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KEEP SHARP

INTRODUCTION

Nothing Brainy about It

The brain is wider than the sky . . . [and] . . . deeper than the sea.

EMILY DICKINSON

Unlike most of my colleagues, I didn't grow up with a deep-seated desire to be a doctor, let alone a brain surgeon. My earliest aspiration was to be a writer, likely triggered by a boyhood crush I had on a grade school English teacher. When I chose medicine, I was thirteen years old and my grandfather had just suffered a stroke. We were very close, and witnessing his brain function change so quickly was jarring. He was suddenly unable to speak or write but seemed to understand what people said and could read without difficulty. Simply put, he could receive verbal and written communication easily, but he could not respond in those same ways. It was the first time I became fascinated by the intricate and mysterious functioning of the brain. I spent a lot of time at the hospital and was that annoying kid who asked the doctors a lot of questions. I felt very grown up as they patiently explained what had happened. I watched as those doctors were able to return my grandfather to good health after opening up his carotid artery to restore the blood flow to his brain and prevent future strokes. Having never spent much time with surgeons before then, I was hooked. I started reading everything I could about medicine and the human body. Before long, I was fixated on the brain, and specifically memory. It still astonishes me that our memories—the very fabric of

who we are—can be reduced to invisible neurochemical signals between tiny areas of the brain. For me, those early explorations into the world of brain biology were at once demystifying and magical.

Years later, when I was in medical school in the early 1990s, conventional wisdom was that brain cells, such as neurons, were incapable of regenerating. We were born with a fixed set and that was it; throughout life, we'd slowly drain the cache (and accelerate that killing off with bad habits like drinking too much alcohol and smoking marijuana—the truth about that later). Perhaps it was the eternal optimist in me, but I never believed that our brain cells simply stopped growing and regenerating. After all, we continue to have novel thoughts, deep experiences, vivid memories, and new learning throughout our lives. It seemed to me that the brain wouldn't just wither away unless it was no longer being used. By the time I finished my neurosurgery training in 2000, there was plenty of evidence that we could nurture the birth of new brain cells (called neurogenesis) and even increase the size of our brains. It was a staggeringly optimistic change in how we view the master control system of our bodies. Indeed, every day of your life, you can make your brain better, faster, fitter, and, yes, *sharper*. I am convinced of that. (I'll get to the bad habits later; they don't necessarily kill brain cells, but when they are abused, they can alter the brain, especially its memory powers.)

Let me say at the outset: I am certainly a fan of excellent education, but this is not what *Keep Sharp* is all about. This book is less about improving intelligence or IQ and more about both propagating new brain cells and making the ones you have work more efficiently. This isn't so much about remembering a list of items, performing well on exams, or executing tasks adeptly (though all of those goals will be more achievable with a better brain). In *Keep Sharp*, you will learn to build a brain that connects patterns others might miss and helps you better navigate life. You will develop a brain able to toggle back and forth between short-term and long-term views of the world and, perhaps most important, a brain highly resilient in the face of life experiences that might be disabling to someone else. In this book, I will precisely define *resilience* and

teach you how to nurture it. Resilience has been a critical ingredient for my own personal growth.

Context matters when talking about something as important as the function or dysfunction of our brains, and our view of cognitive decline has changed dramatically over time. The history of documenting dementia dates back to at least 1550 BCE, when Egyptian doctors first described the disorder in what's known as the Ebers Papyrus, a 110-page scroll or manuscript that contains a record of ancient Egyptian medicine. But it was not until 1797 that the phenomenon was given a name, *dementia*, which literally means "out of one's mind" in Latin. The term was coined by a French psychiatrist, Philippe Pinel, who is revered as the father of modern psychiatry for his efforts to push for a more humane approach to the care of psychiatric patients. When the word was first used, however, *dementia* referred to people with an intellectual deficit ("abolition of thinking") at any age. It was not until the end of the nineteenth century that the word was confined to people with a specific loss of cognitive ability. During that century, the British physician Dr. James Cowles Prichard also introduced the term *senile dementia* in his book, *A Treatise on Insanity*. The word *senile*, which means old, referred to any type of insanity that occurs in old people. Because memory loss is one of the most prominent symptoms of dementia, the word became mostly associated with old age.

