

PAIN NATION

PAIN

Klee Irwin

NATION

SICK, STRESSED
AND ALL F*CKED UP
IS CBD THE CURE?

● PAGE
● TWO
BOOKS

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INTRODUCTION

THERE ARE, arguably, five ingestible plant molecules that have changed the course of how we eat and live, and which have had a massive impact on human history.

Alcohol, the molecule derived from plant fermentation, was the first. Each society discovered how to make it or imported the technology over the course of generations, with the archaeological record showing us that alcoholic drinks existed in the Neolithic period of human history. Distillation, that heady and rich process designed to make alcoholized fruits even more potent, was discovered in the Arabic world. It's credited to the chemist Al-Kindi, with its application widely known in European and Asian societies by the tenth century CE.¹

Sucrose, from plants like sugarcane, beets and corn, was the second of these molecules to be refined for human consumption. While honey was also used to sweeten food, once we learned how to refine sugar in the eighth century BCE in India, all bets were off. The Roman writer Pliny the Elder, describing refined sugar at the time of the explosion of Mount Vesuvius in the first century

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BCE, said that although there was sugar made in the Arabic world, “Indian sugar is better. It is a kind of a honey found in cane, white as gum, and it crunches between the teeth. Sugar is used only for medical purposes.”² The health doctrines to which Pliny was referring were linked to Ayurvedic medicine, which suggested that sugar, known as *iksū*, could be used as a laxative and diuretic, and as a means to increase the production of breast milk. But once it became known how sugar could act as a mental as well as a physical stimulant, its medical use became secondary. Sugar and salivary desire became synonymous, and by the eleventh century CE it was on every family’s table in Europe.

Theobromine, the feel-good plant molecule in chocolate, also became a widely used substance in fast succession. Although it was once confined to ritual uses for the Mayan peoples in Mesoamerica around 500 CE, attacking Aztecs quickly adopted it for both religious and personal uses. It’s likely that the Spanish conquests in the region in the sixteenth century CE influenced its global adoption, but, at the time, Jesuit missionary José de Acosta couldn’t stand the stuff. “Loathsome to such as are not acquainted with it, having a scum or a froth that is very unpleasant to taste,” he said of the chocolate beverage. “Yet it is a drink very much esteemed among the indigenous peoples, wherewith they feast the noble men who pass through their country. The Spaniards, both men and women that are accustomed to the country, are very greedy of this Chocolate.”³

Nicotine is also a plant molecule that has reached global proportions in use. After finding Indigenous communities using tobacco as a medicine, a ritual plant and as a general relaxation practice, Spanish colonizers adopted it and began to plant it near modern Toledo for the personal supply of King Philip II in the sixteenth century CE. It was so popular that it was used as a currency in the Virginia colonies of what was to become the United States,

and it made its way around the world as a cash crop facilitated by the US slave trade from the seventeenth century onwards.⁴

And finally, there's **caffeine** which was used as a plant medicine by Sufi tribes in Yemen and the Oromo in Ethiopia as early as the fifteenth century CE, and it then made its way westward through trading in Turkey. Known as an Arabic beverage, coffee became part of the world diet after being quickly sought after by the Dutch East India Company, which realized its potential for financial gain as early as 1711, when it started to import it to Europe in mass quantities.⁵

And now, there's **cannabidiol (CBD)**.

CBD, which has no psychoactive properties, is a possible cure for the American pandemic of physical pain and psychological illnesses. Until recently, cannabinoids (including CBD) were legally suppressed under an 80-year prohibition: a ban of the cannabis plant from which it hails. CBD offers a bounty of health benefits: evidence-based research shows that it can benefit people with cancer, epilepsy, Alzheimer's disease, diabetes, obesity, pain, insomnia and countless other health challenges.

This book is the story of uncovering the *why* behind our American health care legacy in the hope of finding a set of synergistic cures, with CBD being the cornerstone.

I come to this exploration from my vantage point as a 23-year veteran of the plant medicine industry. I spent the first phase of my life gaining plant medicine knowledge and building a nutraceutical company, Irwin Naturals, into a market leader that is carried in more than 90,000 stores nationwide including CVS, Walgreens, Walmart, Whole Foods and Costco. Along the way, however, I shifted gears: learning about the plant world inspired me to move toward a role in which I could create high-impact change to understand our globe, and our universe, on a broad scale. I now lead a team at Quantum Gravity Research, studying

fundamental unification physics, doing the best I can to use my creativity and investments in change agency.

CBD is the answer to the question of how to create substantive positive change in the American health care system. After I researched CBD as a treatment for my own chronic pain and tendency toward attention deficit disorder, I knew that I had to find a way to share it with the world. I perceive a beautiful synergy between the personal and societal harmonizing effects of CBD and the need to address our deep pain as a nation.

In this book, we'll discover why America is a country on the brink, wracked by record levels of mental and physical pain. A din of false pessimism and fear is part of our collective conversation and group psychology as a nation.

We'll explore why stress and fear influence two important things. The first is our health. Stress creates a breeding ground for disease in our bodies. The second is related to our individual and collective psychologies. Stress changes the way we treat one another and the policies we adopt. It ramps up our conflict with each other and with other nations around the world, as we struggle to find a sense of safety and direction. Nonetheless, physicians treat our mental problems, such as anxiety, post-traumatic stress disorder and depression with prescription opioids, antidepressants, amphetamines and other drugs as if they were candy. These drugs have side effects that include anxiety, kidney damage, heart problems, psychosis and even suicidal and homicidal tendencies.

Despite our financial and scientific prowess, however, we're still set on continuing on the same health pathway we've always followed: blind trust in our ailing health care systems and powering through to wellness by amplifying our reactive health care strategies, like surgery, radiation, chemotherapy and pharmaceuticals. Only by understanding why we follow this path can we hope to evolve toward a new understanding of what it means

to use preventative care practices instead. Preventative care, of which CBD and other plant medicines are a crucial part, is by far the less expensive, more effective and less problematic option.

On our way through this analysis, we will meet inspiring people who reached the end of their ropes with various mental and physical illnesses and who have found CBD to be a virtual miracle cure. We will learn how it may be the single most impactful thing we can consume to reduce our outrageous rate of mental illness and other diseases—even weaning ourselves off our record-breaking consumption of the majority of the world’s prescription drugs. We will discuss an optimistic but realistic vision of how much kinder, gentler and happier America might be if plant medicines were at the center of our health care system.

What might we be like if we were more relaxed and stress-free as a nation?

I hope to play a critical role in this process by increasing access to CBD in the United States and around the world—by trying to make CBD much more affordable and easily available to everyone. I’ve been dipping back into the business realm for a few months, temporarily distracted from my physics mission, to help my company Irwin Naturals move CBD into the mass market. We’re actually trying to make CBD products more accessible than any other company in the business, setting pricing as low as we possibly can, literally a tiny fraction of what it currently costs in the open market. In doing so, our company is buzzing with the excitement of a new purpose: service to others. Our team of long-time employees in Los Angeles have undergone a cultural shift from me to we, toward a new commitment to altruism and societal purpose. We’re fighting for people to have universal access so that they can be healthier, more productive and happier.

To that end, I’m not publishing this book to make money. All proceeds from the book will go to support cannabinoid-related

research. I will do whatever it takes to serve others and contribute toward making our community a better place, where everyone has access to the plant medicines we need. CBD is only the beginning of this journey.

I want to thank a number of people for assisting in the research and development of this book. I would not have been able to move forward in this process without the long-term support of my closest advisors, Stephanie Nadanarajah and Keith A. Powers. The development of the book owes a debt of gratitude to Lisa Thomas-Tench for her mastery of language and research, as well as my amazing editor, Amanda Lewis. I am thankful for the commitment in supporting the quick launch of this book provided by my publisher Trena White and her team at Page Two. I am grateful for the in-depth social research completed by Carolyn Schmidt and David Jakubovic, and the interview transcript work led by Tamarah Ackland. Without the heartfelt and moving contributions of all of our interviewees, listed at the back of this book, this story could not have been written. I also want to give thanks to my mother. She made sure that I had access to a good education despite not having the means for much else. In her last days living with breast cancer, she learned about and encouraged me to look into CBD. I just wish we had known then how powerful this molecule is and how to use it. Finally, I owe my thanks to my friend Peter Diamandis for challenging me, over ten years ago, to think differently about making an indelible impact on the world and, in fact, on the universe.

KLEE IRWIN

Los Angeles · August 2018

1

FEEDING THE NEED

THE WASHINGTON State coastline is a breathtakingly beautiful area of the country. It's home to the world's largest population of orcas, which travel thousands of miles from Mexico every year to feed their young in these rich, cold waters. The Salish Sea and the surrounding San Juan Islands are among the top shellfish-producing regions in the nation, with their famous Dungeness crab and geoduck clams. It's a relatively safe and quiet place to live and work. There's a reason that business leaders like Bill Gates and Jeff Bezos have snapped up properties here; it's stunning, peaceful, wild and yet close to one of the biggest cities on the west coast of the United States.

In 2018, however, environmental tests near Seattle revealed something unexpected.

Shellfish, specifically mussels in three locations along the Seattle waterfront and Bremerton shipyard areas, among other areas, tested positive for the prescription painkiller oxycodone, also

known as OxyContin and Percocet. In eighteen locations of the eighty tested, mussels also tested positive for detergents, as well as seven kinds of antibiotics, five types of antidepressants, a synthetic insulin commonly prescribed to Type 2 diabetes patients called metformin and a chemotherapy agent called melphalan. Half of the mussels tested positive for iopamidol, which is an X-ray contrast agent that helps in lab technicians' work.

Mussels situate themselves on rocky outcroppings in the sea bed in the open ocean, but these mussels weren't wild. The Washington Department of Fish and Wildlife carefully placed these mussels in eighteen Seattle-area locations for the purpose of water testing. Every two years (dependent on funding) state biologist Jennifer Lanksbury and her team transplant mussels from a clean aquaculture source at Whidbey Island to dozens of sites in Puget Sound in order to test the waters, literally. Mussels are unique: they absorb water in a way that allows scientists to accurately gauge the effect of our social practices on animals and our ecosystems, plus the potential for harm to the human body. They're the new canary in the coal mine for biologists like Lanksbury.

People may be completely unaware of how much all of the pharmaceuticals they are putting into their bodies are affecting their community and making their way into our shared waters: not just in the ocean but also in the rivers and lakes that eventually feed into our drinking water. Yes, wastewater treatment can deal with much of this pharmaceutical excess, but we're reaching a tipping point at which it becomes increasingly difficult to manage.

"A lot of the pharmaceuticals are probably coming out of our wastewater treatment plants," Lanksbury says. "They receive the water that comes from our toilets and our houses and our hospitals, and so these drugs, we're taking them and then we're excreting them in our urine."

Mussels, for Lanksbury, are an emblem of where we are heading as a species. The levels of antidepressants that she found in

some samples were high enough to be the equivalent of human prescriptions. In other words, it's as if our sea life is filling prescriptions for several antidepressants, heart medications, insulin and toxic loads of carcinogenic chemotherapy every day.

"It's become a chemical soup in urban environments," Lanksbury says. "There's a cocktail of chemicals out there and it's an emerging concern. We don't know how they interact, and they may be multiplying the effects of each other. And it's not just mussels. We monitor herring, English sole, salmon and orcas on a regular basis. We know that this situation causes cancer in fish, changes in hormones and behavioral changes that limit the ability of these animals to thrive."

Pharmaceutical overload also affects human beings' ability to thrive. We want to be well, but we want it to be easy. And that's why, unlike coastal sea life, we're taking these drugs willingly, and we're taking them in larger quantities than ever before.¹ We're eating them up as quickly as we can convince our doctors that we need them.

Eating our pain

By early 2018, it was found that our dependence on the painkillers known as opioids (as they are by-products of the plants used to make opium and heroin) continues to grow at an alarming rate. News reports state that there are nearly 150 opioid-related deaths per day in the United States.²

More than 63,600 lives were lost to drug overdose in 2016, the most lethal year yet of the drug overdose epidemic, according to the latest report from the National Center for Health Statistics, part of the US Centers for Disease Control and Prevention.³ In 2016 alone, 42,249 US drug fatalities—66 percent of the total—involved opioids. That's over a thousand more than the 41,070

Americans who die from breast cancer every year. Governors are begging Congress to do more to address the issue.⁴

On a per capita basis, the increase in opioid use over the last three decades has been staggering. We hear about the opioid crisis in America on the news every day, and we assume, wrongly, that it is an issue confined to the streets. In fact, 40 percent of opioid prescriptions are written by general or family practitioners, osteopaths or internists, most commonly for general pain.⁵ The rest are written by surgeons, prescribed as aftercare for surgeries or other procedures. These are the prescription drugs that we are flooding into our water supplies and even the oceans.

Think about it. The water you drink and the food that you eat are already affected by an over-prescription of opioids, even if you've never taken them.

And it's not just accidental. Studies on unused prescription medications have shown that stimulants, such as Ritalin, and opioids, such as Vicodin and OxyContin, are related to a rise in prescription drug abuse among teenagers.⁶ In the home environment, there is a greater risk of abuse of these drugs, particularly when adolescents have access to their parents' unfinished prescriptions. In many cases where teens face significant emotional or psychological challenges, they may turn to prescription drugs to numb the pain associated with their problems even when they don't have their doctor's support, and they may also resort to negative behaviors to obtain access to these drugs. For both young people and adults, there is essentially no effort involved in reaching into the medicine cabinet on a regular basis, even when the pills are prescribed to somebody else.

Why are we taking so many drugs?

It's not just a moral issue. We're not doing this for fun. Many people assume that taking drugs to the point of overdose is something that only affects the young, that it's linked to poverty and

social disorganization and that it's a result of poor life choices, but that's far from the truth. Americans are deeply affected by stress and pain. We comprise 5 percent of the world's population but consume more than 80 percent of the world's prescription antidepressants, opioids and amphetamines.⁷ And if we're taking it, we're also drinking it: opioids, blood thinners, hormones, chemotherapy agents and amphetamines are in our water. The increase in the use of these drugs, according to our nation's own statistics and experts in the field, have contributed to a shortening of the US life expectancy for many years in a row because of the risk of overdose.⁸ We're not talking about heroin, but even in their pharmaceutical state, opioids seem to be just as dangerous as street drugs.

And it's not just physical pain we're trying to eliminate. Our perceived need for mental health drugs may be warranted. Results from the World Mental Health Survey consortium, which looked at trauma and its effects in twenty-four countries, show that people in the United States experience more subthreshold and deep trauma than almost any country in the world, including those in the Middle East and Africa. In fact, more than 80 percent of our population has seen trauma in our lifetimes.⁹

What kinds of trauma do we face? Most of what we see is everyday interpersonal violence. This means that when we witness death or serious injury, the unexpected death of a loved one, when we're mugged or in a life-threatening automobile accident, or experience a life-threatening illness or injury, we feel trauma. These are all examples of subthreshold trauma—in other words, the kind of trauma that adds up over our lifetimes. Deep trauma, such as the experience of a life-altering event like a school shooting or terrorist attack, or our experiences as soldiers on the battlefield, adds to that pain. Over and over again, when we face these events, we also experience psychological revictimization.

The Stress in America survey is conducted online within the United States by Harris Poll on behalf of the American Psychological Association (APA) every year. It tracks how we feel about ourselves, our communities and our future as a nation, and it looks into what stressors affect us the most; it's been tracking these metrics since 2007. The results of the 2017 survey found that the stress that we face is even more substantial than ever. More than half of Americans (59 percent) said they consider this the lowest point in US history that they can remember—including those who lived through the Second World War and Vietnam, the Cuban Missile Crisis and the September 11 terrorist attacks.¹⁰

And this stress doesn't just affect a few of us; stress reaches across all social divides, from our level of financial security to our race to our level of education and also across political beliefs. "We're seeing significant stress transcending party lines," states Arthur C. Evans Jr., PhD, the APA's chief executive officer. "The uncertainty and unpredictability tied to the future of our nation is affecting the health and well-being of many Americans in a way that feels unique to this period in recent history."

The most common issues causing stress when thinking about the nation are health care (43 percent), the economy (35 percent), trust in government (32 percent), hate crimes (31 percent) and crime (31 percent), wars/conflicts with other countries (30 percent) and domestic terrorist attacks (30 percent). In other words, we're perceiving stress from all corners of our lives, from what we experience in our own homes to how safe we think we are from threats in our communities to how we navigate global challenges as a nation.

"With twenty-four-hour news networks and conversations with friends, family and other connections on social media, it's hard to avoid the constant stream of stress around issues of national concern," says Evans. "These can range from mild thought-provoking

discussions to outright intense bickering, and over the long term, conflict like this may have an impact on health.”

With this ongoing strain comes a physical response: individual and collective pain brought on by not only recent but centuries of conflict creates a breeding ground for disease in our bodies. We Americans, perhaps more than any other group of people on Earth, have built a nation through the infliction of pain and through enduring conflict. We extracted our freedom from English rule through conflict with European armies and with Indigenous people of this continent. We have created and endured through the pain of slavery and the trade of human lives. We have actively chosen to participate in wars on almost every continent on the globe, and we continue to do so.

Stressed, depressed and diseased

Let me make it simple. The more that we experience stress, the more that we are depressed. The more depressed we are, the more pain our bodies actually feel, and the more susceptible we are to illness and disease.

In essence, when we are depressed, our neurological systems have a heightened response: they send out signals throughout our whole nervous system that tell us to be on high alert. If direct danger doesn't come, this response doesn't abate as long as we believe that danger is around the corner. This constant stress response leads to inflammation throughout our bodies, in every cell.

We can think of inflammation as the body's response to various forms of stress. It can be stress from our environment, such as our diets or excessively loud noises (like living next to a highway). Or it can be self-induced mental stress, such as excessive worrying. When physical or mental stressors are part of our daily

life, the body-mind system remains in a state of constant alert—an unintended perception of danger that exists subconsciously and is present in our body as a whole.

