

THE BIG IDEAS

Medicine 3.0

vs. Medicine 1.0 & 2.0.

Metabolism

Optimized vs. dysfunctional.

Exercise

The #1 tactic.

Protein

A top nutrition tactic.

Sleep

It does a Hero good!

Outlive

The Science and Art of Longevity

BY PETER ATTIA, MD · HARMONY © 2023 · 496 PAGES

“Why does the world need another book about longevity? I’ve asked myself that question often over the last few years... This is how I see my role: I am not a laboratory scientist or clinical researcher but more of a translator, helping you understand and apply these insights. ... My approach to longevity is firmly rooted in science, but there is also a good deal of art in figuring out how and when to apply our knowledge to you, the patient, with your specific genes, your history and habits, and your goals.

I believe that we already know more than enough to bend the curve. That is why this book is called *Outlive*. I mean it in both senses of the word: live longer and better. ...

My goal is to create an actionable operating manual for the practice of longevity. A guide that will help you *Outlive*. I hope to convince you that with enough time and effort, you can potentially extend your lifespan by a decade and your health span possibly by two, meaning you might hope to function like someone twenty years younger than you.

But my intent is not to tell you exactly *what to do*; it’s to help you learn *how to think* about doing these things. ... More broadly, longevity demands a paradigm-shifting approach to medicine, one that directs our efforts toward preventing chronic diseases and improving our health span—and doing it now rather than waiting until disease has taken hold or until our cognitive and physical function has already declined. It’s not ‘preventive’ medicine; it’s *proactive* medicine, and I believe it has the potential to not only change the lives of individuals but also to relieve vast amounts of suffering in our society as a whole. This change is not coming from the medical establishment, either; it will happen only if and when patients and physicians demand it.”

~ Peter Attia, MD from *Outlive*

“There comes a point where we need to stop just pulling people out of the river. We need to go upstream and find out why they’re falling in.”

~ Bishop Desmond Tutu

As per the back cover of the book: Peter Attia, MD, is the founder of *Early Medical*. He received his medical degree from Stanford University School of Medicine and trained at Johns Hopkins Hospital in general surgery.

He also trained at the NIH as a surgical oncology fellow at the National Cancer Institute, where his research focused on immune-based therapies for melanoma. He serves on the editorial board for the journal *Aging* and is the host of the popular podcast *The Drive*.

As per my take on him: Attia is one of the most credible, grounded, practical, and inspiring authorities on the art and science of longevity.

I got this book as part of my recent micro-sabbatical in which I unplugged for a month and enjoyed GOING DEEP reading 15+ books on a couple of subjects: Peak Performance and Energy.

"Longevity has two components. The first is how long you live, your chronological lifespan, but the second and equally important part is how well you live—the quality of your years. This is called healthspan."

~ Peter Attia, MD

"The time to repair the roof is when the sun is shining."

~ John F. Kennedy

"I never won in the ring. I always won in preparation."

~ Muhammad Ali

"Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat."

~ Sun Tzu

On the Energy side of things, I read this book along with [Georgia Ede's *Change Your Diet, Change Your Mind*](#), [Gabrielle Lyon's *Forever Strong*](#), [Casey Means' *Good Energy*](#), and [Robert Lustig's *Metaboficial*](#). (Plus [Johann Hari's *Stolen Focus*](#) and [Michael Easter's *Scarcity Brain*](#).)

This book is FANTASTIC. It's been life changing for me. I'm recommending it to all my friends. I think you'll love it and I'm VERY confident it will be life changing (and almost certainly life extending!) for you as well. (Get a copy [here](#).)

As you'd expect, it's PACKED with Big Ideas. Technically, this one is ABSURDLY (!) packed with Big Ideas and we'll *barely* scratch the surface of its wisdom but I'm excited to share a handful of my favorite Ideas so let's get to work.

MEDICINE 3.0

"During my stint away from medicine, I realized that my colleagues and I had been trained to solve problems of an earlier era: the acute illness and injuries that Medicine 2.0 had evolved to treat. ... I believe we need a new way of thinking about chronic diseases, their treatment, and how to maintain long-term health. The goal of this new medicine—which I call Medicine 3.0—is not to patch people up and get them out the door, removing their tumors and hoping for the best, but rather to prevent the tumors from appearing and spreading in the first place. Or to avoid that first heart attack. Or to divert someone from the path to Alzheimer's disease. Our treatments, and our prevention and detection strategies, need to change to fit the nature of these diseases, with their long, slow prologues."