For a long time, the elderly with dementia were believed to be cursed, or to have an infection like syphilis (because the symptoms of syphilis can be similar). So the word *dementia* was considered pejorative, used as an insult. In fact, when I first told my kids I was writing this book, they asked if it was about *dementors*, the dark, soul-sucking creatures from Harry Potter. The idea that dementia, which is not a specific disease but a group of symptoms associated with memory loss and poor judgment, is sometimes thought of in such negative ways is worth addressing briefly here.

It is true that scientists and doctors use the word clinically, and it is also true that patients and their loved ones don't always know what to make of it, especially when they first receive the diagnosis. It is too

imprecise, for one thing. Dementia can be a spectrum, ranging from mild to severe, and some of the causes of dementia are entirely reversible. Alzheimer's disease, which accounts for more than half the cases of dementia, gets nearly all the attention, and as a result, the terms *dementia* and *Alzheimer's* are often used interchangeably. They shouldn't be. The word *dementia*, however, is steeped in our common vernacular, and so is the association with Alzheimer's disease. In this book, I use both terms with the hope that the conversation, and the words we use to describe the broad condition of cognitive decline, will shift in the future.

I believe there has been an overemphasis on Alzheimer's disease as a way to talk about this broad condition, and it has further fueled a widespread sense of fear that memory loss is inevitable as we get older. Perfectly healthy people in their thirties and forties are alarmed about the implications of common memory lapses, like misplacing their keys or forgetting someone's name. That is a misguided fear, and as you will learn, memory loss is not a preordained part of aging.

As I started traveling the world talking to people about this book, I realized something else extraordinary. According to an AARP survey of Americans aged thirty-four to seventy-five, nearly everyone (93 percent) understands the vital importance of brain health, but those same people typically have no idea how to make their brains healthier or that achieving such a goal is even possible. Most believe this mysterious organ encased in bone is a black box of sorts, untouchable and incapable of being improved. Not true. The brain can be continuously and consistently enriched throughout your life no matter your age or access to resources. I have opened the black box and touched the human brain, and I will tell you all about those extraordinary experiences in this book. As a result of this training and decades of additional learning, I am more convinced than ever that the brain can be constructively changed—enhanced and fine-tuned. Just consider that. You probably think of your muscles that way—even your heart, which is a muscle. If you are reading this book, you are someone who is probably already proactive about your physical health. It is time to realize the same is possible with your brain. You can

affect your brain's thinking and memory far more than you realize or appreciate, and the vast majority of people haven't even begun to try. *Keep Sharp* is going to help you design your own "sharp brain" program, which you can easily incorporate into your daily life. I have already done it myself, and I am excited to teach you to do it as well.

As an academic neurosurgeon and a reporter, a big part of my job is to educate and explain. I have learned that in order for my messages to stick, explaining the why of something is just as important as the what or the how. So throughout this book, I explain *why* your brain works the way it does and *why* it sometimes fails to deliver what you'd hoped. Once you understand these inner workings, the specific habits I encourage you to adopt will make sense and more likely become an effortless part of your routine.

Truth is, even when it comes to our general physical health, there is very little explanation in public discourse of how our bodies actually work and what makes them work better. Even worse, there is a lack of agreement among medical professionals about the best foods to eat, the types of activities we should pursue, or the amount of sleep we really need. It is part of the reason there are so many conflicting messages out there. Coffee is practically a superfood one day, and the next it's a potential carcinogen. Gluten is hotly debated continuously. Curcumin, found in turmeric, is touted as a miracle brain food, but what does that really mean? Statins seem to have a split personality, at least in the research circles: Some studies propose that statins lower risk for dementia and improve cognitive function, and other studies suggest the exact opposite. Vitamin D supplementation is constantly under fire too; some people swear by it, but study after study shows no benefit.

