LONGEVITY ROADMAP

Become Young at Any Age

30 Days to Aging Backwards

WORKBOOK

MARK HYMAN, MD

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WELCOME TO THE LONGEVITY ROADMAP: 30 DAYS TO AGING BACKWARDS WORKBOOK

I like to say that aging is in the hands of the "ager." Aging does not have to mean getting old.

That's why I put together my new docu-series, The Longevity Roadmap: *How to Slow Down Inflammaging, Step into Vitality, and Become Young at Any Age*.

I plan to live to be 120 and do it well. That means staying active, sharp, strong, energetic, and engaged at every age. With the emerging research on longevity and the right mindset, I believe that's possible.

In this workbook, I break down all of the research my colleagues from The UltraWellness Center and I shared with you throughout the series into easy-to-follow action items. This is where you start reversing aging in your own body, today. Some of our most simple, everyday habits have immense opportunity to impact the way we age—this Longevity Roadmap Workbook will be your guide to preventing chronic illness and supporting a long life of vitality.

By focusing on healthspan as opposed to just lifespan, we're able to extend our years of feeling great and living fully—instead of extending our years and struggling through the last of them.

We can do that through addressing the root cause of inflammation; balancing hormones; caring for the microbiome; eating a longevity-promoting diet; focusing on community; supporting lean muscle mass and staying active; asking our doctors the right questions and getting the right tests; and practicing self-care through multiple lifestyle choices like good sleep practices (and much more). There is so much exciting new science in these areas that can literally turn back the signs of aging and lead to more youthful years ahead; I'm going to walk you through it.

There's also incredible research available specifically for avoiding the diseases associated with aging, like cardiovascular disease and cancer. As always, it's not just one part of the body we need to focus on. We need to support all of our systems as a whole. In doing so we optimize our energy production on a cellular level and stimulate our bodies' natural resilience. That includes creating a stronger immune system, something we've seen is especially important for those in their later years of life during the coronavirus pandemic.

Using Functional Medicine combined with the emerging science of Regenerative Medicine allows us to promote vitality *and* longevity—we get the best of both worlds. And it's important to note that genetics are not our destiny and we can change our genetic expression using these action items. If you've feared you're in for the same fate as your parents or grandparents, think again. Your genes load the gun, but your environment pulls the trigger. This is good news. It means that your daily behaviors control your health more than anything else.

Despite your chronological age, you have the ability to change your biological age. I just turned 60 last year and have the biological age of a 39-year old. I have seen that number come down using the very methods laid out in this workbook. I can't wait to share them with you.

Are you ready to feel younger every day? Let's get started!

Mark Hyman, MD

A Note About Medication

Even though I believe that medication will not solve the root cause of most illnesses, taking medications are required in many situations. Medication can be life-saving. If you are on medication, please work with your doctor while following this program. I do not recommend getting off of any medication without working with your doctor.

A Note About Following this Program

Participation in 30 Days to Aging Backward is completely voluntary, and before starting this plan, you are agreeing to participate for wellness informational purposes only. Nothing presented, stated, or suggested in this workbook shall be considered medical advice, and all information shall solely be considered general wellness information. Please understand and acknowledge that any specific information or changes to your diet, lifestyle, medication, or overall health should be discussed with your primary care provider and not be based solely on information presented, stated, suggested, or learned in the Longevity Roadmap docuseries or in this workbook.

Who this Program is Not For

This plan is not meant for anyone under the age of 18. There are many aspects of this plan that can be helpful such as eating a whole foods diet; however, children and anyone under 18 should not implement any part of this program without working with a doctor.

If you are currently under the care of a doctor for a serious medical condition, please do not follow this program without the approval of your doctor.

This program is not recommended for anyone who is pregnant, nursing, or actively trying to conceive.

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HOW TO USE THIS WORKBOOK

It often takes achieving our most vibrant health for us to realize just how unwell we were in the past. Follow the sections listed below to gauge your current healthspan so that after the 30 Days to Aging Backwards Plan, you can see just how far you've come.

Section One—The Assessment:

- First, complete the "How's Your Healthspan?" quiz, starting on page 7.
  - Make sure to make careful and honest assessments.
  - Retake the quiz following the 30 Days to Aging Backwards to check your progress.

Section Two—The Overview:

- Next, review the 7 Keys to Aging Backwards Overview, starting on page 9.
  - This section breaks down the seven areas I believe are the most important when it comes to longevity and healthspan.

Section Three—The Keys:

- Then, dive into each Key, starting on page 13. Each Key includes:
  - An in-depth before-and-after quiz to identify how much attention that particular Key may need.
  - An explanation of why I believe each Key is important for longevity.
  - A step-by-step action guide containing items you can start today to radically improve your health.
  - A list of tests you can request your health practitioner can run, if you suspect dysfunction.

Section Four—The Plan:

- Finally, jump into the 30 Days to Aging Backwards Plan, starting on page 89, which covers:
  - My Three Pillars to Age in Reverse.
  - An extensive "What to Enjoy/What to Limit" foods list.
  - Tips for success on the plan and a daily habits schedule.
  - Step-by-step instructions to increase your healthspan and age backwards.

Section Five—The Decades:

- Take it up a notch by checking out this section, starting on page 117.
  It will walk you through specific areas to focus on as you age.

Section Six—The References and Resources

- Dig even deeper in this section, starting on page 120, which includes:
  - Where to find a Functional Medicine and mental health practitioner.
  - My favorite longevity and mindset books and podcasts.
  - Pegan diet recipes.
  - Recommended gadgets and apps.
  - A list of all the supplements listed in the workbook.
  - All references mentioned throughout the workbook.

It's never too late to improve your healthspan and stay young at every age.

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TRACKING YOUR PROGRESS

You'll never know how far you've come until you reflect on where you've been. Take this "How's Your Healthspan?" quiz before and after your 30 Days to Aging Backwards Plan. Think about these questions and assess yourself objectively; try to be as honest as possible.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

HOW'S YOUR HEALTHSPAN?	BEFORE:	AFTER:	DIFFERENCE:
I WAKE WITH ACHES AND PAINS			
I HAVE A HARD TIME GETTING OUT OF BED IN THE MORNING/NEED TO NAP IN THE MIDDLE OF THE DAY			
I NEED COFFEE/TEA TO FUNCTION			
I STRUGGLE WITH SKIN ISSUES			
I EXPERIENCE HAIR THINNING/LOSS OR BRITTLE/DRY HAIR			
I GET FREQUENT HEADACHES/MIGRAINES			
I OFTEN FORGET THINGS EASILY			
I SOMETIMES FEEL DEPRESSED OR ANXIOUS			
I HAVE BEEN DIAGNOSED WITH DIABETES OR PREDIABETES			
I EXPERIENCE ENERGY PEAKS AND DIPS THROUGHOUT THE DAY			
I HAVE LOW SEXUAL DESIRE/FUNCTION			

HOW'S YOUR HEALTHSPAN?	BEFORE:	AFTER:	DIFFERENCE:
I AM NOT ABLE TO DO SOME OF THE THINGS I WISH I COULD DO (I.E. PLAY TENNIS, HIKE A MOUNTAIN, ETC.)			
I FEEL NEGATIVELY IMPACTED BY STRESS			
I FEEL OUT OF BREATH EASILY OR WHEN WALKING UP STAIRS			
I OFTEN HAVE BLOATING, GAS, ACID REFLUX AFTER EATING			
I HAVE IRREGULAR BOWEL MOVEMENTS (LESS THAN 1 PER DAY OR MORE THAN 5 PER DAY)			
I CRAVE SWEET FOODS			
I WAKE FREQUENTLY THROUGH THE NIGHT OR REQUIRE THE USE OF SLEEP AIDS			
I USE STATINS			
I HAVE PHYSICAL REACTIONS TO STRESS AND ANXIETY			
TOTAL			

KEY

0-20: You're on track to age in reverse! If you scored low, it's all about maintaining the vibrant health and lifestyle to have a strong healthspan. Keep up the good work!

21-40: There are some areas that could use some attention—some minor adjustments to your diet and lifestyle will show improvements here!

41-60: It's likely that your healthspan isn't in tip top shape. But, there are some manageable diet and lifestyle suggestions that can make a huge difference.

61-80: Your healthspan could use some serious attention, make sure you're working with a doctor or Functional Medicine practitioner for one-on-one direction to help get you back on track.

RESULTS

How was your score? Were you surprised by the quiz results? So often, we get stuck in routines and neglect to take the time to assess our health. We accept aches, pains, fatigue, and excess weight as inevitable, or we ignore them entirely. It's not until we sit down and seriously assess our own health that we realize we don't feel youthful, energized, or amazing. So, if you're surprised by your quiz score, you're not alone. Keep reading.

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7 KEYS TO AGING BACKWARDS OVERVIEW

HEALTHSPAN

How Is Your Healthspan?

When was the last time you were excited to jump out of bed in the morning? Or had the energy to do all the activities you'd like to do? How about the last time you had no joint pain, didn't rely on prescriptions, or had clear thoughts and cognition all day long? To be honest, most of us are barely getting by. Many people don't realize that true, vibrant health really can exist.

So many of us drag ourselves out of bed in the morning, glug several cups of coffee, experience fatigue, mental blocks, energy drains, and a little fluff around the midsection. We spend all day looking forward to bedtime, then experience restless sleep at night, and repeat day after day. That is NOT vibrant health. That is surviving, but not thriving.

We seem to accept aches and pain, loss of energy, memory issues, and loss of mobility as inevitable signs of aging. We view crossing "over-the-hill" as a new normal full of:

- Hearing loss
- Joint pain
- Memory troubles
- Increased diseases
- Poor digestion
- Frequent night wakings
- Loss of mobility
- Muscle loss
- Fatigue

And even if you're feeling okay right now, when we view the diseases associated with aging, the statistics[1,2,3] paint a pretty grim picture:

- 6 in 10 Americans currently suffer from at least one chronic disease.
- 4 in 10 have more than one chronic disease.
- In a few years, 83 million Americans will have **3 or more** chronic diseases.
- By 2030, it's projected that 50% of the adult American population will be obese.
- By 2030, it's also projected that Americans 65 and older requiring nursing home care will increase to **1.9 million**.
- By 2050, Americans living with Alzheimer's disease could **more than double** to 13.8 million.
- By 2050, Social Security and Medicare expenditures will increase from a combined 8.7 percent of gross domestic product today to **11.8 percent**.
- We spend about 90% of our lifelong healthcare dollars in the last 2-3 years of our lives. These are long, painful, expensive deaths.

Improving Your Healthspan

We are living longer, but we are NOT living better.

Longevity is not just about extending lifespan. No one wants to live to be 120 if our health, energy, and function peak at age 40 and steadily decline until we're bedridden. However, it does not have to be this way. There are simple and easy things you can do every day to help make your healthspan equal to your lifespan—to make your golden years even better than your adolescent years.

The good news is that you aren't alone and there is help. The bad news is that you aren't likely to find the help you need in a conventional doctor's office. This is because we have been looking for the answer to healthspan in the wrong places.

You see, the solution to your healthspan probably won't be found by using more pharmaceutical medication or using drugs to treat the symptoms of one disease or another. There aren't any magical pills that bring immortality and we can't find the fountain of youth by mechanically or chemically extending the amount of years in a lifespan. In other words, the answer isn't about making us live longer. It's about making us live better.

My guess is that if you have come to this program you are suffering from one of the signs of aging outlined above. It's likely you've been looking for answers—perhaps desperately searching for them—for many years.

The Keys to living a youthful, vibrant, and healthy life can be found in my 7 Keys to Aging Backwards. When these key systems are out of balance, your body breaks and you may suffer from a long list of disorders associated with aging, from depression to dementia, from Alzheimer's to diabetes, from brain fog and memory loss to joint aches and pains, from fatigue to muscle loss, and everything in between. But it doesn't have to be this way. Getting old does not have to equal getting sick and slow.

When you rebalance these systems, your body will heal itself. And it doesn't take years to do it. You can rebalance the 7 Keys and begin to age backwards within a matter of weeks.

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THE 7 KEYS TO AGING BACKWARDS

In medical school, I was taught all about how to identify symptoms, categorize the disease, name it, and match pharmaceutical treatments to manage it. I was never taught about treating the *underlying* cause of disease or what it takes to create vibrant, energetic, lifelong health.

The 7 Keys are based on the most crucial areas of life that contribute to wellness. I use Functional Medicine principles—the biggest revolution medicine has seen in the last 100 years—to improve your whole-body healthspan and create vibrant health. These Keys allow us to take a personalized approach based on the specific areas in the body that have the biggest role in disease, aging, and health.

By addressing these 7 Keys (which is what I am going to teach you to do in this program), your health will get a major makeover. If you're tired of experiencing less than optimal health, struggling to get out of bed in the morning, desperately wanting to stay young as long as possible, or wondering what your golden years will look like, or worse: dreading them, pay close attention to these Keys. This workbook lays out exactly what you need to know to feel young at every age.

Here is a brief introduction to the 7 Keys to Aging Backwards. In the next section, I will go into greater details about each of them.

Key #1: Reduce Inflammaging

Inflammation is at the root of many (some would argue all) chronic conditions. Our modern diets and lifestyles have created an environment of chronic inflammation. While life-saving and extremely important in acute situations, inflammation and inappropriate immune response can wreak havoc on our health. Balancing your immune system and cooling off chronic inflammation is essential to creating optimal health.

Key #2: Keep Your Hormones In Check

Your hormones help you maintain great health and keep you happy, focused, and calm. They control everything from your stress response through the adrenal glands, to your blood sugar balance through the pancreas, to your thyroid hormone through the thyroid gland, to your sexual behavior and function through the reproductive organs. Hormones also control growth, muscle tone and mass, mood, longevity, and so much more.

Key #3: Fuel Your Energy Powerhouse

Life is energy. When no more energy is produced in your cells, you die. The process of extracting energy from the food we eat and the oxygen we breathe is the most essential process to life. Your mitochondria are microscopic organelles found in your tissues that generate energy to keep you alive. Keeping those metabolic engines running smoothly and protecting them from harm are essential for health.

Key #4: Feed Your Beneficial Bugs

The more we learn about your holobiome, or all of the beneficial bacteria living on and in us, the more we understand the immense benefits of feeding, supporting, and optimizing our good bugs. Beneficial bacteria help you digest, absorb, and assimilate foods, protect you from invaders on your skin, in your digestive tract, your nasal passage, your lungs, and literally everywhere on your body, and they keep your immune system healthy.

Key #5: Keep Your Cells Clean

Our bodies are equipped with a very sophisticated detoxification and cleaning system. However, we are overwhelmed with insults from every direction. Toxins are everywhere: in our air, water, food, skincare products, medications, furniture, cars, and so many other parts of daily life. The toxic burden in the 21st century is overwhelming, and often our bodies can't keep up. This leads to dis-ease. It's crucial to clean up your cells and support your natural detoxification systems.

Key #6: Protect Your Vehicle

Your body is the vehicle that transports the organs, tissues, and cells that make you "you" all throughout your life. Just like a car or truck, regular maintenance and use is important to keep the vehicle running smoothly. Daily movement keeps your body young and active. Incorporating fun, exercise, and movement into your daily routine sets the foundation for a vehicle that keeps running for decades.

Key #7: Nourish Your Spirit

Studies show that having a strong sense of purpose in life is associated with a longer, more fulfilling lifespan.[4,5] Nourishing your spirit through purpose, building community, finding support and love, a sense of empowerment, and connection all help to enhance your healthspan. It's so easy in our modern society to be overwhelmed by stresses like social isolation, overwork, negative news, disconnection, comparison, and media addiction. You can't live a long, fulfilled life with an empty spirit.

I know the truth of these Keys, both as a doctor and a patient. I have scoured the medical literature and reviewed thousands of scientific articles in search of this information. As I turned 60 recently, I am dedicated to making my remaining 60 years even better than my first. (Yep, I plan to live until I'm 120, and live *well*.)

So, how about you? Let's get started.

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THE 7 KEYS DEEP DIVE

KEY #1: REDUCE INFLAMMAGING

Our immune systems are sophisticated and complex. They work feverishly (excuse the pun) to keep us safe, healthy, and protected. In an ideal world, we would only experience very short bouts of stress (like being chased by a predator), have minimal toxic exposures, get an abundance of sunlight, fresh air, and movement, and would be rolling around with our children and animals in the soil all day.

Unfortunately, in our modern times, we commonly experience long-term, chronic stress. We are cooped up indoors for the vast majority of our days and have relatively limited access to the beneficial bacteria found in our soils, animal dander, and natural environment.

While we have adapted to many of these changes, when our systems are overloaded by insults from every direction, like chronic stress at work, financial worry at home, raising children in a mono-culture as opposed to a village, devices and information at our fingertips, and toxins all over the place, our bodies just can't keep up.

On one end of the spectrum, our immune system might hyper-respond to all of these insults, potentially leading to an autoimmune condition where the immune system attacks its own body. And on the other end, it might be so fatigued from the constant exposures, it simply quits.

One of the most important features of the immune system is its ability to cause inflammation. Inflammation gets a bad rap, but it is crucial to our survival. In an acute accident, a laceration from cutting slippery tomatoes, for example, our body's normal-functioning immune system springs into action. The platelets in our blood band together forming a clot at the laceration site to stop any excess bleeding. These platelets release cytokines, which signal the next line of defenses in our immune system to scan our body for any signs of infection and respond accordingly. This rush of platelets and cytokines can cause the area to feel warm and swollen—that's inflammation, and in scenarios like this, it serves an essential function.

Any germs that enter our body through the dirty knife will require different immune cells to fight them off, called neutrophils and macrophages. Luckily, we have these cells across the entire body, always at the ready to jump into action. These cells react by "eating" invaders, shooting antimicrobial proteins at them, catching them, collecting them, and/or disposing of them.

Our immune system also includes T-cells and B-cells, located in the lymphatic system. These cells act as defenders and aid in the removal of unwanted invaders. A principal role the T and B cells play is in "remembering" these invaders so that should we encounter them again, our adaptive immune system is already equipped and ready.

The reason inflammation gets a bad rap comes from when we experience chronic, low-grade inflammation. Things that cause our immune system to react include infections, toxins from our environment or food, eating an inflammatory diet, chronic stress, micronutrient deficiencies, inactivity, or altered gut function. Any time we are experiencing one of more of these insults, our immune system creates inflammation.

Have an intimidating boss? Tight deadlines? Financial worries? What about exposure to exhaust? Pollution? New car or carpet? What about new furniture? Do you know the ingredients in your shampoo? Do you drink out of plastic bottles? The list goes on, but it's easy to see that a lot of things you might not be aware of can be insults to your immune system and result in low-grade inflammation in your body. Did you answer "yes" to many of them? It's entirely possible that you have long-term, chronic inflammation.

In addition to toxic inputs and situations, serious long-term chronic inflammation can stem from another invisible source, and it's something you can affect 3 or more times every day: blood sugar.

Understanding Blood Sugar and Insulin's Role in Your Body

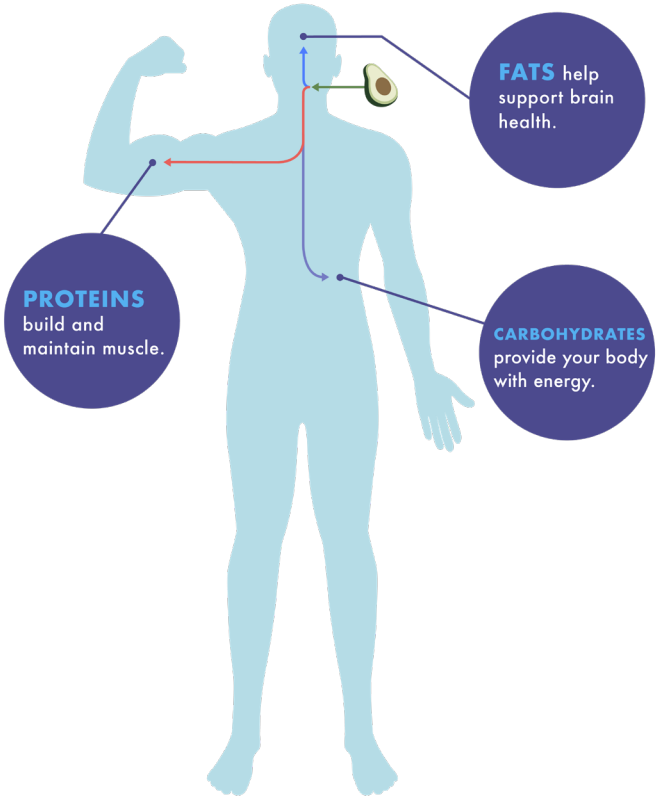
In order to understand how the foods you eat can cause inflammation, we need to take a deep dive into exactly how blood sugar and your hormones insulin and cortisol interact in your body. To get started, we need a brief overview of digestion and metabolism—what happens when we eat food.

All foods consist of elements called "macronutrients"—most people are familiar with proteins, fats, and carbohydrates. Proteins are a type of macronutrient found in meats, lentils, beans, and other foods that break down into amino acids and are used by your body to help repair and support muscles.

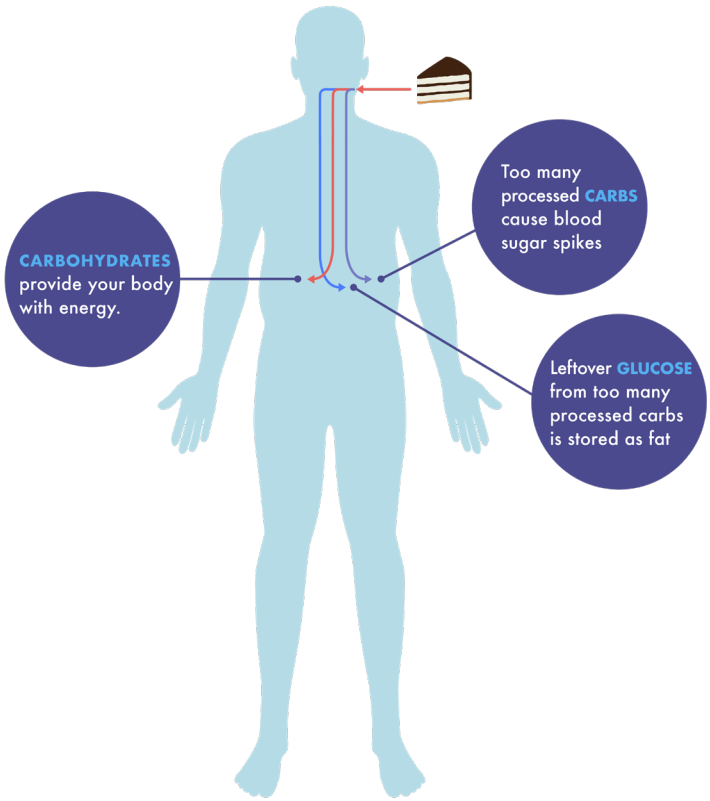
Fats are a type of macronutrient found in meats, oils, nuts, seeds, and foods like avocados and coconuts. Fats from these foods break down into different structures of fatty acids, each that perform different, extremely important tasks, such as supporting healthy inflammation levels, effective cell-to-cell communication, and cell membrane integrity.

Carbohydrates (carbs) can be found in fruits, vegetables, grains, and sugars and break down into glucose, the term for sugars in your bloodstream. Most foods are a combination of all three macronutrients, which is a good thing. However, for this Key, we will mostly focus on foods that are carb-heavy, meaning, they don't have as much protein or fat.

When you eat a balanced food or meal, such as an avocado, your body digests the food, breaks it into smaller bits of fats (fatty acids), proteins (amino acids), and sugars (glucose, fructose, galactose, etc.). Those smaller components are sent throughout your body to be used in processes that create the fuel you need to perform activities, concentrate on tasks, remember important details, maintain excellent cellular communication—basically everything you need to do to function. This is a very good thing.

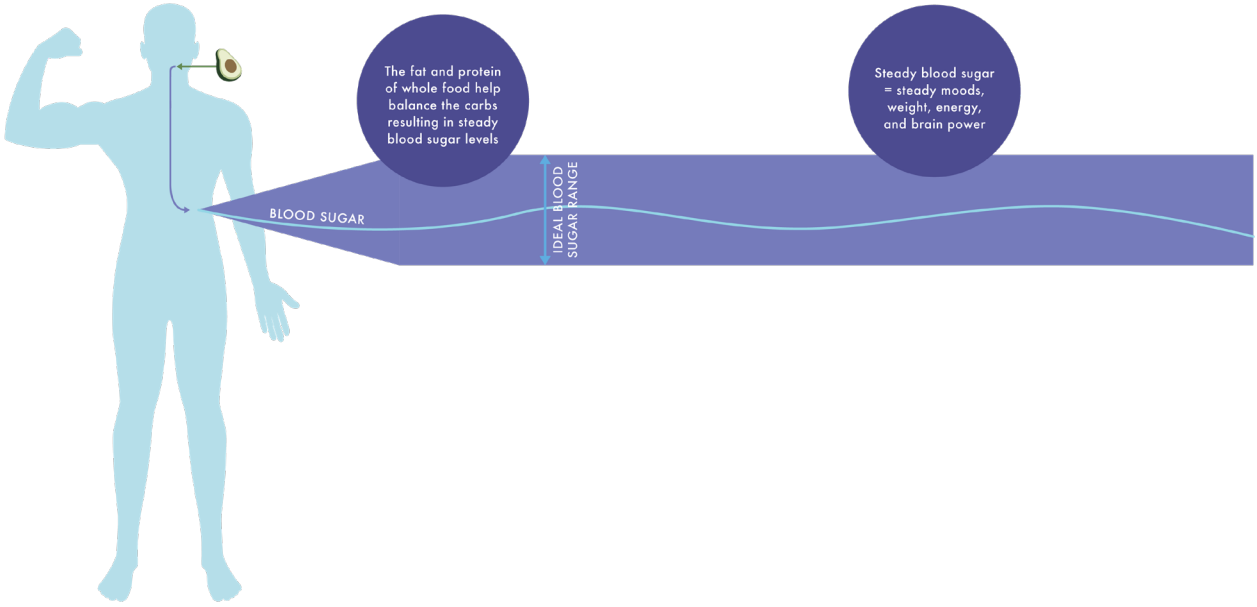


When you eat a food that is very carb-rich, such as a piece of cake, your body digests the food and breaks it into smaller bits of sugars (glucose) that are shunted to your bloodstream. Insulin is secreted from your pancreas to direct your cells to take up the glucose to be used as fuel or stored as fat if there's too much glucose available. The carb-rich food can cause your blood sugar levels to spike because your body digests carbs very quickly and can send a huge wave of glucose into your bloodstream.



Your body maintains restrictive levels of blood sugar because without some glucose, some cells will die, and with too much, cells can be damaged and no longer functional. Too low or too high of blood sugar is extremely stressful to our bodies, so it's imperative to our health that our blood sugar stays within range.

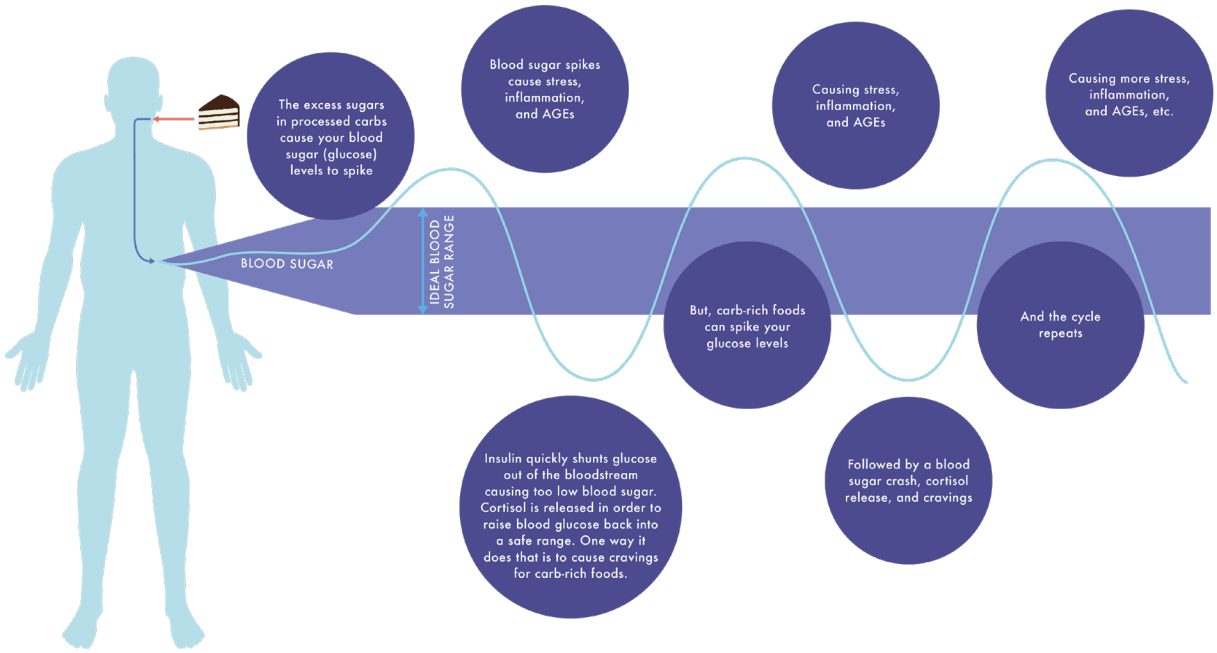
BLOOD SUGAR RESPONSE



These blood sugar extremes are literally life or death to your cells and your body. During periods of uncontrolled blood sugar levels, your body does NOT prioritize focus, mental clarity, vitality, vibrant skin, proper weight, muscle structure, hormonal balance, fertility, etc. Your body has one priority: to survive. And as you can imagine, it would be taxing on you mentally, emotionally, and physiologically to constantly be in a state of "Will I die today?" Think about how the deep inner workings of your body would feel in this reactive state day in and day out.

When you consume a carb-rich meal, initially, your blood sugar levels rise dramatically. Because this is a life or death situation for your cells, it is imperative to remove glucose from your blood quickly and effectively, and insulin is very good at its job. So good, that it diverts the glucose so quickly, it causes your blood sugar levels to crash. Ever noticed feeling quite sleepy about an hour after eating a carb-rich meal? That's why.