The book has three parts.

In Part I, Attia walks us through the evolution of health care and maps out the high level objectives, strategy, and tactics for the book.

In Part II, he walks us through what the longest-lived people have in common and the top three challenges we face in our quest to Outlive: heart disease, cancer, and Alzheimer's.

In Part III, we get into the practical tactics for our plan to live longer, better including: exercise (Attia's #1 recommendation for longevity!), nutrition (more specifically "nutritional biochemistry"!), sleep (learn to love it—it's the best medicine for your brain!), and our emotional well-being (and the high price of ignoring it).

That passage is from the second chapter in Part I called "Medicine 3.0: Rethinking Medicine for the Age of Chronic Disease." Here's the quick overview of Medicine 1.0, 2.0, and 3.0...

Attia tells us that: "*The first era, exemplified by Hippocrates but lasting almost two thousand years after his death, is what I call Medicine 1.0. Its conclusions were based on direct observation and abetted more or less by pure guesswork, some of which was on target and some not so much.*"

Then we have Medicine 2.0 which "*arrived in the mid-nineteenth century with the advent of the germ theory of disease, which supplanted the idea that most illness was spread by 'miasmas' or bad air. This led to improved sanitary practices by physicians and ultimately the development of antibiotics.*" Although "*Medicine 2.0 was transformational*" in many ways, it "*has proved far less successful against long-term diseases such as cancer,*" heart disease and Alzheimer's.

There are FOUR distinctions between 2.0 and 3.0: "*First, Medicine 3.0 places a far greater emphasis on prevention than treatment.*" Second: "*Medicine 3.0 considers the patient as a unique individual.*" Third: "*In Medicine 3.0, our starting point is the honest assessment, and acceptance, of risk—including the risk of doing nothing.*" Fourth: "*Perhaps largest shift is that where Medicine 2.0 focuses largely on lifespan, and is almost entirely geared toward staving off death, Medicine 3.0 pays far more attention to maintaining healthspan, the quality of life.*"

*" Absorb what is useful,
discard what is useless, and
add what is specifically your
own."*

~ Bruce Lee

He brings it all together at the very end of the chapter when he tells us: *"Which brings us to perhaps the most important difference between Medicine 2.0 and Medicine 3.0. In Medicine 2.0, you are a passenger on the ship, being carried along somewhat passively. Medicine 3.0 demands much more from you, the patient: You must be well-informed, medically literate to a reasonable degree, clear-eyed about your goals, and cognizant of the true nature of risk. You must be willing to change ingrained habits, accept new challenges, and venture outside of your comfort zone if necessary. You are always participating, never passive. You confront problems, even uncomfortable or scary ones, rather than ignoring them until it's too late. You have skin in the game, in a very literal sense. And you make important decisions.*

Because in this scenario, you are no longer a passenger on the ship; you are the captain."

CANCER METABOLISM

"As you might have gathered by now, we tend to think of cancer as primarily a genetic disease, driven by mutations of unknown cause. Clearly, cancer cells are genetically distinct from normal human cells. But for the last quarter century or so, a handful of researchers have been investigating another unique property of cancer cells, and that is their metabolism.

*"The conundrum we face
is that our environment has
changed dramatically over
the last century or two, in
almost every imaginable way—
our food supply and eating
habits, our activity levels, and
the structure of our social
networks—while our genes
have scarcely changed at all."*

~ Peter Attia, MD

In the 1920s, a German physiologist named Otto Warburg discovered that cancer cells had a strangely gluttonous appetite for glucose, devouring it at up to forty times the rate of healthy tissues. But these cancer cells weren't 'respiring' the way normal cells do, consuming oxygen and producing lots of ATP, the energy currency of the cell, via the mitochondria. Rather, they appeared to be using a different pathway that cells normally use to produce energy under anaerobic conditions, meaning without sufficient oxygen, such as when we are sprinting. The strange thing was that these cancer cells were resorting to this inefficient metabolic pathway despite having plenty of oxygen available to them.