How does the average person make sense of the competing messages? Almost everyone agrees that toxins and pathogens from mercury to mold are bad for you, but what about certain artificial ingredients or even your own tap water? A new Canadian study showed that the fluoride in tap water consumed by pregnant mothers can lead to a small drop in their children's IQ later in life.[1] But fluorinated water also clearly has benefits

for oral health and is still recommended by most top medical associations. It can be confusing. On top of all that, just about every doctor's visit ends with the blanket, generic recommendation that you should "get plenty of rest, eat right, and exercise." Sound familiar? Sure, it's good advice, but the problem is that there is hardly any consensus on what that means from a highly practical, day-by-day standpoint. What is the ideal diet, and how does it change from person to person? How about activity? High intensity, or slow and steady? Does everyone really need seven to eight hours of sleep a night, or can some people do just fine with far less? Why? Which drugs and supplements should one consider, given individual risk factors? And with brain health in particular, there is an even greater lack of basic understanding by both patients and the medical community. Has a doctor ever told you to take good care of your brain besides reminding you of the importance of wearing a helmet when riding a bike? Probably not.

Well, this doctor is going to tell you what you need to know and show you how to do it. If you think this already sounds complicated, don't worry. I am going to take you through step-by-step. You will understand more about your brain than you ever have in the past, and the ways to keep it healthy will make complete sense by the time you finish this book. Think of this as a master class on how to build a better brain, which opens the door to whatever you want to get out of life—including being a better father, mother, daughter, or son. You can be more productive and joyful, as well as more present for everyone with whom you interact. You will also develop more of that critical ingredient, resilience, so the optimization of your brain isn't derailed by the trials of daily life. These goals are all far more connected than you may realize.

Believing you can always be better tomorrow is an audacious way to view the world, but one that has helped shape my own life. Since I was a teenager, I've always worked hard on my physical health—to make my body stronger, faster, and more resilient to illness and injury. I think everyone has different motivations for taking care of their own health. For many, it is to feel better and more productive, and to be there for the children. For others, it is about achieving a certain physical appearance.

As we get older, the inspiration often comes from a brush with mortality and seeing the fragility of life up close. That was the case for me. When my father was just forty-seven years old, he developed crushing chest pain while out on a walk. I remember the panicked call I received from my mom, and the voice of the 911 operator I spoke to seconds later. A few hours later, he had an emergency four-vessel bypass operation on his heart. It was a frightening ordeal for our family, and we were worried he might not survive the operation. I was a young medical student at the time and fairly convinced I had somehow failed him. After all, I should've seen the warning signs, counseled him on his health, and helped him avoid heart disease. Luckily he survived, and the near-miss completely changed his life. He lost thirty pounds, paid close attention to the foods he was eating, and made regular activity a priority.

Now that I am past that age with my own children, I make it a priority to learn not just how to prevent disease, but to continually assess myself to make sure I'm performing to the best of my ability. Over the past few decades, I have also been exploring the deep connection between the heart and the brain. It is true that what is good for one is also good for the other, but I now believe the secret is that it all begins with your brain. As you are about to learn, once your brain is running cleanly and smoothly, everything else follows. You will make better decisions, have improved resilience and a more optimistic attitude, and the physical part of your body will improve too. There are studies showing that your pain tolerance will increase, your need for medications will decrease, and your ability to heal will be accelerated. Nearly every doctor I have spoken to about this book has said some variation of the following: In order to best take care of your body, you have to first take care of your mind. It is true, and the best part is that it is not that hard to do. Think of it as periodic little tweaks and adjustments instead of wholesale changes in your life.