Although inflammation has long been known to play a role in allergic diseases like asthma, arthritis and Crohn's disease, clinicians such as Dr. Tanya Edwards of the Center for Integrative Medicine say that Alzheimer's disease, cancer, cardiovascular disease, diabetes, high blood pressure, high cholesterol levels and Parkinson's disease may all be related to chronic inflammation in the body.¹¹ Over time, when the inflammation doesn't go away, our cells become tired and unable to fight off disease, like fibromyalgia, or they proactively mutate, as in cancer.¹²

The more that we as a population experience this stress, the more that we will, collectively, become challenged. The more stressed we are, the sicker we get, and the less likely we'll remain the productive, leadership-oriented Americans that we want to be.

All possible futures

We need to talk about the drugs we are using versus those that we don't, and why what we're doing isn't working anymore.

There is a broad spectrum of medicine that can address stress and almost all of its physical and mental health effects—such as pain, trauma, anxiety, depression—and can even help to alleviate and eliminate some forms of cancer. It calms the central nervous system. It rapidly decreases inflammation and nausea. It makes the pharmaceuticals that we take more effective and less challenging for our nervous systems to process. It has minimal, if any, side effects, and it does not cause intoxication or mental distress. Unlike opioids such as fentanyl or oxycodone or Vicodin, there are zero recorded deaths associated with its use.

It's called cannabidiol, commonly referred to as CBD. It's something that we found in cannabis and hemp plants almost 6,000 years ago and learned to use in order to make ourselves well.¹³

Let's begin by clarifying some commonly confused terms.

Hemp and marijuana are both forms of cannabis. Cannabis that is rich in tetrahydrocannabinol, or THC, is marijuana. THC makes people high. Cannabis with low THC is called hemp, and it also contains CBD. Both CBD and THC are health-promoting molecules. Medical products that are made from hemp are not psychoactive, meaning that the level of THC in the plant is very low. As we'll explore over the course of this book, however, CBD can make almost anyone's life better. It is a non-addictive, non-psychoactive plant medicine, which means that it has zero chance of making anyone high.¹⁴

Here's the problem.

CBD has been legally unavailable to Americans because of a bizarre social context in which the possession of marijuana has been perceived as serious of a federal crime as being caught with heroin. In a way, lawmakers have been a bit sloppy. They made all forms of the cannabis plant illegal. Ironically, products such as hemp seed milk are freely sold in stores such as Walmart, but because we can't grow it here, we import most of the hemp seeds from Canada. We have been denied access to CBD from hemp plants and have subsequently become a nation deeply affected by physical and mental pain, turning to unusually harsh and dangerous pharmaceutical prescriptions. There is an assumption that it, like non-medicinal cannabis, causes more health problems than it solves. But we take opioids every day and, as I've shown here, they are killing us. While the legal environment for cannabis is changing both at the state and the federal level, the way we feel about it hasn't changed all that much.

Ricardo Baca, a former editor at the *Denver Post*, has specialized in the coverage of cannabis since its entry into the Colorado market after its legalization was passed by voters on November 6, 2012. He explains that CBD is undergoing a shift in the public sphere but is still grossly misunderstood.

“Five years ago people were saying stay away from it,” Baca says. “Today, the Food and Drug Administration has approved it as medicine. We’re re-scheduling it. But even cocaine is a Schedule 2 drug. Cannabis, including CBD, has been a Schedule 1 drug for almost one hundred years.”

Schedule 1 drugs are, in the words of the Drug Enforcement Agency, the “most harmful” substances to the American public. As Baca explains, CBD, a product of a non-psychoactive plant with no side effects and no associated deaths, has been listed as more dangerous than cocaine, despite the fact that cocaine is responsible for the largest increase in overdose deaths, at least among street drugs, for the last five years running.¹⁵

Because it’s been largely unavailable to prescribe for years, CBD is not widely known or trusted by doctors or by the general public as a wellness tool. To most Americans, cannabis medicines seem like snake oil or a hippie drug. But that’s not the case according to most researchers. As we’ll explore here, the discovery of the endocannabinoid system in the body has produced more than 10,000 new evidence-based research studies over the last thirty years on CBD and its effects on human and animal health.

The results are unequivocal: researchers have tested CBD as a possible treatment and even a cure for conditions as diverse as sleep apnea, cardiovascular disease, epilepsy, chronic neuropathic pain, Alzheimer’s disease, Parkinson’s disease and so many more.

The question of self-care

There is absolutely no question, from the point of view of Western medical research, that CBD is the real deal. Don't get me wrong: it may not be a cure for every ailment on the planet. CBD may lead us on the path forward, the healthy path, that we've been seeking all of our lives. And, in some cases, it may not. Even so, CBD is probably the closest thing we've found to a magic solution for health in the history of our species, as most of the researchers, medical practitioners and patients I've met in the course of my own CBD journey have told me. It's worth exploring how we can use this plant medicine to improve our lives.

And CBD isn't the only plant medicine we're underusing. While I want to explore CBD in particular, as someone whose past career was dependent on understanding how we can best care for our bodies and our minds, I've come to learn that there are a lot of extremely powerful medical traditions that Americans at best ignore and at worst demonize. We have been lacking the initiative to do anything but follow the status quo for so long that we're out of practice in helping ourselves. We need to create pathways to wellness that work for each of us, and that requires new information, a commitment to self-care and the freedom to choose what is right for our individual health.

We're nonetheless left with a number of questions. Why are we afraid of trying a plant medicine that is made from cannabis? Why do we ignore plant medicines altogether? Why are we stuck in this stress loop, inching our way toward permanent debilitation and disability? Why do we keep feeding ourselves deeply dangerous pharmaceuticals, rather than addressing the underlying problems that we face as individuals and as a nation? How can we shift toward wellness and build new and more effective medical habits within our health care system?

Part of the challenge is the health care system itself.

Despite the fact that the US health care system is the most comprehensive in the world, it is also the costliest.¹⁶ The cost of American health care is prohibitive on a national level compared to nations with public health systems. According to the Organisation for Economic Co-operation and Development (OECD), the cost of health care to the US public consisted of 16 percent of GDP, even though the majority of health care is private and US government programs only cover 27.8 percent of the population's overall health care needs. It is the second-highest percentage rate of health care costs among all OECD nations. In Canada, where the entire health care system is public and covers 100 percent of the population's fundamental health care needs, the cost of provision was less than 10 percent of gross domestic product (GDP) in the same year. In the UK, it was just over 8 percent for a fully public system.¹⁷ The World Health Organization (WHO) has ranked the US health care system first in responsiveness but thirty-seventh in overall performance and seventy-second by overall level of health (among 191 nations).¹⁸ The United States ranks poorly in terms of years of potential life lost (YPLL), a statistical measure that predicts being saved by health care. Among OECD nations, the United States ranked third to last for the health care of women and fifth to last for men. On top of this, survival from major illnesses in the US is systematically and substantially lower for those living in poverty.¹⁹

The high rate of underinsured Americans, especially given all of the continued debate over federal health care policy, is an economic burden to the nation and morally questionable as we let those without the means suffer and die from preventable illnesses.

What this means is that our emerging concern isn't the mussels or even the opioids and antidepressants in our waters. We can make changes to clean our water systems and shift the

environmental status quo, and we can change our policies. As Lanksbury points out, however, our actual emerging concern is our health habits. As Americans, we have a responsibility to the planet, but we also have a responsibility to our own health and happiness. Like our record with the environment, however, we may very well be on track to destroy the collective well-being and safety nets that we've created, because we think in terms of quick fixes rather than preventative care.

We're not looking critically at what we eat, how we live and how we care for ourselves and each other. We are, in fact, a nation in deep pain and distress. But we can change this, and change our collective future.

It's my goal in this book to investigate the links between our health and our choices and how Americans can find a better way forward to wellness. I'll show you just how profound our collective endocannabinoid deficiency really is and its effect on our health care, our stress levels, our disease burden and our future.



2

A HERO IN HEALTH CARE

DR. MICHAEL MASTERMAN-SMITH is a biologist and pharmacologist at the forefront of cancer research. Masterman-Smith's discovery of cancer stem cells in pediatric brain tumors was deemed to be a "high impact discovery" by the National Cancer Institute.¹ His research focuses on the development of plant-based drugs, more commonly known in medicine as phytochemicals, to treat diseases. One of those phytochemicals is CBD.

This is groundbreaking work. Masterman-Smith's findings, as to how to effectively use cannabis medicine, help children dying from usually intractable forms of cancer. What he's discovered has turned around the lives of families across the country. But, as he tells me, when he talks about his work, he is often dismissed outright, especially by politicians.

"They call me a 'pot doc.' And I say, 'Oh, okay. Alright. You can call me what you want, I'll be happy to educate you,'" Masterman-Smith says.

CBD and cancer

Most of us have heard about how prescribed cannabis can help alleviate the pain and nausea associated with cancer treatments, but Masterman-Smith's work is about how CBD can help prevent or get rid of cancer altogether.

In order for a cancerous tumor to grow, it has to start somewhere. The initial stage of cancer, as Masterman-Smith describes it, is when a stem cell changes from having a positive role in the body to a negative one.

As Masterman-Smith explains, "Stem cells . . . normally are in the body to do repair, regeneration and grow parts of our body and build us out. Those types of cells go bad, and they hold all the properties of the stem cells. They can stay alive and do whatever they need to do in our bodies in a health function. This is one of the reasons why people call cancer a heterogeneous disease. But these cells lead to incredibly malignant cancers, and that's why they're very difficult to treat."

Steve DeAngelo is the co-founder and CEO, along with his brother Andrew, of Harborside, the largest nonprofit medical cannabis dispensary in the United States. He is one of the founders of Steep Hill Labs, which is the nation's first cannabis-testing facility. He doesn't work with Masterman-Smith, but DeAngelo has been working with cancer patients for more than twenty years, and he explains how these malignant cancers grow faster than we can address them.

"The essence of cancer is that cells that are supposed to die don't die," DeAngelo says. "They agglomerate into a mass. That's the essence of cancer. That happens in two ways. First, there's a natural process of cell death that usually happens, that's called apoptosis, and cancer interrupts that process of apoptosis, so the cells don't die. There's a second process that cancer uses called

angiogenesis, where cancer will appropriate blood vessels that are used normally for other things in the human body, steal those blood vessels and use them to grow the cancer tumor.”

All of these cells can divide, either to our benefit or to our detriment. Masterman-Smith calls cancer stem cells the queen bees of cancer: they tell the rest of the cells what to do and when, but the results are always negative. Stem cells tell other cells to divide and conquer through the creation of tumors.

Once they found these queen bee cells, Masterman-Smith and his team really got to work.

“A lot of really hard lab work is just rigorous drug screening. We looked at drug after drug after drug that might kill these cells. Pharmacology is based on our ability to match a drug to a disease. The drugs already exist, and they’re in what are called libraries. The drug library that we started with included 30,000 compounds: all drugs that were clinically approved for cancer and any other known condition.”

One by one, the team applied drugs to these stem cells and found that the only group of drugs that was toxic to the cancer stem cell were synthetic forms of CBD, which had been known to scientists for about a century already.

“We found a drug class, cannabinoid receptor antagonists, that can potentially treat cancer stem cells,” Masterman-Smith explains. “But then we stopped because we couldn’t progress these drugs into trials.”

Essentially, the form of CBD that Masterman-Smith and his team discovered to be effective wasn’t made in nature but was a chemical version of a cannabinoid created in a lab. This particular early chemical version of CBD made people sick, not well. There’s a pretty simple reason why, says Masterman-Smith. Researchers can recreate what’s found in nature by simply putting together the elements that are in a chemical compound. It’s a lot like following

a recipe. The challenge is that, when you try to recreate a meal from scratch, a few key things will always go missing. Scientists are best able to guess at these missing elements, but it's hard to isolate all of the variables. Synthetic single-molecule drugs can, in some cases, rapidly increase the risk of a range of side effects, depending on the molecules involved, which makes them hard to use over the long term.

Plant-based CBD doesn't produce side effects, and it works to stop cancer in a really beautiful and elegant way. Inside the tumor itself, CBD restarts apoptosis, which means that the cancer cells begin to die off faster. At the same time, the blood vessels that have been taken over by the tumor (angiogenesis) start to wither and shrink.

"So at the same time the tumor's being blown up from the inside," DeAngelo says, "its nutritional lines of supply are being cut from the outside."

In other words, CBD has the potential to stop cancer in its tracks.

While CBD doesn't have a positive effect on all cancers, when there are cancer stem cells in play, such as in breast, prostate, pancreatic, ovarian, colorectal and even brain cancers, the chances are that CBD can help shrink those tumors if the cancer is caught at the right time.

"The finding was remarkable," Masterman-Smith says. "We had shown a potentially useful therapeutic drug class for a particularly lethal cancer. I thought, 'There's something here. This is excellent data—we found a drug class to work with.' I wanted to test plant-based cannabinoids. And I knew this would be a leap from what I had known my entire scientific career, but when you're looking for a cure, how you get there takes some unusual routes."

The leap of faith meant that, in 2016, Masterman-Smith chose to leave his job at his UCLA research laboratory and, in essence, become a farmer.

“The goal is to find a cure. I followed my data, I found the drug that could potentially be a cure and I was going to do whatever it took. I said, ‘You know, let’s really dive in and let’s start. Let’s make this transition.’ And I was in the right position as a pharmacologist. It’s my job to develop drugs. Am I going to spend my time on a lab bench? Or am I going to spend my time trying to understand the plant material and understand these strains to go after the cancer? The only difference is that I’m getting it from a plant now.”

The war we should be fighting

Why did Masterman-Smith have to step away from the lab to start looking for a cure for cancer? Why did this highly respected leader in the field of pediatric brain cancer, working to save the lives of America’s most vulnerable children, have to move his research to a farm, rather than continue working under the auspices of a large research group or university?

When it comes to health care, the American way stresses a single standard: rational thought. There’s a structure in place that governs how, when and why we research and evaluate pharmaceuticals and other forms of medicine. Drug research standards are set by the Food and Drug Administration (FDA) so that all Americans can be assured that what they buy is safe to use.

It makes sense. We should be able to look at a problem, research a solution and then apply that solution in every case.

We do this everywhere in our society. We create bureaucracies at every level of our economic, legal and scientific institutions because we believe that we can apply rational thought to all aspects of our lives. In these institutions, every person must meet strict and rationalized criteria in their work, usually on a minute-by-minute basis.

For drugs, therefore, the process starts with research aimed at the goal of winning FDA approval. Most of the research in the US must also go through the National Institute on Drug Abuse (NIDA), which looks at the potential for drug abuse in relation to potentially addictive drugs, rather than the therapeutic effects or side effects. In addition, it has to pass the tests of the Drug Enforcement Administration (DEA), which takes the addiction potential of a drug as sacrosanct in its codification of whether or not a drug classifies as a banned substance. As Masterman-Smith explains, what this means is that, in order to develop a drug and get it through this process and to market, it costs approximately a billion dollars. “Wall Street is basically the only place you go to get that kind of money. Private equity. You’ve got to get massive amounts of money in order to do the basic job of trying to find a cure for cancer,” he says.

The problem for CBD is that it is made from cannabis, a federally illegal substance. Even though it has no psychoactive properties, it becomes the proverbial baby thrown out with the bathwater.

Because psychoactive cannabis has been a strictly controlled substance in the United States since 1940, CBD does not qualify for research status except under very extreme circumstances in which there are a number of checks and balances put into place by the DEA and NIDA; even then, it’s unlikely to happen. And yet other banned street drugs, such as heroin, have their medical equivalents, such as morphine, used on a daily basis in hospitals across the nation.

Thirty years ago, the DEA wanted to address this inconsistency. Judge Francis Young, a DEA administrative law justice, reviewed all evidence from a lawsuit against federal marijuana prohibition in 1988 and found that:

The evidence in this record clearly shows that marijuana has been accepted as capable of relieving the distress of great numbers of very ill people, and doing so with safety under medical supervision. It would be unreasonable, arbitrary and capricious for the Drug Enforcement Administration to continue to stand between those sufferers and the benefits of this substance in light of the evidence. Marijuana, in its natural form, is one of the safest therapeutically active substances known. In strict medical terms, marijuana is safer than many foods we commonly consume.²

The response from a DEA committee was that it refused to reschedule marijuana from its Schedule I. And yet peer-reviewed studies from one of the most respected medical journals in the world, *The Lancet*, report that using marijuana as pain relief, even in its psychoactive form, is ten times safer than Tylenol.³ The American Medical Association (AMA) reviewed the randomized, double-blind controlled trials published on the possible adverse effects of medical marijuana over the course of decades and found that it has no substantive side effects.⁴ No deaths caused by medical marijuana overdose have ever been confirmed in the US.⁵

Without the DEA and NIDA on side, the FDA won't even consider easing the way for cannabis-based medicine without a significant backing by a major pharmaceutical firm.

But here's the challenge: Big Pharma won't touch it either but not because it's illegal—because it won't make them money, at least not on a path they've followed in the past.

Let's take what Masterman-Smith has told me at face value: it takes a billion dollars to create a new drug. The synthetic version of CBD, however, the one that has been created by a pharmaceutical firm sometime in the past, it doesn't help people. It hurts them. It's not quite right.

Plant-based CBD, however, can be grown in someone's backyard. And it's safe.

And it works (and we'll get more into that in the rest of the book).

