogen that is stored in the liver serves to maintain glucose homeostasis in the bloodstream (which is largely modulated on a long-term basis by a balance between insulin and glucagon). During our hunter-gatherer past, we (as is the case with most other animals) were at greatest risk of attack while feeding. Consequently, we evolved a mechanism by which we could turn our metabolism on a dime. The way this is accomplished is by the process of glycogenolysis within our skeletal muscles. In times of emergency, the glycogen that is stored within our muscles tor on-site use is cleaved on the spot and quickly metabolized tor energy within the cell from which it was cleaved.

Sugar is a quick-burning form of energy. That is why you feel hungry again after eating bread or cereals for breakfast, or why you need a nap after a big pasta lunch. When your body uses up those carbs, you end up feeling distracted, tired, and hungry until you eat again. When you eat carbs, insulin goes up, stopping fat oxidation (aka, burning fat for energy) which is a more stable source of energy.

Sugar is not all bad – but it should be avoided. Sugar is the perfect fuel if you need a quick burst of energy lasting under 30 seconds, because the body can use that sugar instantly while it takes up to 20 minutes for the body to mobilize a significant amount of fat.

Sugar is great in a pinch—but if you want sustained energy, you are much better off using fat as your primary fuel. Nature knew what she was doing when she gave you an endless supply of fat. When you burn fat for fuel, you can easily go on for hours without thinking about food. You feel energized and focused all day long. Your body gets energy by burning fat from your body.

4: Sugar

Sugar, Glycation, and Aging

Glycation is what happens when excess sugar in your bloodstream and binds with proteins making them sticky and turning them into toxic molecules that keeps you as a sugar burner and effectively downregulates your fat burning mechanisms.[10]

When you eat a high-sugar diet—or a diet that converts to sugar quickly—meaning a diet rich in bread, cereal, pasta, rice, potatoes and all the other processed carbs—that excess sugar gets right into your bloodstream. This affects insulin's function in your body.

Insulin rises to remove that excess sugar from the bloodstream, but chronic excess sugar in your bloodstream starts bumping into the slick proteins. These sugar-sticky proteins are now called glycated proteins.

Eventually, these sugar-coated, sticky proteins clump together in bunches and form what scientists call AGEs (advanced glycation end products). The accumulation of these modified macromolecules in vivo has been implicated in a number of pathologic abnormalities, most prominently the complications associated with normal aging and long-term diabetes. Additional factors that contribute to AGEs are cooking food at a really high temperature, caramelized foods, and being under a high level of stress.[11]

[10] https://pubmed.ncbi.nlm.nih.gov/7918300/
[11] https://pubmed.ncbi.nlm.nih.gov/14568004/

These molecules accumulate everywhere—in the skin, the brain, the nervous system, the vital organs, the vascular system—and they do exactly what their name implies. They age you, and they make you fat.[12]

Interestingly, a few new studies have shown that as AGEs in the blood go up, IGF-1 goes down. This makes sense since AGEs are created by having too much sugar in the blood, which drives up insulin and drives down IGF-1 production.[13]Small amount of glycation is normal body has mechanisms to eliminate these harmful compounds, including those involving antioxidant and enzymatic activity.[14]

Glycated proteins are toxic and make your cellular machinery run less efficiently. They exhaust the immune system, and they contribute mightily to the diseases of aging – even to aging itself. But here's what else they do: They overwhelm the mitochondria, the main fat-burning factories in the cell and your energy levels drop. Your body shifts further and further into sugar burning, sputtering along, using this toxic fuel like an engine trying to run on sugar-coated gasoline. That alone is guaranteed to keep your metabolism running on sugar, your skin wrinkly and your belly bulging.[15] [16]

But here's the good news: glycation—and its damaging impact on all systems in the body—is something you can control by avoiding processed foods and cooking in a healthy way, avoiding deep fry and high heat. Instead, try to steam, boil. Eating a diet full of antioxidants; colorful fruits, vegetables, herbs, and spices like turmeric may help protect against the damaging effects of AGEs[17]; and having an active lifestyle it's proven to reduce the number of AGEs in the body.[18] [19]

In essence, sugar causes hormonal disruption, increases insulin release and decreases IGF-1. This downregulates leptin, which sets you up for a sugar-burning metabolism while shutting down fat burning. This contributes to inflammation and oxidation, and elevated blood sugar that ultimately leads to glycation, causing even more inflammation and more mitochondrial damage and a further impairment of fat burning and energy production.[20]

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[12] https://pubmed.ncbi.nlm.nih.gov/11270668/
[13] https://pubmed.ncbi.nlm.nih.gov/11270668/
[14] https://pubmed.ncbi.nlm.nih.gov/14568004/
[15] https://pubmed.ncbi.nlm.nih.gov/14568004/
[16] https://pubmed.ncbi.nlm.nih.gov/25695886/
[17] https://pubmed.ncbi.nlm.nih.gov/24614199/
[18] https://pubmed.ncbi.nlm.nih.gov/19478714/
[19] https://pubmed.ncbi.nlm.nih.gov/19608208/
[20] https://pubmed.ncbi.nlm.nih.gov/17531120/

5: Macronutrients

Macronutrients are the nutrients your body need in larger amount, namely:

- Protein
- Carbohydrates
- Fat

Protein

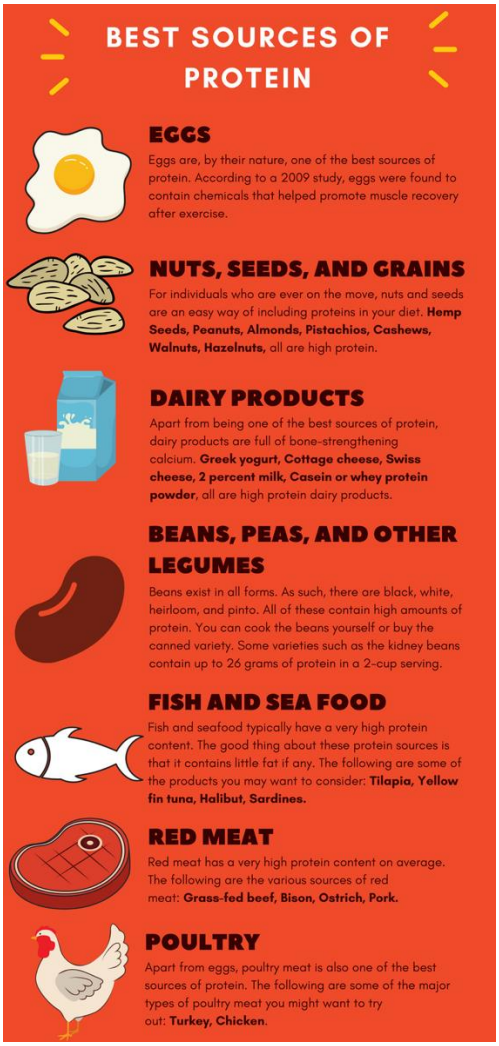
Proteins are a large molecule composed by amino acids (an organic compound our body uses to make proteins to help the body break down food, grow, and repair body tissue). This macronutrient is responsible for maintaining our muscle structure (and other tissues), hormones, enzymes, immune chemicals). Dietary protein is a must since from a total of 20 amino acids the body has the ability to make 12 amino acids, known as non-essential amino acids.

