

EAT TO THINK

By

Peter M. Castleman

&

B. Eric Christianson

ABOUT THE AUTHORS

Peter M. Castleman. Chairman of Nutrient Survival; Chairman of WISEcode; Chairman of Nutrient Institute. A lifetime entrepreneur who, for the past decade, has been dedicated to improving human nutrition and information about what is in our foods. He fundamentally believes the human body and mind are remarkable, with regenerative powers that can protect us against most wellness and health issues. If we care for our bodies and minds, they will care for us. We live in an “I got a pill for that” curative culture. Instead, our body’s natural healing powers should be the first line of defense, not drugs and medical procedures.

To elevate the body’s and mind’s natural power, we need to do two things: consume nutrient-dense foods and live the Six Pillars of Brilliance described in this book. With WISEcode, which will tell us exactly what is in our foods, we can control our lives instead of being controlled by Big Food, Big Ag, Big Pharma, and Big Info (including from the government). All try to keep us in the dark and not provide the nutrition necessary to power our wonderful bodies. Mr. Castleman believes that with good information, humans can make informed decisions with their lifestyle choices, including those to maintain our beautiful minds forever. The BrainCare products highlighted are an easy, powerful way to care for our brains for as long as we live.

B. Eric Christianson. CEO of Nutrient Survival; accomplished food industry Executive; Army Veteran; Airborne Ranger; West Point graduate. After a career of leading iconic food brands at Fortune 100 companies, Eric found his lifelong calling when he was asked by Peter to build a company called Nutrient Survival. Born at the start of the pandemic, Nutrient Survival is a disruptive end-to-end food company based in Reno-Tahoe, Nevada. Core to their beliefs is that food should free us, not fail us.

Nutrient Survival’s patented products bring top-shelf, delicious, Special Ops grade nutrition. Designed to the same elite nutritional standards of the military for its Special Operations Forces but intended for people like us. When describing the venture to people, Mr. Christianson says, “We’re actually not a food company at all. We’re a Freedom company that happens to sell food.” That’s because Nutrient Survival invites all Americans to take action and truly be free from the grip of ultra-processed, empty-calorie, dead food. They do it with unsurpassed nutrition and delicious chef-made recipes to help keep those who eat it running with a sound body and mind – not only in times of extreme stress, but every day. With the introduction of BrainCare® products, the company promises to nourish people’s brains for lasting memory, sharp focus, and optimal performance.

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NUTRIENT SURVIVAL

110 Woodland Avenue
Reno, Nevada 89523

www.NutrientSurvival.com

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TABLE OF CONTENTS

ABOUT THIS BOOK	2
CHAPTER 1:	
The Beauty of the Brain	5
CHAPTER 2:	
The Dark Side of Cognitive Decline	24
CHAPTER 3:	
Neuroinflammation	39
CHAPTER 4:	
Take Control of Your Brain	52
CHAPTER 5:	
Essential Nutrients: The Path to Cognitive Eternity	78
CHAPTER 6:	
Beyond the Essentials	104
CHAPTER 7:	
The Six Pillars of Brilliance™: A Lifestyle Roadmap to Health ...	117
CHAPTER 8:	
The BrainCare® Diet: Add One/Subtract One	130
CHAPTER 9:	
Stay Sharp with Braincare® Products	148
CHAPTER 10:	
Love Begets Love	161
RESOURCES	
ACKNOWLEDGMENTS	
REFERENCES	

INTRODUCTION

Prevent Dementia with Nutrients, Not Drugs

If you're over 50, you're most likely a part of the growing number of people who fear a gradual loss of brain function, otherwise known as cognitive decline or dementia. It's normal to worry. No one wants to slip into their later years with a failing memory or inability to think clearly and make decisions. And if they do, they're at the mercy of a healthcare system ill-equipped to treat cognitive decline. But there is good news; you'll learn about it in this book.

Cognitive decline is the fastest-growing disease in the world and by far the costliest when long-term care costs are factored in. Unfortunately, society has generally accepted that cognition decline is inevitable, with no proven medical treatment. If you have a loved one with this condition, you know how heart-wrenching and omnipresent it is.

We do not accept this societal view. As you age, you aren't helpless; yes, your memories can last forever. Cognitive decline is mostly the result of lifestyle choices, not genetics. It is simply a story of "too little/too much" - too little of the nutrients your brain needs daily to maintain health and too much of the foods, drugs, and poor lifestyle choices that damage the brain.

With our main focus as cognition decline, what you eat greatly affects brain development - for both children and young adults during the brain's main development period (birth to early 20s), as well as peak performance during our most demanding years. The principles we talk about cognition also apply to all stages of our brain life.

ABOUT THIS BOOK

The first section of this book explores the beauty of the brain and how it is designed to regenerate forever. It will help you understand, appreciate, and love your beautiful brain as the incredible gift it is.

You'll also understand how your lifestyle choices either strengthen or damage your brain. Unfortunately, more people are making lifestyle choices that interfere with the brain's function, resulting in declining mental faculties with age. Most of this results from "neuro inflammation," a process that gradually damages brain cells but can be reversed with proper nutrition and other positive lifestyle habits.

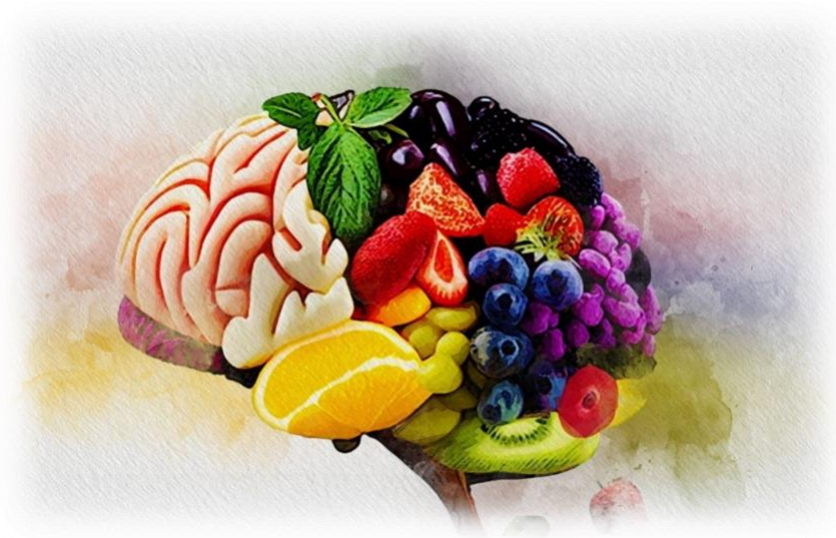
In the second section, we outline our recommended program for preserving memories forever, from diet to supportive nutrients to lifestyle measures you can begin immediately. As older adults, we both started this program years ago, putting its strategies to practical use, and we believe (and tests indicate) that our brains have grown stronger since then.

Although behavior change is challenging, we give you a simple dietary program: add one good brain care habit/subtract one bad brain care habit – so that brain care improvements are gradual and integrated into your daily life.

Once you have started this program, expect to gradually:

1. Feel more mentally alert
2. Experience greater clarity of thought
3. Have more overall energy
4. Feel younger
5. Make your brain more resilient to disease

Starting this program as early as possible is ideal. But we meet you where you are, and you can begin at any age – because there is room for improvement at any age – even if you are a pre-menopausal woman (and at a higher risk for cognitive decline.)



Our prescription is simple:

1. Consume a nutrient-dense diet. Eventually, we expect a new breakthrough technology company, WISEcode, to produce a tool to help you obtain the most nutrients from your diet, along with our ready-to-eat foods fortified with brain-healthy nutrients.
2. Even without the technology assistance, you can easily learn the “add one/subtract one” diet to help you. We show you how with the BrainCare Diet.
3. Focus on nutrients your brain loves and generally does not get. We introduce you to products formulated with intensive nutrients the brain loves and uses for healing.

Everything in this book and the products offered are the result of 10 years of specific research and a lifetime effort to promote the best brain performance in everyone. We live it daily and have for the last decade.

The human brain is the last frontier of medicine, and science has barely touched the surface of this very complex organ. But we know that each individual is gifted a brain when we step into this world. We believe our brains, like our bodies, can be protected and perform forever. The first line of defense is to do this naturally by caring for our brain, not by drugs.

CHAPTER 1

THE BEAUTY OF THE BRAIN

Your beautiful brain. It rules supreme in your body. Perched atop your neck, inside your skull, it contains all the perceptual machinery that defines who you are, how you navigate the world, the stuff from which your decisions arise, the material from where creativity is birthed, how you love, what you believe and perceive, and where you are headed in life.

If you were to peer inside your skull and observe your brain close-up, you'd see an organ with the consistency of room-temperature butter, wrinkly folds, and an odor reminiscent of blue cheese. Granted, the brain doesn't look beautiful, but its beauty lies in its astonishing mental powers – powers you can harness to live an amazing life.

There is no other organ as special, magnificent, or all-powerful as the human brain. Without the brain, you wouldn't be human at all. Your brain is your life.

But what, exactly, makes your brain so extraordinary? The answer is largely twofold. One lies in its amazing biological performance. Weighing approximately three pounds and containing approximately 100 billion neurons, the brain controls all necessary functions of your body – heart beating, breathing, sleeping, speaking, hearing, moving – everything that keeps you alive.

The other part of its specialness embodies the essence of your mind – how you experience and process emotions, what you remember, make decisions, and who you are at your very core.

When you understand the emotional and biological aspects of your brain, something comes forth that you may not have expected in there: you.



THE EMOTIONAL ESSENCE OF YOUR BRAIN

A lot is going on inside your head. Among the billions of brain cells and trillions of connections between them, your brain is influencing your emotions. Does this surprise you - that your brain runs your emotions? Maybe you had fun on your last vacation, which made you happy. Or perhaps one of your parents got seriously ill, making you sad or worried. Or you suffered some deep personal loss, so you're very depressed. Where do those feelings come from? Your brain, of course.

It is intimately involved in interpreting your circumstances and crafting emotional responses. Your brain influences how you feel in ways you're probably unaware of. This leads to the question: What exactly is happening there regarding emotions?

YOUR MEMORIES DRIVE AND INFORM YOUR EMOTIONS

Think about the last time a negative memory came to mind. It probably made you sad or angry or put you in a bad mood. Recalling a happy memory can make you feel good. Not surprisingly, memories of previous experiences influence how you respond emotionally to situations. If you once nearly drowned, you might be afraid of the water. If a previous partner had a wandering eye, you might feel jealous when your current love looks at another person. Memories are powerful drivers of emotions.

How your brain creates a memory, stores it among numerous connections, and is then able to retrieve that memory after a lapse of days or decades is a miracle that neuro scientists have been studying for decades.

Their first clue surfaced in 1953 after a 27-year-old patient named Henry Molaison underwent brain surgery to relieve his long struggle with epileptic seizures. A neurosurgeon stood above an awake Henry and carefully suctioned out the seahorse-shaped brain structure called the hippocampus.

The operation was successful in significantly reducing Henry's seizures, but it left him with widespread memory loss and the inability to form new memories. Up until then, it had not been known that the hippocampus was essential for making memories and that if you lose it, you suffer global amnesia. Once this was realized and the findings widely publicized, it was determined that such an operation would never be performed again.

But what was a tragedy for Henry led to one of the most significant turning points in 20th-century neuroscience: the knowledge that complex functions such as learning and memory are tied to specific brain regions. Everything you learn and experience is encoded or laid

down in your brain as patterns of electrical pulses passing between brain cells. A particular memory returns each time one of these patterns is activated.

We possess both a long-term memory and a short-term memory. Long-term memory stores most of everything we know: vocabulary, the names of friends and loved ones, your favorite movies or books, how to read, write, and do math, perform your job, and so forth. Information stays in your long-term memory for months, years, and even the rest of your life.

On the other hand, your short-term memory can store only a maximum of around seven things at a time. That is the reason why telephone numbers are seven digits long. Your short-term memory is very vulnerable to distractions around you. This is why facts in your short-term memory are displaced easily by new ones. Sometimes, the old facts are simply transferred to your long-term memory.

As wonderful as memory is, it isn't always perfect. It can be quite erratic and unpredictable. For example, you may not remember where you parked your car after grocery shopping. This simply means that your brain never encoded the memory in the first place. Memory is quite fragile. It has to be set, like wet cement or cooling Jell-O.

Amazingly, some memories are so vivid that they become virtually indelible. For example, most people can recall exactly where they were and what they were doing when 9/11 hit.

Why is it that we recall such significant emotional events so strongly? With any type of trauma, the brain takes advantage of two powerful stress hormones, epinephrine, and norepinephrine, which flood the body during stress and strong emotions. This process carves the memory into the brain forever. It is a life-saving defense mechanism. We need to be able to recall danger or threats to take precautions should we ever encounter them again.

Memory is an indispensable part of life and survival. We need it to remember who we are, how to walk and talk, and how to avoid danger. Without memory, staying alive would be impossible.

EMOTIONS INFLUENCE DECISION-MAKING

Decisions. Decisions. Each day, your brain makes thousands of them - as many as 2,000 per hour. Many — what to eat for dinner or what to wear to work — have few, if any, long-lasting consequences. Others — whether to look for a job or marry a certain person — can greatly impact your life's direction.

Why do we make so many decisions? For one thing, your brain is constantly absorbing and processing information. It picks up details about your environment from your eyes, ears, skin, and other sensory organs and instantaneously sorts that information based on your entire personal history. Almost without even noticing, you decide that you do want or do not want to pursue a certain course of action.

The two most important decision-making centers of the brain are the limbic system, found deep within the brain, and the prefrontal cortex, the seat of higher-level reasoning. The limbic system generates an emotional response, and the prefrontal cortex produces rational thinking.

Both regions duke it out at each of your decision points before coming to a final verdict. In other words, you don't base your choices only on logic and fact but also on memories and emotions. Normally, the limbic system does most of the driving. This is because we need emotion to make decisions.

The major force behind everything we do in our lives, in one way or another, is related to emotions. Example: What made the Mughal Emperor Shah Jahan construct the Taj Mahal for his wife was nothing but the deep and passionate emotion of love.

Effective decision-making is impossible without the motivation and meaning of emotional input. If we lack feeling, we become incapable of making a decent decision.

Consider “Elliott,” a patient of Dr. Antonio Damasio, a neuroscientist and professor at USC and the Salk Institute. Previously a successful businessman, Elliott underwent neurosurgery for a tumor and lost a part of his brain—the orbitofrontal cortex—involved with emotion. He was described as a real-life Mr. Spock, devoid of emotion. But rather than being perfectly rational, he became paralyzed by every decision in life.

Decision-making is at the heart of everything – who you are, what you do now and in the future, and your entire way of being in the world – and it all happens within your magnificent brain.

LOVE AND CONNECTION

For centuries, people thought love (and most other emotions, for that matter) arose from the heart. As it turns out, your brain falls in love – not your heart! Larry Young, a psychologist who has researched the subject of love at the Emory University School of Medicine in Atlanta, said that the brain churns out a brew of three chemicals, oxytocin, dopamine, and opiates, making people fall in love.

Oxytocin, not to be confused with the drug oxycodone, is sometimes called the “cuddle hormone.” It produces the bond between partners – and is released during orgasm – and the bond between mother and newborn.

The absence of oxytocin severs the normal attachment between mother and baby. For example, thousands of infants abandoned in Romania orphanages during the 1980s were left untouched in their cribs, deprived of human contact for up to 20 hours a day. As they grew up, neurological and psychological tests confirmed that early isolation and neglect produced lasting cognitive damage, ranging from emotional

volatility to the inability to connect to others meaningfully. Yet if the children were removed to loving homes before age 2, they generally recovered well. This case highlights the critical role of oxytocin in a child's developing brain – and who that child becomes.

Dopamine is involved in exhilaration, excitement, and reward. When you see your partner, and you're a mess of heart-sick jelly oozing with delight, your dopamine system is activated, and often love can be like an addiction. For humans, finding "the one" makes a person high on dopamine.

Your body has its own natural set of opiates, of which the main type is a class of chemicals called endorphins, responsible for the natural high produced by exercise. The body's opiates create feelings of warmth, pleasure, and well-being, especially when you feel love and connection toward another human being.

Love and connection are chemically based and orchestrated by the fascinating processes in the brain when you interact with and are attracted to others.

YOUR BRAIN DICTATES PERSONALITY

Personality is the sum of who you are - how you act, think, and express your emotions. It is shaped by the family you were born into, your neighborhood and culture, and your life experiences.

Scientists have discovered something else: there are striking structural differences in the brains of people with different personality types. As personality psychologists see it, there are five major traits of personality: openness, conscientiousness, extraversion, agreeableness, and neuroticism (OCEAN). This has been termed the "Big Five" theory of personality.

Each of us falls somewhere on a continuum that stretches between five sets of opposing qualities: extraversion and introversion; emotional

stability and neuroticism; conscientiousness and impulsivity; agreeableness and hostility; and open-mindedness and close-mindedness.

To understand how brain structure might correlate to personality, psychologists at the University of Minnesota studied 116 participants. After answering a personality questionnaire, they submitted to a brain imaging test.

The researchers found that all the extroverted participants had a significantly larger medial orbitofrontal cortex responsible for decision-making. The conscientious ones had a bigger lateral prefrontal cortex, involved in goal setting and obedience to rules. The brains of the neurotics revealed a smaller volume in a section of the brain that regulates memory and attention.

Associating brain structure with personality traits might be a crucial step toward improving the understanding and treatment of mental disorders. In the future, it may even provide mental health professionals the opportunity for early detection of those at high risk of developing mental illnesses – something that has obvious implications for prompt intervention.

THE BIOLOGY OF YOUR BRAIN

Your brain is part of a trio that makes up your central nervous system, or CNS. It has these components: the brain, the spinal cord, and the neurons (or nerve cells). The main job of the CNS is to organize and analyze information. This happens as nervous system impulses run to and from the brain via the spinal cord. Various areas of the CNS process what you sense and feel, letting you observe and respond to the world around you. The CNS must perform at the highest level, or we will deteriorate rapidly, physically and mentally.

The Brain and the Spinal Cord. From a biological standpoint, the human brain is the body's central processing unit (CPU). It receives signals from sensory organs and outputs information to the rest of the body. This natural CPU is believed to have unlimited potential and miraculous powers – and can perform in amazing ways that a computer could never match!

The brain comprises approximately 2 percent of our body weight, uses about 25 percent of the oxygen we breathe, and expends 25 percent of the energy in our foods. Although there is no precise scientific consensus, some scientists estimate the brain uses up to 40 percent of the nutrients in our foods. It is a very greedy organ in terms of fuel consumption. But how is this fuel used? It enables the brain to “work.”

Your brain is the boss of your body, but it can't do it alone. It needs some nerves — lots of them. And it needs the spinal cord, which runs from your brain down through your back.

The spinal cord and nerves let messages flow back and forth between the brain and body. If a speeding car is headed right for your best friend, your nerves and brain communicate so that you can yell and grab your friend to get out of the way.

NEURONS

Those 100 billion neurons are the largest cells in your body. Each neuron has tiny branches called dendrites (from the Greek word for tree) coming off it that let it connect to many other neurons. When you learn things, the messages travel from one neuron to another with the help of chemicals called neurotransmitters. As this process continues, the brain starts to create connections (or pathways) between the neurons, so things become easier, and you can do them better and better.

Remember when you learned how to drive a car? Your brain had to think about turning on the ignition, fastening your seat belt, putting

the car in gear, steering the wheel, watching the road, accelerating slowing down, and maybe even slamming on your brakes — all in sequence. Complicated, right? But as you practiced more often, the neurons sent messages back and forth until a pathway was etched into your brain. Now, you can operate your car confidently because the neurons have successfully created a “car driving” pathway.

Neurons don't have an on/off switch; they work 24/7. They get their non-stop power from nutrients found in food, and you will learn about those nutrients in this book.

OTHER BRAIN CELLS

Like a blockbuster film, neurons have long been the “star” of the brain movie. But researchers are now learning that a lesser-known type of brain cells, called glial cells, have more control than anyone suspected. It turns out that neurons would be lost without these co-stars.

The term “glial” comes from the Greek word meaning “glue.” This name reflects one of their chief functions: to hold the moist mass of the brain together. Yet glial cells do a lot more than provide structural support.

Primarily, glial cells provide backup for the neurons. Think of them as support employees, plus the janitorial and maintenance staff. They may not tackle the big jobs, but those big jobs would never get completed without them.

Two types of glial cells exist the microglia and the astrocytes. The microglia are the brain's housekeeping cells. They scan the brain for signs of injury and disease. In a healthy brain, they engulf and destroy waste, toxins, and protein collections, including amyloid plaques.

The microglia can work the night shift in your brain, performing maintenance work while you're sleeping. During sleep, the brain updates memories and clears out waste.

Researchers from the University of Rochester Medical Center in New York and the Massachusetts Institute of Technology in Cambridge have studied how the brain maintains itself during sleep. In one experiment — which appeared in *Nature Neuroscience* — they studied lab mice to see exactly how the microglia perform their maintenance jobs during sleep.

They looked at awake mice versus anesthetized mice. They observed that the microglia seemed less active and less efficient when the mice were awake. The researchers were then able to zero in on norepinephrine, a chemical messenger that helps regulate sleep-wake cycles. During sleep, norepinephrine levels in the brain are low. When norepinephrine levels spike, however, the brain becomes suddenly alert, and you wake up.

In this study, the researchers observed that norepinephrine acts specifically on the microglia. When norepinephrine levels become elevated, the microglia apparently fall into a state of slumber. This means that when you're awake, the microglia can't do their maintenance. But when you have a good night's sleep, the cells go to work, taking out the “trash” in your brain and keeping it healthy.

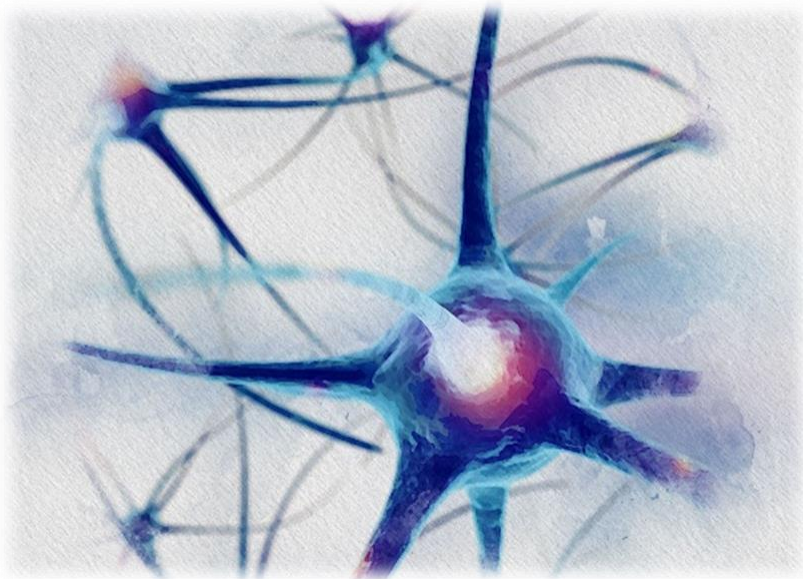
The other type of glial cell – and the most common - is the astrocyte. The “Astro” part of the name refers to the fact that they look like stars, with projections going out in various directions.

Astrocytes have several key duties. They form the blood-brain barrier (BBB). This works like a security system; it lets in only substances that are supposed to be in your brain and keeps things out that could be harmful. This security system is necessary to keep your brain healthy.

Astrocytes also regulate blood flow to the brain. For your brain to process information properly, it needs a certain amount of blood flowing into all its different regions. They also control metabolism in the brain by storing glucose in the blood and providing this as fuel for neurons. This is one of the most essential jobs astrocytes have.

THE BRAIN AND NEUROTRANSMITTERS

A healthy brain needs a huge reserve of neurotransmitters - the chemicals that transmit signals from one cell to another - to process thoughts and emotions to the fullest capacity. If that stock of neurotransmitters gets depleted, trouble brews in that magnificent brain of yours. You can become forgetful and lose your ability to think coherently. Your thoughts and memories may still be stored in the brain, but you can't access them any longer. Your personality can change, too, when neurotransmitters are imbalanced.



It is also possible that an inadequate supply of these neurotransmitting chemicals may cause areas of your brain to cease working together. A vicious cycle is set in motion. More neurons die, and more neurotransmitters fall off, which in turn brings on even more destruction, with the endpoint being cognitive decline and dementia. In these cases, the neurotransmitters serotonin, norepinephrine, dopamine, and acetylcholine, in particular, are dangerously reduced.

Nutrition to the rescue. The nutrients in the foods you eat are the building blocks of neurotransmitters. With adequate nutrients from food, your brain can produce neurotransmitters and maintain both their volume and function.

UNRAVELING THE MYSTERIES OF THE BRAIN

Despite what we know about the brain, its various cells, neurotransmitters, and other aspects of the CNS, scientists still do not fully comprehend all the mysteries of the human brain but are making new, fascinating discoveries all the time about how it works. One of these discoveries is called “neuroplasticity” – the ability of the brain to change its structure and function and form new connections in significant ways.

Consider the brains of virtuoso violinists, for example. Their brains display a measurable increase in the size and activities of areas of the brain that control the fingers. A similar finding has been observed in the brains of London taxicab drivers, who must learn to navigate the complex network of streets in that city. They show significant growth in the hippocampus, which is associated with context and spatial memory.