Before I explain what those tweaks are and why they work, I offer my philosophy when it comes to the tone of this book. Over the years, I have worked in many different areas of our society: academic neurosurgery jobs within universities; public service at the White House; as

a journalist in media organizations; as a husband and father of three strong, smart, and beautiful girls. All along I have stuck to a principle I learned at a young age: Don't try to inspire people with fear. It doesn't work well, and it doesn't last long. When you scare someone, you activate that person's amygdala, the emotional center of the brain. The reaction is swift and hot, as one would have when confronted with a threat. The problem is that an action that starts in the emotional centers of the brain bypasses the judgment and executive function areas of the brain as well. As a result, the reaction may be intense and immediate, but it is also often uncoordinated and transient. It is why telling people they will likely have a heart attack if they don't lose weight may lead to a single intense week of dieting and exercise followed by an abrupt return to the old bad habits. Fear-based messaging will never lead to a long-term effective strategy because it is not the way we are wired. Nowhere is this more important than when telling someone he or she might develop Alzheimer's disease.

Many polls consistently show that people fear losing their minds more than anything else, even death. For many, it is considered the bogeyman of old age. And at one point in my life, I also worried a great deal about cognitive decline and dementia as I watched another grandparent progress through the stages of Alzheimer's disease. At first, he seemed to be contributing to conversations in nonsensical ways. Because he was a fun-loving, quick-to-laugh sort of guy, we thought perhaps he was making jokes we weren't quite in on yet. What finally gave him away was the vacant stare that would turn to puzzlement, and then to panic, as he realized he could not recall how to perform the most basic tasks and execute plans. I will never forget that look—at least I hope to never forget it.

But again, the fear of dementia should not be the motivation for you to read this book. Instead, it should be the knowledge that you can build a better brain at any age. I will teach you how to do it and explain why these strategies work. As you read this book, I don't want you to be running away from something. I want you to be running *toward* something—running toward a brain in peak shape that can withstand the test of your time on this planet.

When I started my work as a neurosurgeon more than twenty-five years ago, the idea of "improving" my own brain seemed like a bit of a misguided quest. After all, I was trained to remove tumors, clip aneurysms, relieve pressure from collections of blood and fluid, and so on. Even today, it is not possible for any neurosurgeon to go inside a human brain and adjust the 100 billion or so neurons to make the organ more intelligent and less vulnerable to decline. While heart surgeons can rotor away plaques in the heart, I can't rotor away the brain tangles often associated with Alzheimer's disease. There is no operation or medication to cure dementia or render someone more brilliant, creative, equipped with an extraordinary memory, or poised to invent the next big thing the world needs.

The brain is unlike any other organ. You can't transplant a brain like you can a heart (or liver, or kidney, or face for that matter), and our knowledge of the brain is still in the early stages, continuing to develop and expand. I had an astonishing realization recently while moderating a panel for the American Academy of Neurological Surgery, with the world's experts on concussion. They came from medicine, the Department of Defense, and the tech world. While they all talked about the great strides we have made in awareness, astonishingly there was no clear agreement on how to best treat a concussion, a condition diagnosed millions of times every year in the United States. There was hardly any published data presented to the Academy on effective treatments, either. Many current recommendations are based only on anecdotal evidence.[2] Even topics like rest—how much and for how long you rest a brain touched by concussion—were debated. For example, do you minimize activities that require concentration and attention during recovery from a concussion or increase those activities? When does light exercise, such as speed walking on a treadmill, help rather than hinder the recovery process? I heard all kinds of opinions, but very little of it was evidence based. And remember: That panel was made up of the world experts on brain injury.