BLOOD SUGAR RESPONSE



One problem with blood sugar crashes is that our body responds by releasing the stress hormone cortisol (remember: when blood sugar is too high *or* too low, it is extremely dangerous for our body). Cortisol isn't inherently bad. In fact, it is very beneficial to help regulate blood sugar levels, stabilize blood pressure, and store memories. Cortisol is a steroid hormone regulated by the sympathetic "fight-or-flight" nervous system. It's responsibility in blood sugar regulation is to tell your liver to make more glucose when blood sugar levels get too low. It also plays a part in prioritizing functions like shunting glucose to the brain and muscles for rapid use. This is useful when you're in immediate danger, as well as helpful for curbing functions less important for short-term survival—when your cortisol is high, your body does **not** prioritize things like proper digestion, reproduction, or fighting inflammation.

Note:
Chronic stress from things like a demanding job, unsupportive relationships, financial or health worries, or anything that causes emotional unrest also elevate cortisol.

Clearly, this isn't helpful *unless* you're in immediate danger. So, every time you experience a large blood sugar fluctuation, your body is also experiencing the stress of frantically directing glucose, activating its fight or flight response, producing insulin and cortisol, and storing excess sugar as fat. Imagine that happening with *every* meal.

Luckily, this is something you can control by prioritizing the foods you eat. More on this later.

Insulin Resistance, AGEs, and Inflammation

If this cycle continues over time, your cells begin to become less sensitive or even immune to insulin signaling. They literally tune it out. If this happens and then you consume a carbohydrate-containing food, you're left with increased blood sugar circulating in your bloodstream and a non-responding insulin-signaling pathway, which causes your pancreas to produce even more insulin—we call this insulin resistance. This situation can result in dangerously high blood sugar *and* insulin levels.

This is a big deal when it comes to healthy aging and longevity. In fact, high blood sugar contributes to increased levels of advanced glycation end products, aptly shortened to AGEs, which are compounds that contribute to oxidative stress and inflammation in the body (and you guessed it—accelerated aging!). Without getting into all the chemistry of it, the short explanation is that AGEs can form as a normal part of metabolic pathways in the body, from the spontaneous non-enzymatic reaction that combines certain kinds of sugar molecules with the amino groups of proteins or lipids from fats. One major source of both inflammation and increased AGEs is chronically elevated blood sugar caused by insulin resistance.

We also get AGEs through diet, for example by cooking sugars with protein or fat at very high heat. That means that sugary BBQ sauce smothered over your chicken thighs is causing some real damage. The browning on a crust of bread or sear marks from the grill are also signs of the reaction that produces excess AGEs.

AGEs are a major concern because they are irreversible once formed. And it's a dangerous cycle—more AGEs, equal more inflammation, which increases AGEs, and the cycle continues.

Not only do AGEs have a major correlation with inflammation, but they have also been found to make many chronic conditions worse, including diabetes, cardiovascular disease, neurodegenerative diseases.[1] They are toxic molecules that create reactive oxygen species (ROS) and cause cell death, organ damage, and mitochondrial dysfunction. AGEs are counterintuitive to healthspan and longevity.

Luckily, there are simple ways to reduce your AGEs and the most important one is to balance your blood sugar. You can also make sure you're consuming plenty of natural antioxidants, in the forms of whole vegetables and occasional fruit, and you can make sure you're not eating charred, heavily grilled, or sugar-coated cooked or fried foods, like BBQ. Low, slow, moist cooking methods, and acidic marinades help to offset the production of AGEs, especially for meats. I go into steps to reduce your inflammaging later in this key, and all steps are helpful to reduce your AGEs as well.

Insulin Resistance, Metabolic Syndrome, and Inflammaging

Because chronic excess blood sugar gets stored as fat, it's common to see obesity or extra weight go hand-in-hand with insulin resistance, but not always. It can also cause a condition I refer to as "skinny-fat,"[2] where the excess fat is stored around the vital organs. An individual like this may not look overweight, but the stored visceral fat can be even more dangerous than subcutaneous fat, which is visible fat stored under the skin.

Those experiencing diabesity and insulin resistance tend to have quite high inflammation levels and most likely have metabolic syndrome. Metabolic syndrome is a term for someone who has high blood glucose and insulin levels, dyslipidemia (cholesterol and triglyceride numbers that are out of range), elevated blood pressure, high C-reactive protein (a marker for inflammation), and obesity or increased waist-to-hip ratio.[3]

Metabolic syndrome is problematic because having it means that you are at increased risk for heart disease and atherosclerosis, diabetes, Alzheimer's and dementia, obesity, and chronic inflammation.[4] And, I believe there are many more people with metabolic syndrome than we recognize. In fact, only 12% of the US adult population is metabolically healthy.[5] That means, about 9 in every 10 adults either have metabolic syndrome, or are well on their way.

Most likely, they're already experiencing one or more symptoms, including many that I've mentioned in Key #1 on inflammaging: increased blood sugar and insulin, elevated cortisol and stress, excess fat and toxin storage, high AGEs, high inflammation, and a decreased healthspan because of it all.

That also means about 9 in every 10 US adults likely has chronic inflammaging. Do you?

Do You Have Inflammaging?

Inflammaging isn't necessarily something that will wave obvious red flags on your annual physical exam, but it definitely has a bunch of sneaky symptoms you need to be aware of. Most of us have experienced, or are currently experiencing, serious inflammaging, though we might not recognize the signs because a lot of these signals are brushed off as "normal aging." Do you have inflammaging? Take this quiz to give you an idea.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

HOW'S YOUR INFLAMMAGING?	BEFORE:	AFTER:	DIFFERENCE:
I WAKE WITH ACHES AND PAINS			
I NOTICE STIFFNESS AND/OR PAIN IN MY JOINTS			
I NOTICE SWELLING IN MY BODY			
I GET SICK WITH A COMMON INFECTION (COLD, FLU, ETC.) OFTEN			
I EAT GRILLED, CHARRED, AND/OR BBQ FOODS OFTEN			
I GET FREQUENT HEADACHES/MIGRAINES			
I HAVE BEEN DIAGNOSED WITH DIABETES OR PREDIABETES			
I HAVE A HIGH FASTING GLUCOSE (>80 MG/DL), INSULIN (>5 µIU/ML), OR HBA1C (>5.5%)			
I FEEL FATIGUED			
I EXPERIENCE DEPRESSION			

LONGEVITY ROADMAP

Become Young at Any Age

HOW'S YOUR INFLAMMAGING?	BEFORE:	AFTER:	DIFFERENCE:
I HAVE LOW SEXUAL DESIRE/FUNCTION			
I AM NOT ABLE TO DO SOME OF THE THINGS I WISH I COULD DO (I.E. PLAY TENNIS, HIKE A MOUNTAIN, ETC.)			
I OFTEN EXPERIENCE GI ISSUES (I.E. CONSTIPATION, DIARRHEA, ACID REFLUX, ETC.)			
I HAVE A HARD TIME INTENTIONALLY LOSING (OR GAINING) WEIGHT			
I GET FREQUENT INFECTIONS (SINUS INFECTIONS, URINARY TRACT INFECTIONS, EAR INFECTIONS, ETC.)			
I HAVE A HARD TIME SLEEPING ALL NIGHT			
I GET MOUTH SORES			
I HAVE SKIN IRRITATION, RASHES, ERUPTIONS, BLEMISHES, ETC.			
I FEEL DIZZY SOMETIMES			
I EXPERIENCE DRY EYE			
TOTAL			

KEY

0-20: Your inflammaging levels are great! Keep up the good work!

21-40: You could use some attention on inflammaging—some minor adjustments to your diet and lifestyle will show improvements here!

41-60: Your inflammaging levels need some attention, make sure to pay attention to this section.

61-80: Your inflammaging is severe, make sure you're working with a doctor or Functional Medicine practitioner for one-on-one direction to help support healthy inflammaging.

RESULTS

How'd you do? And more importantly, how do you feel? If you scored higher than a 40 on this quiz, it's likely that you are experiencing pain, swelling, stiffness, brain fog, and other symptoms that are typically associated with "normal" aging. However, it's not normal and there's something you can do about it. Keep reading!

Conventional vs. Functional Approach

Conventionally, as we age, it's considered "normal" to have joint pain and stiffness, brain fog, trouble remembering things, vision and hearing loss, immobility, and general slowing down. However, in the Functional Medicine world, many of the signs considered "normal aging" are actually unresolved inflammation and something that can be both addressed and improved in many, if not all, cases.

Unfortunately, conventional medicine tends to follow an approach I like to call the "pill for every ill" style of medicine. Got pain and stiffness? Here, take an NSAID. Blood sugar too high? Take Metformin. Cholesterol high? Here's a statin. None of those approaches address the cause of pain and stiffness, high blood sugar, or cholesterol.

Inflammation comes from things in your diet like sugar, gluten, processed carbohydrates, dairy, and food sensitivities. It comes from unregulated blood sugar and insulin resistance. Even without a diabetes diagnosis, prediabetes and metabolic syndrome are rampant. In your lifestyle, things like chronic stress, poor sleep, inactivity, and lack of community and solid relationships can contribute to increased inflammation.

In Functional Medicine, we always ask, "Why?" Why are you experiencing joint pain and stiffness? Why is your blood sugar unregulated? Why is your cholesterol a concern? This helps to identify the root cause of your inflammaging so we can create an individualized protocol including dietary guidance, helpful supplements, stress-reducing activities, a movement plan, and/or sleep hygiene practices depending on your specific situation. An individualized root cause approach can make a significant impact on inflammation and inflammaging.

5 Steps to Reduce Inflammaging and Feel Better Today

Inflammation is at the root of every chronic condition—it is pervasive and affects nearly everyone. It is crucial to address, but there are simple, practical, and doable steps you can take today to make a significant impact quickly and effectively.

Step 1: Eat Inflammation-Busting Foods

The first step for improving inflammation is to focus on the things that contribute to healthy inflammation levels and support the immune system.

INFLAMMATION-BUSTING FOODS TO ENJOY

WHY EAT **NON-STARCHY VEGETABLES**?	WHAT TO EAT:	WHY EAT **FATTY FISH**?	WHAT TO EAT:
Veggies are loaded with phytonutrients, polyphenols, and fiber that help to balance blood sugar, provide your cells with fuel, support your detoxification organs, and allow your biochemical pathways to run efficiently—all things your immune system requires to function appropriately.	The more vibrantly colorful, the better. Make sure to eat a rainbow of veggies every day—try to get every color, and eat organic, if possible. Leafy greens, peppers, onions, radishes, and cucumbers are just some of my favorites. Mushrooms, like shiitake, reishi, and turkey tail are great to support the immune system. Starchy veggies are also loaded with beneficial phytonutrients, but can affect your blood sugar. Try to stick with the most nutrient-dense varieties, like sweet potatoes, yams, and squash. Limit to ½ cup per day. For more info on why to eat organic, make sure to check out Key 5—Keep Your Cells Clean.	Fatty fish, like wild-caught salmon, contain beneficial omega-3 fatty acids6 including docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). These are important to keep your omega-6 to omega-3 ratio around 1:1 to 2:1, which is ideal. If this ratio gets too far out of proportion, you can end up with inflammation. EPA and DHA are also great for your heart, brain, skin, nerves, and joints.	Try to incorporate low-mercury fish at least once per week: • Salmon • Sardines • Anchovies • Mackerel • Herring • Bass • Shellfish like oysters and mussels
WHY EAT **WHOLE FRUITS**?	WHAT TO EAT:	WHY EAT **NUTS AND SEEDS**?	WHAT TO EAT:
Fruits are an amazing source of antioxidants, polyphenols, and other phytonutrients, which quell the free radicals and reactive oxygen species that contribute to inflammation and can damage your cells.	Stick with low-glycemic fruits like: • Berries • Green apples • Kiwi • Consider high-glycemic fruits an occasional treat • Avoid fruit juices	Nuts and seeds are great sources of protein, healthy anti-inflammatory fats, and beneficial fiber.	• Walnuts • Brazil nuts • Cashews • Almonds • Macadamia nuts • Hazelnuts • Pecans • Pistachios • Chia seeds • Flax seeds Note: Peanuts are technically legumes and often loaded with mycotoxins and molds, make sure to eat organic or limit intake.

INFLAMMATION-BUSTING FOODS TO ENJOY (CONT.)

WHY EAT **QUALITY PROTEIN**?	WHAT TO EAT:	WHY EAT **HEALTHY FATS**?	WHAT TO EAT:
Pasture-raised, grass-fed, or wild-caught are non-negotiable when it comes to animal protein. Animals raised in their natural environments have much higher omega-3 fatty acid and conjugated linoleic acid (CLA) levels—both of which are beneficial to support healthy inflammation levels. Conventionally raised meats contain much higher levels of omega-6 fatty acids, hormones, and toxins that cause inflammation; avoid whenever possible.	• Locally-raised, grass-fed beef and pork • Pasture-raised chicken/eggs • Wild-caught fish • Organic beans and legumes **NOTE:** If you're vegetarian/vegan, make sure you soak your beans/legumes, aim for organic when possible, and include plenty of healthy fats in each meal to balance your blood sugar.	Your body is made up of trillions of cells. Each cell is made up of different types of fats. In order to ensure proper cellular communication, integrity, and function, your diet must be abundant in healthy fats. Your cells require fats to properly transport cholesterol, which is essential for repair of your cells, hormone synthesis, and nerve insulation. Fats are also needed for proper immune response, healing, and clotting. And of course, your brain is mostly fat, so keeping your brain healthy and sharp as you age requires a variety of healthy fats.	Stick with whole-food fats: • Avocados • Nuts • Seeds • Chia and flax seeds • Pasture-raised/grass-fed meats* • Wild-caught l ow-mercury fish • Grass-fed ghee and butter* • Coconut* • Olive oil • Avocado oil **See Pegan Fats section on page 95 for an explanation on why these fats may not be a good fit for everyone.*
WHY EAT GUT-HEALING FOODS?	**WHAT TO EAT:**	**WHY EAT HERBS AND SPICES?**	**WHAT TO EAT:**
70% of our immune system resides in our gut. Our gut health is deeply linked with our inflammatory and immune response. Having poor gut health often means having increased inflammation and decreased immune protection. The overuse of antibiotics in our bodies and livestock, our ultra-processed diet, toxic overloads, and lack of diversification in our diets has destroyed our guts. Eating gut-healing foods is crucial for supporting our immune system and a healthy inflammatory response.	Fermented foods like: • Natto • Sauerkraut • Tempeh • Unflavored yogurt and kefir • Lacto- fermented foods and pickles • Kimchi • Miso Prebiotic foods (food for our good bacteria) like: • Jerusalem artichoke • Onions • Garlic • Leeks • Asparagus • Acacia fiber • Green banana flour	Many herbs and spices are some of the most nutrient-dense foods that can not only enhance the flavor profile of your foods, but also contain very potent anti-inflammatory properties, like curcumin, quercetin, piperine, and others.	Add unlimited fresh and dried herbs and spices to your meals: • Turmeric • Ginger • Rosemary • Thyme • Cinnamon • Garlic • Cayenne • Black pepper • Basil • Sage • Oregano • Parsley • Cayenne • Saffron • Mint • Cloves

Step 2: Remove Inflammatory Foods

The second step for improving inflammation is to eliminate the things that contribute to inflammation.

INFLAMMATORY FOODS TO LIMIT			
WHY LIMIT **DAIRY**?	WHAT TO LIMIT:	WHY LIMIT **SUGAR**?	WHAT TO LIMIT:
Not only are roughly 75% of the population lactose intolerant, but dairy also contains other inflammatory properties that can cause gas, bloating, acne, ear infections, and congestion, among other signs of inflammation.7 Almost everyone can benefit from significantly reducing dairy.	• Cow's milk and cream • Cheese • Sweetened yogurts and kefir • Ice cream • Sour cream	Consuming sugar has been shown to damage your intestinal lining, disrupt your beneficial gut bacteria, and decrease your immune function. It contributes to diabetes and insulin resistance, is associated with heart disease and obesity, and can negatively impact your brain function. The verdict is out: sugar is no good.	• All sweeteners • Artificial sweeteners • Sugar alcohols • Cane sugar • May use minimal amounts of natural sweeteners like honey and pure maple syrup • Oh, and NEVER drink your sugar!
WHY LIMIT **REFINED GRAINS** AND **PROCESSED CARBOHYDRATES**?	WHAT TO LIMIT:	WHY LIMIT **FOOD SENSITIVITIES****?	WHAT TO LIMIT:
All grains are primarily made up of carbohydrates, and while there are some that are better than others, the majority of grains are consumed in the form of grain flours—think pastas, breads, bagels, cakes, crackers, pizza, ramen, etc. These flours can spike blood sugar exactly the same as table sugar and cause elevated blood sugar, insulin resistance, inflammation, weight gain, and have been associated with increased risk for heart diseases, diabetes, metabolic syndrome, and others.	• Limit pretty much anything you can find in a bag, a box, or a fast food joint. • Avoid *all* grains if you have diabetes, prediabetes, autoimmune conditions, or if you scored 41 or more on the How's Your Inflammaging? Quiz. If you scored less than 40, I still recommend avoiding gluten-containing grains and grain-flours.	Consuming foods you are sensitive or allergic to can contribute to leaky gut and inflammation, and sometimes the symptoms are easy to miss.[8] I discuss leaky gut much deeper in Key #4, but it's important to understand that consuming foods that cause acute allergic reactions, with symptoms of anaphylaxis, diarrhea, shortness of breath, etc. or chronic sensitivity reactions, with symptoms of itchy skin, headaches, brain fog, bloating, etc. can cause inflammation, an immune response, and damage to your gut. If you recognize you're sensitive to a certain food, it is imperative that you avoid that food and work to heal your gut.	Avoid any food that causes symptoms. If you are unsure about a specific food, try avoiding it for 2 weeks and then add it back. We find that many people are unknowingly sensitive to corn, soy, wheat/grains, dairy, eggs, sugar, alcohol, and/or caffeine. If you're interested in sensitivity testing, see the section on testing options in the section, Want to Dig Deeper at the end of this Key.

** *Want a program dedicated at uncovering these sensitivities, balancing blood sugar, and reducing your inflammaging? I highly recommend my 10 Day Reset.*

Step 3: Move Daily

Exercise has been shown to help modulate inflammation. Even as little as 20 minutes of light exercise or 7 minutes of high-intensity interval training (HIIT) can have significant effects on your immune system and inflammation levels. Even if you don't hit the gym, try to find a way to incorporate movement into your day.[9,10]

Things to try:

- Go for a 20 minute walk first thing in the morning.
- Play a sport. Play catch with your kids, take up frisbee golf or club golf, play tennis, shoot some hoops, take up skeet shooting, archery, or surfing.
- Invest in a standing desk, treadmill desk, or under-desk elliptical.
- Pick up an outdoor hobby. Try gardening, landscaping, hiking, bird watching, photography, fishing, hunting, canoeing, or kayaking.
- Invite friends to join a group exercise class. Most gyms and facilities offer a range of group classes, from stationary biking in a theater, to zumba, to chair yoga. There's anything from dance classes, to light stretching, to group weight training. You're way more likely to stick with an exercise routine if you have an accountability-buddy.
- Have FUN! You don't need to visit a gym to incorporate daily movement.

Note:
Take it up a notch by turning it into a Gratitude Walk. A Gratitude Walk is where you mentally list all the things you're currently grateful for. Try not to repeat the list from day to day and you'll be amazed at how much you have to be grateful for and how much better you feel!

Step 4: Mind Your Mind

Short bursts of stressful experiences are beneficial to overall health. It helps keep your immune and cardiovascular systems in tip top shape. When stressful experiences extend into a chronic experience, our systems can become worn out and fatigued. Our cortisol levels become dysregulated and can contribute to hormonal imbalances (see Key #2 for more information on a deep dive into hormones). When our systems, hormones, and stress are out of balance, it can lead to chronic inflammation,[11,12,13] as well as a slew of other dysfunctions, like poor digestion, sleep issues, skin inflammation, brain fog, heartburn, blood sugar imbalance, and many others. Check out Key #7 for more information on mindset practices, but something you can incorporate today is to watch this 14-minute TED Talk on "How to Make Stress Your Friend" with Kelly McGonigal.

Step 5: Supplement Wisely

The basis of any healing protocol should be whole, real food. However, with the genetic modification of foods, long transport and storage times, monoculture farming methods, and depletion of our soils, food is not as nutritious as it once was. Gut health, stomach acid, and digestive enzymes can affect nutrient absorption too. So, supplements can be beneficial and necessary in some situations. I always recommend supplementing with a high-quality multivitamin/mineral as a basis of your program. Once you've covered your bases, there are some supplements that can be very helpful for supporting an appropriate immune response and inflammation level. Here are my top 5 to reduce inflammation and support the immune system:

Vitamin D

Up to 90% of the population has inadequate intakes of vitamin D and around 40% are deficient.[14,15,16] Vitamin D, which works closely with magnesium (that around 50% of the population is deficient in), is a steroid hormone and is absolutely critical for proper immune function. It activates the innate immune response, important for immediate threats, infections, reactions to viruses, etc. It also plays a role in mediating the adaptive immune response and helps support healthy inflammation levels. It's important for supporting bone health, improving mood, reducing cancer risk, and reducing severity of illnesses, including respiratory illnesses. It's best to have your blood levels tested; ideally your vitamin D should be between 40 and 60 ng/mL. I find that most people do well between 1,000 and 5,000 IU daily.***

Fish Oil

Fish oil is an excellent source of EPA and DHA. These are long-chain fatty acids that have been shown beneficial to support healthy levels of inflammation, as well as brain, heart, and joint health, among other things.[17] While there are plant sources of omega-3 fatty acids, like flax seeds, soy, evening primrose, borage seeds, and walnuts, they are considered medium-chain fatty acids, called α-linolenic acids (ALA). It's been shown that long-chain fatty acids are biologically active and the conversion of ALA to DHA or EPA in humans is inefficient,[18] so a high-quality fish oil is the best source. I find that most people do well with 1,000 to 2,000 mg of omega-3s daily.***

Curcumin

Curcumin is one of the biologically active properties of turmeric—the popular spice used in Indian dishes. Curcumin has powerful antioxidant and anti-inflammatory properties and has been shown beneficial in mitigating inflammation and oxidative stress in various chronic conditions.[19,20] I find that most people do well with 600 mg to 1,000 mg daily.***

B-Complex

Your B-vitamins are crucial for supporting metabolism, immune function, and overall health.[21] They are important for keeping your mitochondria healthy and supporting brain, immune, heart, and bone health. And unfortunately, things like stress, poor diet, environmental toxins, and genetic polymorphisms cause a majority of individuals to be deficient in at least one B-vitamin.

HTB-Rejuvenate

This is a specialized blend of phytochemicals that help support immune function, activation, and rejuvenation, as well as metabolism, and muscle mass. This blend was formulated based on the scientific evidence that Himalayan Tartary buckwheat has in supporting and rejuvenating the immune system. The HTB-Rejuvenate is loaded with rutin, quercetin, hesperidin, luteolin, and diosmin, which are key factors in immune support.

*** *These are basic supplement ranges. You may need more or less, so make sure you are working with a practitioner to determine your current levels and recommended dosage.*

Want to Dig Deeper?

When it comes to testing, it's important to understand something fundamental to Functional Medicine: there is a big difference between "normal" and "optimal." When medical professionals determine the "normal" ranges for many lab tests, it's based on a general population. Unfortunately, our general population is metabolically unhealthy. In fact, only 10% of people are considered metabolically healthy. So, if you want optimal health, you want your test results to be optimal, not just "normal."

Interested to learn where you stand in the inflammaging spectrum? There are a ton of very useful tests that you can use to help determine your inflammatory response, many of which can be run by your doctor. This section will outline various tests your doctor can run, along with the "normal" and "optimal" ranges. I'll also include tests that Functional Medicine practitioners can run as well, though keep in mind these are usually not covered by insurance. You don't have to do all of the tests to understand where you're inflammaging is at, even one or two can be very helpful.

Conventional Testing

Fasting blood sugar: This is a snapshot of your blood sugar in time. Like we said on Day 3, this is not the best measurement for metabolic disease. Instead we want to look at HbA1C and fasting insulin (see below) to gather more information about how you metabolize sugars.

- Normal 65-99 mg/dL
- Optimal 70-80 mg/dL

Fasting insulin: If someone is moving towards diabetes, then the first marker to elevate is insulin, not blood sugar. After insulin has been elevated for a prolonged period of time THEN we will see a rise in blood sugar levels. Thus, fasting insulin and an insulin response test is essential if you are concerned about preventing metabolic dysfunction. And given that 1 in 2 people have diabesity, this is something you should be concerned about.

- Normal: 2.6–24.9 µIU/mL
- Optimal: <5 µIU/mL
- Optimal 1 hour and 2 hours post sugar challenge: <30 µIU/mL

HbA1C: HbA1C is a measure that calculates your average blood sugar over the last 6 weeks. This is a better indicator of your body's metabolic health than a single measure of blood sugar because it gives us more data points. Your body should be able to regulate your blood sugar tightly—not allowing it to fall too low or go to high.

- Normal 4.8% - 5.6%
- Optimal 4.8% - 5.5%

Total cholesterol: This is the total amount of cholesterol and is not specific to the type of cholesterol. This number doesn't tell us too much because it lumps together HDL and LDL and it doesn't differentiate between the particle characteristics.

- Normal: 100-239 mg/dL
- Optimal 150-200 mg/dL

HDL: This is considered the "good cholesterol," though that's not the whole picture. It can be protective against heart disease and can be raised with exercise and eating certain healthy fats.

- Normal men: 40-50 mg/dL
- Normal women: 40-50 mg/dL
- Optimal men: >50 mg/dL
- Optimal women: >60 mg/dL

LDL is considered the "bad cholesterol," though it's not inherently "bad." LDL particle number is a better measure for heart disease. We can also look at whether the LDL present is oxidized and whether it is small and dense (more problematic) or big and fluffy (less problematic).

- Normal: <100 mg/dL
- Optimal: <100 mg/dL

LDL particle number: This is the number of particles that are in your blood. We can compare this to LDL-C (LDL) which is the amount (weight) of the LDL in the blood. This measurement is more important when considering risk factors for heart disease than the LDL measurement found on a standard lipid panel.

- Total particle count optimal: <1000 nmol/L
- Small dense LDL particle number (sdLDL) optimal: <400 nmol/L

Oxidized LDL: This is the amount of LDL that is damaged. Oxidized LDL increases the risk for heart disease compared to non-oxidized LDL because it forms plaques that can narrow our vessels and increase our risk for heart attack and stroke.

- Normal: <70 U/L
- Optimal: <60 U/L

Triglycerides: Triglycerides are fatty acids that participate in fat storage, and elevated triglycerides are associated with carbohydrate intolerance. Thus having high levels of triglycerides might mean that you need to cut out processed carbohydrates from your diet.

- Normal: <150 mg/dL
- Optimal: <70 mg/dL

Triglyceride to HDL ratio: This ratio tells us about your sensitivity to insulin, the hormone that is responsible for regulating our blood sugar levels. Thus in addition to fasting insulin levels we can also look at this ratio to see if insulin resistance is a reason for your symptoms.

- Optimal <2
  – A measurement greater than 2 suggests insulin resistance

C-Reactive Protein (CRP): CRP is a general inflammatory marker. hsCRP is specific to cardiovascular health but normal CRP is not specific to any system. Instead, it just tells us that there is inflammation somewhere. Low-grade inflammation is a sign of chronic disease and should be addressed. Your doctor needs to dig deeper to find out where an elevation is coming from.

- Normal: 0.0–4.9 mg/L
- Optimal: <0.7 mg/L

hsCRP: High-sensitivity C-reactive protein is a cardiac-specific inflammatory marker. If it is elevated it suggests an increased risk for cardiovascular disease. If you have high cholesterol as well as high inflammatory markers, like CRP, then it is more concerning than just elevated cholesterol by itself.

- Normal: <3.0 mg/L
- Optimal: <0.7 mg/L

Homocysteine: This is a general inflammatory marker, similar to CRP. It is also a marker of B12 and folate status, and gives us an insight to our ability to methylate. If this marker is elevated, then looking at causes for inflammation, as well as your MTHFR status, can be helpful.

- Normal: 0–15 µmol/L
- Optimal: 6-8 µmol/L

APOB: This is an advanced cardiac marker found on LDL cholesterol. It is a marker for cardiovascular disease, but is better when looked at as a ratio (see below).

- Normal: 52–135 mg/dL

APOA1: This is an advanced cardiac marker found on HDL cholesterol. It is a marker for cardiovascular disease, but is better when looked at as a ratio (see below).

- Normal Men: 101–178 mg/dL
- Normal Women: 116–209 mg/dL

Ratio of APOB to APOA1: This is a more accurate risk predictor for cardiovascular disease then APOA1 or APOB alone.

- Optimal: <0.8

Fibrinogen: Fibrinogen is a measure of blood flow and clotting risk. Fluid blood flow is important in preventing cardiovascular disease because when we form clots we are more likely to have a stroke. Adequate blood flow is needed to maintain all of our vital organs!

- Normal: 193–507 mg/dL
- Optimal: <300 mg/dL

Lp(a): This is a marker of cardiovascular risk linked to genetics, and may be even more problematic than LDL. If you have a family history of heart disease and your lipid panel shows elevated LDL, then this is a must-order test. Lp(a) has more to do with genetics than it does with diet, however there are natural therapies that can lower Lp(a) and reduce your risk of ever developing heart disease in the first place. One of the therapies that has been found to reduce Lp(a) is niacin, a B-vitamin.

- Normal: <75 nmol/L
- Optimal <30 nmol/L

Carotid Intima media thickness test (CIMT): If you have elevated cardiovascular measurements for the markers above, then getting a CIMT will give you even more information about your actual risk. This test looks at whether you have plaque in your arteries, which causes narrowing and increases your risk for stroke/heart attack. Many facilities offer this test, and it can often be done at health fairs for a reduced rate as well.

Apolipoprotein E (ApoE): ApoE is a genetic marker for metabolic disorders and Alzheimer's. ApoE is also a helpful marker if you are curious about a high-fat ketogenic diet. This is because people with the ApoE4 allele do not always respond well to a high-fat diet, and especially to saturated fat. This population also does not respond well to statin therapy. They typically respond better to a moderate or lower fat diet or other types of fats. But remember, genetics load the gun, environment always pulls the trigger.

- ApoE2 = protective allele
- ApoE4 = increased risk for Alzheimer's
  - ApoE3/4 (2-3x risk)
  - ApoE4/4 (12x risk)

Sedimentation Rate (sed rate, ESR): This is a general inflammatory marker. It just tells us there is inflammation somewhere, potentially from an infection, physical injury, autoimmune disorder, toxicity, or other causes of inflammation.