In a practical sense, neuroplasticity means that specific areas of the brain can become more active with practice. For example, learning a foreign language requires regular and ongoing practice, resulting in an increase in brain activity and improvement in the skill. When you are learning, your brain cells are changing structurally. Your brain retains this plasticity across your entire life span.

Every moment of the day, your brain is literally changing its physical form and function in response to your experiences, behaviors, and even your thoughts through neuroplasticity. Now, think about that for just a minute!

Also, in cases of insults to the brain, such as an injury, the areas of the brain associated with certain functions may be damaged. But eventually, thanks to neuroplasticity, healthy parts of the brain take over those functions, and those functions can be restored. Many times, blind people develop heightened senses in other areas, like hearing and touch, because their brains adapt to a lack of sight.

In rare cases, the brain astounds us with neuroplasticity miracles. One widely reported case: While 10-year-old Orlando Serrell was playing baseball in 1979, the ball hit him so hard on the left side of his head as he dashed for first base that he fell to the ground. Eager to keep playing, he did not tell anyone how severe the blow was, and so he did not receive medical treatment, even though he suffered terrible headaches. But, after the headaches subsided, Serrell found himself with a miraculous new skill: he was able to make lightning-fast mental calculations involving extremely complex figures. He could also recall what the weather was like and what his activities were on every single day since his fateful baseball game.

From its ability to change based on experiences to its miraculous powers, your brain works tirelessly behind the scenes, 24 hours a day. In fact, nearly 98 percent of its activity takes place outside of your conscious awareness!

Imagine that you must sign a document by hand. Your visual system scans your environment to find a pen, and your prior experience triggers memories of using a pen. Your frontal cortex signals your motor cortex, which coordinates muscle contractions throughout your arm, forearm, and hand so that you can grasp the pen.

As you pick up your pen, nerve cells transmit messages about its weight, its position in space, and the feeling of your fingers around it up your spinal cord and to your brain. This information is processed among parts of your brain with names like basal ganglia, cerebellum, somatosensory cortex, and many other regions. All sorts of calculations

relating to visual processing, motor coordination, spatial awareness, proprioception (your body's ability to sense joint movement), balance, grip, intention, and more are all occurring in your brain – in milliseconds – just so you can write your signature.

Not even the world's fastest computer could pull off such a feat!

None of us is completely aware of these unconscious operations – until they stop working. Just think what it would be like if we had to consciously think about daily actions that we normally take for granted. The next time you walk, ride your bike, shake someone's hand, cross the room, drink a cup of coffee, or eat your dinner, take a moment to marvel at the power of the unconscious brain to execute these activities flawlessly.

THE FRAGILITY OF THE BRAIN

For all its masterful complexity and beauty, the brain is fragile and vulnerable to damage. Unlike other parts of your body, if even a small piece of the brain is harmed – through an injury, disease, drugs, or cognitive decline - who you are and how you act is likely to change radically – often in strange ways.

On August 1, 1966, Charles Whitman murdered his mother and his wife. He then traveled to the campus of the University of Texas, climbed inside the tower, and killed 14 people. He was dubbed the infamous UT sniper, but his story involves much more. In fact, Whitman moaned of headaches and a strange mental state in the days and weeks prior to the murders. His own suicide note read, “I do not really understand myself these days. I am supposed to be an average, reasonable, and intelligent young man. However, lately (I cannot recall when it started), I have been a victim of many unusual and irrational thoughts.”

Whitman felt that something was amiss. His note read, “After my death, I wish an autopsy would be performed on me to see if there is any

visible physical disorder.” And sure enough, there was. Doctors discovered that Whitman had a glioblastoma, a type of brain tumor. It was pressing against brain regions responsible for regulating strong emotions.

Beyond an organic disease like a brain tumor, external injuries inflict trauma on our beautiful brains. The two most prevalent today are 1) damage to the brain during military operations and 2) repeated and excess pounding to the brain that occurs in sports like football.

Much scientific work has studied war trauma and brain health for more than a century. From autopsies, early research revealed that the brains of war veterans looked very similar to those of dementia patients. More recently, such findings have been confirmed: scientists have found a direct correlation between war trauma and dementia in studying soldiers in the Gulf and Iraq wars. Specifically, 22 percent of war veterans had post-traumatic stress disorder (PTSD) - a disorder that develops in some people who have experienced a shocking, scary, or dangerous event (like war). PTSD led to a two-fold increase in the risk of dementia. Beyond PTSD, those with moderate to severe head injury were 2 to 4 times more likely to develop Alzheimer’s and other forms of dementia.

The NFL has long been faced with a problem known as the “Concussion Crisis.” NFL injuries have been front and center in our national sports conversation in recent years. People have long suspected that players who continually hit their helmets against opponents’ helmets were bad for the brain. Those fears were validated in a 2017 study published in the highly respected Journal of the American Medical Association.

Researchers studied the brains of 202 deceased people who played football at the high school, college, or professional level. They found that 99 percent of NFL players, 91 percent of college players, and 21 percent of high school players had chronic traumatic encephalopathy

(CTE), a progressive, degenerative brain disease found in people with a history of repeated brain trauma.

This type of brain deterioration can end in tragedy. Consider the suicide of Junior Seau, an American professional football player who was a linebacker in the NFL known for his passionate play. On May 2, 2012, Seau's girlfriend found him dead with a gunshot wound to the chest at his home in Oceanside, California. There was speculation that Seau suffered brain damage due to CTE, which produces depression as a symptom. Seau's family donated his brain tissue to the National Institute of Neurological Disorders and Stroke, part of the National Institutes of Health (NIH). On January 10, 2013, Seau's family released the NIH's findings that his brain showed definitive signs of CTE. The NIH said the findings on Seau were similar to autopsies of people "with exposure to repetitive head injuries."

Luckily, most people are not NFL players or war veterans with brain trauma. Thus, most of us will not experience a brain tumor or a traumatic brain injury. Still, it is generally expected that everyone is at risk of experiencing the gradual deterioration of mental faculties due to cognitive decline, primarily from aging and hormonal changes. Cognitive decline may range from brain fog, short-term memory loss, and awful brain diseases like dementia and Alzheimer's.

There is good news. Research, particularly in the last five years, has shown that cognitive decline is not an inevitable consequence of aging. There are promising methods that can halt this deterioration, even reverse it, through lifestyle changes in ways we didn't know previously were possible.

One of the most positive and uplifting pieces of proof came from the University of California, Los Angeles, and the Buck Institute for Research on Aging in Novato, California. Dale E. Bredesen, MD, and his research team designed a therapeutic lifestyle program to see if it would reverse patient memory loss. It was a very complex 36-point

program that included comprehensive dietary changes, brain stimulation, exercise, sleep optimization, and other factors that affect brain chemistry.

The program was tested on ten patients with various cognitive impairment stages, including one with advanced Alzheimer's. They ate more fruits and vegetables and non-farmed fish and ate no meat except occasional grass-fed meat or organic chicken. They eliminated all sugars, processed carbohydrates, and sometimes gluten. Their diets, in general, were anti-inflammatory. They get key nutrients from food, such as B vitamins, antioxidants, and omega-3 fatty acids. Other lifestyle actions included exercising four times a week, on average, and getting eight hours of quality sleep.

In short, they pursued a proactive and lifelong brain health lifestyle – with powerful and inspiring results. Nine of the ten participants displayed improvements in their memories within 3 to 6 months. The one patient with late-stage Alzheimer's did not improve. Although a trial of 10 people is not statistically significant, this study bordered on the miraculous by demonstrating the importance of early lifestyle intervention, particularly diet.

What this study and others demonstrate now about our amazing brains is that you can delay the onset of what so many of us worry about – losing our memories and cognitive skills – and we can do it through altering our diets, changing our lifestyles, social interaction (yes, love), and opening ourselves up to novel and enriching experiences. We are not helpless just because modern medicine has not yet provided the magic pill. We can take control of our brain, cognition, and longevity.

With all that it does and means to your life, your beautiful brain is worth protecting. Take some time to consider what your life might be like without a healthy brain. Even if you think you've passed the point of no return, you have not. You can preserve what you have, get back what you have lost, and guard the door to your mind well into your

golden years. You have much power from now on – more than you ever believed - to influence your brain and mental realities – and, in doing so, experience joy, enjoy your life, and respond positively and successfully to the world around you.

CHAPTER 2

THE DARK SIDE OF COGNITIVE DECLINE

Like many people, maybe you've wondered why one minute you can recite the names of your entire fourth-grade class, the color dress you wore to the Senior Prom or lines from your favorite movie, and the next moment, you space out on the name of your last boss. Could something be happening to your mind?

This question points to what is now the second leading health fear (after cancer) among adults in the United States, as well as in three European countries – France, Germany, and Spain, according to a survey by the Harvard University of Public Health and the Alzheimer's Consortium: the fear of developing dementia.

This fear is real. After all, dementia affects memory, thinking, judgment, daily life, livelihood, and who you are at your very core. When we hear of someone famous like singer Glenn Campbell or President Ronald Reagan dying from Alzheimer's, it is scary. There is little we contemplate with greater dread than losing our minds and identities to an increasingly common condition we don't yet know how to cure.

There are 3 million cases of dementia diagnosed annually in the U.S. One out of every three seniors in the U.S. dies with some form of dementia. The most serious form is Alzheimer's disease, now the sixth leading cause of death in the United States. It kills more people than breast cancer or prostate cancer combined. Sadly, deaths from Alzheimer's are growing at an alarming rate of 125 percent, the fastest rate of any disease.

Alzheimer's already accounts for \$1 of every \$5 of Medicare/Medicaid spent and is predicted to increase to \$1 of every \$3 in the coming years. Dementia-related medical costs are expected to reach \$1 trillion by 2050. Experts predict it will "single-handedly" collapse our government health insurance.

Brain disease is not only bankrupting our country but also leveling financial ruin on individuals. Unpaid health care costs are the number-one cause of personal bankruptcy, accounting for two-thirds of personal bankruptcy in the U.S.

Alzheimer's is the worst offender. It is the most expensive illness by far, costing on average \$424,000 per case – 60 percent more costly than heart disease and cancer, the #2 and #3 costliest illnesses. Unlike cancer, the life span of people living with Alzheimer's is much longer, sometimes even decades – which is the main reason why its treatment price tag is so exorbitant. Unfortunately, many costs are not covered by insurance, forcing families to spend their hard-earned funds. Shockingly, families with relatives who have dementia already spend approximately 25 percent of their total income on those loved ones. As costs skyrocket, the problem will only worsen as co-pays go up, uncovered services increase and the burden on families brings further financial disaster.

These facts and statistics reflect the dark side of dementia. But there is a bright side. Dementia is largely a lifestyle disease – which means it is also preventable and, in many cases, reversible, even if it runs in your family. Although scientists debate the importance of genetics, the UK Alzheimer's Society states that a mere 1 percent of cases are inherited.

Even for those who believe genes play a larger role, the genetic number is still small. A paper in the *Lancet* estimated only 25 percent of people over 55 in the U.S. have a family history of dementia.

In truth, the most important issue with dementia is lifestyle, not genetics. An Oxford University-led study published in the *Journal of*

American Medical Association concluded that a “healthy” lifestyle reduces the risk of dementia by 40 percent. That being so, we can change our lifestyles and the course of our brain health for the better.

THE AGING BRAIN

Throughout your lifetime, the brain changes more than any other part of your body. As you get older, there may be a gradual decline in your cognitive function. Mental tasks may take longer to finish, and your memory and attention span may be less sharp. Age-related cognitive decline is a complex process with numerous contributing factors, including the following:

Brain mass. Shrinkage in the frontal lobe and hippocampus, both involved in higher cognitive functions such as problem-solving, creativity, planning, impulse control, as well as the formation of new memories, starts at around the age of 60 or 70 years.

Cortical density. The cortex, the wrinkled outer layer of the brain, also thins as you age. It contains synapses, or connections between nerve cells, and these decline. Fewer connections may contribute to slower cognitive processing - the rate at which you take in new information, reach a judgment regarding it, or formulate a response.

White matter. Found in the deeper tissues of the brain (subcortical), white matter contains branch-like nerve fibers called axons that radiate out from nerve cells. The nerve fibers themselves are enveloped by a type of sheath or covering called myelin. It acts as insulation, much like the plastic or rubber that is used to insulate electrical wires. Myelin gives the white matter its color. It also protects the nerve fibers from injury. Researchers have found that myelin shrinks with age, and, as a result, mental processing slows down.

Neurotransmitter systems. As we age, our brains may also generate fewer of these chemical messengers. Several studies have reported that older brains synthesize less dopamine, acetylcholine, serotonin, and

norepinephrine activity, which may decrease cognition and memory and increase depression.

Hormonal changes. Another factor involved with the aging brain and its mental performance is hormonal influence. The brain relies significantly on the proper balance of hormones for peak operation. In fact, estrogen, progesterone, testosterone, DHEA, and other hormones can be higher in your brain than in your bloodstream!

Yet hormones ebb significantly with age, particularly in women at menopause. Although this may have little effect initially, over time, it can cause a lack of energy and a decline in a woman's brain function just before and during menopause, otherwise known as "brain fog." Women also have a higher incidence of Alzheimer's disease even when longer life expectancy is considered.

Why are women more susceptible to the disease than men? Scientists can only guess at this point, but several factors may be at work. Some experts suspect that beyond hormonal decline, the anatomy of a woman's brain or her brain-glucose metabolism may play a role. Women are also more prone to depression than men – up to twice the risk – and depression is linked to dementia. Women with depression have a smaller hippocampus and faster shrinkage of this brain region. The same association is not seen in men.

But like women, men suffer the effects of losing hormones as they age. Low levels of testosterone, for example, increase their risk of Alzheimer's disease, as well as neuro degenerative diseases like Parkinson's. When testosterone and other hormones fall off, memory and thinking can change – and not for the better. This is why men tend to suffer from memory problems, have trouble concentrating, or just feel less mentally sharp as they age.

Vascular health. The brain critically depends on a healthy blood supply for its structural and functional integrity. But with age, the lining

of the arteries hardens, and blood flow is more restricted to the brain, compromising cognition.

High blood pressure can impede the blood supply to the brain and is a leading risk factor for stroke. At least one European study suggested that the treatment and management of high blood pressure can cut the risk of dementia in half.

Understanding Cognitive Decline. Whatever the cause may be, the brain naturally changes with age, affecting memory, learning, focus, concentration, and other mental functions. According to studies, memory is the largest reported cognition issue, making up 60 percent of the condition. Although cognition science is relatively new, scientists have begun to partition cognitive decline into specific categories:

Normal Senior Decline. Most seniors seem to suffer from what are commonly known as “senior moments,” temporary flickers of forgetfulness. Maybe you were shopping and swiped your debit card. The machine asks you for your PIN, which you had entered hundreds of times before, and you froze. You couldn’t remember it at all! As the cashier peers at you, like you’re a possible identity thief, you quickly cancel the transaction and switch to a credit card that requires no PIN. That’s a senior moment. Generally, these memory lapses involve short-term memory rather than long-term memory.

Should senior moments ever go beyond the realm of occasional slips and make it hard to manage your daily life, see your doctor to have your symptoms evaluated. They may be early warning signs of Alzheimer’s disease or another dementia.

SUBJECTIVE COGNITIVE DECLINE (SCD)

SCD is not a diagnosable disorder. It refers to a condition in which you – not a doctor or family member - first recognize changes in your memory and thinking abilities. This is why SCD is called

“subjective;” it is a self-reported experience. However, SCD has long been recognized as an early predictor of dementia.

It is estimated that at least 11 percent of seniors suffer from SCD, but the actual number could be significantly higher because it is self-reported. Today, SCD is often included in the normal senior decline category. Common symptoms of SCD are:

- You gradually lose your ability to perform routine tasks that you used to do easily, such as fixing meals or managing your finances.
- You often forget appointments or where you place things.
- You repeat stories over and over.
- You can't remember whether you took medicines or supplements.
- You have trouble finding the right words to describe something or say what you want to express.
- You have a hard time understanding instructions.

MILD COGNITIVE IMPAIRMENT (MCI)

Some people, however, experience changes that go beyond these conditions. For example, you may sometimes forget where you placed your keys – that's a senior moment or SCD - but if you can't remember how to use a key, this may signal “mild cognitive impairment” or even dementia. Unlike senior moments or SCD, MCI can be identified, tested, and measured.

A precursor to dementia and Alzheimer's, MCI is a border zone between the tiny cognitive changes associated with healthy aging and the more substantial cognitive and functional problems brought on by dementia. Up to 20 percent of seniors suffer from MCI. However, the numbers could be higher because not all seniors are tested for cognition.

MCI can affect your memory, your ability to solve problems, or form language. Specific signs include:

- You are more forgetful than usual.
- You lose your thoughts during conversations or reading books or other texts.
- You are increasingly overwhelmed by making decisions, planning steps to accomplish a task, or understanding instructions.
- You begin to have trouble navigating around familiar surroundings.
- You are more impulsive and make faulty judgments more often.
- Your family and friends have noticed one or more of these changes.

One study found that approximately 40 percent of people over age 65 diagnosed with MCI developed dementia within three years. According to the National Institute of Health, 80 percent of people with amnesic MCI will develop Alzheimer's within seven years versus less than 3 percent of people older than 65 who have normal cognition.

Fortunately, not everyone with MCI develops dementia or Alzheimer's. Many continue to live with mild cognitive problems that do not worsen, and sometimes they can be reversed. As highlighted later in the book, lifestyle changes have been shown to be effective in addressing MCI.

DEMENTIA

Cognition decline interfering with independent functioning is called dementia, a general term, not a defined disease. People with dementia can no longer function on their own. Although dementia can strike at an early age, it is more prevalent in seniors: 5 to 7 percent of 60+-year-olds, 14 percent of 71+-year-olds, and 37 percent of 90-year-olds suffer from some form of dementia.

Dementia discriminates against women, African Americans, and Hispanics for unknown reasons. The risk of developing dementia with no prior cognition problems by age 70 for a man is 27 percent; for a woman, 37 percent. The risk for African Americans is double that for Caucasians; the risk for Hispanics is 1.5 times higher than that for Caucasians.

ALZHEIMER'S DISEASE

This most-feared form of cognitive impairment strikes in middle age and gradually destroys its victims, physically and mentally. It is a creeping disease and often difficult to diagnose. When it attacks, it damages the brain - not all at once but over time. As it progresses, brain cells die, and brain tissue shrinks. Early signs of Alzheimer's include forgetting names and recent events, inability to recognize and name objects, and depression. In later stages, people experience confusion and mood changes. They also have trouble speaking and walking. Between 60 and 80 percent of cases of dementia are caused by this disease, according to the Alzheimer's Association. The prevailing theory of the



disease is that a protein called beta-amyloid peptide builds up outside of brain cells, forming brain-cell-killing plaques and inside brain cells, causing fibrous tangles. These changes impair the way brain cells

operate, primarily by decreasing the number of synapses, the tiny gaps between brain cells that are communication units.

However, questions about the amyloid hypothesis have been raised since several drugs aimed at the protein have failed. In 2013, Mayo Clinic researchers analyzed 50 post-mortem brains from Massachusetts General Hospital, Mayo Clinic, and the University of Pittsburgh ADRC Brain Banks. The cases were divided into four groups:

1. Individuals without dementia and a low probability of Alzheimer's disease before death (this was the control group);
2. Individuals without dementia but with an intermediate probability of Alzheimer's before death;
3. Individuals without dementia but with a high probability of Alzheimer's before death;
4. Diagnosed cases of dementia and Alzheimer's.

Based on their analysis, the researchers concluded that “amyloid- β plaque deposition and tangle formation do not inevitably result in dementia in all individuals.” In other words, amyloid plaques can exist in healthy individuals, and not everyone with dementia develops these plaques. Amyloid, they argued, may very well be a sign of Alzheimer's but not necessarily the cause.

Another powerful study along these lines is the Religious Orders Study, in which nuns and priests have been studied to explore the effects of aging on the brain. Based at Rush University Medical Center in Chicago, the study has involved more than 1000 older clergy who have agreed to medical and psychological evaluation each year and brain donation after death. Researchers are using the data to pinpoint the major risk factors for the development of dementia.

What the research team has found so far speaks again to the miraculous beauty and workings of the brain. When the team began their investigation in 1994, they expected to find a clear association between cognitive decline and the three diseases that are the most

common cause of dementia: Alzheimer's, stroke, and Parkinson's. But they did not. Instead, they discovered that having brain tissue riddled with the ravages of brain disease, namely amyloid plaques, didn't necessarily mean someone would experience cognitive problems!

To make sense of this phenomenon, the researchers combed the data to identify factors determining whether someone could retain or lose their cognitive abilities. Specifically, activities that kept the brain engaged – crossword puzzles, reading, driving, learning new skills, and having responsibilities – were protective. So were nutrition, social activity, and physical exercise.

On the other hand, the team found that negative psychological factors such as loneliness, anxiety, depression, and low-stress tolerance triggered rapid cognitive decline. Positive psychological attributes like conscientiousness, purpose in life, and keeping busy were protective.

The participants with diseased brain tissue – but no symptoms of cognitive decline – had built up what is termed “cognitive reserve,” in which areas of the brain that have been well exercised take over the functions of degenerated, incapacitated brain tissue. Put another way, cognitive reserve is your brain's ability to improvise and find alternate ways of getting a job done. It is developed over a lifetime of education, curiosity, and self-care that ultimately helps your brain better cope with any failures or declines it faces.

The Religious Orders Study demonstrates that protecting our brains and holding on to who we are as long as possible is possible. We might be unable to stop the brain's aging, but we can employ many skills and behaviors to slow it down.

DEMENTIA THROUGH THE AGES

We think of dementia as something relatively new, but it is as old as humankind itself. As far back as 2000 BC, ancient Egyptians were aware that age could bring on major memory problems. Similarly, Plato seems to have thought that old age was synonymous with dementia.

Galen, the Greek physician who discovered that arteries carry blood, and before him, Hippocrates, often referred to as the “Father of Medicine,” believed that memory disorders were related to brain impairment brought on by a disease affecting other organs of the body. Greek and Roman history also includes several descriptions of atypical and deranged behaviors by historical figures. For example, Nero played his fiddle during the burning of Rome, often considered an act of a demented mind.

In the Middle Ages, dementia was not of much interest or concern, perhaps partly because of the prominence of deadlier epidemics such as the bubonic plague. The founder of modern psychiatry, Philippe Pinel (1745–1826), first coined the term dementia (démence), a French word derived from Latin meaning “out of mind.” His medical description was fairly accurate; however, the name did not reflect the disease process. Dementia is the gradual deterioration of cognitive ability, often due to aging or disease.

Dementia also appears in many great literary works, notably Jonathan Swift’s *Gulliver’s Travels*, published in 1726. It presents a descriptive and satirical picture of cognitive and personality changes that accompany aging. On *Gulliver’s* third voyage, he meets the Struldbrugs, who are described as immortal. At first, Gulliver is envious of their fate until they tell him that their bodies and brains get depressed and hostile with age. In addition, Swift wrote: “They have no remembrance of anything but what they learned...in their youth...and even that is very imperfect.... In talking, they forget the common appellation of things and the name of persons, even of those who are their nearest friends and relations. For the same reason, they never can amuse themselves with reading because their memory will not serve to carry them from the beginning of a sentence to the end.”

This description obviously must have been inspired by Swift’s personal observation of people with dementia. In a tragic, ironic twist of fate, Swift, about ten years after these writings, developed dementia. He wrote to a friend: “I desire you will look upon me as a man worn with years and sunk by public as well as personal vexation. I have lost my memory, incapable of conversation by cruel deafness, which has lasted almost a year, and I despair of any cure.” Due to his deteriorating mental faculties, Swift was medically found incompetent and worsened steadily until his death. The famous author may well have been one of the first documented cases of Alzheimer’s disease.

This disease itself was named after Dr. Alois Alzheimer, who discovered it in 1906. He autopsied the brain of a woman who died after experiencing memory loss and delusions. He found clumps of sticky plaques between her nerve cells, which came to be known as beta-amyloid peptides. His findings led to the theory that these peptides build up, causing fibrous tangles. They impair the way brain cells operate, primarily by decreasing the number of synapses, the tiny gaps between brain cells that are the units of communication. Clearly, dementia has been very much with us throughout the ages, from history to art to medicine, and these influences have no doubt intensified our fears of developing it.

THE PROMISE OF NEUROGENESIS

Did you know that from birth until now, your brain is still generating new brain cells? For decades, the traditional scientific assumption was that the brain stagnates and stops growing at a certain time (between 21 and 25 years old). But this belief has been disproven – with the discovery of “neurogenesis” in the 1990’s.

Neurogenesis is the creation of new neurons in the brain. Some scientists think that it may improve memory and help with anxiety and depression. Neurogenesis takes place in two brain regions: the subventricular zone and the hippocampus. The latter plays a key role in learning and memory, and changes there have been tied to a variety of cognitive problems such as anxiety, depression, addiction, and neurodegenerative diseases such as Parkinson’s. The subventricular zone is the area containing neural progenitor cells, which are specialized cells that develop into neurons.