Sure, we've come a long way from the ancient days of Aristotle, who

thought the heart was the seat of intelligence and the brain was a kind of refrigerator that cooled off the fiery heart and hot blood, but there are still more questions about the brain than answers. We now know how actions are created and how thoughts are formed, and we can even identify the hippocampus, the two tiny seahorse-shaped structures in the brain essential for memory function. But we still haven't made much progress in stemming the tide of people with cognitive decline and dementia. While we enjoy lower rates of cardiovascular disease and certain cancers than a generation ago, the numbers are going in the other direction when it comes to brain-related impairment. According to a 2017 study out of the University of California, Los Angeles, 47 million Americans have some evidence of preclinical Alzheimer's disease, which means their brains show signs of adverse changes but symptoms have not yet developed. Oftentimes, it could still take years before their memory, thinking, and behavior are obviously affected.[3] The problem is we don't necessarily know who those 47 million people are and which ones will go on to develop full-blown Alzheimer's disease. We do know, however, that by 2060, the number of Americans with Alzheimer's dementia or cognitive impairment is expected to climb from 6 million to 15 million.[4] One new case of dementia will be diagnosed every four seconds, and it will be the most common neurodegenerative disorder of our time. Globally, the numbers of people living with Alzheimer's disease will swell to 152 million by 2050, which reflects a 200 percent increase since 2018. While science is steadily trying to push back, there still hasn't been a single new treatment since 2002 despite more than four hundred clinical trials for the disease.[5] That's why the gap between brain science and good therapeutics in drug discovery for brain disorders has been called the "valley of death."[6] That's the bad news.

The good news is that even without some major medical breakthrough, we can significantly optimize our brains in a variety of ways to improve its functionality, boost its neuronal networks, stimulate the growth of new neurons, and help stave off age-related brain illnesses. As you read this book, always remember this: Cognitive decline is not

inevitable. As an analogy, think of a historical building that still stands. Perhaps it's more than a century old. Had it not been cared for throughout the decades, the wear and tear of weather and constant use would have certainly caused its deterioration and dilapidation. But with routine maintenance and occasional renovations, it not only withstood the test of time but is likely celebrated for its beauty, significance, and prominence. The same holds true with your brain, which is just another structure of different components and input needs for general maintenance and upkeep. Some of the strategies I will teach you will help assemble brain scaffolding—creating a support structure for your brain that is stronger and more stable than what you currently have and will help you to perform some initial "renovations," including reinforcement of your brain's "foundation." Other strategies will act to provide the raw materials necessary to do ongoing maintenance, as well as build what's called "cognitive reserve," or what scientists call "brain resiliency." With more cognitive reserve, you can lower your risk of developing dementia. Finally, there will be strategies that serve as finishing daily touches akin to dusting and tidying up to keep the better brain—better. As I mentioned, the old-school thinking dictated that the brain was pretty much fixed and hardwired after childhood development. Today, as we visualize the brain with new imaging technologies and study its ever changing function, we know the truth.

When you think of your heart, you probably have a good idea of things that might damage it: certain types of food, lack of activity, elevated cholesterol. But what about your brain? While many of those same things apply, your brain is also a highly sensitive antenna taking in millions of stimuli every day, and how we process these inputs can make a world of difference when it comes to a sharper brain. For example, I know many people who are absolutely crushed by events in the news, while others are emboldened and undaunted. Your brain can be strengthened by what you experience, like a good workout, or it can be battered and defeated. What separates those two camps of people? The answer is resilience. A resilient brain can withstand ongoing trauma, think differently, stave off

decisions around marriage—much more so than most other decisions in our lives. The researchers, who also analyzed birth and death dates of nearly 55 million family trees that encompassed 406 million people who were born from the nineteenth century to the mid-twentieth century, found that genes accounted for well under 7 percent of people's life span versus the 20 to 30 percent of most previous estimates. That means that over 90 percent of our health and longevity is in our own hands.

When I gathered all the highlights from my research colleagues at the Alzheimer's Association International Conference in 2019, one fact stood out: Clean living can slash your risk of developing a serious mind-destroying disorder, including Alzheimer's disease, even if you carry genetic risk factors. No matter what your DNA says, a good diet, regular exercise, not smoking, limiting alcohol, and some other surprising lifestyle decisions, can change that destiny. A few years ago, I experienced firsthand that healthy living could help someone overcome genetic risk for heart disease. Now we know the same is true for dementia. So worry less about your genes and stop using them as an excuse. Instead, focus on the things you get to choose, big and small, day in and day out.