However, 8 amino acids can only be supplied by the diet, since our body cannot make them, and once used they need to be replaced from outside, that's why they are called essential. Without them, we won't be able to function.

Our body must have a balance in amino acid intake and consumption, if we use the amino acid and they are not replaced, our body will have a negative protein balance resulting in certain enzymes and structural proteins broken down. If this process persists for long enough, vital functions shut down.

Some great protein sources include:

- Grass fed meat
- Free range poultry (with skin on)
- Wild caught fish
- Organic eggs and egg yolks
- Nuts and seeds (e.g., hemp seeds, macadamia nuts, pecans, etc.)
- Tempeh



Dietary Fibers

Dietary fibers are a food component that isn't digested by your body since it passes relatively intact through your stomach, small intestine and colon and out of your body. Fiber comes in two different forms: soluble and insoluble.

Soluble fiber dissolves in water to form a gel-like material. It can help lower blood cholesterol and glucose levels. It is found in oats, dried beans and peas, nuts, barley, flax, fruits like oranges, bananas, and apples, and vegetables such as artichokes, tomatoes, and carrots.

Insoluble fiber, on the other hand, promotes the movement of material through your digestive system and increases stool bulk, so it can be of benefit to those who struggle with constipation It is found primarily in vegetables such as green beans, beets, and dark green leafy vegetables, fruit skins and root vegetable skins, whole-grain products, seeds, and nuts.

Both types of fiber, while indigestible, play important dietary roles. This provides several benefits: increased satiety; lowered blood fat and cholesterol; reduced risk of colon cancer; proper intestinal motility; and a boost in overall gut health. The recommended intake for fiber is 25 to 35 grams per day for women, and 35 to 48 grams/day for men.

Carbohydrates

Carbohydrates provide you with energy for daily tasks and are the primary fuel source for the brain. They are broken down through a series of enzymatic steps until their final conversion to individual glucose (sugar) molecules in the liver. These glucose molecules are either stored as glycogen in the liver and the muscle tissue or enter circulation, providing fuel to the rest of the body.

It is the macronutrient that most affect the glucose and insulin response of our body. To understand better glucose and insulin response, we will talk later about glycemic index of foods, glycemic load and insulin index, being the latest 2 most important indexes to take in consideration for its implication in weight gain/ loss). This response depends on portion size of the food and its source, it can be fast or slow. Not all carbohydrates are the same, and for a better understanding we will divide them in 2 categories: Refined carbohydrates and unrefined carbohydrates. Refined carbohydrates are starchier and more unrefined carbohydrates are more fibrous.

Refined Carbohydrates

Refined carbohydrates are processed and cannot be found in nature. The most common ones are white flour whole wheat flour. In the process of creating white flour, a lot of the proteins, fibers, and fat are extracted. Because it's been so highly refined, the body absorbs it extremely quickly, especially when it’s grounded into fine dust.

When we consume it, we get the very quick rush of glucose because carbohydrates are made of chains of glucose. Therefore, insulin also spikes up very quickly. And it can sometimes fall just as quickly which can lead to this crash that happens perhaps an hour and a half after eating high carbohydrate meals. These refined carbohydrates are the main things that people suggest that you cut out in low carbohydrate diets.

People also tend to think that whole wheat flour (whole wheat bread is made from it) is healthy, and while is indeed healthier than wheat flour, since contains slightly more fiber, it's also still browned up very fine, which leads to the same instant absorption. The glycemic index shows whole wheat bread is almost converted into glucose as quickly as white bread. So, it's maybe marginally better, but it's still not great.

The wheat varieties today are not the same as the ones we had 50 years ago. A research published in 2017 documented the change in wheat’s nutritional content over the last half century.[21] Today’s wheat contains less nutrient. The bran, middling, germ, and oils have been completely removed, leaving pure white starch. Similarly, most of the vitamins, proteins, fiber, and fats are also removed along with the outer hull and bran during processing. The flour is ground to such a fine dust that its absorption by the intestine is extremely rapid. The increased rate of glucose absorption amplifies the insulin effect. Whole wheat and whole grain flours retain some of the bran and germ, but suffer from the same problem of rapid absorption.

Additionally, things like rice flours and corn flowers are also highly processed. So, all the things that are predominantly made out of these flowers should be avoided if you want to avoid this

[21] Evidence of decreasing mineral density in wheat grain over the last 160 years: https://pubmed.ncbi.nlm.nih.gov/19013359/

glucose spike in insulin which may lead to weight gain. Some examples of wheat products would be things like bread, pasta, cereals, breakfast cereals, beer muffins.

The other group of refined carbohydrates that is particularly problematic is sugar. Sugar, like table sugar, for example, is composed of one molecule of glucose and one molecule of fructose as opposed to starches, which are mostly chains of glucose. And it is this fructose, which is particularly problematic for weight gain. It's in the way that the fructose is metabolized, it goes straight to the liver and often becomes converted into fat which can lead to a lot of insulin resistance, which leads to high insulin levels.

The problem with sugar is not only that it's very easy to turn into fat, but it's also very rewarding. It is very easy to eat sugar, making it even easier to overeat sugar. There is lots of natural foods that contain sugar but there's usually a limit to how much sugar they contain. Processed foods are particularly bad because they add a lot of sugar because it's a way to make food taste very good at a very low cost.

A lot of fructose, like high fructose corn syrup for example, is critical to avoid for weight loss. That includes white sugar, brown sugar, high fructose corn syrup, maple syrup, fruit juice concentrates, and so on. There's lots of different names because they often want to hide how much sugar is contained in ingredient list. If you want to find out, you really have to go dig in.

We should also look out for are refined grains, while these are not as refined as flour which has been grounded very finely, they are still refined. Things like white rice, instant rice and instant oatmeal are all considered refined grains. Because again, it's ground very fine so that it cooks very quickly, that is much more processed than steel cut oats for example which have to be cooked for a long time, corn starch potato starch, modified food starch tapioca starch, you want to avoid all of those things.

Sugar

More than any other refined carbohydrates, seems to be particularly fattening and leads to type 2 diabetes. Daily consumption of sugar-sweetened drinks not only carries a significant risk of weight gain, but also increases the risk of developing diabetes by 83 percent compared to drinking less than one sugar-sweetened drink per month.[22]

Sugar is sometimes considered “empty calories,” containing few nutrients. It is also thought to make food more “palatable” and “rewarding,” causing overconsumption and obesity. But perhaps the fattening effect of sugar is due to its nature as a highly refined carbohydrate. It stimulates the production of insulin, which causes weight gain. But then again, most refined carbohydrates, such as rice and potatoes, do so too.