This struck Warburg as a very strange choice. In normal aerobic respiration, a cell can turn one molecule of glucose into as many as thirty-six units of ATP. But under anaerobic conditions, that same amount of glucose yields only two net units of ATP. This phenomenon was dubbed the Warburg effect, and even today, one way to locate potential tumors is by injecting the patient with radioactively labeled glucose and then doing a PET scan to see where most of the glucose is migrating. Areas with abnormally high glucose concentrations indicate the possible presence of a tumor.

*"Longevity may be a game
of inches, where relatively
small interventions, with
cumulative effect, could help
us replicate the centenarian's
lifespan and healthspan. Put
another way, if we want to
outlive our life expectancy
and live better longer, we will
have to work hard to earn
it—through small, incremental
changes."*

~ Peter Attia, MD

Warburg was awarded the Nobel Prize in Physiology or Medicine in 1931 for his discovery of a crucial enzyme in the electron transport chain (a key mechanism for producing energy in a cell). By the time he died in 1970, the weird quirk of cancer metabolism that he had discovered had been all but forgotten. The discovery of the structure of DNA by James Watson, Francis Crick, Maurice Wilkins, and Rosalind Franklin in 1953 had caused a seismic shift, not just in cancer research but in biology in general."

That's from a chapter called "The Runaway Cell" in Part II in which Attia walks us through the leading killers of humanity and what they have in common.

The HYPER-abridged, oversimplified summary? All of the chronic diseases killing us (that Medicine 2.0 does a VERY POOR job of addressing!) are related to metabolic dysfunction.

For the record, here's how Attia defines metabolic dysfunction: *"Today we call this cluster of problems 'metabolic syndrome' (or MetSyn), and it is defined in terms of the following five criteria: (1) high blood pressure (>130/85); (2) high triglycerides (>150 mg/dL); (3) low HDL cholesterol (<40 mg/dL in men or <50 mg/dL in women); (4) central adiposity (waist circumference >40 inches in men or >35 in women); (5) elevated fasting glucose (>110 mg/dL).*

"It turns out that peak aerobic cardiorespiratory fitness, measured in terms of VO₂ max, is perhaps the single most powerful marker for longevity."

~ Peter Attia, MD

"The fittest people had the lowest mortality rates—by a surprising margin. ... This study found that someone of below-average VO₂ max for their age and sex (that is, between the 25th and 50th percentiles) is at double the risk of all-cause mortality compared to someone in the top quartile (75th to 97.6th percentiles). Thus, poor cardiorespiratory fitness carries a greater relative risk of death than smoking."

~ Peter Attia, MD

"It is impossible to produce superior performance unless you do something different from the majority."

~ Sir John Templeton

If you meet three or more of these criteria, then you have the metabolic syndrome—along with as many as 120 million other Americans, according to a 2020 article in JAMA. About 90 percent of the US population ticks at least one of those boxes."

Quick check in: How are YOU doing with those numbers?!

Now... I pulled out that particular passage regarding cancer's preferential metabolism of glucose because it struck a nerve. As you know if you've been following along, my brother died of pancreatic cancer several years ago. Immediately after he had an emergency surgery and was diagnosed with Stage IV pancreatic cancer, I immersed myself in the literature to support him.

In the process, I created Notes on some of the leading books on the subject, including [The Metabolic Approach to Cancer](#) by [Nasha Winters](#), [Cancer As a Metabolic Disease](#) by [Thomas Seyfried](#), [Keto for Cancer](#) by [Miriam Kalamian](#), and [Tripping Over the Truth](#) by [Travis Christofferson](#). I also created classes called [Conquering Cancer 101](#) and [Conquering Cancer 102](#).

And... I wrote a Note on *the* mainstream book on cancer by one of Medicine 2.0's leading thinkers: [Siddhartha Mukherjee's The Emperor of All Maladies](#).

In that Note, I came as close to being rude/belligerent as I have ever gotten in a Note. Why? Because, in his 592-page book—which is considered THE best book on cancer by Medicine 2.0—he didn't mention Otto Warburg and his theories on metabolism. Not even a single reference.

It was infuriating for me when I read it. Almost as infuriating as going to my brother's oncology appointment with him to get a PET scan (which, as Attia points out measures hot spots of glucose metabolism to identify potential cancerous tumors that preferentially feast on glucose) and seeing a CANDY BOWL at the reception desk. They were feeding my brother the very food that would feed his cancer and HAD NO IDEA that was a bad idea.