I believe the way we have long approached the care of our bodies and brains is too passive. For much of medical history, doctors did nothing more than wait for disease or dysfunction to occur, and then they swooped in with antidotes to symptoms but not to the underlying pathology. As we evolved and cultivated more knowledge, we discovered that we could detect and diagnose disease before it reached late stages. Still, hardly anything was done to anticipate the disease long before it surfaced. Over the past few decades, we have begun to focus more attention on early intervention of disease and, more recently, on prevention. But in the brain health realm, attention to these final two areas has still been weak and too often missing. Let's change that. I wholeheartedly believe—and I am not alone in this thinking—that addressing brain decline is going to come from those two camps: prevention and early intervention. And I will throw another into the mix: optimization, or continuously building a better and more resilient brain.

Numerous books have been written about enhancing brain function and long-term brain health, but many of them are biased toward a particular philosophy, lack real data behind them, and are limited in their advice. The ones that I find particularly concerning are brain books that are platforms for selling products. The only thing I am selling (besides this book) is a way to understand your own brain and make it better. My aim is to present a comprehensive review of the science with practical lessons anyone can carry out starting now. I am not tied to any single "do this, not that" approach, though I do offer a few hard-and-fast rules. Like you, I seek the best that science has to offer, but the guidance has to also be truly practical.

I want you to keep one caveat in mind as you read this book: What will help stave off your cognitive decline may not be the same for someone else. If there's one fact I've learned in my years of studying the brain, operating on brains, and working with top scientists, it's that each of us carries our own unique profile. That is why any program to optimize brain health needs to be wide ranging, inclusive, and based on indisputable evidence. That is what I deliver in this book. And while there is no single nostrum, no one-size-fits-all solution (don't believe anyone who tells you otherwise), there are simple interventions all of us can make right away that can have a significant impact on our cognitive function and long-term brain health.

I am excited to share all the latest research and give you a personalized road map for arriving at a sharper brain for life. It is a spectacular destination.

IN THIS BOOK

For most of us, our brains are probably working at 50 percent capacity at any given time. That is my own made-up number. I don't know exactly how much it is (and neither does anyone else), but it is clear that with various behavior interventions such as meditation training or regular

sound sleep, our brains can be put into hyperdrive status (and no, we of course don't use just 10 percent of our brains—see chapter 3). We know our brain can crank out a lot more torque than it is normally doing. So are our brains more like the mother whose child is pinned under a car and she displays superhuman strength to save him? Or are our brains high-performance Ferraris sputtering along on potholed neighborhood roads and hardly ever opening up to full throttle? I think it is the latter. We don't hit the open road enough with our exquisitely designed brains, and after a while, we forget what our brains are really capable of achieving.

You will read some car references in this book because they reflect the way I was raised. Both of my parents were in the auto industry; my mom was the first woman ever hired as an engineer by Ford Motor Company. So on my childhood weekends, often the whole family was tinkering with the family car. Our garage was filled with toolboxes and a running commentary about how the human body wasn't really that much different from the Ford LTD we were rebuilding. Both had engines, pumps, and life-sustaining fuel. I think those conversations contributed to my interest in the brain, because here was one area of the body that really couldn't be compared mechanically to a car. After all, there is no seat of consciousness in a car, no matter how plush the leather. Still, it is nearly impossible for me to look at the brain and not think about tuning up and maintenance. Is an oil change necessary? Is it getting the right fuel? Is it revving too high or being driven without a break? Are there cracks in the windshield or the chassis, and do all the tires have enough air pressure? Can it heat and cool properly? Does the engine respond appropriately to a sudden demand for speed, and how quickly can it be brought to a halt?

Part 1 starts with some basic facts. What exactly is a brain? What is it like to operate on one? What does it really look and feel like? Why is it so mysterious and hard to understand? How does memory work? What is the difference between normal brain aging and the occasional brain lapse, abnormal brain aging, and signs of serious decline? Then we'll take a deep dive into the myths about aging and cognitive decline, as well as how we know the brain can remodel, rewire, and grow.