Now you might think, if I can’t have sugary drinks, maybe I can switch to diet soda or artificial sweeteners. But the truth is **diet sodas and artificial sweeteners** both have a negative effect on both weight loss and health.[23] [24]

Consuming noncaloric artificial sweeteners (NAS) is associated with obesity and diabetes. This is counterintuitive because these sweeteners have no calories, and there have been many claims, by dieters as well as national organizations, that artificial sweeteners can assist with weight loss by reducing calorie intake. We wanted to find out why so many research studies support the idea that a zero-calorie product would contribute to weight gain and associated blood sugar disturbances.[25]

Caloric reduction is the main advantage of artificial sweeteners. But it is not calories that drives obesity; it’s insulin. Since artificial sweeteners also raise insulin levels, there is no benefit to

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[22] Sugar-sweetened beverages, weight gain and incidence of type 2 diabetes in young and middle-aged women: https://pubmed.ncbi.nlm.nih.gov/19943985/

[23] Non-nutritive sweetener consumption in humans: effects on appetite and food intake and their putative mechanisms https://pubmed.ncbi.nlm.nih.gov/19056571/

[24] Artificial sweeteners induce glucose intolerance by altering the gut microbiota https://pubmed.ncbi.nlm.nih.gov/25231862/

[25] Artificial sweeteners induce glucose intolerance by altering the gut microbiota: https://pubmed.ncbi.nlm.nih.gov/25231862/

using them. Eating chemicals that are not foods (such as aspartame, sucralose or acesulfame potassium) is not a good idea.do not help you lose weight and may actually cause you to gain it. They may cause cravings that induce overeating of sweet foods. And continually eating sweet foods, even if they have no calories, may lead us to crave other sweet foods. Artificial sweeteners may also cause harm by increasing cravings. The brain may perceive an incomplete sense of reward by sensing sweetness without calories, which may then cause overcompensation and increased appetite and cravings.[26]

Despite reducing sugar, diet sodas do not reduce the risk of obesity, metabolic syndrome, strokes or heart attacks. But why? Because it is insulin, not calories, that ultimately drives obesity and metabolic syndrome. The important question is this: Do artificial sweeteners increase insulin levels? Sucralose raises insulin by 20 percent, despite the fact that it contains no calories and no sugar.[27]

This insulin-raising effect has also been shown for other artificial sweeteners, including the "natural" sweetener, stevia. Despite having a minimal effect on blood sugars, both aspartame and stevia raised insulin levels higher even than table sugar.[28] Artificial sweeteners that raise insulin should be expected to be harmful, not beneficial. Artificial sweeteners may decrease calories and sugar, but not insulin. Yet it is insulin that drives weight gain and diabetes.

[26] Gain weight by "going diet?" Artificial sweeteners and the neurobiology of sugar: https://pubmed.ncbi.nlm.nih.gov/20303371/#:~:text=Self-reported%20hunger%20and%20satiety,05

[27] Sucralose affects glycemic and hormonal responses to an oral glucose load: https://pubmed.ncbi.nlm.nih.gov/23633524/

[28] Effects of stevia, aspartame, and sucrose on food intake, satiety, and postprandial glucose and insulin levels: https://pubmed.ncbi.nlm.nih.gov/20303371/#:~:text=Self-reported%20hunger%20and%20satiety,05

Unrefined Carbohydrates

Unrefined carbohydrates are carbohydrates that occur naturally. These carbohydrates for later use. This includes grains like rye, barley, buckwheat, spelt basmati rice black rice, certain noodles like Shirataki noodles are made of yam and root vegetables like potatoes. Sweet potatoes parsnips, Taro, artichoke, for example, those are all starchy carbohydrates, but because they're unrefined, they do contain things such as fiber, which helps slow down the digestion so you don't get that very quick rise in glucose that you see with the refined carbohydrates in indices such as the glycemic index.

What you see is that the glycemic index is much, much lower than those are fine carbohydrates, and therefore you can take these foods in moderation. They're not necessarily bad for you, it depends on how you make them, and also how much you take and how often you eat them, but they're often a much better choice than the refined carbohydrates.

Unrefined carbohydrates are what should make up the bulk of the carbohydrates in your diet because they are but non starchy and more fibrous. These are usually the vegetables that grow above ground as opposed to the starchy ones that grow below ground. These occur naturally but because of the amount of fiber in them, they're very bulky they tend to make you feel full. They're very slowly absorbed so you feel this very slow rise in blood glucose and insulin, and therefore, it may make it easier to keep that weight off. Legumes and lentils are a great example of carbohydrates that really don't have much of an effect on insulin. They contain a lot of proteins so they're very good vegetable sources of protein. Occasionally, they can be added with natural fats, and there's a ton of fiber in these which means that it's going to slow the rise of glucose because absorption is much slower.

The other big category that you'll see here are the non-root vegetables so things like asparagus, peppers, broccoli, cauliflower, brussels sprouts, eggplants, and leafy greens. While these are considered carbohydrates, nobody really gets fat eating broccoli. It's just very difficult to do if you're eating a lot of these above ground vegetables, it's going to provide a lot of nutrients but it's also going to fill you up.

The general consensus is that these vegetables are not particularly fattening, and this doesn't matter if you're on a low-fat diet, keto diet, paleo diet, or any other standard diet. Most people acknowledge that these leafy greens and beans are great parts of your weight loss process.

Fruit

This is a group that we should really be careful on how we consume it. While full fruit is a natural food, some fruits have a lot of fructose and chemically there's no difference between the fructose that is contained in fruit, and the fructose that you would get in high fructose corn syrup.

The difference with fruit is that it comes packaged with a lot of other things when you eat an apple. There's a lot of fiber, there's a lot of the pulp, and there's other nutrients in it, and it's often very hard due to the bulk of the fruit to over eat these fruits, as opposed to over eating things like the fruit juice for example where all of that has been removed.

This means that certain fruits are going to be much better than others; berries, strawberries, raspberries, blackberries are often going to be much better than other very sweet fruits. The other thing to keep in mind is that many of the fruits that we eat today are different than the fruits that we ate thousands of years ago, they're much sweeter they've been genetically altered they've been bred together That's why it's not so hard to get people to eat fruit these days because it really is nature's candy so if you are going to take fruit. While it's not the worst thing you can take it can be one of the factors that's impeding your weight loss.

Keep in mind fruit should be consumed with empty stomach, this means, don’t mix fruit with other food, since I will slow and interfere proper digestion. Eat it as a snack in between meals but not as dessert.

Carbohydrate digestion, metabolism, and storage

Complex forms of carbohydrates (oligo and polysaccharides) break into the monosaccharide's glucose, fructose, and galactose, for eventual release into the bloodstream as glucose.

The liver takes what it needs for energy transfer and glycogen storage and then ships the rest out as glucose monosaccharides. Galactose and fructose are absorbed from the diet, but are virtually absent from general circulation for two reasons. First, they are both primarily converted to glucose by the liver (although with very high intakes of fructose some of the fructose can be converted to triglycerides).
Second, fructose is actually a primary source
of energy and carbohydrate for liver glycogen replenishment, which the liver prefers to use over glucose. Again, once the liver takes what it needs and does the appropriate chemical alchemy, the glucose units released into circulation work their way through the blood until they' re taken up into our cells.