- Normal Male: 0 to 50 years: 0–15 mm/hour, 50 years and older: 0–30 mm/hour
- Normal Female: 0 to 50 years: 0–32 mm/hour, 50 years and older: 0–40 mm/hour
- Optimal: <20 mm/hour

ANA: This is a general autoimmune marker. It does not tell you what type of autoimmunity is present but just that there is an autoimmune process taking place.

- Normal: Negative

Rheumatoid Factor (RF): This is a marker for autoimmunity that is associated with rheumatoid arthritis, an autoimmune condition of the joints. A negative value does not rule out the possibility of rheumatoid arthritis—in these cases, a Cyclic Citrullinated Peptide Antibody test should be run (CCP antibody).

- Normal: negative

Cyclic Citrullinated Peptide Antibody: This is a more specific test for rheumatoid arthritis when compared to RF.

- Normal: <20 u/ml

White Blood Cell Count (WBC): This is how many white blood cells your body is making. Our immune system can be thought of as an army. Chronically low levels of WBC tells us that your immune system is not sending enough troops out. This can be an early sign of autoimmunity or infection.

- Normal: 4.5-11 x 103/µL
- Optimal: >5.5 x 103/µL

Functional Testing

Continuous Glucose Monitor
One of the easiest ways to track how foods affect your blood sugar is by asking your doctor for a continuous glucose monitor. They are easy to use and relatively painless, and they provide real-time feedback.

NMR LipoProfile by **Labcorp** or **Cardio IQ Report** by **Quest Diagnostics Lab**
Either profile will tell you your normal cholesterol results along with LDL particle size and number, Apo(a), and CRP values.

Omega-3 Index Complete by **Omegaquant**
More than 98 percent of Americans are deficient in omega-3 fats. Omega-3 fats help balance out omega-6 fats and regulate our body's production of anti-inflammatory and inflammatory molecules.

- Normal: 2.9-12.9%
- Optimal: 8-12.9%

Advanced Immune Testing: IGeneX, Labcorp, Quest
If your immune markers come back suboptimal, then further testing can help identify the cause. Your doctor can test for Lyme, Epstein-Barr virus, or cytomegalovirus (CMV) through most large conventional lab companies. These are chronic infections that may be the root of an immune imbalance.

Celiac testing (conventional lab companies): Celiac disease is serious autoimmune disease that can be treated with a gluten-free diet. These tests can help identify celiac:

- IgA antigliadin antibodies
- IgG antigliadin antibodies
- IgA antiendomysial antibodies
- Tissue transglutaminase antibody (IgA, and IgG in questionable cases)
- Total IgA antibodies
- HLA DQ2 and DQ8 genotyping for celiac disease (used occasionally)

Comprehensive Stool Analysis from **Genova Diagnostics**
Stool samples can tell us not only if we have an imbalance in our gut bugs, but also about the level of inflammation present in the digestive tract. Many chemical markers in stool can be analyzed to give a picture of the ecosystem. Markers for acid-alkaline balance, as well as cultures of various bacteria, yeasts, or parasites can often pinpoint the sources of inflammation and be linked to many diseases.

Wheat/Gluten Proteome Reactivity & Autoimmunity: Array 3 from Cyrex Labs
Gluten/wheat sensitivity is when someone experiences low-level inflammation due to these foods. This can manifest through a variety of symptoms (headache, brain fog, fatigue, etc.) and can be experienced well after the food is consumed.

Gluten-Associated Cross-Reactive Foods and Foods Sensitivity: Array 4 from Cyrex Labs
If you have gluten-sensitivity then eliminating gluten might not be enough. This is because gluten and other foods have similar chemical structures, so for example, someone with gluten-sensitivity may also have a corn or coffee sensitivity.

Intestinal Antigenic Permeability Screen: Array 2 from Cyrex Labs
This test looks for "leaky gut." Sometimes our gut can become leaky due to chronic inflammation, bacterial imbalances, and eating the wrong foods for our bodies. Zinc and glutamine are repairing nutrients that the gut needs to heal and recover.

Food Sensitivity Test Array 10: Array 10 from Cyrex Labs
This test looks at how your body's immune system responds to 180 different foods. And it is different from other food sensitivity tests because it uses the specific form of the food that you actually eat. This is important because all foods have different protein structures, and when they're cooked, you may react to a cooked version versus a raw food or vice versa.

Edifice Health formerly known as Iuvebio
The iAge® test helps determine your inflammatory age.

Conclusion

Inflammaging is an enormous topic, but I placed it as the first Key because it is crucial to address before you address any other areas. If you have chronic inflammation, you'll struggle to balance your hormones, keep your mitochondria functioning optimally, have a healthy gut microbiome, incorporate daily movement, or even focus on your spiritual health. Make sure you know your status and are taking steps (even small steps) daily to support your immune system and inflammation levels.

KEY #2: KEEP YOUR HORMONES IN CHECK

Your hormones are like a symphony. Each hormone acts like a different instrument in the orchestra, interpreting a signal from the conductor and then responding appropriately. They all work together. However, what would it sound like if one instrument was too loud and another too quiet? Or if one was playing a different song entirely or totally out of tune? That's kind of what happens in our body when our hormones are out of whack. Everything else tends to fall apart.

In this Key, I'll start off by walking you through the major hormones related to aging. Then, you can take my Do You Have Imbalanced Hormones? Quiz to see where you stand. In the section 3 Ways to Support Your Hormones, I'll cover things you can do to help support balanced hormones. Please note, hormone imbalance can be tricky to treat; if you suspect serious hormone imbalance, it's a good idea to work with your practitioner for testing and therapy options to get you back on track.

Your Hormones and What They Do

Insulin and Cortisol

I covered insulin and cortisol in depth in Key #1 but wanted to include a brief description here since they are very important hormones for longevity.

Insulin is made in response to consuming foods containing carbohydrates, which break down into sugar (glucose) during digestion and metabolism. Insulin directs the glucose to be used as fuel or stored as fat. If blood glucose gets too low, cortisol is released to signal the body to increase glucose levels in the blood. Too much blood sugar, insulin, and/or cortisol is extremely stressful for your body and can cause increased inflammation, diabesity, and insulin resistance, which can all contribute to the destruction of the thyroid gland and negatively impact thyroid hormone production.

Thyroid Hormones: Thyroxine, Triiodothyronine, and Thyroid Stimulating Hormone

Thyroxine (T4), triiodothyronine (T3), and thyroid-stimulating hormone (TSH) are super important to our overall health. Your thyroid is the conductor of your metabolic symphony. In response to TSH signals, it takes iodine from your foods combined with the amino acid tyrosine and converts it to the thyroid hormones T4 and T3. While the majority of thyroid hormone found in your body is T4, T3 is the active form, much more potent, and the one that actually affects your cells. This process largely occurs in your liver and gut, so it's important those organs are functioning well and that detoxification is working properly. Melatonin made during sleep is also needed to help convert T4 into T3.

Hunger Hormones: Leptin and Ghrelin

Leptin is made by your adipose (fat) cells in response to stored fat levels. If your body has high levels of leptin, your brain recognizes that you have plenty of stored fat and sends the signal that you are no longer hungry. However, if you have low leptin levels, your brain believes you need to store more fat and signals that you need to eat.

Ghrelin is primarily made in your stomach. Ghrelin signals your appetite, hunger, and fat storage. It also plays a role in glucose metabolism and energy homeostasis, among many others.

When your leptin or ghrelin hormones become unbalanced, you may experience inappropriate hunger or satiety, fat gain, increased blood sugar levels, prediabetes and type II diabetes, inappropriate melatonin signaling, and poor sleep.

Human Growth Hormone

Human growth hormone (HGH) is essential for physical growth and appropriate body mass. It is secreted in the anterior pituitary, found in your brain, and controls growth in children and helps maintain stature in adults. HGH is important for stimulating the breakdown of triglycerides and keeps excess fat from being stored, helps build protein and muscles, and plays a role in helping maintain blood sugar levels within non-threatening levels. HGH declines as we age and with it we see a decrease in muscle mass, libido, energy, and increase in fat storage. Certain lifestyle interventions, such as balancing blood sugar, exercising, and practicing intermittent fasting, can help to improve production.

Sex Hormones: Progesterone, Testosterone, Estrogen

Estrogen is found in the highest quantities in women, but men also make estrogen. Formed primarily in the ovaries or testes, estrogen is important for women's menstrual cycles and for bone formation and health, blood clotting, skin and hair, mood, sex drive, and reproductive function. Estrogen levels increase with puberty and decrease with age.

Progesterone is produced by the ovaries and adrenals in women and the testes and adrenals in men. While progesterone is found in much higher quantities in women, it is important for men as well and helps support nerve relaxation, reproduction, ovulation, pregnancy, and sperm count and quality. It also allows the body to calm down, relax, and sleep. Progesterone is required to form testosterone.

Testosterone is also produced by both men and women, though men tend to have much higher levels. It's important for sperm production, motivation, sex drive and libido, muscle mass, bone health, exercise recovery, and to strengthen adrenal glands (important for cortisol regulation). It's also neuroprotective. Low testosterone levels have been associated with obstructive sleep apnea for both men and women. Testosterone production decreases with age and menopause, but should never be depleted entirely.

LONGEVITY ROADMAP

Become Young at Any Age

Do You Have Imbalanced Hormones?

Often, signs and symptoms of hormone imbalance are ignored. They range from mild to debilitating but can often improve with the right interventions. Because your hormones are so intertwined, when you experience one type of hormone imbalance, you're likely to experience more. The first step is to identify if hormone imbalance is affecting you—take this quiz to get a good idea. And when in doubt, check with your doctor for blood tests. You can find more information about what's available in the Want to Dig Deeper? section in this Key.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

DO YOU HAVE IMBALANCED HORMONES?	BEFORE:	AFTER:	DIFFERENCE:
I EXPERIENCE MOOD ELEVATIONS AND DIPS			
I HAVE ACNE			
I HAVE IRREGULAR BOWEL MOVEMENTS (< ONE OR > FOUR PER DAY)			
I HAVE DRY SKIN			
I HAVE A HARD TIME LOSING WEIGHT			
I AM SENSITIVE TO TEMPERATURE EXTREMES			
I HAVE BEEN DIAGNOSED WITH DIABETES OR PREDIABETES			
I HAVE A HIGH FASTING GLUCOSE (>80 MG/DL), INSULIN (>5 µIU/ML), OR HBA1C (>5.5%)			
I HAVE IRREGULAR MENSTRUAL CYCLES OR EXPERIENCE PMS (IF APPLICABLE) OR EXPERIENCE EXCESS FAT STORAGE IN THE BREAST AREA (FOR A MALE)			
I EXPERIENCE HAIR LOSS OR THINNING (INCLUDING EYEBROWS AND EYELASHES)			
I EXPERIENCE FATIGUE			
MY HANDS AND FEET ARE FREQUENTLY COLD			
I HAVE A LOW SEX DRIVE			
I EXPERIENCE POOR SLEEP OR INSOMNIA			

DO YOU HAVE IMBALANCED HORMONES?	BEFORE:	AFTER:	DIFFERENCE:
I GET HEADACHES			
I EXPERIENCE INFERTILITY			
I CAN GET "HANGRY" IN BETWEEN MEALS			
MY MOOD IS SIGNIFICANTLY IMPACTED BY THE TIMING OF MEALS			
I EXPERIENCE BRAIN FOG			
MY HANDS ARE WHITE AND/OR CLAMMY			
TOTAL			

KEY

0-20: Your hormones are likely balanced

21-40: Your hormones could use some attention—some minor adjustments to your diet and lifestyle can make improvements here!

41-60: You might consider meeting with a doctor to consider testing for your current hormone levels. You'll definitely want to pay attention to this key.

61-80: Your hormones might be unbalanced or you might be experiencing an underlying condition. Make sure you're working with a doctor or Functional Medicine practitioner for one-on-one direction and testing.

Conventional vs. Functional Approach

Unfortunately, testing for hormone levels can be complicated. In fact, your body as a whole is quite complicated (surprise!). Each organ, tissue, and cell in your body functions both individually and holistically as a unit. You can't just treat a single organ without affecting the rest of the body.

Take your thyroid, as an example. Your thyroid is a butterfly-shaped gland located in your neck. It produces the hormones T3 and T4, important for energy production and metabolism. Your thyroid receives a message from your pituitary gland, in the form of thyroid stimulating hormone (TSH). This stimulates the production of the T3 and T4 hormones, as the name implies. If your brain senses low levels of hormone, it can increase this TSH message to encourage your thyroid to produce more hormones.

Unfortunately, it's not as simplistic as it sounds to deduce that high TSH equals insufficient thyroid function. As mentioned in Key #1, the test result ranges are based on the average (subjectively unhealthy) person and are not necessarily based on optimal levels. Additionally, your blood levels of TSH may be different than your tissue levels, so your *blood* may test "normal" but the *tissues*, where it's desperately needed, may be inadequate. Relying solely on a TSH test doesn't show the whole picture.

To take it a step further, there are many different causes to thyroid dysregulation. Chronically elevated cortisol levels from long-term stress, blood sugar imbalance/insulin resistance, or sometimes pregnancy, can negatively affect your pituitary gland causing a decrease in TSH signaling and subsequent thyroid-like symptoms. However, there's nothing actually wrong with the thyroid in this example.

Or, for some people, things like chronic stress, elevated cortisol, chronic inflammation, a poor gut microbiome, or others can cause your T4 to under-convert to active T3, again meaning the thyroid gland is functioning fine with "normal" TSH levels, but still experience signs and symptoms of hypothyroid.

And there are other causes of thyroid dysfunction or abnormal test results as well. So it's easy to see that relying on a single testing method based on an overall unhealthy testing curve is not sufficient.

That is why the functional approach to testing and treating hormone dysregulation takes many factors into account, looks at multiple different tests, uses a personalized approach, and most importantly: addresses the root cause. Using the thyroid example, in Functional Medicine, we would likely look at: TSH, total T3 and T4, free T3 and T4, reverse T3 (which helps identify your toxic load), **and** thyroid antibodies (which helps identify autoimmune thyroiditis) at a *minimum*. This helps to give a much more accurate look at your thyroid function.

Functional Medicine also takes into account your personal life—your mental and spiritual health, your stress levels, your activity and exercise, your weight, your energy levels, your diet, your genetics, your history, etc. The one-size-fits-all approach to medicine and healthcare just does not work. Each person is unique, it's important that your protocol is just as unique to you.

3 Ways to Support Your Hormones

#1: Balance Blood Sugar

I think it's pretty clear at this point how crucial having balanced blood sugars is. Not only can blood sugar spikes and dips directly affect hormone levels, but this type of stress causes inflammation and can disrupt nearly every system in your body. If you remember from Key #1, chronic inflammation is at the root of nearly every chronic disease and one of the main causes is unregulated blood sugar and insulin resistance.

But this is really great news. There is SO MUCH you can do to help support healthy blood sugar levels. Even if you're already diagnosed with diabetes or insulin resistance, you can still make dietary modifications that can significantly help blood sugar. I'll dive into this much deeper in my 30 Days to Aging Backwards Plan, but if you're wanting to start today, and I suggest you do, try to do these three things:

1. Eat 2 servings of veggies with every meal.
2. Make sure you have a serving of quality protein with every meal.
3. Include a serving or two of healthy fats with every meal.

#2: Eat Healthy Fats[1]

Every cell in your body utilizes fats to keep healthy. On the exterior of each cell is a dual-layer of lipid molecules, called the lipid bilayer. Within this lipid bilayer are different proteins, channels, and molecules of cholesterol. These molecules are essential for cellular integrity, communication, and replication. In fact, your hormones are formed from fat and cholesterol.

Healthy fats play a role in supporting healthy levels of inflammation and your immune response, and are needed for your body to utilize the fat-soluble vitamins, A, D, E, and K, all of which are needed to synthesize hormones.

Nutrient deficiencies, fatty acid imbalances, and not enough healthy fats can lead to hormone dysfunction, so make sure to include 1 to 2 servings of healthy fats with each meal and snack.

Examples of a serving of healthy fat:

- Extra virgin olive oil, avocado oil, macadamia oil, walnut oil, almond oil (1 tablespoon)
- MCT oil (1 to 2 tablespoons a day)
- Avocado (½ to 1 avocado)
- Fatty fish like sardines, mackerel, herring, black cod, and wild salmon (4 to 6 ounces); aim to include these 3 to 4 times per week
- Nuts and seeds (2 to 3 handfuls); all are okay except peanuts
- Olives (¼ cup)
- Grass-fed butter or ghee (1 tablespoon)*
- Organic coconut milk (¼ cup)*
- Extra virgin coconut oil (1 tablespoon)*

See Pegan Fats section on page 95 for an explanation on why these fats may not be a good fit for everyone.

#3: Prioritize Self-care

Every one of your hormones are impacted when you experience stress.[2] If your stress is acute, only lasting a few seconds or minutes, these impacts are easy to recover from. However, if you experience long-term chronic stress, your hormones can take a major hit.

Prioritizing self-care and making time for reflection, relaxation, and mindfulness can support healthy hormone levels. Studies have shown that interventions like meditation and mindfulness can significantly lower cortisol levels.[3,4] So, make sure you're taking time for you.

Here are some examples of ways to prioritize self-care:

- Commit to meditating for 5 days. Apps like the Calm meditation app have guided meditations of different lengths.
- Pick up an old hobby or try something new
- Start a garden
- Join a yoga studio
- Go on a walk with a friend
- Write your thoughts in a journal
- Keep a notebook by your bed and write 3 different things you're grateful for every day. Try not to repeat anything!
- Take a bath
- Video call with a friend
- Start an exercise and strength training routine (exercise not only releases your feel-good neurotransmitters serotonin and dopamine,[5] but resistance training has been shown to help mitigate age-related testosterone decline.6 It's a form of both self-care and hormone support!)

Want to Dig Deeper?

There's a lot you can learn from tests that are largely covered by insurance. It's always a good idea to know where you currently stand. Always keep in mind that it's important to check your results against "optimal" levels if you're striving for optimal health.

Conventional Testing

Men's Hormones

Testosterone (total): This is the main male hormone for brain health, motivation, optimal energy, heart health, and more. It is estimated that 39% of men over the age of 45 have low testosterone. Why such a huge percentage? Well, diabesity is a leading contributor to this because elevated insulin levels decrease testosterone levels and can cause an increase in estrogen levels in men. As your belly fat goes up, your testosterone goes down and so does libido and sexual function. Basically when your consumption of sugar and starch go up, your sex hormones get messed up—both for men and women in slightly different ways.

- Normal: 264-916 ng/dL
- Optimal: >500 ng/dL

Free Testosterone: The majority of testosterone is bound to sex hormone binding globulin (SHBG). Free testosterone is the amount of testosterone that is actually able to produce its effect on the body because it is not bound to a protein carrier.

- Normal: 20-50 years old: 7.2-26.5 pg/mL
  - > 50 years old: 6.6-24.0 pg/mL
- Optimal >15-25 pg/mL

Sex Hormone Binding Globulin (SHBG): This is the protein that binds testosterone (making it unusable).

- Normal:
  - 20-49 years: 16.5–55.9 nmol/L
  - >49 years: 19.3–76.4 nmol/L

DHEA: DHEA is the precursor to testosterone. We need this hormone for optimal energy levels. If DHEA is low it can indicate that your adrenal glands, which are responsible for responding to stressors, may not be functioning optimally.

- Normal 71.6-530 µg/dL
- Optimal: 200-530 µg/dL

Estrogen (estradiol): Estrogen is an important hormone for both men and women, though it is often demonized in men's health because some men have too much estrogen. However, normal levels of estrogen are essential to maintain balanced hormones and a happy brain. Estrogen becomes elevated in men due to diabesity, and insulin can actually increase the conversion of testosterone into estrogen, which can add to the fatigue and sexual dysfunction that is already prevalent in insulin resistance. Too much estrogen causes man boobs, beer belly, loss of hair on chest and limbs—basically turning a man more into a woman!

- Normal: 7.6–42.6 pg/mL
- Optimal: 20-40 pg/mL

Luteinizing Hormone (LH): LH causes the production of testosterone in men and stimulates the release of an egg in women.

- Normal: 1.7–8.6 mIU/mL

Follicle Stimulating Hormone (FSH): FSH is responsible for the production of sperm in men and develops the follicles in the ovaries of women.

- Normal: 1.5–12.4 mIU/mL

Women's hormones between days 19-21 of menstrual cycle

Day 1 = first day of bleeding (first day of a women's period)

Because womens' hormones wax and wane depending on where they are in their natural cycle, it's important to test female hormones at a consistent day during the menstrual cycle. Otherwise, the results may be skewed and not give an accurate snapshot.

Progesterone: Progesterone is a female hormone that is calming (reduces anxiety) and prepares the uterus for pregnancy. Some women have normal values of progesterone but have too little progesterone when compared to the amount of estrogen they produce, which is why we want to look at the ratio of estrogen to progesterone.

- Normal: 1.8–23.9 ng/mL
- Optimal: >5 ng/mL

Estrogen (estradiol): Estrogen is a female hormone responsible for female sex characteristics, memory, and heart health. While it is essential, women can have too much estrogen due to suboptimal detoxification pathways, or constipation—both of which are how we clear estrogen from the body.

- Normal: 43.8-211.0 pg/mL
- Normal postmenopausal: <6.0–54.7 pg/mL
- Optimal: 80-200 pg/mL

FSH: FSH is responsible for developing the follicles in the ovaries of women. In polycystic ovary syndrome (PCOS), FSH can be low, so low that ovulation and conception can't occur, which is why women with PCOS have infertility.

- Normal (d 19-21): 1.7-7.7 mIU/mL
- Normal postmenopausal: 25.8-134.8 mIU/mL

LH (see above)

- Normal: 1.0-11.4 mIU/mL
- Normal postmenopausal: 7.7-58.5 mIU/mL

DHEA (see above)

- Normal: 41.2-432 µg/dL
- Optimal 200-432 µg/dL

Testosterone: Testosterone is responsible for male sex characteristics in men, but is also essential in women's health. Testosterone ensures that we have optimal energy levels, motivation, muscle mass, and a healthy sex drive.

- Normal 20-49 years: 8–48 ng/dL
- Normal >48 years: 3-41 ng/dL
- Optimal: 60-80 ng/dL

Free testosterone (see above)

- Normal: 0-4.2 pg/mL
- Optimal: >0.5 pg/mL

SHBG (see above)

- Normal 20-49 years: 24.6–122.0 nmol/L
- Normal >49 years: 17.3–125.0 nmol/L
- Optimal: 16.5-80 nmol/L

Thyroid Panel

Thyroid stimulating hormone (TSH): This is the most commonly run test to check for thyroid disease. 1 in 5 women and 1 in 10 men have low thyroid function. Common signs of hypothyroidism are cold hands and feet, trouble losing weight or weight gain, brittle hair and nails, dry skin, constipation, being tired all of the time, having trouble getting up in the morning, and brain fog or memory issues or depression. These symptoms warrant a thyroid panel to see if this gland is not kicking out the fuel it should be.

- Normal 0.45-4.5 µIU/mL
- Optimal 1.0-2.0 µIU/mL

Free T3 (fT3): This is the active thyroid hormone that actually exerts its effect on the cells. It is responsible for energy production, hormone production, regulating bowel movements, and so much more.

- Normal: 1.81–4.06 pg/mL
- Optimal: 3.2-4.4 pg/mL

Free T4 (fT4): T4 is the majority of the thyroid hormone that is produced. It must get converted to active thyroid hormone (fT3) in order to have any effect in our body. If fT4 is normal but fT3 is low, then you are not converting properly and might require supplementation with nutrients to help this process along.

- Normal: 0.82-1.77 ng/dL
- Optimal: 1-1.5 ng/dL

Thyroid Peroxidase Antibodies (TPO antibodies): 90% of the individuals who have hypothyroidism have autoimmune hypothyroidism (Hashimoto's disease). TPO is one of the markers for Hashimoto's. It is important to know the cause of hypothyroidism because you treat it differently from non-autoimmune hypothyroidism.

- Normal: 0–34 IU/mL
- Optimal: 0 IU/mL

Anti-thyroglobulin antibodies: Another marker for autoimmune thyroid disorder (Hashimoto's).

- Normal: 1-115 IU/mL
- Optimal: 0 IU/mL

Reverse T3: Reverse T3 is like the brake that stops your thyroid hormone production. Sometimes there are good reasons for higher reverse T3 but often it's because something's wrong. Unfortunately, toxins, stress, inflammation all increase levels of reverse T3, which blocks your thyroid. Even if the regular thyroid tests appear normal, high levels of reverse T3 mean your thyroid is not really working properly.

- Normal: 9.2-24.1 ng/dL

Functional Testing

DUTCH Test by Precision Analytical or **Essential Estrogens by Genova Diagnostics**

Both of these tests look into downstream breakdown products of hormones and tell you a lot more about what's happening with your hormone metabolism. These are measured using urine, not blood, and are used for assessing HPA axis function: These tests can help you determine whether chronic stress and high cortisol are causing pituitary dysfunction, under-conversion of T4 to T3, or thyroid hormone resistance.

Cortisol Test: Cortisol is a hormone that is produced by your adrenal glands. It is responsible for waking you up in the morning and responding to stressful situations. The adrenals are two small glands that sit on top of your kidneys and they produce cortisol as well as the reproductive hormones above. These glands are one of our first responses to stress, and in chronic stress your adrenals get fatigued, your energy plummets, and it becomes difficult to manage your life. You could feel tired and wired, all at the same time. You might get palpitations or feel anxious or have trouble sleeping. You might crave salt. You may get dizzy when you stand up. You might have low blood pressure. You might even have sugar cravings, because your body can't regulate your blood sugar properly. All these are clues that you could have adrenal problems.

To test cortisol, it is best to test it at multiple time points throughout the day to ensure that your levels are normal AND that you have a normal pattern of cortisol release (highest upon waking, and lowest before bed).

Companies who test cortisol measurements throughout the day using saliva: Adrenal Stress Hormones-Salivary by ZRT Laboratories, Adrenocortex stress profile by Genova Diagnostics, Adrenal Stress Index by Diagnos-Techs

Conclusion

Your hormones regulate your internal symphony. Hormone imbalance can present itself in a multitude of ways, from cold extremities, to acne, to headaches, to irregular bowel movements, due to how interconnected your hormones are. Working closely with a practitioner is key when treating hormone imbalances, so if you suspect that your hormones could use extra support, check with your doctor regarding testing options or contact a Functional Medicine doctor near you through www.ifm.org.

KEY #3: FUEL YOUR ENERGY POWERHOUSE

Mitochondria are those little organelles found in every cell in your body that you probably remember your middle school teacher referring to as the "powerhouse." They are absolutely crucial to preserving your healthspan, creating energy, breathing, and overall survival.

Reactive Oxygen Species

Each one of your 30+trillion cells has hundreds to thousands of mitochondria, with concentrations highest in tissues that require the most energy, like your brain and heart. These mitochondria convert the food you eat and oxygen you breathe into energy called adenosine triphosphate, or ATP, that your body uses to drive nearly every biochemical process. One by-product of this reaction is the creation of a small amount of the free-radical reactive oxygen species (ROS).

Some ROS is normal and needed for cell homeostasis, but as we age, mitochondrial quality and quantity naturally decline. Mitochondria end up producing less ATP and more ROS, which contributes to damage and inflammation that can snowball throughout the body. Ideally, your mitochondria would function optimally to create energy until they are replaced by new, young mitochondria. Instead, we see that with aging and certain diseases, mitochondria can slowly decline in function, mucking up your cells.

Note:
This section on mitochondrial function is a bit science-heavy. I kept this section to the basic premise because topics like sirtuins, telomeres, AMP-kinase, and mTOR are central to mitochondrial function and longevity, but are extremely complicated with new research emerging daily. If you're interested in digging deeper, check out my References and Resources section for recommended readings.

Telomeres

It's been shown that mitochondrial function can decrease for a number of reasons beyond aging. One potential cause could be the shortening of telomere length. Telomeres are the end caps on your chromosomes—often likened to the hard plastic shells on the tips of shoelaces. They are protective against DNA damage, and as they become shorter (which happens naturally with each replication and unnaturally through things like toxin exposure, chronic inflammation, etc.) they become less protective and are associated with age-related diseases and a shortened lifespan.[1]

Sirtuins

Another cause of decreased mitochondrial efficiency is the decline of sirtuin (SIRT) enzyme activity.[2] Sirtuins are a class of enzymes found in the mitochondria. There are several subtypes of sirtuins, but much of longevity studies focus on SIRT1 and SIRT3. SIRT1 acts on certain pathways that help increase insulin production, support brain health and cognition, and mitochondrial function in your muscles.[3,4] SIRT3 is essential to help keep ROS levels balanced in your cells and support and protect your liver. If ROS overwhelm your cells, they can cause damage leading to a multitude of chronic diseases, like cancer, insulin resistance, obesity, reduced immune function, and cognitive decline.

Senescent Cells

Another link between mitochondrial function and aging comes from types of cells in your body called senescent cells. Normally, when cells get old or no longer functional, they die through a process called apoptosis. In senescent cells (sometimes referred to as zombie cells), they become old and non-functional, but don't actually die.[5] Instead, they leak massive amounts of inflammatory compounds. In fact, the many mitochondria in senescent cells become dysfunctional creating large amounts of ROS, which contribute to inflammation, cellular damage, and aging.[6]

AMP-Activated Protein Kinase

And another target of research regarding mitochondria and longevity is the AMP-activated protein kinase (AMPK) enzyme, which is found throughout many of your tissues. The AMPK is activated during certain "good" stresses (called hormesis), like exercise, which signal your body to increase fuel (ATP) production in your muscles.

AMPK is a target of longevity research because when it is activated, it is involved with mitochondrial biogenesis, among other benefits, like angiogenesis, and protecting against insulin resistance, inflammation, and fat storage.[7] As we've learned already, these are some of the keys to improving health span and living more vibrantly.

Mammalian/Mechanistic Target of Rapamycin

Finally, another area of focus regarding aging and longevity is the mammalian/mechanistic target of rapamycin (mTOR) process. mTOR is important for regulating cell growth, protein synthesis, mitochondrial dysfunction, cell senescence, and more.[8] It also plays an important role in nutrient sensing, and responds to signals like insulin. Insulin activates the mTOR pathway which can lead to nearly every hallmark of aging. Though the full pathway is quite complicated, the key takeaway with mTOR is keeping your blood sugar and insulin balanced can help reduce the activation of mTOR and improve your mitochondrial function.