Part 2 offers a tour of the five main categories that encompass all the practical strategies you need to protect and heighten your brain function: 1) exercise and movement; 2) sense of purpose, learning, and discovery; 3) sleep and relaxation; 4) nutrition; and 5) social connection. This part includes a look at some of the research going on now to explore the brain and find ways to better maintain and treat it. You'll meet top scientists who have dedicated their lives to decoding the mysteries of the brain. Each chapter offers science-backed ideas you can adapt to your own preferences and lifestyle. Part 2 ends with a brand-new and easy-to-follow twelve-week program to carry out the steps I suggest.

Part 3 takes a look at the challenges of diagnosing and treating brain diseases. What should you do if you notice the early signs? Are they symptoms of another health condition that mimics dementia? Why have our research and clinical trials failed so miserably in coming up with cures and drugs to treat neurodegenerative ailments? What treatments *are* available at all levels of severity? How can a spouse remain healthy while caring for a partner with dementia (caregivers have a much higher risk of developing the disease)? Dementia is a moving target; caring for someone with the disease can be one of the most challenging jobs ever undertaken. No one learns in formal schooling how to deal with a loved one whose brain is in irreversible decline. For some, the brain changes are slow and subtle, taking years or even more than a decade for symptoms to become pronounced; for others, it's sudden and rapid. Both circumstances can be difficult and unpredictable. In addition to covering evidence-based care that improves quality of life and makes the caregiving manageable, I'll also review highly treatable conditions caregivers should be on the lookout for that are often mistaken for Alzheimer's disease.

Finally, I'll look to the future, for this book ends on a high note. There is tremendous hope for the neurological conditions we still struggle with today (e.g., Alzheimer's, Parkinson's, depression, anxiety, panic disorders). I have no doubt that in the next ten to twenty years, we will be much further along when it comes to treating brain disorders. We may even have a successful therapy or preventive vaccine for Alzheimer's disease. Many of

the advances may come from gene and stem cell therapy, along with deep brain stimulation, which is already being used for depression and obsessive compulsive disorder. We will also advance further technically, allowing a more minimally invasive approach to the brain. I'll explain what this all means for you and offer ideas to help prepare for this future. Many of the messages in this book are also directed at helping younger generations care for their own brain health since brain-related illnesses often start decades before symptoms show up. If I knew in my younger years what I know now, there are many things I would've done to take care of my own brain differently. You won't make the same mistakes I made.

I like an adage I once heard in Okinawa: "I want to live my life like an incandescent lightbulb. Burn brightly my entire life, and then one day suddenly go out." We want the same for our brains. We don't want the flickering of fluorescent lightbulbs that signal their impending demise. When we think of old age, we think of hospital beds and forgotten memories. Neither needs to happen, and your brain is the one organ that can get stronger as you age. There's nothing brainy about it—anyone can build a better brain at any age.

In a way, writing this book has been a selfish experience. I've had the privilege of going to specialists all over the world and getting their insights and action plans to keep my brain sharp and do all I can to prevent my brain from declining. Along the way, I've picked up on strategies to also be more productive, feel less overwhelmed, and generally navigate through life with ease and joy. I've been sharing this knowledge with everyone I hold near and dear to me. Now I want the same for you. Welcome to the Keep Sharp community.

Let's get started with a self-assessment.

1. Do you suffer from any brain-related ailment now, or have you been diagnosed with mild cognitive impairment?

2. Do you avoid strenuous exercise?

3. Do you sit for most of the day?

4. Are you overweight or even obese?

5. Are you a woman?

6. Have you been diagnosed with cardiovascular disease?

7. Do you have any metabolic disorders such as high blood pressure, insulin resistance, diabetes, or high cholesterol?

8. Have you ever been diagnosed with an infection that can lead to chronic inflammation and can have neurological effects (e.g., Lyme disease, herpes, syphilis)?

9. Do you take certain medications with known possible brain effects, such as antidepressants, antianxiety drugs, blood pressure drugs, statins, proton pump inhibitors, or antihistamines?

10. Have you ever experienced a traumatic brain injury or suffered head trauma from an accident or playing an impact sport? Have you ever been diagnosed with a concussion?