CBD can be processed simply and easily, and it can be combined with a number of different plant medicines to make it even more effective. But it's never going to be worth investing a billion dollars in to get FDA approval, because the market for it is simply too diverse. Right now, as we'll discuss in the following chapters, it's important to understand that CBD is linked to a spectrum of other cannabinoids that are provided to patients in different, and sometimes very specific, combinations. This means that it can't be packaged neatly into an easily recognized and marketable drug. As well, it's a risk for Big Pharma because once people understand how it works, they can access CBD much more inexpensively than a drug company wants to sell it for, simply by growing it and extracting it themselves.

At the time of writing, the company GW Pharmaceuticals is launching, with the approval of the FDA, a CBD-based drug called Epidiolex. It's targeted at children who have epilepsy, and it consists of a combination of CBD and traditional epilepsy pharmaceuticals. GW Pharma is interested in this work for different reasons than the traditional American firm. First, it's based in the United Kingdom, not the United States, which means that it has a different set of standards in place for research and development, some of which are funded through the UK university system rather than by the company itself, which offsets the cost of developing the drug. Second, GW Pharma is a relatively small firm in its industry, even though it has more resources than average. It doesn't quite reach the echelon of what we refer to as Big Pharma, and it's more flexible in its practices as a result. Third, and perhaps most important, the company can protect its financial rights

to CBD only by combining its own pharmaceutical compounds with this plant medicine. Big Pharma does not try to patent entire plants. All a company can patent is the specific genetic design of one generic version of a species. And because countless genetic versions will produce the same and beneficial pharmacological result, there's no way for a company to make money on the whole plant. What it can do, however, is isolate molecules from a plant and claim the invention of using it for some specific purpose. This is what GW Pharma is doing.

In the United States, in comparison to the UK and other nations, our medical system is affected by a complicated system of laws that allow corporations to do what they're designed to do—make money in any way that is not illegal, rather than serve the public interest. It's about money: not only does Big Pharma have the investment dollars to get drug approval via the FDA, they also have the ability to lobby both governments and individual doctors to push their products into the American system.

And that's why Masterman-Smith, one of the shining lights of cancer research in our nation, has become a farmer.

“We are in a war on cancer,” he says. “There's no doubt about it, we throw plenty of drugs at cancer, and we do everything we possibly can to treat cancer. It's a horrible, horrible disease, and we need to go after it with all the guts and gusto we have. But I'd always felt I was an unconventional warrior, so going off to a farm to find a cure was a no-brainer to me.”

Rationality that isn't rational

Masterman-Smith is an unconventional warrior. Most American doctors follow what is known as an allopathic medical code, based on the idea that we can test everything using the scientific

method. There is a limit to what we can model in nature, and so there is a limit to what we can prove with pure scientific experiments and the general scientific method. We cannot control for everything. The scientific method requires strict controls on experimental inputs. But any physically realistic system in the universe cannot, even in principle, be disconnected from the influence of the environment or the non-computable complex system's internal self-evolution of itself. The scientific method, as incredibly important and helpful as it is, has very serious limitations on what can be deduced from its process of controls and experiments. If we can't test a medicine, then it probably won't pass muster either legally or socially.

At the same time, the allopathic medical code is also based on the idea that, rationally, we should be able to create a solution, such as a pill or a surgery, and make our health problems go away.

Don't get me wrong. Doctors are allowed, by law, to look at plant medicines as an option for their patients. In fact, the United States has a pathway to this kind of care unlike anywhere else in the world through the Dietary Supplement Health and Education Act of 1994 (DSHEA). But doctors don't prescribe these plant medicines, because plant medicines aren't a part of the conversation in the first place. The system, with respect to the way that it affects physicians, is actually more restrictive than anywhere else in the world, simply because doctors get punished through lawsuits and the refusal of the insurance system or Medicare to pay for plant-based medicines.

The actual conversation, the one that doctors rely on, is the foundation of the Flexner Report. This document transformed the nature and process of medical education in America and established the allopathic biomedical model as the gold standard of medical training.⁶ This report, written by Abraham Flexner and published in 1910 under the aegis of the Carnegie Foundation, created a world of hyper-rationalized medicine in the United

States, in which standards were created that pushed out a range of medical techniques and placed a focus on patented drugs alone, rather than plant medicines. Our common understanding of the Hippocratic Oath, the foremost standard for Western medicine, is “first, do no harm,” but we all know people who experience negative effects from allopathic medicine, and these are ignored. We know that more and more people are taking opioids, and not just for what they were prescribed to heal. In 2014, 20.5 percent of the US population age twelve or older, or roughly 56 million people, reported using prescription pain relievers, tranquilizers, stimulants or sedatives for a nonmedical purpose at some point in their lives. And doctors made that possible, along with the rest of our money-centered medical system that has led to the over-prescription of these fatally dangerous classes of drugs.⁷

The Flexner Report decreased the number of doctors, as well as what they practiced, and placed an emphasis on pills as solutions. Women, trained and practicing physicians prior to the report, were no longer accepted into American medical schools under this system. Basically, the Flexner Report created a new way of thinking about medical care. This way of thinking tells us that there is only one way to practice medicine, and that is to follow a tradition that privileges drugs over wellness.

CBD does not fit into this system.

Even though it has no side effects, and no associated deaths.

Even though it works to solve some of the most complex illnesses.

Even though there have been more than 10,000 research studies conducted on CBD in the last thirty years using the same evidence-based standards required by the American medical establishment.

What it comes down to is the social space in which we fight diseases in this country. Overall, the United States stands behind most other developed nations in terms of its health care efficacy

and efficiency, and it has to do with a belief that we know what we are doing.

Except that we don't.

There's a grave misunderstanding in how truly excellent American health care is, or is not. Let's look at what we're telling ourselves versus the reality as measured by external less-biased sources.

The American College of Physicians (ACP) prepares metrics each year on our health care system, and these indicators help to shape our policy efforts at least to some degree, depending on the administration in power. In terms of the costs of our health care, the ACP argues that we are on par with the rest of the world, except that's really not true.

The challenge in much of the ACP's analysis in comparing the US health care system to that of other countries is that they use percentages of costs paid by patients for comparison, rather than per capita or hard costs, which is different from the approach of the OECD and other international bodies. This means that the ACP's comparative statistics make it seem as if Americans are paying less for health care than Canadians or the British, when this is not the case since the cost per service in the US is, on average, more than ten times higher than that in the other countries in the OECD.⁸ What this means is that Americans are actually paying a much higher cost per health care service, and our overall cost of care is significantly higher than that of other countries' citizens. Similarly, while the ACP makes the argument that Americans have a higher GDP per capita than other countries, which they suggest means that more Americans can afford the higher costs of care, they fail to recognize the higher differential between rich and poor in the United States compared to other OECD countries. A much greater percentage of the population lives below the poverty line in the United States compared to Canada, the United Kingdom and Australia, for example.⁹

This is why our life expectancy in the US, despite our relative wealth, is lower than much poorer nations such as Greece and South Korea, let alone our nearest counterparts such as Canada, which is close to the top of the list. In the developed world Canada ranks eleventh, which is in the top 5 percent of nations. The US ranks forty-third, which is in the bottom half of countries in this category. This is a remarkable statistic, considering the fact that most foreign visitors driving between cities in the US and Canada would view the two societies as being nearly identical. Something is broken with the system. We spend the most and we probably have the best technology in the world compared to other nations. And yet, at the same time, we are the sickest both mentally and physically in all of the important ways.

Accordingly, we must always use some degree of intuition and common sense along with our experimental evidence. The often remarkable results of traditional plant-based medicine have been discovered over thousands of years of trial and error and intuition by Indigenous people. All pharmaceuticals do not work for all people, and there are countless examples of, for example, antidepressants that have been FDA-approved and scientifically backed and then later found to not work at all, where the results that were perceived were either due to the placebo effect or to an unknown control that was not experimentally managed.¹⁰ Because almost all pharmaceutical drugs have at least one troublesome and oftentimes many more horrific side effects, this is a challenging place to begin to treat a patient in pain.¹¹

At the heart of this issue is social equity, as well as a core mentality that we're better than everyone else and therefore we must know what we are doing, even when this is not the case. Even so, the ACP and the US Department of Commerce have both admitted that there are underlying social discrepancies in access to care in the US that simply don't factor into policy decisions.¹² There

is a need to recognize that the health care system's efficacy and efficiency is not contingent on a large amount of money but rather on social determinants of health. Social factors that limit access to health care may be self-administered or provided by a health care system. These factors are deeply connected to a country's cultural and social norms. If, as in the United States, the cultural norm is to seek care from a professional with knowledge that is approved by our broken health care system, then the average American will simply not receive effective or efficient care over the long term.

The underlying philosophy of the US health care system is likely to provide exemplary care under extreme circumstances, such as in the case of cancer, but there is an argument to be made that these extremes could be avoided with proper preventative care. For example, the CDC reports that even traditional interventions necessary for treating cancer in the US are accessed, at present, by only 77 percent of men and women over the age of forty,¹³ and the American College of Physicians notes that people in the United States only receive proper preventative care about 55 percent of the time.¹⁴ The outcome that would be preferable to the CDC and other health agencies, of course, is 100 percent compliance with physician or nurse recommendations for disease testing and follow-up examinations, but this does not take place. That's why Masterman-Smith, DeAngelo and others have chosen to operate in their own world of health care, separate from this shattered system.

The United States ranks at the highest level of opportunistic behavior of health care organizations and pharmaceutical companies; as a result, patients in the health care system have the lowest level of agency, or ability to participate in both personal and community decisions, among all countries in the OECD.¹⁵ People not only have financial barriers to care but barriers to understanding how to manage their own health, participate in healthier behaviors

or know when to seek professional assistance.¹⁶ As a result, many individuals in the United States are not able to prevent emergent care issues, which is likely to cost more than preventative medicine or health advice from a primary care practitioner.¹⁷

The wrong way round

I've spent a lifetime exploring how we can use plant medicines to make our lives better, and I know that Americans deserve better health than what we've been offered, but the reality is that, perhaps, we're looking at the question of health the wrong way round.

Scientists like challenging the status quo.

There's an old story about the English scientist Sir Isaac Newton (1642–1727). You are likely to know his work on gravity and motion, but when he was just starting out as a researcher, Newton bought his first prism in 1666, only one year after Francesco Grimaldi's work on the diffraction of light was published. A couple of years later, Newton presented the theory that light is made of particles and not waves, based on his experiments that showed that white light could be produced by a mixture of distinct colored rays. This was at a time when the Royal Society contended that color was created by mixing light and darkness. Newton showed them a different way of thinking about the same problem: by passing a beam of light through two prisms that shifted the angle back upon itself, he was able to illuminate how a beam of colored light remained the same no matter how many times it was reflected or refracted. Color was, indeed, a property of reflected light and therefore consisted of particles.

For thirty-two years, however, Newton's ideas were rejected. English natural philosopher Robert Hooke had stronger social capital than Newton, and Hooke's popularity gave him the kind

of legitimacy that was required to convince others at the time. On Hooke's death, Newton was finally able to demonstrate his theories on light again, this time to a more receptive audience, and the nature of light as particles was finally accepted. While his theory was eventually shown to reveal only a small aspect of what constitutes light (Einstein believed light was a particle, which he called a photon, and he argued that photons can flow in a wave), Newton was able to shift the way that we think about what we see and how we perceive our universe. In 1704, he was actually elected president of the Royal Society and he published *Opticks*, a monograph on his theory of light, the same year.

We can challenge the status quo in the same way; we just have to be patient.

CBD and the intervention of health practitioners who look at care in a completely different way than imagined by the Flexner Report may be able to provide us with what we've been searching for all along: a healthy and simple way to prevent and treat disease and to make us well.

3

CHANGING THE CONVERSATION

AT THE UNIVERSITY of British Columbia in Canada, Dr. Zach Walsh, a professor of clinical psychology and addiction, operates a cannabis research lab. And, like Michael Masterson-Smith, Walsh loves his work.

“I’m just fascinated by the plant,” Walsh says. “I’m fascinated by what it does, on so many levels. It’s fascinating at the neurochemical level, it’s fascinating at the social level. And as we saw the whole profile of cannabis changing over the last couple decades, I thought, ‘That’s exactly where I need to be.’”

Each of Walsh’s graduate students, who run their own projects on CBD and THC and their medical effects, operates under their own federal Social Sciences and Humanities Research Council grant. The cannabis lab team members are paid by the Canadian government to find out how medical cannabis can work to increase wellness. Walsh’s own research is on the effects of CBD on post-traumatic stress disorder (PTSD), which we’ll hone in

on later on in this book; his students study everything from cannabis's ability to treat pain to its potential to make it easier for non-athletes to excel at exercise activities like running and yoga to its ability to solve the opioid crisis.

As excited as they are for the possibilities that cannabis offers the medical community, these researchers remain professionally skeptical. As Michelle Thiessen, a graduate student in the lab, explains, even she was very critical of cannabis before she started her research.

"I grew up during the 'Just Say No' and the DARE campaigns," Thiessen says, "so I was exposed to a lot of fear-mongering when it came to cannabis. I was a staunch opponent against it. It wasn't until I started to learn that cannabis can be an effective medicine, that it had thousands of years of use behind it, that I wanted to look into it a little bit further."

We'll further explore this history of cannabis use for medical purposes, but what you need to know is that while not all plants can grow in all climates, cannabis can. It can grow in marshes; it can grow in the Himalayas; it can grow in the desert. Because the plant has so many functions—such as its use as a clothing, paper and industrial fiber, as a food and as a medicine—we can trace its history back at least 6,000 years. Ancient Chinese, Egyptian, Indian and Palestinian texts refer to its application to help with inflammation, skin rashes, gynecological issues and stomach ailments.¹

To this end, the work at the Zach Walsh Research Lab is hugely important, but it isn't unique. It's grounded in our collective history, and Walsh's team follows a trail of evidence-based studies from around the world that indicates why we need to pay attention to cannabis.

The medical mystery unwrapped

CBD is one of an estimated 140 or more compounds found in the cannabis plant that are the active ingredients known as cannabinoids. That means that CBD is one of many, many phytocannabinoids, many of which are yet to be discovered.²

Surprisingly, cannabis, or a neurochemical form of it, is also found inside the human body. And we need to replenish this system every day of our lives.

“The endocannabinoid system is essentially a whole bunch of receptor sites throughout the body,” Thiessen explains. Think of these receptor sites as locks. “All of these little locks are located throughout our body and then our brain. And our body produces endocannabinoids that fit into those locks as keys. Endocannabinoids are neuromodulators, which are different than neurotransmitters, which are chemical messengers in our bodies that move information along our central nervous system to our brain and back again. Endocannabinoids tell our neurotransmitters what to do. The endocannabinoid system is referred to as the master regulator, so it controls our body’s abilities to eat, sleep, rest, digest and relax.”

This is one of the most amazing things I’ve learned about the science of cannabis. Our human bodies endogenously, internally and on their own, produce many of the same compounds that you find in the cannabis plant. Endocannabinoids are produced internally by our body, and phytocannabinoids are produced by the cannabis plant. In both cases, when these cannabinoids are present in our body, they are managed by a neurotransmitter system that is present in every organ of our body, in all of our connective tissue, in our skin, in our circulatory system, in our immune system, in just about every single part of the human body.³

“We are now at a point where you have to understand how

these plants can be so relevant in so many areas—literally everywhere in the body,” says Mauro Maccarrone, head of biochemistry and molecular biology at University of Rome’s Campus Bio-Medico, who has studied the molecules since 1995. “There must be a reason why these endocannabinoids are always there.”⁴

In fact, these endocannabinoids may be among the oldest neurotransmitters in our bodies. As Maccarrone explains, they may have been a part of our evolution going back as far as 156 million years ago, even before cannabis plants themselves are known to have existed.

Within this master signaling system, our bodies produce chemicals that mirror the plant chemicals found in cannabis. We use these chemicals to calm our central nervous systems. As Thiessen says, they are the keys to open up doors within our bodies so that we can eat, sleep and function at our highest levels. They regulate everything that we do.

But maybe the discovery of the endocannabinoid system, and how essential it is to our survival, shouldn’t be so surprising. It’s a fundamental part of how our body works, just as essential as our nervous systems.

We can thank Dr. Raphael Mechoulam for that discovery.

Born in 1930, Raphael Mechoulam and his family left their native Hungary because of the Holocaust. His father barely survived a concentration camp while the rest of the family was able to hide. Together, they sought solace in Israel in 1949.

A biochemist, Mechoulam was the first person to isolate the $\Delta 9$ -tetrahydrocannabinol (THC) molecule, and this led him on the path to CBD as early as the 1960s. In 1992, along with Lumír Hanuš⁵ and William Devane,⁶ he discovered that the human brain produces its very own chemicals that mirror cannabis: endogenous cannabinoids. Hanuš, originally from the Czech Republic, and Devane, an American researcher, named it anandamide after

the Sanskrit word *ananda*, meaning bliss. Later, the team also discovered 2-Arachidonoylglycerol (2-Ag), another endocannabinoid that also helps manage this system. Over the course of decades, Mechoulam has since investigated CBD's medical efficacy in his lab at Hebrew University in Jerusalem with more than 35,000 patients and research participants.⁷

When it comes to endocannabinoids, Mechoulam is a legend in the research world. He has published more than 350 scientific peer-reviewed articles, and his research has been cited more than 50,000 times by other scholars. In his eighties, Mechoulam is still actively pursuing new information on endocannabinoids. Why?

“Nothing happened,” he said. “Nothing happened for thirty years after we made our discovery. The neurologists were not very interested, nobody was very interested until parents found out that cannabis plants that contain a lot of cannabidiol work for children with epilepsy. Now we know that it helps relieve diabetes type I, which is an autoimmune disease. It's an excellent anti-schizophrenic drug. We're doing research on addiction, jointly in collaboration with four groups—a group in Richmond, Virginia; a group in Canada; a group in Italy; as well as our team.”

The heart of all of these findings is that CBD helps our nervous system function properly.