There are several lifestyle actions that affect and optimize neurogenesis, most of which we have considerable power to influence, including diet and exercise. These actions help the brain regenerate so that we can live long, healthy, productive lives well into our golden years.

THE POWER OF EPIGENETICS

Genetics is not a major factor in the development of dementia, so you are not a prisoner of your genes. You can protect yourself through the power of “epigenetics.” Simply put, this is the study of “gene expression” - your ability to assert control over your DNA by switching certain genes on and silencing others.

Like thousands of light switches, some genes are flipping on while others are flipping off – all in response to what you’re doing, seeing, and

feeling. And all these actions, behaviors, and thoughts can be changed, which means you can change for better health today and in the future.

That said, you can't alter your basic genetic code – your DNA – but you can make the best of what you have by changing what gets turned on and what gets turned off – by your lifestyle choices. No pills or test tubes are required, either. Everything you need is in your kitchen, home, or gym bag. This means a healthy diet, regular exercise, meditation, and other positive actions – all of which can help you express your best self, including a healthy brain.

A good example of epigenetics in action involves omega-3 fats, found mostly in fish. These essential molecules incorporate themselves into the membranes of cells, including brain cells, where they support gene expression and create healthier cells. Specifically, omega-3 fats switch off genes that activate inflammation, an underlying cause of cognitive decline (more on this in the next chapter). The result, according to several studies, shows that consuming fish oil may improve brain function in people with age-related cognitive decline and mild cognitive impairment.

Amazing, isn't it? These findings raise the possibility that simple epigenetic changes may reduce gene damage, delay cognitive decline, and prevent brain diseases in later years.

RENEWED HOPE

The greatest progress so far against dementia is in the knowledge that dietary habits, exercise, stress management, and other lifestyle activities practiced over a lifetime play a crucial role in determining whether or not you develop dementia.

Take diet, for example. As noted previously and worth repeating, Research shows that altering your diet can reduce your risk of Alzheimer's disease by as much as 40 percent!

On the flip side, when the body does not receive proper nutrition, it can't perform as it is supposed to. Many studies have determined that with malnutrition, the brain can't process thoughts as rapidly and has a hard time making decisions. Concentration becomes more difficult, and learning efficiency decreases. These adverse changes can become permanent if general nutrition is not attended to.

Consider one of the participants in Dr. Dale Bredesen's therapeutic lifestyle program, described in the previous chapter: a 67-year-old woman reported that she had been slowly losing her memory over two years. She worked at a demanding job that involved preparing analytical reports and traveling widely. As her mental faculties declined, she was no longer able to analyze data, create reports, or remember material she had just read. She also began to have trouble navigating while driving. She'd get lost or confused about where to exit or enter a highway. She also mixed up the names of her pets and forgot where the light switches were in her home for years. Eventually, she was forced to quit her job.

Her own mother's memory had wavered beginning in her early 60s. She eventually developed severe dementia, entered a nursing home, and died at the age of 80.

After this woman consulted her physician about her problems and her mother's health history, she was told that the problem was genetic and that there was nothing he could do about it!

Completely discouraged, she wanted to commit suicide. She called a friend to commiserate. But thankfully, the friend referred her to Dr. Bredesen's study, and she enrolled.

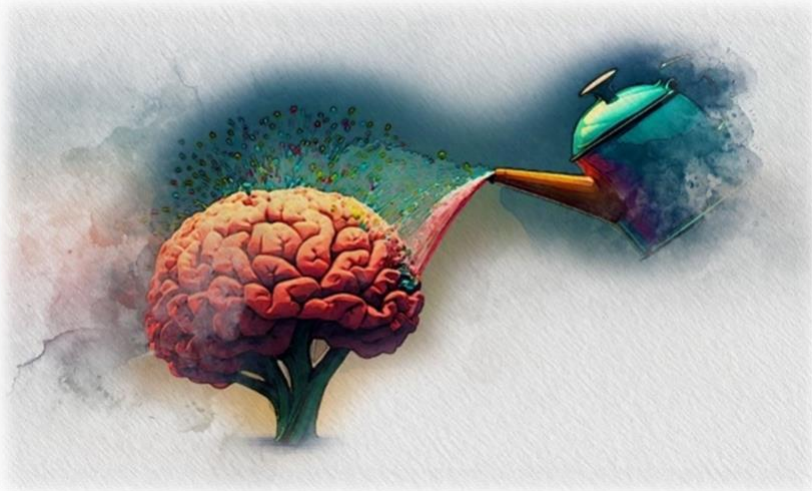
After three months of following the protocol, her symptoms had subsided. She could navigate and drive normally, recall phone numbers, generate complex reports, do all her work competently, and read and retain information. Amazingly, she reported that her memory was now

sharper than it had been in ages. Two and one-half years later, at age 70, she remained symptom-free and continued to work full-time.

At the root of her miraculous reversals were very simple lifestyle changes, mostly focused on diet and nutrients. She eliminated all simple carbohydrates, such as refined sugar, and lost 20 pounds. She excluded gluten from her diet and increased her intake of vegetables and non-farmed fish. To manage stress, took up yoga and meditation – and ultimately became a yoga instructor! And she went from sleeping 4 to 5 hours nightly to 7 to 8 hours. Simple lifestyle changes miraculously reversed her cognitive decline.

It gets down to this: You can protect your brain and heal it as it ages by consuming the right nutrients and making healthy lifestyle decisions. Choice of diet, level of physical activity, and ability to manage stress all contribute to maintaining the health and functionality of your brain, even though no pills or medicines or standard of care can return memory and brain function to its youthful proficiency.

Pursuing a proactive and lifelong brain health lifestyle is the key, and it is powerful. What we now know about our amazing brains is that you can delay the onset of what so many of us worry about – losing your memory and cognitive skills – and you can do it by altering your diet,



changing your lifestyle, and opening yourself up to novel and enriching experiences. Cognitive decline does not have to be your destiny.

CHAPTER 3

NEUROINFLAMMATION

Have you ever wondered why some people have senior moments while others deteriorate to SCD, MCI, and, ultimately, Alzheimer’s? What is causing these conditions? How much control do we have?

To answer these questions, we must draw back the curtains on brain disease. Do so, and you’ll discover a lurking beast called “neuroinflammation,” currently a fertile field of study for brain researchers. Neuroinflammation means your brain is on fire – and not in a good way. It brings on symptoms like memory problems, brain fog, mental fatigue, trouble concentrating, and cognitive decline that can lead to Alzheimer’s disease and other dementias. It is the reason why so many people deteriorate to various degrees of cognitive impairment.

What makes this condition so unusual and troublesome is that, unlike the rest of the body, inflammation is not even supposed to occur in the brain!

WHAT IS INFLAMMATION?

Inflammation, in general, is your body’s first line of defense against infection and injury and is critical to how your body naturally protects you. Inflammation comes in two flavors: acute and chronic.

ACUTE INFLAMMATION

Designed to be the body's way of protecting itself, acute inflammation is typically short-term and is the body's natural immune response to harmful invaders, such as irritants, toxins, germs, or injury.

Let's say you sprain your ankle or cut your skin. The injury brings on redness and heat, generated by increased blood flow that ushers in special immune cells and agents called cytokines to fight infection and manage the entire healing process. Moreover, extra plasma is dispatched to the cells, causing swelling, which helps stabilize the region.

Finally, the pain and tenderness you feel is your body's way of preventing you from using your ankle too much. The body isolates the problem naturally – and heals it.

Once the foreign invaders are destroyed, and the healing is sufficiently underway, the inflammation recedes. If not for acute inflammation, you wouldn't survive an injury or illness.

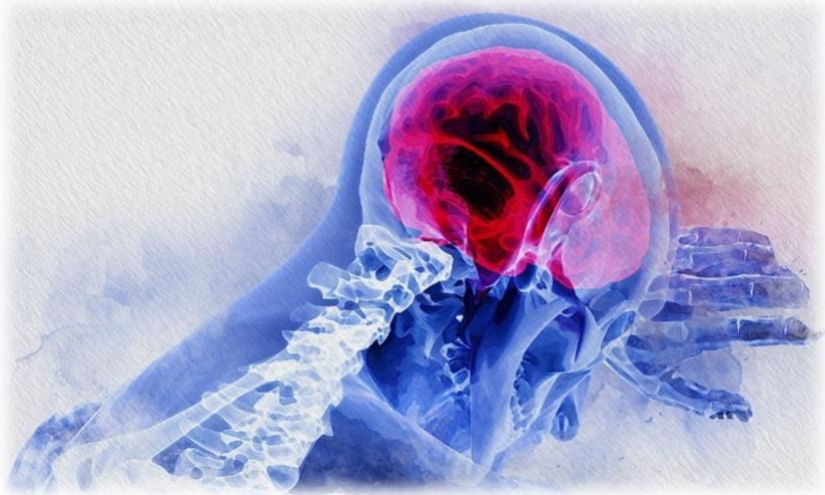
CHRONIC INFLAMMATION

Chronic inflammation is an entirely different matter. There is no swelling, redness, or pain. A different mechanism is at work.

Chronic inflammation may be caused by infections that don't go away, abnormal immune reactions to normal tissues or even to ingredients in your diet, or conditions such as obesity. It's almost as if your body turns on itself. Unlike acute inflammation, chronic inflammation does not recede.

With chronic inflammation, your immune system releases chemicals called cytokines. These are tiny proteins that serve as intercellular messengers. Cytokines are "good" when stimulating the immune system to fight a foreign pathogen or attack tumors. By contrast, some "bad" cytokines trigger your body's inflammatory response. This happens when too many cytokines are produced or are of a certain kind.

Examples of bad or pro-inflammatory cytokines are interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-alpha). Both are pro-inflammatory agents. More pro-inflammatory cytokines incite more



inflammation, keeping your body in a constant state of inflammation, leading to even more inflammation. No one knows exactly what triggers this storm of cytokines, but an overreactive immune response to a new virus, bacteria, or another substance foreign to the body is suspected to be the cause. Several food nutrients, including omega-3 fatty acids, reduce your production of pro-inflammatory cytokines.

INFLAMMATION – CAUSE OR SYMPTOM?

For decades, the conventional medical approach to inflammation was to treat it as a symptom. But now we know that inflammation is not a symptom but a cause of humankind's most challenging diseases. Evidence has been piling up that the more common chronic conditions—including Alzheimer's, cancer, arthritis, asthma, gout, psoriasis, anemia, Parkinson's disease, multiple sclerosis, diabetes, and depression—are indeed triggered by chronic inflammation. But it took

a couple of large-scale human trials to dispel any lingering doubt that chronic inflammation is killing people by degrees.

The first trial looking into this was conducted in 2007. It was a study that probed why exercise reduces the risk of cardiovascular disease as well as cholesterol-lowering statin drugs do.

To solve this mystery, scientists analyzed biomarkers in the blood of 27,055 women participating in a long-term study and other objective measures. They also wanted to know: How much of the exercise benefit had to do with improved blood pressure? To reduce body weight? Or to something else?

The women had donated blood in the 1990s when they entered the study, and it was frozen. Eleven years later, the researchers analyzed this frozen blood to see if they could find anything that correlated with long-term cardiovascular outcomes such as heart attack and stroke.

They were surprised to discover that the “something else” was reduced inflammation. It was the biggest protector against disease risk.

Ten years later, two cardiologists at Brigham and Women’s Hospital in Boston

published the results of a human clinical trial that forever changed the way people think about inflammation. The trial involved more than

INFLAMMATION AND EVOLUTION

Inflammation was important to survival throughout much of human history. This is because our ancient ancestors could break a leg while chasing down dinner or pick up a parasite from drinking river water. The inflammatory process kicked in by recruiting immune cells to fight the infection or injury. Inflammation was thus a built-in healing mechanism. Without it, there would be no humankind. It is – and was – an essential part of physiology that contributed to how ancient humans were able to survive in the past.

Many of the disease-causing factors now associated with chronic inflammation were rare among our ancient ancestors. But in modern times, we live in an inflammation-promoting environment in which hunting for food takes us to fast-food outlets. We are exposed to toxins and pollution. We don’t get enough exercise. That being so, the strong inflammatory responses that allowed our ancestors to survive and pass on their genes are now linked to the most serious diseases in the modern world including cognitive

10,000 patients in 39 countries. It was primarily designed to determine whether an anti-inflammatory drug (canakinumab), by itself, could reduce rates of cardiovascular disease without lowering levels of cholesterol at the same time as statin drugs do. The answer was yes.

But the researchers went further. They built into the trial additional tests to clarify what effect the same anti-inflammatory drug might have on illnesses unrelated to cardiovascular disease: arthritis, gout, and lung cancer. As it turned out, lung cancer mortality dropped by as much as 77 percent. Reports of arthritis and gout also fell significantly. Again, reduced inflammation was protective. Their findings proved that inflammation is the cause of disease, not a symptom. Case closed.

ENTER NEUROINFLAMMATION

Neuroinflammation is the process by which the brain becomes inflamed. This is usually triggered by an inflammatory challenge such as a poor diet, injury, infection, exposure to a toxin, neurodegenerative disease, or aging.

The brain possesses its own immune-type cells – the microglia. These normally sit around the brain in an inactive state, but if they are activated, then they begin to attack other cells, including nerve cells. This results in neuroinflammation.

Neuroinflammation isn't the type that makes your brain swollen, red, or sore—it's inflammation on a microscopic level – and largely a matter of microglial activation. Recall that their job is housekeeping under normal circumstances, namely removing damaged cells from the brain. However, these cells have no off switch, and when over-stimulated via chronic inflammation, they can create a self-perpetuating cycle of neuroinflammation that instigates brain cell damage, decreases brain function, and sets off familiar symptoms such as brain fog and depression.

In the presence of neuroinflammation, these housekeeping cells get lazy and don't clear away enough cellular debris and waste from the brain. Think of a messy room that gets messier by the day. Eventually, you can't find anything. That's what happens when the microglia slack off.

Chronic inflammation in the brain can even lead to neurodegenerative disorders such as cognitive impairment, Parkinson's, and Alzheimer's. Unlike the inflammation of an injury (that sprained ankle) or arthritis, brain inflammation doesn't cause pain because the brain has no pain receptors. But that doesn't mean that inflammation is not present. It's there for sure, and it's causing harm to your most vital organ. Some symptoms of neuroinflammation:

- Brain fog
- Chronic depression and other psychiatric disorders
- Low brain endurance (such as having a hard time reading for long periods)
- Slow mental speed and processing
- Lack of attentiveness
- Adverse reactions to environmental factors such as scents, chemicals, and pollutants

Yet all of what you have just read is not supposed to apply to the brain because the brain is walled off by the blood-brain barrier, that security system made up of tightly bound cells, including astrocytes. Its job is to ensure that unwelcome molecules and germs don't enter the brain where they can trigger inflammation and inflict cell damage while allowing certain vital substances in to help nourish the brain.

Should the blood-brain barrier be compromised, however, harmful substances can access the brain's fragile environment. Doctors call this "leaky brain syndrome." Once these substances enter the brain, they over-activate the microglia cells that cause neuroinflammation.

There's a reason the brain is protected by the blood-brain barrier and not the acute inflammatory response employed by the rest of the body. The brain is so sensitive that just a little inflammation can cause huge problems. This neuro-inflammatory response:

1. Shuts down energy production in brain cells, leading to mental fatigue, brain fog, and memory loss.
2. Slows down the firing between brain cells – the process by which you think.
3. Prevents the microglia from keeping the brain free of waste, debris, toxins, and beta-amyloid plaques.

Disrupts the function of neurotransmitters that are necessary for communication between nerve cells. A casualty of disrupted communication – damaged neurotransmitter signals between neurons – is all types of neurological disease: loss of brain function, slower thinking, mental decline, worsened motor skills, loss of memory, cell death, and, ultimately, long-term cognition damage.

It is generally accepted in today's world that neuroinflammation is a normal part of aging, though this is not true. Most people believe it's out of their control, and therefore, they can't do anything about it. But nothing could be further from the truth. There is a lot you can do about neuroinflammation, as you will discover in later chapters.

HOW DOES YOUR BRAIN BECOME INFLAMED IN THE FIRST PLACE?

If neuroinflammation is not inevitable as we age, what causes it? While it is a developing area of science, there is generally no disputing that several factors promote neuroinflammation. Briefly, they are:

Poor quality nutrition. Of all the organs in your body, the brain is the one most easily damaged by a poor diet – namely, one made up of

processed foods. Sadly, processed foods make up about 80 percent of our diet. We're living off factory-made food with very few nutrients.

Many processed foods in the U.S. contain harmful inflammatory substances, not only sugar but also artificial colors, chemical flavorings, and fake sweeteners. They're stabilized with toxic preservatives and then packaged in plastics linked to many chronic diseases, including Alzheimer's and other brain diseases.

Research tells us a poor, additive-laced diet may cause the loss of key structural and functional elements in the brain and a higher vulnerability to dementia. Your brain depends on protein, fats, carbohydrates, vitamins, minerals, and other nutrients, to keep its cells alive and functioning. These come from your diet. As a general rule, good nutrition for the body is good nutrition for the brain.

Drugs. Illegal and legal drugs, whether prescription or OTC, can do massive inflammatory damage to the brain. Drugs that inflict neuroinflammation include alcohol, painkillers, stimulants, marijuana, and cocaine.

Illegal drugs. Illegal drug use is a major problem. According to the CDC, about 50 percent of the population has used illegal drugs, and 12 percent are active users. The National Institute on Drug Abuse, part of the NIH, explains how drugs interfere with the normal operations of the brain:

Drugs interfere with the way neurons send, receive, and process signals via neurotransmitters. Some drugs, such as marijuana and heroin, can activate neurons because their chemical structure mimics that of a natural neurotransmitter in the body. This allows the drugs to attach to and activate the neurons. Although these drugs mimic the brain's chemicals, they don't activate neurons in the same way as a natural neurotransmitter, leading to abnormal messages being sent through the network.

Other drugs, such as amphetamine or cocaine, can cause the neurons to release abnormally large amounts of natural neurotransmitters or prevent the normal recycling of these brain chemicals by interfering with transporters. This, too, amplifies or disrupts the normal communication between neurons.

Some drugs like opioids also disrupt other parts of the brain, such as the brain stem, which controls basic functions critical to life, including heart rate, breathing, and sleeping. This interference explains why overdoses can cause depressed breathing and death.

PRESCRIPTION AND OVER-THE-COUNTER (OTC) DRUGS

As for prescribed and OTC drugs, there are two major classes of drugs that definitely do harm to this beautiful, amazing organ of ours:

Anticholinergic drugs. Anticholinergic drugs block the action of acetylcholine, an important neurotransmitter or a chemical messenger. It transfers signals between certain cells to affect how your body functions. Anticholinergics are used to treat a variety of conditions, including allergies, colds, depression, high blood pressure, and incontinence.

Neuroscientists have warned us for years about how bad these drugs are for the brain. And the studies keep accumulating. The latest was published in the highly regarded journal *Neurology* in 2020. The study emphasized that reducing exposure to drugs that interfere with the actions of acetylcholine could be an important step in reducing the risk of AD.

The researchers recruited 688 older people deemed “cognitively normal” at the start of the study. They were followed for a decade. There was neuropsychological testing to assess language, attention, executive function, and memory. In addition, each participant was analyzed for

exposure to anticholinergic drugs. One-third of the people in the study were taking anticholinergic drugs. In a nutshell, here are the conclusions in the authors' own words:

“Our results demonstrate that use of aCH [anticholinergic medication] in cognitively normal, highly educated, and healthy older adults is associated with increased risk of progression to MCI [mild cognitive impairment] and accelerated cognitive decline, which is exacerbated in the presence of AD [Alzheimer's disease] biomarkers.”

Many anticholinergic drugs are available over-the-counter, namely those used to treat cold symptoms and allergies. You may have taken some of these: Benadryl, Dramamine, or Unisom. Unfortunately, they are linked with cognitive impairment and an increased risk of dementia.

The first study that examined this was conducted in 2016 by researchers at the Indiana University School of Medicine. The researchers recruited 402 people, with average age of 73. Sixty of them were taking at least one medication with medium or high anticholinergic activity.

The researchers analyzed the results of memory and cognitive tests. They also assessed PET scans to measure brain metabolism and MRI scans to look at brain structure. The test results revealed that people taking anticholinergic drugs performed very poorly on short-term memory tests, as well as on some tests of executive function, including verbal reasoning, planning, and problem-solving.

Another study that included OTC anticholinergics found that you increase your risk of dementia by 54 percent by taking anticholinergics for 3 years or more. The researchers concluded that people aged 55 or over who had taken strong anticholinergics daily for at least three years had an almost 50 percent higher chance of developing dementia than people who had not taken these medications.

Benzodiazepines. Benzodiazepines increase the neurotransmitter gamma-aminobutyric acid (GABA). By doing so, these drugs produce a relaxing, sedative effect that works to relieve anxiety. Two of the best-known are Valium and Xanax. Physicians often prescribe these drugs for short-term use only for people who suffer from unusual anxiety, stress, or unprovoked anger or for people with bipolar disorder.

If you've ever taken a benzodiazepine or are taking one, beware. A French and Canadian study published by the journal *BMJ* suggests that benzodiazepine use may promote the development of dementia. In the study, the greater a person's cumulative dose of benzodiazepines, the higher his or her risk of Alzheimer's.

The researchers used a database maintained by the Quebec health insurance program. From it, they identified nearly 2,000 men and women over age 66 who had been diagnosed with Alzheimer's disease. They then randomly selected more than 7,000 others without Alzheimer's. Once the groups were designated, the researchers looked at their drug prescriptions during the five to six years preceding the Alzheimer's diagnosis. Here's what they discovered:

1. People who had taken a benzodiazepine for three months or less had about the same dementia risk as those who had never taken one.
2. People who had taken the drug for three to six months had a 32 percent chance of developing Alzheimer's disease.
3. People on the drug for more than six months had an 84 percent risk of developing the disease.

The type of drug taken also made a difference. People who were on a long-acting benzodiazepine like diazepam (Valium) and flurazepam (Dalmane) were at greater risk than those on a short-acting one like triazolam (Halcion), lorazepam (Ativan), alprazolam (Xanax), and temazepam (Restoril).

What is ironic about such findings is that these drugs are prescribed to treat insomnia and stress, both of which increase your risk of dementia. But by taking these drugs, you are possibly causing an even worse outcome by increasing the risk of the worst brain disease, Alzheimer's.

The AARP cautions against ten other drugs associated with memory loss that are widely used, particularly by seniors. This includes statins, antiseizure medications, antidepressants, narcotics, Parkinson's drugs, hypertension (beta-blockers) drugs, sleeping aids, incontinence drugs, and antihistamines.

Lifestyle. There are several lifestyle issues that promote neuroinflammation. These are covered later in the book. But they are:

1. Poor sleep
2. Physical inactivity
3. Lack of mental engagement
4. Stress
5. Lack of love and happiness

JUST TAKE A STEP

Knowing that neuroinflammation causes cognitive impairment and dementia may give you the extra push to stay—or get—on the brain health wagon. Caring for your precious brain is one of the smartest things you can do.

Start by thinking of your brain as the fanciest, high-performance dream car you can imagine, You know, like a Ferrari. You have to choose only high-quality, high-octane, and the cleanest fuel for optimized performance. You can't put salt water in the radiator or mud in the gas tank or forget to air the tires. Or else the Ferrari will gunk up and break down.

Your brain is a perfect biochemical machine that WANTS to run efficiently. So, to stop the march of cognitive impairment, Alzheimer's, and other dementias, we must make sweeping, intentional changes in how we eat and approach brain health. The program in this book, the BrainCare Diet "Add one/subtract one", is a natural strategy – not another drug with major side effects – offers the tools to help you make a difference in your brain health and in the health of those you love. It is a huge part of the solution.

CHAPTER 4

TAKE CONTROL OF YOUR BRAIN

With lifestyle - how we live our lives and care for our bodies and minds - you can enhance, even renew, your health and your brain power by taking charge of them through nutrition, exercise, and other preventive measures. Cells replace cells, tissues heal, and organs like the brain change to meet new biological demands. By giving your body a chance to heal and regenerate, even feel young again, you may even touch the limits of your lifespan, which scientists believe may be around 120 years.

All of this adds up to personal responsibility - the best “cure” we have for cognitive decline and for slowing the clock. As you help your body and mind do what it does best, realize that there are other forces at work that undermine that responsibility – forces in the food industry, pharmaceuticals, medicine, and even the government.

Please understand that this book and program are not out to bash these forces but rather to make you aware that our society, as it is today, does not lead us to eternal cognitive health. However, most of these forces have good intentions, and in their own way, they are trying to help people. But they have underlying interests and agendas, including profit motives, and these sometimes obscure the obvious – that prevention and lifestyle not only matter, but they also work. You really have to be a cultural rebel, taking the “road less traveled” to get on the path to eternal cognition.

CURATIVE CULTURE

There is no question that the U.S. has one of the best healthcare systems and pharmaceutical industries in the world. Advances in

medicines have been spectacular over the past 50 years, and the ability to extend lifespan is incredible.

Despite these strides, the world in which we live says, “There is a pill for that.” And most of us believe this, especially if we get sick. In fact, many people feel shortchanged if they go home without a prescription from their doctor. In addition, we’re reluctant to pay healthcare providers for advice that we can get free from our mothers and grandmothers (for example, eat plenty of fruits and vegetables, stay active, don’t smoke, and avoid alcohol). After our doctor hands us a prescription, we get the message that the appointment is over and it’s time to leave the office.