11. Do you smoke or have a history of smoking?

12. Do you have a history of depression?

13. Do you lack social engagement with others?

14. Did your years of formal education end at high school or earlier?

15. Is your diet high in processed, sugary, fatty foods and low in whole grains, fish, nuts, olive oil, and fresh fruits and vegetables?

16. Do you live with chronic, unrelenting stress? (Everyone has stress. This is stress that seems to be constant or present more often than not and that you have trouble coping with.)

17. Do you have a history of alcohol abuse?

18. Do you suffer from a sleep disorder (e.g., insomnia, sleep apnea) or otherwise experience poor sleep on a regular basis?

19. Do you have hearing loss?

20. Does your day lack cognitive challenges in the form of learning something new or playing a game that requires a lot of thinking?

21. Does your job lack complex work with people in the form of persuasion, mentoring, instruction or supervision?

22. Are you over sixty-five years old?

23. Does Alzheimer's disease "run in your family," or have you been diagnosed with carrying the "Alzheimer's gene variant," APOE3 or APOE4, or both?

24. Do you care for someone who suffers from some form of dementia, Alzheimer's disease included?

If you answered yes to five or more questions, then your brain could be in decline or may be soon, and you can benefit tremendously from the information in this book. Even if you answered yes to only one or two questions, you can help optimize the health and performance of your brain for the better. Curious as to how these questions (and their answers) relate to your body's most mysterious organ? Read on to learn everything you want—and need—to know for a smarter, sharper, better-thinking you. Final reminder: This book isn't just about avoiding disease. It is about making your brain as sharp as it can be at any age.

Read on to learn everything you want—and need—to know for a smarter, sharper, better-thinking you. My hope is you can wind up like the couple who inspired me several years ago and who showed me what to aspire to when it comes to "old age." We all age and will one day live with an old brain, but that doesn't mean it has to lose its sharpness. Looks can be deceiving.

The husband was ninety-three years old and had been brought to the emergency room where I was on call. When my chief resident first told me about the patient, who was in serious neurological decline, his advanced age concerned me. I honestly thought he was too old to undergo an operation, should he need one. A little while later the CT scan showed a significant brain bleed that explained his symptoms.

I went to the family in the waiting room fully expecting them to tell me not to pursue an aggressive, risky operation. A spry woman who looked to be in her sixties was nervously pacing the room with several other family members sitting earnestly in chairs. I was shocked to learn she was his wife and they had just celebrated their seventieth wedding anniversary. "I am actually older than he is," she said. "I robbed the cradle." She was ninety-four years young in perfect health, took no medicines, and had driven her great-grandkids to school earlier that day. She shared that my patient was still an avid runner and worked part-time as an accountant. His sixty-three-year-old son said they kept him around because "he's such a whiz with numbers." His brain bleed occurred after he fell

from his roof while he was blowing leaves up there. These nonagenarians were healthier than most of my patients, of any age.

Since I started medical school, there has always been a truism: We consider "physiological" age more than chronological age. At the family's request, I took the gentleman to the operating room for a craniotomy, which would fix the bleed. Before closing the dura, the outer layer of the brain, I took a few moments to closely inspect his brain, and what I saw surprised me. Given how active, cognitively intact, and sharp he was, I expected to see a large brain pulsating robustly and appearing healthy. But this looked like a ninety-three-year-old brain. It was more shriveled, sunken with deep wrinkles indicative of his age. Now, if this sounds disheartening to you, it should not. In fact, just the opposite.

Another truism in medicine is the following: Always treat the patient, not their test results. Yes, of course his brain had aged; he was ninety-three. But, the brain—perhaps more so than any other organ in the body—can reliably grow stronger throughout life and become more robust than in years past. I will never forget that experience. There seemed to be a total disconnect between the brain I was staring at and the man whose skull it inhabited.

He recovered quickly. When I visited him later on, recovering in the ICU, I asked him how the whole event affected him. He smiled and said, "The biggest lesson in all of this is no more trying to blow the leaves off the roof."

Final reminder: This book isn't just about avoiding disease. It is about making your brain as sharp as it can be at any age.

PART

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