Aside from the natural aging process, there are other things that send mitochondrial function in a bad direction, like smoking, stress, lack of sleep, environmental pollution like mold and smog, and eating a diet rich in refined sugar and flour that causes blood sugar imbalances and insulin resistance.[9]

However, the good news is that there's a lot you can do to support healthy mitochondria. There's things you can do to clear out the old and sluggish mitochondria and to support building new, robust mitochondria. This is easily one of the most important things you can do to extend your healthspan.

LONGEVITY ROADMAP

Become Young at Any Age

How Powerful is Your Powerhouse?

Your mitochondrial function decreases as you age, but unfortunately, we find that most people experience inappropriate mitochondrial slowing independent of age. In fact, around half of the population experiences some sort of mitochondrial sluggishness prior to the natural decline with age. Luckily, there's a lot you can do to support your mitochondria, but it's important to start with an idea of where you currently stand.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

HOW POWERFUL IS YOUR POWERHOUSE?	BEFORE:	AFTER:	DIFFERENCE:
I HAVE ACHY JOINTS			
I HAVE A HARD TIME GETTING OUT OF BED IN THE MORNING			
I EXPERIENCE POOR SLEEP			
I FEEL VERY FATIGUED THROUGHOUT THE DAY			
I FEEL OLDER THAN MY ACTUAL AGE			
I EXPERIENCE BRAIN FOG/TROUBLE CONCENTRATING			
I NOTICE PAIN IN MY BODY (NOT ASSOCIATED WITH AN INJURY)			
I EXPERIENCE WEAKNESS			
I SUSPECT OR HAVE BEEN DIAGNOSED WITH ARTHRITIS			
I GET FREQUENT NOSE BLEEDS			
I HAVE SPIDER VEINS			
I STRUGGLE WITH BLOOD SUGAR IMBALANCE, PREDIABETES, OR DIABETES			
I NOTICE LOOSE SKIN OR WRINKLES			
I HAVE SLEEP APNEA			

HOW POWERFUL IS YOUR POWERHOUSE?	BEFORE:	AFTER:	DIFFERENCE:
I GET FREQUENT HEADACHES			
I FEEL WEAK			
I HAVE EXCESS FAT STORAGE			
I NOTICE A DECREASE IN MUSCLE MASS			
I EXPERIENCE MEMORY LOSS, LIKE FORGETTING NAMES OR WHERE I PUT MY KEYS			
I HAVE HIGH LEVELS OF INFLAMMATION			
TOTAL			

KEY

0-20: Your mitochondria are in tip top shape!

21-40: Your mitochondria could use some attention—some minor adjustments to your diet and lifestyle can make improvements here!

41-60: You might be experiencing some level of mitochondrial dysfunction. You'll definitely want to pay attention to this key.

61-80: Your mitochondria may need some serious attention or you might be experiencing an underlying condition, make sure you're working with a doctor or Functional Medicine practitioner for one-on-one direction and testing.

Conventional vs. Functional Approach

The conventional world doesn't put much emphasis on supporting your mitochondria unless you have a genetic condition causing total mitochondrial disease. It's reasons like this why Functional Medicine is so important here. There are many well-meaning doctors who simply haven't been taught the importance of supporting your mitochondria (similarly: most medical schools teach one or less classes on nutrition and zero on environmental toxins and toxic overload.)

In fact, take a look at the use of statins for example. People are prescribed statins to help lower their cholesterol, which we already learned is not what we need to focus on when it comes to heart disease. Statins interfere with the HMG-CoA reductase pathway, which is to say that they decrease this reaction from happening, which decreases the formation of cholesterol in our body.

However, this same pathway also synthesizes ubiquinol (coenzyme Q10, CoQ10) and dolichol (used in protein synthesis). CoQ10 is required for your mitochondria to create energy. It is also a powerful antioxidant. So, statins decrease the production of cholesterol and CoQ10. However, rarely do you find a conventional doctor who will recommend a statin *and* a supplemental CoQ10. This is unfortunate since people who use statins commonly complain of severe fatigue, weakness, and inflammation, largely caused by the reduction in the production of CoQ10.

This is not to say that doctors are bad and no one needs statins. Almost all doctors are very well-meaning, they just weren't *taught* about looking for the root causes of disease. Similarly, statins are needed for certain individuals—they can save lives. It's mainly a problem when they're used as a band-aid for people with increased heart disease risk instead of getting to the root cause and focusing on their diet, exercise, and lifestyle.

In Functional Medicine, we approach your mitochondria as a top priority. If your mitochondria are lagging, so will nearly every other aspect of your health. If we suspect your mitochondria are in need of attention, we make sure to include all aspects of supporting your mitochondria into your protocol.

4 Non-Negotiables to Mitochondrial Health

There are many different stressors that negatively affect your mitochondria and many interventions that can significantly support your mitochondria. However, I like to focus on 4 non-negotiables for mitochondrial health. These are 4 things that I recommend to my patients, do myself, and always prioritize.

Non-Negotiable #1: Eat. Real. Food.

And be intentional about it.

You've heard me say it before, and I'll say it again (and again and again). You must eat whole, real food. If man made it, leave it; if nature made it, eat it. Eating natural foods as close to how they are found in nature as possible is absolutely paramount when it comes to not only supporting your mitochondria, but your overall health. You can't out-exercise a bad diet, nor can you out-live a bad diet.

Focus on eating healthy fats. Fats like avocados, nuts and seeds, coconut and MCT oil, olives and olive oil, macadamia oil, and pasture-raised meats and eggs help support your mitochondria. Not enough fats or the wrong type of fats (like trans fats, fats from conventionally raised meats or fried food) can cause your cells to become brittle and weak and they wreak havoc on your system, causing chronic inflammation.

Try intermittent fasting (IF) and/or calorie restriction (CR).[10,11,12,13,14] There are many ways to practice IF and CR, most of which are fairly easy. I am a big advocate for time-restricted eating, as a method of IF. This is where you eat the normal amount of calories you would in a day, but limit it to a short eating window, usually within 10 or less hours. So, for example, if you eat breakfast at 9 am, you'd make sure your last meal of the day was 7pm or earlier.

There are studies to suggest that people benefit from IF while having an eating window of anywhere between 8 and 12 hours, or even periods of fasting from 24 to 48 hours once a month or once a quarter. By practicing an extended pause from eating, your body has a chance to rest and recover from the barrage of foods, chemicals, and functions typical in a day. Your body responds to these periods by increasing fatty acid oxidation (using fats for fuel), becoming more insulin-sensitive, clearing out old mitochondria, and increasing mitochondrial biogenesis—all *really* good things when it comes to increasing healthspan.

Note:
If you are pregnant, trying to get pregnant, have blood sugar dysregulation, or hormonal imbalances, intermittent fasting might not be for you. Be sure to check with your doctor or Functional Medicine practitioner before making any dietary modifications.

Periods of calorie-restriction, about 40% less or fewer calories than normal, and intermittent fasting/time-restricted eating have been shown to increase your sirtuin pathway (improves mitochondria), your FOXO pathway (enhances your autophagy, or clearance of dead and damaged cells), and your Nrf2 pathways (increases your antioxidant defenses). They can decrease your overall inflammation, fasting insulin levels, and blood pressure, while improving your oxidative stress, sleep, and muscle-building. Hello, longevity!

Non-Negotiable #2: Move, Seriously.

Exercise is so important for your overall health. It can help prevent telomere shortening, reduce stress and inflammation, and help clear out ROS and other pro-oxidants. I love high-intensity interval training (HIIT) because there are great studies showing the efficacy of this for so many areas of health: weight and fat loss, muscle building, cardiovascular improvement, stress relief, toxin-clearing, and improvements in sleep and blood sugar control, all using a routine that's usually less than 10 minutes. That's extraordinary!

My favorite HIIT exercise is the 7-Minute Workout that you can do at home. When it's this short and effective, there's really no excuse to not exercise a few times per week.

If you can, I also encourage you to include 2 to 3 strength training days each week as well. These are usually longer than 10 minutes per workout, but strength training is what helps build and maintain your muscles and increase your mitochondria, which in turn will increase your energy, fat burning, and longevity.

If you don't have a current exercise routine, I recommend finding a plan that you will stick to. Download the 7-Minute HIIT Workout, buy a gym membership to encourage you to actually go, invite a friend on a walk, or start a movement hobby like gardening or hiking. Small or big, any addition of movement into your current routine can do your mitochondria good.

Non-Negotiable #3: Get Light, But Not Just Any Light

Our ancient ancestors had some major natural advantages that our modern societies have no choice but to succumb to. It's rare that we look at our ancient ancestors' advantages when they clearly had so many disadvantages—lack of healthcare, lack of technology, lack of stable housing or protection against predators, lack of education, etc. However, one major and distinct advantage was actually the lack of electricity and technology. I know this sounds contradictory, but stick with me here.

Our modern times are flooded with artificial light from electricity, building lights, computers, TVs, tablets, phones, alarm clocks, etc. and also significantly lacking in natural sunlight. Our circadian rhythms are closely tied to the natural cycle of the sun. This rhythm is a natural, internal process that regulates our sleep-wake cycles. Sleep involves quite a bit more than simply closing your eyes, turning off your brain, and opening your eyes again in the morning.

There's an entire internal "ecosystem" at work within your body that is closely connected with your environment to help produce the hormones and neurotransmitters needed to either help you fall and stay asleep at night or help you wake and stay motivated during the day. This ecosystem is almost exclusively regulated by light exposure.

Basically, light goes into your eye, hits your retina, and then is transmitted to the suprachiasmatic nucleus and on to the pineal gland. This is an area of the brain where serotonin is synthesized into melatonin based on the light/dark signal. If light is hitting this area, melatonin synthesis is suppressed and cortisol production is ramped up. If light is not hitting this area, melatonin is formed and cortisol is suppressed.

Melatonin is a hormone produced in response to darkness and controlled by norepinephrine—part of the parasympathetic "rest and digest" nervous system. It helps signal your body to feel sleepy, fall asleep, and stay asleep. It is also a potent antioxidant and has many implications for your overall health.

Cortisol is a hormone controlled by your sympathetic "fight or flight" nervous system and is released in response to stressors. It is what fuels the rush of adrenaline that allows you to respond and move quickly, especially beneficial if the insult is life-threatening. It also responds to light exposure and is supposed to be at its highest levels first thing in the morning to help you wake and feel motivated to take on the day and any time you experience a stressful situation. Unfortunately, your body can't tell the difference between a lion chasing you and a stressful job, so cortisol can be chronically elevated, and you can see why this could be an issue.

It's clear that we want our cortisol highest in the morning to give us fuel, motivation, and focus, and we want our melatonin highest at night to encourage restful sleep. And since light exposure boosts cortisol and inhibits melatonin, getting exposed to light first thing in the morning and throughout the early day is possibly the most important thing you can do to help regulate your circadian rhythm. I want to stress here: all sources of light affect these pathways. That includes sunlight, lightbulbs, computers, TVs, smart phones, tablets, etc.

So how does this all tie in with your mitochondria? Your body requires restful, deep, and adequate sleep to both create new mitochondria as well as clear out the old, fatigued mitochondria. Lack of sleep can cause your mitochondria to become sluggish and one of the easiest and most effective "hacks" for sleep is to get bright light first thing in the morning (ideally from the sun) and turn off all electronic signals and artificial light at night. (Natural sunlight also increases your vitamin D levels, which your mitochondria love!)

Note:
In addition to when and what type of light exposure impacts your mitochondria, research indicates that exposure to near-infrared light could support mitochondrial function and energy production.[15] Check the References and Resources section for our favorite infrared sauna recommendations.

Non-Negotiable #4: Try Supplements for Added Support

The foods you eat today are not as nutrient-dense as they once were. Food should always be the foundation of your health regimen, but with the depletion of soils, travel distance and packaging of produce, loss of heirloom species, and introduction of monocropping and genetic modifications, our fruits and veggies are not as nutritious as they once were. Even with the perfect diet, you may be lacking in certain nutrients. Plus, our uber-stressed lifestyles, exposure to toxins at every turn, access to less-than-ideal foods, and interference of many medications with our nutrient pathways means that we need more nutrients than ever before.

If you suspect mitochondrial dysfunction or are just looking to support your mitochondrial health, I have 5 favorite supplements that are mitochondrial all-stars—you can take one or all, but always double check with your doctor first.

- Ubiquinol (Coenzyme Q10)

  Your mitochondria use CoQ10 to produce energy,[16] and unfortunately, as you age, the production of CoQ10 declines. It also declines with chronic stress, toxin exposures, and certain medications. To help support your mitochondria, I find most people do well with 100 to 200 mg ubiquinol daily.** (Note: Ubiquinol is the active form of CoQ10 and more expensive. You can find ubiquinone for a bit cheaper, but that's the inactive form. Consider this information when making your decision.)

- Alpha Lipoic Acid (ALA)

  Alpha lipoic acid is a powerful antioxidant that helps neutralize free radicals and ROS, supports fuel production in your muscle mitochondria, and supports stabilized blood sugar levels. I find most people do well with 600 to 1,200 mg daily.**

- Resveratrol

  Resveratrol, a major polyphenol found in red wine, is a powerful antioxidant that helps protect and promote mitochondrial biogenesis. I find most people do well with 40 to 200 mg daily.**

- Epigallocatechin-3-Gallate (EGCG)

  Commonly called green tea extract, EGCG is an antioxidant polyphenol that targets mitochondria to support biogenesis and quell ROS.[17] Surprisingly, EGCG has also been shown to create oxidative stress purposely and situationally to combat cancer cells. I find most people do well with 225 mg daily.**

- L-Carnitine

  L-carnitine has been shown to carry activated fatty acids into the mitochondria for fuel production, remove toxic fatty metabolites, and regulate mitochondrial function. It's also been shown to support cardiovascular health. I find most people do well with 600 to 1,200 mg daily.**

***These are basic supplement ranges. You may need more or less, so make sure you are working with a practitioner to determine your current levels and recommended dosage.*

Next-Level Supplementation

These are totally optional but promising in the realm of biohacking your mitochondria. Check with your doctor before incorporating any of these supplements into your routine.

- **Nicotinamide adenine dinucleotide (NAD)**

  NAD is a coenzyme required by your mitochondria to make energy. Your body also uses NAD to generate ketones, keep stable blood sugar overnight, for nerve communication, and proper muscle function. It's an extremely important coenzyme to protect and repair your cells[18]—all of which are crucial for longevity and a long healthspan. You can also find this in the form of nicotinamide riboside (NR) or nicotinamide mononucleotide (NMN).

- **Nrf2 activators**

  The Nrf2 pathway regulates the production of the master antioxidant, glutathione, as well as superoxide dismutase (SOD). It also is important for your detoxification pathway to help keep your cells and mitochondria clean and can help downregulate inflammatory factors. Nrf2 activators include sulforaphane (an extract from broccoli), pterostilbene, curcumin (the active ingredient in turmeric), and green tea extract (EGCG), among others.

- **Sirtuin activators**

  Sirtuins are important to protect your cells from oxidative damage and help maintain telomere length. Of course, they are also important for keeping your mitochondria functioning optimally. Fisetin, resveratrol, and quercetin are all sirtuin activators.[19]

- **Pyrroloquinoline quinone (PQQ)**

  PQQ is an amazing antioxidant, up to 100x as powerful as vitamin C. It stimulates your mitochondria to increase in number and efficacy, which equals more energy for you.

Want to Dig Deeper?

Unfortunately, there aren't many tests available that your doctor can run. You can check your cardiometabolic stress test, which is VO2 max, to see how these systems are functioning, and this can give you an idea of your mitochondrial function.

Functional Testing

Oxidative Stress Analysis: This test is used to test the oxidative stress markers and antioxidant reserves. This also tests glutathione and glutathione peroxidase levels.

Coenzyme Q10 (CoQ10): This is an essential nutrient for your mitochondria to make energy. CoQ10 is formed from cholesterol, so people taking statins are likely deficient in this nutrient. It's essential for heart health because our hearts contain some of the highest levels of mitochondria. But the serum CoQ10 test is definitely not the most comprehensive one to get for mitochondrial function. There is another test that includes CoQ10 levels and so much more. So if your doctor will order this test for you then there is no need to do a seperate CoQ10 measurement. The most important test for mitochondrial health is the organic acids test (OAT).

- Normal: 0.37–2.20 µg/mL

Organic Acids Test (Organix) by **Genova Diagnostics**

The organic acids test not only looks at mitochondrial function, it also examines how well our bodies are able to detoxify, B-vitamin status, as well as whether you may have dysbiosis. Dysbiosis is a term that we will talk about in the gut testing section—it is when the bacteria in your gut are not in balance.

Conclusion

Your mitochondria are crucial for your survival—you literally can't live without them. However, how well you live, how much energy you have, how well your cells communicate, and how well your organs function can vary depending on how well your mitochondria are functioning. So much of the longevity research is deeply intertwined with functions that rely on mitochondrial health: sirtuin activation, mTOR inhibition, activation of AMPK, telomere length, healthy inflammation and immune function, and the list goes on. These microscopic organelles hold the key to healthy living, be sure to take good care of them.

KEY #4: FEED YOUR BENEFICIAL BUGS

Your microbiome and holobiome include all the beneficial bugs that live in and on you. Your skin is teeming with them, your gut is loaded with them, every inch of your body is covered in them, in fact, every time you poop, about half of your waste consists of these organisms.[1,2] But this is a very, very good thing.

Your microbiome consists of bacteria, viruses, fungi, and protozoa and as long as these organisms are all in a particular balance, with the "good" outweighing the "bad" varieties, these little critters are literally what keep you alive. They all play a crucial role in helping digest and assimilate your foods, keep your immune system healthy and functioning, protect you from infections, help remove toxins, and even help synthesize essential vitamins. In fact, scientific research suggests that your mitochondria actually evolved from bacteria.[3]

These microscopic microbes have many important roles, but one of the most important when it comes to longevity is preserving your gut lining. Ideally, your digestive system should be a fairly closed, end-to-end system, only allowing for the needed and necessary nutrients to pass out of the digestive system. The food you eat should travel through your digestive system, extracting out only the nutrients and leaving everything else to be excreted as waste.

In fact, this is a pretty important function of a healthy digestive system: the ability to fully digest food, direct and utilize specific nutrients in the bloodstream, and leave everything else to be discarded.

The only thing that separates your digestive system from your bloodstream is the lining of your gut and stomach. This lining acts as a barrier to selectively allow certain crucial nutrients to pass into your bloodstream through what are called "tight junctions" but does not allow other things to cross. That's also where the majority of your bacteria are found, and for good reason too.

For anyone who's had food poisoning, after experiencing the extreme discomfort in your stomach caused by the harmful bacteria or virus, you could imagine how detrimental it would be if that got into your bloodstream. So this intestinal lining that is teeming with beneficial bacteria with the purpose of keeping harmful bacteria, viruses, etc. restricted to the digestive tract is very important. Unfortunately, there are things in our modern lifestyle and diets that can destroy our beneficial bacteria and cause our tight junctions to become not so tight.

This is a big problem, because damaged tight junctions can allow toxins, unwanted substances, harmful bacteria or viruses, or other particles into your bloodstream that would otherwise be neutralized and discarded as waste. We call this "leaky gut." And not only can harmful bacteria or viruses pass through damaged tight junctions, but so can food proteins. When this happens, the immune system, which does not expect to find food proteins in the blood, responds by launching an attack. This can result in a full-blown autoimmune attack or can trigger allergies or sensitivities which can all lead to widespread, chronic inflammation. Have you ever suddenly become allergic to a substance you've consumed for years?

Note:
Antibiotics (and all medications, for that matter) can be life-saving in certain situations; I am not anti-antibiotic. I am however, anti-unnecessary or over-used antibiotics. Unfortunately, antibiotics are being used in many unnecessary situations, for things that should be treated using other methods, like acne or illnesses caused by viruses. Antibiotics are prevalent in conventional meat and dairy systems, which causes them to wind up in our meat, milk, and water. In addition to destroying our gut microbiome, unnecessary antibiotics are creating antibiotic-resistant strains of bacteria, and that's a deadly issue.

Leaky gut has been associated with nearly every chronic condition: autoimmune diseases, diabetes, inflammatory bowel disease, multiple sclerosis, asthma, celiac disease, and even common conditions, like acne and rosacea, headaches, and fatigue.

Things like antibiotics, certain medications, environmental toxins, conventionally raised meats, glyphosate and other chemical pesticides, antibiotics, sugar, lectins, and certain proteins found in gluten, like zonulin and agglutinin are all known to damage your tight junctions and can lead to leaky gut.

Also, remember that 70% of your immune system is found in your gut and your gut bacteria make about 90-95% of the serotonin,[4,5] your "feel good" neurotransmitter, in your body. In fact, gut health has been implicated in many neurological disorders including depression, anxiety, autism, and others, through the gut-brain axis. Poor gut health, especially leaky gut, can lead to a multitude of unwanted downstream effects.

As much as I'd love to tell you that it's a "perfect storm" situation that can lead to leaky gut, there's a fairly straight-forward equation that can lead to this.

LEAKY GUT FORMULA

BACTERIAL DISRUPTER	+	TIGHT JUNCTION DESTROYER	=	INVITATION FOR LEAKY GUT
• Antibiotics • Nutrient-poor diet • Sugar • Fiber-poor diet • Not enough prebiotics • Certain medications • Mono-diet (lack of diversity) • Stress		• Gluten (zonulin) • Alcohol • Agglutinins • Sugar alcohols • Cortisol • Certain medications • Nutrient deficiencies • Prolamins • Saponins • Gliadin • Stress		Bacterial degradation, cellular damage, and opening of tight junctions can allow for unwanted substances to enter the bloodstream

It's quite likely that leaky gut or bacterial imbalance affects nearly every one of us. But, let's find out.

LONGEVITY ROADMAP

Become Young at Any Age

How Beneficial Are Your Bugs?

There are companies out there that make testing your gut bacteria easy and something you can do from the comfort of your own home. However, you don't have to purchase a testing kit to know your gut health. There are some telltale signs that may indicate that your gut could use some attention. If you are interested in testing, there are some suggestions in the Want to Dig Deeper? section of this Key.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

HOW BENEFICIAL ARE YOUR BUGS?	BEFORE:	AFTER:	DIFFERENCE:
I HAVE IRREGULAR BOWEL MOVEMENTS (< 1 OR > 4 PER DAY)			
I GET BLOATING, GAS, INDIGESTION			
I OFTEN GET HEARTBURN FOLLOWING MEALS			
I NOTICE GURGLING IN MY STOMACH			
I EXPERIENCE STOMACH ACHES AFTER EATING CERTAIN FOODS			
I HAVE SKIN ERUPTIONS, LIKE ACNE, ROSACEA, ECZEMA, ETC.			
I GET HEADACHES			
I HAVE FOOD ALLERGIES			
I HAVE SEASONAL ALLERGIES			
I GET SMELLY GAS			
I BURP FREQUENTLY			
I OFTEN NEED TO CLEAR MY THROAT			
I HAVE BEEN DIAGNOSED OR SUSPECTED TO HAVE AN AUTOIMMUNE CONDITION			

HOW BENEFICIAL ARE YOUR BUGS?	BEFORE:	AFTER:	DIFFERENCE:
I HAVE A HARD TIME LOSING WEIGHT			
I HAVE ACHY JOINTS, STIFFNESS, PUFFINESS			
I GET BRAIN FOG OR MEMORY LOSS			
I HAVE CRAVINGS FOR SUGARS			
I HAVE HORMONE IMBALANCES			
I HAVE CHRONIC FATIGUE OR FIBROMYALGIA			
I GET MOOD IMBALANCES			
TOTAL			

KEY

0-20: Your gut is doing great!

21-40: Your microbiome could use some attention—some minor adjustments to your diet and lifestyle can make improvements here!

41-60: You might be experiencing some level of bad bacterial overgrowth. You'll definitely want to pay attention to this key.

61-80: You might be experiencing leaky gut or an underlying condition, make sure you're working with a doctor or Functional Medicine practitioner for one-on-one direction and testing.

Conventional vs. Functional Approach

As we've noticed from the other Keys, this one rings true too: conventionally, most doctors tend to ignore or downplay the importance of gut health. Luckily, as we are starting to see the damage caused by unnecessary use of antibiotics, doctors are becoming more aware of the importance of your gut health and careful about prescribing unnecessary antibiotics. Unfortunately, though, most are largely untrained when it comes to identifying and treating leaky gut and what it takes to support gut health.

In Functional Medicine, we tend to agree with Hippocrates who said, "All diseases begin in the gut." Many metabolic and chronic conditions can arise from unhealthy gut microbiomes, so in Functional Medicine, we focus testing and treatment on making sure your gut is thriving. This means we aim to make sure your gut has more beneficial microbes than detrimental ones (there will always be some "bad bacteria," it's actually a good thing—just as long as there's more good than bad). We also want to see that there's a great variety of different strains of bacteria and that these bugs are abundant. If any of those qualifications aren't met, it opens the door for a leaky gut.

Most Functional Medicine practitioners follow a similar protocol, we call it the 5Rs:

- **Remove:** First, we identify if you have an unbalanced gut microbiome or possibly leaky gut and remove the overgrowth of bad bacteria as well as the external causes of poor gut health, like toxins, foods that cause damage, unnecessary antibiotics, etc
- **Replace:** Next, we add in the good stuff, like a whole-foods, Anti-Aging Pegan diet, and digestive enzymes to aid in digestion and support your gut.
- **Reinoculate:** Next, we reinoculate your gut with beneficial bacteria through probiotics, prebiotics, resistant starches, fiber-filled foods, and fermented foods that your microbes love.
- **Repair:** Next, once your gut microbiome is thriving, we can focus on healing your gut lining, using things like L-glutamine, omega-3 fatty acids, and bone broth.
- **Rebalance:** Finally, the fifth R is all about rebalancing your lifestyle to help your gut stay healthy. This includes meditation and mindfulness practices, having a life/work balance, and making time to play.

4-Step Bacteria-Your-Way-to-Longevity Protocol

Here, I lay out four things you can do today to support your gut-health and microbiome. It's fairly simple: Out with the bad, in with the good. Whenever you're making changes to your current regimen, it's important to pay close attention to your body. For example, if you start adding in high-fiber foods or supplements and your body responds with changes like extreme bloating or gas, it might be a sign that you have a type of small-intestinal bacterial overgrowth (SIBO). If that's the case, you'll definitely need to work with a doctor to get your bacteria sorted out.

And even if you don't experience negative symptoms, it's important to note positive symptoms, like increased energy, consistent bowel movements, skin improvements, etc. Always celebrate the wins—it keeps you "on-track" and motivated to keep up healthy lifestyle changes.

Step 1: Identify

Identify if your microbiome is out of balance. You can do this by taking the How Beneficial Are Your Bugs? quiz from the beginning of this section or by checking out some of the at-home testing listed in the Want to Dig Deeper? section. It's best to know, not guess.

Step 2: Include Biome-Builders

Promote a vast and diverse microbial community by including biome-builders, like:

- **Fiber.** Aim for at least 25 grams of fiber daily from your organic vegetables (not processed grains). Consider including an additional 10 or more grams of a powdered acacia gum fiber supplement.
- **Veggies.** Eat an abundance of polyphenol-rich veggies daily. Aim to fill your plate ¾ with non-starchy veggies for *every* meal. Try to eat organic whenever possible, or follow the EWG's Clean Fifteen or Dirty Dozen produce list.
- **Prebiotics.** Include plenty of prebiotic foods: Jerusalem artichoke, garlic, onions, leeks, dandelion greens, jicama, chicory root, asparagus.
- **Probiotic foods.** Include plenty of probiotic foods: Sauerkraut, kimchi, pickles, fermented soy, unsweetened yogurt or kefir, miso, natto.
- **Probiotic supplements.** Take the right probiotic supplement (work with your practitioner to determine which is right for you): Consider a low or no-histamine probiotic. That means avoiding histamine-creating strains like *Lactobacillus casei, lactobacillus reuteri, lactobacillus delbrueckii (bulgaricus)* and taking the neutral or histamine-blocking strains: *Streptococcus thermophilus, lactobacillus rhamnosus, bifidobacterium infantis, bifidobacterium longum, lactobacillus plantarum*
- **Digestive enzymes.** Add in a digestive enzyme supplement to help properly break down foods while you're repairing your gut.
- **Bone broth.** Include grass-fed bone broth for a gut-healing boost.

Step 3: Avoid Biome-Busters

If possible, avoid or reduce the things that cause your good bacteria to become unbalanced or damage your gut, like:

- Alcohol
- Sugar
- Gluten
- Glyphosate (eat organic, when possible)
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Unnecessary antibiotics
- Unnecessary steroids
- Acid blockers

Step 4: Try My Gut Healing Shake

This shake combines prebiotics with polyphenols, a therapeutic combination that is especially effective at supporting the growth and proliferation of the bacteria *Akkermansia muciniphila*. Not only does *Akkermansia* support the health of the gut by producing a protective mucus layer as well as short chain fatty acids, it may also protect against metabolic syndrome and improve blood sugar regulation.

- 1 scoop of ImmunoG PRP by NuMedica (this is bovine immunoglobulins aka colostrum)
- 1 scoop of acacia fiber (a prebiotic)
- 1 tablespoon of organic pomegranate concentrate (I use Lakewood organic) or powder
- 1 tablespoon of organic cranberry concentrate (I use Lakewood organic) or powder
- 1 teaspoon of organic matcha green tea powder
- 1 scoop of collagen powder (you can also drink bone broth)
- 1 capsule of MegaSporebiotic (or your favorite high-potency probiotic) Open the capsule to empty the probiotic powder into your shake.

Blend all ingredients together. Enjoy daily or as directed by your health practitioner.

Want to Dig Deeper?

Unfortunately, there aren't many options to test your microbiome that most doctors will run or insurances will cover, unless you're experiencing certain symptoms. However, if you do suspect SIBO, your doctor can run a breath hydrogen test that is pretty accurate and very easy to do.

Your doctor can also run your C-reactive protein test, as mentioned in other Keys, which is helpful because your body's inflammation levels can tell you a lot about your gut health. Though, I would not rely on this as the only test you do when determining your gut health.

There are at-home microbiome tests you can do. Look into Viome as one of the most comprehensive reports.