First, it helps to alleviate pain. Neuropathic pain, the kind that is associated with having a stroke, fibromyalgia, multiple sclerosis or arthritis, is the hardest to treat. It's essentially the nervous system in shock, twenty-four hours a day, because of chronic inflammation. Opioids rarely work at all with neuropathy, but CBD can decrease or even fully relieve this type of pain.⁸

Second, CBD can help address mental health issues that are caused by misfiring impulses in the brain related to the nervous system, especially those caused by stress. Think about PTSD, depression and anxiety, as well as obsessive compulsive disorder.

Third, neurodegenerative diseases such as epilepsy and other seizures, Alzheimer's, Parkinson's and other forms of dementia are nervous system disorders that have been directly improved by CBD, as research that goes back more than thirty years has shown.⁹

Looking at this list, it's impressive. It's not hard to see why researchers are excited about everything that CBD can do, but it doesn't mean that CBD can solve everything that ails us.

As Walsh tells it, "I think the two biggest myths about cannabis are, first of all, that it is a miracle drug that can cure everything. The other one is that it's not a medicine at all and that it has no actual value. I think both sides are missing the point. What I do know is that it has tremendous therapeutic potential. It's not a miracle drug because there are no miracle drugs; that's why we say 'miracle,' because they're not real. But in terms of a drug that has multiple applications, that has unknown potential—absolutely, I can't think of anything with greater potential right now than cannabis medicines."

We need healthier endocannabinoid systems

Let's get down to the core thing you need to know.

Chronic inflammation and stress affect most Americans, and when this happens, our brains and central nervous systems are not able to gear down to rest and digest. This is true even if you don't have a disease.

We need healthier endocannabinoid systems, and this all comes down to brainwaves. CBD works better than other treatments by engaging four interacting types of brainwaves, building what scientists call neuroplasticity: the ability to shift the way that we make positive connections in our brains in response to stress.

Our four brainwaves are called alpha, beta, delta and theta states. Each of these states represents a different way in which

we process the world around us and the way that we respond to stimuli in our environment. The lower the number of brainwaves and the longer they last, the less you are aware of everything else in the room, at least on a conscious level.

Beta waves are the shortest. Think of beta brainwaves as short and violent choppy turbulence, like when waves crash on a beach. We need all of our body's functions for specific tasks, but the beta state is associated with our adrenal system, which most people call our fight-or-flight response. This is both good and bad. This system activates when you are in danger, and you either run, fight for your life or freeze. It doesn't always have to represent something that dire, though. Remember when you were learning to drive a car? I bet you weren't exactly laid back and relaxed. But that was a good thing, because you paid a lot of attention to the road. If you've ever had to use a chainsaw or perform a heart-transplant surgery, you want to be able to access your beta state. But we can't reasonably operate in a beta state all the time. It's a state of constant stress.

The alpha state is our natural awake state, and it's the state in which we are the healthiest. We all want to be in the alpha state as much as we can because it's associated with regulation and homeostasis: balance. When you're in alpha, you're relaxed and your digestive system works perfectly. This state balances your cardiac output, oxygen and carbon dioxide, as well as your consciousness and body temperature. It can manage your production of insulin, the regulation of your food intake, your water and electrolyte balance and your metabolism. It's the state in which you are the most calm and focused, which in the end will help you make better decisions.

We may want to be in an alpha state, but the reality is that we are in beta most of the time.

In the theta state, your brain activity is higher, but you are still in a calm, relaxed stage where your body is able to recharge. In

this stage, marked by very long brain waves, your body deeply neutralizes stress. Many people train to access the theta state through meditation, in which they experience this healing sleep-like state, while they are fully awake and conscious of their surroundings.

The brainwave state with which you might be the most familiar is that of delta waves. When we go into a delta state, we're asleep, and this is where our brainwaves are longest.

When you are in deep dreamless sleep, your mind produces about one brainwave per second at 0.5 Hertz to 3 Hertz. This is a necessary human state: if you don't reach delta stage every night, you won't release the hormones your body needs for your organs and nervous system to recover from the impact of your day. You literally can't survive without proper sleep. Delta brainwaves are long: think of them like the glassy wavelengths in water that surfers ride. You may have heard of REM (rapid eye movement) sleep; this can occur during the delta stage, or between delta and alpha.

All particles, all atoms in your body are oscillators, moving up and down with some amplitude, and these can oscillate in different directions. With turbulence, they can even crash into each other.

Imagine a 500-mile-per-hour wave, five miles deep and eighteen miles wide, moving at jet speed across the Pacific. In this wave, all molecules move in synchrony; they are emergent and coherent. As the depth compresses to the shoreline, this glassy global wave gets compressed, and no longer are all of its particles cooperating. It begins to wind back and crunch into other parts of the water, and the quantity of parallel directions goes turbulent. What was once a glassy gigantic wave has become countless microscopic turbulences, and all that exists is a disconnected noise.

Your mind exists with these same principles. Your brain produces a collective pattern in the electromagnetic spectrum in light, as well as in the chemical exchanges that take place there. When

you're in a state of fear, when you're overheated, have depression or attention deficit disorder, the average wavelength is short.

Your brain is only supposed to move toward turbulence in special emergency situations, and even in those situations it's not a great idea. When you're in that state of turbulence, you are stressed, numb and unable to achieve your goals.

What CBD does is increase the ratio of alpha and theta brainwaves to the rest of your other neurological operations. This can not only relax the body and improve digestion, but it can raise your performance on creative problem-solving tests. When we have a high level of neuroplasticity, we experience a sensation of relaxed but focused calm and safety in our body and mind, whether we consciously notice it or not. In turn, this state subdues the inflammation response throughout our bodies.

CBD is not the only pathway to neuroplasticity. We can achieve the same effects, and create our own endocannabinoids in our systems, by controlling our minds through meditation, taking regular walks in nature and reducing stress in our lives. The thing is, CBD calms and soothes the nervous system more easily and makes it more likely to recover from illness faster by opening up those doors to shifts in our bodies and minds.



4

FREEDOM TO BE HEALTHY

CJ. HARRIS, a Georgia-based high school football player who takes CBD to prevent his pediatric epileptic seizures, was ruled ineligible to play at the college level by the National Collegiate Athletic Association (NCAA) in 2018.¹

Although Harris has a legal prescription for CBD in his home state and would have the same support at Auburn University, where he was offered a scholarship, the athletic association believed that he should not be able to play because CBD is a banned substance. They argued that he was breaking the law and therefore did not meet their standards for ethics. While coaches, doctors, college administrators and even state representatives stand behind Harris, there is an inherent fear of cannabis that is preventing his success as a professional player.

“I saw everything lining up perfectly for me,” Harris told a reporter working on his story. Harris was getting better on his CBD medicine and getting ahead in life through his exceptional football skills, but then with the ruling, everything fell apart.

His father, Curtis Harris, feels the same way. His son has been experiencing seizures since the third grade almost ten years ago but has not had a single seizure since he began taking CBD in January 2017. Curtis Harris knows that his son needs CBD for what he considers to be a disability. He has reached out to Allen Peake, his state representative, as well as the Epilepsy Foundation, a non-profit advocacy group, to try to help his son receive the support that he needs to achieve his goals. Not only his career as a football player but also his college education rely on this decision.

“We urge the NCAA to review their existing guidelines and explore possible exceptions to allow players under medical treatment, like C.J., the ability to fulfill their dreams of playing college football,” Phil Gattone, president and CEO of the Epilepsy Foundation, said in response to the NCAA’s actions against the student. “We hope the NCAA would reconsider their decision and assess C.J. on his character and talent as a football player.”

Fast, effective and feared

Epilepsy treatment is one of the core stories that has emerged from research into CBD, and the results are stunning and easy to understand.

Leonard Leinow is a CBD specialist who has written a book on medical dosages for specific diseases. He’s worked with hundreds of patients who, like Harris, have gone years without solutions to their health problems and need practical answers. If you’ve ever seen a young child have a seizure, you know how devastating it is to both the child and their parents.

“You could have somebody who’s having an epileptic seizure and their whole body, their muscles are convulsing. And you squirt some CBD in their mouth and they just stop,” Leinow says.

It's that fast and that effective?

“When we talk about seizures, let's say someone has four seizures a day and the intensity is high, and the duration is long. When they take CBD, now instead of having four a day, they're having, you know, one a week. And it only lasts two minutes instead of ten minutes. It's a high percentage of people who are helped, as well. I'm talking about seventy-five, eighty percent of the people are getting a significant benefit, and ten to twenty percent of the people are able to get rid of seizures altogether,” Leinow explains.

CBD isn't just stopping their seizures: it's providing these children with a lifeline. When children have pediatric epilepsy, their brains, and therefore all of their neurological functions, are permanently affected by seizures: the more they have, the more brain damage they will sustain.

So when Jason David's son, Jayden, was diagnosed with an extreme form of epilepsy called Dravet syndrome, he assumed that it was a death sentence. Dravet syndrome affects children in a profound way. In addition to seizures, frequent and intensive fevers threaten their lives. Children do not get better from this illness and require constant caretaking. The seizures slowly destroy these children's bodies and their ability to heal, grow and thrive.

The prescriptions he had for Jayden didn't work. Out of desperation, David started doing his own research to help his son. He had heard about cannabis-based solutions but he couldn't get support from his doctor, who was afraid about the potential impact on his practice. David lobbied for political support, and he felt as if he had no one on his side while he watched Jayden succumb to his disease.

“No one wanted to hear about me and my son when he was sick, so sick,” he says. “You need to get someone that cares. Someone who cares about people, who cares about medicine. Not someone

making money off medication. Someone worried about lives. Politicians don't give a fuck about lives.”

Someone who did care was Andrew DeAngelo, who runs Harborside with his brother Steve. In 2011, a mutual friend connected DeAngelo and David.

“He showed me videos on his phone of his child having seizures,” DeAngelo says. “This was a little child, and even smaller than most five-year-olds because the epilepsy had stunted his growth. You see a child like that have a grand mal seizure and you are moved. You have no choice but to feel empathy for that child to the point where it breaks your heart. Jason was clearly at the end of his rope. He told me that he was very depressed. He was borderline suicidal. He didn't know what he was going to do.”

Under everyone's radar, with the DeAngelos' help, David began to experiment, eventually using a high-CBD strain of cannabis now known to many parents of children with epilepsy called Charlotte's Web, named after the epileptic child Charlotte Figi, who was having 300 grand mal seizures a week. But DeAngelo was worried.

“It was a little scary for me and for Harborside and for our community because we'd never given cannabis to a child that young. This was 2011, and you know the feds were still raiding dispensaries and farms, and I was certainly afraid that if I was going to be *the* dispensary to give cannabis to a child that young, I was worried I was going to get busted. Or even worse, Jason would get busted and his child would be taken away from him. When you meet Jason and you hear his story, however, you have no choice... but to help him. I felt a moral obligation despite the risks. But I met Jayden personally, and we went through the process of making sure that Jayden had a doctor's note and a caregiver recommendation from a reputable doctor.”

Medical refugees and CBD

As journalist Ricardo Baca explains, when medical cannabis began to be permitted in places such as California and later Colorado, hundreds of families whose children had epilepsy were moving to these states as medical refugees. Although CBD does not help every child or adult with epilepsy, some children are what Baca calls super-responders. When any seizure could kill a child, and many can result in permanent brain damage, it's important to look at how we can make a difference as fast as possible.

It's also important to help parents. Caregiver burnout is a substantive problem for those who are taking care of children with often fatal diseases, and parents like David often reach a state of psychological paralysis because they don't know where to turn.

"When you have a child with severe epilepsy your life literally revolves around every single breath that that child takes and just feeding a child with epilepsy, just feeding them can be an enormous challenge," DeAngelo explains.

DeAngelo's plan worked quickly, however. With an oil tincture made up of a 20:1 CBD to THC ratio, Jayden's symptoms immediately subsided.

"After four and half years of twitching and having grand mals, it was the first day he went seizure-free," David says. "For the first four days that I gave it to him, Jayden didn't have a seizure and I remember calling my mom and screaming and crying at the top of my lungs, 'Jayden didn't have a seizure today!'"

Even so, David was worried, and he wanted to make sure that the CBD therapy would stand the test of time and different environments. His vigilance toward his son's condition was honed over years of being exposed to a range of triggers that can make his epilepsy worse.

"Jayden's had over three hundred grand mal seizures in the bathtub. Families with epilepsy kids understand that sudden

temperature changes can cause seizures. So, it was about one hundred degrees, in June, and I put Jayden in a little swimming pool in front of my house. It was cold water. He sat there and played in the pool for about an hour. Not in a million years would I ever have thought that would happen. I remember my neighbors all coming out. They were crying and clapping. They used to see Jayden in ambulances and this was the first time they were seeing Jayden outside really being a child. It was really a monumental moment in our lives.”

Janie Maedler’s daughter Rylie had a form of bone cancer that resulted in extreme seizures as well, but she was facing a possible early death because of a disease that was threatening her on several fronts at the same time.

Before her daughter was diagnosed, Maedler says, “We started noticing that Rylie’s teeth were getting very loose, and we were out to lunch one day and she started swallowing her teeth. All of her teeth look like a picket fence that somebody would run a truck through. And at the same time, I started noticing that whenever I would look at Rylie’s face, something was just off about it and I was asking my husband, and asking their grandmother, and asking friends and family, ‘Do you see what I’m seeing?’”

Maedler took Rylie to a number of different doctors, none of whom could explain what was going on. She decided to follow her gut instinct and demand an MRI and a CT scan.

“I think I was just in denial of what was going to happen,” Maedler says. “And so, we’re just sitting there in the hospital, and I’m joking around with the kids, and the doctor walks in and flips on the computer screen, and a CT scan shows what looks like somebody who had been shot in the face with a cannon, and like a whole chunk of bone was missing. Have you ever seen the old movie *The Blob*? That’s all I could think of, that something was eating away or had blown away this person’s face. And I was

thinking, *Gosh, that's kind of like wrong of him to flip on the computer screen and show me somebody else's scan.* And at that point, I kind of started going numb. And my husband was taking care of Rylie and keeping her cheerful, goofing off and playing with her. And the doctor hadn't even told me at that point, because he hadn't even understood what was happening, that it was actually cancer."

Rylie had been diagnosed with aggressive giant cell granuloma, which is a rare form of bone cancer that can destroy a child from the inside out, as it breaks down the cells that form bone. After surgery to remove one of the main tumors infecting her skull and to restructure her face, Rylie was put on daily injections of a cocktail of pharmaceuticals to ensure that her cancer would not continue to eat away at her tiny body, as there were tumors that they could not remove, but the medications themselves caused her pain.

"That's it," Maedler says she said to her husband at the time. "We're not doing that anymore. We're not going to pile on more medications to treat the symptoms of the last medications."

Rylie's condition was so rare and so challenging to treat that Maedler felt alone. But, like David, Maedler was willing to do whatever it took to help her child live a full and amazing life.

"All the studies showed that whenever there is a piece of the cancer left behind you might as well plan your next surgery," Maedler explains. "They're telling us that she's going to be pretty much deformed. Like, they're going to remove a quarter of her face or more. She's going to lose her teeth. She's going to have nerve damage, and this is probably not going to be her only surgery. And who knows what the pain level is going to be and all of that. That was what we had heard from Johns Hopkins and everyone. Otherwise it is just going to come back like crazy. The tumor is so aggressive and it grows back from virtually nothing."

Maedler took it upon herself to explore all of the research she could. She learned that Rylie's type of cancer can be radically

improved through the use of CBD, but Maedler ran into roadblocks similar to David's in getting access to this medicine. She found pre-clinical trials that were combining CBD with chemotherapy in order to treat this type of bone tumor. She began petitioning Rylie's doctors to help her find a CBD medication that would help, but she realized that she had to get the information herself. "The one thing that kept popping up very strongly was using cannabis. It wasn't smoking cannabis; it was cannabis oil. I found a safe source through the different moms I met in the hospital, and it was lab-tested."

Maedler wasn't convinced she was on the right path, though, because she is not a medical professional. But she felt like it was the only thing she could do to help her daughter have a chance of survival.

"I had a lot of people in our family that I knew were going to doubt why I was giving this to her. And even I wasn't sure if I was doing the right thing. Even giving her that first dose, I was scared to death. You doubt yourself as a parent, that you're making the best choices for your child. And so, I thought to myself, if I can get a baseline of one month after she's had surgery and give her the CBD, and then she's supposed to have a follow-up MRI, if I don't see the improvement that I expect to see, then we could just stop doing it. Hopefully, it wouldn't have caused any harm."

Even before the MRI, doctors remarked about Rylie's facial inflammation. They noticed very quickly that her teeth were getting firmer because her teeth roots were regenerating. Even better, the doctors found that the bones in her face were regenerating. When the MRI took place, they found that that tumor that was left behind had shrunk by 30 percent.

Maedler did not get Rylie to this point easily. Like Jason David, she had to fight for her child's right to use a medicine that had been proven to work for others. What she found was discouraging

and, in fact, not what she expected. “In our state, they passed a law in 2011 that made medical cannabis legal for adults, but they forgot about the children,” Maedler says. “It was illegal for children in Delaware at the time that all of this was happening.”

The Maedler family lived in which she calls an A.I. duPont state, referring to the large health maintenance organization (HMO) and hospital system that controls their medical care. The company has a monopoly over policies and what doctors are allowed to prescribe, and they don’t like cannabis.

Maedler says, “The largest medical research hospital put their foot down and said we are against this—and if you [use CBD], we’ll keep you out of the hospital. There are a ton of parents giving the oil to their kids illegally. It’s been hard, with all the recreational cannabis marches, to get them to change. In their minds, it’s all marijuana. It is so hard to get them to even talk to you because it’s all lumped into the same group.”