Introducing the glycemic index (GI),
The glycemic index (GI) is a measure of how quickly and significantly a given food can raise blood sugar. In essence, the GI is the relative degree of blood sugar elevation after the consumption of 50 g of carbohydrate coming from a specific test food. Since this is a relative measure, the GI is determined relative to a specific reference food - 50 g of carbohydrates from table sugar - which is given a GI value of 100. Each food's GI score is then calculated relative to this value of 100.

Higher glycemic foods such as sugar, candy, breakfast cereal, bagels, white potatoes, etc. can raise blood sugar levels very quickly, leading to a large spike in blood sugar and a corresponding spike in blood insulin concentrations. Lower glycemic index foods such as legumes, nuts, unprocessed high fiber grains, and vegetables do not cause the same spikes in blood glucose and insulin. Thus, lower glycemic index foods are often recommended over higher glycemic index foods. Managing blood glucose and insulin is an important way to improve health, body composition, and performance.

The glycemic index is based on a standardized amount of carbohydrate, 50g, not a standardized amount of food. Which for some foods may be an unfair comparison due to higher or lower degree of carbohydrates by grams of food.
For example, to get 50 gr of carbohydrates from watermelon it's necessary to eat much more than 50gr of cake which makes it an unfair comparison.

For this reason, we should look to the the glycemic load as more realistic measure. The glycemic load of a food is based on the glycemic index multiplied by the serving size of the food. While this gives a better picture of post ingestion glycemia, some of the same problems discussed above exist.

GI and glycemic load are useful to determine overall glucose load, but they aren't the best predictors of insulin response to a meal, which is the measure most closely correlated with health. Another index, the insulin index measures the amount of insulin the body produces in response to a set carbohydrate load in a particular food.
This index measures the blood insulin response to a food directly

Fat

Fats perform a variety of important processes in the body, including forming part of the lipid bilayer of cells, regulating membrane permeability, serving as a source of fat-soluble vitamins, and as a storage of energy. They contain 9 kcal per gram, more than double of what carbohydrate and protein contain, and they're stored more efficiently in adipose than carbohydrate or protein.

Dietary fat has six major roles:

1. provides an energy source (in fact, it's the most energy-dense macronutrient);
2. helps manufacture and balance hormones;
3. forms our cell membranes;
4. forms our brains and nervous systems;
5. helps transport the fat-soluble vitamins A, D, E, and K; and
6. provides two essential fatty acids that the body can't make, omega-6 fatty acid and an amega-3 fatty acid

You can get your daily requirement of fats from fatty cuts of red meat, poultry with skin on, fatty fish (such as sardines, salmon, and mackerel), eggs and egg yolks, nuts and seeds (such as hemp seeds, macadamia nuts, and pecans), and tempeh. On the other hand, fat sources from soybean oil, corn oil, cottonseed oil, peanut oil, canola oil, grapeseed oil, safflower oil, and sunflower oil, should be limited or avoided completely if possible.

Fat is organized into two subgroups: saturated fat and unsaturated fat. Unsaturated fat is further classified as monounsaturated fat, polyunsaturated fat, and trans-fat. These different classifications determine the effects of these fats on an organism, and the roles that they have in metabolism.

Saturated Fat

Saturated fat, or animal fat, is a class of fats that have higher viscosity and energy content than their unsaturated cousins. Due to poor solubility issues, this is the type of fat that is most commonly associated with heart disease, which it's been overall disproven, we will talk about it later.

Examples of Saturated Fat. Saturated fat can be found in

1. Butter, ghee
2. Suet
3. Lard
4. Coconut oil
5. Palm oil
6. Bacon
7. Cheese
8. Cured meats (such as salami, chorizo, and pancetta)

Unsaturated Fat

Unsaturated fat, or vegetable fat, is divided in monounsaturated fats, which are often referred to as the “good fats” and polyunsaturated fats.

Examples of monosaturated fat. Saturated fat can be found in

1. Olive oil
2. Tropical oil
3. Avocados
4. Nuts (such as almonds, hazelnuts, and pecans)
5. Seeds (such as pumpkin and sesame)

Examples of polysaturated fat

1. Omega-3 / Omega-6
2. Flax
3. Hemp
4. *Fish*
5. Canola
6. Safflower

Saturated Fat, Cholesterol, and Cardiovascular Disease

The relationship between dietary SFAs and heart disease has been studied in about 400,000 people and summarized in a number of systematic reviews of observational studies and randomized controlled trials. Some meta-analyses find no evidence that reduction in saturated fat consumption may reduce CVD incidence or mortality.

While saturated fats are not associated with all-cause mortality, but the evidence is clear that trans fats are associated with all-cause mortality.[29]

Another study demonstrated that there was no evidence that saturated fat was associated with death from any cause during the course of the study or with cardiovascular disease, ischemic

[29] https://pubmed.ncbi.nlm.nih.gov/26268692/

stroke, or type 2 diabetes, but industrial trans-fat was associated with increased Risk of All-Cause Mortality, Cardiovascular Disease, and Type 2 Diabetes.[30]

It is important to distinguish between dietary saturated fat and circulating SFAs. Whereas several reports show no association between increased intake of SFAs and risk for chronic disease metabolic syndrome CVD heart failure and mortality.[31] [32]

However, the amount of circulating SFAs in blood is not related to saturated fat intake from the diet but instead tends to track more closely with dietary carbohydrate intake. For example, an increase in saturated fat consumption by 2- to 3-fold either has no effect or decreases serum levels of SFAs in the context of lower carbohydrate intake. Decreased accumulation of circulating SFAs in response to diets lower in carbohydrate and higher in saturated fat is partially mediated by lower production (through de novo lipogenesis), but also increased clearance.

Low-carbohydrate diets consistently increase rates of whole-body fat oxidation, which includes the preferred use of SFAs for fuel. Thus, the combination of greater fat oxidation and attenuation of hepatic lipogenesis could explain why a higher dietary saturated fat intake is associated with lower circulating SFAs in the context of low carbohydrate intake

Cholesterol, Fat, and Obesity

The liver manufactures the overwhelming majority—80 percent—of the blood cholesterol, with only 20 percent coming from diet. Cholesterol is often portrayed as some harmful poisonous substance that must be eliminated, but nothing could be farther from the truth. Cholesterol is a key building lock in the membranes that surround all the cells in our body.

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[30] Intake of saturated and trans unsaturated fatty acids and risk of all-cause mortality, cardiovascular disease, and type 2 diabetes: systematic review and meta-analysis of observational studies: https://www.bmj.com/content/351/bmj.h3978

[31] Evidence from prospective cohort studies does not support current dietary fat guidelines: a systematic review and meta-analysis: https://pubmed.ncbi.nlm.nih.gov/27697938/

[32] Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease: https://pubmed.ncbi.nlm.nih.gov/20071648/

In fact, it's so vital that every cell in the body except the brain has the ability to make it. If you reduce cholesterol in your diet, your body will simply make more.