Functional Testing

Comprehensive Stool Analysis from **Genova Diagnostics**

Stool samples can tell us not only if we have an imbalance in our gut bugs, but also about the level of inflammation present in the digestive tract. Many chemical markers in stool can be analyzed to give a picture of the ecosystem. Markers for acid-alkaline balance, cultures of various bacteria, yeasts, or parasites, and short-chain fatty acid levels can often pinpoint the sources of inflammation and be linked to many diseases.

Array 2: Intestinal Antigenic Permeability Screen from **Cyrex Labs**

This test looks for "leaky gut." Sometimes our gut can become leaky due to chronic inflammation, bacterial imbalances, and eating the wrong foods for our bodies.

GI Effects from **Genova Diagnostics**

The GI Effects® Comprehensive Stool Profile is an advanced stool test that provides immediate, actionable clinical information for the management of gastrointestinal health. Utilizing cutting-edge technologies and biomarkers, this test offers valuable insight into digestive function, intestinal inflammation, and the intestinal microbiome.

GI Map from **Diagnostic Solutions**

The GI-MAP (Microbial Assay Plus) is unique in the field of comprehensive stool testing. It relies exclusively on quantitative polymerase chain reaction (qPCR) technology to detect parasites, bacteria, fungi, and more, by targeting the specific DNA of the organisms tested.

Conclusion

Your gut is the gateway to your healthspan and longevity. Even if you have the perfect diet and exercise routine, if your gut health is poor, your health will suffer. By identifying if this is an issue for you, including the biome-builders and removing the biome-busters, you can support a diverse microbial community. You'll notice benefits in all areas of your health, from mental and emotional boosts, physical flexibility, enhanced digestion, and improved energy. You really can't go wrong by healing your gut.

KEY #5: KEEP YOUR CELLS CLEAN

Our bodies are equipped with sophisticated detoxification and cleaning systems. However, the toxic burden in the 21st century is overwhelming our systems with insults from every direction—our bodies can't keep up. This leads to illness, shortens our healthspan, and decreases our lifespan. It's crucial to clean up our cells and keep them protected.

From the air we breathe, to the water we drink, the products we put in our skin, to the food we eat, the medications we take, the chemicals in our furniture, carpets, paint (you get the picture), toxins are everywhere. In fact, did you know that even vegetables take up heavy metals from the soil, which can be stored in your body when you consume them? Now, I'm absolutely not telling you to avoid vegetables, in fact, the opposite. Vegetables help boost many of our toxin-clearing capabilities, in addition to the beneficial micronutrients, polyphenols, and phytochemicals that keep us young. I mention this to impress how overloaded our systems can get.

LONGEVITY ROADMAP

Become Young at Any Age

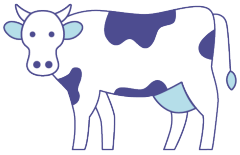
WHERE TOXINS ARE LURKING

Arsenic

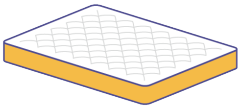
Asbestos

Bisphenol A (BPA)

Chromium-6



Dioxin



Flame Retardants

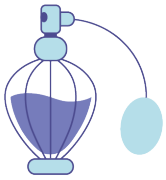
Lead

Mercury

Nanomaterials

Perchlorate

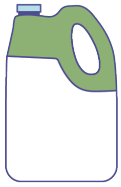
Pesticides



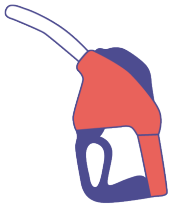
Phthalates

Per- and polyfluoroarlkyl substances PFAS Chemicals (PFOS, PFOA, GenX)

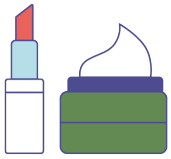
Triclosan



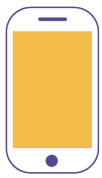
Glyphosate



Mercury



Parabens



Electromagnetic Fields (EMFs)

Mold

Glycol ethers

Don't lose hope—there's a lot you can do to avoid and help your systems detoxify from these insults. The first rule of thumb is: Avoid toxins when possible. The second rule of thumb is: Don't stress over small exposures (stressing can make matters worse). And the third rule of thumb is: Support your detox systems to help clear toxins when exposed. But first, let's look at how overloaded (or not) your system currently is.

How's Your Toxic Burden?

Having excess, unwanted toxins stored in our system is detrimental to our health. Toxins are largely stored in our fat cells, so carrying excess fat goes hand-in-hand with having excess toxins. Toxins interfere with our mitochondrial function and cellular integrity and communication; they muck up our brain, interfere with our hormones, disrupt our guts, cause our organs to be overloaded, dysfunctional, and more. It's a big deal. BUT there's a lot you can do to help. First, let's find out where you stand in the realm of toxic-burden.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

HOW'S YOUR TOXIC BURDEN?	BEFORE:	AFTER:	DIFFERENCE:
I GET FREQUENT HEADACHES			
I CARRY EXTRA WEIGHT/FAT (NOTE: THIS IS NOT ABOUT PHYSICAL APPEARANCE—VISCERAL FAT FOUND AROUND ORGANS OF INDIVIDUALS OF ANY STATURE, INCLUDING SLIM-APPEARING INDIVIDUALS, IS JUST AS DANGEROUS AS SUBCUTANEOUS FAT)			
I STRUGGLE WITH BLOOD SUGAR IMBALANCE			
I GET HANGRY			
I EXPERIENCE DIZZINESS			
I EXPERIENCE FATIGUE			
I HAVE TROUBLES SLEEPING, FALLING ASLEEP, OR STAYING ASLEEP			
I WAKE FREQUENTLY BETWEEN THE HOURS OF 1 AND 3 AM[1,2]			
I HAVE AMALGAM DENTAL FILLINGS (MERCURY)			

HOW'S YOUR TOXIC BURDEN?	BEFORE:	AFTER:	DIFFERENCE:
I DRINK FROM PLASTIC			
I USE TEFLON			
I USE PLASTIC STORAGE CONTAINERS			
I HAVE NEW CARPET, FURNITURE, OR MATTRESSES			
MY CAR IS NEWER THAN 5 YEARS			
I DRINK EXCESS ALCOHOL (>7 DRINKS PER WEEK OR >3 DRINKS IN A SINGLE SETTING)			
I DON'T KNOW WHAT'S IN MY SKIN CARE PRODUCTS			
I HAVE POOR DIGESTION (INCONSISTENT BOWEL MOVEMENTS, ESPECIALLY CONSTIPATION, BLOATING, GAS, ETC.)			
I USE DEODORANT CONTAINING ALUMINUM			
I HAVE SKIN ISSUES (ACNE, ECZEMA, PSORIASIS, ITCHY OR DRY SKIN, ETC.)			
I HAVE SINUS ISSUES (POST-NASAL DRIP, RUNNY NOSE, FREQUENT SINUS INFECTIONS, ETC.)			
TOTAL			

KEY

0-20: Your toxic load is low!

21-40: Your toxic load could use some attention—some minor adjustments to your diet and lifestyle can make improvements here!

41-60: You might be experiencing some toxic burden or laggy liver/detox organs. You'll definitely want to pay attention to this key.

61-80: You might be experiencing toxic overload, liver/detox issues, or an underlying condition. Make sure you're working with a doctor or Functional Medicine practitioner for one-on-one direction and testing.

Conventional vs. Functional Approach

Conventionally, many well-meaning doctors insist that our current detoxification systems are enough to keep us safe. And while our systems are sophisticated and well-functioning, they are not far enough evolved to protect us fully from the toxic burdens we encounter from every direction. These systems functioned really well in the time of our ancestors when the invention of man-made chemicals and toxins were nowhere to be found. But unfortunately for us, evolution is *much* slower than the on-going advancements that continue to increase our toxic burden.

Luckily, running a liver and kidney panel is fairly easy and readily prescribed by conventional doctors, and this can be helpful in determining your current detoxification capacity.

Functionally, we take toxic exposure very seriously. We have testing methods to determine your level of heavy metals, liver function, mold exposure, and toxic capacity. It's important to understand how toxic the body is, what kind of toxins you're dealing with, and where those toxins are stored. Then we can follow a protocol to remove these toxins first from your cells, and then from your body. This two-step process is important because if you skip either step, you're left with toxins in your cells or circulating throughout your body.

Here's the basic approach I take to handling toxins:

- **Identify and remove toxic inputs.** I listed the primary forms of toxic exposure above and in the next section, 3 Focus Areas to Make Your Life Less Toxic. Reducing your exposures is absolutely essential if you want to rebalance your detox system.
- **Fix your gut.** Gut imbalances are a key source of toxins for many. I talked all about this in Key #4.
- **Get moving.** This helps your blood and lymphatic circulation do its job, essential for getting toxins out of your body. I talk about this more in Key #6.
- **Get your liver and detox system working.** If your detoxification system isn't working properly, this is a serious problem and needs to be addressed.
- **Detox your mind, heart, and spirit.** This is just as important as detoxing your body, and it's an area few of us ever think about as a source of toxins. I talk more about this in Key #7.

In the next section, I lay out my top focus areas for supporting your detoxification systems.

3 Focus Areas to Make Your Life Less Toxic

This topic can feel daunting. When we look at all the places we find toxins, it can feel overwhelming to make changes to reduce this load. I want to emphasize that every little bit helps. If you can switch out a single thing each week or month, it will add up. And the more small steps you take to reduce the toxins in your life, the less overwhelming it will feel. Just take it one day and one item at a time and stick to it.

Note:
If you suspect a serious toxic burden, I highly recommend that you work with a practitioner to help detoxify your body. This can be a complicated process and certain side-effects sometimes occur, so it is best to work with someone for a personalized protocol. You can work with my team at The UltraWellness Center or find a Functional Medicine practitioner near you.

Focus Area 1—Identify and Remove Toxic Inputs

POTENTIAL TOXIC SOURCES	WHAT'S THE PROBLEM?	WHY?	BETTER ALTERNATIVE
Personal Care Products including: • Shampoo • Conditioner • Soap and body wash • Deodorant • Face cream and moisturizer • Sunscreen • Lotion • Shaving cream • Feminine hygiene products • Hair styling products • Makeup	• Triclosan • Fragrance • Retinyl palmitate/retinol • Formaldehyde/formalin • Toluene • Dibutyl phthalate (DBP) • PEG • Polyethylene • Parabens • DMDM hydantoin • Oxybenzone • Diazolidinyl urea/ imidazolidinyl urea • Ceteareth • Aluminum	These chemicals are associated with allergies, reproductive concerns, interference with hormones, toxic accumulation, microbiome imbalances, and others. Much of what you put on your skin absorbs into your bloodstream and makes its way to your organs in a matter of seconds—and the additive effect of these chemicals is potentially deadly.[3]	• Use the Environmental Working Group's Skindeep App to help identify problem ingredients and safer alternatives. • Stick with plant-based products • Aim for organic • Find non-nano barrier sunscreen (zinc oxide) • Use non-aluminum deodorant (like Native brand) • Look for brands with Vegan, Cruelty-free, and Organic certifications

Focus Area 1—Identify and Remove Toxic Inputs (cont.)

POTENTIAL TOXIC SOURCES	WHAT'S THE PROBLEM?	WHY?	BETTER ALTERNATIVE
Dental Amalgams	Mercury	Mercury amalgams "silver fillings" (extremely popular to fill cavities) can cause mercury vapors to be released during chewing. At high levels, mercury can damage your brain, kidneys, or more. Mercury can be neurotoxic	Find a biological dentist in your area to see if your amalgams should be removed https://iabdm.org/
Plastics, including: • Water bottles • Baby bottles • Baby pacifiers • Aluminum can liners • Cash register receipts • Plastic toys • Epoxy paint and coatings	• Bisphenol A (BPA) • Bisphenol S (BPS) • Bisphenol F (BPF)	BPA can leach into the things it touches. This is made worse by duration and extreme temperatures, like freezing food in a plastic container, or heating in the microwave. BPA is an endocrine disruptor by mimicking hormones. This can cause a multitude of reproductive issues, cell damage, development, and behavior to only name a few. BPS and BPF (often found in "BPA-free" plastics) have also been shown to have just as much endocrine-disrupting effects.[4]	• Glass • Stainless steel • Solid wood • Sustainably-sourced and made bamboo • Medical-grade silicone • Rubber
Non-stick Cookware	• Teflon • Perfluorooctanoic Acid (PFOA) • Polyfluoroalkyl substances (PFAS)	These man-made chemicals can leach into your foods and remain in your body for a very long time. They have been associated with certain cancers, disruption in hormones, and fetal development.[5]	• Stainless steel • Pure ceramic

Focus Area 1—Identify and Remove Toxic Inputs (cont.)

POTENTIAL TOXIC SOURCES	WHAT'S THE PROBLEM?	WHY?	BETTER ALTERNATIVE
Chemicals Found In Your Home, includes: • Mattresses • New furniture • New car • New carpets • Infant car seats • Paint • Toxic mold • These can circulate causing your air to become toxic as well	• Volatile Organic Compounds (VOCs) including: • Polyurethane or polyester in crib mattresses • Organohalogen flame retardants (halogenated) in toys, mattresses, furniture • Polybrominated diphenyl ethers flame retardants (PBDEs)	These chemicals leach into your air and dust and circulate indoors. They have been associated with lower IQ, cancers, hyperactivity, impaired memory, endocrine disruption, low-weight babies, headaches, fatigue, respiratory irritation, among others.[6,7]	• Look for items labeled Low- or No-VOC • Use wool as a natural flame retardant material in crib mattresses • Find used furniture that have off-gassed much of their chemicals • Use an air filter • Find non-toxic mattresses
Non-organic Food	• Heavy metals • Pesticides, like glyphosate • Antibiotics • Synthetic hormones	Studies show that non-organic foods (including conventionally raised meats) have higher levels of toxins, chemicals, artificial hormones, antibiotics, and heavy metals.	Opt for organic when possible. If not possible, follow EWG's Clean Fifteen: • Avocado • Sweet Corn (try to find non-GMO) • Pineapple • Onion • Papaya • Sweet peas • Eggplant • Asparagus • Cauliflower • Cantaloupe • Broccoli • Mushrooms • Cabbage • Honeydew melon • Kiwi And avoid the Dirty Dozen (find these organic only): • Strawberries • Spinach • Kale • Nectarines • Apples • Grapes • Peaches • Cherries • Pears • Tomatoes • Celery • Potatoes • Hot peppers

Focus Area 2—Treat Heavy Metal and Toxic Burden

The idea here is to move stored toxins out of the fat cells and then get them out of your body. As you may already be quite familiar, there are only a few ways things can exit your body: poop, pee, sweat, and breath. So, this focus area is all about how to move toxins from your fat cells to your liquid, solid, or gas waste.

1. **Exercise Often**
   - **a.** It's been shown that exercise and movement can help increase lipolysis, the breakdown of fat cells, which can help release stored toxins.[8]
2. **Sweat Via Exercise or Sauna Daily**
   - **a.** Sweating through exercise or sauna use also helps with moving those toxins from your fat cells out of your body.
   - **b.** Your skin is your largest elimination organ, the more you sweat, the more detox ability you have.[9,10,11]
3. **Have Consistent Bowel Movements**
   - **a.** If you're not pooping frequently, you're not releasing toxins. In fact, you're likely making it worse—your poop is quite toxic by itself, and when it's stuck in your colon, those toxins can reabsorb. No good!
   - **b.** Eat plenty of fiber through consuming 2 servings of non-starchy vegetables with every meal, adding a tablespoon or two of flax or chia seeds daily, and/or adding in a powdered fiber supplement, like my favorite acacia fiber.
   - **c.** To help ensure you're having regular bowel movements, make sure to incorporate daily movement, drink plenty of water (discussed next), and consider taking Natural Calm, a gentle magnesium supplement that can help encourage consistency.
4. **Drink Adequate Water**
   - **a.** Drinking water helps to flush toxins out of your kidneys. It also helps with encouraging regular bowel movements. I encourage you to aim to drink at least ½ your body weight (pounds) in ounces daily.
   - **b.** If you weigh 170 pounds, try to drink a minimum of 85 ounces of water each day. Increase to 1 ounce per pound body weight if you sweat often.
   - **c.** Don't forget electrolytes to keep your cells appropriately hydrated. My favorite is E-Lyte—add a capful to each glass of water and drink throughout the day.
5. **Help Bind Toxins Using Natural Binders**
   - **a.** Activated Charcoal: This has been found to bind to heavy metals and other toxins making it easier to remove them from your body.[12,13] (Note: activated charcoal can bind to nutrients as well, so try to take them away from your meals and supplements.)
   - **b.** Chlorella: This is a type of single-celled algae found to not only help bind and rid toxins, but also can help support gut and immune health.

Note:
Chelators are also very effective at removing toxins and heavy metals. However, I do not recommend doing this on your own. It is important to work with a physician if you are wanting to use chelation therapy.

Focus Area 3—Support Your Natural Detoxification Systems

There's so much you can do to support your natural detoxification systems. Here's a simple list:

a. **Focus on a Whole Foods Diet.**[14]
   i. Try to eat organic when possible. If not possible, try to stick with the EWG's Clean Fifteen and Dirty Dozen lists.
   ii. Incorporate tons of fiber-rich, prebiotic, cruciferous veggies, including: broccoli, cauliflower, cabbage, Brussels sprouts, bok choy, broccoli sprouts,[15] spinach, and dandelion greens, among other veggies.
   iii. Use lemon, which is great to protect the liver.[16] Sometimes, I'll start my day with a giant glass of fresh-squeezed lemon water.
   iv. Green tea is loaded with antioxidants and helps boost production of detoxification enzymes.[17]
   v. Garlic, turmeric, and herbs like cilantro, parsley, basil, and others help enhance detoxification and protect DNA from damage;[18,19] and they make your food taste delicious!
   vi. Beets and berries, especially blueberries, are loaded with antioxidants and powerful toxin-fighting polyphenols.[20]

b. **Try Supplements**
   i. Glutathione is our body's master detoxifier and antioxidant. It helps protect cells, support the immune system, and removes toxins from the body.
      1. In some cases, IV glutathione therapy may be needed. Ask your doctor if IV glutathione is right for you.
   ii. N-acetyl-l-cysteine (NAC) is a powerful free radical scavenger and supports tissue levels of glutathione.
   iii. Alpha lipoic acid (ALA) is an antioxidant that helps support liver function and energy production in the muscles.
   iv. Selenium is required for synthesis of glutathione. It can be found in foods like Brazil nuts and meats, but this is an excellent supplement that incorporates selenium with ALA and NAC.
   v. Zinc is crucial to support the body's defense and immune system.

Note:
A note about toxic inputs: I recommend switching out your products as you run out. Almost out of your shampoo and conditioner? Replace them with an organic product. Do you have a plastic container that is stained and falling apart? Replace it with glass. Use the Environmental Working Group as a helpful resource for finding cleaner products.

Want to Dig Deeper?

Conventional Testing

Aspartate aminotransferase (AST): This is a blood test liver function test that can indicate if there is liver damage occurring.

- Normal: 0–40 IU/L
- Optimal: 0–25 IU/L

Alanine aminotransferase (ALT): This is a blood liver function test that can indicate if there is liver damage occurring.

- Normal: 1–44 IU/L
- Optimal: 1–26 IU/L

Gamma-glutamyl transpeptidase (GGT): This is a blood test liver function test that is specific for toxin exposure and for fatty liver. This value can be elevated in people with diabesity, drug exposures, excess alcohol intake, and for many other reasons.

- Normal: 1–65 IU/L
- Optimal: 1–29 IU/L

Functional Testing

Oxidative Stress Analysis

This test is used to identify oxidative stress markers, antioxidant reserves, glutathione, and glutathione peroxidase levels.

Organic Acids Test (Organix) by **Genova Diagnostics**

The organic acids test looks at how well your body is able to detoxify. It measures specific compounds including sulfates, pyroglutamate, and orotate and can identify a problem with your detox pathways or if you're exposed to toxins.

Mycotoxin test by **RealTime Laboratories**

Another cause for inflammation and immune system disturbances is toxic mold sometimes found in older buildings and homes.

Urine Toxic Metals by **Doctor's Data**

The Toxic Metals urine test is used to easily and accurately identify levels of heavy metals.

Mercury TriTest by **QuickSilver**

This test measures both organic mercury from fish, also known as methylmercury, which is mostly what you find in your blood, as well as inorganic mercury which comes from dental fillings or pollution.

Conclusion

While it's true that toxic exposures are unavoidable and overwhelm our natural detoxification systems, it's also true that there's a lot we can do to reduce our toxic exposures and boost our detox systems. By making small changes and modifications, little steps can add up. It's impossible to be completely toxin-free, but we can work to limit incoming insults and help fortify our body for those inevitable invaders.

KEY #6: PROTECT YOUR VEHICLE

I think most people can agree that our physical bodies are awfully important to our existence and longevity. And for the most part, the body you're given is the only one you get, so it's important to take care of your vehicle—the thing that transports your vital organs and houses everything that makes you, you.

So how does science say you protect your vehicle? It should come as no surprise that there's three main factors that play a significant role in physical health—**diet**, **mindset**, and **movement**. So let's look at the research.

Diet

The most well documented correlations between diet and longevity, health, and disease prevention come from the Mediterranean diet, which focuses on healthy fats like olive oil, whole grains, legumes, and low protein. The ketogenic diet (which is heavy in fats, moderate in protein, and low in carbohydrates), Paleo diet (high in protein, moderate in fats, low in carbohydrates), and vegan/vegetarian diets (heavily reducing or eliminating meat and animal products) have also been studied.

The Mediterranean diet has shown correlations with increased lifespan and healthspan,[1,2] but so have the ketogenic diet,[3,4,5] the Paleo diet,[6] and the vegan/vegetarian diet,[7] though not as well-studied. So, I took the best parts of all of those diets, the parts with the strongest scientific research, and created what I light-heartedly refer to as the "Pegan" (Paleo+vegan) diet. This means eating plant-rich, nutrient-dense, whole foods with plenty of healthy fats, quality protein, and as many polyphenols as your stomach can hold.

I've followed the Pegan diet for years and recommend it to many of my patients, friends, and loved ones. I've done the research and compiled it into my book, *Food: What the Heck Should I Eat?* and shown what a delicious way of eating it is in my follow-up cookbook, *Food: What the Heck Should I Cook?* (Then, I expanded on the importance of our food system in my book *Food Fix*.) Keep your eyes out for my new book, *Pegan Diet*, coming out February 2021 for an even more extensive breakdown of the Pegan diet. I believe an individualized approach to diet and longevity is important for everyone, and I also believe that the Pegan diet is a very good starting point. I talk all about the details of this diet in my 30 Days to Aging Backwards Plan. Stay tuned.

Mindset

I talk all about spiritual health in Key #7, but it worth mentioning here that part of protecting your vehicle includes your mindset, and you simply cannot ignore it. Focusing on negativity has been shown to shorten lifespan,[8] whereas being psychologically well, practicing stress-management, and nourishing your spirit has shown to increase telomere length, lifespan, and most importantly, healthspan.[9,10]

Note:
Almost all nutritional and dietary research is based on cohort observational studies and few-to-no long-term, randomized placebo-controlled trials—the gold standard for scientific research. The reason for this is that it is quite difficult to force a large group of individuals to follow specific dietary guidelines for an extended period of time and trust that they follow it strictly. So, we are left with many observational studies. To give an idea of observational studies, it's largely a questionnaire that people respond to periodically. This works well to gather information over longer periods of time for larger groups of people. The downside is recollection-style data collection is proven quite unreliable and subjective. Do you remember what you ate 2 months ago? It's all to say that studies surrounding diet should all be taken with a grain of salt.

Movement

When it comes to exercise, it's hard to dispute the evidence. Countless high-quality research has shown the benefits of exercise on every facet of health and longevity.

Exercise has a direct correlation with improving heart and cardiovascular health, decreasing the risk of heart disease, and improving outcomes of those with heart disease.[11,12,13]

Exercise has been shown in preventing certain types of cancer, improving outcomes during treatment, and also preventing recurrence of cancer.[14,15]

It has been shown extremely beneficial in treating diabetes, helping to stabilize blood sugars, improving outcomes and management of diabetes, improving inflammation, and improving insulin-sensitivity.[16,17,18,19,20]

Exercise helps in supporting a healthy and diverse microbiome,[21,22] reducing chronic inflammation,[23] supporting mitochondrial health and biogenesis,[24,25] helping balance hormones,[26,27] keeping your body strong as you age,[28,29] and increasing overall happiness and satisfaction with life.[30,31,32] It can improve every aspect of life.

And the research is just as compelling when we talk about longevity pathways specifically. Exercise has been shown to protect your telomeres[33,34,35] and has been associated with increased telomere length, helps mediate metabolic effects of AMPK,[36,37] activates sirtuins,[38] and improves longevity and healthspan overall.[39,40,41]

The science is there. Want to live to be 120? Improve your healthspan? Reduce your risk for chronic diseases? Or simply *feel* better or happier? All of the above? Move.

LONGEVITY ROADMAP

Become Young at Any Age

Does Your Vehicle Need a Tune-Up?

Can you physically do everything that you'd like to do? That's the main question here. If you wanted to go play tennis or hike a mountain or go ice skating, could you? Protecting your vehicle means taking care of your body so that you can do the things you truly want to do, even as you age. So, let's take your vehicle in for a check-up.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

DOES YOUR VEHICLE NEED A TUNE-UP?	BEFORE:	AFTER:	DIFFERENCE:
I HAVE A HARD TIME SWITCHING POSITIONS (GOING FROM SITTING TO STANDING OR VICE VERSA)			
I CANNOT STAND FROM A SEATED POSITION ON THE FLOOR WITHOUT ASSISTANCE			
JOINT PAIN INHIBITS ME FROM DOING PHYSICAL MOVEMENTS			
I EXPERIENCE PHYSICAL LIMITATIONS			
THERE ARE THINGS I'D LIKE TO DO, BUT PHYSICALLY CAN'T			
I GET OUT OF BREATH EASILY			
I HAVE BEEN DIAGNOSED WITH DIABETES OR PREDIABETES			
I SIT FOR MOST OF THE DAY			
I HAVE BEEN DIAGNOSED WITH OSTEOPENIA, SARCOPENIA, OR OSTEOPOROSIS			
I NOTICE GASTROINTESTINAL UPSET AFTER EATING CERTAIN FOODS			
I CONSUME FOODS CONTAINING ARTIFICIAL SWEETENERS OR ARTIFICIAL INGREDIENTS			
I CONSUME PROCESSED CARBOHYDRATES (FOODS OFTEN FOUND IN BOXES OR BAGS: CEREALS, PASTAS, RAMEN, POP TARTS, ETC.)			

DOES YOUR VEHICLE NEED A TUNE-UP?	BEFORE:	AFTER:	DIFFERENCE:
I FEEL LIKE MY WEIGHT INHIBITS ME FROM DOING THINGS I'D LIKE TO DO			
I FEEL LONELY			
MY FEELINGS OF DEPRESSION OR SADNESS ARE HEAVY			
MY INNER-THOUGHTS TEND TO BE NEGATIVE			
I AM OVERLY HARD ON MYSELF			
I FEEL ANXIETY OR DEPRESSION IN PHYSICAL LOCATIONS, LIKE MY STOMACH OR HEART			
I HAVE ELEVATED BLOOD PRESSURE			
I HAVE ADDICTIVE HABITS (I.E. SMOKING, ALCOHOL USE, SOCIAL MEDIA OVERUSE, ETC.)			
TOTAL			

KEY

0-20: Your vehicle is functioning well!

21-40: Your physical body could use some attention—some minor adjustments to your diet and lifestyle can make improvements here!

41-60: You might be experiencing some physical limitations that are keeping you from truly enjoying life. You'll definitely want to pay attention to this key.

61-80: You might be experiencing some serious physical limitations or an underlying condition, make sure you're working with a doctor or Functional Medicine practitioner for one-on-one direction and testing.

Conventional vs. Functional Approach

Conventionally, there are a lot of ways to test your body, your bone strength, adipose tissue around your organs (called visceral fat), your muscle score, cardiovascular function, and others. This is helpful to give you an idea of where you stand physically, as far as testing is concerned.

Functionally, we do a full body assessment as part of our standard office visits. Many practitioners will watch you walk, assess your posture, your gait, and your emotional state. We look at your skin texture, nail health, eye clarity, even your tongue. Often, poor health is reflected outwardly, we just tend to ignore it most of the time. For example, have you ever noticed vertical lines in your toe or fingernails? Or what about ridges along the edges of your tongue? These can be signs of certain conditions that most conventional doctors ignore.

Functional doctors also deeply assess your diet, ensuring that you are eating in a way that supports health and longevity. If you have a prior diagnosis, we will also assess how food can play a role in treatment. We do a deep dive into every symptom you might be feeling and ask you to pay close attention to when you experience symptoms and the foods you ate around that time.

Functional Medicine doctors also look into your spiritual health. We understand that if you're feeling lonely, lost, or hopeless, you're very unlikely to find optimal health. Your mind is very powerful and we take the time to assess how your mindset is helping or hurting your body.

And, of course, we also take the time to educate about how to make improvements to your movement, your diet, and your mental health.

How to Move Youthfully at Any Age

For this Key, I'm going to focus on things you can incorporate into your daily routine to add more movement. I think I made my point pretty clear that exercise is an absolute non-negotiable if you want to feel better, age slower, lengthen your lifespan, prevent disease, and increase your healthspan. So, why is it so hard to stick with an exercise regimen?

I have a few ideas about this: I think for some people who don't currently have a routine, it can feel overwhelming thinking of going from 0 days of exercise per week to 5. I get it, that feels overwhelming. I also know, as a person with a very, very full calendar, the idea of adding *one more thing* can also feel overwhelming. Some people might not know where to start or maybe have tried a gym routine in the past but hadn't noticed a "difference." Whatever your reason, I wanted to create this plan to make it impossible not to succeed. I am bringing in some advice from some experts in the field of making habits stick, Jim Kwik, author of *Limitless* and BJ Fogg, author of *Tiny Habits*.

I'm also making two movement plans: one, called the Will-Do Movement Plan, for someone who currently does not have an exercise routine and one, called the Move More Movement Plan, for someone who does but wants to maximize their results and exercise intentionally for longevity and healthspan.

Will-Do Movement Plan

The Will-Do Movement Plan is for you if you don't currently have an exercise routine or struggle to maintain a consistent schedule. This is a 3-step plan that might sound overly simplistic. And it is, but that's the point. I don't mention the gym, how many days to exercise, how long to lift weights, or anything that might sound too big if you're currently overwhelmed or don't know where to start. But it is important that you *start*. So let's decide today to follow my 3-step movement plan.