Maedler didn’t take no for an answer. Instead, she moved her family to South Carolina so that she could access CBD, simultaneously working toward Rylie’s Law in her home state of Delaware so that other parents wouldn’t have to face the same challenges.

“One of the things I meet with legislators and with A.I. duPont about is the need to have control taken out of their hands. Children’s own pediatricians should be able to recommend CBD,” she argues. “A.I. duPont has so much power that once this doctor said that no one in the state would touch Rylie; we had to work our way to finding another neurologist, one not working with A.I. duPont.”

But Maedler also worries about the way that CBD is perceived within the medical community. As she explains, even when she moved to South Carolina and got the access Rylie needed, she had to continue to rely on her own amateur research, especially since her husband works in public service and they needed intense secrecy to feel safe as a family.

“Rylie’s neurologist in South Carolina, he’s the only pediatric neurologist, and all the kids here, the kids with cancer who have a medical cannabis card, go to him,” Maedler says. “He actually believes that it works, sees that it works. But he’s not educated. As long as you can get it and you know what you are doing, he says, ‘Good luck.’ We are in a unique situation; we have medical cannabis here but there is no training at all.”

This neurologist’s lack of CBD-specific training prevents him from fully participating in Rylie’s care. In fact, her doctors continue to be amazed, rather than curious, as to how they can use plant medicines to help their patients. These stories help us understand just what kind of challenge we’re facing in the United States.

At Johns Hopkins, Maedler explains, after a year of treatment on CBD, Rylie’s case was reviewed by an oncologist.

“He said, ‘And these are her records?’ And I said, ‘Yeah, these are her records.’ And he said, ‘Are you sure?’ And I looked at him and I said, ‘Yeah, that’s hers.’ And then he said, ‘Well, what are you doing?’ and I said, ‘Oh, you know, we’re using essential oils, eating healthier.’ And he just kind of smiled and smirked at me and he said, ‘Well, whatever you’re doing, you better keep it up because I cannot tell that that child is this child on the records, because she shouldn’t look like this.’”

Today, Rylie is a happy and healthy child, and cancer-free.

“Today, she looks beautiful and she hasn’t had a single reconstructive surgery,” Maedler says. “She’s on absolutely no medications, only CBD. She didn’t have chemotherapy. She wasn’t on any medications besides the CBD oil.”

5

THE HEALTH PENTAGON

DISEASE RATES and a lack of access to health care that works could be said to be part of a complicated system of interacting parts. There is no simple conspiracy theory explanation, as fun and sensational as those finger-pointing stories are. Instead, our country's health problems are about systemic barriers to care, including access to CBD and other plant medicines, that can't be solved easily. The way I see it, there are five primary elements of our complex system of health, with each part influencing the other. Easy health solutions arise when we can move through these barriers.

Big Pharma and Big Food

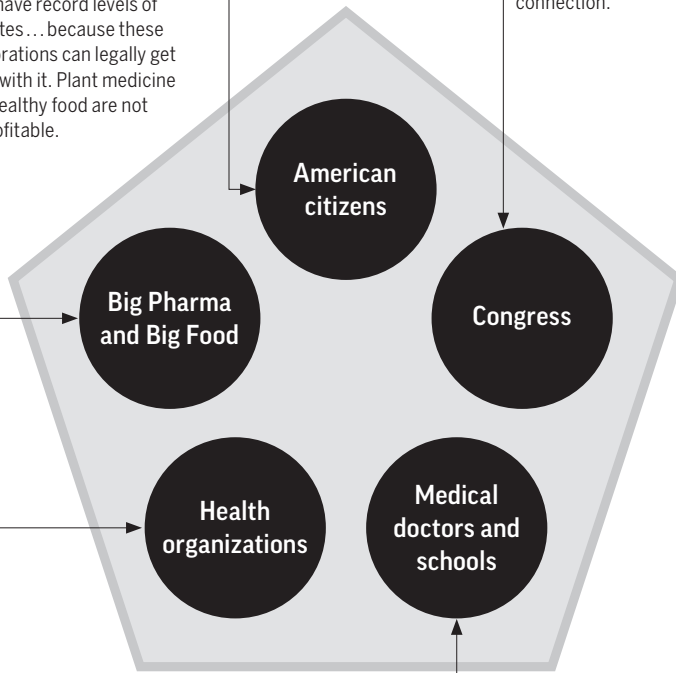
Most corporations are set up to make profit in any way that is legal. For example, when we vote for laws allowing advertising to kids for breakfast cereal that is more sugar than cereal, we'll have record levels of diabetes... because these corporations can legally get away with it. Plant medicine and healthy food are not as profitable.

American citizens

We cannot give away our responsibility to educate ourselves and take control of our health by learning about plant medicine and the diet-disease connection.

Congress

Our laws allow campaign donations from Big Pharma and Big Food, along with overly cozy fraternization with lobbyists. Plus, congresspeople know very little about plant medicines and the diet-disease connection.



Health organizations

Organizations, such as the American Diabetes Association and the American Heart Association, accept massive donations from Big Pharma and Big Food. How urgently can they really warn us of danger without biting the hands that feed them?

Medical doctors and schools

Doctors are doing the best they can considering virtually zero required medical education on plant medicine or even on the connection between diet and disease.

Until we change the laws intended to protect us, we cannot fully rely on the knowledge or good intentions of Big Pharma, Big Food, doctors, non-profit health organizations or Congress. We must take back control of our health by educating ourselves on the diet-disease connection and the amazing power of plant medicines.

American citizens

Because we are one of the oldest of the modern democracies, it's been a long time since we've looked at what we have, what we need and whether we're doing things in the right way. Like children born into wealth, we all too often take what we have for granted.

The premise of a democracy is healthy skepticism and self-responsibility. We are supposed to educate ourselves on the issues we compel our Congress to turn into policy and law. But only a tiny fraction of us really do this.

People like Janie Maedler are the exception, not the rule, but they can make a difference. Rylie is still taking CBD in order to make sure that the cancer does not come back, but to do so, she needed help. Maedler wanted to get the School Nurses Association on board so that they could help her administer the oil when Rylie was at school, as Maedler had to take Rylie off school property once per day to give her the dosage she needs. Maedler, and Rylie herself, decided that the only way they would be able to make an impact was to challenge and change the law.

Maedler got into contact with Senator Ernesto B. (Ernie) Lopez of Delaware. Lopez had actually long stood against medical cannabis, even going so far as to campaign on its ban. After a few long conversations with him, Maedler wasn't sure she could make any difference with him.

"I tried not to get my hopes up too much. And so we continued on about our day, and it was just a couple weeks later when I got the call. I said to Rylie, alright, we have to go meet Senator Lopez. He wants to show us something. We went, and he handed me this paper, and he said, 'Look at this and see what you think and get back to me.' And I looked at it, and it was his rough draft of the bill and he had called it Rylie's Law.¹ And I was just like, woah. This is

crazy. We felt honored. And I showed it to Rylie, and she was just excited, and she couldn't believe it."

Maedler took Rylie to the state Senate committee to actually speak on her own behalf at the age of seven. "Little Rylie, she was there at that table, and she stood up, and she said what she needed to say. She told them how she just wanted a normal life, and she wanted to be able to go to a friend's house and spend the night. And she wanted to not be afraid of going to bed and never waking up. She had a fear of death, still, and she told the senators that she thought that they could be her friends, and they could help her with all these fears just by allowing her to use this medicine. And that was very powerful. I mean, she had reporters crying."

Rylie's law passed unanimously in the Senate and the House. It allows Delaware children under the age of 18 to use medical marijuana-based oils like CBD to treat intractable epilepsy and some related illnesses. But it took the courage of Maedler, her family, and Rylie herself to make that happen.

When it comes to our health, arguably the most important issue facing us as a nation and individually, too many of us presume others will worry about it and that we already have the best health laws to protect us. We assign our right and responsibility to Congress and the Senate, to the medical establishment, to Big Pharma, to industry and to NGO health organizations, such as the American Diabetes Association. After all, we're very busy and certainly the people we pay to represent our interests will figure it out. We'll be protected.

That decision, made by so many of us, influences everything else in our lives.

Big Pharma and Big Food

There is no cigar-smoke-filled room of old white men at a board table chuckling as they conspire to steer congressional and public opinion toward their own financial gain. Business is a far more nuanced interplay between shareholders, attorneys, management and many other influencers. In the United States, a corporation can be sued by shareholders if it does not exercise its freedom within the law to maximize shareholder profit payouts.

Plant medicines such as CBD have been available for some years both in the medical community and for those who seek them out, and clearly they are making an impact. The population doesn't really know much, if anything, about CBD. At least not compared to how well we're aware of pharmaceuticals like Vicodin and over-the-counter drugs like Tylenol. Americans, for the most part, get their education on these matters from drug and food commercials, not by actually studying, thinking and engaging in debate. While this apathy and buck-passing persists, we will continue to lose out on opportunities to be healthy.

So, if it is legal to use a TV commercial with a magical cartoon character to convince a seven-year-old to push her mother into buying a breakfast "cereal" that has more sugar by weight than grains, companies will do so or risk being sued. And when Big Food, namely the agricultural industrial complex that feeds our nation, creates a food supply system that focuses on quantity over quality, this naturally leads to an increase in consumption, whether or not this is the right thing for the average American.

The system of laws and practices guiding corporate behavior is not designed to protect consumers. But the populace, not Congress, ought to be responsible for demanding laws that ensure advertising and the products sold by them do no harm. The board members and managers of these companies, in this sense, are

swept into the tide of a system that is larger than them—a system of laws, shareholder lawsuit risks and unrestrained institutional emphasis on making money—as long as it’s legal.

In this way, Big Pharma has a greater influence on our medical system than Congress. GW Pharma has just released a pharmaceutical made from a CBD isolate (which we’ll discuss later on) that helps children suffering from epileptic seizures. GW Pharma will advertise this drug to the public, and they will educate doctors in the way that they see fit. Until the countless other scientifically known health conditions that CBD can help with are connected to drugs that can make billions for Big Pharma, it is not logical to expect medical doctors to know about the health benefits of prescribing CBD.

Medical doctors and schools

Congress does not require medical students to spend time learning about preventative care. There are causal connections between our choices and our most serious world-leading disease conditions, but the reality is that we have created a medical care framework that is based on reactive care with very low access to needed resources.

Comparing the United States with other OECD countries, for example, the US has the lowest public health care available by far among all other leading countries in the world.² As well, in a recent survey of 3,505 Canadian and 5,183 American adults from the Joint Canada/United States Survey of Health, researchers found that US survey participants were less healthy than Canadians, with higher rates of obesity, physical inactivity, diabetes, hypertension, arthritis and chronic obstructive pulmonary disease overall. The overall difference was related to access to care.

While Canadian residents needed to wait longer for surgery due to backlogs in their care system, more Americans were likely not to get care at all.³

The health care organizational framework for addressing these challenges within the United States must change. We concentrate on how we can fix what's broken, rather than how to prevent breaking it in the first place.

We should, perhaps, blame ourselves for not changing education requirements. Our doctors are generally completely ignorant of the medical literature that reveals the connection between what we put in our bodies and Americans' extreme levels of diet-induced disease. Similarly, we know even from the interviews in this book that doctors are not trained on how to use natural plant medicines such as CBD. Those who are trained have taken it upon themselves to learn.

Congress

There is probably a lot less collusion in Congress than we think, but consider this: even if they are on our side, congresspeople often do not have a great deal of corporate or social work experience, and even fewer have medical training. And, due to their relative age (i.e., older than the average parent), they are likely to be less knowledgeable on modern health issues than most of their constituents.

The primary job of a congressperson is to respond to letters and calls from their constituents and vote accordingly. Without meaningful direction from their electorates, they are at risk of being fully and legally manipulated by Big Pharma and the food industry. This happens thanks to the way in which the US permits lobbying at the highest levels of governance. Volunteer and

nonprofit donations are simply eclipsed by those who have the money to push their agendas to the forefront of discussion.

Here's a good example of how this affects you personally. Let's look at how, as mentioned above, American companies sell high-sugar breakfast "cereal" to children. They're not only allowed to do it, they face scrutiny from their shareholders if they don't. In other countries, that's not the case. In Canada, a 1989 Supreme Court ruling stated that corporations were no longer permitted to advertise to children, a law that included breakfast cereal, fast food and even toys.⁴ The rationale behind this was that children, in the court's eyes, are unable to comprehend the meanings behind advertising because their cognitive abilities preclude them from doing so. Advertisers thus have the additional responsibility of not misleading children in addition to older consumers. Not only that, Canada determined that the company had the right to advertise to parents and other adults but did not need to direct marketing toward children in order to succeed as a corporate entity. In addition, the court decided that corporations, as such, did not have equal rights to human beings, in that the lives and security of people should be held dearer in considering such cases.

That's not the case here in the US.

We don't even make it a requirement for doctors to do the right thing and keep up with evidence-based research. Bills have been put on the table proposing that medical doctors participate in continuing education on the latest medical findings every four years.⁵ If these bills had passed, your primary care physician may have been compelled to pass a skills upgrade test on a regular basis. Right now, that's not happening here, but it's required in places like Canada and the UK.

Without meaningful public concern over an issue, American forms of democracy and our unusually lenient campaign and lobbying laws perform exactly as intended. The laws that we allow to

exist are those that privilege corporations. While elected officials are usually doing the best they can, there is no incentive to change.

Health organizations

It's not too difficult to imagine how Big Pharma and Big Food influence our laws. It's also easy to see how Americans succumb to the manipulation of advertising, as well as the effect of the lack of doctor and Congress education.

However, it is not as easy to distrust large nonprofit health organizations whose very charters have been created for our protection. Unfortunately, the laws we have established in our democracy allow Big Pharma and Big Food to donate to these organizations. As a result, some of these organizations consciously or subconsciously omit scientific information that has been well established in peer-reviewed medical journals. They advise diet protocols and drug usages that contradict the science. Let's take, for example, the story of how the sugar lobby pressured the American Heart Association into claiming that fat, not sugar, resulted in the risk of arteriosclerosis, even though the opposite is true.⁶ We have a history of financially incentivized medical advice flooding our journals as well as our news media, which has substantially shifted our health habits to our detriment. And because natural products companies don't make billions of dollars and are far less sophisticated in understanding how to leverage nonprofit health agencies, these organizations offer almost no advice on safe plant medicines.

But natural products companies are springing up because of the rise of interest in plant medicines. Not only are there large-scale operations like Harborside and Steep Hill Labs, individuals like Jason David are also joining the fray.

“Now Jason has his own dispensary and he has his own lab and he makes his own high-CBD medicine for his own son and for a bunch of other kids,” DeAngelo explains. “He’s got a product called Jayden’s Juice that we sell to dispensaries and that helps a lot of kids with epilepsy.”

David, like Maedler, has taken it upon himself to share his child’s story with the world and to help others find alternate pathways to health that are not necessarily recommended by large nonprofit health organizations. They are successful in achieving health for their children and for others, and yet they don’t fit into the standard medical care that is supported by our health care system. They aren’t doctors. They aren’t researchers. What Maedler and David have, however, is a vested interest in wellness that makes it possible for them to find pathways to health that others have ignored.

Dr. Reggie Gaudino is a molecular biologist who completed postdoctoral research in the regulation of genes and is currently the vice president of scientific operations at Steep Hill Labs, where he works with the DeAngelo brothers. He’s one of the most educated and respected researchers in his field, and even he is baffled as to why the evidence-based standards required by the American medical establishment don’t recognize CBD, plant medicine or any type of care that doesn’t fit into our current concept of health care.

“The American Medical Association doesn’t teach about CBD,” Dr. Gaudino explains. “In fact, I think there’s only one medical college that’s actually offering any curriculum on the endocannabinoid system and cannabinoids. So the reason we don’t know about it is because eighty years ago, when [cannabis] was made illegal due to Prohibition, all research in the United States stopped. In fact, it’s interesting because, in terms of our own research, we’re having to reinvent the wheel. And we ended up

doing a tremendous amount of research only to find that some of the things that we're discovering now were actually already discovered in the mid to late 1800s."

We're so caught up in our own set of values around health care that we literally have thrown out valid, helpful scientific facts. We've let corporations control what medicines we access and when, and we've stopped caring about preventative health work that would ensure that we don't require extreme forms of reactive care, such as surgery, when we have nothing else left to try.

Our health and our freedom at stake

Looking at the whole Health Pentagon, it becomes painfully clear that the conspiracy is not in Congress or even corporate board rooms. In fact, there is no conspiracy.

Instead, it can be said that the American people have become oblivious to how these intersecting issues affect our personal health.

We trust almost anyone other than ourselves to find solutions to what ails us.

Spend only a few hours reading credible plant medicine books and diet disease connection resources—namely resources backed by the scientific establishment and the peer-reviewed journal system—and you'll see why this is the case. Our best scientists are publishing groundbreaking work, like that of Michael Masterman-Smith, but what they're reporting isn't picked up by the media or by doctors on the ground. Masterman-Smith's work has been referenced by almost 3,000 other researchers around the world,⁷ for example, but you've likely never heard of his findings before now. This information isn't making its way into our daily lives.

Our health issues are stubborn. Our current medical system is not responding fast enough to the irrefutable scientific evidence that now exists. It is almost as though the medical establishment and the American public are incapable of seeing the utterly incontrovertible facts in front of them.

In order to help your community and nation, you must not only find your own personal health solution but also accept your role as a citizen in a democracy. You have to educate yourself, and you have to vote accordingly. You have to call and write to your congressperson. Yes, it is true that there are so many issues to educate yourself on, from the environment to foreign policy to civil rights. However, without our health—our lives—these other issues are in many ways secondary.