Further, we have an insurance industry not based on the prevention of illness through dietary/nutritional or lifestyle changes but based on handing out pills and treating symptoms. Our insurance industry is sickness-based rather than health-based.

This scenario describes the curative culture in which we live that medicine will solve our problems. But will it?

Not always. Consider two truisms:

20/80 rule. Most scientists agree that genetics determine about 20 percent of our wellness and health. But what makes up the balance – the other 80 percent? You and how you choose to live your life. Put another way, lifestyle choices determine about 80 percent of your well-being. As has been pointed out, nutritional choices are arguably the most important. Unfortunately, our curative culture has defaulted us completely to a “fix me” solution versus an “I can fix my body and brain with healthy choices.”

Human biochemistry. The body and brain have remarkable powers of regeneration, immunity, and natural protection from disease and functions with trillions of moving parts unmatched by any human invention. Isn’t all this worth taking care of? Of course, it is – and it is

within our control to do so – and achieve a disease-free state as long as possible.

Ignoring both truisms damages rather than strengthens our health. But once you acknowledge that ours is not a curative culture – with forces not looking after us or for real cures – you can begin to take control of your own health and cognitive destiny.

Let's take a brief look at some of the major impediments to cognitive health and how these forces have failed us, but more importantly, what you can do to rise above those failures and take your brain health into your own hands.

WHAT IS IN OUR FOODS?

We literally do not know, despite the fact that there is an ingredient list on all packaged foods. The ingredient list, however, can be incomplete, inaccurate, and misleading. But most importantly, it includes thousands of ingredients that have not been tested or approved. Here's the background.

Story of GRAS. The government became concerned about what was in our foods almost 70 years ago when Dwight D. Eisenhower was president. And so, the FDA started regulating our food ingredients with the Food Additives Amendment of 1958 and created a new designation called “GRAS,” or General Recognized As Safe. GRAS meant manufacturers could use these products or ingredients without testing, while certain other ingredients had to be tested to demonstrate their safety. In 1958, approximately 700 ingredients earned the GRAS designation. Back then, the food industry was simpler, and the GRAS designation probably worked, but not for long.

The 1958 Act contained a loophole that accepted common ingredients like vinegar and baking soda that were already widely used and known to be safe. The loophole was supposed to spare only the most time-tested substances from the rigors of pre-market approval.

Forty years later, this loophole got worse because, in 1997, the FDA introduced a new rule that allowed companies to decide for themselves what ingredients qualify as GRAS and to report those designations to the FDA—or not—on a voluntary basis. Over this time, about 1000 additional ingredients have been certified GRAS, and the rate is about 25 per year. The problem is GRAS has not kept up with the self-regulating food industry.



There have been advancements in food chemistry, the explosion of processed foods, changing consumer tastes and habits, and societal changes such as an “on the go” demand for foods. Gone are the families of the 1950s, where moms shopped for fresh foods and prepared dinners without having to worry about shelf life and other aspects of food as we know it today. More than 50 percent of meals are eaten away from home, and 80 percent of the foods we eat are processed. Plus, foods with only GRAS ingredients are rare.

The Ingredient List. One company that is attempting to map our ingredients has determined the following:

1. There are ~1 million unique foods in grocery stores, but once you eliminate private labels and duplication of foods

under different labels, the actual number is about a half million unique foods;

2. These foods list 4,037,513 ingredients;
3. Adjusting for misspellings, errors, synonyms, and duplications, it is estimated that this list of over 4 million ingredients is reduced to about 100,000 unique ingredients;
4. Importantly, this ingredient list does not even include where the other half of our foods come from – restaurants and other eating places out of home. In these places, there are no reporting requirements for nutrient facts or ingredients whatsoever. Thus, most likely, the actual number of unique ingredients is significantly larger than 100,000.

One hundred thousand ingredients are less scary than 4 million, but not when compared with the less than 2,000 GRAS ingredients. That means only 2 percent of our food ingredients have been tested, and the remaining 98 percent we just don't know. In fairness, food companies probably know their ingredients but just don't have to report their effect on human consumption.

What makes up the big gap in the ingredients list? Mostly, additives such as coloring, flavoring, preservatives, artificial ingredients, synthetic ingredients, binders, and emulsifiers – chemicals that make food look appetizing, have a good mouth feel, and taste great. But as even the FDA admits: "We simply do not have the information to vouch for the safety of many of these chemicals," Michael Taylor, the FDA's deputy commissioner for foods.

It is not realistic to think we can go back to the 1950's food supply. Less than 50 percent of meals are prepared at home, and less than 10 percent of these meals are made with "fresh ingredients," which means less than 5 percent of our foods have a connection to foods from 100 years ago. Even fruits and vegetables have been "bred" to have brighter colors, sweeter profiles, and last longer on the shelf. But we can at least

take action on what we choose to eat, which might reduce the unknown, as we will suggest in the BrainCare Program.

Hidden Ingredients. While we assume that the ingredients problem just evolved naturally and there is no nefarious activity of the food industry and government conspiracy, that might not be the case with “hidden ingredients.” Food companies can hide the true chemical profile of an ingredient by calling it by different names. The best example is sugar, which, when consumed in excess, clearly damages the brain. Alzheimer’s is often referred to as “type 3 diabetes.”

Can you guess how many ways there are to name sugar? According to the University of California at San Francisco, there are sixty-one terms for sugar, and most of those are not included in what is labeled as total sugar or added sugar. An analysis from WISEcode concluded that the UCSF number is low by more than 50 percent, and there are 159 sweeteners in our foods, of which 139 should be on the

INGREDIENTS GONE WILD: THE IMPOSSIBLE BURGER

Generally, it’s better to eat single-ingredient food – an apple, tomato, lettuce, a fillet of salmon, for example. Single-ingredient foods are unprocessed, free of chemical additives, and full of nutrients. It’s the kind of food our ancient ancestors ate exclusively for thousands of years. However, since processed foods came on the scene in the 20th century, our diets have shifted to multi-ingredient foods, which, though convenient, are potentially harmful to our health and loaded with inflammatory ingredients.

One of the latest entries into the multi-ingredient food mix is the Impossible Burger – a meatless burger that contains more than 20 ingredients. It is basically a soy burger, but the soy is “soy leghemoglobin,” or HEME. This additive is genetically engineered by adding soy protein to genetically engineered yeast. In other words, it is a GMO product. It enhances the flavor and color of the burger and makes it “bleed” like a beef burger does when cut, but it is the most controversial ingredient in the Impossible Burger.

For years, the maker of the Impossible Burger tried to get this GMO yeast approved as GRAS but was rejected by the FDA. Under political pressure, the FDA succumbed and allowed the company to sell its burgers without the GRAS indication and without the years of research to understand what GMO yeast does to our bodies and brains. Now soy leghemoglobin is viewed as a “healthy” plant alternative to beef, and HEME has joined the FDA’s list of dubious 99,000 food ingredients list.

nutrition fact panel as added sugar but are not always recorded unless you are a food chemist who would know that these names on the ingredient list mean sugar: carob syrup, buttered syrup, dextrin, evaporated cane, fruit juice, barley malt and many more. Yet, sugar is a major factor in poor cognition health.

A study by researchers at the Mayo Clinic concluded that seniors with high-sugar diets were four times more likely to develop mild cognition impairment. But if there are 61 ways or more to present sugar on the ingredient list, and most of these do not have to be included in the total or added sugar count, and considering that sugar inflames and damages your brain, how can you possibly control your sugar intake?

The hidden sugar issue opens a broader issue of the power of special interest groups to influence the composition of our foods and the narrative around them. The sugar industry literally got its hand in the cookie jar trying to deflect the damages of sugar and divert it to fats. One of the most blatant and disturbing examples involves the sugar lobby. In 2016, the Journal of the American Medical Association published a historical document review that exposed a massive conspiracy by the sugar lobby to shift the blame for a high risk of heart disease from sugar to fat.

In the 1960s, there was a surge of studies downplaying the role of sugar consumption in heart disease. In fact, the Sugar Association (then called Sugar Research Foundation) funded purpose-biased research naming dietary fat as the culprit of heart disease.

A researcher from the University of San Francisco dug up documents revealing that the Sugar Research Foundation paid scientists to do a 1967 literature review that ignored the role of sugar in heart disease. Those scientists were paid the equivalent of \$50,000 in today's currency for their valuable services. Lobby groups have deep pockets, and they are dipping into them to insert their policies into food production for their own gain, not to help the American public. Even

worse, these scientists blamed high fat, not sugar, which has led to two generations of the low-fat–high-carbohydrate diet promoted vigorously by the FDA, the National Institutes of Health, the American Heart Association, and the USDA, which may well have played an unintended role in the current epidemics of obesity, lipid abnormalities, type 2 diabetes, and metabolic syndrome.

Did our government purposely try to obfuscate the ingredients in our foods? Of course not. But trust is earned, and our government officials are bureaucrats, not scientists, with many competing forces bearing down on them. So why has the government failed to deliver responsible reporting? One of the biggest reasons has to do with the fact that our elected officials (politicians), who are driving policy, are in bed with lobbyists. Both are playing politics with our food. We just have to realize this reality, and if we want to protect our cognition, we have to gain control of what we eat. Luckily, with technology, this is now possible, and as you learn later, we are working with a company, WISEcode, to develop a consumer tool to evaluate foods for brain health. WISEcode is a technology company that has created the most extensive database of nutrients and ingredients to profile exactly what is in our foods. Quite simply, using the “code” can tell people what they need. A major effort of WISEcode is to create a “brain code” to help people evaluate what foods are good for their brains. See the Resources section for more information.

Nutrition Fact Panel. The Nutrient Fact Panel (NFP) can best be summed up in a “failure of good intention” story. Twenty-seven years old, the NFP was established in 1994 by the FDA to move from a “voluntary” system of reporting what is in the food to “required” information. There is one problem: the NFP lacks critical information and gives us less than 15 percent of the essential nutrients your brain needs.

Specifically, there are:

1. No information on amino acids, which make up 70 percent of our bodies beyond water;
2. Data on only 1 of 14 essential vitamins and only 3 of 14 essential minerals;
3. No information on the critically important omega 3 fats or on the less important omega 6 fats;
4. Limited information on fiber;
5. Lack of inclusion of inflammatory substances.

Bottom line: If you're looking for information on how you're feeding your brain – good or bad – you won't find it. The NFP is well-intentioned but worthless as a brain health tool.

Dr. Google. Consumers are in the dark, so they refer to “Dr. Google” for help. But that's problematic, too, because the internet is full of conflicting, confusing, and, most of the time, inaccurate information. The Pew Study estimates that 71 percent of online consumers use Google as a source of health information. This is good and bad. The good is that people are seeking the truth; the bad is that Google has about a 75 percent misinformation rate. So be very careful with Dr. Google.

DESIGNER FOODS

These are foods that have been modified to suit consumer demands – foods engineered to smell great, offer a pleasing mouthfeel, and irresistible flavor. Consumers love them, so who can blame the food industry for meeting this demand? The problem is that designer foods are generally not the best for our bodies and long-term cognitive health.

The Cereal Wars. For half a century, cereals delivered essential nutrients and were often fortified to provide a very high nutrient-dense meal. That all changed in the 1950's. Competing for consumer attention, the major food companies discovered that Americans valued sweet-tasting cereal over nutrient-dense products, so they loaded sugar

into cereals and removed various nutrients. Cereal sales boomed, feeding families with even more sugar. This trend further taught the food industry that manipulating foods for taste, mouth feel, and smell was more valuable than delivering foods that were good for you. This became a major fork in the road.

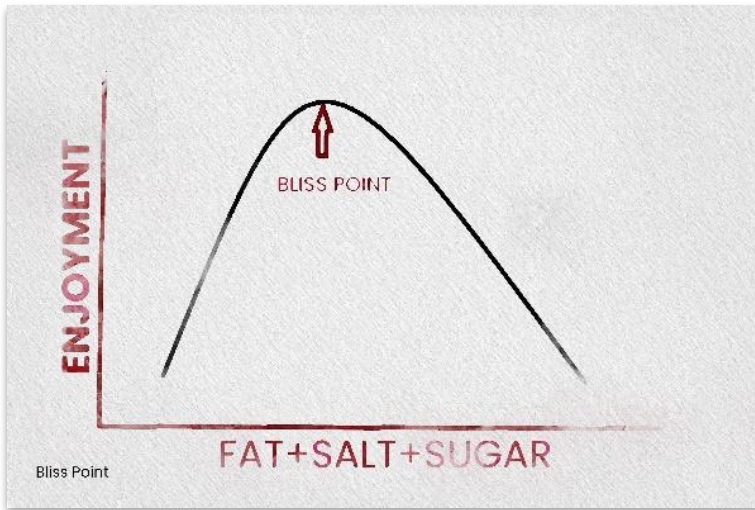
The Bliss Point. More than 50 years ago, nutrition scientists discovered something called the “bliss point,” forever changing the food industry and becoming the formula for modern food products.

The discovery started innocently enough. America was fighting the Vietnam War, and the Department of Defense (DOD) had a problem: the soldiers could not keep on weight. It was thought that the MRE (meals ready to eat) were so awful tasting that the soldiers were not getting enough calories. So, the DOD hired a few scientists from Harvard to help. They discovered that you could manipulate the sugar, salt, and fats in foods to create a taste that releases the pleasure-seeking neurotransmitter dopamine in the brain. Dopamine has the same addictive, craving effect on the body as cocaine has. In fact, it is so addictive that it sparks a desire to want more of these foods. This discovery became known as the bliss point – the perfect combination of sugar, salt, and bad fat to make foods addictive. MREs were modified. The soldiers ate more and gained weight.

The modification of foods using the bliss point, however, did not stop there. It was extended to the broad manufacturing of most processed foods. Virtually all these huge conglomerates of food manufacturers, beverage makers, restaurants, and marketers produce and aggressively push processed foods laden with sugar, salt, saturated fat, and calories. Since the 1970s, they have spent billions of dollars manipulating nutrition science and food policy and creating foods that are highly palatable and even addictive for our pleasure and their own gain, and it’s making America sick.

What occurred over the next five decades was an explosion of calorie consumption and processed foods modified to the bliss point and the golden age of foods. Not only do major food companies create foods designed to addict you, but they also produce processed foods that are laced with highly inflammatory ingredients known to harm the brain and lead to impairment of cognitive function.

The engineering of addictive food has also fueled the obesity crisis, the slow destruction of our bodies and minds, and chronic diseases, including dementia. The unintended consequence of this was a fattening up of the American population and an out-of-control growth in chronic diseases, including those involving cognitive decline. Arguably, no invention has done more damage to human health than the discovery of the bliss point.



Processed foods. Processed foods dominate our foods today, making up over 80 percent of our meals, and continue to gain market share every year. Processed foods do not necessarily mean bad foods; the definition of processed foods is a catch-all for any food that has undergone changes to its natural state, according to the USDA. So processed foods would

include simple oils like olive oil-fortified foods and highly processed foods.

The quality of foods starts to deteriorate when artificial items (such as coloring, preservatives, and flavorings) are added, or high-temperature cooking is involved, killing the underlying nutrients. You can't avoid processed foods completely, but being aware of how they are made and what goes into them can lead to better choices that support body and brain health.

For example, there are several culprits that are brain-damaging. Here's a rundown of the most pro-inflammatory substances and foods developed by the food industry:

High sodium. Processed foods laden with salt can elevate blood pressure. Uncontrolled blood pressure may break capillaries in the brain, forming clots and killing neurons. The result is an inability to think properly and recall information. Blood vessel damage in the brain is one of the causes of dementia.

Junk food. Foods like snacks, chips, and anything in a box or package jack up the production of dopamine, that feel-good brain chemical that increases cravings for these foods and motivates people to repeat the consumption of junk food because it feels good. Naturally, this behavior brings about obesity and obesity-related diseases like diabetes.

Certainly, there are lots of reasons to avoid obesity; now, add brain health to the list. Obesity is known to cause changes to the immune system, boosting inflammation in the body, including the brain. A study published in the *International Journal of Obesity* found that obesity works independently of other factors to cause a decline in thinking ability, especially memory and learning. It was the first major study to show that obesity alone might decrease brain power.

Trans fats. The brain needs natural fats to function properly. But man-made trans fats do more harm than good. They allow the formation of plaques in the arteries, leading to heart disease, Alzheimer's disease, and

other life-crushing illnesses. Plaques gradually choke off the passage of blood through the arteries, including those to the brain, restricting the oxygen and nutrient supply lines to neurons. Trans fats also generate a lot of neuroinflammation.

Further, they reduce levels of the feel-good neurotransmitter serotonin, which impairs memory. Foods that contain trans fats are processed pastries, fatty red meats, store-bought salad dressings, and whole milk, among others.

Trans fats were once the poster child of bad ingredients, but in 2015, the FDA banned their use. Companies had until 2018 to remove all trans fats. However, they still exist in foods under the name “hydrogenated vegetable oil.”

Bad oils. Many scientists contend certain vegetable oils are among the worst things you can eat because they promote inflammation. It used to be that these oils were promoted as healthy options because they are cholesterol-free, low in saturated fat, and come from plants.

But let’s be truthful: many do not exist in nature and require industrial methods and often chemical solvents to extract. Such oils are found in nearly every processed food in the grocery store—commercially baked goods, salad dressings, chips, snack foods, soups, fried foods, mayonnaise, and more. There is growing evidence that certain oils might encourage and allow the formation of plaques in the arteries, leading to heart disease, Alzheimer’s disease, and other life-crushing illnesses. Plaques gradually choke off the passage of blood through the arteries, including those to the brain, restricting the oxygen and nutrient supply lines to neurons. Ultimately, certain oils might generate neuroinflammation and reduce levels of the feel-good neurotransmitter serotonin, and this impairs memory.

Fried foods. Often sold in frozen foods and at fast-food establishments, fried foods contain high levels of saturated fats and cholesterol. Both elements are responsible for clots in the blood vessels of the brain. In

worst-case scenarios, this can lead to strokes. This does not mean you have to reject all fried foods, but caution is required.

Sugary products and simple carbohydrates. We have addressed that sugar is a “hidden ingredient” and critical ingredient for creating the bliss point. But there’s more. In 2012, researchers from the Mayo Clinic reported that seniors who ate a diet high in simple carbohydrates were nearly four times as likely to suffer mild cognitive impairment than those who did not consume as many carbs.

Why is this? Eating sugary products poses a triple threat to the brain in addition to the dopamine threat discussed above.

First, they promote insulin resistance, in which cells reject insulin. Because insulin helps brain cells take in glucose, insulin resistance prevents the brain from receiving the energy it needs to function properly, especially in learning and memory.

Second, simple carbohydrates such as pasta, bread, white rice, and sweets convert very quickly to sugar in the body. This produces high surges of energy in the brain. The body then must compensate by releasing lots of insulin to process that large amount of sugar. This action creates a steep drop of glucose in the bloodstream, which makes the brain unable to access fuel for functioning. These seesaw surges and depletions of energy can damage brain cells and even destroy them over the long term.

Third, high sugar consumption causes neuroinflammation that triggers the onset of cognitive impairment, Alzheimer’s disease, and other degenerative brain diseases.

When it comes to sugar in foods, be cautious. Packaged food is often marketed as “natural,” although there is no definition of this term. It is simply a word meant to lure you to buy the product. Examples of foods marketed this way are those that include added honey or fruit sugar (fructose), such as bars or cookies. Make no mistake: honey and fruit sugar are still sugar. Your body processes all sugar, whether highly

refined or not, in the same manner (except fructose sugar, which is the worst and can only be processed by your liver).

Many major food companies love to add fructose to foods because it is a cheap sweetener. But it is one of the worst and leads to obesity, diabetes, and heart disease. Cancer cells thrive, multiply, and spread with fructose as their energy source.

Excess fructose in the diet also interferes with proper brain function. It has also been shown to impair memory in rats. In addition, when the brain is exposed to fructose repeatedly, dopamine release is altered in a way that drives increased food intake and weight gain. You crave more food even though you don't need it for energy.

Artificial sweeteners. Many processed foods contain these fake sweeteners. Research shows that people who consume artificial sweeteners perform worse in memory, recall, and intelligence tests. Additionally, fake sweeteners have been linked to cancer.

Excitotoxins. You may be unfamiliar with this term, but these are food additives usually employed to enhance flavor. Examples include aspartame, MSG (Monosodium Glutamate), and hydrolyzed vegetable protein.

These and other excitotoxins alter the chemistry of the brain. They can over-stimulate or overexcite neurons to the point where they fire so rapidly and continuously that they become exhausted and die. Excessive excitotoxin levels can also cause neuroinflammation and throw neurotransmitter activity out of balance.

Also, studies in experimental animals show that some excitotoxins routinely added to processed food can damage the parts of the brain cell called the mitochondria (the energy center of the cell). This is an important finding because as we age, the mitochondria begin to lose their ability to effectively process fuel for cellular energy, leading to a cascade of events that cause neuroinflammation. Consuming excitotoxins may very well speed up this process.

As a result of such findings, some medical experts feel that excitotoxins are involved in the development of many different neurological diseases, including Parkinson's disease, seizures, and Alzheimer's disease.

Merging of Supplements and Foods. If you ask Americans what the difference between food is - processed foods, fortified foods, medical foods, and supplements - you would most likely get a very poor answer.

In fact, many foods are dietary supplements, not food – and people do not really know it. Some examples are Lean Body, Protein Milk, and Muscle Milk. Plus, many foods are fortified with synthetic nutrients, which, if put into a capsule or a pill, would be called a “dietary supplement.”

The supplement industry emerged for two reasons: 1) the 1994 DSHEA act allowed supplements to offer what Asian and American Indian medicine had been doing for thousands of years, and 2) because our foods were being stripped of nutrients.

Supplements generally try to give the body the nutrients that are lacking in our foods. A great example is the collagen market, now approaching 10 billion dollars in sales to people (mostly women) who want to postpone aging. Every collagen product is a supplement, whether it says so or not. You cannot consume collagen; you consume 4 amino acids (arginine, glycine, proline, and lysine), all of which give your body what it needs to produce collagen. These products give people an easy-to-obtain nutrient that may benefit skin, joints, and bones health.

So, when it comes to the food industry, the lack of good information and the proliferation of processed foods have damaged our ability to use nutrition as a first line of defense in guarding our health.

FEEDING THE WORLD BUT AT WHAT COST?

The U.S. agricultural industry – Big Ag – has led the world in innovation and productivity. Ag products are a major export, and Big Ag has had a major impact on helping feed the world and reducing worldwide food shortages. However, there are some costs to the way Big Ag operates, four of which are detrimental to our brain health:

1. Use of pesticides;
2. The advancement of GMOs;
3. The emphasis on grain production vs. fruits and vegetables;
4. The end of the US breadbasket, California's Central Valley.

Pesticides. Big Ag's ascension to world leadership has been at the mercy of the development of hundreds of chemicals, namely pesticides, which sadly do significant harm to the human brain. Chemicals like these are called “xenobiotics” - referring to a chemical compound (such as a drug, pesticide, or carcinogen) that is foreign to a living organism.

For proof, consider a startling fact: the increase in pesticide production parallels the growing prevalence of dementia! A major study published in 2014 in the prestigious Journal of the American Medical Association tied chemicals in pesticides with an increased risk of Alzheimer's disease. Although this study focused on DDT, now banned in the U.S., many harmful chemicals, including DDT, are allowed in other countries. Fifty percent of all fruits and vegetables are imported to the U.S., so we unknowingly consume brain-damaging chemicals from these foods. In fact, a French study showed that vineyard workers exposed to pesticides were 5 times more likely to have neurological issues.

According to WebMD, there are now 18,000 pesticides licensed in the U.S. They are highly dangerous to health. After all, pesticides are designed to kill plant invaders; they do so by affecting the nervous systems of insects. It stands to reason that pesticides do the same damage

to the human nervous system, of which the brain is the command center.

Published in 2020 in *Toxicology Letters*, researchers reviewed animal and human studies exploring the association between pesticide exposure, cognition, and dementia. They concluded that there is most definitely an association between exposure to neurotoxic pesticides and cognitive dysfunction, dementia, and Alzheimer's disease.

Big Ag's sins go beyond pesticides. The fertilizers used, the contamination of our water supplies, and many other farming practices are undermining the food chain.



GMOs. One controversial issue is GMOs, short for genetically modified organisms. According to the U.S. Department of Agriculture (USDA), GMO seeds are used to plant more than 90 percent of all corn, cotton, and soy grown in the U.S., which means that many foods you eat likely contain GMOs.

Is this harmful to health, and to the brain in particular? We don't know. Although most notable organizations and research suggest that GMO foods are safe and sustainable, some people claim otherwise. In a study published in the *Journal of Organic Systems* and reported in the

Doctor's Health Press, researchers discovered a link between many serious diseases and the increased use of genetically modified crops and the "Roundup" herbicide glyphosate. Some of these health conditions were strokes, high blood pressure, diabetes, autism, Alzheimer's and dementia, obesity, multiple sclerosis, Parkinson's disease, inflammatory bowel disease, and certain cancers, such as bladder, pancreas, kidney, liver, and thyroid.