The percentage of dietary energy from fat has been suggested to be an important determinant of body fat, and this presumed effect has been invoked to justify the general promotion of low-fat diets. Dietary fat and the prevalence of obesity are lower in poor countries than in affluent countries.[33] These findings suggest that serum cholesterol and triglyceride levels among Americans are more dependent on degree of adiposity than on frequency of consumption of fat, sugar, starch, or alcohol. Independence of serum lipid levels and dietary habits.[34]

Trans Fat

Trans fats are chemically produced fats. They are generally considered to be unhealthy, and are found in mass produced oil found in processed and fried foods. Trans fats have a controversial history. They have even been banned for consumer use in some countries.

Clinical and epidemiologic studies suggest that this means an increased risk for coronary heart disease, cancer, and other chronic disease. Trans fats also lower the good form of cholesterol High trans-fat intake is also linked to, a higher risk of Alzheimer's disease, a higher risk of lymphoma, suppression of the excretion of bile acids, increased liver cholesterol synthesis, and exaggerated essential fatty acid deficiency.

Even a single meal with a high "bad fat" content can diminish blood vessel function and elasticity. This can contribute to the progression of heart disease as well. For instance, a study published in the New England Journal of Medicine tracked the exercise and nutrition l habits of 80,000 women over 14 years and found that the most important correlate of heart disease was the amount of trans fats in the diet.

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[33] Dietary fat plays a major role in obesity: https://pubmed.ncbi.nlm.nih.gov/12120421/#:~:text=The%20percentage%20of%20dietary%20energy,countries%20than%20in%20affluent%20countries

[34] The Tecumseh study: https://pubmed.ncbi.nlm.nih.gov/989556/

7: Hormones & Fat Loss

Hormones that Help Us Burn Fat

Growth Hormone

Growth hormone (HGH) it's produces by the pituitary gland, it helps maintain muscle mass, cell repair, and metabolism. It boosts, strength, and exercise performance, while helping you recover from injury and disease. Low HGH is linked to obesity, low energy levels and increase all-cause mortality.[35] [36] [37]

How to boost growth hormone through nutrition

- **Fasting:** Multiple studies links fasting with increased HGH levels up to 1.250%. At the same time, it'll help lower insulin and glucose levels.[38] [39] [40]
- **Reduce sugar intake:** An increase in insulin is associated with lower HGH levels. Refined carbs and sugar raise insulin levels the most, so reducing your intake may help optimize growth hormone levels.[41] [42]

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[35] Effects of human growth hormone in men over 60 years old: https://pubmed.ncbi.nlm.nih.gov/2355952/

[36] Abdominal visceral fat and fasting insulin are important predictors of 24-hour GH release independent of age, gender, and other physiological factors: https://pubmed.ncbi.nlm.nih.gov/11502822/

[37] Growth hormone deficiency in adulthood and the effects of growth hormone replacement: a review. Growth Hormone Research Society Scientific Committee: https://pubmed.ncbi.nlm.nih.gov/9467546/

[38] Fasting: the history, pathophysiology and complications: https://pubmed.ncbi.nlm.nih.gov/6758355/

[39] Augmented growth hormone (GH) secretory burst frequency and amplitude mediate enhanced GH secretion during a two-day fast in normal men: https://pubmed.ncbi.nlm.nih.gov/1548337/

[40] Fasting enhances growth hormone secretion and amplifies the complex rhythms of growth hormone secretion in man: https://pubmed.ncbi.nlm.nih.gov/3127426/

[41] Elevated insulin levels contribute to the reduced growth hormone (GH) response to GH-releasing hormone in obese subjects: https://pubmed.ncbi.nlm.nih.gov/10484056/

[42] The plasma sugar, free fatty acid, cortisol, and growth hormone response to insulin. I. In control subjects: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC292717/

How to boost growth hormone through exercise and body composition:

- **Losing body fat:** Those with higher levels of belly fat will likely have impaired HGH production and an increased risk of disease.[43] One study observed that those with three times the amount of belly fat as the control group had less than half their amount of HGH.[44]
- **Perform High Intensity Interval Training (HIIT)**
  Exercise is one of the most effective ways to significantly raise your HGH levels, being HIIT the type of exercise that improves HGH the most.[45]

IGF-1

Stands for “insulin-like growth factor.” It’s called “insulin-like” because it is very similar to insulin, and they compete for the same receptors on the cell membrane. When you are a sugar burner, the primary pump delivering fuel for your cells is insulin. And this is a problem because insulin is the fat-making hormone, delivering fat-making messages that we’d prefer our cells not hear. Additionally, insulin is darn good at its job—the more insulin you’ve got circulating in your bloodstream, the fatter you get. IGF-1, on the other hand, is a fat-burning hormone. It therefore stands to reason that when you’re a fat burner, your cells are “listening” to IGF-1. Theoretically, insulin should only be elevated for a short time, a few times a day, right after you’ve eaten. Which is a good thing. The rest of the time, your cells should be getting their fuel primarily from the IGF-1 fuel pump.

But why is this important? Well, pull up a chair.

IGF-1 feeds the cells much like insulin does, but it also sends a number of important signals to the body at the same time. One of those signals is to rebuild and repair your most metabolically

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[43] Massive weight loss restores 24-hour growth hormone release profiles and serum insulin-like growth factor-I levels in obese subjects: https://www.ncbi.nlm.nih.gov/pubmed/7536210

[44] Novel Relationships of Age, Visceral Adiposity, Insulin-Like Growth Factor (IGF)-I and IGF Binding Protein Concentrations to Growth Hormone (GH) Releasing-Hormone and GH Releasing-Peptide Efficacies in Men during Experimental Hypogonadal Clamp: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2690428/

[45] Impact of acute exercise intensity on pulsatile growth hormone release in men: https://www.ncbi.nlm.nih.gov/pubmed/10444604

active tissue—your M.A.T.—which includes your organs, glands, bones and nerves. And what does IGF-1 use to feed all those cells? Your fat. That's why it also sends a signal that tells your fat cells to open up and release all of the stored fat inside. as opposed to filling them up the way insulin does. IFG-1 breaks into the fat storage banks, releasing fat from the fat cells so that it can be used to feed the rest of your body.

Catecholamines; adrenaline and noradrenaline

These hormones are released by the adrenal glands and some neurons. They increase in heart rate, blood pressure, and breathing rate.

Leptin

This hormone is released by the fat cells as a measure of protection. Leptin is what tells your brain that our fat cells—are full (or empty).

In fact, leptin is actually released by the fat cells, in direct proportion to how full they are. When leptin is present in high levels, it sends a signal to our brain that we're full and should stop eating. When leptin levels are low, the opposite happens: we feel hungry and crave food.

This is how the body communicates with the brain and inform about the amount of fat stores. When our body is in balance, the system works efficiently, but when we consume high amount of sugar (sugar burner), the system is breaks. Your brain never gets the leptin message, you're hungry all the time, even though your fat-storage tanks are bursting at the seams, and the whole hormonal fat-burning symphony is playing horribly out of tune.

The reason for this is because your brain has become insensitive to leptin's messages. Contrary to what you might expect, obese people have tons of leptin. The problem is that their leptin isn't getting into their brains, so it never gets chance to deliver the message to "stop eating!"