Then there was the Pancreatic Cancer society's walk-a-thon fundraising event I went to that was sponsored by a fast food restaurant. Free soda and hot dogs were served and beach balls with their logo were handed out to kids and adults alike.

To be blunt: That is all CRAZY. Which is why I was very happy Attia talks about this and also mentions a chat in which he talked to Mukherjee. Apparently he has evolved his thinking and is now pursuing metabolic solutions to cancer.

P.S.: The way I tried to help my brother be the "Captain" of his ship rather than a mere passenger as he navigated his cancer treatment was to encourage him to see himself less as a "patient" (which literally means "one who submits") and more as a CONQUEROR (which literally means "one who seeks successfully").

EXERCISE: THE #1 TACTIC

"More than any other tactical domain we discuss in this book, exercise has the greatest power to determine how you will live out the rest of your life. There are reams of data supporting the notion that even a fairly minimal amount of exercise can lengthen your life by several years. It delays the onset of chronic diseases, pretty much across the board, but it is also amazingly effective at extending and improving health span. Not only does it reverse physical decline, which I suppose is somewhat obvious, but it can slow or reverse cognitive decline as well.

So, if you adopt only one new set of habits based on reading this book, it *must* be in the realm of exercise. If you currently exercise, you will likely want to rethink and modify your program. And if exercise is not a part of your life at the moment, you are not alone—77% of the US population is like you. Now is the time to change that. Right now. Even a little bit of daily activity is much better than nothing. Going from zero weekly exercise to just ninety minutes per week can reduce your risk of dying from all causes by 14 percent. It's very hard to find anything that can do that."

"The loftier the building, the deeper the foundation must be laid."

~ Thomas A Kempis

"As Centenarian Decathletes, we are no longer training for a specific event, but to become a different sort of athlete altogether: an athlete of life."

~ Peter Attia, MD

"If there is one type of food that I would eliminate from everyone's diet if I could, it would be fructose-sweetened drinks, including both sodas and fruit juices, which deliver too much fructose, too quickly, to a gut and liver that much prefer to process fructose slowly. Just eat fruit and let nature provide the right amount of fiber and water."

~ Peter Attia, MD

"The healthier and more efficient your mitochondria, the greater your ability to utilize fat, which is by far the body's most efficient and abundant fuel source. This ability to use both fuels, fat and glucose, is called 'metabolic flexibility.'"

~ Peter Attia, MD

That's from the first practical chapter in Part III.

Once we've established the high-level intellectual framework (Medicine 3.0!) and clarified our objectives and strategies (optimize our metabolism/mitochondria to increase BOTH our lifespan AND our healthspan!), we get to work on the TACTICS that will enable us to succeed.

Attia tells us we want to dominate the same core fundamentals we come back to ALL THE TIME: Eating, moving, and sleeping. But... He tells us the place to start is with... EXERCISE.

I'm going to repeat this line: "So, if you adopt only one new set of habits based on reading this book, it **MUST** be in the realm of exercise."

Attia italicized "must." I put it in **ALL CAPS bold italic** just to make sure you got the memo. And, I want to emphasize that Attia isn't a bio-hacking nut. He's a relatively conservative (and VERY rigorous thinking!) Stanford-trained medical doctor.

So... I personally took him at his word and have rearchitected my training protocol to meet his standards. The biggest shift for me? Zone 2 training. Although my VO2 max (I got it tested immediately after reading his book!) was in the highest/"superior" category for my age (I guess the 101 burpees, 1,000 meters of rowing, and 10,000 steps a day EVERY DAY for a decade have helped!), I was only getting about an hour of Zone 2 in per week. Frankly, I was seeing how LITTLE I could train to feel great.

But... I wasn't even hitting the standard American recommendation of getting 150 minutes (or 2 and 1/2 hours per week) of Zone 2. Attia recommends THREE to FOUR hours per week. I can assure you I hit 3 hours the week I read the book and I've hit 4 hours the last three weeks since.

Attia says this about Zone 2 (which is 60-70% of your max): "I am so persuaded of the benefits of zone 2 that it has become a cornerstone of my training plan. Four times a week, I will spend an hour riding my stationary bike at my zone 2 threshold."

In addition to strength and stability training as part of our new exercise protocol, he's ALL about optimizing our VO2 max which is why hitting his standard is my current #1 Energy goal: "I push my patients to train for as high a VO2 max as possible, so that they can maintain a high level of physical function as they age. Ideally, I want them to target the 'elite' range for their age and sex (roughly the top 2 percent). If they achieve that level I say good job—now let's reach for the elite level for your sex, but two decades younger. This may seem like an extreme goal, but I like to aim high, in case you haven't noticed."