That is a long catalog of health degenerative problems caused by these substances! Sadly, exactly what we are eating is not really known and circles back to the ingredient problem.

Grain Society. Since the 1930's Great Depression, grains began to take precedence over fruits and vegetables in our diets – a trend that started with the original U.S. Farm Bill.

For background, during the Depression, America's farmers were in dire straits. Crops and crop prices were severely eroded by drought, overproduction, and apocalyptic natural disasters in the form of massive grasshopper plagues and dust storms combined with reduced international demand.

After Franklin Delano Roosevelt took office in March of 1933, one of the first pieces of legislation he put forth was the Agricultural Adjustment Act (now known as the "Farm Bill"). The bill controlled the supply of seven staple crops — wheat, corn, cotton, rice, peanuts, tobacco, and milk — by paying farmers to take portions of their land out of farming or to plant alternate crops to reduce surplus and subsequently raise incomes for farmers, as well as to encourage soil conservation. The Farm Bill didn't end the Great Depression, but over the next 90 years, it certainly changed what crops America's farmers grew.

The early Farm Bill encouraged farmers to grow soil-conserving crops, such as legumes and grasses, and it also set guaranteed prices for the production of the staple crops controlled by the bill. Since

subsidized crops were less expensive to grow, farmers who participated in the bill reaped more profit than farmers who grew unsubsidized crops such as fruits and vegetables. The Farm Bill established the subsidy of three crops: wheat, corn, and soybeans at the expense of fruits and vegetables – a move that every session of Congress has reapproved.

Today, the effects of decades of subsidized crop production are clear. According to the U.S. Department of Agriculture, these three crops make up over 90 percent of all planted crops on U.S. farms, with severe reductions in brain-loving, nutrient-dense fruits and vegetables.

The primary reason behind this skewed production of healthy foods is that farmers who grow “specialty crops” such as fruits and vegetables don’t receive federal subsidies. You certainly can’t blame the farmers. After all, they will continue to grow what pays best. Until there are regulatory changes in the way America’s foods are grown, cheap, unhealthy foods will continue to dominate consumer food choices.

The Farm Bill creates an unfair playing field for America’s farmers — federal subsidies guarantee pay and lower the risk for farmers who plant commodity crops over fruits and vegetables. That’s not to say Americans can’t find healthy foods in supermarkets, but rather that the overwhelming majority of foods on supermarket shelves are high in ingredients from subsidized commodity crops that have flourished over the decades. This moves into our cheaply made junk foods, which dominate supermarket shelves.

The Twilight Years of America’s Bread Basket. America has been blessed with wonderful natural resources and one of the richest in the Central Valley of California, which has been America’s breadbasket. Except for citrus from Florida and apples from the Pacific Northwest, the Central Valley has produced over 90 percent of America’s fruits and vegetables. The Central Valley’s rich soil and ideal climate make it perfect for growing nutrient-dense foods. There is just one problem: we are killing the Central Valley as a food source.

For over one hundred years, America has been a net exporter of fruits and vegetables, but a few decades ago, this all changed. Today, we import about 50 percent of vegetables and 25 percent of fruits, and this is rapidly growing.

The most important reason for the coming end of the Central Valley is the fight for precious water between the California cities on the coast and the California farmers. California has lost 50 percent of its water by court order, while its population has doubled in the last couple of decades.

Other reasons include the fact that most farms in the state are barely breaking even, with the cost of wages, health care insurance for workers, unemployment insurance, and other factors. These costs cannot be passed off to consumers with higher prices for produce; consumers won't stand for it. They'd rather buy cheaper fruits and vegetables from overseas importers with questionable farming practices. The problem with these foods is that they are bred to survive thousands of miles to get to the U.S. – resulting in foods that look good but lack taste and nutrition.

The tech industry's growth has also disrupted the balance of the Central Valley. A Google worker in San Jose can earn 4 times more than other professions yet can't afford to live there. Thus, they are spilling over the hills into the Central Valley, and rich farmland is being paved over by developments and shopping, becoming an asphalt vista. And with it, fewer and fewer nutrient-dense fruits and vegetables to support good health.

FAILURE TO ESTABLISH A STANDARD OF CARE

Another alarming issue is that, in contrast to cancer or heart disease, no “standard of care” exists for treating cognitive issues or dementia. For background, standard of care refers to an appropriate treatment protocol a doctor follows for a patient with a certain set of

symptoms or a specific illness. Standards of care are established in a number of ways; sometimes, they are simply developed over time by physicians or medical organizations, and in other cases, they spring from the result of clinical trial findings.

Without a standard of care for cognitive decline or dementia, treatment remains elusive, misguided, and fragmented, with inappropriate medication use, emergency room visits, and unnecessary medical and surgical interventions. Patients can't get their questions answered, either. Sadly, too, there is little support for countless burdened caregivers, who could otherwise be spared from intense stress, depression, and other serious physical and psychological effects if a standard of care was in place.

Of the approximately 120 medical schools, fewer than 25 percent teach even one course in nutrition, much less any course in cognition as it relates to nutrition. Most doctors are dedicated, talented, and well trained, but medical education institutions have done a disservice in these areas.

As for patients with cognitive problems, many people remain undiagnosed, too. An Alzheimer's Association survey showed only 16 percent are asked about their memory by primary care doctors during annual physicals. Lack of care standards robs individuals and their families of the benefit of detecting such an important health issue.

Even physicians who treat cognitive issues and dementias know how heartbreaking it is when someone is diagnosed and started on available drugs, only to come back later and say: "What next? What can you do? I'm still declining."

The helplessness of knowing that there is no cure, no treatment, and no standard of care feels like watching the Titanic slowly sink with your loved one on board. And we're left to hope and pray that we do not develop dementia.

We desperately need a cure, a proven treatment, and an effective standard of care to wage the battle on our behalf and that of our loved ones. In light of this, we must take responsibility and realize that chronic diseases cannot be cured by medicine – they must be prevented.

CONTROL OF HEALTHCARE

Historically, there has never been a higher calling than becoming a physician or a nurse to help cure people of disease. According to most surveys, nurses and doctors are consistently ranked #1 and #2 as our nation's most trusted professionals. However, neither are in control of your health care. Bureaucrats are, with healthcare being controlled by tyrannical insurance companies. This control has led to the following trends:

1. The average physician visit lasts 7 minutes.
2. More than 90 percent of all physician visits result in a drug prescription being provided. Many of these drugs are potentially dangerous to cognition.
3. 50 percent of all Americans are on at least one drug.
4. Government bureaucrats now control about 50 percent of our 3.5 trillion dollars in spending and other health care insurers.

Health care in the U.S. is controlled by the Centers for Medicare & Medicaid Services (CMS). This government organization oversees 50 percent of all healthcare spending and tells providers what they can and can't do under Medicare and Medicaid. Other insurance companies follow CMS's lead in these areas, using CMS practices to approve or not approve medical procedures and drugs.

As a result, there are very sad stories around insurance approval of expenditures for dementia. One such story concerned a dementia patient whose condition had deteriorated so much that he could no longer walk. His health providers tried to get a wheelchair and hospital

bed from his insurance provider, the University of California Educational System, and were told “no.” They appealed and were then told to submit additional forms that would be presented to an exception committee – a process that might take 6 to 9 months. Sadly, this family bought a wheelchair and a hospital bed from their savings.

One of the saddest facts is that preventive care for cognitive impairment and dementia is rarely practiced, and in most cases, it is not reimbursable. Put another way, the one area known to halt or reverse cognition decline – nutrition - is not only ignored but discouraged by our medical system.



THE FALTERING SEARCH FOR A MEDICAL CURE

What about a prescription medication to halt cognitive decline? As previously noted, there is a prescription pill or drug in our society for practically everything, right? Not so good news here: despite many clinical trials that have tested various medications, no drug to treat cognitive decline has proven successful.

In fact, “Big Pharma” - the nickname given to the world’s pharmaceutical industry - has spent an astonishing billions of dollars on cognition research. Yet, we still have nothing that can slow down, let

alone stop these diseases. This leaves patients and their families in the hopeless position of waiting for pharmaceutical companies to discover something that works.

This may be a very long wait. More than 300 Alzheimer's drug trials have failed so far. In 2018, pharmaceutical giant Pfizer pulled out of Alzheimer's research altogether after spending billions on failed drug trials.

In 2020, researchers at Washington University announced that two drugs they had been investigating to prevent or slow Alzheimer's disease had fallen flat - ponezumab, made by Eli Lilly and Co., and gantenerumab, made by Roche and its U.S. affiliate, Genentech.

Both drugs were tested in people with a rare, inherited, early-onset form of Alzheimer's called dominantly inherited Alzheimer's disease. Such people experience declines in memory and thinking skills starting in their 50s, 40s, or even 30s. Neither drug worked.

Also, in 2020, another setback for dementia drugs occurred. Cambridge-based Biogen and a Japanese partner scrapped a clinical trial of a closely watched Alzheimer's drug candidate, aducanumab. An independent committee of outside experts assembled by the FDA to review the drug's merits gave it a thumbs down, noting that the clinical data did not show its effectiveness. Late-stage studies in 2019 determined there is less than a 20 percent chance the drug would succeed in slowing study patients' cognitive decline.

Yes, there are drugs currently approved for cognitive decline. According to the Alzheimer's Association, they include drugs formulated to slow down the progression of the disease. They are designed to work by attacking the underlying biology of the disease process. Their goal is to slow the loss of memory and thinking, as well as function, in people living with Alzheimer's disease, and include:

Aducanumab (Aduhelm™), an anti-amyloid antibody given intravenously. It is approved for early Alzheimer's disease, including

people living with mild cognitive impairment (MCI) or mild dementia due to Alzheimer's disease.

Lecanemab (Leqembi™), an anti-amyloid antibody intravenous (IV) infusion therapy approved for early Alzheimer's with confirmation of elevated beta-amyloid. Leqembi has been a very controversial drug approval because of 1) questions on its effectiveness and 2) how expensive its treatment is. It is not clear if medical insurance will reimburse the drug treatment.

The following drugs are prescribed to treat symptoms related to memory and thinking:

Cholinesterase inhibitors (Aricept®, Exelon®, Razadyne®) prevent the breakdown of acetylcholine, a chemical messenger important for memory and learning. These drugs support communication between nerve cells.

Glutamate regulators (Namenda®), prescribed to improve memory, attention, reason, language, and the ability to perform simple tasks. These drugs work by regulating the activity of glutamate, a chemical messenger involved in processing information.

Some drugs are combination treatments:

Cholinesterase inhibitor + glutamate regulator (Namzaric®), a combination of a cholinesterase inhibitor and a glutamate regulator.

Donepezil and memantine (Namzaric®), approved for moderate-to-severe Alzheimer's disease.

Despite the use of such drugs, none is a cure. Why? One main reason, cited by scientists in the know, is that the search for a cure has tunnel-visioned on a single hypothesis: the presence of amyloid plaques in the brain, as mentioned earlier. But we know from studies like the Religious Orders Study and others that people can still display remarkable mental clarity despite a brain full of amyloid plaques. Scientists have realized that we need a more diversified portfolio of

treatments because there are many paths by which someone develops dementia.

But until then, not a single drug – no long-hoped-for silver bullet - has been shown to slow the relentless progression of cognitive decline or dementia, and the research to find one continues to falter. The few drugs that have been approved only ease symptoms rather than altering the course of the disease, and their effects are temporary.

In all fairness, however, Big Pharma has developed remarkable drugs and treatments over the decades: vaccines to prevent polio, smallpox, and more recently, COVID-19; penicillin, which led the way to cure all sorts of bacterial infections; and insulin that has helped countless individuals with advanced diabetes; among others.

Unfortunately, these developments have been few and far between. Many other drugs have been developed for many other diseases. But they are not without frightening side effects. Have you ever watched a prescription drug commercial on television or looked at a drug ad in a magazine? If so, you know that long lists of side effects are rattled off or printed on the page. And some are very scary, right? Many of these drugs violate the most important principle in medicine – the Hippocratic Oath – “do not harm.”

Encouragingly, though, prevention is the greater prize in the long run – and we already have that in our grasp. So don’t think momentarily that you have no power because these forces are so powerful. You have the power to take charge of your health. These forces are relentless, but so are you.

CHAPTER 5

ESSENTIAL NUTRIENTS: THE PATH TO COGNITIVE ETERNITY

Overnight, the Hatzler family in Great Britain went from being happy to a family in crisis. Mom Sylvia, age 80, was losing her memory and slipping into dementia, as related on the website of the Alzheimer's Society. She was formally diagnosed with Alzheimer's in 2016 and prescribed various medications to slow down the disease. But those drugs did not stop or reverse her symptoms.

Sylvia's health continued to go downhill. She could no longer recognize her son Mark and other family members. She reached the point where she required 12-hour-a-day bedside assistance and once called the police, alleging that she had been kidnapped. Alarmed and worried, Mark decided they had to fight back before it was too late. He researched various diets that might help relieve her symptoms. He learned about how disease rates were much lower in Mediterranean countries. He copied those eating habits and upgraded his mother's nutrition.

Sylvia's new diet was loaded with foods known to be beneficial to brain health: blueberries, walnuts, broccoli, kale, spinach, sunflower seeds, green tea, oats, sweet potatoes, and dark chocolate. She also ate chicken and fish as protein sources. The beauty of this dietary approach is that it is high in brain- and body-protective antioxidants known to fight neuroinflammation and guard against damage to brain cells associated with dementia, as stated by the Alzheimer's Society. It was not so much the food she ate but what was inside it – the essential nutrients required by the brain.

She was eating a “nutrient-dense diet.” This term describes the amount of beneficial nutrients in a food in proportion to how many

calories it has (or its energy content). According to the National Institutes of Health and the U.S. Department of Health & Human Services, “nutrient-dense foods” provide a high amount of nutrients but have relatively few calories.

Many people do not eat this way, and their brain health suffers over time. They eat too few nutrient-dense foods and too many foods that harm the brain – excess sugar, bad fats, preservatives, artificial ingredients, and foods laced with inflammatory substances. But because of her nutritional changes, Sylvia’s health improved measurably. Best of all, her memory started to return. She became more alert and engaged. After just several months, she was back to her old self.

Sylvia’s miraculous case demonstrates a vital point: Although age is thought to be the biggest risk factor for cognitive decline, what we eat – not drugs, pills, or supplements - has the strongest influence on our brains and whether or not our faculties will decline over time.

Science backs this up, too: an article published by the American Academy of Neurology shared the outcome of a large study of nearly 28,000 people in 40 countries. The researchers followed them for an average of five years. The results revealed that participants with the healthiest diets were 24 percent less likely to experience a decline in cognition and memory than those with the least healthy diets.

The practical implications of this exciting study and others like it are obvious. It points to the need for a major re-editing of how we prevent and treat cognitive decline: increase the nutrients in our diets to enhance brain health and protect against dementia.

ESSENTIAL NUTRIENTS – LIFE TO HUMANS

Nutrients give life to humans. They are chemical compounds that the 35 trillion cells in the body require to operate, function, regenerate, and live. While there are hundreds of nutrients, there are two main categories: non-essential and essential. “Essential are” is just what it

means: essential to human life. Our bodies can't make them; we must get them from our food. We still need non-essential nutrients, and they can be made from essential nutrients.

According to scientific consensus, there are 40 essential nutrients, and we need them all. If we don't get all our essential nutrients daily, our cells can be damaged, exposing us to sickness, including dementia, and the body can be weakened.

These 40 essential nutrients include 14 vitamins, 14 minerals, 9 amino acids, 2 healthy omega fats, fiber (technically not a nutrient), and water. Our bodies are about 65 percent water, and once you exclude water, we comprise approximately 70 percent amino acids.

Nutrients are classified into macronutrients and micronutrients. Micronutrients differ from macronutrients (like carbohydrates, protein, and fat) because they are only necessary in tiny amounts. As Harvard Health Guide says, they are called micronutrients "because your body needs only tiny amounts. Yet failing to get even those small quantities virtually guarantees disease." Many micronutrients are essential nutrients, while others, like protein (amino acids) and fats, are macronutrients.

With the evolution of our foods over the past 70 years, more nutrients have been removed, while preservatives, artificial ingredients, sugar, and bad fats have been added to make our foods addictive and, thus, are often void of essential nutrients. This has led the supplement industry to "supplement our foods with nutrients in a pill" because our current foods are not nutrient-dense.

So, from its beauty to its astounding ability to perform, the brain demands proper nutrition and all the essential nutrients. Day after day, your foods are dismantled into nutrients, taken into the bloodstream, and carried to your brain and other organs. Once there, they replenish depleted nutrients, activate neuronal reactions, and, finally, become incorporated into the very fabric of your brain. This is

something to consider the next time you reach for a bag of potato chips! Your brain is what you eat.

If you minimize processed foods and maximize whole foods – those found in nature and brimming with nutrients - you gain control over your brain health, reduce neuroinflammation, and prevent cognitive decline. In short, you have a path to cognitive eternity – a sharp, healthy mind for the rest of your life – and that path is called nutrition.

ESSENTIAL NUTRIENTS AND YOUR BRAIN

Your brain is a hungry organ that needs many essential nutrients. They have healing effects on your brain and are used to maintain general cognitive health, reduce neuroinflammation, strengthen brain function, and protect your brain from damage.

Essential nutrients have the same purpose for our brains as they do for our bodies:

Brain and body functions. Essential nutrients are dissolved in our gut, transported into the bloodstream, and carried to cells, tissues, and organs. In the brain, the needed nutrients cross the brain-blood barrier, delivering the nutrients required for proper function.

Each nutrient contributes a different benefit, but they all work in concert. Without all the essential nutrients delivered daily, the brain operates poorly and, over time, can be damaged, potentially resulting in MCI and, ultimately, dementia.

Repair. Our body and brain are spectacular because they can repair themselves, regenerate, and stay healthy forever. But for these processes to happen, the cells must receive all the essential nutrients. Otherwise, the repair function does not occur, and brain disease can set in over time.

Anti-inflammatory functions. Many essential nutrients can fight inflammation, which is a root cause of many diseases, including

cognitive decline. As our body and brain become inflamed, it is more exposed to disease states like dementia.

Antioxidant functions. Many essential vitamins (and minerals) function as powerful antioxidants. As your brain ages, it gets tougher for neurons to protect themselves against rogue molecules called free radicals. The cells in your body spew out thousands of these devils every day. You're also exposed to them in your environment through tobacco smoke, indoor and outdoor air pollution, and even UV rays from sunlight. Processed foods generate high levels of free radicals in the body, too.

Free radicals in excess are toxic. The net result is “oxidative stress” or “oxidative damage.” It means that the pace of free radical production is faster than the antioxidants the body can create to fight them. The body's antioxidant defenses are thus overwhelmed, and tissue damage occurs, including in the brain.

Nutrients rescue and destroy or neutralize these free radicals so they can no longer exert their destructive power on cells, organs, and tissues. Without all the essential nutrients in play, the brain acts like Robin Hood. It starts robbing essential nutrients from one supply in the body and allocating them elsewhere. This can negatively affect some organs, increasing disease risk, including mood disorders, brain aging, and degenerative brain diseases. All organs need all the essential nutrients. You cannot choose certain nutrients and ignore others. Essential nutrients are like a symphony – you need all the instruments to produce beautiful harmony – the equivalence of brain health. Here is a closer look at all the essential nutrients.

ESSENTIAL VITAMINS

Every essential vitamin has a vital role in your brain health. Some are involved in producing neurotransmitters. Others protect brain cells

and guard against neuroinflammation. Still others affect your frame of mind, memory, and thinking.

Your brain requires 14 essential vitamins daily. Many are commonly known, such as vitamins C and D, but others are less well known but equally important for brain health.

The major problem for most people is not getting all their vitamins. You would need about 11 servings of different fruits and vegetables to get all your vitamins daily, but very few people eat that amount of fruits and vegetables. A lack of vitamins does not have an immediate effect, but it can hurt brain health over time.

In general, the essential vitamins 1) improve brain function, 2) guard and repair the brain, 3) reduce inflammation, and 4) fight oxidative stress to maintain brain health. The chart below summarizes the role of each essential vitamin in the health of your brain.

14 Essential Vitamins	Brain Function
Vitamin A	<ul style="list-style-type: none">○ Guards neuron cell health○ Regulates utilization of essential nutrients○ Protects against mitochondrial decay○ Reduces oxidative damage○ Protects against structural brain deformation, cognition deterioration, and loss of mental and emotional abilities
Vitamin C (ascorbic acid)	<ul style="list-style-type: none">○ Guards neuron cell health○ Synthesizes neurotransmitters○ Metabolizes dopamine and noradrenaline○ Boosts brain energy

- Slows brain aging and reduces the risk of impaired cognition
 - Supports the immune system and reduces chronic inflammation
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and loss of mental and emotional abilities
-

Vitamin D

- Guards neuron cell health
 - Regulates utilization of essential nutrients
 - Slows brain aging and reduces the risk of impaired cognition
 - Maintains nerve health
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and loss of mental and emotional abilities
-

Vitamin E (tocopherol)

- Guards neuron cell health
- Affects nerve membranes for growth and sending out signals
- Slows brain aging and reduces the risk of impaired cognition
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay
- Reduces oxidative damage

- Protects against structural brain deformation, cognition deterioration, and loss of mental and emotional abilities
-

Vitamin K
(naphthoquinones)

- Guards neuron cell health
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and loss of mental and emotional abilities
-

Vitamin B1 (thiamine)

- Guards neuron cell health
 - Affects nerve membranes for growth and sending out signals
 - Regulates utilization of essential nutrients
 - Boosts brain energy
 - Slows brain aging and reduces the risk of impaired cognition
 - Helps nerves and the brain communicate
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Vitamin B2 (riboflavin)

- Guards neuron cell health
- Synthesizes neurotransmitters

- Metabolizes dopamine and noradrenaline
 - Boosts brain energy
 - Slows brain aging and reduces the risk of impaired cognition
 - Prevents plaque build-up; eases certain headaches
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Vitamin B3 (niacin)

- Guards neuron cell health
 - Synthesizes neurotransmitters
 - Metabolizes dopamine and noradrenaline
 - Boosts brain energy
 - Slows brain aging and reduces the risk of impaired cognition
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-
- Guards neuron cell health
 - Regulates utilization of essential nutrients

Vitamin B5
(pantothenic acid)

- Slows brain aging and reduces the risk of impaired cognition
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Vitamin B6 (pyridoxine)

- Guards neuron cell health
 - Synthesizes neurotransmitters
 - Metabolizes dopamine and noradrenaline
 - Boosts brain energy
 - Slows the shrinkage of specific brain regions that are related to the development of Alzheimer's disease
 - Slows cognitive decline and reduces the progression of brain atrophy in people with mild cognitive issues
 - Slows brain shrinkage rate by 40%
 - Slows brain aging and reduces the risk of impaired cognition
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Vitamin B7 (biotin)

- Guards neuron cell health
- Regulates utilization of essential nutrients

- Slows brain aging and reduces the risk of impaired cognition
- Protects against mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

Vitamin B9
(folic acid, folate)

- Guards neuron cell health
- Synthesizes neurotransmitters
- Metabolizes dopamine and noradrenaline
- Slows the shrinkage of specific brain regions that are related to the development of Alzheimer's disease
- Slows cognitive decline and reduces the progression of brain atrophy in people with mild cognitive issues
- Slows brain shrinkage rate by 40%
- Slows brain aging and reduces the risk of impaired cognition
- Supports healthy cognition
- Helps preserve brain health, boosts mood
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

Vitamin B12
(cobalamin)

- Guards neuron cell health
- Synthesizes neurotransmitters
- Metabolizes dopamine and noradrenaline
- Boosts brain energy
- Slows the shrinkage of specific brain regions that are related to the development of Alzheimer's disease
- Slows cognitive decline and reduces the progression of brain atrophy in people with mild cognitive issues
- Slows brain shrinkage rate by 40%
- Slows brain aging and reduces the risk of impaired cognition
- Boosts mood
- Maintains nerve and blood health
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

Choline (Vitamin B4)

- Guards neuron cell health
- Synthesizes neurotransmitters
- Slows brain aging and reduces the risk of impaired cognition
- Metabolizes dopamine and noradrenaline
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay

- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

ESSENTIAL MINERALS

Derived from the soil and primarily absorbed from fruits and vegetables, essential minerals are Earth’s gift to humans and are another set of brain savers. Plants extract minerals from the soil, sun, water, and fertilizer (yes, we would not get our minerals without fertilizer) and embed them in the final food.

Fruits and vegetables grown in our grandparents and great-grandparents’ days were much richer in minerals (and vitamins) than most of us eat today. The reason for this alarming nutritional trend is soil depletion. Modern farming methods have stripped nutrients from the soil in which our food grows. Add the fact that processed foods make up more than 80 percent of our diet, and we risk deficiencies of essential minerals in our diets. The cost of these trends is the deterioration of brain health.

Your brain needs to obtain 14 essential minerals each day. Because minerals are micronutrients, you don’t need a large quantity of them. However, you require them all because they work harmoniously with the other essential nutrients to promote brain health. Below is a list of the essential minerals the brain requires for health and proper function.