This happens because, when exposed to high levels of leptin, the brain becomes resistant to its effects. If this kind of hormonal resistance sounds familiar, it's because it is. You'll recall that the exact same thing happens in insulin resistance, except in that case it's the muscle cells becoming "resistant" to the effects of insulin. If your brain cells are becoming resistant to leptin, here's what happens:

1. You feel compelled to eat constantly. This is one reason most "crash diets" are ineffective. When you lose a lot of weight quickly, leptin levels plummet
2. Your body responds to this perceived deficit of leptin by increasing appetite and at some point, you begin to gain the weight right back since your body is signaling your brain that you should eat.
3. Your entire metabolism slows down to accommodate this perceived starvation. Your thyroid slows down and your overall metabolic rate drops. This means that your body is actually making you fatter even if you eat the same amount as before. Your body has learned to run on less fuel because it thinks you're starving. The amount of food you ordinarily eat is now considered "excess" calories for your slowed down metabolism, and your body stores those "extra" calories as fat.

To put it simply, you become a sugar burner instead of a fat burner. You eat more, you burn less fat, your growing fat cells produce even more leptin, but instead of responding to it (like someone with a functioning, fat-burning metabolism would) you become more resistant to it and you get fatter every second of the day. It's a vicious cycle.

Thyroid

It manufactures hormones that regulate your body's metabolism. "every single muscle, organ and cell in the body depends on adequate thyroid hormone levels for achieving and maintaining optimal functioning." Constantly eating devitalized food will result in deficiencies of vitamins, minerals and other essential products and will inevitably lead to hormonal and immune system abnormalities." Sugar and refined carbohydrates among the major culprits.

Hormones that Cause Us to Gain Weight

There are two main types of hormones that contribute to weight gain:

- Cortisol
- Insulin

Cortisol

It is a stress hormone released by the adrenal glands. The brain triggers the release of cortisol to help us to deal with stressful situations. In the short term, cortisol is meant to help us by elevating our energy level and attention, but chronic, high levels may cause weight gain and high blood pressure, disrupt sleep, negatively impact mood, reduce your energy levels and contribute to diabetes. Cortisol stimulates fat and carbohydrate metabolism for fast energy. It stimulates insulin release and maintenance of blood sugar levels, causing our body to eventually increase appetite and cravings for sweet, high-fat, and salty foods.

In Paleolithic times, the stress that led to a release of cortisol was often physical: for instance, being chased by a predator. Cortisol is essential in preparing our bodies for action — to fight or flee. Cortisol's main function is to substantially enhance glucose availability, which provides energy for muscles—very necessary in helping us to run and avoid being eaten, all available energy is directed toward surviving the stressful event. When that happens, growth, digestion and other long-term metabolic activities are temporarily restricted. Proteins are broken down and converted to glucose (gluconeogenesis). Vigorous physical exertion (fight or flight) soon often followed, burning up these newly available stores of glucose. Shortly thereafter, we were either dead, or the danger was past and our cortisol decreased back to its normal low levels.

And that's the point: the body is well adapted to a short-term increase in cortisol and glucose levels. Over the long term, however, a problem arises.

You see, stress is a short-term mechanism to help us survive, it's not meant to be turned on consistently. Due chronic psychological stress, the same mechanism that has helped humanity not go extinct, is producing the opposite effect nowadays. As we have explained, when in stressful situation, cortisol signals the body to release glucose for fat energy, but more often

than not, we actually do not use that energy in a modern environment, causing us to have we have excess sugar in our bloodstream.[46]

And this is where insulin comes into play.

How to reduce Cortisol:

- Balance the amount of Intense Exercise
- Get good quality sleep
- Deep Breathing[47]
- Mindfulness[48]
- Massage therapy[49]

Insulin

Insulin is a hormone made in your pancreas and allows your body to use glucose for energy. Glucose is a type of sugar found in many carbohydrates. When our cells absorb too much glucose (because of overeating, for example), our body will convert glucose into fat, leading to weight gain.

High insulin secretion has long been associated with obesity.[50] Obese people secrete much higher levels of insulin than do those of normal weight. Also, in lean subjects, insulin levels quickly return to baseline after a meal, but in the obese, these levels remain elevated.

Insulin levels are almost 20 percent higher in obese subjects, and these elevated levels are strongly correlated to important indices such as waist circumference and waist/hip ratio.

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[46] Cortisol levels increased but perceived stress, strongly correlated with increased levels of both glucose and insulin: https://pubmed.ncbi.nlm.nih.gov/9626108/

[47] The role of deep breathing on stress: https://pubmed.ncbi.nlm.nih.gov/27995346/

[48] https://www.ncbi.nlm.nih.gov/pubmed/18842742

[49] Cortisol decreases and serotonin and dopamine increase following massage therapy: https://www.ncbi.nlm.nih.gov/pubmed/16162447

[50] Insulin and weight gain: https://pubmed.ncbi.nlm.nih.gov/11574431/

Insulin Resistance

People who are obese or have unhealthy habits such as smoking, skimping on sleep, or eating unhealthily are more likely to develop insulin resistance. Insulin resistance is defined clinically as the inability of a known quantity of exogenous or endogenous insulin to increase glucose uptake and utilization in an individual as much as it does in a normal population.

Another important cause of insulin resistance is not watching out for *when* we eat.

There are a few myths that it's time to eliminate because they are causing by health problem, actually this paper is meant to give an entire perspective, fact and science-based perspective, on most of common believes regarding nutrition. We've been sold the idea that 6 meals a day are better than 3.

In the 70's, when obesity rates were low compared to nowadays, the average number of meals was 3 (breakfast, lunch and dinner) and in the 2000s is average 5-6 meals.[51] But in the development of obesity, the increase in meals is almost twice as important as the change in diet; increase eating/drinking occasion and portion size have accounted for most of the change in total energy intake. These findings suggest a new focus for efforts to reduce energy imbalances in US adults.[52] You might be wondering, why this is important? Because for insulin resistance to happen, we need consistent elevated insulin.

However, insulin resistance can be reversed. Using synthetic cortisol, we can increase insulin experimentally. In a study, healthy volunteers given high-dose cortisol increased their insulin levels 36 percent above their baseline.[53]

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[51] https://pubmed.ncbi.nlm.nih.gov/20237134/

[52] https://pubmed.ncbi.nlm.nih.gov/21738451/

[53] Increasing insulin using synthetic cortisol: https://pubmed.ncbi.nlm.nih.gov/7917157/3

8: Herbs and Spices to Improve Overall Health and Wellbeing

For centuries humans have used herbs and spices for their healing properties.
They are the original and natural medicine that we have used for thousands of years.
This Thesis has the objective of maximizing health and longevity and nature has provide us with everything we need to thrive through a science-based and natural way.
There are hundreds of herbs and spices, in this Thesis we will be introducing xxxxx, their properties and research behind them.