6

DEPRESSION, STRESS AND THE AMERICAN DREAM

BY THE time she was twenty-one years old, Siomara Melina had been taking drugs for depression for six years. “At one point, I was given Buspar,” Melina explains, referring to the trade name for buspirone, a drug with more than 160 listed possible side effects.¹ “It’s supposed be like an anti-anxiety drug but is more like a tranquilizer. I was also on clonazepam for my anxiety, Wellbutrin for an antidepressant, trazodone for sleep, and then my doctor put me on Lyrica, which is an anti-seizure medicine. I would try something and tell them it wasn’t working, and doctors would be like, ‘Okay, let’s try Zoloft, let’s try Dexedrine.’ They just give you the hardest drug to try to kind of fix you. A lot of doctors don’t really listen. It’s frustrating because these things make you feel sick.”

Neither Melina nor her mother, who live in Victoria, British Columbia, in Canada, had a clear idea of whether they were

getting the right medical advice, but they felt desperate. “I was young and took what the doctor gave me,” Melina says. “I was really depressed and having anxiety attacks at school, and I was self-harming a lot, and my mom noticed and took me to the doctor where I was put on my first med. It was Prozac. There were no positive effects. I was hungrier. I was sleeping in class and tired all the time. I was numb and dragging myself along a life I hated.”

Financial successes and health failures

Prozac, also known generically as fluoxetine, is one of the most successful antidepressant products of all time, so it makes sense that Melina’s doctor wanted to start her out on that drug. Discovered by Eli Lilly in 1972, Prozac has been prescribed to more than 54 million people around the world. Since its patent ended in 1999, sales of generic versions have increased by 65 percent in the US alone.²

It is widely thought that these little blue pills cheer us up because they give our brains what it has been sorely missing: a dose of happiness. Depression is a serious issue, and happiness is serious business. Globally, 11 percent of the adult population has suffered from depression at some point in their lives, and that number rises to an average of 16 percent in the United States.³

In fact, Americans consume more than 80 percent of the world’s prescription antidepressants, and that number has continued to rise by about 4 percent per year.⁴ The depression business is expected to generate revenue of \$16.8 billion for drug companies by the end of 2020 in the US alone.⁵ On a global basis, 17.4 percent of our collective human years are lived with disabling mental disorders like depression.

That’s too long to wait for happiness, health and the American Dream.

We can blame drug companies for the rise of antidepressant product use, but the bottom line is that depression is very difficult to treat. Most psychiatrists suggest that many of their patients are not able to physically tolerate the side effects of the most common drugs, such as fluoxetine; they do not respond adequately to treatment; or they suffer from a decreased response to these drugs over time.

This is because depression isn't caused by just one thing. When we face stressful life situations, or when we don't have an outlet for our pain, like a close friend ready and willing to talk things through, or when we don't know how to solve difficult problems like unemployment, depression can come on suddenly. This means that most doctors find it difficult to actively help patients who are sad and can't functionally cope with life.

What is depression, really? It's a product of both mental and physical stress. This means that depression is not just about being sad: it's associated with how we think and how we move our bodies, as well as with mood symptoms. In basic terms, when we experience stress, our bodies shut down core functions to decrease the energy we use.

Depression leads to inflammation, diseases such as diabetes, premature aging and other physical problems. This is because we burn fewer calories and we retain both fuel and fluids. Our minds are affected because our whole nervous systems are affected. People who are depressed are likely to sleep more, move less and process food poorly. It's a process of gradual stagnation of both the body and the mind.

On a chemical level, when a person is deeply affected by this kind of strain, their brain can overuse certain hormones. The two main hormones that are affected are serotonin and adrenalin, which are part of our nervous system. These hormones help us react to challenges, rev up our systems, fight our foes and

eventually calm down and relax. When our storage of serotonin and adrenalin goes down, we can't easily replace it. This means that depression happens again and again, as the body struggles to increase its resources to face future stress. Depression can increase because of environmental factors such as where we live, the weather patterns we face such as a lack of sunlight in winter, and other life factors such as raising children. All of these issues can spark the same effects within the brain.

Here's where medications like Prozac come in. As the first major antidepressant on the market, the marketing of Prozac taught doctors that it was necessary to increase the brain's supply of serotonin. Serotonin is what creates feelings of comfort in our bodies. Drugs like Prozac are officially called selective serotonin reuptake inhibitors (SSRIs). They create pathways to increase our serotonin use. The theory was that the more serotonin the body has, the happier the person.

The problem with this theory is that it can't be proven.

Depression is not a lack of chemical happiness; in fact, experiments on the human brain have since shown that the reverse is true. If we artificially lower someone's serotonin level, they don't become depressed. Lower serotonin levels don't even make their mental health symptoms worse.

Recent research has shown that while serotonin has a role in helping to build pathways in the brain when we are young, and it can help keep brain cells healthy, it's not responsible for making us happy when we're stressed. When we're physically stressed out from the flu, or dealing with external factors like morning traffic, an impatient boss or an impending divorce, serotonin does nothing. What serotonin does, instead, is make sure that our brain cells do not die off when we need them the most.⁶

"The best way to think about depression is as a mild nervous system disease," suggests Ronald Duman, a professor of psychiatry and pharmacology at Yale University. "Your brain cells atrophy,

just like in other diseases. The only difference with depression is that it's reversible. The brain can recover. The mental illness occurs when these stress mechanisms in the brain spiral out of control."⁷

How does the brain recover? Science is only beginning to figure that out, but serotonin is not the answer that doctors thought it was going to be. As Dr. Duman explains, SSRIs like Prozac are just a Band-Aid solution. Depression is actually a sign that we have to make changes in our lives because our bodies are literally shutting down. Depression is asking us to develop what doctors call synaptic plasticity: the ability to shift direction when life's not working quite right. It's our job to teach ourselves how to feel better, slowly and steadily.

Prozac and other drugs can help to ensure that the brain is equipped to make these changes, but the reality is that SSRIs can cause other problems at the same time. Patients on these drugs are affected by what doctors call "Prozac lag," which is how long it takes for SSRIs to have an effect. This delay causes danger to people who are clinically depressed.

SSRIs themselves are also dangerous. The side effects of SSRIs can be as serious as suicide and seeing and hearing things that aren't there. There are also physical risks: weight loss, inflammation, intestinal and sexual dysfunction, dizziness and vision problems, and the list goes on. The body doesn't know what to do with the extra serotonin, and therefore it actively tries to get rid of it in every way possible.

We can change our minds

Americans often believe that these challenges are hardwired in our genetic makeup and that they are not going to change, but that isn't true either. Siomara Melina, like other mental health

patients, was told by doctors that her depression was never going to go away and that she should expect a lifelong reliance on medical care and drugs.

But research shows that genetics only plays a small role in our mental health. In fact, more than 92 percent of how we feel is affected by lifestyle choices and learned daily habits.⁸ Research shows that we can only achieve the goal of truly long-term positive mental health through physical exercise, therapy and diet changes. We have to take charge of our own lives. Essentially we have to shift the triggers that lead to stress in the first place, not just take a single pill.

The challenge, as Dr. Duman explains, is that our care system isn't set up to help us take charge. Doctors have very little time and very little knowledge about the impact of the drugs that they are prescribing in the first place. Doctors are also given the incentive to prescribe new SSRIs by drug companies that use well-trained salespeople, few of whom have any medical background, to hand out free samples every month.

Here's the other thing you need to know. Doctors prescribe us these drugs because it's the easiest way to make a patient satisfied. When we have a prescription in our hands, we believe that we will be well. This is because we live in a health care system that teaches us that we can buy a solution to every problem.

When it comes to our health, too many of us presume that the doctor knows best and that we actually can fix something in our bodies as quickly as we change a tire. Even if you know that there are better solutions than those presented in a five-minute chat with your doctor once a year, and that it's possible to make healthier choices, that's not the reality of our health care system. We want it to be easy to find happiness and achieve wellness, and taking a pill that fixes the chemicals in our brains makes things very easy indeed.

This means that Americans take mental health drugs for granted.

In other countries, different solutions are prioritized by doctors. Don't get me wrong. Our doctors are some of the best-trained medical caregivers in the world. But American doctors treat depression in a very different way from others.

If you were a German doctor diagnosing moderate depression like the kind Melina has, you would be more likely to treat her with St. John's wort than Prozac. St. John's wort is a plant medicine with no side effects. Sixty-six million Germans, or the equivalent to more than 80 percent of all people with depression, have been treated with this medication since the mid-1990s.⁹ It's a \$2 billion industry there. Germany surveys the safety of these plant medicines and how they work so that consumers have a clear picture of what they do. This makes it easy for manufacturers to market products, as well as for doctors to have confidence in their use and for insurance companies to cover drug costs for patients.

In the Middle East, saffron (literally the same saffron that may be in your spice cabinet, except in a concentrated form) is used to treat depression. Researchers have shown, through strict drug trials, that saffron reduces blood pressure, anxiety and depression, and it can even be used to decrease the size of cancer tumors.¹⁰ Saffron has been shown in study after study to be as effective as other drugs prescribed for depression, even when directly compared to Prozac.

But compared to St. John's wort and saffron, CBD is even more effective.

There are 22,000 published studies about CBD and how it helps with all mental illnesses including depression. Half of this research has taken place within the past ten years, which means that we are just beginning to show what it can do. In studies on adults, CBD treatment has been shown to reduce depression in as little as three weeks.

And here's what's most important. Unlike any other solution being marketed today by drug or plant medicine companies, CBD actively helps our brains and our bodies recover from depression. It decreases brain cell death in the same way as Prozac, but it also increases the amount of oxygen in our brains, nervous systems and cells. This means that the nutrients we take into our bodies can actually get to where they need to go so that we can be healthy again.

All of this shows us that something needs to change in how we, and our doctors, think about depression. Studies show that plant medicines are more effective in treating depression than SSRIs. The problem is that, as Melina explains, doctors don't want their patients to try out plant medicine solutions because it challenges the way they're used to working.

In Melina's case, she insisted on trying CBD, because she couldn't live with the side effects of SSRIs any longer. "With these things, you can't come off it right away. I just want to stop taking it, but you can't. You have to find the right time and do it really slowly. You can die. I could have seizures and die by just stopping the drugs without a doctor's supervision."

Like many Americans seeking a better solution, Melina turned to her own internet research, as well as a number of legal CBD dispensaries, to find the right dosage for her. With this research, she was able to finally gain her doctor's support for her new CBD-based mental health care plan.

Drug by drug, Melina replaced her doctor's prescriptions with CBD.

"Getting off clonazepam was so, so hard. I was so depressed, way more than before. I just knew I could not have it and I just used it as a crutch. I also felt nauseous, had headaches, stomach cramps and that happened for about a month. And then the mental aspect of it continued for about a month. It was just the worst depression. What got me through it was a lot of support from

family and friends and knowing it would not go on forever. That once I was off, I'd be off."

CBD has made it possible for her to eliminate eight different daily drug prescriptions over the course of the past eighteen months.

Health self-education

Americans need healthy skepticism about the mental health care system. We need to educate ourselves on what will serve us best. Plant medicines such as CBD, St. John's wort and saffron have been available for generations, but the American public doesn't know much about them, at least not compared to how much we know about drugs like Prozac. Only a tiny fraction of us actually do our own research. Patients report that many health professionals today lack the clinical skills of listening, of being helpful and hopeful and of letting them know that healing is possible, but patients themselves don't take the lead and look at how they can make a positive impact on their own health.

All of this means that there are many people who resign themselves to a lifetime diagnosis of depression.

Something has to shift.

Our current health care standards are based on old information. In order to move toward positive mental health, we have to demand a different standard than the one we have relied on. We can't be apathetic any longer. With this default behavior, we will continue to miss out on the benefits of plant medicines that will lead us to long-term wellness.

What we need is a new way of thinking about depression. We need to create healthy lives for ourselves every day through our choices to live better and more fully aware of our opportunities to

become our best selves. Americans can't continue to rely on hope that a five-minute miracle cure is our best option. If the pursuit of happiness is a right of American citizenship, then so is being healthy enough to be happy in the first place.

Health-promoting habits have to come first in our lives, starting with self-education and self-care. We need to take responsibility for our health by increasing access to new proactive tools to wellness. We can find the right combination of support systems for our minds and bodies.

7

THE AGE OF TRAUMA

THE UNITED STATES has officially been engaged in a global war on terrorism since September 11, 2001.

Accordingly, there's been a rapid increase in deployments, from the Middle East to Africa to our home turf, so that instead of serving in active combat for months, soldiers spend years in the field. When they are forced to go on a second or third term of duty, they will likely be more profoundly affected by their time on the battlefield.

Jerry Zuniga is one of those soldiers. An infantryman in the United States Marine Corps from 2005 to 2013, Zuniga was deployed twice to Iraq and once to Afghanistan and then served in a tactical training exercise combat group as an anti-tank training instructor for 220 marines. When he was honorably discharged, he was quickly labeled disabled.

"And basically that's where my life started to really degrade," Zuniga says. "I found myself trying to transition out of the military

back into society with no real foundation. It was very difficult. I was homeless at one point, with my family. I was struggling financially. We were living from house to house, with my mother and uncles and basically wherever we could, coping with my post-traumatic stress disorder and a traumatic brain injury.”

Soldiers are separated by long distances from spouses and family members, work long hours, endure prolonged tedium and ethical challenges, suffer in the wounding or death of friends, experience the constant threat of violence and lose access to social support groups. These combined dynamics, compounded with the extended duration of a combat deployment, heavily tax the physical, mental, emotional and spiritual stores of any soldier.

As a result of these stresses, the number of suicides during deployment years has increased dramatically.

“I was trying to figure out how I could help myself so that I didn’t deteriorate within the next ten years,” Zuniga shares. “And I became an alcoholic. I drank myself to sleep basically every night, blacking out. I was drinking so much I was fighting everyone. I was isolating myself. I ruined a lot of friendships and relationships. I ended up in my recliner while my family was asleep in the bed behind me. With a gun in my hand. We have veterans committing suicide at an exponential rate, and I was about to be a number.”

But US soldiers aren’t just feeling the impact back at home and taking their own lives when experiencing PTSD. They’re increasingly dying by suicide before they get home.

Acts of courage

Zuniga is correct about the increase in suicides in his professional field. We don’t have statistics for every division, but what we do know is that in 2003 in the US Army alone, there were sixty

suicides. In 2006, there were 102 suicides Army-wide. In 2007, there were 935 suicide attempts in the Army including 115 successful suicides; in 2008, 140 suicides of active-combat soldiers; and in 2009, as many as 160 suicides plus seventy-one soldiers who died by suicide after being taken off active duty at the end of their deployment.¹ According to Pentagon statistics, in 2009, more soldiers killed themselves than were killed in active duty in Afghanistan and Iraq combined. By 2016, the last year for which the US Department of Veterans Affairs has provided statistics, soldiers in all divisions were killing themselves at a rate of twenty individuals per day.

“I’ve had three marines close to me take their own lives,” Zuniga says. “When I was sitting in the recliner, I was thinking that this is exactly how they felt before they killed themselves. I prayed that night, cried. I wasn’t sleeping at all, or if I was sleeping I was having nightmares and night sweats. In the daytime, I was hypervigilant, running my wife through scenarios in case anyone came into the house. I was going nowhere. You don’t understand that it’s PTSD.”

For soldiers coming off deployment in a war-torn country, sometimes suicide feels like the courageous choice, because there’s a fine line between fear and courage. It’s not just a matter of feeling incapable of coping but also feeling like you are a burden on your closest friends and family members. When PTSD affects your own life and those of your spouse and children (and, in Zuniga’s case, his elderly relatives as well), eliminating yourself from the equation may feel like the right thing to do.

Looking at statistics tracked for the last thirty years, the rate of suicide in the US military is the highest it has ever been. The US Centers for Disease Control and Prevention states that this rate of self-harm is more than twice that of the US population as a whole.

Why?

The most common form of psychological injury in a combat setting is trauma and related stress. According to the American Psychiatric Association, trauma can be categorized as exposure to a physical or psychological threat or assault to a person's physical integrity, sense of self, safety or survival or to the physical safety of another significant individual in a person's life.² The result of trauma, which can be categorized as a singular or ongoing experience, is likely to be associated with PTSD.

Here's why this has such a devastating effect on soldiers. Following exposure to combat, individuals may repeatedly re-experience the events through active dreams or hallucinations. This leads to depression and anxiety and, for many, social and psychological impairment. These soldiers feel the risk of danger, even when they are safe at home.

The impact of PTSD is not just related to mental health. The American Psychiatric Association states that physical reactions to PTSD after exposure to combat are common. These can include chronic sleep deprivation, cardiovascular disease, difficulty with fine motor skills and difficulties with cognitive performance. The hypervigilance that Zuniga describes is very common: those with the disorder find it necessary to constantly check and recheck what is happening to themselves and to family members in order to make sure that they are safe. PTSD can also lead to neuropathic pain, where the body simply shuts down some of its processes in order to cope with strain. PTSD can make it hard for people to make decisions, and it can make it impossible to complete detail-oriented work. It can also lead to challenges at home, as the person with PTSD increasingly withdraws from interpersonal conflicts in order to cope.³ It is therefore an incredibly difficult disease to treat, as it crosses physical, emotional and social lines, all of which have to be addressed in order for a patient to move toward wellness.

There's not just one trauma

You may know, or have guessed, of the impact of PTSD and its connection to soldiers. You may have long assumed that combat will result in this kind of mental and physical reaction, because we've seen these narratives played out constantly in the media, in real life and in fictional accounts.

What you may not know is that, just by living in the United States, you may also be affected by what's called subthreshold PTSD.

There isn't a clear definition of what subthreshold PTSD is from a medical perspective, simply because so much of it goes undiagnosed and untreated.⁴ But the medical community suggests that there are many more people who have been affected by traumatic events than those who have a clinical form of this mental illness. In fact, in the United States, you're more likely than not to be a survivor of a trauma. Subthreshold PTSD is the kind of low-lying problem that comes up over and over again simply because it's never treated.