14 Essential Minerals	Brain Function
Calcium	<ul style="list-style-type: none"> ○ Guards neuron cell health ○ Enhances brain function ○ Acts as a nerve cell messenger ○ Regulates neurotransmitters

- Controls nerve excitability
 - Regulates utilization of other essential nutrients
 - Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Magnesium

- Guards neuron cell health
 - Helps the nervous system function smoothly
 - Helps maintain psychological and nervous system function
 - Regulates utilization of essential nutrients
 - Conversion of B complex vitamins; promotes other nutrients working in the brain
 - Improves working and long-term memory
 - Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Manganese

- Guards neuron cell health
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay
- Protects against structural neuro deformation, cognition

deterioration, and the loss of mental and emotional abilities

Selenium

- Guards neuron cell health
 - Protects brain cells from oxidative damage
 - Maintains cognitive function with aging
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Chromium

- Guards neuron cell health
 - Regulates utilization of essential nutrients
 - Protects mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Iron

- Guards neuron cell health
- Contributes to normal cognitive function and the immune system
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay
- Protects against structural brain deformation, cognition

deterioration, and the loss of mental and emotional abilities

- Molybdenum
- Guards neuron cell health
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

- Zinc
- Guards neuron cell health
 - Supports normal learning, attention, and memory
 - Supports normal cognitive function with aging
 - Supports immune system; serves as an antioxidant
 - Promotes communication between neurons and hippocampus in the brain
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Protects against structural neuro deformation, cognition deterioration, and the loss of mental and emotional abilities
-

- Copper
- Guards neuron cell health
 - Promotes proper brain development
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay

- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Iodine

- Guards neuron cell health
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Sodium

- Guards neuron cell health
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Chloride

- Guards neuron cell health
 - Regulates utilization of essential nutrients
 - Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Potassium

- Guards neuron cell health
- Regulates utilization of essential nutrients

- Protects against mitochondrial decay
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

Phosphorus

- Guards neuron cell health
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

AMINO ACIDS

One of the most important groups of essential nutrients – amino acids - are also the least understood – and they are critical to brain health.

The protein you eat is dismantled into amino acids. Many of these amino acids are essential, meaning the human body can't manufacture them and needs to obtain them from foods. There are 20 amino acids, 9 of which are essential. Your brain requires all 20 amino acids to maintain good brain health and normal functioning. If you absorb the nine essential amino acids from food, your body can produce the other eleven amino acids.

Your brain thrives on amino acids for many functions: for neurotransmission that impacts mood, behavior, cognition, and focus; for repair and protection; and general brain cell health. The quality and bioavailability of amino acids varies tremendously. Below is a list of the nine essential amino acids and one conditional essential amino acid the brain requires for health and proper function.

9+ Essential Amino Acids

Brain Function

Tryptophan

- Guards neuron cell health
- Synthesizes neurotransmitters
- Metabolizes dopamine and noradrenaline
- Makes serotonin, which elevates mood, helps sleep, and improves behavior and cognition; reduces stress and headaches

Histidine

- Guards neuron cell health
- Regulates utilization of essential nutrients
- Protects against mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

Isoleucine

- Guards neuron cell health
- Helps brain muscle healing and repair
- Part of hemoglobin synthesis and regulate blood sugar and energy levels
- Stimulates anabolic (tissue-building function)
- Protects against mitochondrial decay
- Reduces oxidative damage

- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
- Leucine and valine constitute 70 percent of the AA in the body's protein

Leucine

- Guards neuron cell health
- Synthesizes protein
- Supports metabolism
- Regulates blood sugar and energy levels
- Promotes cell regeneration and tissue recovery
- Protects against mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

Lysine

- Guards neuron cell health
- Assists CNS against seizures
- Key building block for all proteins
- Helps form collagen and calcium
- Protects mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

- Methionine
- Guards neuron cell health
 - Reduces depression, inflammation, and muscle loss
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

- Phenylalanine
- Guards neuron cell health
 - Building block of tyrosine
 - Helps form adrenaline, which is converted into a brain chemical to promote mental alertness and memory and elevate moods
 - Suppresses appetite
 - Treats chronic pain, speech difficulties, and depression
 - Protects against mitochondrial decay
 - Reduces oxidative damage
 - Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities
-

- Threonine
- Guards neuron cell health
 - Supports CNS and immune functions
 - Helps synthesize glycine and serine
 - Speeds up healing from trauma

- Protects against mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

Valine

- Guards neuron cell health
- Supports nervous system and cognition function
- Protects muscles
- Regulates immune system
- Improves insomnia and nervousness
- Promotes muscle recovery, metabolism, and endurance
- Protects against mitochondrial decay
- Reduces oxidative damage
- Protects against structural brain deformation, cognition deterioration, and the loss of mental and emotional abilities

Tyrosine
(conditional essential amino acid)

- Promotes cell health
- Synthesizes neurotransmitters
- Metabolizes dopamine and noradrenaline within Central Nervous System (CNS)
- Makes norepinephrine and epinephrine, which helps nerves transmit signals and maintains blood pressure

- Helps reduce stress on aged, tired brains and bodies
- Improves mental alertness, mood
- Produces hormones for metabolism, mental health, skin/hair health and human growth



ESSENTIAL FATTY ACIDS

Your brain thrives on essential fatty acids because they enhance and maintain its health. There are only two essential fatty acids: omega-3 and omega-6 fatty acids.

Omega-3 fatty acids are a family of fats that occur naturally in food, mainly fatty fish. There are three types of omega-3. Two of them, in particular, are important components of a brain-healthy diet: eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

The third type of omega-3 is a-linolenic acid (ALA), mainly plant-derived. Found in walnuts, canola oil, chia seeds, flaxseeds, and other vegetables, ALA is valuable to the extent your body can convert it into EPA/DHA. Still, its conversion rate is less than 10 percent.

When foods highlight their omega-3 content on the packaging, it does not reveal how much EPA/DHA you are getting. Although there is no RDA for omega-3 fats, the best science says you need about 1 gram of EPA/DHA daily. For reference, a fillet of salmon has about 1.7 grams.

Why are these fatty acids good for your brain, and why should you obtain them from your diet? There are many reasons, but one of the most obvious is that our brain cells use them to construct their cell walls. They also support neurotransmitter function, facilitate communication between brain cells, fight neuroinflammation, keep the brain young, improve mental concentration, fight memory loss, and enhance mental health. Our bodies do a poor job of making these fats on their own. We must obtain them from food to maintain good brain health.

In 2006, a very important study (the Framingham Study) tied the omega-3 fat DHA to a 47 percent lower risk of dementia and a 39 percent lower risk of Alzheimer's. The therapeutic amount omega-3 was relatively small, just 0.18 grams of DHA daily and three servings of fish a week.

This study confirmed many scientists' belief that your brain loves omega-3 fatty acids. They slow brain aging and reduce the risk of impaired cognition by reducing the effect of forming amyloid proteins.

In a 2014 study published in *Neurology*, researchers found that postmenopausal women with higher levels of EPA in their blood also had larger brain volumes – a sign of good brain health and cognitive strength. Smaller brain volume has been linked to Alzheimer's disease.

Other studies have suggested that omega-3 fats may improve brain function in people with milder brain conditions like mild cognitive impairment (MCI). Unfortunately, up to 75 percent of Americans are not getting enough omega-3 fats, and nearly one out of every three children is deficient in this essential fat, which is required by their developing brains.

Another type of omega fat is the omega-6 fat, which is also part of cell membranes. A problem with this fat is that we consume too much of it, which results in inflammation. A healthy ratio of omega-6 to omega-3 fatty acids is between 1-to-1 and 4-to-1, but studies suggest that people who follow a typical Western diet may consume a ratio of between 15-to-1 and almost 17-to-1, or as much as 15x too much omega-6 versus omega-3.

ESSENTIAL FIBER

Also called “roughage,” fiber is the indigestible portion of plant foods that keeps the digestive system healthy, controls weight, and ushers toxins from the body. There are two categories of fiber: soluble and insoluble. Although they’re sometimes found in the same foods, they play different bodily roles. Insoluble fiber adds bulk to waste in the digestive system and thus helps keep you regular and prevents constipation. Soluble fiber absorbs water to form a gel-like substance inside the digestive system. This fiber helps soften stool so it can easily pass through the digestive tract. It also binds to substances like cholesterol and sugar, preventing or slowing their absorption into the blood. It also helps with various brain functions.

Fiber is important to brain health because of the “gut-brain axis.” This describes the communication network that connects your gut and

ESSENTIAL NUTRIENTS BY FUNCTION
<p>Brain health and cell regeneration All essential nutrients</p>
<p>Antioxidant/anti-inflammatory Omega 3 fatty acids B-Complex [B-1, B-2, B-3, B-5, B-6, B-7, B-9, B-12] Choline Vitamin E Vitamin C Vitamin A Vitamin D Vitamin K Selenium Chromium</p>
<p>Neurotransmission Vitamin B-1 Vitamin B-2 Vitamin B-3 Vitamin B-6 Vitamin B-9 Vitamin B-12 Choline Vitamin C Vitamin E Tyrosine Tryptophan Calcium Fiber Zinc</p>

brain. Your gut contains 500 million neurons connected to your brain through nerves in your nervous system. For this reason, your gut is sometimes called your “second brain.”

Your gut has trillions of microbes that affect brain functions like immunity, appetite, the strength of the blood-brain barrier, and the production of chemicals that impact cognition, mood, stress, depression, inflammation, and toxins. Research shows that a high-fiber diet, in general, can reduce inflammation of the microglia - one of the causes of cognitive decline as we age.

Your gut and brain are connected through neurotransmitters, too. Most of the feel-good neurotransmitter, serotonin, is produced in your gut!

The gut is populated with friendly bacteria called probiotics, which affect brain health, so supporting that bacteria may help your brain. High-fiber foods such as whole grains, nuts, seeds, fruits, and vegetables all contain important fibers called prebiotics that feed your gut bacteria to help it thrive.

A healthful diet contains a mix of both soluble and insoluble fiber. Thus, you must eat fiber daily to support the gut-brain axis. The USDA guidelines are at least 25 grams per day, but the average consumption is much less – around an average of 16 grams daily, according to the USDA.

It helps to get more thoughtful about your food and the essential nutrients it contains. These nutrients pave the way to eternal cognition.

**ESSENTIAL NUTRIENTS
BY FUNCTION (CONT.)**

Memory/cognition/focus

- Vitamin B-1
- Vitamin B-2
- Vitamin B-3
- Vitamin B-5
- Vitamin B-6
- Vitamin B-7
- Vitamin B-9
- Vitamin B-12
- Choline
- Vitamin D
- Calcium
- Magnesium
- Manganese
- Selenium
- Iron
- Molybdenum
- Zinc
- Potassium
- Omega 3
- Omega 6
- Fiber

CHAPTER 6

BEYOND THE ESSENTIALS

SPECIAL NUTRIENTS THAT MAY REVERSE BRAIN AGING

When interviewed many years ago to name three wishes, the famed novelist and scientist Isaac Asimov answered: to live so happily that no one would mourn his passing, to leave this world knowing that civilization would survive into the 21st century and beyond, and finally, not to outlive his intelligence – that is to remain productive and quick-witted to the end, without any loss of cognition.

Like Asimov, most of us feel the same way and desire to avoid mental decline later in life, hoping not to become among the statistics of those suffering from some degree of cognitive impairment.

And, as it has been made clear throughout this book, there's nothing to say we must. With the 40 essential nutrients leading the way to cognitive eternity, many cases of cognitive decline can be prevented or reversed.

If a contest was held for the most promising brain nutrients of our time, the prize might be awarded to these brain-protective superstars.

PHOSPHATIDYLSERINE (PS)

Maybe you've heard of phosphatidylserine? Most people haven't, but it's present in every single human cell and is a key building block for the billions of cells in your brain.

Technically, phosphatidylserine is a fatty substance called a phospholipid. It envelops and protects the cells in your brain and carries

messages between them. It helps keep your mind and memory sharp and is involved in neurogenesis, generating new neurons.

Studies suggest that the level of this substance in the brain steadily declines with age. Fortunately, we can challenge this inevitability through something as simple as diet. By restoring healthy PS levels in the brain, good things happen. Cognitive performance improves. So does short- and long-term memory and mood, as well as creating new memories and retrieving old ones. The progression to dementia may even come to a standstill and, quite possibly, reverse itself. Even the FDA, which does not normally make claims, says: “Consumption of phosphatidylserine may reduce the risk of dementia in the elderly.”

Other feats of phosphatidylserine include better learning and recall, greater attention and concentration, improved problem-solving and reasoning, and sharper communication skills.

The body produces phosphatidylserine, but we get most of our intake from food. Good sources are organ meats, white beans, soybeans, and fish such as mackerel and herring.

Also important: Phosphatidylserine works synergistically with the omega-3 fatty acids to provide the building blocks for healthy cell membranes.

ALPHA-GLYCERYL PHOSPHORYLCHOLINE (ALPHA-GPC)

Alpha-GPC is another phospholipid that occurs naturally in the brain and is essential for brain health. It is a building block of acetylcholine, a neurotransmitter involved with memory and cognition. Alpha-GPC can cross the blood-brain barrier, entering the brain to increase acetylcholine.

Alpha-GPC is also beneficial in treating vascular dementia. This is the second most common type of dementia, caused by a lack of blood

flow to the brain that leaves pockets of dead brain cells. Vascular dementia can happen as you age and can be caused by a stroke or a series of strokes.

In Europe, alpha-GPC has been developed as a prescription drug for Alzheimer's disease. And no wonder. A wealth of research on this compound supports a role in enhancing cognitive function. In research, patients with dementia experienced an improvement in standardized cognitive tests after taking Alpha-GPC. The tangible benefits of taking Alpha-GPC are improved memory, better moods, and greater mental stamina, energy, and recovery.

Alpha-GPC is found in trace amounts in eggs, chicken, soy, and liver. Most food sources, however, do not contain a great deal of Alpha-GPC. An egg, for example, has just over 100 milligrams; beef liver (though not a popular diet choice) has 400 milligrams. A cup of lima beans contains 70 milligrams. Unless you eat a lot of organic meats, and most people don't, diets are light on this nutrient.

For brain health, most experts, using data from studies, recommend a minimum of Alpha-GPC of 300 to 600 milligrams daily to a maximum of 1.2 grams.

POLYPHENOLS

Among the most powerful brain nutrients is a class of compounds called polyphenols, which are naturally found in fruits, vegetables, spices, and tea. More than 8,000 polyphenolic compounds of plant origin have been identified, many of which have been widely studied and recognized for their brain-protective properties. One of their most healing qualities is reducing pro-inflammatory cytokines in your body and brain.

Although polyphenols have long been known to be important to the body, more recent studies have concluded they are also critical for brain health. A 2018 published study noted that “polyphenols exhibit a

strong potential to promote brain health due to their efficacy in protecting neurons against oxidative stress-induced injury, suppressing neuroinflammation and in ameliorating cardiovascular risk factor control and cardiovascular function thus counteracting neurotoxicity and neurodegeneration.”

An earlier study published in *Neurotoxicity Research* concluded similar importance of polyphenols and brain health:

Compelling evidence has shown that dietary phytochemicals, particularly polyphenols, have properties that may suppress neuroinflammation and prevent toxic and degenerative effects in the brain. The mechanisms by which polyphenols exert their action are not fully understood. Still, it is clear that they have a direct effect through their antioxidant activities. Polyphenols also interact with a range of neurotransmitters, illustrating that these compounds can promote their health benefits in the brain through direct, indirect, or complex action.



Green tea and other substances are high in polyphenols that fight these cytokines. One of these polyphenols is epigallocatechin gallate (EGCG), a constituent of green tea and curcumin found in the turmeric plant, which is tightly tied to higher cognitive function, better mood, and protection against various brain diseases. A study of elderly Asians found that consuming turmeric from curry improved their cognitive function compared to those who rarely ate curry. Scientists believe that

the widespread use of turmeric in India contributes to the low incidence of Alzheimer's disease in that country.

A similar study found that people in Japan who frequently drank green tea, compared to those who rarely drank it, were less likely to develop cognitive impairment. This finding may explain the low prevalence of brain diseases in Japan. Scientists know from other research that polyphenols:

1. Stimulate neurogenesis;
2. Protect neurons against injury induced by neurotoxins (these are damaging agents found in the environment, cosmetics, and food and include substances such as mercury, lead, acrylamide found in potato chips and French fries, and fake sweeteners);
3. Promote memory, learning, and cognitive function;
4. Suppress neuroinflammation.

Polyphenols work these wonders because of their special brain-boosting properties:

Antioxidant power. As your brain ages, it gets tougher for neurons to protect themselves against free radicals and oxidative stress. Fortunately, antioxidants help get these problems under control. In addition to well-known nutrients such as vitamin C, beta-carotene, and selenium, polyphenols are powerful antioxidants, especially a sub-class called flavonoids.

Almost all fruits, vegetables, and herbs contain flavonoids, which have been found to have many health benefits, including reducing inflammation, increasing blood flow, and fighting free radicals. Studies suggest that these miracle workers slow aging in the brain, increase the number of connections between neurons, and disrupt the development of brain-clogging amyloid plaques.

Foods high in flavonoids include berries, leafy greens, colorful vegetables, red apples with skin, coffee, dark chocolate, onions and scallions, broccoli, and citrus fruits.

Microglial Protection. Researchers have also discovered that polyphenols are helpful to the brain's microglial cells. As explained earlier, microglial cells are the brain's "housekeeper." They clean up messy neurons and engulf and destroy waste, toxins, and protein collections, including amyloid plaques, from the brain. Microglial cells also play an important role in neuroplasticity. If the microglia are inflamed, they go on strike and do not do their housekeeping duties. Thus, it is critical to keep the microglia healthy, and the most important nutrients are polyphenols, fiber, and a micronutrient called BCP (see below).

Researchers at the Human Nutrition Research Center on Aging at Tufts University reviewed cellular, animal, and human studies on berries and the aging brain. They found overwhelming proof that flavonoid-rich blueberries, blackberries, strawberries, and other berries protect microglial cells, preventing neuroinflammation and improving cognition.

There is no recommended amount of polyphenols daily, but many studies have concluded we need at least 300 milligrams a day. Here is a list of food sources of polyphenols:

- Blueberries: 535 mg per 1/2 cup
- Black/red/strawberries: 160 mg per 1/2 cup
- Clove: 542 mg per ounce
- Peppermint: 427 mg per ounce
- Oregano, sage, thyme rosemary, celery seed: >30 mg per ounce
- Cocoa Powder: 516 mg per tablespoon
- Dark Chocolate: 249 mg per tablespoon
- Almonds: 53 mg per one ounce

- Pecans, hazelnuts: 140 mg per one ounce
- Chestnuts: 347 mg per one ounce
- Flaxseeds: 229 mg per tablespoon
- Artichoke: 260 mg
- Spinach: 40 grams per cup
- Black Olives: 113 mg per 5
- Green Olives: 70 mg per 5
- Coffee: 35 mg per brewed cup
- Green tea (depends on tea): 51 to 500 mg per cup
- Black tea (Darjeeling): up to 50 mg per cup

QUERCETIN

One flavonoid that stands out is quercetin, which is found in fruits, vegetables, herbs, teas, and red wine. It is the most abundant flavonoid in the diet.

Quercetin is a powerful antioxidant for reducing neuroinflammation and preventing degenerative brain disorders. One of the ways it does this is by counteracting the oxidative stress that can be so destructive to cells.

Research hints that quercetin's antioxidant power may help guard against degenerative brain disorders, such as Alzheimer's disease and dementia. In one study, researchers injected quercetin into mice with Alzheimer's disease every 2 days for 3 months. By the end of the study, the injections had reversed several markers of Alzheimer's, and the mice performed much better on learning tests.

Quercetin also appears to reduce beta-amyloid formation and improve neurotransmitter function. This flavonoid may keep your brain operating better and younger. The National Institutes of Health (NIH) advises that we get an average daily intake of 10 to 100 milligrams, but virtually no one gets enough, probably due to poor diet.

HESPERIDIN

Hesperidin is a plant chemical classified as a flavonoid. It works as an antioxidant to reduce neuroinflammation. It increases blood flow to the brain, thereby enhancing cognition and memory – possibly helping protect the brain against trauma and dementia. An important paper published in 2019 in *Molecules* backs this up. The researchers concluded that hesperidin “can significantly improve cerebral blood flow, cognition, and memory performance.”

Found mostly in citrus fruits, hesperidin also has been shown to calm the brain by reducing anxiety and panic attacks.

BETA-CARYOPHYLLENE (BCP)

BCP is a nutrient in more than 1,000 plants and is considered GRAS by the FDA. It is quite concentrated in various essential oils: clove (over 95 percent concentration), bayberry (89 percent), black pepper (80 percent), copaifera bark (57 percent), thumbai (50 percent), and hemp (35 percent).

BCP is a relative newcomer on the brain-nutrition scene. However, research in mice shows it might provide an extra edge in improving cognition. Studies indicate that BCP:

1. Improves memory
2. Reduces microglial inflammation
3. Prevents oxidative stress
4. Reduces inflammatory cytokines
5. Boosts energy
6. Decreases plaque
7. Improves neuronal structure and neurotransmission connections

Experiments with mice are one thing, but what about studies in humans who want to stay sharp in the years ahead? There is promising

news on this front. One study involved 30 seniors who took one dose of BCP daily for 8 weeks. At the end of the study, the participants experienced significant improvement in the following areas:

1. Improved reasoning >70 percent
2. Better concentration >60 percent
3. Sharper memory > 70 percent
4. Improved attention and focus >50 percent

This study also found that BCP may prevent some neurological damage from occurring. Early signs of Alzheimer's disease in the participants improved by 60 to 70 percent.

One reason that BCP appears to be so effective is that it can cross the blood-brain barrier and, therefore, can directly reduce neuroinflammation. Once it obtains access to the brain, it works directly on the microglial cells so that they do a better job cleaning the brain of debris for better function.

BCP also improves the function of astrocytes, those star-shaped cells that repair damage in the brain and nervous system, plus compose and maintain the structure of the blood-brain barrier.

This simple oil found in nature promises to create a measurably keener mind as people age.

ACETYL L-CARNITINE

Acetyl L-carnitine is an amino acid made from L-carnitine, a generic term for several compounds (including acetyl-L-carnitine) that help produce energy to fuel the body. Although the body can produce this nutrient by itself, it relies on food sources to meet its requirements. The richest source is meat, but this can be problematic for people who are vegetarians or vegans.

With its ability to cross the blood-brain barrier, acetyl-L-carnitine addresses several issues related to the aging process, most

notably memory and brain function. It is an antioxidant that increases focus, enhances cognition, fights mental fatigue, and protects mitochondrial health. Some physicians prescribe high doses (1500 to 3000 milligrams) for patients with Alzheimer's. For MCI, smaller doses are recommended.

ALPHA LIPOIC ACID (ALA)

In every cell, where it assists in energy production, alpha lipoic acid is another important antioxidant found in many foods, including yeast, spinach, potatoes, broccoli, and organ meats. Interrupting free radical damage on several levels, alpha lipoic acid reduces neuroinflammation and may protect brain cells from conditions such as stroke and Alzheimer's.

In one clinical trial, Alzheimer's patients who took a combination of 600 milligrams of ALA with omega-3 fatty acids for one year showed less cognitive and functional decline.

One of the other important functions of alpha lipoic acid is its ability to restore and maintain glutathione levels. Glutathione is a vital antioxidant that detoxifies dangerous toxins in the body, protects the immune system, and regenerates other antioxidants.

Together, alpha lipoic acid and glutathione are a powerful pair. Alpha lipoic acid binds with excess mercury, copper, iron, lead, and cadmium, preventing these metals from building up in the body. This action is important because it reduces the workload of glutathione in heavy metal removal. Both antioxidants deliver a double whammy against free radicals and oxidative stress.

These benefits make alpha lipoic acid a key nutrient in preserving brain function and repairing a damaged or injured brain.

COENZYME Q-10

Coenzyme Q10, or CoQ10, is a vitamin-like compound that helps generate energy in your cells. Your body manufactures CoQ10 naturally, but its production tends to fall off with age.

The primary function of CoQ10 is to improve the function of mitochondria. These are the main power factories of cells, including brain cells. Mitochondrial function begins to decline with age. Full mitochondrial dysfunction can lead to the death of brain cells and diseases such as Alzheimer's and Parkinson's.

This nutrient is another very powerful antioxidant. These nutrients are important because the brain is susceptible to oxidative damage due to its high fatty acid content and oxygen demand. This oxidative damage can affect memory, cognition, and physical functions. Because it can target brain cells, CoQ10 may reduce these harmful compounds, possibly slowing the progression of Alzheimer's and Parkinson's disease.

CoQ10 has also been found to reduce brain plaques and increase mental focus. It is made naturally by the body but is also available from fish, nuts, and meat. Nutrients like these listed can help prevent cognitive decline and support overall brain health. The healthiest strategy is to follow a diet that supplies plenty of high-quality, nutrient-dense foods. And remember that cognitive decline in late life is the exception, not the rule.