Turmeric

It contains several compounds with medicinal properties, being curcumin[54] the most important one. It has powerful anti-inflammatory properties[55] that match in effectivity some anti-inflammatory drugs without the side effects[56]: chronic inflammation plays a major role in almost every chronic disease, from heart disease, cancer, metabolic syndrome, Alzheimer's to degenerative conditions.
It has also antioxidant properties [57] that help against oxidative damage, which is proven to be linked with many diseases and aging and aging.
Thanks to these properties may help in our quest fat loss and long term health. [58]

Ginger

It is a spice with anti-inflammatory properties; one study showed similar decreases of colon inflammation as aspirin.[59]

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[54] Role of curcumin in systemic and oral health: An overview https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3633300/
[55]Anti-inflammatory properties of curcumin, a major constituent of Curcuma longa: a review of preclinical and clinical research https://pubmed.ncbi.nlm.nih.gov/19594223/
[56] Nonsteroidal anti-inflammatory agents differ in their ability to suppress NF-kappaB activation, inhibition of expression of cyclooxygenase-2 and cyclin D1, and abrogation of tumor cell proliferation https://pubmed.ncbi.nlm.nih.gov/15489888/
[57] On the Antioxidant Mechanism of Curcumin: Classical Methods Are Needed To Determine Antioxidant Mechanism and Activity
[58] Protective effects of curcumin on antioxidant status, body weight gain, and reproductive parametershttps://www.tandfonline.com/doi/abs/10.1080/02772248.2013.829061#.UyAZAfl_t8E
[59] Phase II study of the effects of ginger root extract on eicosanoids in colon mucosa in people at normal risk for colorectal cancer https://pubmed.ncbi.nlm.nih.gov/21990307/

It can treat nausea[60] [61] and help with pain management[62].

Cinnamon

It' is a spice[63] with potent antioxidant properties, and it's proven to help reducing cholesterol. It has a powerful effect of blood glucose management[64]: some studies have shown reductions up to 29% reduction in fasting blood sugar in diabetic patients[65],[66] and helps improve insulin sensitivity[67].

Cinnamon, is, in my opinion, one of the best spices to help with fat loss and health due to its effects on insulin and glucose, that are a fundamental pillar as we have already reviewed, plus gives an amazing tastes when added to fruit or healthy milkshakes or smoothies.

Garlic

It has been used for centuries for its medicinal properties[68]. These properties are due to a compound called allicin.

Garlic has proven in a randomized control trial to helps reduce blood pressure in people with high blood pressure[69].

In a meta-analysis published in the Journal of the Royal College of Physicians of London, Garlic also proved to significantly lower serum triglyceride compared to placebo[70].

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[60] Cinnamon: A Multifaceted Medicinal Plant Efficacy of ginger for nausea and vomiting: a systematic review of randomized clinical trials https://pubmed.ncbi.nlm.nih.gov/10793599/
[61] Effectiveness and safety of ginger in the treatment of pregnancy-induced nausea and vomiting https://pubmed.ncbi.nlm.nih.gov/15802416/
[62] Ginger reduces muscle pain caused by eccentric exercise https://pubmed.ncbi.nlm.nih.gov/20418184/
[63] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4003790/
[64] Cinnamon improves glucose and lipids of people with type 2 diabetes https://pubmed.ncbi.nlm.nih.gov/14633804/
[65] Cinnamon supplementation in patients with type 2 diabetes mellitus https://pubmed.ncbi.nlm.nih.gov/17381386/
[66] Effects of a cinnamon extract on plasma glucose, HbA, and serum lipids in diabetes mellitus type 2https://pubmed.ncbi.nlm.nih.gov/16634838/
[67] The potential of cinnamon to reduce blood glucose levels in patients with type 2 diabetes and insulin resistance https://pubmed.ncbi.nlm.nih.gov/19930003/
[68] Historical Perspective on the Use of Garlic https://academic.oup.com/jn/article/131/3/951S/4687053?login=true
[69] Aged garlic extract lowers blood pressure in patients with treated but uncontrolled hypertension: a randomised controlled trial https://pubmed.ncbi.nlm.nih.gov/20594781/
[70] Garlic as a lipid lowering agent--a meta-analysis https://pubmed.ncbi.nlm.nih.gov/8169881/

Cayenne Pepper

It is a spice that has proven in human studies to increase fat burning and reduce appetite[71],[72] by activating brown adipose tissue[73].

Studies also proved that can assist in weight management[74] by sustaining fat oxidation during weight maintenance compared with placebo[75].

Holy Basil

This Indian sacred herb has shown in a double-blinded randomized controlled trial, to increase the number of certain immune cells[76], boosts our immune system and may inhibit the growth of certain bacteria[77],[78].

Black Pepper

This popular spice, which main active compound is piperine, is widely used to treat gastric related conditions and may help reducing systemic inflammation.

Many studies have shown anticancer activities[79] of piperine while also playing a role in the management of chronic diseases[80].

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[71] Sensory and gastrointestinal satiety effects of capsaicin on food intake https://pubmed.ncbi.nlm.nih.gov/15611784/

[72] Effects of red pepper on appetite and energy intake https://pubmed.ncbi.nlm.nih.gov/10743483/

[73] Nonpungent capsaicin analogs (capsinoids) increase energy expenditure through the activation of brown adipose tissue in humans https://pubmed.ncbi.nlm.nih.gov/22378725/

[74] Capsaicin as an anti-obesity drug https://pubmed.ncbi.nlm.nih.gov/24941669/

[75] Effect of capsaicin on substrate oxidation and weight maintenance after modest body-weight loss in human subjects https://pubmed.ncbi.nlm.nih.gov/13129472/

[76] Double-blinded randomized controlled trial for immunomodulatory effects of Tulsi (Ocimum sanctum Linn.) leaf extract on healthy volunteers https://pubmed.ncbi.nlm.nih.gov/21619917/

[77] Comparative studies on the activity of basil https://pubmed.ncbi.nlm.nih.gov/12732427/

[78] The effect of essential oils of basil on the growth of Aeromonas hydrophila and Pseudomonas fluorescens https://pubmed.ncbi.nlm.nih.gov/9633630/

[79] Piperine as a Potential Anti-cancer Agent: A Review on Preclinical Studies https://pubmed.ncbi.nlm.nih.gov/28545378/

[80] Piperine and Its Role in Chronic Diseases https://pubmed.ncbi.nlm.nih.gov/27671817/

Peppermint

Used orally, peppermint has proven in various studies, including a double blind randomized placebo-controlled study to improve pain in people with irritable bowel syndrome[81].

It also helps reducing abdominal bloating and alleviates stomach pain[82].

Sage

Research proves that Sage can improve memory function in healthy young people[83] and old people[84], but most importantly, in a a double blind, randomized and placebo-controlled trial published Journal of Clinical Pharmacy and Therapeutics, sage extract was shown to produce significant improvements in brain function in 42 individuals with mild to moderate Alzheimer's disease[85].

Green Tea

Is one of the most popular herbal tea and is packed with polyphenols, healthy compounds[86] that have proved to have benefits for the brain, our heart and our body reducing systemic inflammation and help with weight management and fat loss, and is beneficial for conditions as osteoarthritis, rheumatoid arthritis, Alzheimer's disease, gum diseases, and certain cancers[87] [88].