Step 1—Make Up Your Mind

Decide. Today, decide that no matter what, you are going to start a movement routine. Write it down, tell your friends and family, and ask them to hold you accountable. If your mind is wishy-washy about something, your actions will be, too.

If it helps you, write out sticky notes with your commitment and list why it's important for you to make these changes and post them everywhere. Are you deciding to focus on your physical health because you want to play with your grand and great-grandchildren as long as possible? To reverse a diagnosis? To become stronger? To run a marathon? To live longer and better? To prove that you can? Whatever the reason, write it down and remember it daily.

Step 2—Commit to the Smallest Step Possible and Stick to It

My good friend Jim Kwik says, "Ask yourself: What is the smallest thing I could do today to achieve progress towards my goal?" For example, if your goal is to read a book every month, the very smallest step might be committing to reading one word every day. Make it something so easy, simple, and doable that there's no way you CAN'T do it.

Want to go to the gym? Commit **only** to putting on your exercise shoes. That's it. You can do that right? Want to wake up early to go for a walk? Commit to set your alarm clock, and that's it. Want to start riding your bike after work? Commit to putting on your helmet, and that's it. **And *do it***. Do those easiest, most simple commitments, and celebrate when you do (check out Step 3 for more on celebrating yourself).

Why am I asking you to commit to doing next-to-nothing? Because the likelihood that you stop at that one thing is very low. If you can find the motivation to read one single word in your book, it's extremely likely that you'll keep reading. One sentence, one page, one chapter. But here's the kicker. If you commit to something small and that's all you do—great! You did it! Did you commit to put your shoes on and you put them on and took them right back off? That's awesome! Don't beat yourself up; you literally made progress towards your big goal. Do it again tomorrow, and the next day, and the next. So, focus on the easiest and most simple step you can take toward your goal, do it, and then celebrate.

Step 3—Celebrate EVERY Accomplishment

As motivation researcher BJ Fogg puts it, "When you do a behavior and feel a positive emotion about it, your brain pays attention. It essentially thinks, '*Wow, that felt good. I want to do that behavior again!*' ...Emotion creates habit."

I know it can seem silly to celebrate yourself, especially if it's something "small." But I want you to think about how we teach children how to walk, to talk, to use the potty. We celebrate-the-heck out of everything they do towards that goal. I mean, we parents freak out with excitement for them. (My children are long-grown now, but I remember screaming, "You pooped in the potty!" like it was yesterday.)

They love it, we love it, and they have an amazing time reaching a major milestone. There is absolutely no reason why you shouldn't approach yourself with the same grace, patience, and support as you do with a small child.

The more you celebrate wins, the more you fall in love with the process, the more likely you are to work harder, and the more satisfied you'll be overall. Why? Because it feels good to be proud of yourself.

That's how you get started. You make it easy, impossible to fail, and fun. You remind yourself why it's so important to you and celebrate yourself every day.

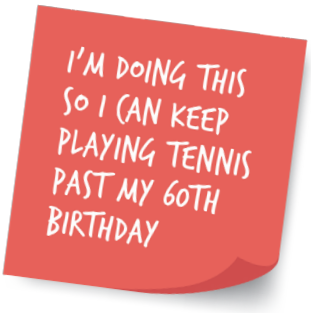
So what do I want you to do for the Will-Do Movement Plan?

1. **Decide.**
2. Commit to something so small you can't not do it. **And do it**.
3. Celebrate **every** action.

Move More Movement Plan

The Move More Movement Plan is for you if you currently have an exercise routine or gym membership and are wanting to structure your daily routine to emphasize longevity and healthspan. As with the Will-Do Movement Plan, make sure to **mind your mind**. Commit to continuing your routine and taking it to the next level. Buy yourself a sticky note pad, write down your goals, post them everywhere.

And as with the Will-Do Movement Plan, make sure you **celebrate every accomplishment**. Even if you've been keeping up an exercise routine for years, the more fun and joy you experience, the younger you look and feel, so let's take it up a notch and get moving!



Step 1—Basic Exercise Structure

Aim for a 7 to 10 minute HIIT routine Mondays, Wednesdays, and Fridays. I love Seven, the 7-Minute App you can do from home or a gym.

Aim for a 30 to 60 minute resistance training session on Tuesdays, Thursdays, and Saturdays. Consider a routine, like this one from our team's fitness coach, Adam Cobb, or Pure Barre, a full body barre workout.

Step 2—Make It Fun

Instead of a gym workout, or in addition to, pick up a movement-based activity. The more fun, the better.

- Join a softball league.
- Register for a Color Run, Tough Mudder, or Insane Inflatable 5k. Bring friends.
- Join a regular dance class. (Build your relationship by taking a ballroom class with your partner.)
- Do a community sunrise yoga class.
- Commit to a long-term challenge, like the 52 trail challenge, where you commit to hike a new trail each week of the year. Bring friends.
- Play an instrument? Join or form a band and practice regularly.
- Pick up hockey.
- Try rollerblading.

- Buy a trampoline.
- Go for a swim or walk against the flow in a lazy river.
- Join a Ninja Gym.

Step 3—Take It Up a Notch

Incorporate movement all throughout your day. Some examples:

- First thing in the morning, aim to go for a 15 to 20-minute walk outside.
- Always take the stairs.
- Find a coffee shop that is walking distance from your office and visit daily.
- Take a "stairs" break at work—If you need a mental break, instead of skimming social media, try walking or jogging up and down a few flights of stairs.
- Get a standing desk.
- Get a walking desk.
- Get an under-desk elliptical.
- Have walking meetings, whether in person or via tele-or video conferencing.
- Take a bike ride after work.
- Walk around the block during your lunch hour.
- Take advantage of your workplace's wellness incentive program (if yours doesn't have one, volunteer to start one). Challenge a coworker to join you in the program.

Want to Dig Deeper?

There are a ton of super useful tests that your doctor can run to help give an idea of your physical health. Most or all are covered by insurance, so I highly recommend getting a full work-up.

Conventional Testing

DEXA scan: The dual energy X-ray absorptiometry (DEXA) scan is a type of x-ray that can determine your bone density.

Heart Rate: This shows how fast your heart is working and is a reflection of your cardiovascular health and stress. Your heart rate can also tell you about your thyroid health: a low or high heart rate may be reflecting an underactive (slow heart rate), or overactive (fast heart rate) thyroid gland.

- Normal: 60-100 beats per minute
- Optimal: 60-80 beats per minute

Blood Pressure: Your blood pressure is the resistance your heart is pumping against. You want it low enough so it doesn't damage your vessels, but high enough that it can get blood to your brain and limbs.

- Normal: less than 130/80
- Optimal: 110/60-129/79

Functional Testing

Heart Rate Variability (HRV): This reflects the complexity of your heart rate and the health of your autonomic nervous system, which controls all the subconscious processes of your body such as digestion, heart rate, breathing, etc. It's healthy to have a lot of variability in your heart rate. In other words, ideally, your heart rate isn't a steady 72, but instead is 69, 71, 68 ½, 73, and so on. It varies from beat to beat. Your doctor may not run this, but you can find apps that work with your tracking device that can help track HRV.

- Ideal: high HRV

Waist-to-Hip Ratio: This is a better measure of metabolic risk factor (i.e. your risk of cardiovascular disease, diabetes, etc.) compared to weight or body mass index (BMI) alone. Your waist-to-hip ratio tells us more about your body composition—how much of your body is fat versus muscle/water.

How to:

- Measure your waist:
  - Measure midway between the last rib you can feel and the top of the iliac crest (the topmost bony ridge of your hips). This is roughly where your belly button is.
- Measure your hips:
  - Measure the widest part of your hips a few inches below where your belt goes (these bony protuberances of the thigh bone are known as the greater trochanters)
- Divide your waist measurement by your hip measurement:
  - waist/hip= waist to hip ratio
- Optimal Women: <0.8
- Optimal Men: <0.9

Conclusion

Take care of your body and it will take care of you. It's hardly worth trying to increase your lifespan if you are physically tired and weak. By starting now, no matter your age, increasing your movement can significantly improve your health today and sets the stage for a healthier, more active tomorrow. Whether it's through sports, resistance and strength training, play, or hobbies, any type and amount of movement is beneficial. Start small, but never stop.

KEY #7: NOURISH YOUR SPIRIT

I think we are programmed to brush off the idea of taking care of our spirit and mental health. Our fast-paced society, our full calendars, our many extracurricular activities, building careers, raising families, taking work home, etc. has made self-care and mental status low priority. However, I'm here to tell you that you cannot live a healthy, happy, fulfilled life while neglecting to nourish your mind and spirit.

This looks different to everyone, and I'm not necessarily talking about religious beliefs. Nourishing your spirit includes focusing on uplifting thoughts, believing in your own worth, valuing yourself and others, prioritizing self-care, cultivating community and meaningful relationships, practicing healthy stress management techniques, finding support, and practicing religion or spirituality if that speaks to you.

Nourishing your own spirit is especially tough for the natural givers—those that dedicate their lives to helping others. It is not second nature to think of taking care of themselves, but it's just like the flight attendants remind us on every flight: In an event where the cabin loses pressure, you must put the oxygen mask on yourself before helping someone else with their oxygen mask. Why? Because if the oxygen saturation on the plane gets too low and you're not equipped, you'll lose consciousness and *really* won't be able to help others. The best, and only sustainable way to help others, is to prioritize your own spirit. By making sure your own cup is filled, you'll be able to fill others' cups, tenfold, than if you're continually running on empty.

Spiritual health isn't "woo-woo," either. There is a ton of empirical research that indicates self-care, mindset, and community help improve all factors of health and longevity.

It's been shown that practicing self-compassion can significantly help people improve their health behaviors, like quitting smoking, exercising, eating healthier/overcoming eating disorders, practicing self-care, and overall well-being.[1,2] Self-compassion is also associated with improving physical symptoms,[3] mental health, outcomes, *and* glycemic control in patients with diabetes,[4,5] and resiliency against certain cancers as well as improved mental health in those with cancer.[6]

Social connections, community, and strong relationships have been associated with increased lifespan, improved mental health, and improved physical markers like blood pressure, waist circumference, body mass index, and inflammation.[7] Social relationships are shown to improve health and longevity,[8] help mitigate the negative effects of aging,[9] and help you to live longer.[10]

Mindset, another feature of spiritual health, is also scientifically important. Research shows that people who ruminate over repetitive negative thoughts tend to have decreased lifespans and poorer physical and mental health,[11,12] and that those who focus on positive thoughts and future goals and rewards have better well-being and physical health.[13]

Having a sense of purpose is associated with overall well-being, improved physical and cognitive health, reduced depressive symptoms, and slower aging.[14]

In fact, psychological wellbeing is even associated with increased telomere length and slower telomere attrition[15] whereas chronic stress is associated with decreased telomere length, accelerated cellular aging, and increased oxidative stress.[16]

So, taking care of yourself, practicing self-love and self-compassion, working on a growth mindset, building relationships and community, and having a sense of purpose are not only "not woo-woo," but are crucial to living a fulfilling, long, healthy life.

LONGEVITY ROADMAP

Become Young at Any Age

How's Your Spirit?

Are you feeling empty? Like you've given all you can give? Are you envisioning negative future events and/or ruminating on the past? Are you feeling lonely regardless of if you're around a lot of people or not? Or, are you hopeful for the future? Building lasting relationships, sharing in life's joys and creating memories with others? Do you feel worthy? Nourishing your spirit is more than yoga and meditation, it's *knowing* that you're worthy, worth it, and important. Let's find out how burdened your spirit is so we can work to introduce freedom.

RATING SCALE

0 = Never or almost never have the symptom

1 = Occasionally have it, effect is not severe

2 = Occasionally have it, effect is severe

3 = Frequently have it, effect is not severe

4 = Frequently have it, effect is severe

HOW'S YOUR SPIRIT?	BEFORE:	AFTER:	DIFFERENCE:
I FEEL HOPELESS ABOUT THE FUTURE			
I FEEL LIKE I HAVE NO CONTROL OVER WHAT HAPPENS IN MY LIFE			
I FEEL LIKE DISEASE AND AGING ARE PART OF GROWING OLD			
I FEEL SADDENED OR DEPRESSED AT THE THOUGHT OF GROWING OLDER			
I DON'T HAVE TRUSTED FRIEND(S) THAT I CAN TURN TO FOR ADVICE AND SUPPORT			
I DON'T FEEL SUPPORTED			
I DON'T KNOW MY PURPOSE IN LIFE			
I CONSTANTLY WORRY ABOUT THINGS BEYOND MY CONTROL			
MY EMOTIONAL FEELINGS HAVE PHYSICAL PAIN AND/OR MANIFESTATIONS			
I DON'T TAKE TIME FOR MY OWN HOBBIES OR SELF-CARE			
I FEEL LIKE I PUT MORE EFFORT INTO RELATIONSHIPS THAN THE OTHER PARTIES			
I FEEL UNFULFILLED IN MY CAREER			
I DON'T FEEL MOTIVATED TO MAKE CHANGES IN MY LIFE			

HOW'S YOUR SPIRIT?	BEFORE:	AFTER:	DIFFERENCE:
I AM OVERLY HARD ON MYSELF WHEN I MAKE A MISTAKE			
THE VOICE INSIDE MY HEAD IS USUALLY NEGATIVE			
I FOCUS ON THINGS THAT ARE GOING WRONG MORE THAN THINGS THAT ARE GOING RIGHT			
WORRY AND ANXIETY INTERFERE WITH MY LIFE, SLEEP, RELATIONSHIPS, ETC.			
I DON'T TAKE TIME FOR MYSELF			
I COPE WITH NEGATIVE THOUGHTS OR FRUSTRATIONS USING UNHEALTHY HABITS LIKE ALCOHOL, DRUGS, OVEREATING, OR AVOIDANCE TENDENCIES			
I DON'T FEEL WORTHY OF "GOOD THINGS"			
TOTAL			

KEY

0-20: Your spirit is nourished, keep it up!

21-40: Your spiritual body could use some attention—some minor adjustments to your diet and lifestyle can make improvements here!

41-60: You might be experiencing some emotional and spiritual limitations that are keeping you from truly enjoying life. You'll definitely want to pay attention to this key.

61-80: You might be experiencing some serious emotional or spiritual set-backs. Make sure you're working with a psychologist, doctor, or Functional Psychiatrist for one-on-one direction—see my Resources section for my recommendations.

Conventional vs. Functional Approach

As with all Keys I've covered, this one is no different. In Functional Medicine, we include spiritual health in whole-body health. We don't believe that mental struggles can be solved by simply finding the pill to match the ill. We believe that there's underlying causes to emotional upset, whether it's releasing past trauma, freeing yourself from limiting beliefs, learning how to focus on growth mindset, or coaching to help focus self-talk on worthiness and support. We don't treat the brain as an organ detached from the rest of the body. What you do to your body, you do to your brain, and vice versa.

Overall, spiritual health in conventional medicine is an afterthought. I believe some caring physicians take the time to check in on emotional health, which is amazing. I don't necessarily think that they are equipped to guide you through healing past trauma, releasing limiting beliefs, or helping you build friendships and community. That's just a bit out of most of their wheelhouses.

And to be honest, some of it may be beyond many Functional Medicine practitioners too. We all know the extreme importance of fueling your spirit and will take significant time and emphasis into making sure you're supported spiritually and emotionally. However, we also understand that our training is largely not in trauma-relief, manifesting, or meditation, as much as we believe in these healing modalities. For this, we recommend our Functional family: Functional Psychologists and Functional Psychiatrists.

Note:
Pharmaceuticals are absolutely necessary in certain situations. Do not stop any medications without working directly with your doctor or psychiatrist. Many Functional Psychiatrists help patients using functional approaches in conjunction with important drugs. This section is not anti-medication. You need to do what's best for your mind, spirit, and body, while working closely with your mental health specialist.

These practitioners take a whole body approach to your spirit as well. They will look at your diet, your lifestyle and exercise, your physical health, and other areas, to help support your emotional healing and vibrant spiritual health. They work very closely with us to ensure that all of your healing needs are met. Yes, we literally talk to each other to ensure your care is individualized to your needs and that we are all on the same page. This is very important when you're on your healing journey. Just as we can't treat the brain as an individual entity, we can't treat spiritual health as an independent entity either. What you do to your spirit, you do to your body, and vice versa.

5 Practices that Support Your Spirit

Healing from trauma, serious life events, or complicated struggles like chronic depression, anxiety, and others requires support from a qualified professional. These steps and tips are intended for taking your spiritual health to the next level to live a longer, healthier, and happier life, and not necessarily to heal. If you are in need of more serious healing, please work closely with a practitioner to receive one-on-one support. Refer to the Resources and References section of the workbook for some recommended mental health practitioners.

Practice 1—Gratitude

Practicing gratitude improves your well-being. It has been shown over and over again that focusing on the things you're grateful for enhances your life views, satisfaction, and well-being.[17,18,19,20] You simply feel better the more you focus on abundance.

Try this:

- Get a gratitude journal, app, or notes list for your phone. Record three things that you're grateful for at the end of each day. Try not to repeat anything on your list for a year.
- Volunteer at a nursing home, retirement community, soup kitchen, meals on wheels, etc. Serving others helps instill gratitude.
- Ask others what they are grateful for.
- Share gratitude for your friends and loved ones. If you haven't tried this before, think of something really impactful that someone else has done for you. Why was it impactful? How did it make you feel? Make sure to let that person know. And, try to let them know every time you feel grateful for someone else.

Practice 2—Self-Care

You can't pour from an empty cup.

Try this:

- Pick up an old hobby or try something new. Make time to do this at least once per week or more.
- Get a massage.
- Take a bath.
- Schedule meditation into your daily calendar.
- Drink your morning coffee outside.
- Wake up early to exercise, read, meditate, practice gratitude, enjoy your hobby, take a walk, or even enjoy your favorite show.
- Listen to uplifting podcasts. Our team favorites: *The Doctor's Farmacy Podcast*, *The Broken Brain Podcast* (I'm a little biased!), *Unlocking Us Podcast* with Brene Brown, and *Ten Percent Happier Podcast* with Dan Harris.
- Try a creative outlet: take a dance class, try photography, take an online design class, try ceramics or pottery-making, invite friends to a paint and sip event, take a stab at writing a book, write poetry, practice an instrument, take up woodworking. Even if you think you're not creative, almost everyone finds joy in expressing themselves in some way. Find yours.

Practice 3—Community

Friends help celebrate your accomplishments, comfort you during struggles, cheer you on to achieve your goals, and support you along the way. Building strong relationships with your friends, loved ones, family, and even coworkers is so important because knowing that we're all in this together feels good. Knowing that you're not alone, that you are supported, and that you are valued embodies an important fact: you are special, worthy, and worth it.

Would you like to make new or more friends? Try this:

- Talk to a new parent at your kid's event.
- Ask to join someone sitting alone at a coffee shop or restaurant.
- At a work function, church, gathering, or spouse's event? Start a conversation with someone you've never talked to before.
- Try a Meet Up.
- Go to a class (yoga, pottery, dance, etc.) alone and start a conversation with someone.
- Call a friend you haven't talked to in a while.
- Go through your phone and text someone you hardly know but felt a connection with.

Want to make your current friendships stronger? Try this:

- Be direct with your communication.
- Tell them what you need.
- Ask them what they need.
- Share your gratitude for them.
- Check in on them.
- Approach your communication out of love.
- Try the Soft Starter approach from the Gottman Institute for tough conversations.
- Acknowledge when they've helped you, but also if they've hurt you.
- Make sure they know they can come to you if you've wronged them.

Practice 4—Sense of Purpose

When we are small, one of the most common questions we get asked is, "What do you want to be when you grow up?" It's exciting to think about the endless possibilities. For many of us, at some point, we succumb to the "work to live, live to work" mentality and forget our dreams. For most of us, we require steady income to provide food and shelter for our families—but that doesn't mean that we should give up on our dreams. When we lose sight of the goals and aspirations that we have, we also lose sight of the ambition, enthusiasm, motivation, and joy that comes from realizing a goal. We find ourselves in mundane routines and easily fall victim to becoming neutral to our passions. However, your life's dreams, goals, and work are much bigger than that. Of course, I'm not saying quit your job or make a drastic life change irresponsibly. I'm saying your dreams are worth the effort and you need to be intentional with your sense of purpose in life.

Not sure what your purpose is? Meditate, journal, and/or think about these questions:

- Think about a time in your life when you felt the most fulfilled, what were you doing?
- If you had unlimited money, what would your life look like?
- If time and money were no object, what would you do with your time?
- If you could become a master at one skill, what would it be?
- What are you doing when you're the happiest?
- What did you do that caused you to feel the most accomplished?
- What project did you work on that you're the most proud of? What was it about this project that piqued your interest?
- What have you always "wanted to do?"

Have you realized a dream but aren't sure how to pursue it? Try this:

- Write it down. Post it everywhere—on your fridge, on your computer, on your mirror, on the book you're reading, on your cabinet doors, on your steering wheel, etc.
- Tell your community. Tell your crew your goals. Ask them to hold you accountable. Ask them to check in on your progress.
- Prioritize your dreams. Instead of saying "I'm too busy," try saying, "It's not a priority." That feels different. So, make it a priority.
- Wake up an hour early to take steps towards this goal or dream.
- Work through the roadblocks, and there WILL be roadblocks.
- Check in on your dream. Revisit it often. Does it still give you joy? Does it still fuel you? Do you need to evolve it or change it?
- Ask for help. People love helping others. But, they can't help if they don't know how. So tell them. Do you need a connection with a publishing agency? Ask around, it's likely that someone you know, or someone they know, can help. Do you need public speaking lessons? A connection to the movie industry? Financial assistance? What do you need to accomplish your goals and dreams? Ask for help.

Practice 5—Mindset

Our minds are hard-wired to fixate on negative thoughts.[21] It's called the negativity bias and evolutionarily, it kept us alive. If you encounter a life-or-death situation, your brain stores as much information about that event as possible so that should you encounter it again, your brain already recognizes the warning signs and can react appropriately to save your life. This works really well when stumbling into a bear cave. This does not work particularly well when experiencing a tough conversation with a superior, or experiencing the ebbs and flows of relationships, or maneuvering through self-discovery and self-confidence. By focusing on negative things, two main consequences happen: **1.** Our mind continues to fixate on the negative things and looks for more negative things to confirm the first negative thing; **2.** We miss out on the positive things.

So, how to break this cycle? Try this:

- **Become aware.** Start noticing your thoughts and pay close attention—especially to the repetitive ones. Notice where they stem from and why you're ruminating on them. If they are not serving you, ditch them. When you notice a thought like this, think of the most recent thing to bring you joy or make you smile. *Choose* to focus your mind on something that lifts you up.

- **Practice mindfulness.** I highly recommend downloading a guided meditation app, like Calm or Insight Timer, and dedicating a few minutes every day to practicing mindfulness. Our minds are very powerful, but they are easily manipulated to focus on negative and destructive thoughts—and one destructive thought leads to another. It takes practice to identify when we get hung up and know how to change course. Committing to practicing mindfulness daily can help.

- **Practice gratitude.** See Practice 1—Gratitude for tips.

- **Read.** There are some amazing resources to not only reframe your mindset, but show you the power of your mind and how your thoughts can guide you to heal or harm. I recommend *Limitless* by Jim Kwik, *The Universe Has Your Back* by Gabrielle Bernstein, *The Power of Your Subconscious Mind* by Dr. Joseph Murray, and *The Untethered Soul* by Michael A Singer.

- **Listen and learn.** The more you learn and understand why your mind gravitates towards negative thoughts and how to reframe your thinking, the easier it will be to reset your mindset. There are a ton of helpful podcasts out there, but some of my top recommendations are: *The Broken Brain Podcast* with host and my business partner Dhru Purohit featuring Peter Crone and his episode featuring Dr. Yashar Khosroshahi, and *The Doctor's Farmacy* podcast featuring Gabrielle Bernstein

- **Remember, you are not your thoughts**.

Conclusion

Your spiritual, emotional, and mental health are just as important as your physical health. What you put in your mind is just as important as what you put in your body. In order to live your best, longest, fullest life, focusing on self-love and self-care, forgiveness, community and solid relationships, positive mindset, sense of purpose, and gratitude are the fuel your spirit needs. When you think better, you feel better.

LONGEVITY ROADMAP

Become Young at Any Age

THE 30 DAYS TO AGING BACKWARDS PLAN

Well, you've made it to my 30 Days to Aging Backwards Plan. So far, we've talked about my 7 Keys to Longevity. We discussed inflammaging and how inflammation is at the root of nearly every chronic condition. We talked about all of the hidden sources of inflammation and how to support your immune system for health.

We talked about how intertwined your hormones are to every organ system. Every biochemical pathway in your body relies on appropriate hormone signaling, so we discussed how to know if your hormones are unbalanced, what causes hormone disruption, and how to support healthy hormone levels. We stressed the importance of your mitochondria, which is a funny choice of words since stress is one of the mitochondria-killers. We talked about the things that cause your mitochondria to become sluggish and how to fuel your powerhouse and support the biogenesis of new, energy-producing machines.

We highlighted the billions of microbes that live in and on our bodies and how extremely essential they are to our existence. We talked about how the damage caused to our guts can open the gates to leaky gut syndrome. But more importantly, we talked about how to create a diverse and healthy internal ecosystem.

We talked about the barrage of toxins we encounter multiple times a day, every day. We talked about the damage toxins can cause, despite our sophisticated detoxification systems. We laid out how to help reduce toxin load and how to support our detox systems. We talked about our physical health and how crucial movement is to staying and feeling young. We laid out two no-fail movement plans to get you moving more, hurting less, and feeling great.

And we talked about spiritual, emotional, and mental health. We talked about how negative self-talk can be detrimental to our physical well-being. And we laid out 5 practices to nourish your spirit.

So now is the time to put it all together into my 30 Days to Aging Backwards Plan. This plan incorporates all 7 Keys into a step-by-step plan to get you feeling more youthful using my Three Pillars to Age in Reverse.

The Three Pillars to Age in Reverse

If you're familiar with my work at all, you're probably surprised to have gotten this far into the workbook and not had an extensive section focusing on food. Well, look no further! The basis, the most important, the absolute non-negotiable and first Pillar in the 30 Days to Aging Backwards Plan is: Eat for Life. Food is medicine. It's the cheapest, easiest, and most effective medicine on the planet and if you want to feel younger and live longer, you need to prioritize eating for life.

Pillar two is: Do The Work. Listen, I'm not going to say that it's easy to overhaul your health for longevity, but I will say it's worth it. This Pillar includes steps to increase movement, support your immune system and mitochondria, reduce toxins and support your detox systems, and support your hormones. But, it's also about putting in the effort.

And the third Pillar to Age in Reverse is: Enjoy Your Journey. I've mentioned before, but the more you focus on negativity, how hard challenges may be, or how difficult it is to make changes, the more difficult your experience will be. You are setting yourself up to fail. However, if you celebrate every victory, find joy in every win, and find gratitude for every moment, not only will you succeed, but you'll love the journey along the way.

Pillar One: Eat for Life

Food is medicine. I always say, if you put crap in your body, you're going to feel like crap. How many times have you experienced a food hangover where you felt bloated, fatigued, gassy, and overall gross? I know, some greasy, fried food tastes delicious. However, nothing tastes as good as experiencing vibrant, youthful health feels. It's just not worth it.

My Anti-Aging Pegan diet, introduced in Key #6, is based on whole, real foods. Anti-Aging Pegan foods are nutrient-dense and loaded with the phytonutrients, polyphenols, and antioxidants to help keep you young. A longevity diet is anti-inflammatory, blood sugar and hormone balancing, gut-healthy, and full of fuel for your mitochondria—just like my Anti-Aging Pegan recommendations. It is not a trend or a fad, it is how I eat for life, and you should too.

How to Eat Anti-Aging Pegan:

- **Eat mostly plants**. More than half of your plate should be covered with veggies. The deeper the color, the better. Stick with mostly non-starchy veggies. Winter squashes and sweet potatoes are fine in moderation. Choose organic and regenerative when possible. Use the Dirty Dozen and Clean Fifteen guide by the Environmental Working Group to choose the least contaminated fruits and vegetables and save money.

- **Go easy on fruits**. I find that most of my patients feel better when they stick to low-glycemic fruits and enjoy others as a treat. Stick with berries, kiwis, and watermelon, and watch the grapes, melons, and higher glycemic index fruits. Think of dried fruit as candy and keep it to a minimum.

- **Eat more foods with healthy fats**. Start with fats in whole foods such as nuts, seeds, olive oil, avocados, pasture-raised eggs, and small wild fatty fish such as sardines, mackerel, herring, and wild salmon. For oils, use extra virgin olive oil (at low or no heat), avocado oil (for higher heat cooking), and organic virgin coconut oil*.

- **Eat more nuts and seeds**. They have universally been shown to prevent and reverse disease; help with weight loss, diabetes, and heart disease; are great sources of minerals, protein, good fats, fiber, and more. Almonds, walnuts, pecans, macadamia nuts, and pumpkin, hemp, chia, and sesame seeds are all great.

- **Think of meat and animal products as condiments** or, as I like to call them, "condi-meat"—not a main course. Vegetables should take center stage, and meat should be the side dish. Servings should be palm-sized per meal. Plant-based meals are fine as long as the protein comes from whole foods, not processed powders, bars, or fake meat. I often make three or four vegetable side dishes for each meal.

- **Choose regeneratively raised animal products whenever possible**. They are better for you and help drawdown carbon from the atmosphere and reverse climate change.

- **Eat pasture-raised eggs**. They are rich in vitamins, minerals, antioxidants, protein, and more. They are also a cheap source of high quality and bioavailable nutrients including B12, which you can't get from a vegan diet.

- **Eat wild-caught or sustainably raised or harvested low-mercury, high omega-3 fish**. If you are eating fish, you should choose low-mercury and low-toxin varieties such as sardines, herring, anchovies, mackerel, and wild-caught salmon, all of which have high omega-3 and low mercury levels, and they should be wild-caught or sustainably harvested or farmed. Check out www.cleanfish.com or the Environmental Working Group's guide on fish to learn which fish are sustainably harvested/raised and the lowest in toxins.