PROTEIN: THE ESSENTIAL BUILDING BLOCKS OF LIFE

"Why is protein important? One clue lies in the name, which is derived from the Greek word *proteios*, meaning 'primary.' Protein and amino acids are the essential building blocks of life. Without them, we simply cannot build or maintain the lean muscle mass we need. ...

The first thing you need to know about protein is that the standard recommendations for daily consumption are a joke. Right now the US recommended dietary allowance (RDA) for protein is 0.8 g/kg of body weight. This may reflect how much protein we need to stay alive, but it is a far cry from what we need to thrive. ... How much protein do we actually need? It varies from person to person. In my patients I typically set 1.6 g/kg/day as the minimum, which is twice the RDA. The ideal amount can vary from person to person, but the data suggest that for active people with normal kidney function, one gram per pound of body weight per day (or 2.2 g/kg/day) is a good place to start—nearly triple the minimal recommendation."

As you might have guessed, that's from the chapter on Nutrition. I'm going to skip the details on this chat and encourage you to check out the Notes on [Gabrielle Lyon's *Forever Strong*](#) for more wisdom on the subject.

"I am increasingly persuaded that our 24-7 addiction to screens and social media is perhaps our most destructive habit, not only to our ability to sleep but to our mental health in general."

~ Peter Attia, MD

"There's a quote from Paulo Coelho that I think about often: 'Maybe the journey isn't so much about becoming anything,' he writes. 'Maybe it's about unbecoming everything that isn't really you, so you can be who you were meant to be in the first place.'"

~ Peter Attia, MD

For now, remember: High-quality protein (about 1 gram per pound per day!!) does a Hero good!

P.S. Attia says: "In case my point here isn't clear enough, let me restate it: don't ignore protein. It's the one macronutrient that is absolutely essential to our goals. There's no minimum requirement for carbohydrates or fats (in practical terms), but if you shortchange protein, you will most certainly pay a price, particularly as you age."

SLEEP: GET SOME OR ELSE...

"We need to sleep about seven and a half to eight and a half hours a night. There is even some evidence, from studies conducted in dark caves, that our eight-ish hour sleep cycle may be hard-wired to some extent, suggesting that this requirement is non-negotiable. ...

Even a single night of bad sleep has been found to have deleterious effects on our physical and cognitive performance. Athletes who sleep poorly the night before a race or a match perform markedly worse than when they are well rested. Endurance drops, VO2 max drops, and one-rep-max strength drops. And we are more likely to be injured: A 2014 observational study found that young athletes who slept less than six hours per night were more than two and a half times more likely to experience an injury than their peers who slept eight hours or more. Good sleep is like a performance-enhancing drug."

Sleep! It does a Hero good!

Right after that passage, Attia references the same Stanford study we talk about in our Notes on [Arianna Huffington's *The Sleep Revolution*](#). Then he talks about how LeBron James "makes sleep a key part of his recovery routine, always trying for nine and sometimes ten hours of sleep per night, plus a daily nap."

Then... He tells us "Yet we are often unaware of the devastating effect that poor sleep is having on our energy levels and our performance. Research has found that people who are sleep deprived almost always underestimate its effects on them, because they adapt to it... we come to accept the resulting state of mild exhaustion and mental fog as a new normal, a process called 'baseline resetting.' ... It's like a regular TV looks fine if that's all you've ever seen. But once you see a 4k screen, you realize that your old cathode-ray tube TV was not very clear at all. The difference is that dramatic."

And THAT's how we'll wrap up this SUPER quick look at this GREAT book.

How's YOUR metaphorical TV resolution? Here's to dialing it up to Heroic levels as we DOMINATE the fundamentals as we optimize our lifespan AND our healthspan, while showing up with all the Energy we need in our Work and our Love... TODAY!

B

Brian Johnson,
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Brian Johnson is the Co-Founder + CEO of Heroic Public Benefit Corporation and the author of [Areté: Activate Your Heroic Potential](#). He's 50% Philosopher and 50% CEO and 101% committed to helping create a world in which 51% of humanity is flourishing by the year 2051. Learn more at heroic.us.

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