BRAIN PROTECTIVE NUTRIENTS BY FUNCTION

Brain Health and Cell Regeneration

All brain-protective nutrients

Antioxidant/ Anti-Inflammatory

Polyphenols
BCP
Quercetin
Acetyl L-carnitine
Alpha lipoic acid
Hesperidin

Neurotransmission

Alpha-GPC

Memory/Cognition/Focus

Phosphatidylserine (PS)
Polyphenols
BCP
Acetyl L-carnitine
Alpha lipoic acid
Coenzyme Q-10
Alpha-GPC
Hesperidin

CHAPTER 7

THE SIX PILLARS OF BRILLIANCE™: A LIFESTYLE ROADMAP TO HEALTH

As pointed out, a nutrient-dense diet is the number-one foundation, or “pillar,” of brain health and protection. Nutrients positively affect brain performance, from thinking to remembering to processing the huge input of information from all directions. The right nutrients enormously impact your mental capabilities and long-term cognitive health.

Although nutrition might be the most important lifestyle pillar to promote long-term brain health, there is strong scientific evidence that there are five other pillars that support the brain. They work individually and harmoniously to protect your brain and keep it young. With nutrition as the primary pillar, here is a look at the other five – all of which can result in formidable mental fitness over your lifetime.



SLEEP WELL

Quality sleep is essential for a healthy brain. During deep sleep (REM or rapid eye moment), the brain repairs itself, boosts your immune system and consolidates information learned during the previous day. Poor quality or insufficient sleep leads to fatigue, immune suppression, memory problems, lack of concentration, and mood disorders. On the other hand, evidence increasingly suggests that quality sleep enhances cognitive function.

Studies have found that:

1. Sleep helps us solve specific problems.
2. Sleep strengthens and improves memories.
3. REM sleep is critical for recovering from mental stress.
4. Naps can make you smarter and more productive.
5. Sleep fosters creativity, emotional processing, and judgment.

SHORT-TERM EFFECTS OF POOR SLEEP

For people who are sleep-deprived, struggle with insomnia, or have sleep apnea or other sleep-disrupting conditions, there are serious consequences on cognition and brain health. One has to do with daytime sleepiness, which reduces your attention, learning, processing, and ability to carry out instructions.

Others have to do with memory. Lack of sleep hinders working memory, which is necessary to remember things for immediate use. Poor sleep impairs memory consolidation by throwing off the normal process that draws on both NREM and REM sleep for building and retaining memories.

Research shows that sleep helps the brain conduct important housekeeping, such as clearing out potentially dangerous substances like amyloid plaques, which worsen cognitive function and have been linked

to Alzheimer's. Studies have found that even one night of sleep deprivation can increase the formation of these plaques in the brain.

Poor sleep also hurts thinking by altering how emotional information is understood. Recognizing the emotional context is often important when you learn something new, analyze a problem, or decide. Because insufficient sleep affects mood, you cannot properly process this emotional information component, and judgment is impaired. You're apt to make risky choices with poor sleep; for example, sleep deprivation may worsen mental health conditions such as anxiety and depression.

LONG-TERM EFFECTS OF POOR SLEEP

While you feel the cognitive effects of poor sleep immediately, mounting evidence shows that sleep influences the long-term risks of cognitive decline and dementia. Some examples:

A 2017 Neurology study found that people with less REM sleep may have a higher risk of dementia, including Alzheimer's. The study concluded that for every 1 percent less REM sleep (as a percent of overall sleep) you get, this results in a 9 percent increased risk of dementia. In this study, patients diagnosed with dementia got 15 percent less REM sleep. You need a lot of sleep, but sleep is not enough; you need REM – peaceful, heavy sleep.

A 2021 study from Harvard's Brigham and Women's Hospital concluded that the risk of dementia doubled for seniors (65 years old plus) who got less than 5 hours of sleep a night versus those who got over 7 hours a night.

A 25-year study by University College London concluded that seniors (60 years plus) who get less than 6 hours of sleep have a 37 percent increased risk of dementia, and those younger than 60 still have a 25 percent increased risk of dementia.

An analytic review of more than 25 studies found a considerably higher risk of cognitive impairment and Alzheimer's in people with sleep problems. That analysis estimated that as many as 15 percent of cases of Alzheimer's are caused by poor sleep.

If you have sleeping problems, improving sleep offers a practical way to improve your cognitive performance. Although more studies are needed to determine sleep's role in preventing cognitive decline, early research hints that improving sleep reduces the odds of developing cognitive impairment, dementia, and Alzheimer's disease.

With the scientific evidence in mind, we should all try to get more sleep, particularly to bolster our learning, retention, and memory – and protect our brains against cognitive decline. Here are some guidelines to help ensure brain-protecting sleep, night after night.

1. Go to bed at a regular time and maintain a regular sleep schedule.
2. Avoid and turn off electronics, including TV, at least 90 minutes before bedtime. These devices emit blue light, which interferes with the brain's production of the hormone melatonin, necessary to induce sleep.
3. Establish calming pre-bedtime activities. Some ideas: Take a hot bath, sip a mug of chamomile tea, or read a favorite book.
4. Eat a nutrient-dense diet. A poor diet interferes with sleep, causing digestive problems that keep you up at night. Populate your diet with fresh vegetables and fruits, whole grains, lean proteins, etc. The BrainCare Diet, later in this book, can help you.
5. Exercise regularly but moderately. Physical activity contributes to quality sleep. But don't exercise too late in

the day or close to bedtime because this will build up natural chemicals in the body that stimulate your system.

6. Keep your bedroom well-ventilated and slightly on the cool side.
7. Cut out sleep-robbing substances such as caffeine and alcohol.
8. Create a neat, restful sleep environment in your bedroom.

STAY PHYSICALLY ACTIVE

One of the greatest geniuses of all time – Albert Einstein – took frequent walks to solve problems. And no wonder. Walking and other forms of exercise get your creative juices flowing – in at least three ways. First, physical activity pumps more into your brain, energizing cells for laser-sharp mental performance. Second, exercise helps churn out various brain chemicals that enhance creative thought. Third, exercise may subdue activity in the brain's left half, which deals with logic, and stimulate the right half, which is responsible for creative thinking.

Exercise is good for the body, and of course, what's good for the body is also good for the brain. Studies have found that:

1. Exercise involving complicated motor skills, such as dance, affects mental agility by stimulating the brain to develop new connections between brain cells.
2. Exercise sharpens reaction time – which refers to how long it takes you to respond to an unexpected situation, for example, bolting out of bed when you hear an intruder.
3. Exercise enhances the synthesis of neurotransmitters, which are required to transmit messages throughout the body rapidly.
4. Exercise enhances brain plasticity and the growth and survival of brain cells.

5. Exercise increases the supply of “neurotrophins,” natural substances that stimulate the growth of new brain cells.
6. Exercise significantly improves mood disorders such as anxiety and depression because it elevates feel-good endorphins in the body.
7. Exercise improves concentration, relieves stress (which damages the brain), and energizes the body and brain.

As for the protective effects of physical activity against cognitive decline, research has found that exercise also helps reduce brain damage and the build-up of amyloid plaque seen in Alzheimer’s disease.

Other studies show that:

1. After just 6 to 12 months of exercising, brain volume increases, and cognitive function improves.
2. Physical activity at all ages may protect against dementia.
3. Older adults engaged in regular physical activity have a lower risk of cognitive decline and of developing dementia compared to those who are inactive.

Given this proof, getting active as early as possible makes sense. And it’s never too late. You can improve your cognitive function after exercising for as little as four months.

So, what is the best form of exercise to prevent cognitive decline? Many forms of physical activity benefit brain health and cognitive function. However, according to research, the most effective is aerobic exercise, such as walking, jogging, swimming, cycling, and even energetic housework. This exercise enhances brain plasticity, increases brain blood flow, improves cognitive function, and lowers the risk of dementia.

Guidelines recommend adults do at least 30 minutes on most days of the week, preferably daily.

Strength training is important for everyone, especially as we age, because it preserves muscle and strength, which decline. Only a few studies have investigated the effects of strength training on brain function, and results have been mixed. Strength training is beneficial in preventing and managing diabetes, an important risk factor for dementia. Guidelines recommend adults do strength exercises for each major muscle group at least twice weekly.

Even low to moderate activity helps. One analysis pooled the results of 15 studies and found that this level of exercise, including playing a round of golf once a week or tennis twice a week, was linked to a 35 percent reduction in the risk of cognitive decline.

Moving your body with whatever activity you choose will improve your brain and overall health.

ENGAGE YOURSELF MENTALLY

If we neglect our brains – we don't use them – we can expect foggy thinking, poor memory, and sluggish reasoning to set in. By contrast, stimulating your brain activates neural pathways, triggers lively neurotransmitter activity, expands tiny blood vessels in the brain, and builds connections for mental power. The result is a brain that stays sharp and refuses to decline.

An extensive review published in 2017 in the journal *Neural Plasticity* noted that engagement in mental activity protects the brain against aging. Some specific examples of cognitive engagement noted by the researchers included:

1. The pursuit of higher levels of education (which reduces the risk of cognitive impairment)
2. A career in a mentally demanding profession
3. Involvement in active leisure activities, such as reading, computer usage, participation in card and board games,

solving puzzles, playing musical instruments, and learning a second language

4. An active social life that included activities such as traveling, attending theater concerts or art shows, and participating in activities with friends and family

What follows are some easy-to-perform mental exercises that will help protect your brain as you get older.

1. Do puzzles. Crossword puzzles, acrostics, cryptograms, word jumbles, jigsaw puzzles – these keep your brain stimulated and powered up. Research shows that jigsaw puzzles, in particular, build spatial skills. For example, when assembling a jigsaw puzzle, looking at different pieces and figuring out where they fit within the larger picture is a great way to challenge your brain.
2. Play cards. Researchers who conducted a study on mentally stimulating activities for adults noted that a quick card game builds brain volume in several brain regions and improves memory and thinking skills.
3. Build your vocabulary. Research shows that many brain regions become stimulated by vocabulary tasks, particularly in areas important for visual and auditory processing. Each week, pick a new word from the dictionary. Review its definition and memorize its spelling. Incorporate the word into your language in both speaking and writing.
4. Memorize. One of the easiest ways to strengthen cognition is to embark on a regular memorization program. Commit something to memory each week – a short poem, quote, Bible verse, or other memory builder. Tape the passage to your mirror so you'll see it when you're getting dressed, or post it on your computer at work – so it's in front of you most of the time. In subsequent weeks, practice memorizing it without looking at it. Memorization stimulates your

neural circuits, boosts blood flow to your brain, and keeps neurotransmitters active.

5. Go back to school. Scientists have peered into the brains of people who decided to return to school for more education. What they found is rather intriguing: The brain cells in back-to-schoolers become stimulated and active – a phenomenon known to protect your brain from damage as you age. It is also well known that educated people are less likely to develop dementia later in life. Consider learning how to play a musical instrument and mastering a second language.
6. Do math in your head or on paper. Occasionally, forgo your calculator. Overused calculators can make us mentally sluggish. The next time, you must tally up a tip or add some simple numbers, figure it out in your head, or do it on paper.
7. Play games. Games like Scrabble, chess, checkers, or bridge improve your powers of concentration and reasoning. All these games and others like them are excellent for keeping your brain alert and your memory sharp.
8. Vary your hobbies and interests, which preserves cognitive skills, according to research. In practical terms, take up a variety of hobbies or try something you ordinarily wouldn't do. For example, if you're a computer programmer, you might take up painting, while an artist might take an accounting course.
9. Stay socially active. Plenty of research reveals that people with a network of friends and loved ones are less likely to get depressed, lonely, or have cognitive problems. So, look for ways to stay involved socially. Volunteer, join a house of worship, or become a member of an organization you're interested in.

REDUCE STRESS

Stress is an epidemic in our daily lives. It is estimated that about 25 percent of adults in the U.S. suffer from extreme stress, which can become chronic and unresolved.

Growing scientific evidence shows that stress damages the brain. The reason involves the brain's response to hormones that surge during stress. These elevated stress hormones have been shown to destroy neurons in animals and are thought to do the same in humans.

One of these hormones is cortisol. When faced with a threat, the body goes into fight or flight mode, releasing cortisol. Cortisol gives you energy sources such as extra glucose to fight or flee from the threat. Once the threat passes, cortisol returns to normal levels.

If the stress is not resolved, cortisol builds up in the brain, killing brain cells and reducing brain size. This damage adversely affects memory, learning, and the ability to be social and interact normally with others. Moreover, stress can lead to depression and anxiety, which are associated with a higher risk of dementia.

Given the evidence of what stress can do to your brain and memory, can you do anything to prevent or reverse the process? Absolutely. Some suggestions:

1. Fortify yourself nutritionally. The BrainCare program and diet will help you.
2. Cut down on stress-inducing substances such as alcohol (which is a depressant).
3. Exercise. It helps lower levels of cortisol plus increases blood flow to the brain, which leads to a better memory.
4. Pursue spiritual activities such as prayer and meditation.
5. Get regular massages.
6. Practice deep breathing exercises.
7. Get adequate sleep and rest.

8. Take mini time-outs to read or relax.
9. Organize your life. Look for ways to take better control of your time –saying no more often, not bringing your work home, and not worrying if you don’t complete your entire “to-do” list.
10. Laugh a little or a lot; smile more often.
11. Get professional help with financial management relationship counseling or other counseling in which a professional can set up a stress management plan for you.
12. Seek purpose in life. Studies have shown that having a purposeful life protects against the harmful effects of amyloid plaques and tangles on memory and other thinking abilities. So, engage in meaningful and purposeful activities to promote cognitive health as you get older.
13. Accept stress. Don’t aim for a stress-free life; it’s not possible. But do aim to have better, healthier responses to stress.

TAP INTO THE LOVE HORMONE

Love is not just an emotion; it is an action that is critical for long-term brain health. As we mentioned earlier, a lesser-known chemical in our bodies is called oxytocin. It has been nicknamed the “love hormone” because it is released when you fall in love, during sexual intimacy, and when women give birth and bond to their infants. Originating in the hippocampus, it helps us form social bonds and boosts our moods. But recently, it has been studied for its effect on memory, and some scientists are predicting that it might be developed into a drug to treat cognitive decline, dementia, and Alzheimer’s.

Researchers at Tokyo University of Science in Japan and Kitasato University, also in Tokyo, Japan, wondered whether or not oxytocin could help protect brain cells in the early stages of Alzheimer’s disease. In a novel experiment, they infused brain cells from the hippocampi of

mice with the toxic protein beta-amyloid, thereby reducing the cells' neuroplasticity (vital for memory and learning). Then, they treated those same brain cells with oxytocin. Amazingly, the hormone appeared to reverse this impairment. Bottom of Form The researchers have proposed that oxytocin could potentially treat the memory loss associated with Alzheimer's disease.

It has long been known that oxytocin makes people more social, trusting, generous, and loving – which helps with social connection and is important to the health of your brain. Oxytocin has a positive effect on stress reduction, and stress, as mentioned, harms the brain by chronically elevated cortisol. Oxytocin opposes cortisol, lowering it in the body.

Lasting love and being in a committed relationship are consistently linked to lower stress levels – and oxytocin may play a role here. Research suggests that single people may have higher levels of brain-harming cortisol than people in committed relationships. It's understandable, then, that the support and companionship of someone you love can help you manage challenging life events more easily. Research has found that a loving relationship can also help you enjoy a longer, healthier life.

Some researchers believe that this love hormone prevents neuroinflammation – the number-one cause of cognitive decline - and therefore protects neurons in the brain. Oxytocin has been found to prevent severe damage in animal models of stroke.

Researchers writing in *Neuroscience and Biobehavioral Reviews* noted that low oxytocin levels play a role in depression. This is an important perspective because research shows that depression increases your risk of dementia by two- to five-fold later in life.

On the other side of the depression coin is happiness and optimism. Both have been increasingly shown to confer several protective health benefits. According to Harvard researchers, happier

individuals tend to live longer lives, enjoy better physical health, and possess better cognitive and psychological health.

Another study noted that enjoying a consistent state of happiness reduces your risk of dementia by 70 percent, compared to suffering from depression. With all that it does, here are some strategies to coax the brain into releasing more oxytocin.

1. Enjoy sexual intimacy.
2. Cuddle and hug more often.
3. Touch or kiss someone you love.
4. Spend time with friends.
5. Have a pet and give it affection.
6. Enjoy warm showers and temperatures.
7. Have regular massages.
8. Embrace a meditation or prayer practice.
9. Listen to soothing music.

Nutrition is at the center of these pillars of brilliance, affecting them all. We need nutrients to create a healthy body for sleep and to fuel the brain and body for physical and mental exercise. Good nutrition is an important stress management tool. When our bodies are poorly fed, stress takes an even greater toll on our health and brain. Nutrition is also linked to hormonal balance and is crucial in producing hormones like oxytocin and endorphins. The key to lifelong brain health is to take all this information to heart – do it, live it – to experience its health-building, rejuvenating power on your brain.

CHAPTER 8

THE BRAINCARE® DIET: ADD ONE/SUBTRACT ONE



Because the number-one pillar of brilliance is nutrition, you'll be introduced to some remarkable foods that can lead to laser-sharp memory, mental energy, and stronger cognitive powers – all working together in the BrainCare Diet. This healthful diet, devoid of processed foods, supplies your brain with the nutrients and energy required for optimal function and protection.

BE SUCCESSFUL ON THE BRAINCARE DIET

Most diets fail because of dramatic “behavior changes” required simultaneously. This approach is difficult at best and ultimately leads to discouragement and failure.

You'll be more successful at changing your behavior by making small changes instead. This is what the BrainCare Diet will help you do. Also, the diet is not a quick fix or a short-term plan. It is designed to be

a way of life for you, something you can live with permanently and enjoy its benefits well into your golden years.

In essence, this plan asks you to master adopting brain-healthy nutrition, one or two changes or steps at a time, with plenty of room for practice. So basically, you'll make small changes with a measured approach to help you become successful for a lifetime with this way of eating.

For example, Each day, add one food to your diet that your brain loves – and subtract one that is harmful to your brain. Repeat this behavior once you have embraced the first “add one/subtract one,” If you only make a change weekly, you'll still see an amazing improvement in your eating habits.

The following chart will help you start making these gradual but significant changes.

Time of day or event:	Think about subtracting this:	Think about adding this:
Breakfast	Bacon or pork sausage	Turkey bacon or turkey sausage
	Sugar-sweetened cereal	Whole grain cereal like oatmeal and add fruit
	Sugar-sweetened yogurt	Plain yogurt and add fruit
	Donut or pastry	Whole-wheat toast with peanut butter

Lunch	Ham sandwich on white bread	Tuna salad on whole wheat bread
	Ramen noodles	Whole-wheat pasta
	Grilled cheese on white bread	Grilled cheese on whole-wheat bread
	Chef salad with ham and cheese	Mixed green salad with salmon salad
Dinner	Pork chop	Baked haddock
	Sirloin steak and mashed potatoes	Grilled fish or chicken with roasted potatoes in olive oil
	Curried lamb	Curried lentils
	Beef and broccoli	Chicken and broccoli
	Creamy winter squash soup	Winter squash soup without cream base
	Fried chicken	Lemon chicken
	Hamburger	Soy or black bean burger
	Macaroni and cheese	Macaroni and cheese whole-wheat noodles
Snacks	Salted chips	Nuts

	Ice cream	Fresh fruit cup
	Sweetened beverage	Orange juice
	Popcorn made in oil	Air-popped popcorn
	Chips and dip	Apple slices and almond butter
	Cookies	Dark chocolate and nuts
Dining out	Bread and butter	Skip and have a salad
	Cream soup	Clear vegetable soup
	Pizza with pepperoni	Pizza with vegetable topping
	Burger, fries, cola	Grilled chicken, salad, iced tea
	Chicken Parmigiana	Grilled chicken, pasta, green vegetable
	Sweet and sour pork with white rice	Shrimp and vegetables with brown rice
	Fried fish and chips	Baked fish and baked potato
	Baked Alaska	Baked apple

Cheesecake

Cheese and crackers

Chocolate cake

Mixed berries

By the end of two months of adopting this gradual-change approach, you will have rebooted your diet, reduced your intake of brain-harmful foods, and discovered new ways to enjoy smart, great-tasting, and nutritious choices. And soon, you'll notice positive changes in your brain and bodywork.

THE BRAINCARE DIET PLAN

No single “brain food or nutrient” can ensure a sharp brain as you age because foods and nutrients all work together to create a brain-restorative diet. The most important strategy is to follow a healthy dietary pattern that includes most of the foods discussed throughout this book, along with healthy fats, such as olive oil or canola, rather than too many saturated fats (which, in excess over time, can impair brain function).

Incorporating as many brain-healthy foods into your diet as possible regularly can help rejuvenate your brain, which could translate into better mental function as you age. The BrainCare Diet will show you how to do this.

Below is a guide for what to eat MORE of and LESS of. Those foods listed under MORE are good for your brain and help preserve cognitive function. Those foods listed under LESS can damage the brain, especially if consumed frequently and for a long time.

Thus, when planning your diet for brain health, eat MORE of the following foods and LESS of others.

ADD MORE OF THESE FOODS

Protein. This macronutrient contains essential amino acids known to protect the brain. Tyrosine, for example, promotes clear thinking and alertness, and tryptophan is a building block of serotonin. Protein also supplies iron and selenium, which boost concentration and enhance brain health.

Good sources of protein include:

1. Seafood (any type; salmon, sardines, trout, tuna, mackerel, shrimp, oysters, clams, crab, mussels) – 1 serving (3 to 5 cooked ounces) every other day
2. Poultry (chicken, turkey) – 1 serving (3 to 5 cooked ounces) at least every other day
3. Dairy (low-fat milk, yogurt, Greek yogurt, cheese) – 1 serving daily (8 ounces of milk or yogurt; 1 ounce of cheese)
4. Beans and legumes (black beans, pinto beans, navy beans, kidney beans, chickpeas, lentils peas) - 1 serving (1/2 cup to 1 cup cooked) at least every other day
5. Nuts and seeds – 1 handful daily

Note: Most protein and some vegetables are rich in choline. This B-vitamin is required to help synthesize the neurotransmitter acetylcholine, which is involved in memory retention and is used to make phosphatidylcholine, a major constituent of cell membranes. An adequate choline intake reduces dementia risk by 28 percent and slows the progression of Alzheimer's disease.

Choline-rich foods include:

1. Eggs*
2. Chicken breast
3. Salmon
4. Lean meats such as beef and pork

5. Shrimp
6. Navy beans
7. Broccoli
8. Green peas

** No credible studies have shown that eggs increase heart disease risk when consumed at three eggs a week.*

VEGETABLES AND FRUITS

These foods are high in essential vitamins, minerals, and antioxidants, protecting your brain cells from free-radical destruction. They are also loaded with phytochemicals that prevent neuroinflammation. Veggies and fruits are rich in potassium, too, a mineral that helps prevent mental fatigue.

Leafy greens like kale, spinach, collards, and broccoli are rich in brain-healthy nutrients like vitamin K, folate, and beta-carotene. Research suggests that leafy greens are instrumental in slowing cognitive decline.

The best sources of veggies are:

1. Green leafy vegetables (kale, spinach, collard greens, lettuces of all varieties): 1 serving daily (1 to 2 cups, raw or cooked)
2. Cruciferous vegetables such as broccoli, cauliflower, and Brussels sprouts – 3 to 4 servings daily
3. Vegetables like lettuces, onions, tomatoes, cucumbers, peppers
4. Squashes (all types) – 3 to 4 times weekly (1/2 cup cooked)
5. Brightly colored vegetables such as red, yellow, or orange peppers, red cabbage, carrots, sweet potatoes, and yams – 3 to 4 times weekly (1/2 to 1 cup cooked, or 1 medium)
6. Root vegetables, including parsnips, turnips, and beets - 3 to 4 times weekly (1/2 cup cooked)
7. Virtually all vegetables

Antioxidant-rich fruits to choose from include (1 to 2 pieces daily):

1. Berries (handful)
2. Apples
3. Pears
4. Citrus fruit
5. Plums
6. Peaches
7. Virtually any fresh fruit

HIGH-FLAVONOID FOODS

Fruits and vegetables are rich in flavonoids - brain- and body-beneficial compounds in many plant foods. They have improved blood flow and cognition in young people and cognitive decline in older adults. Also, flavonoids can potentially reduce the risk of Alzheimer's disease by 30 percent. They improve memory, attention, and executive function, too.

In addition to the foods mentioned above, other notable foods containing these super-nutrients are:

1. Tea
2. Orange juice
3. Dark chocolate
4. Red wine (moderate amounts)

WHOLE GRAINS

A part of the human diet for thousands of years, grains are the seeds of grass-like plants called cereals. Among the most common are corn, rice, and wheat. Some seeds of non-grass plants, or "pseudocereals," are also considered whole grains, including buckwheat, quinoa, and amaranth. All these foods supply a wealth of nutrients: fiber, B vitamins, minerals, protein, and antioxidants.

Eating whole grains is linked to a lower risk of high blood pressure, cardiovascular disease, obesity, and type 2 diabetes. Preventing or controlling these diseases may indirectly promote healthy brain function. Whole grains may also help lower your risk of stroke. Some evidence suggests that whole grains can help reduce inflammation.

While whole grains are healthy for most people, they may not be appropriate for people with a sensitivity or allergy to gluten (a protein in wheat, barley, and rye) or with celiac disease. Among the most nutritious whole grains:

1. Buckwheat*
2. Rice*
3. Oats*
4. Amaranth*
5. Quinoa*
6. Corn*
7. Rye
8. Bulgur
9. Wheatberry
10. Whole-wheat products (bread, pasta, and so forth)
11. Millet

**These foods are gluten-free.*

Enjoy 3 servings daily of whole grains (1/2 cup per serving).