- **Eat only whole grains (not whole grain flours) and avoid gluten**. All grains can increase your blood sugar. Stick with small portions (½ to 1 cup per meal) of low-glycemic, gluten-free grains like black rice, quinoa, teff, buckwheat, or amaranth.

- **Eat beans**. Lentils are best. Stay away from big starchy beans as staples. Beans can be a great source of fiber, protein, and minerals, but they cause digestive problems for some, and the lectins and phytates they contain can impair mineral absorption. Moderate amounts (up to 1 cup a day) are okay.

- **Stay away from sugar**. Or anything that causes a spike in blood sugar and insulin production—sugar, flour, and refined starches and carbohydrates. Think of sugar in all its various forms as an occasional treat. Your body can't tell the difference between a bagel and a bowl of sugar once it gets below your neck. I tell people to think of sugar as a recreational drug. You use it for fun once in a while, but it is not a dietary staple. Liquid sugar calories (from soda, energy drinks, sweetened teas, even fruit juice, etc.) cause increased hunger, obesity, and death. Stay away.

- **Stay away from most vegetable, bean, and seed oils**. That includes canola, sunflower, corn, grapeseed, and especially soybean oil. Small amounts of expeller or cold-pressed nut and seed oils like sesame, macadamia, and walnut oils are fine to use as condiments or for flavoring. Avocado oil is great for higher-temperature cooking.

- **Avoid or limit dairy**. Dairy today is not what it used to be. Conventional dairy is bad for the environment and not well tolerated by most people. Dairy has been linked to inflammation, cancer, osteoporosis, autoimmune conditions, allergic disorders, digestive problems, and more. I recommend avoiding it, except for the occasional grass-fed dairy from yogurt, kefir, grass-fed butter, ghee, and even cheese if it doesn't cause any problems for you. Try goat or sheep products instead of cow dairy. And always go organic and grass-fed.

- **Stay away from pesticides, herbicides, antibiotics, hormones, and ideally GMO foods**. Choose foods raised or grown in regenerative ways, if possible. Also, no chemicals, additives, preservatives, dyes, artificial sweeteners, or other junk ingredients. If you wouldn't find it in your kitchen for cooking, you shouldn't eat it. Polysorbate 60, red dye 40, and sodium stearoyl lactylate (also known as Twinkie ingredients), anyone?

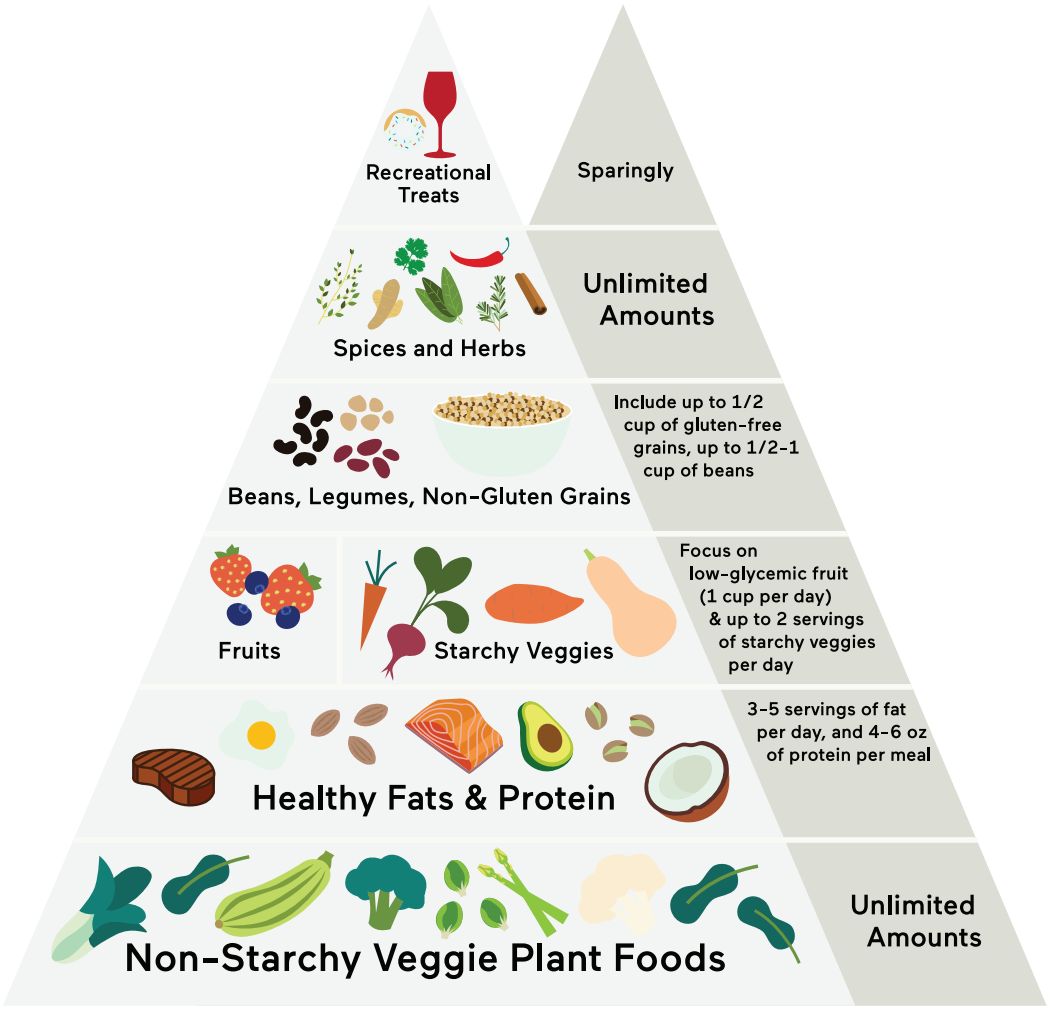
See Pegan Fats section on page 95 for an explanation on why these fats may not be a good fit for everyone.

LONGEVITY ROADMAP

Become Young at Any Age

DR. MARK HYMAN'S

PEGAN FOOD PYRAMID



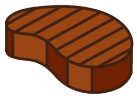
LONGEVITY ROADMAP

Become Young at Any Age

ANTI-AGING PEGAN FOODS

WHAT TO ENJOY/WHAT TO LIMIT

Here is your full foods list. Take this with you to the grocery store and keep it handy throughout the 30 days so you can be equipped to know what to enjoy and what to skip.






	POULTRY & MEAT	FISH & SEAFOOD	EGGS	NUTS AND SEEDS	OILS	VEGETABLES
FOODS TO ENJOY	**Poultry:** Organic (and if possible pasture-raised) chicken, turkey, duck, pheasant, Cornish game hen **Meat:** Grass-fed, pasture-raised lamb, beef, bison, venison, ostrich, deer, elk	Anchovies, clams, cod, crab, flounder/sole, herring, small halibut, mussels, wild salmon (canned or fresh), sardines, sable, shrimp, scallops, trout	Organic, pasture-raised eggs	**Nuts:** Almonds, Brazil, cashews, hazelnuts, macadamia, pecans, pine nuts, pistachios, walnuts, raw cacao **Seeds:** Chia, flax, hemp, pumpkin, sesame, sunflower, pumpkin **Nut/Seed Butters and Flours:** Unsweetened almond, cashew, pecan, macadamia, walnut, coconut **Soy:** Organic, non-GMO tofu or tempeh	**For cooking:** Grass-fed ghee,* humanely raised tallow,* lard,* duck fat,* chicken fat,* organic avocado oil, organic unrefined coconut oil,* MCT oil* **For salads:** Almond oil, flax oil, hemp oil, macadamia oil, organic extra-virgin olive oil (also for medium heat cooking), sesame seed oil, tahini, walnut oil	**Non-starchy:** Organic artichokes, asparagus, avocado, bean sprouts, broccoli, Brussels sprouts, cabbage, cauliflower, celery, cucumber, eggplant, garlic, ginger root, hearts of palm, kohlrabi, leafy greens, mushrooms, onions, peppers, radicchio, radish, rutabaga, seaweed, shallots, summer squash, tomatoes, turnips, zucchini, unlimited Starchy: Yam, sweet potatoes, winter squash, carrots, pumpkin, limit to 1/2 cup per day
FOODS TO LIMIT	**Poultry:** Conventionally raised chicken, duck, eggs, turkey **Meat:** All processed meats and deli meats. Conventionally raised bacon, beef, hot dogs, lamb, pork, sausage, salami	Larger fish like halibut, Chilean sea bass, tuna, swordfish, farm-raised fish	Non-organic eggs	Nuts with sugar or chocolate, nut butters that contain hydrogenated oils or sugar, peanuts/peanut butter	Canola oil, partially or fully hydrogenated oils, margarine, peanut oil, soybean oil, sunflower oil, safflower oil, trans fats, vegetable oil, vegetable shortening	Corn, white potatoes

LONGEVITY ROADMAP

Become Young at Any Age





	DAIRY	BEANS	GRAINS	FRUIT	SUGAR & SWEETENER	BEVERAGES
FOODS TO ENJOY	Pasture-raised butter or ghee*	Green beans, green peas, gluten-free soy sauce, lentils, miso, natto, non-GMO soy, tempeh, chickpeas, black beans, snap beans, snow peas	Whole quinoa, buckwheat, amaranth, millet, teff, sorghum, oat, wild rice, limited to 1/2 cup per day	**Low glycemic fruits:** Organic blackberries, blueberries, cranberries, raspberries, strawberries, kiwi, lemon, lime, watermelon **High glycemic fruits:** Bananas, grapes, mangoes, pineapples, apples, cherries, nectarines, peaches, pears, limited to 1/2 cup per day	Limited amounts of natural sweeteners like honey, pure maple syrup, coconut sugar, molasses, stevia, monk fruit	Purified water, herbal tea, green tea, yerba mate tea, seltzer, mineral water, coffee Limit alcohol intake and stick with unsweetened options, like dry red wine, hard alcohols, or hard seltzers. Skip the sugary mixers.
FOODS TO LIMIT	All other dairy	GMO soy, soymilk, soybean oil, peanuts/ peanut butter, corn *Avoid all beans if you have an autoimmune condition, prediabetes, diabetes, or leaky gut	Avoid all grain flours and gluten-containing grains: semolina, wheat, couscous, barley, rye, spelt	Fruit juice, dried fruit, candied fruit	All artificial sweeteners, cane sugar, high-fructose corn syrup, sugar alcohols, added or refined sugars	Bottled water, soda and diet soda, sugary beverages, fruit juice

See Pegan Fats section on page 95 for an explanation on why these fats may not be a good fit for everyone.

Pegan Fats

There is a subset of people who experience something we are only recently becoming aware of and researching further. We call this subset a "lean mass hyper responder (LMHR)," and these individuals typically show a similar pattern where they have an athletic, lean build, are typically quite active, and eat a fairly low carbohydrate, high fat diet. We are finding that when these individuals eat a lot of saturated fats, some notice unusual cholesterol patterns.[1] We actually don't know enough yet to indicate if these surprising cholesterol patterns are concerning or not, but I created a special "Pegan Fats" list because LMHRs may consider skipping certain fats that I normally consider healthy.

To help determine if you fit into this category, you can check out cholesterolcode.com for more information. You can also ask your doctor to run an NMR lipid test (discussed in "Want to Dig Deeper?" section from Key #1) to get a good idea of your cholesterol and lipid levels. I also find that listening to your body is key. Some people feel amazing consuming coconut oil and other saturated fats, whereas others find they need to stick with fats like avocado and olive oil. Your body is your smartest doctor.

PEGAN FATS

ENJOY	RESEARCH FIRST	LIMIT
• Organic extra virgin olive oil • Organic avocado oil • Walnut oil • Almond oil • Macadamia oil • Unrefined sesame oil • Tahini • Flax oil • Hemp oil • Avocado, olives, and other plant sources of fat • Nuts and seeds	• Butter from pastured, grass-fed cows or goats • Grass-fed ghee • Organic, humanely raised tallow, lard, duck fat, or chicken fat • Coconut oil or MCT oil (medium chain triglycerides) • Sustainable palm oil (Look for Certified Sustainable Palm Oil)	• Vegetable oil • Soybean oil • Canola oil • Corn oil • Grapeseed oil • Safflower oil • Sunflower oil • Peanut oil • Vegetable shortening • Margarine and butter substitutes • Anything that says "hydrogenated" or "partially hydrogenated" • Anything fried

Longevity Superfoods

My Anti-Aging Pegan diet is all about eating the foods that give you life, nutrients, and nourishment, and skipping the foods that don't. When it comes to longevity, there are some superstar foods that really shine. Want to feel young at any age? Eat these phytonutrients often:

LONGEVITY SUPERFOODS

PHYTONUTRIENT TYPE	PHYTONUTRIENT CATEGORY	SOURCE	BENEFIT
CAROTENOIDS	Lutein and Zeaxanthin	• Cooked spinach • Kale • Turnip greens • Dandelion greens • Collards • Mustard greens	• Antioxidant • Anti-inflammatory • Selectively taken up by the macula • Vision health • Filters blue light[2]
	Lycopene	• Tomatoes • Watermelon	• Cancer prevention • Nrf2 activation • Anti-inflammatory[3]
	α-Carotene and β-Carotene	Orange, red, and yellow pigmented plants, especially: • Carrots • Pumpkin • Sweet potatoes • Cooked spinach • Papaya	• Antioxidant • Cancer prevention • Cardioprotective[2]
CURCUMINOIDS	Curcumin	• Turmeric	• Anti-inflammatory • Neuroprotective • Anti-tumor • Antioxidant • Nrf2 activation • Glutathione biosynthesis[4]

LONGEVITY SUPERFOODS (CONT.)			
PHYTONUTRIENT TYPE	**PHYTONUTRIENT CATEGORY**	**SOURCE**	**BENEFIT**
GLUCOSINOLATES/ ORGANOSULFUR COMPOUNDS	Isothiocyanate	Cruciferous vegetables, especially: • Brussels sprouts • Garden cress • Mustard greens • Kale • Turnip	• Anti-cancer • Anti-inflammatory • Antioxidant[5,6,7]
	Sulforaphane/ glucoraphanin	• Broccoli sprouts • Broccoli	• Anti-cancer • Anti-inflammatory • Antioxidant • Anti-aging[8]
	Indole-3-carbinol	Cruciferous vegetables, especially: • Brussels sprouts • Garden cress • Mustard greens • Kale • Turnip	• Anti-cancer
POLYPHENOLS/ FLAVONOIDS	Anthocyanins	Blue, red, purple pigmented plants, especially: • Blueberries • Black raspberries • Purple potatoes • Blackberries • Cherries • Currants	• Anti-cancer • Antioxidant • Anti-diabetic • Cardioprotective • Vision health • Neuroprotective[9]
	Flavanols (Catechins, Epigallocatechin gallate (EGCG))	• Black tea • Green tea • Oolong • White tea • Dark chocolate	• Antioxidant • Anti-aging • Anti-cancer • Repair DNA damage • Cardioprotective[10]

LONGEVITY SUPERFOODS (CONT.)			
PHYTONUTRIENT TYPE	**PHYTONUTRIENT CATEGORY**	**SOURCE**	**BENEFIT**
POLYPHENOLS/ FLAVONOIDS (CONT.)	Flavonols (Quercetin, Fisetin, Rutin, Kaempferol)	• Onion • Spinach • Dill • Kale • Arugula • Watercress • Cowpeas • Chili peppers • Strawberries • Apples	• Antioxidant • Anti-cancer • Activates AMPK • Inhibits mTOR • Glutathione biosynthesis[11,12]
	Flavones (Apigenin)	• Parsley • Celery • Onions • Oranges • Chamomile • Thyme • Oregano • Basil • Herbal teas	• Anti-inflammatory • Cognitive support • Anti-diabetic • Anti-cancer[13]
	Flavanones (Hesperetin)	• Lemons • Oranges	• Antioxidant • Anti-inflammatory • Neuroprotective • Enhances the Nrf2 pathway[14]
	Isoflavones** (Genistein)	• Soybeans • Tofu • Natto • Legumes	• Antioxidant • Anti-inflammatory • Anti-cancer[15]
CHLOROGENIC ACIDS	5-O-caffeoylquinic acid	• Coffee	• Antioxidant • Anti-diabetic • Cognitive support • Detoxification
STILBENOIDS	Resveratrol	• Berries • Red grapes • Blueberries • Red wine	• Antioxidant • Anti-cancer • Cardioprotective • Activates AMPK • Protects against AGEs[16]

LONGEVITY SUPERFOODS (CONT.)			
PHYTONUTRIENT TYPE	**PHYTONUTRIENT CATEGORY**	**SOURCE**	**BENEFIT**
PHENOLIC ACIDS	Benzoic acid and Cinnamic acid	Mushrooms, especially: • Cordyceps • Reishi • Oyster Mushrooms • Shiitake • Lion's Mane • Maitake • Chaga • *Agaricus blazei Murrill* • *Antrodia cinnamomea* (AC)	• Antioxidant • Activates Nrf2 pathway • Activates sirtuins • Protect mitochondria • Anti-cancer • Anti-diabetic[17, 18]
	Oleuropein	• Olives • Olive oil	• Anti-cancer • Antioxidant • Cardioprotective • Anti-inflammatory • Neuroprotective[19,20,21]
FATTY ACIDS	Omega-3-fatty acids Docosahexaenoic Acid (DHA) and Eicosapentaenoic Acid (EPA)	• Fatty fish • Fish oil • Fish eggs • Salmon • Sardines • Krill • Krill oil	• Anti-inflammatory • Cardioprotective • Cognitive support
	Lauric acid	• Unrefined coconut oil • MCT oil • Breastmilk	• Anti-inflammatory • Supports the microbiome • Neuroprotective[22,23,24]
	Caprylic acid	• Unrefined coconut oil • MCT oil • Palm oil	• Anti-inflammatory • Neuroprotective • Cardioprotective • Blood sugar balance[25,26,27,28]

***Isoflavones are classified as phytoestrogens and may not be a good fit for everyone. Be sure to check with your doctor before incorporating foods high in isoflavones into your diet.*

Recipe-Free Cooking

I almost never follow recipes. I love opening my fridge, taking an inventory of whatever I have on hand, and throwing it all together to see what new flavor combinations I can create. I call it Recipe-Free Cooking, and it takes a lot of pressure off of meal prep. It can take some practice, so I've created some helpful resources you can use to cook Anti-Aging Pegan recipe-free. To keep things simple, you can also tweak your current favorite recipes by swapping out ingredients for foods on the Approved list or you can follow the basic templates below.

So, here's a quick guide for how to cook recipe-free the Anti-Aging Pegan way:

The general formula is this:

Step 1: Fill your plate ¾ full with colorful, non-starchy veggies.

Step 2: Include a 4 to 6 ounce serving of clean protein (like pasture-raised steak or organic tempeh),

Step 3: Make sure you have healthy fats (like olive oil, grass-fed butter, or ½ avocado).

Example of an Anti-Aging Pegan plate:

- 1 oven-baked salmon fillet
- 1 cup lightly steamed broccoli, drizzled with olive oil
- 1 cup asparagus lightly sautéed
- Season all with sea salt and pepper

Here are a few templates for recipe-free meals that provide endless possibilities:

BERRY-ANYTHING SMOOTHIE
Choose one from each column

Unsweetened dairy-free milk 8 ounces	**Frozen berries** ½ cup	**Fat** 1 tablespoon	**Greens** 1 handful	**Optional add-ins** 1 tablespoon	**Instructions**
Almond milk Cashew milk Hemp milk Macadamia nut milk Coconut milk Flax milk	Blueberries Blackberries Strawberries Raspberries Mixed berries	Avocado Almond butter Coconut butter Sunflower butter Pecan butter MCT oil	Kale Spinach Beet greens Chard	Cacao powder Cacao nibs Cinnamon Vanilla Ginger (fresh or ground) Turmeric (fresh or ground)	Blend all ingredients together until smooth and creamy. Add a few ice cubes if desired.

LONGEVITY ROADMAP

Become Young at Any Age

QUICK AND EASY SUPER SALAD

Choose one from each column

Greens 2-3 cups	**Veggies** Unlimited	**Protein** 4 to 6 ounces	**Aromatics** 1 tablespoon	**Fat** 1 to 2 tablespoons	**Acid** 1 to 2 tablespoons	**Instructions**
Kale Spinach Red leaf lettuce Arugula Mix of above	Peppers Radishes Cucumbers Fennel Mushrooms Tomatoes Roasted beets Broccoli sprouts Broccoli Cauliflower	Wild-caught salmon Sardines Cooked pasture-raised chicken or turkey Grass-fed beef Hard-boiled eggs	Fresh parsley Cilantro Basil Oregano Mint Green onions Red onion Shallots	Avocado Extra virgin olive oil Macadamia oil Nuts or seeds	Fresh lemon juice Fresh lime juice Red wine vinegar Balsamic vinegar Apple cider vinegar	Toss all ingredients in a large bowl.

KITCHEN SINK STIR-FRY

Choose one from each column

Fat 2 tablespoons	**Aromatics** 1 to 3 tablespoons	**Protein** 1 pound	**Veggies** 6 cups	**Garnish** ¼ cup	**Instructions**
Avocado oil Grass-fed butter/ ghee Coconut oil	Yellow onion Fresh garlic Fresh ginger	Grass-fed beef Pasture-raised chicken or turkey Organic tempeh	Broccoli Peppers Mushrooms Carrots Cabbage Cauliflower Celery Eggplant Bok Choy Brussels sprouts	Fresh lime juice Coconut aminos Balsamic vinegar Chopped cashews or almonds Cilantro Broccoli sprouts	Heat oil over medium heat. Add onions and sauté 2 to 3 minutes until onions are translucent, then add garlic and/or ginger and sauté another 2 minutes. Turn heat to medium-high. Add protein and sauté until golden and cooked completely through, this will depend on what kind of cut you use. Add vegetables and continue stirring and cooking for 5 minutes, until heated through but still crunchy. Divide into 4 bowls, add garnish, and serve.

Note: *You can easily turn this Kitchen Sink Stir-Fry into a delicious and hearty soup by following the steps listed above, then adding 2 quarts of pasture-raised chicken or beef stock or bone broth and cooking for about an hour.*

How to Choose Quality Foods

Despite what many diets have preached over the past several decades, finding good health and a happy weight is not a matter of calories in and calories out. 300 calories from an avocado does not have the same effect on your health as 300 calories from jelly beans. There are different macronutrients (fat, protein, carbohydrates) and micronutrients (vitamins, minerals, antioxidants, phytochemicals) at play here.

Bottom line: Focus on real, whole food, on quality, and give up calorie counting. Your body will take care of the rest. Here are some tips to make sure you're saying YES to real whole foods and avoiding processed foods.

1. **Know Your Ingredients:** Don't eat anything that contains ingredients you wouldn't have in your own pantry. You wouldn't cook with things like carrageenan or MSG. If you see ingredients you don't recognize on a label, avoid that food.
2. **Go Organic:** When possible, try to eat as much certified organic foods as possible. It can get quite pricey, so you may want to follow The Environmental Working Group's Dirty Dozen and Clean Fifteen. This is a list of foods that shows you which fruits and veggies should be purchased organic because they contain more pesticides and which ones are safe to buy conventionally.
3. **Say No to GMO:** There's just not enough information out there about what GMOs (genetically modified organisms) are doing to our health. Take the precautionary principle and avoid them.
4. **Say Yes to Grass-fed:** The "grass-fed" or "pasture-raised" designations mean the product is from an animal that was raised eating its natural diet and foraging outdoors. This is the type of animal protein you want to consume. Look for the American Grassfed, Certified Grassfed, or 100% grass-fed designations.
5. **Purchase Conscious Fish:** Always go for wild-caught or sustainably harvested seafood. Look for the Certified Sustainable Seafood, Certified Responsible Fisheries, or ASC Certified certifications. And be sure to stick to the low-mercury varieties; in general, wild-caught salmon, mackerel, anchovies, sardines, and herring.
6. **Protect the Environment, Animals, and Workers:** Look for Fair Trade Federation, World Fair Trade Organization, RainForest Alliance, and Certified Humane certifications.
7. **Eat the Rainbow Daily:** The color of a plant signals different beneficial compounds within it, with each color group representing naturally protective and healing substances:
    - Red foods are heart healthy: tomatoes, bell peppers, strawberries, raspberries, pomegranate.
    - Yellow foods are great for skin and eyes: yellow peppers, yellow summer squash and orange bell peppers
    - Green foods support detoxification: spinach, leafy greens, kiwi, zucchini, cucumber, kale, asparagus, broccoli, Brussels sprouts, bok choy, arugula
    - Orange foods help prevent cancer: orange peppers, carrots, pumpkin, acorn squash, sweet potatoes
    - Blue-purple foods are great for longevity: eggplant, blueberries, blackberries, beets, red cabbage
    - White foods help boost your immune system: cauliflower, mushrooms, garlic, radish, turnips, leeks, onion, cabbage

All About Cooking

There are a few simple cooking rules to always keep in mind. These help ensure your foods are nutrient-dense and abundant in flavor.

Use the Right Fats

For drizzling: olive, sesame, flax, hemp, almond, walnut, and macadamia oils.
For cooking: avocado oil, coconut oil, grass-fed butter, and ghee.

Lower and Slower Is Better

Focus on lower-temperature, slow cooking for meat—such as baking, poaching, and stewing—as well as methods that embrace moisture, like cooking in a slow cooker.

Soak for Better Digestion

Nuts, seeds, grains, and legumes are all healthy, whole foods, but they can be made more easily digestible by soaking them overnight prior to cooking.

Avoid Boiling, Unless it's Soup

When vegetables are submerged in water and boiled, certain nutrients, like B-vitamins and vitamin C, leach into the water. If you toss that water, you toss the nutrients. Making soups or stews is also a good option because you consume the nutrient-rich liquid the vegetables cook in.

Simple Cooking Techniques for Vegetables

There are lots of hacks to make healthy cooking take less time and energy. Here are some simple veggie-preparation techniques.

How to Steam

- Add water to a saucepan fitted with a steamer basket, but be careful that the water doesn't rise up into the basket.
- Bring the water to a boil.
- Place chopped veggies into the steaming basket, cover the pan, and steam for 4 to 8 minutes, depending on the vegetable and your desired level of tenderness.
- Remove the veggies from the basket, add favorite seasonings, and drizzle with some kind of healthy oil, such as extra virgin olive oil, walnut oil, or hemp seed oil.

How to Sauté

- Add 1 to 2 tablespoons of cooking fat (coconut oil, avocado oil, ghee, or grass-fed butter) to a skillet.
- Turn heat on to medium/medium-high.
- When the pan is hot and oil is melted or shimmering, add chopped veggies and sprinkle with any desired spices.
- Cook for 5 to 7 minutes, stirring occasionally, until your desired level of tenderness is reached. Sprinkle with sea salt and black pepper to taste.

How to Roast

- Preheat the oven to 425°F.
- Toss chopped veggies in about 1 teaspoon cooking oil for every 1 cup of vegetables to coat.
- Add your choice of dried herbs and spices and toss well to coat.
- Spread the veggies on one or two baking sheets. Take care not to crowd them.
- Pop your baking sheets in the oven. Stir every 10 minutes, until the veggies are fork-tender, around 20 to 40 minutes.
- Once done, remove from the oven and sprinkle with sea salt and pepper to taste.

Pillar Two: Do The Work

This Pillar is important. I don't want to set fictional expectations—as nice as it would be, it's unlikely that you can change absolutely nothing and expect to have great improvements in your healthspan. If you want something to change, you need to be willing to put in effort.

So, what's the "work?"

This includes: following through with the food plan, taking steps to mitigate inflammation, supporting your mitochondria, reducing toxic inputs, supporting your detox systems, taking steps to support balanced hormones, incorporating daily movement, focusing on mindset. Basically, putting all of the 7 Keys into action.

The plan incorporates a low-inflammatory, hormone-balancing, mitochondria-supporting diet, and includes daily movement and mindset support. If you follow the plan, you're well on your way to supporting health and longevity. And it all begins with a commitment. Choose and decide that you're going to follow through.

I highly recommend grabbing a friend and accountability partner to go through the 30 Days to Aging Backwards Plan with you. It's more fun to have someone in it with you—you can compare experiences, challenge each other, and raise each other up. It's easy for us to be hard on ourselves, but easy to support and lift others. So, grab a friend, and get started.

I've made suggestions for ideas on incorporating movement and mindset into each day, but feel free to mix it up and make it work for you. Revisit Keys #6 and #7 for more ideas of movement and spiritual support to find the best fit for you.

So, start today. Decide. Commit. Follow through.

Note:

I've gone through a couple very serious health crises, the most recent being within the past couple of years. It was so serious, I literally thought I was going to die, I couldn't get out of bed, I couldn't remember things from 5 minutes prior, I was extremely fatigued, I was basically wasting away. And at that time, the thought of putting any sort of effort into anything, no matter how little, seemed impossible.

But, I am here to tell you that even the smallest step will pay off. I am now experiencing the best health I have felt in my entire life. It was hard; I had to decide that I wanted to live, heal, and repair. It was not easy, but it was worth it. So, if you're experiencing any level of illness that is making you feel unable to put for energy or effort, I've made a gradual plan, Easing In, just for you. Even if the Easing In plan feels overwhelming, just choose one thing to focus on for as long as it takes until you feel ready to take on another.

Pillar Three: Enjoy Your Journey

Have you ever helped teach a young child a new skill, like taking their first steps, using the potty, or learning the alphabet? Part of their success is sharing in your immense joy and excitement. The more excited and encouraging you are, the more likely they are to step out without your hands. And, the more likely they are to have a giant smile on their face.

We as parents are extremely good at really amping up our kids and celebrating them when they've accomplished a big task or goal. But, we as adults are extremely poor at doing this for ourselves. Why? Because, as we get shaped by our surroundings and begin to learn that the world asks for a lot more responsibility and a lot less celebration. Accomplishing things becomes the expectation and we are hard on ourselves if we don't hit the mark. We experience disappointments left and right and find it easy to get sucked into a routine of completing tasks just to complete them. That can make it really hard to get excited to put in the work.

However, just imagine what it would feel like if every time you did something, like went on a walk or followed a short guided meditation, someone was standing there cheering for you, saying "Yes! You did it! You are amazing! There is nothing you can't do!" That would feel amazing, right? You'd want to do it again, and again, and again. It feels good to be supported.

Now, imagine that every time you thought about doing something, like taking a walk or following a guided meditation, but didn't, someone was standing there still cheering for you. Saying, "You are still amazing, you are still worthy, you are doing the best you can!" You'd feel supported, loved, accepted, and much more likely to try again. **Be that kind of cheerleader for yourself**.