If you've witnessed unforeseen violence, such as life-threatening accidents on the street or at work or natural disasters like Hurricane Katrina, you'll be more likely to feel physically or mentally ill when you're faced with stress at any point in your life. The same is true if you've experienced a physical or sexual assault, if you've been mugged or if you've been stalked or threatened at home or at work. If your loved ones have faced a life-threatening illness or injury, or a traumatic death, including those that take place during military service, you're also more likely to have a trauma-based reaction to strain in your day-to-day life. Americans face as many of these triggers in their lives or more than the average human being on a global basis.

"One of the things that makes PTSD difficult to treat," says Dr. Zach Walsh, "and also one of the things that makes it so fascinating

is the diversity. It's commonly associated with combat, but that's not the majority of people who have PTSD. As someone who's interested in mental health, it's hard to avoid PTSD. I did a lot of work in jails and I worked primarily on violence, partner violence, domestic violence, and PTSD is always very prominent there as well."

For example, it's estimated that more than 16 percent of all people who lived in New York City at the time of 9/11 experience subthreshold PTSD.⁵ People who are first responders and regularly deal with stressful work conditions, such as firefighters and police, are likely to have it.⁶ People who live at a chronic level of low income have it, because of the strain of having to provide for a family or themselves every day.⁷ Those who are survivors of abuse or those who live with social isolation have it.⁸ The list goes on and on.

In a society that is increasingly affected by polarization between rich and poor, chances are that citizens of the United States are deeply affected by the trauma of simply having to survive, and their health burden and strain is increasing year over year as we move further from a solution to our health care crisis. The polarization between rich and poor has a significant effect on whether someone acquires a disease and can recover before it worsens.⁹ For example, because of hidden social barriers that prevent the homeless or the poor from seeking out the support that they need from the health care system, such as endemic forms of discrimination, these individuals are more likely to have long-term, acute health conditions and more intensive risks of mortality, most of which are connected with stress.

In fact, because of this subthreshold PTSD, and a lack of direct health care, there is as much of a disease burden in the United States as in the poorest countries in the world.¹⁰ Although the rich in our society have access to the best care in the world, the

majority of Americans do not because we're still mired in a debate about what our best health care options are, which is part of the reason we're under so much stress on an ongoing basis, as the APA has explained. Think about it: we have created a system in which our health indicators show that we're less able to care for our vulnerable people than the majority of countries in Africa and the Middle East. We have higher levels of alcohol consumption, childhood obesity and mortality due to interpersonal violence, self-harm and unintentional poisoning due to toxic opioid overdoses than any country in the Western world.¹¹ We're stressed, but we don't put our significant resources toward preventing this problem in the first place.

Trauma is who we are.

Building our reserves

So how do we address it? In some ways, it all comes back to 9/11 and CBD. As Walsh tells me, as much as this horrific event traumatized the American public, it also galvanized research into trauma using cannabis.

“In one study,” Walsh explains, “where they looked at people who'd survived the World Trade Center attack and who developed PTSD and who didn't, they found lower levels of naturally occurring cannabinoids in those who had PTSD following the attacks versus those who didn't.”¹² So it seems like that natural endocannabinoid system plays a role in a human response to stress, and perhaps in maintaining that overactivity of the stress response that characterizes PTSD.”

In other words, Walsh says that it's all about our response to fear. If our endocannabinoid system is working well, it provides us with a primal chemical response that calms our central nervous

system. When we're physically or mentally overwhelmed, however, our brains stop producing cannabinoids in a way that allows us to calm down. Walsh is researching how this actually takes place by studying the effect of CBD and THC on recovery from trauma, but he says that early findings in both animal and human brain studies show that there may be a link between the endocannabinoid system and whether or not we experience PTSD.

As he says, "It's about the naturally occurring cannabinoids in the brain. People who have PTSD following exposure to a trauma suggest that this natural system, the endocannabinoid system, is implicated in development of PTSD following exposure to traumatic experiences. It's a restorative system involved in maintaining and producing memories and relaxation and sleep. It's involved in so many things that it's hard to give you a comprehensive list. It's one of the most prevalent systems in the human body, and the molecules that you make are not dissimilar from what is in these plants. And that's why the plant molecules have an effect: they mirror what's being made inside your own body."

Walsh's work investigating PTSD shows us that when it comes to trauma, CBD provides us with a uniquely effective shift toward wellness. But he's not alone in finding out just how effective it can be. New field research published in 2018 shows that a CBD therapy plan can alleviate and even eliminate bad memories, also known as "flashbacks," for those with acute PTSD.¹³ It can relieve the inability to sleep, as well as reduce anxiety, for children who have PTSD.¹⁴ Taken in combination with talk therapy, it can be helpful for families dealing with the effects of trauma.¹⁵

For Zuniga, CBD was the pathway to health he was looking for, but he came to CBD therapy in an unusual way. "I was on the path to becoming a number, and I had to make a decision not for myself but for my family," Zuniga explains. "So, I quit drinking alcohol and I started using cannabis. Medical cannabis wasn't

even an option. But I was so far gone: with my PTSD symptoms and my brain injury combined with the alcohol, the not getting sleep, the sweats at night and being on constant watch at my house, I had to make a choice.”

His choice wasn't CBD, but marijuana. As Zuniga tells it, he had heard about medical cannabis and assumed that smoking pot was going to be the cure he was seeking. “I was getting it down the street from an old guy; he grew his own cannabis legally and he was giving me it. I didn't ask him what type of cannabis it was, nor did I care; I just said give it to me. I tried it for about three months, but I found myself getting lazy, so I quit.”

At that point, Zuniga felt that he had no other choice but to go back to using the pharmaceuticals provided to him by Veterans Affairs to address his PTSD symptoms so he could get through the day. He gave it another three months, at which point he gave up because he felt like he was just going through the motions, not feeling like a human being. “I made a decision to myself to never take any pills again,” he says. “On pharmaceuticals, you're a zombie.”

It was at that juncture that Zuniga, like Siomara Melina and Janie Maedler and countless others, began to do his own research. When he did, he found Jason David. “I knew that the THC was the medical marijuana part,” Zuniga explains. “I never knew about the health benefits of CBD.”

Working with Jason, Zuniga started on a medical therapy plan with a 28:1 ratio of CBD to THC that offered him a freedom he hadn't felt in years. He felt so much better that, within months, he created a registered US charitable organization, Tactical Patients,¹⁶ that offers medical cannabis care and other resources for PTSD-affected soldiers after they leave service so that they get adequate support. His goal is to prevent suicides by creating the right conditions for soldiers to thrive.

“CBD literally changed my life. CBD works in a way for me that no THC, no pill, no medicine, no alcohol, nothing can do for me. I do not take any pharmaceuticals at all. I was never going to go back to a pill that had fifty side effects instead of trying an organic CBD extracted oil that has no side effects but all the health benefits. After doing the research on CBD, you’ll find all the miracles. I don’t understand why it’s being ignored. It’s been here and we just need to start utilizing it,” Zuniga says.

Community and care

What we don’t often hear in our clinics and hospitals is that there is a deep connection between physical and mental health and large-scale social stressors. As we can see through the experiences of Zuniga and others, the challenge can be tied back to social injustices in access to care, as well as to the way in which social determinants of health can shape the way that people respond to stress in their lives. This is especially true for soldiers but also for all of us. The higher the level of environmental, social and economic stress that we experience, the more difficult it is for us to cope both physically and mentally. What this results in is a situation in which there are limited means by which people in trauma can care for their own needs. All of these barriers to care, such as those that prevented Zuniga from accessing CBD in the first place, may make it difficult for anyone seeking help from professional health care providers.

It is clear from American health care research that, for barriers to be broken down, a new approach to health care must be taken in which people are empowered to make choices for themselves.¹⁷

As American communities become more economically and socially polarized, the health of our most vulnerable citizens

becomes more compromised. Patients who are affected by mental illness, including those who have given years of their lives in military service, often become more cut off from health services.

The problem isn't just that we put up barriers to care, but that we are creating trauma in the first place through our policies, our actions and our social responses to fear. "PTSD will never go away. PTSD is stuck with me for life," Zuniga explains. It's something that he, and all of the people he supports through Tactical Patients, will have to face every day on the job, at home with their families and even in their dreams. There is no escape.

Zuniga has created a community of support that is filled with hope for soldiers and for himself. "CBD not only allows me to function, but it also allows me to be a leader now in the community," he says. "It's an honor to serve all these other veterans who are coming to our program. It's giving them a chance to thrive, to participate in society, and giving me the chance to be a positive role model and give back."

Everyone ought to have this kind of hope for their personal health and for their future.

Trauma does not need to be who we are.





ADDICTION GATEWAY OR SAFE EXIT?

IN THE EARLY twentieth century, there was ongoing pressure on the United States government from the Temperance movement, a loosely based social activist network aimed at eliminating alcohol from society as a whole.

The movement gained support at the federal level when organizations such as the Committee of Fifty for the Investigation of the Liquor Problem and the Anti-Saloon League of America began to suggest policy reforms to the way that liquor was both administered and permitted in public places. These organizations were supported by the corporate and social elite and gained momentum in the middle classes, because there was a perceived threat to the economy when alcohol use was pervasive, especially during working hours.

The immediate difficulty faced was that Prohibition law was almost impossible to enforce, and that continued to be the case

throughout its course, because of the sheer volume of people who had to be policed. The rationale for this policy was based in a new way of thinking about one's life and livelihood based on Protestant values and work ethic; if it took hold on a cultural level in the United States, the movement could be successful. With such a broad immigration policy prior to this time period, and increased fears about immigrants and their social norms after the First World War among a vocal segment of the population, Prohibition seemed to ensure that everyone was on the same page, so to speak, in terms of what they valued and how they acted.

Controlled and constrained

A control mechanism like Prohibition felt safe to the American public.

Even though Prohibition was put in place in order to reduce crime and corruption, solve social problems, reduce the tax burden created by prisons and poorhouses and improve health and hygiene, the opposite seems to have happened. Prohibition resulted in a massive increase in cross-border and in-city trafficking of alcohol, which, some say, led to the rise of the mafia in certain areas of the United States. In addition, the consumption of alcohol actually went up during the years of Prohibition, in that annual per capita consumption and the percentage of annual per capita income spent on alcohol had been steadily falling before Prohibition, and annual spending on alcohol during Prohibition was greater than it had been before.

In fact, Prohibition created a disconnect between the needs and interests of the population and the police. This in turn led to the creation of a large black market, different forms of law under the mafia, increased murder and other crimes associated

with trafficking and a massive increase in the prison population. What this suggests is Prohibition's extended enforcement may have shaped the current standards of conflict between the police and communities, which we continue to see in the present day.

We know that this "noble experiment" of Prohibition failed, almost from the time of its institution in 1920 as the Eighteenth Amendment to the Constitution, under the Volstead Act, until it ended in 1927.

Prohibition of the use of psychoactive drugs is likely to fail as well.

That doesn't mean we can't look at how to manage the steady rise in addictive behaviors in our communities. I would argue that we ought to address addiction, just as we ought to address other debilitating health issues, but not for the moral reasons that are aligned with Prohibition.

Cannabis is seen by many as a so-called gateway drug, which seduces people into becoming drug addicts over the long term. To that end, CBD is often seen as deeply problematic because of the fact that it makes cannabis seem less of a problem, less of a risk.

The inherent lack of risk in cannabis use

What if cannabis was, instead of a gateway drug, an exit drug from addiction and addictive behaviors? As the scientific research literature suggests, it may be just that.

The gateway drug hypothesis has long played an important role in shaping drug use policy, and it has been called upon from the time of alcohol prohibition to the modern war on drugs as a justification for the time, money and moral justice efforts spent on policing our use of cannabis.¹ This is not just an oversimplification of the issue of drug use, but it has been actively harmful from the point of view of health care.

“Far from being a so-called gateway to the use of harder drugs such as cocaine and heroin, marijuana is, for most people who try it, not even a gateway to more marijuana use,” according to William Martin, PhD, director of the Baker Institute drug policy program at Rice University, and his fellow researchers.²

Martin’s research, looking back at more than fifty years of cannabis use statistics in every part of the country, has shown that the average psychoactive cannabis user in the United States does not make smoking pot a habit. It’s clear that this substance doesn’t come close to meeting our expectations for what can be defined as addiction. In fact, the opposite is true. Researchers from other institutions also agree with this hypothesis. A study sponsored by the National Institutes of Health concluded that there is no evidence that the effects of marijuana are causally linked to the subsequent abuse of other illicit drugs, and that the risk was much higher for people who are prescribed sleeping pills or even Tylenol from their general physician.³

So, if cannabis is not generally found to be a gateway drug, then what, if anything, does it have to do with addiction? And why do I think that codifying cannabis as addictive is actively harmful from the point of view of health care?

We’re so very, very wrong about addiction

We can’t just start with the roots of addiction. We have to start with our assumptions because, well, they’re wrong.

In the United States, the areas with the highest numbers of addicts aren’t city centers. Yes, you’ll see addicts in every major city. Like you, I’ve witnessed the living conditions of homeless addicts on the streets of places like San Francisco and New York. I’ve talked with some of them and heard their stories. But they’re not representative of the biggest masses of addicts in our country.

Where are our addicts?

West Virginia. New Mexico. New Hampshire. Kentucky. Ohio. According to researchers at the Baker Institute drug policy program, most of America's addicts live in flyover states, in small towns and in rural areas. Addicts live in towns that are affected by high poverty and low economic stability. These are people who are seeking out illegal opioids or prescription drugs that are being resold. These are the same regions where there is a vast discrepancy in the availability of and access to health care; in the Deep South, Appalachia, along the Mississippi River, in the Southern Plains and in Texas, life expectancies are decreasing and the life expectancy gap is growing between rich and poor in this country.⁴

“Those who are addicted are significantly more likely to have had a traumatic childhood experience, to have a mental illness or to be facing economic insecurity,” Martin writes. “These are far stronger predictors of opioid dependence than the availability of heroin coming across the Mexican border or the street price for OxyContin.”

Addicts want drugs in order to feel better about the challenges that they face in their lives. But, perhaps even more likely, they soon need drugs. Opioids temporarily numb pain until a rapid desensitization process kicks in, driving an elevated dosage level by users, intense physical addiction—and eventual death in far too many cases.

The opioids inside us

Let's talk about the opioid system in the body and how it relates to the endocannabinoid system.

We all produce our own opioids, just as we produce CBD. Think about the last time you felt angry. Maybe you were cut off on the highway, or maybe you lost out on landing a partnership at

work. Maybe you were woken up in the middle of the night by an inconsiderate neighbor, and you had to get out of bed to bang on the wall. How did you calm yourself?

The most likely thing that you did first was to take a deep breath.

Breathing fast acts to flood your blood stream with endorphins and adrenalin, so that you can react quickly to any additional challenge you face. When you feel safe, breathing slowly works to slow down your heart rate and stop these chemicals from moving through your body. Next, your gut produces serotonin, which moves through your bloodstream to your brain and finally to your liver. Serotonin acts to modulate what you see, hear and feel, so that you can move into a calmer state. Many more chemicals are released in the process, such as neuropeptides. These decrease physical and mental pain and allow your body to return to a state of homeostasis. You may directly aid in this process by slowing your breathing deliberately, but the body does its own internal “breathing” to make sure you’re safe.

But why does this happen?

Brain safety

Opioid receptors in your brain are present in order to absorb these chemicals and to interact with your physical and mental pain sensors. Not only do these receptors exist in the nervous system, but they’re also present in your heart, lungs, liver, gastrointestinal and reproductive tracts.⁵

“We have our own opioid system just like our own endocannabinoid system,” Dr. Andrea Furlan, associate professor in the department of medicine at the University of Toronto and a staff physician and senior scientist at the Toronto Rehabilitation Institute, explains. “It is our way of producing our own

substances more potent than morphine but released in tiny doses in specific areas.”

Think about endorphins. We’ve all heard about what they do, and we talk about them all the time. We get what we call an endorphin “high” when we go for a run or go dancing. The reason we get this high is that, once they’re released, our opioid receptors are allowing these chemicals to move through our brains.

For some people, those receptors don’t open.

Here’s why. Social and personal stressors affect our brain function. We’ve already talked about the neuroplasticity of the brain, and the fact that when we have a high level of stress affecting us, we aren’t able to find a sense of calmness and safety in our body and mind.

In adults, a prescription for opioids doesn’t make this stress better, nor does it make pain go away.

“If you put someone on opioids it will depress, even totally surpass their own opioids,” Furlan tells me. “They are drowning their opioid system. It’s like hormones: if you take thyroid hormones, your thyroid stops making its own. So it takes a long time to rebuild it. It is my opinion that some patients will never be able to have their own opioid system again.”

The addiction cycle that Furlan describes is the one with which we are most familiar: someone gets into a habit of taking a drug, whether by a doctor’s prescription or just for the fun of it, but in either case, they are left with a crippled opioid system, which isn’t able to be fixed.

But there’s another, perhaps more devastating, opioid crisis, and that is based on what happens to infant children who are affected by a great deal of stress. What happens when this stress takes place while children’s brains are still developing?

It’s a complex scientific conundrum, but stay with me here. This story is worth your while.

Parents who are stressed out or don't have enough money coming in are not likely to spend as much time with their children. This may be from the simple fact that they are working more than one job, and they have to count on a relative or neighbor for child-care when they do so. It may also be due to the fact that they are too exhausted or overwhelmed by stress to spend happy quality time with their children when they are at home. These parents may also suffer from addiction or social withdrawal.

But here's the crux of the matter: children who experience a great deal of separation distress and a lack of attachment as infants *may not develop opioid receptors at all*. They will not physically develop the capacity to actually stop stress from happening on a neurological level.⁶

The reason is that these children have never learned how to calm themselves and force a rush of positive opioids through their central nervous systems in the way others have.⁷ They are physically incapacitated as a result, just like Furlan's adult patients whose opioid systems have been destroyed from drug use.