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[81] Efficacy of Peppermint oil in diarrhea predominant IBS - a double blind randomized placebo - controlled study https://pubmed.ncbi.nlm.nih.gov/23416804/

[82] Peppermint oil for the treatment of irritable bowel syndrome: a systematic review and meta-analysis https://pubmed.ncbi.nlm.nih.gov/24100754/

[83] Salvia lavandulaefolia (Spanish sage) enhances memory in healthy young volunteers https://pubmed.ncbi.nlm.nih.gov/12895685/

[84] An extract of Salvia (sage) with anticholinesterase properties improves memory and attention in healthy older volunteers. https://www.pubfacts.com/detail/18350281/An-extract-of-Salvia-sage-with-anticholinesterase-properties-improves-memory-and-attention-in-health

[85] Salvia officinalis extract in the treatment of patients with mild to moderate Alzheimer's disease https://onlinelibrary.wiley.com/doi/abs/10.1046/j.1365-2710.2003.00463.x

[86] Green tea polyphenols and their potential role in health and disease https://pubmed.ncbi.nlm.nih.gov/26164000/

[87] Anti-inflammatory Action of Green Tea https://pubmed.ncbi.nlm.nih.gov/27634207/

[88] Chronic Inflammatory Diseases and Green Tea Polyphenols https://pubmed.ncbi.nlm.nih.gov/28587181/

9: Meals

Meal Frequency

Much has been made of meal frequency for fat-burning purposes. Fitness experts have claimed, “Eat smaller, more frequent meals to boost metabolism!” Some have even suggested that meal frequency was more important than overall caloric intake (notice a trend with these zealots?). Metabolism is smarter than you are, and there aren’t really any “hacks” like eating small, frequent meals to “stoke your metabolic furnace.”

Research has convincingly demonstrated that it does not matter how many meals per day are consumed; it’s total energy balance that drives fat loss[89]. To our knowledge, there are no studies that show differences in fat loss due to meal frequency when calories are equated. Indeed, we’re currently experiencing the opposite trend of fasting for fat loss and anabolism. While we don’t think eating small, frequent meals is superior for fat loss, we also don’t think consuming a single huge meal is superior, either.

Let’s look at an example of two meals per day versus eight meals per day with calories equated.[90] At each of those small meals, there will likely be less fat deposited in adipose due to the meals being smaller, which means fewer nutrients being shuttled into adipose on a per-meal basis. The two big meals would likely have a large amount of fat deposited into adipose tissue for the first few hours post meal. Ah ha! So more frequent meals are better for fat loss, right? Simply put, no.

Although two large meals would result in a large amount of energy stored in adipose initially, the body would then burn quite a bit of body fat in the postabsorptive state, since there would be a long postabsorptive phase where stored energy would need to be utilized. And, while the smaller meal group is storing less body fat at each small meal compared to the two big meals,

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[89] Increased meal frequency does not promote greater weight loss in subjects who were prescribed an 8-week equi-energetic energy-restricted diet: https://pubmed.ncbi.nlm.nih.gov/19943985/

[90] Effects of Increased Meal Frequency on Fat Oxidation and Perceived Hunger: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4391809/

they're still storing some at each small meal, or if they're in a caloric deficit, they're spending less time in a postabsorptive state and not getting a big increase in fat burning.
Once again, the net overall difference is zero with regards to fat loss.

Eat More Vegetables and Fruits: Standard Advice to Lose Weight

Before saying anything, let me ask you. How can I eat more and lose weight: the advice is at best incomplete, because it's not only about increasing the intake of fruits and vegetables, we must also eliminate the food that is making us unhealthy in the first place!

In 2014, researchers gathered all available studies on increased intake of fruit-and-vegetable and weight loss.[91] They could not find a single study to support this hypothesis. Combining all the studies did not show any weight loss benefits either. To put it simply, you cannot eat more to weigh less, even if the food you're eating more of is as healthy as vegetables.

So, should we eat more fruits and vegetables? Yes, definitely. But only if they are replacing other unhealthier foods in your diet. *Replace. Not add.*

[91] Increased fruit and vegetable intake has no discernible effect on weight loss: A systematic review and meta-analysis: https://pubmed.ncbi.nlm.nih.gov/19943985/

Snacking: It Will not make You Thin

For some reason, health professionals are now heavily promoting snacking, which previously, had been heavily discouraged. But studies confirm that snacking means you eat more.[92] Subjects given mandatory snacks would consume slightly fewer calories at the subsequent meal, but not enough to offset the extra calories of the snack itself. This finding held true for both fatty and sugary snacks. Increasing meal frequency does not result in weight loss.[93]

In addition, the quality of the food decreases substantially because snacks tend to be very highly processed, this includes crackers, chocolate bars, breads, pastries, most fruit juices, potato chips, just to name a few.

There are many factors that can lead to weight (fat) gain and loss. And while exercising is an important part of a healthy lifestyle, having a balanced diet contributes even more to losing fat. Undeniably, exercising can bring us additional benefits such as improving our metabolism and nutrition absorption. However, if we continue to consume large amounts of unhealthy, sugary and fatty products, we won't be able lose fat. Fat loss is difficult, and nearly impossible, to achieve if you aren't watching what you eat and the amount you eat. Even if you increase the intake of fruits and vegetables, you can't lose weight if you are still eating an unhealthy amount of sugar and fats.

As obesity rates in our world continue to climb, having scientific knowledge of health has never been more important. Especially because of the health and wellness boom in recent years that have resulted in many unqualified health gurus, spreading misinformation online for the sake of profit. Therefore, it's so important to understand the science behind health and wellness instead of listening to health advice that might permanently damage your body instead.

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[92] Carbohydrates, appetite and feeding behavior in humans: https://pubmed.ncbi.nlm.nih.gov/11584105/

[93] Increased meal frequency does not promote greater weight loss in subjects who were prescribed an 8-week equi-energetic energy-restricted diet: https://pubmed.ncbi.nlm.nih.gov/19943985/

FINAL WORDS

In conclusion, improving our quality of life, longevity and health span is quite easy if we follow the simple steps that we have shown you in this document. Do not focus on short term diet plans, but on healthy nutrition that includes all the nutritious foods that your body needs to feel and function optimally. Be aware of how you feel when you eat the food you eat and learned to understand the signals that your body, send you. You should you feel active and energized, energized all the long. Don't forget that well to hydrate yourself, to have a good quality sleep, and manage your stress levels.

Whatever you do, focus on long term healthy habits that adapt to your current lifestyle and be open to modify them and improve, avoid long term restrictions that will only make you feel frustrated, it will not work long term.

Now you have an overall understanding of how foods and lifestyle affect your health and your aging process. Take action. Remember, take small steps at a time, with specific goals and make it consistent. Willpower is not what will lead you to a healthy lifestyle, habits will.
And do not forget that conventional wisdom, regarding nutrition and exercise science is mostly wrong. If you have any doubt, please do your research. Here I have put together the most the important basic knowledge that you will need including all the relevant science-based research to for you to know what is happening in your body, and take the proper steps to a healthier lifestyle, one step at a time.