Enjoying your journey is about finding the joy and support in the process. It's about learning a new way to cheer yourself on, celebrate your victories, and show yourself compassion when you miss the mark. It's about paying close attention to how good your body feels when you fuel it with life-giving foods. It's about noticing how energized you feel, how much more you smile throughout the day, about how grateful you've become, and even how your relationships grow. And, really, about focusing on exactly what you want for your life, how you want to feel, how you want to spend your time. We have a limited amount of time on this earth. What do you want to do with yours?

The 30 Days to Aging Backwards Plan

I'm splitting my plan into the **Easing In** and **Jumping In** plans. When I'm making major life changes, what works best for me is to Jump In head first; I want to rip the band-aid off and go all-in. However, I know that approach isn't a good fit for everyone.

The Easing In plan is made specifically for those that want to take things gradually. It's an approach where you focus on one thing at a time, all adding up to living better. If you like to take things step-wise, this plan is for you.

The Jumping In plan throws you in head first. It asks you to make major changes all at once, to overhaul your kitchen, your routine, and your mindset in one fell swoop. If you like to rip the band-aid off, this plan is for you.

Both plans are great. Both plans are effective. It's not a matter of which one is better, it's a matter of which one is the best fit for you. And no one knows you better than you. Are you a mix of both? Feel free to apply whichever plan most resonates with you and mix it up. There are no right or wrongs here; all progress is a step in the right, youthful direction.

Here are some tips to help get you started:

Tip 1: Keep Weekday Meals Simple. On your busiest days, stick with my Recipe-Free Cooking guidelines and templates. The goal is to fill your fridge with nutrient-dense foods and then take the thinking out of preparing them. Keep things simple. On your less busy days, visit my Recipes section under References and Resources in this workbook for links to some of my favorite Pegan recipes to try.

Tip 2: Try Something New. Think you dislike broccoli? Now is the time to test out a new way to prepare broccoli. Keep an open mind and try something new—you might be surprised to find your newest favorite vegetable!

Tip 3: Make Extras. Anti-Aging Pegan left-overs can save the day when you're in a pinch, short on time, inspiration, or motivation, or overly busy. If you find a recipe you love, double it. Cook once, eat twice (or more)!

Tip 4: Keep These Items in Stock:

- Olive oil (great for drizzling on your salads and veggies)
- Avocado oil (great for cooking)
- Unsweetened almond, cashew, hemp, macadamia, or coconut milk
- Ground cinnamon/your favorite spices and seasoning, salt, pepper
- Frozen berries
- Raw nuts and seeds
- Unsweetened nut butter

Tip 5: Prepare for a Food Emergency. It's bound to happen at least once: you are in a situation where you aren't prepared with an Anti-Aging Pegan meal. It's a good idea to always be prepared. Have some Anti-Aging Pegan snacks readily available in your panty, your car, and with you at work. Then, when you run into a situation where you're facing a food emergency, you can feel prepared. Here are a few ideas:

- Hard-boiled egg
- Veggie sticks with hummus or guacamole
- Nuts and seeds
- Nut butter packets
- Grass-fed beef jerky (sugar-free)

So, here we go...

Are You Easing In?

Implementing too many changes at once can be overwhelming for some people, and we want you to have the tools to be successful. The Easing In plan is for you if you'd like to take things stepwise and gradually. I've created a 4-week plan to follow. I've also created a template in the next section that you can use to schedule your days based on the weekly plan.

Week 1

Week 1 Food:

For week 1, reduce the amount of sugar, sweeteners, artificial sweeteners, honey, syrup, etc. that you consume. Aim to limit to one serving per day or less. Consider making ingredient swaps to your normal routine from the Approved Foods list, but make reducing sugar your priority for this week.

Week 1 Work:

For week 1, put a notebook by your bed and write down one thing that you are grateful for each night. Try not to repeat any item.

Week 1 Enjoy Your Journey:

Make sure to give yourself a pat on the back every day that you limit your sugar to one serving or less and write a gratitude entry in your journal. Make sure to give yourself grace—even if you didn't make that mark, still be proud of yourself for trying. Making big changes can be hard, but they are impossible if you always dwell on the obstacles or missteps. You're doing great!

Week 2

Week 2 Food:

For week 2, try to reduce your sugar intake to zero, and also add in reducing your dairy consumption. Aim for one serving or less per day. Remember, dairy includes cheese, milk, yogurt. You can swap out milk with unsweetened coconut or cashew milk, try your recipes without cheese or find an almond cheese substitute, and even try out an unsweetened coconut yogurt.

Week 2 Work:

For week 2, in addition to your daily gratitude entry, try to keep all electronics off for the first 10 minutes of your day. No emails, no texts, no apps, no news—just for 10 minutes first thing. Enjoy your coffee while watching the sunrise, take a short walk, stand outside and breathe fresh air, or hop right in the shower. Whatever you choose to do, try your best to avoid any electronics each morning, just for the first 10 minutes.

Week 2 Enjoy Your Journey:

Take time to reflect on how you feel when you limit your morning intake of social media, news, and emails. Does it feel freeing? Or anxiety-inducing? Do you feel more refreshed starting your day without the input of negative information, or do you feel disconnected? Don't judge your thoughts, just notice them. It's okay if this is very hard for you, it's also okay if you struggle, or even if you aren't able to wait the full 10 minutes. Go easy on yourself!

Week 3

Week 3 Food:

For week 3, in addition to consuming no sugar or sweeteners, try to eliminate dairy entirely, and also reduce the amount of processed carbohydrates you consume. Try to stick with one serving or less per day. Substitute the processed carbohydrates you normally consume (like pasta, bread, bagels, cereal, etc.) with veggies and protein. Try a zucchini noodle with marinara sauce instead of pasta. Try eggs instead of cereal or bagels. Try an almond flour bread instead of grain flour bread.

Week 3 Work:

For week 3, in addition to your daily gratitude entry and your 10-minute device-free mornings, try to add in a 5-minute guided meditation to your day. This can be during your 10 minutes in the morning (the one exception to using devices), during your lunch, during a work break, or right before bed. Work it into anywhere you have 5 minutes. Do you commute to work? Stream the guided meditation on your ride (just don't close your eyes if you're driving!).

Week 3 Enjoy Your Journey:

You are making significant progress! Even if you feel like you've stumbled, no one is perfect. Be gentle with yourself, make a U-turn, and get back on track. Forgiveness and self-compassion is at the center of finding joy in your journey. It's not always going to be easy to celebrate yourself and you're definitely not going to love every minute of it. But, be proud of every step along the way. In fact, be MORE proud if you have made a small misstep and then got back on track. That's a huge accomplishment!

Week 4

Week 4 Food:

For week 4, in addition to no sugar/sweeteners and no dairy, try eliminating your processed carbs, and reducing your intake of processed foods to one serving per day or less. Processed foods would be almost anything you can find in a bag or a box, most fast food, most pre-prepared items. The goal at this step is to get all meals each day to have 2 servings of vegetables, one 4 to 6 ounce portion of quality protein, and one or two servings of healthy fats—all whole food sources. An example would be a 5-ounce serving of wild-caught salmon, one cup of steamed broccoli, one cup of roasted cauliflower drizzled in olive oil for dinner, or two eggs with sautéed spinach, diced peppers, and tomatoes for breakfast.

Week 4 Work:

For week 4, in addition to your daily gratitude entry, your 10-minute device-free morning, and your 5-minute daily guided meditation, add in daily movement for 20 minutes. Try a 20-minute brisk walk first thing in the morning or a walk over your lunch break. Try a yoga class, go for a swim, take the stairs at work, go for a bike ride, or play an outdoor sport. It doesn't have to be vigorous, just aim to include movement. If you already have an exercise or movement routine, try to increase it by 20 minutes or an additional activity each day.

Week 4 Enjoy Your Journey:

Celebrate each win. At this point, you've likely made some major strides towards your goals and you've also likely hit some set-backs. But look at how far you've come! Be proud of your progress, stick with it, and give yourself a little celebration dance every time you follow the diet or work plan.

LONGEVITY ROADMAP

Become Young at Any Age

EASING IN WEEKLY TEMPLATE

	Food to Limit	Food to Limit	Food to Limit	Food to Limit	Activity to Include	Activity to Include	Activity to Include	Activity to Include
WEEK 1	Limit: sugar, sweeteners, artificial sweeteners, honey, syrup, etc.				Write down 1 thing you're grateful for each night. Try not to repeat.			
WEEK 2	Avoid: sugar, sweeteners, artificial sweeteners, honey, syrup, etc.	Limit: dairy products, cheese, yogurt, sour cream, half and half, cream, etc.			Write down 1 thing you're grateful for each night. Try not to repeat.	Keep all electronic devices off for the first 10 minutes of your day.		
WEEK 3	Avoid: sugar, sweeteners, artificial sweeteners, honey, syrup, etc.	Avoid: dairy products, cheese, yogurt, sour cream, half and half, cream, etc.	Limit: processed carbohy-drates, breads, pastas, bagels, cereals, etc.		Write down 1 thing you're grateful for each night. Try not to repeat.	Keep all electronic devices off for the first 10 minutes of your day.	Include a 5- minute guided meditation.	
WEEK 4	Avoid: sugar, sweeteners, artificial sweeteners, honey, syrup, etc.	Avoid: dairy products, cheese, yogurt, sour cream, half and half, cream, etc.	Avoid: processed carbohy-drates, breads, pastas, bagels, cereals, etc.	Limit: processed foods, fast food, foods that you find in a box or a bag.	Write down 1 thing you're grateful for each night. Try not to repeat.	Keep all electronic devices off for the first 10 minutes of your day.	Include a 5- minute guided meditation.	Include a 20- minute movement activity.

Make sure to take things one week, and one day at a time. Try to swap a vegetable with whatever food you're recommended to limit each week. Now is a great time to try out a new vegetable or food. Make a commitment to this plan, ask your friends for help, and be proud of your accomplishments. It's time to start feeling younger!

Are You Jumping In?

If making significant changes in one fell swoop resonates more with you, this is the plan for you. I recommend that you dive in, stick with it, tell your friends and have them hold you accountable, and practice self-compassion if you hit roadblocks or setbacks. Always be gentle with yourself and take a U-turn to get back on track. I've made a template you can use if it helps to have a visual schedule for the plan, you can find it at the bottom of this section.

Food:

For your entire 30 days, starting on day 1, cut out all forms of sugar (read your labels, sugar is hidden everywhere), all grain flours and any sources of gluten, all dairy, any fruit juices or liquid calories (this includes artificial or zero-calorie sweeteners), alcohol, soy, corn, peanuts, processed carbohydrates, and vegetable oils.

You might be tempted to binge on all the pantry items you currently have lying around that don't fit this plan, prior to starting. I'm not a fan of this approach—it's counterproductive to your goal! I'm also not a fan of food waste. If your pantry or fridge has a bunch of non-Pegan foods, consider donating them to your local food pantry or soup kitchen.

Follow my Approved Foods list for a more extensive guide to which foods to eat and which to avoid, but here's the gist:

Enjoy:

- As many non-starchy vegetables as you want in all meals or snacks. Get in the habit of filling 75 percent of your plate with non-starchy veggies. The more color, the better!
- High-quality protein from grass-fed beef, wild-caught salmon, pasture-raised poultry and eggs, etc.
- Gluten-free grains (such as quinoa, black rice, and buckwheat) in their whole-kernel form.
- Nutrient-dense, starchy vegetables such as sweet potatoes and winter squash, in moderation.
- Low-glycemic fruit such as apples, pears, berries, kiwi, or pomegranate, in moderation.
- Beans and legumes (except peanuts); shoot for lower glycemic options like lentils and black beans.
- Have one to two servings of healthy fat with each meal, like olive, avocado, or coconut oil.

Avoid:

- All forms of sugar, but especially avoid foods with added sugars. If you must sweeten, try using coconut sugar, maple syrup, or honey, and do it yourself so you know exactly how much you are getting.
- Inflammatory beverages, like alcohol and coffee. One cup of coffee a day and one glass of wine or alcohol three to four times a week may be okay for some people. Just pay attention and notice how they make you feel.
- Liquid sugar calories such as soda or juices, unless you are making fresh-squeezed green vegetable juices, which are fabulous.
- All artificial sweeteners.
- All fast food, junk food, artificial and refined foods.
- Refined grains, flours, and sugar.

Work:

1. **Stick to it.** Write down your goals on sticky notes and post them everywhere. Tell your friends and family about your goals and ask them to keep you accountable.
2. **Create a gym and movement routine.** Model it after my recommendations in Key #6. Write it down, tell your friends, stay accountable.
3. **Create a mindset protocol.** Meditate, do yoga, download a mindfulness app, find a mindset podcast to subscribe to. Try to keep all electronic devices off for at least 10 minutes first thing in the morning. Having a news, social media, and negative information-free time to start your day helps to set you up for a positive mindset instead of the barrage of negativity we tend to set up our days with. Mindset is crucial, don't skip this.
4. **Consider some health-promoting supplements.**
   I always recommend some staples:

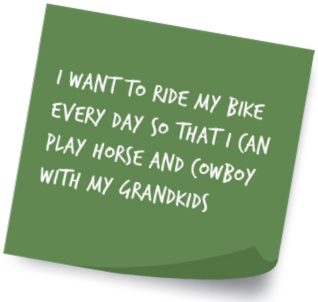
   - A high-quality multivitamin/mineral: Find one that contains optimal amounts of the full range of vitamins and minerals in their correct forms to help fill nutritional gaps.
   - Magnesium: About 75 percent of us are deficient in magnesium, which plays a part in over 300 enzymatic reactions in our bodies.
   - Vitamin D3: More than 80 percent of the US population has insufficient levels of vitamin D, the sunshine vitamin. Research shows vitamin D deficiencies contribute to a wide range of problems, including dementia.

   Some of my favorite longevity supplements are:

   - Probiotics: Stick with ones that are histamine-mitigating and avoid the histamine-causing strains (see Key #4 for more on this).
   - CoQ10: This is what helps your mitochondria to make energy. While our bodies produce it, the amount made decreases as we age and depending on factors like medications, genetics, and overall mitochondrial health.
   - Glutathione. The master antioxidant. It helps with our detoxification, cellular integrity, energy production, and boosts immunity.
   - Resveratrol. This poly-resveratrol product helps support blood vessel health, enhances your sirtuin activity and normal inflammatory response, and it helps support your liver function and detoxification.

Mark's Movement Routine:
Monday, Wednesday, Friday, I have a 60-minute gym session with my personal trainer. Tuesday, Thursday, I do the 7 minute HIIT workout. Every day, I go on at least one 20-minute walk—usually first thing in the morning. On Saturdays and Sundays, I dedicate my movement time to play—I love tennis, hiking, and even surfing. I like to mix it up, but I always play and have fun.

Mark's Meditation Routine:
Every morning, before my coffee or my morning walk, I meditate for 20 minutes. Then, I'll go on my morning walk. If I'm walking alone, I'll listen to my favorite uplifting (or science-heavy, depending on my mood) podcast. I find a lot of peace and mindfulness while I cook, so I consider making meals for my wife and I part of my mindset routine, and I do this most nights a week. I also like to schedule calls with either my friends, mentor, or life coach so that I always stay accountable. And most nights, I include a second 20-minute meditation session. It helps me relax and clear my mind before sleep—I know this helps me to rest fuller, deeper, and longer.



Enjoy Your Journey:

Celebrate every accomplishment you've made. Every time you stick with the meal plan, every meditation session, every time you complete a gym session or movement activity, every time you practiced mindfulness, ate a veggie, or skipped a dessert. Do you have a natural "cheerleader" friend? Ask them to keep you accountable and ask them to help you celebrate your wins. In fact, ask them to join you! You're more likely to accomplish your goals with a team.

Also, be gentle on yourself. Making major change can be challenging, but if you find yourself off track, practice self-compassion and self-kindness and take a U-turn to get back on track. No matter how many roadblocks or setbacks you might experience, the more gentle you are with yourself and practice self-love, the more likely you are to get and stay on track.

You might consider an app that helps you celebrate wins and track your progress, like Confetti. It takes only a few seconds to track each day. It keeps things simple but also gives you some accountability. Even if you don't hit the mark every day, every time you can check something off, celebrate and remember the progress you're making to live better, younger, and longer!

30 Days to Aging Backwards Example Schedule

Here I've listed times and activities that you can follow for your 30-day plan. This is an example, but you can follow it exactly if that is helpful. I filled in Monday with a full example but left some areas for the rest of the week empty for you to fill in with what works for you.

	MON	TUE	WED	THU	FRI	SAT	SUN
6 am	20-minute brisk walk with guided meditation or podcast	20-minute brisk walk with guided meditation or podcast	20-minute brisk walk with guided meditation or podcast	20-minute brisk walk with guided meditation or podcast	20-minute brisk walk with guided meditation or podcast	20-minute brisk walk with guided meditation or podcast	20-minute brisk walk with guided meditation or podcast
8 am	Breakfast: eggs+ sauteed veggies	Breakfast:	Breakfast:	Breakfast:	Breakfast:	Breakfast:	Breakfast:
10 am	Movement Break: Go up/down 4 flights of stairs	Movement Break:	Movement Break:	Movement Break:	Movement Break:	Movement Break:	Movement Break:
12 noon	Lunch: Leafy green salad with canned pasture-raised chicken, avocado, ¼ cup diced almonds, ¼ cup diced peppers, drizzled with olive oil	Lunch:	Lunch:	Lunch:	Lunc:	Lunch:	Lunch:
12:30 pm	Movement Break: take a walk around a block or two. Listen to a short guided meditation during your walk.	Movement Break:	Movement Break:	Movement Break:	Movement Break:	Movement Break:	Movement Break:
2:30 pm	Movement Break: Do 5 to 10 squats, lunges, or high knees to get your blood flowing	Movement Break:	Movement Break:	Movement Break:	Movement Break:	Movement Break:	Movement Break:

	MON	TUE	WED	THU	FRI	SAT	SUN
6 pm	Dinner: Baked wild-caught salmon with 1 cup of steamed broccoli and 1 cup of roasted carrots drizzled in avocado oil, salt and pepper	Dinner:	Dinner:	Dinner:	Dinner:	Dinner:	Dinner:
7 pm	Movement: Go for a bike-ride or sunset walk	Movement:	Movement:	Movement:	Movement:	Movement:	Movement:
8:30 pm	Wind-down, turn off electronics/ use blue blocking apps or glasses. Enjoy a non-electronic device activity	Wind-down, turn off electronics/ use blue blocking apps or glasses. Enjoy a non-electronic device activity	Wind-down, turn off electronics/ use blue blocking apps or glasses. Enjoy a non-electronic device activity	Wind-down, turn off electronics/ use blue blocking apps or glasses. Enjoy a non-electronic device activity	Wind-down, turn off electronics/ use blue blocking apps or glasses. Enjoy a non-electronic device activity	Wind-down, turn off electronics/ use blue blocking apps or glasses. Enjoy a non-electronic device activity	Wind-down, turn off electronics/ use blue blocking apps or glasses. Enjoy a non-electronic device activity
9:30 pm	Gratitude: Use your notebook or journal to write down 3 things you're grateful for that day. Try not to repeat.	Gratitude: Use your notebook or journal to write down 3 things you're grateful for that day. Try not to repeat.	Gratitude: Use your notebook or journal to write down 3 things you're grateful for that day. Try not to repeat.	Gratitude: Use your notebook or journal to write down 3 things you're grateful for that day. Try not to repeat.	Gratitude: Use your notebook or journal to write down 3 things you're grateful for that day. Try not to repeat.	Gratitude: Use your notebook or journal to write down 3 things you're grateful for that day. Try not to repeat.	Gratitude: Use your notebook or journal to write down 3 things you're grateful for that day. Try not to repeat.
10 pm	Sleep	Sleep	Sleep	Sleep	Sleep	Sleep	Sleep

What Happens After the 30 Days?

Keep it up. You're likely in a good routine and groove, and really starting to feel more youthful and vibrant. Like I said, this way of eating and nourishing your spirit is lifelong. I don't recommend fad dieting or short-term meditation. I recommend eating and supporting your spirit *for life*.

You can add in some of the "Limit/Avoid" foods for special occasions or in rare instances, and do make sure you enjoy it. No guilt allowed.

I always say, if what you're doing makes you feel amazing and experience vibrant, youthful health, keep doing it. If not, change.

LONGEVITY ROADMAP

Become Young at Any Age

AGING THROUGH THE DECADES

In the Longevity Roadmap docu-series, our experts mentioned different focus areas depending on what decade of life you're in. I found this information very helpful and wanted to summarize it for you here.

20s and 30s

If you're in your 20s and 30s, focus on creating and maintaining a good routine. Make sure you're incorporating all features of my 7 Keys to Aging Backwards and the Three Pillars to Age in Reverse. That includes taking care of your blood sugar, hormones, mitochondria, diet, exercise, mindset, and emotional wellbeing. Start a self-care focus now. It's easy to get tunnel vision on big changes in life as most people in these decades are going through schooling, marriage, starting families, building careers, and self-care is often put on the back burner.

Make sure you have a solid sleep routine and are not over caffeinating during the day, binge drinking at night, or sacrificing sleep while working through these big changes. And definitely don't smoke, try to minimize your exposure to smoke and pollutants, and take steps to reduce your toxic exposures.

40s

If you're in your 40s, self-care is of utmost importance. People in this decade are well into their family and career lives and are often juggling multiple schedules, work deadlines, home maintenance, spousal relationships, and child nurturing. It can be very, very busy. So busy, that it's easy to put everyone else's needs and schedule before yours. Now is the time to prioritize yourself. Make sure you find what fills your cup and practice it often.

Do you like relaxing baths? Yoga classes? Meditation or stress reduction techniques? Catching up with a friend over coffee or Zoom call? How about hobbies like gardening, landscaping, or home repair? Some things that work for one person don't work for another, so try out different forms of self-care and find (and stick with) the ones that resonate with you.

50s

If you're in your 50s, we focus on body fat and body composition. It's important to identify if you have too much weight around the midsection or are gaining too much subcutaneous or visceral fat. Now is the time to really focus on resistance and weight training. By strengthening lean muscle mass, you can help to reduce some excess (and potentially dangerous) weight, increase physical strength, and improve insulin sensitivity.

Getting into a good gym or exercise routine in your 50s is crucial to help set up the next several decades for strength and agility instead of weakness and fragility. Now is the time to set the stage to ensure you can keep doing the things you love as long as you want.

60s

If you are in your 60s, we bring it back to self-care. It's easy in this decade of life to start to ruminate on the end of life (though you could very well have many decades remaining to enjoy). It can be easy to fall into the "aging is inevitable" mindset here, a lot of people struggle to enter their 60s. So really focusing on taking care of yourself and surrounding yourself with things you enjoy is crucial.

Make sure you are continuing your hobbies and physical activity. Prioritize a healthy diet and sleep routine. Make sure you still include weight and resistance training to keep your bones and muscles strong. Make sure you do what you need to take care of yourself so that you can continue doing things you enjoy.

(I just turned 60 and feel stronger and more energetic than I ever have. I love being 60!)

70s, 80s, and Beyond

If you are in your 70s or 80s+, it's all about movement and exercise. As we get older, strength training becomes more and more important. At this age, the fall risk and serious complications from falls increase dramatically and can be fatal. The best way to reduce the risk of falling and injury is to keep your body strong.

You can practice resistance training using your own body weight, through light yoga or Pilates, or using weights. Even if you're over the age of 70, you can still build muscle and keep physically strong. Make sure you're consuming enough quality protein to support your muscles. Now is the time to keep moving.

LONGEVITY ROADMAP

Become Young at Any Age

CONCLUDING REMARKS

The scientific study and research surrounding longevity is a very exciting frontier. Researchers are learning new and novel ways to address aging every day. In fact, researchers are starting to approach aging as a *disease* instead of something that is inevitable. This opens up the possibilities of finding a *treatment* for aging. This is a real possibility in our lifetime.

I'm not saying that becoming immortal is in our future, but I am saying that we are making massive strides towards living way better, way longer. That's a big deal.

We have a lot of that information at our fingertips right now. There isn't a magic pill, nor a fountain of youth. Unfortunately, it's not that easy. But fortunately, there are so many things you can do today to improve your tomorrow. Every step you take can add up to significant progress.

The more we learn about things like sirtuins, mTOR inhibitors, telomeres, and so many other emerging pieces of science, the more able we are to enhance longevity and live better, longer. And while there's still a lot to learn and discover, we already know there are definitive things we can do to make that happen.

You can work to reduce inflammaging, you can help fuel your mitochondria, you can support your hormones, feed and protect your beneficial bugs, incorporate movement and exercise into your life, and nourish your spirit and mindset. You have the power. There's so much you can do.

Thank you for taking this ride with me. I am fascinated, intrigued, and quite obsessed with learning everything I can to live my fullest, most vibrant, energetic, and colorful life as possible. Will you join me?

Mark Hyman, MD

LONGEVITY ROADMAP

Become Young at Any Age

REFERENCES AND RESOURCES

Resources

Find a Functional Practitioner

General Health

- The UltraWellness Center
  - You can become a patient of The UltraWellness Center and work with the experts featured in The Longevity Roadmap docu-series. The UltraWellness Center offers a variety of testing and treatment options, telemedicine options, a highly-knowledgeable staff of nutritionists, IV therapies, and extensive follow-up.
- Institute for Functional Medicine
  - The Institute for Functional Medicine is one of the most trusted sources for Functional Medicine certification. You can use their database to locate Functional Medicine practitioners anywhere in the world. IFM Certified Practitioners are listed first in the search results, given their extensive education in Functional Medicine. All practitioners in the network have attended IFM's five-day foundational course, Applying Functional Medicine in Clinical Practice (AFMCP), and are also current IFM members.
- Parsley Health
  - At Parsley, they're redefining primary care with a root-cause, whole person approach and a focus on data, technology, and real doctor-patient relationships. Parsley was founded by Dr. Robin Berzin, under the belief that medicine should put nutrition, wellness and prevention on the front lines of health care, while simultaneously making care smart and data-driven to meet our needs in today's world.
- International Academy of Biological Dentistry and Medicine
  - The IABDM is a network of dentists, physicians and allied health professionals committed to caring for the whole person – body, mind, spirit and mouth.

Psychiatry and Mental Health

- Amen Clinics
  - Amen Clinics are outpatient health care clinics that provide mental wellness strategies to patients of all ages. They offer patient-first experiences and customized solutions to an array of behavioral and psychiatric conditions.
- Hope Integrative Psychiatry
  - Hope Integrative Psychiatry offers a comprehensive assessment of the impact of genetics, temperament, early childhood experiences and trauma, current behaviors and lifestyle, along with a deep inquiry to assess your unique strengths, belief systems and coping style. A holistic formulation is developed that pieces together all these relevant factors into a narrative that is comprehensible, manageable and meaningful. This formulation forms the basis of your personalized treatment by a team that is uniquely designed for you to accomplish your transformation and complete recovery efficiently.

Longevity Books

- *Lifespan: Why We Age—And Why We Don't Have To* by David A Sinclair, PhD
- *Super Human: The Bulletproof Plan to Age Backward and Maybe Even Live Forever* by Dave Asprey
- *The Longevity Diet: Slow Aging, Fight Disease, Optimize Weight* by Valter Longo, PhD.
- *Glow15: A Science-Based Plan to Lose Weight, Revitalize Your Skin, and Invigorate Your Life* by Naomi Whittle

- *The Longevity Paradox: How to Die Young at a Ripe Old Age* by Steven Gundry
- *Your Longevity Blueprint* by Dr. Stephanie Gray

Mindset Books

- *Limitless* by Jim Kwik
- *Tiny Habits* by BJ Fogg
- *The Universe Has Your Back* by Gabrielle Bernstein
- *The Power of Your Subconscious Mind* by Dr. Joseph Murray
- *The Untethered Soul* by Michael A Singer.

Podcasts

- *The Doctor's Farmacy Podcast* with Dr. Mark Hyman
- *The Broken Brain Podcast* with Dhru Purohit
- *Unlocking Us Podcast* with Brene Brown
- *Ten Percent Happier Podcast* with Dan Harris.

Specific Podcast Episodes

- *The Doctor's Farmacy* Podcast featuring Gabrielle Bernstein
- *The Doctor's Farmacy* Podcast featuring Dr. Jim Gordon
- *The Doctor's Farmacy* Podcast featuring Dr. David Sinclair
- *The Doctor's Farmacy* Podcast featuring Peter Attia
- *The Doctor's Farmacy* Podcast featuring Valter Longo
- *The Broken Brain Podcast* featuring Peter Crone
- *The Broken Brain Podcast* featuring Dr. Yashar Khosroshahi
- *The Broken Brain Podcast* featuring Dr. John Amaral
- *The Broken Brain Podcast* featuring Dr. Rick Hanson
- How to Make Stress Your Friend TEDTalk by Kelly McGonigal
- Aseem Malhotra Pioppi Diet documentary

Recipes

- Find original Pegan recipes here
- Visit my website for many nutritious recipes
- 10 Day Reset, free version
- *Food: What the Heck Should I Cook?* Cookbook by Dr. Mark Hyman

Gadgets

- Sunlighten - Infrared Saunas
- Joovv - Red and Infrared Saunas
- chiliPAD - Temperature-controlled mattress pad
- Lumen - At home breath-test to track your metabolism

- Vitamix - One of the highest-quality blenders on the market
- HeartMath - A technology to help release stress, find balance, and build resilience

Apps

- Calm - Guided meditation
- Insight Timer - Guided meditation
- Confetti - Progress tracker
- Seven - 7 Minute Workout
- Twilight - Red light blocker for devices
- Skindeep - Skincare ingredient database

Supplements Mentioned in the Workbook

- A high-quality multivitamin/mineral
- Acacia fiber
- Activated Charcoal
- Alpha Lipoic Acid (ALA)
- B-Complex
- Chlorella
- Curcumin
- Digestive enzyme
- E-Lyte
- Epigallocatechin-3-Gallate (EGCG)
- Fish Oil
- Glutathione
- HTB-Rejuvenate
- L-Carnitine
- Magnesium
- MegaSporebiotic
- N-acetyl-l-cysteine (NAC)
- Natural Calm
- Probiotics
- Resveratrol
- Ubiquinol (Coenzyme Q10)
- Vitamin D
- Zinc

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7 Keys to Aging Backwards Overview

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LONGEVITY ROADMAP

Become Young at Any Age

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