NUTS AND SEEDS

All types, including peanuts, walnuts, pistachios, almonds, macadamia nuts, hazelnuts, cashews, sesame seeds, and pumpkin seeds - 1 handful daily.

Although all nuts are excellent protein and healthy fat sources, walnuts deserve special mention because of their memory-improving powers. A 2015 study from UCLA linked higher walnut consumption

to improved cognitive test scores. Walnuts are high in a type of omega-3 fatty acid called alpha-linolenic acid (ALA), which helps lower blood pressure and protects arteries. That's good for both the heart and brain.

OMEGA-3 FATS AND OTHER HEALTHY FATS

The meal plans here are rich in brain-protective fats, especially omega fats. They assist in mental well-being by raising serotonin levels in the brain and enhancing memory. Most importantly, omega-3 fats fight neuroinflammation.

In addition, these fats increase the oxygenation of your blood, which means better delivery of nutrients and oxygen to your brain. Higher omega-3 intake in the diet is associated with bigger brains and better cognitive function. Omega-3 fatty acids have been linked to lower blood levels of beta-amyloid—the protein that forms damaging clumps in the brain and may be a factor in cognitive impairment.

Foods with the highest omega-3 content include:

1. Flaxseeds
2. Chia seeds
3. Fatty fish, particularly salmon, herring, sardines, and tuna
4. Whitefish, including tilapia, cod, and sea bass
5. Shellfish, particularly oysters, crab, lobster, scallops, and mussels
6. Walnuts
7. Canola oil
8. Navy beans
9. Kidney beans
10. Brussels sprouts

BEVERAGES

Water and other beverage crop drinks (tea, coffee) – as much as you want but limit added sugar and artificial sweetener.

HYDRATION AND BRAIN HEALTH

Water may be an unsung “macronutrient” when it comes to the health of your brain. You need water to think, learn, stay alert, and feel good mentally. Water also helps increase serotonin – the brain chemical that regulates mood, anxiety, depression, and memory.

Research in men and women has shown that mild dehydration (a fluid deficit of just 1 to 3 percent) can reduce energy levels, impair mood, and lead to memory problems and poor brain performance.

To prevent dehydration, how much water do you need daily? There are many recommended formulas, from drinking 8 to 10 glasses of pure water daily to consuming half your weight in fluid ounces daily. If you weigh 140 pounds, for example, you should drink 70 ounces of water.

Whatever method you use, make sure to drink enough water each day. It’s one of the best things you can do for your body and brain.

HERBS AND SPICES

Basil, mint, rosemary, sage, nutmeg, cinnamon, pepper. Use liberally.

EAT LESS OF THESE FOODS

Use this list to “subtract one” food from your meal planning while adding one (or more) brain-healthy foods from the above list.

1. Red meat (steak, ground beef, pork, lamb) - Up to four times weekly or less
2. Butter and margarine - 1 tablespoon daily
3. Refined grains (white flour-containing foods) - Up to once daily

4. Sweets (cakes, brownies, ice cream, soda, candy) - Up to three times weekly or less
5. Sugar-sweetened beverages (try to eliminate)
6. Salty, fatty snack foods (some evidence exists showing that a diet high in salt increases dementia risk)
7. Fried or fast food (French fries, chicken nuggets, onion rings, fried chicken, hamburgers) - Once a week or less
8. Processed meats (salami, bologna, or bacon) - Rarely

SAMPLE MEAL PLANS

Here are two weeks of sample meal plans that provide ideas for planning menus with brain-healthy foods. You can mix and match the meal selections if you wish.

WEEK 1

DAY 1

Breakfast: Banana-strawberry smoothie with Greek yogurt (1/2 banana, 1/2 cup strawberries, 1/2 cup plain Greek yogurt, 1 cup almond milk – blended in a blender)

Lunch: Kale Caesar salad with edamame

Dinner: Chili made with ground turkey, quinoa, tomato sauce, and spices

DAY 2

Breakfast: Vegetable breakfast frittata made with one egg and served with a slice of whole wheat toast

Lunch: Tuna salad sandwich on pita bread

Dinner: Pecan-crust chicken with roasted broccoli

DAY 3

Breakfast: Blueberry-walnut whole-wheat pancakes

Lunch: Grilled chicken sandwich on whole-wheat bread with celery and hummus

Dinner: Roasted turkey with a cabbage salad and a whole-wheat dinner roll

DAY 4

Breakfast: Greek yogurt with raspberries and almonds

Lunch: Kale and spinach salad with carrots, bell peppers, mushrooms, tomatoes, chickpeas, olive-oil-based salad dressing, and brown rice

Dinner: Whole-wheat pasta with chicken and marinara sauce, roasted broccoli, and side salad tossed with an olive-oil-based salad dressing

DAY 5

Breakfast: Oatmeal topped with blueberries and slivered almonds

Lunch: Grilled chicken, ½ pita, kale salad with chickpeas, feta cheese, tomatoes, cucumbers, and olive oil

Dinner: Baked salmon with broccoli and Brussels sprouts (roasted in olive oil), quinoa, and a glass of wine

DAY 6

Breakfast: Whole-wheat bagel sandwich with 1 scrambled egg and blueberries on the side

Lunch: Turkey sandwich on whole-wheat bread with tomato slice, lettuce, hummus, and baby carrots on the side

Dinner: Quinoa stir fry with sautéed vegetables, beans, and olive oil

DAY 7

Breakfast: Whole-wheat toast with scrambled eggs and slices of avocado

Lunch: Spinach salad with strawberries, chickpeas, slivered almonds, olive oil dressing, and a small whole-grain roll

Dinner: Grilled salmon with sautéed spinach and brown rice

WEEK 2

DAY 1

Breakfast: Greek yogurt with strawberries and oats

Lunch: Whole-grain sandwich with vegetables and shrimp salad

Dinner: A tuna salad dressed in olive oil, with a piece of fresh fruit for dessert

DAY 2

Breakfast: Oatmeal with raisins with milk or Greek yogurt

Lunch: Leftover tuna salad from the night before

Dinner: Grilled chicken breast and salad with tomatoes, olives, and feta cheese, and grilled chicken

DAY 3

Breakfast: Omelet with veggies, tomatoes, onions, and a piece of fresh fruit.

Lunch: Whole-grain sandwich with cheese and fresh vegetables

Dinner: Lasagna and tossed salad tossed with an olive-oil-based salad dressing

DAY 4

Breakfast: Yogurt with sliced fruits and nuts

Lunch: Leftover lasagna from the night before

Dinner: Broiled salmon, served with brown rice and vegetables

DAY 5

Breakfast: Eggs and vegetables, sauteed in olive oil

Lunch: Greek yogurt with strawberries, oats, and nuts and mixed bean salad

Dinner: Grilled lamb with salad and baked potato

DAY 6

Breakfast: Oatmeal with raisins, nuts, and an apple

Lunch: Whole-grain sandwich with vegetables and milk

Dinner: 2 slices of Mediterranean pizza made with whole wheat, topped with cheese, vegetables, and olives

DAY 7

Breakfast: Omelet with veggies and olives

Lunch: Leftover pizza from the night before and celery and carrots

Dinner: Grilled chicken, with vegetables and a sweet potato, with a piece of fresh fruit for dessert

BETWEEN MEAL SNACKS

Enjoying a snack mid-morning, mid-afternoon, or both is also fine. Healthy options include:

- A handful of nuts
- A piece of fruit
- Carrots or baby carrots
- Some berries, grapes, or any fresh fruit
- Leftovers from the night before
- Greek yogurt
- Apple slices with almond butter
- Air-popped popcorn
- A piece of dark chocolate
- 8 ounces of Greek yogurt

A SIMPLE SHOPPING LIST

As much as possible, shop at the perimeter of the store. That's usually where whole foods are located. Try to choose the least-processed options.

- Vegetables: Carrots, onions, broccoli, spinach, kale, garlic, etc.
- Fruits: Apples, bananas, oranges, grapes, etc.
- Berries: Strawberries, blueberries, etc.
- Frozen veggies: Choose mixes of any kind
- Grains: Whole-grain bread, whole-grain pasta, gluten-free grains
- Legumes: Lentils, beans, peas, etc.
- Nuts: Almonds, walnuts, cashews, etc.
- Seeds: Sunflower seeds, pumpkin seeds, etc.
- Condiments: Sea salt, pepper, turmeric, cinnamon, etc.

- Fish: Salmon, sardines, cod, haddock, trout
- Shellfish
- Potatoes, sweet potatoes, and other starchy vegetables (winter squashes and root vegetables)
- Cheese
- Greek yogurt
- Chicken and turkey
- Eggs
- Olives
- Olive oil, canola oil

It's best to clear all unhealthy temptations from your home, including sodas, ice cream, candy, pastries, white bread, crackers, and processed foods.

This eating method – focusing on whole foods packed with brain-healthy nutrients – is one of your greatest hedges against brain problems. We've presented a framework for staying on a course that enhances brain health. It's simple to follow. Do that, and you're well on your way to eating to think – and think clearly and well.

CHAPTER 9

STAY SHARP WITH BRAIN CARE[®] PRODUCTS

Chapter 8 outlines the path to incorporating a healthy diet for your brain functions. However, many people are just not going to embrace diet behavior change for many reasons. Thus, this chapter lays out an alternative path to ensure you eat your brain nutrients daily, whether or not you can change your diet. As you will learn, these five brain products are designed to positively supplement your diet, whatever condition it currently is.

It is impossible to overstate the importance of a healthy brain. Peak cognitive function is key to enjoying your life, connecting with your loved ones, and remaining truly you. Fortunately, we know through research that we can protect the brain, preserve memory, and prevent mental decline well into our later years.

Naturally, the best way to improve cognitive health is through nutritious food packed with brain-healthy nutrients, as you've read throughout this book. Even with the best efforts, however, you might not obtain all the nutrients required for brain health from your diet.

This is where specially formulated foods enter the picture – foods containing concentrations of nutrients known to soothe neuroinflammation, enhance memory, assist in producing neurotransmitters, and perform other duties that protect cognitive function. They are not single-nutrient supplements because science tells us that nutrients work most effectively with other nutrients.

This is why the authors created a disruptive new food company called Nutrient Survival[®]. Its purpose is simple and clear. We want everyone to choose Freedom. You see, without our health, we are not

free. That's why we think of ourselves as a Freedom company in making nutrient-dense food, the simplest and most powerful way to a strong body and mind. For too long, Big Food has been filling us with ultra-processed junk. And now, with 60% of us living with chronic disease, Big Pharma is more than happy to step in with drugs. Enough said! It's time to take back our health and freedom by making simple daily choices that loosen their grip on our lives.

So that's why we do what we do. What makes extraordinary food that does extraordinary things so that everyone who chooses to eat it can be their most extraordinary self? Our food is delicious, nutrient-dense, and natural – made without artificial colors, flavors, or preservatives. Most are ready-to-eat, but some are freeze-dried, which locks in all the nutrition and the full flavor, and easily prepared with just a little hot water. Although Nutrient Survival's initial focus was on the emergency food market, this company's foods are even more useful for everyday use to keep our bodies and minds at peak performance.

This made our venture into brain food, well – a no-brainer. We call the new product line BrainCare. As the name implies, BrainCare products are specifically created with a powerful combination of brain-nourishing nutrients and clinically tested to validate their efficacy in supporting brain health. The formulas in our BrainCare products are patent pending. They were created by world-renowned food, nutrition, and biotech scientist Charles “Chip” Marsland. Chip is an accomplished inventor and the mastermind behind the food in Dr. Barry Sears's “Zone Diet” and has spent a lifetime making food that optimizes human performance.

These proprietary brain formulas are handed to our Research & Development team, led by Chef Shakka Moore, who crafts them into delicious culinary masterpieces wrapped in nutritious, all-natural ingredients. Shakka learned his trade in some of the world's best restaurants, resorts, and country clubs, including the prestigious Hyatt Regency Lake Tahoe, Marriott International, and Hilton International.

The result is delicious, nutritious food and drinks that turbocharge your brain's memory, focus, and performance. Unlike drugs or supplements, only BrainCare is designed with a clinically tested, patent-pending combination of brain-nourishing nutrients blended with wholesome, natural ingredients. With no artificial colors, flavors, or preservatives, you will love to eat them every day. Today, in addition to making delicious food in the kitchen, Shakka keeps Nutrient Survival running smoothly as Chief Operating Officer.

Regularly fueling your brain with nutritious meals, snacks, and drinks is essential for your overall health, and this line of BrainCare products supports that need. There are benefits to getting your daily brain nutrients with food rather than from a capsule. One benefit is better absorption. Digestive enzymes that aid carbohydrate, protein, and fat absorption into the blood are triggered upon ingesting food and drink. This doesn't happen with popping a pill, but it does with BrainCare. Quite simply, the brain nutrients packed into these foods get absorbed and then used better when ingested this way.

Another benefit is less risk of choking. Many supplements are large and bulky, presenting a choking risk. 23 percent of emergency department visits annually are related to choking accidents involving dietary supplements.

This book has discussed the benefits of the brain-targeted nutrients used in BrainCare. Hundreds and hundreds of studies support that these nutrients are vital for protecting brain health and cognition. Now, it's easy to get what your brain is hungering for. Use these products daily in combination with each other and the BrainCare Diet we've suggested. Once you've read about them, we close this chapter with a suggestion on how to use them. With that said, here is a closer look at these revolutionary products.

BRAIN OMEGA 3 BAR®

This bar is designed as a nutritious snack with specific nutrients that target brain health and prevent neuroinflammation.

Although many nutrition bars on the market are wholesome snacks, most are processed food. On the other hand, the Brain Omega 3 Bar is formulated with key brain-nourishing nutrients, anti-inflammatory omega-3 fatty acids, naturally occurring flavonoids found in fruits and vegetables, and protein. Together, these nutrients can reduce neuroinflammation, boost brain function, and support cognitive function.

Each bar is made with protein, carbohydrates, and fiber, with only 230 calories in a single bar. In addition to the brain nutrients in the bar, other nutritious ingredients include hemp seeds, flaxseed, rolled oats, rice crisps, sweet figs, and cocoa. And have no artificial flavors, colors, or preservatives either.

At the end of the day though, it's true claim to fame is: **as much omega 3 as a fillet of salmon, but without the fishy taste.**

INGREDIENTS

Use these bars daily as snacks or alongside other foods for a complete meal. Bars are available in two delicious flavors: Fig and Dark Chocolate made with sweet ripe figs, rich dark chocolate, and tart cranberry pieces blended with rolled oats, organic rice crisps, milled flax and hemp seeds; or try Fig and Roasted Peanut made with roasted ground peanut with sweet ripe figs, semi-sweet chocolate and creamy peanut morsels blended with rolled oats, organic rice crisps, milled flax and hemp seeds. Each 60g serving contains:

- 1,948mg of Omega 3 (EPA 430mg + DHA 323mg + ALA 1,195mg)
- 40 essential nutrients

- 27 vitamins and minerals
- 8g of protein (including 1.5g of collagen)
- No artificial colors, flavors, or preservatives
- Gluten-free



BRAIN SHAKE®

The Brain Shake is formulated with vitamins, minerals, amino acids, and bioactive compounds known to improve cognitive function. It is used to make shakes that can be taken as between-meal snacks or as meal replacements.

This product is a therapeutic drink comprised of 50 nutrients - all your vitamins, minerals, amino acids, and healthy fats in one complete

meal, along with additional amino and omega-3 for targeted brain health.

Other key brain support nutrients in Brain Shake include:

- Phosphatidylserine – fatty substance that envelopes and protects brain cells while supporting neurogenesis, the generation of new neurons
- Acetyl L-carnitine – antioxidant used in the treatment of Alzheimer's
- Alpha-GPC – building block of acetylcholine, a neurotransmitter involved with memory and cognition
- BCP – naturally occurring in many essential oils, BCP easily crosses the blood-brain barrier to reduce inflammation. Promising signs of improving reasoning, concentration, memory, and focus in elderly
- Quercetin – a flavonoid is known to help reduce beta-amyloid formation in the brain and improve neurotransmitter function
- Alpha lipoic acid – a powerful antioxidant that helps generate the antioxidant glutathione in the body and regenerate other antioxidants-
- Co-enzyme Q-10 – another powerful antioxidant with brain-protecting benefits
- N-acetyl cysteine - essential for making glutathione and valued primarily for its role in antioxidant production
- Hesperidin – a powerful flavonoid known for its anti-inflammatory properties

HOW TO USE BRAIN SHAKE

Mix ½ cup of Brain Shake with 8 ounces of water or your favorite beverage and blend well. For a more nutrient-dense shake, you may add fresh fruit, green vegetables such as kale or spinach, nut butter, or other healthy items. The Brain Shake replaces other protein powders that do

not have the necessary nutrients for your brain. The Brain Shake is a great way to feed your brain with powerful nutrients if you enjoy shakes.

This decadent blend includes whey, nonfat milk, rich cocoa with sea salt, and monkfruit for sweetness. Each 65g serving contains:

- 1,097mg of Omega 3
- 40 essential nutrients
- 9 bioactive brain ingredients
- 4 neurotransmitter converters
- 3 brain energy amino acids
- 14g of protein
- 7g of fiber
- No artificial colors, flavors, or preservatives
- Gluten-free
- Soy free



BRAIN COFFEE™

Many of us start our day with the morning ritual of a hot cup of coffee. We designed this version as a nutritious, brain-wakening combination of brain-targeted nutrients with premium, dark-roasted 100% Colombian Arabica coffee beans. It's flash-frozen, dried, and packed in convenient single sticks for your daily cup. In addition to 14 essential vitamins, other key brain targeted nutrients include:

- Tyrosine – important amino acid needed to produce neurotransmitters shown to help alertness, attention, and focus
- Alpha-GPC – building block of acetylcholine, a neurotransmitter involved with memory and cognition
- Hesperidin – powerful flavonoid known for its anti-inflammatory properties
- MCT oil – helps your body make ketones, an energy source for your brain
- Caffeine – naturally occurring in coffee, caffeine stimulates activity in your brain and nervous system by increasing serotonin and acetylcholine
- Polyphenols – also naturally occurring in coffee, these micronutrients may prevent tissue damage by free radicals.

This classic roast is made from single-origin Colombian Arabica beans, dark-roasted for full-bodied, rich flavor. Each 9g serving has:

- 100% Colombian Arabica coffee beans
- 150mg natural caffeine
- 14 essential nutrients
- 5 bioactive brain ingredients
- No artificial colors, flavors, or preservatives
- Dairy-free
- Gluten-free
- Soy free

Add 8 ounces of hot water or pour over ice for a cooler summer version.



BRAIN DRINK™

The Brain Drink is formulated with the same essential and brain-targeted nutrients as our Brain Shake – all the vitamins, minerals, amino acids, and bioactive compounds known to improve cognitive function. However, unlike the Brain Shake, which can be used as a complete meal replacement, this drink is purely about turbocharging your brain.

Have this drink daily, and you'll be giving your brain the most powerful nutrient-packed cocktail we know to help boost memory, tighten focus, and improve cognitive performance – every day and in the long run.

Key brain targeted nutrients include:

- Phosphatidylserine – fatty substance that envelopes and protects brain cells while supporting neurogenesis, the generation of new neurons
- Acetyl L-carnitine – antioxidant used in the treatment of Alzheimer's
- Alpha-GPC – building block of acetylcholine, a neurotransmitter involved with memory and cognition
- BCP – naturally occurring in many essential oils, BCP easily crosses the blood-brain barrier to reduce inflammation. Promising signs of improving reasoning, concentration, memory, and focus in elderly
- Quercetin – flavonoid known to help reduce beta-amyloid formation in the brain and improve neurotransmitter function
- Alpha lipoic acid – powerful antioxidant that helps generate the antioxidant glutathione in the body and regenerate other antioxidants-
- Co-enzyme Q-10 – antioxidant with brain-protecting benefits
- N-acetyl cysteine – essential for making glutathione and valued primarily for its role in antioxidant production
- Hesperidin – powerful flavonoid known for its anti-inflammatory properties

HOW TO USE BRAIN DRINK

This tropical lemonade features a bright citrus taste of organic lemon juice concentrate and natural flavors, sweetened with monkfruit. Each 19-gram serving contains:

- 40 essential nutrients
- 9 bioactive brain ingredients
- 4 neurotransmitter converters
- 3 brain energy amino acids

- No artificial colors, flavors, or preservatives
- Dairy-free
- Gluten-free
- Soy free

Combine with 8 to 10 ounces of water or juice. Shake or stir well, then enjoy.



RECOMMENDED BRAINCARE PROGRAM

These delicious BrainCare products were designed for one purpose – your brain! One of the best parts is that it’s EASY to give your brain what it’s hungering for. There’s no such thing as too much brain nutrition, so keep improving your everyday diet with all the suggestions we’ve given you with the BrainCare Diet, including these delicious and convenient ones too.

To start with BrainCare, we recommend you try the following daily combination to keep your brain performing at its best.

1. Brain Coffee with breakfast
2. Brain Drink or Brain Shake with breakfast or lunch
The difference between the two products is the Brain Shake contains an excellent source of protein, so it is a meal replacement for those who enjoy shakes. For those who do not enjoy shakes, choose the Brain Drink to feed your brain the critical nutrients it needs.
3. Brain Omega 3 Bar as a snack. Alternate flavors, or go with the one you love most.

You can find them all at NutrientSurvival.com, or try one of our preconfigured brain bundles with just the click of a button.

CHAPTER 10

LOVE BEGETS LOVE

Remember, we are each given a gift – our bodies and minds. How we care for them determines how they care for us. Many Americans and the rest of the world do not care for our bodies and minds and expect our medical world, with its “got a pill for that” solution, to fix us when we get sick or have wellness and health issues. Daily, the evidence is building that this is a big mistake, and about 80% of health issues can be avoided if we take proper care of our bodies and minds with simple lifestyle choices – our Six Pillars of Brilliance.

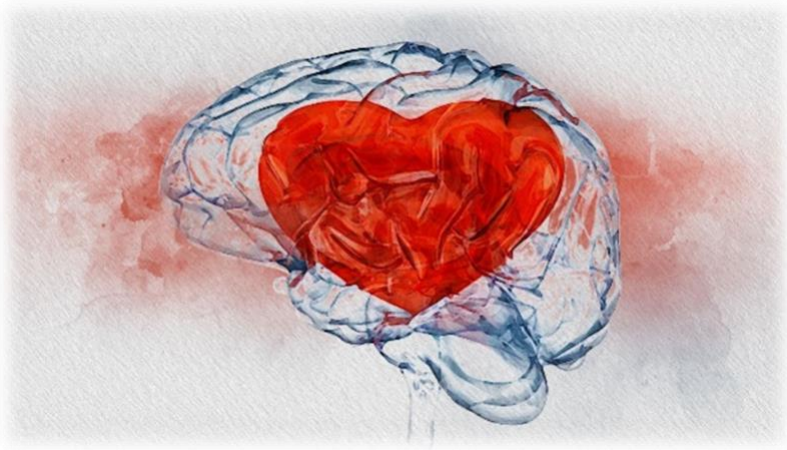
Although much has been studied and written about our bodies, less is known about our brains – which, with our heart, is the body's most important organ. The good news is that it is not hard to care for your brain from birth to death – and in doing so, ensure maximum brain development, performance, and longevity.

The Six Pillars of Brilliance are clear brain care actions and do not take massive behavior change. Nutrition, physical exercise, mental exercise, sleep, reduced stress, and love are wonderful daily actions that care for our brains and lives.

Nutrition is extremely important as it affects the other 5 pillars. In this book, we have offered a program that can make a difference in brain development, peak performance, and keeping memories as we age. Our BrainCare products are full of nutrients that our brains need and are designed to be easily incorporated into your diet.

We are given a choice. Care for your beautiful brain, or roll the dice and hope you are part of the small, lucky gene pool that may evade

brain issues. Love begets love. Take control. Love your beautiful brain daily, and it will love you back. Eat to think.



RESOURCES

WISECODE. PRECISION NUTRITION DATA

The meal plans shared can be summed up in two words: nutrient density. Nutrients are the gift of life that Mother Nature gives to humans. We can develop complex diets, but all the best do one simple thing: try to get humans more essential nutrients in an economy of calories. Our “add one/subtract one” diet lays out wonderful foods and diets for the brain. But this is often hard to remember when you are at the grocery store or out to dinner. We live in the age of technological innovation, which has affected most of our lives. The one laggard is our nutrition and health, as we know more about the sweaters we buy on Amazon than the effects of foods that pass from our lips to our brains.

We live at an interesting time where there is a convergence of life, humanity, and technology. We have been working with one of the leaders in that convergence, WISEcode, which employs fundamental lab analysis and artificial intelligence, or AI, to tell us exactly what is in our foods. WISEcode is mapping all the nutrients and ingredients in all 500,000 foods in the American food system. This is more than just the 15 data points on a food label.

Once we know what is in our foods, we can then apply it to whatever application we seek. One major application is identifying nutrient density and how this affects our human bodies, including our brains.

In the case of our brain, WISEcode is working on a code to evaluate food relative to what is good/bad for the brain. It will provide humans with a nutrition roadmap to improve our food lifestyle choices to protect and advance our brain performance and longevity.

To learn more, visit www.wisecode.ai

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