When these children, from the Midwest and the South and other parts of the country where parents are very vulnerable to stress, reach adulthood, they are at high risk for addiction and related mental health disorders. People with an opioid receptor disorder cannot produce their own chemical mix to self-soothe, and so they seek out chemicals that their bodies need.⁸ People need opioids, and their bodies will supplement these naturally; if they can't access them naturally, people will supplement them through pharmaceuticals or street drugs.

When addicts are only treated by medication, they develop an increasing and addictive pharmaceutical dependence. This is why opioid medications are so problematic. Research has shown that what is known as neuroaffective therapy, which is actually a kind of talk therapy combined with somatic breathing exercises,

can help the brain develop the capacity to create its own neurochemicals. It can actually fix some of these blockages and rebuild a portion of the body's opioid receptors. This is a more substantive and effective approach that frees addicts from a heavy reliance on pharmaceutical forms of care. But our health care system doesn't pay for therapy and, in most cases, doesn't see the value in doing so.

Finding our equilibrium: The ideal of homeostasis

We need to come to terms with each individual's level of vulnerability, but our assumptions are always that addiction is a moral choice. We think that people choose to take drugs, when, in many cases, our bodies are simply crying out for what we need to survive.

We have to understand the role of homeostasis in creating safety for people affected by addiction. We started to unpack this process earlier in the book, but let's break it down even further so that we understand where CBD comes into the mix.

Homeostasis is the equilibrium of all of the major systems in the body so that our primary functions can be maintained: how we manage blood pumping through the body, our brain consciousness and body temperature, how we process food and water and our metabolism.⁹ For example, if our heart muscles aren't working correctly, this can result in high or low blood pressure, high or low temperature, as well as heart issues like internal clotting or clogged arteries that might lead to a stroke or embolism. When we don't drink enough water, our electrolyte balance may be off, and this can lead to low blood pressure, dizziness, kidney problems or even shock or stroke. Similarly, an imbalance in the way that we eat, or how our pancreas works, can result in an imbalance in insulin that could lead to diabetes. When one system goes off

balance, there is the potential for an impact on another system. The maintenance of homeostasis is fundamental to who we are and our survival.

As Dr. Reggie Gaudino explains, this is where CBD does its best work, and if you look at the chemical makeup of CBD, you'll see why. "Based on its structure, CBD actually looks very much like a corticosteroid, which is very important for our homeostasis in the body," Gaudino says. "It also looks a lot like melatonin, the sleep chemical, which is probably why it helps with sleep as well. That's exactly how the cannabinoids work. They actually act on those same systems to produce a homeostatic condition in the body."

Our systems work together to maintain what is known as homeostatic control. For example, our chemical systems aim to regulate the amount of energy in each cell, while our hormonal systems regulate how we eat and move to balance our energy use.

As Steve DeAngelo points out, "No matter who we are, our purpose remains the same, and that is to maintain or restore homeostasis. Homeostasis is a fancy way of explaining the body's natural balance. It means that you need to maintain a stable internal environment no matter what the external influences are."

Perhaps most important, however, in maintaining homeostasis is the role of our central nervous system. The central nervous system is the connective group of nerve fibers that operate throughout the body, aligning both cognitive and intrinsic bodily needs and functions between the brain, the spinal cord and nerves, and the nerves that extend through each limb. The role of the nervous system in the maintenance of homeostasis is that the autonomic nerves control unconscious processes such as breathing, the heartbeat and digestion. The central nervous system is responsible for movement. The sympathetic nervous system allows us to process emotions on a somatic level. For example, the

sweat glands are controlled by the sympathetic nervous system, so moments of strong emotion can be an indication of psychological or physiological arousal.¹⁰

The maintenance of homeostasis is made possible by the regulation of, most significantly, the autonomic nervous system, but it is also affected by the way in which the body responds to stimuli through its nervous system responses. Systems work together to maintain homeostatic control especially when the level of stress, either psychological or physical, put on the body is high. When we have excess hormonal and chemical stress, this can lead to a lack of homeostasis.

Solving pain and addiction

A lack of homeostasis is a direct path to disease, and here's where CBD comes into the picture.

“This is the reason that cannabis is effective for so many seemingly unrelated diseases,” says DeAngelo. “Because in every case, what cannabis does is it restores homeostasis, it restores the natural balance. It seems that our bodies have evolved to work with cannabis. We wouldn't all have an endocannabinoid system if we weren't meant to engage with phytocannabinoids.”

DeAngelo isn't wrong about the way our endocannabinoid system has developed, which we'll discuss in more detail later in this book, but the premise that addiction is amoral really starts to break down when you look at the way our bodies process CBD. We don't just use it to make ourselves feel better; we actually need it to *survive*, in the same way that we need opioids.

Mike Clemens, a scientist and principal at Guild Extracts in the San Francisco Bay area, explains why. “Homeostasis is maintained by a balance of the nutrients and minerals we need to be

alive,” Clemens says. “It’s crazy how Western medicine will treat some other manifestation of the actual problem and that has worse effects than the problem. The endocannabinoid system supports that homeostasis that we need to be healthy—sleep, diet, inflammation, pain. Pain is a way of self-communicating harm. Pain is your body’s way of telling your brain something is wrong.”

What scientists like Clemens can do with CBD in order to create homeostasis and mitigate the effects of addiction is remarkable. One of Guild Extracts’ new efforts is to create a Bluetooth-enabled device that will measure people’s pain and responses to vaporized CBD and THC so that they get the right dose when they need it, thus preventing overdose.

“If you use the device, we know the temperature the vape pen was used at, and how much product was used, and how long you used it,” Clemens explains. “Based on your phone use, we can also then see pupil dilation and use GPS to see if a patient moves or is physically still. What is their behavior after they use the product? If you have Parkinson’s, for example, have your tremors reduced? Then we can put it all into a deep learning neural network that compiles the data, and at the end of the day we crowdsource wisdom about how to best manage people’s medical needs.”

This new focus on CBD and carefully measured doses is something that Furlan knows a lot about. “Not everyone who is on opioids and wants to stop will be able to,” Furlan says, “but when they can, they have to do it through microtapering.”

Microtapering, Furlan explains, is a way of slowly getting opioid drugs out of the system and replacing them with CBD. This helps the body to not only repair its central nervous system so that homeostasis can be regained, but it also decreases the physical and mental pain of opioid detoxification.

“The most common symptom of getting off opioids is extreme anxiety; almost everyone will have it,” Furlan says. “They feel agitated, they can’t sleep or relax, concentrate; they have psy-

chomotor agitation and they can't stop moving their arms or legs, and it can last a couple days, weeks or months. It depends on how long they have been on opioids and how strong. Symptoms also include diarrhea, because opioids are constipating, and muscle pain. It hurts everywhere and nausea, vomiting, headaches and even sweating—profuse sweating—are common.”

Using CBD as a slow replacement for opioids works because it eases all of these symptoms while opening up endocannabinoid receptors so that the body can rest, relax and heal itself.

We're not all the way there yet, however, in knowing exactly how to treat people affected by this kind of pain. “It is much more complicated than we ever understood and the field is still evolving and new studies are coming every day,” Furlan says. “Even the CBD system is still being discovered as we speak, and the receptors able to activate it.”

Despite this lack of clarity, Furlan and her team are trying to change the way that doctors look at pain, addiction and mental health issues linked to opioids and to consider a cannabis-based solution. In fact, not only is Furlan the author of Canada's national opioid guidelines, she's working to change legislation in her province of Ontario in order to make sure that doctors know how to shift their thinking. Furlan also worked to create an app, My Opioid Manager, to help doctors ensure that their patients can microtaper with confidence.

“We are investing a lot of time in an education project, Project Echo, providing information for primary care providers funded by the Ontario Ministry of Health,” she says. “We use telemedicine—we are twelve professors around the table every week, connecting with anyone in Ontario to discuss their cases. We've trained more than three hundred professionals across the province: occupational therapists, physical therapists, nurses, pharmacy operators, chiropractors. It's very intensive. By educating primary caregivers, they can manage their patients better.”

Let's end our moral panic

A moral panic is a form of mass hysteria that is linked to fear and media urgency about a public issue. It includes a common concern, evidence of hostility, consensus in the media, a disproportionate level of response and volatility in terms of the way that the public engages with the issue. It provides a simplistic explanation for an issue in order to give the public a justifiable reason for something that has gone wrong. In other words, a moral panic can cause undue concern about an issue in the public eye, even if it is not necessarily something that will cause a long-term social or economic problem.

Moral panics can lead to rapid demonization of specific ideas, issues or people, such as the demonization of narcotics in the United States. It's easy to blame those who are ill. It's harder to come up with a valid solution for illness.

We can see the forest for the trees here. If Canada can create a foundation for re-educating doctors on how to use CBD, then the same has to be true for the United States.

What Prohibition and its effects have shown us is that the broad application of moral standards to a diverse population is likely to have negative effects. This is especially true in a country where our personal freedoms are highly valued. A moral high ground is not possible when people do not all believe the same thing about how life ought to be lived. And, in fact, the historical evidence shows the difficulty in trying to impose values and ideals: it makes a population question why that imposition is necessary.

The reality of our collective psychology is that we, as human beings, want to push back against government controls over what we ought to do. But perhaps even more important is the fact that we try to use moral arguments to talk about physical illnesses that are not the fault of patients. The moral regulation of what we

believe to be our vices, like the use of opioids, is directly tied to our American expectations of assimilation, to the enforcement of conformity.

Instead of judging people with addiction issues, we need to get to the heart of the problems that bind our decisions as medical professionals, as politicians and as consumers. We need to look at what our bodies need to find homeostasis so that there is a forward shift. We also need the stigma of addiction to dissipate so that we can stop eliminating solid, scientifically valid solutions like CBD.



9

A WOMAN'S RIGHT TO HEALTH

ON DECEMBER 15, 2015, Amina Cordano went in for a routine check-up with her doctor and heard the last thing anyone wants to hear.

Cancer.

“My gynecologist found these abnormal cells. They said the cell cluster was very angry, they said it was angry looking,” Cordano explains. “And at that moment they made a decision, they were going to go in and do a biopsy of it. And a week later, on December 21st, I was diagnosed with stage 3 cervical cancer with both left and right pelvic lymph node involvement.”¹ This optimistic and dedicated mother of two was determined to survive, no matter what her gynecologist and original oncologist told her.

“She was always smiling and very positive and upbeat, and she didn’t lose that. She didn’t get depressed, she didn’t get sad,” Cordano’s husband, Ray, explains. “Every day when she would go

into chemotherapy, she still had a smile on her face and she was still upbeat.”

Cordano spent months researching. When she felt that chemotherapy on its own wasn’t going to help her, she found an integrative oncologist, Dr. Sean Devlin, who believed in cannabis medicine. Devlin connected her with Michael Masterman-Smith and his farm.

“Amina Cordano is one of the very first and favorite patients I worked with after leaving UCLA,” Masterman-Smith says.² He put her on CBD-THC capsules for her regimen. The CBD was to stem her cancer and the THC to ensure that she eliminated the risk of toxic nausea and weakness that most people get from cancer treatments.

Cordano also took vitamin C IV therapy. She started on her regimen for two and a half months before going into battle with chemotherapy and radiation in March 2016, and she refused to medicate herself with all of the pharmaceuticals on offer.

At the time, her husband wasn’t convinced. “I thought it was voodoo or an easy escape out of Amina’s thoughts of cancer,” Ray Cordano explains. “With all of the bad publicity on CBD and THC—and I wasn’t highly educated on the difference between them—I was convinced it was no big deal. But once her original oncologist gave her all these prescription drugs and she said, ‘No, I’m not taking any of them and I’m doing CBD instead,’ I had to support her.”

A PET scan taken in March, three months after her original scan on January 7, 2016, showed that her tumors had shrunk on her cervix and in both of her lymph nodes by 25 percent. She showed me the slides of her PET results, and, as Masterman-Smith recounts, they are extraordinary for someone at her advanced stage of cancer.

The most difficult treatment protocol in the world

When cancer strikes, its effects are on the human body are hugely complex. Not only are cancer patients fighting the disease itself, but the typical approach to curing it is almost as bad, if not worse, than the disease itself.

Jennifer Lanksbury, the biologist from Washington, outlines how an individual's chemotherapy and radiation fit into the big picture. Cancer patients are sent home after their treatments with explicit instructions about what's going to happen, because it's not just physically painful, as Lanksbury explains.³ Chemotherapy and radiation are both incredibly dangerous to patients and to their families, because people expel waste that is life-threateningly toxic. Those who receive chemotherapy can get secondary forms of cancer as a result.⁴ When those who have had radiation come into low-level contact with children, the elderly or pregnant women—through skin-to-skin contact or through simple activities such as cleaning the bathroom—they can actually cause cancer.⁵ Exposure to a parent taking chemotherapy can even change the genetic makeup of a child.⁶

All of the cancer drug risks compound on one another, and they could have deeply affected Cordano's family, which is why she was so adamant about trying to find a better solution, one that would lower the chance of something going wrong.

"She didn't need any of the prescription drugs. She was originally given fourteen different drugstore prescriptions for steroids, anti-nausea, anti-diarrhea. She didn't need them. She did very little radiation," Ray Cordano says. "The doctors were in awe. That's when I became completely sold on the benefit of CBD and the magic of how it worked."

Cordano and her husband don't just believe in magic. They believe in science. That's why she didn't stop at CBD. "Because

I had small children,” she says, “and I wanted to make sure that I hit it from all angles, I went ahead and decided to go in and do radiation and chemotherapy and hyperthermia as well.”

She credits her CBD therapy for how easy it was to go through the process and how the toxins moving through her body didn’t seem to affect her. She didn’t lose her hair, she wasn’t exhausted, she never threw up and, best of all, she was able to be present with her family every day.

“People in chemo with me were really curious about what I was doing and how I was fully functioning. I would go into battle Monday through Friday, all week long, doing chemo, doing radiation, doing hyperthermia. And then I was still able to flip burgers at my son’s barbecue on the weekend.”

A health solution bound to the female experience

Amina Cordano’s case may be an outstanding example of how to manage cervical cancer with CBD, but to Dr. Ethan Russo, it may not be as surprising as it first appears.

Ethan Russo is the director of research and development at the International Cannabis and Cannabinoids Institute in Prague, Czech Republic, and a board-certified doctor of neurology with a special qualification in child neurology. After eleven years with GW Pharma, the company that went on to develop Epidiolex (the CBD-based epilepsy medicine we’ve talked about already), Russo became medical director of Phytects, a company devoted to the research and development of medicines, supplements and lifestyle approaches to optimizing the function of the endocannabinoid system. He has strong opinions on why this system needs to be critically assessed when it comes to women’s health.

“If we look at medical history in the US and Europe, cannabis was primarily used for obstetrics and gynecology and then

treatment of pain, particularly migraine and neuropathic pain,” he says. Russo points out that cannabis used to be used extensively in the treatment of nausea during pregnancy and pain during childbirth, and that it has been proven through evidence-based studies to be safe for both mothers and infants. “There’s no evidence of human birth defects associated with the use of medical cannabis. But CBD uses in women’s medicine have fallen out of practice because of fears of the toxicity of cannabis, which are really unwarranted. Now, frequently, women wind up in the hospital getting drugs that we know are more dangerous and which are largely ineffective.”

Russo points out that our fears about cannabis intoxication in mothers-to-be are largely unfounded. He tells the story of a researcher, Melanie C. Dreher, PhD, who studied the use of cannabis as a traditional plant medicine among a population of Rastafarian women in Jamaica.⁷ Dreher found that women in this community who used what they call ganja were those who avoided alcohol and cigarettes, increased their nutritious food intake, decreased their levels of nausea and had healthier, bigger babies who, over the long term, maintained their health better than others in the same region.⁸ As Russo explains, “Dreher’s team found . . . that these women had very healthy infants whose development, if anything, seemed a little bit advanced compared to women of similar age who were not using ganja during pregnancy.”

Russo suggests that women who are under deep life stressors such as poverty may not be using cannabis recreationally, even though an outsider may assume that they are; in fact, using this medicine, which had a spiritual as well as a health value, made women better parents.

Dreher’s research, however, did not fit with our assumptions about cannabis medicine. “Her findings were published in the journal *Pediatrics*, a very reputable, very conservative source,” Russo says.⁹ “Unfortunately, after this, Dr. Dreher had difficulty getting

further grant money for similar studies. It's hard for the truth to come out, because often there are people opposing the dissemination of this kind of information that might seem to refute the conventional wisdom that cannabis was dangerous in pregnancy.”

In tracing the history of the use of CBD for gynecological issues, Russo also found that it was used as a successful treatment for uterine cancer as far back as 1872.¹⁰ Cannabis extracts have been used as a safe treatment of a wide range of conditions including problems with menstruation and menopausal symptoms, as Russo reports, for more than 9,000 years. The use of hemp (which likely refers to CBD rather than to the THC in *Cannabis sativa* because of the difference in properties associated with the plants at the time) has been found in doctors' records in ancient Mesopotamian, Egyptian and Zoroastrian scripts for women in uterine pain and to prevent miscarriage. CBD was, over the course of centuries, given to female patients orally, rectally, vaginally, on the skin, in the eyes and by a form of steam inhalation similar to that of vaporizing CBD today.

As Russo explains, even Britain's Queen Victoria, mother of nine children, was prescribed CBD. “Sir John Russell Reynolds was personal physician to Queen Victoria, and it has been widely acknowledged that she received monthly doses of *Cannabis indica* for menstrual discomfort throughout her adult life,” Russo says. “In 1890, after more than thirty years' experience with the agent, Reynolds reported, ‘Indian hemp . . . is of great service.’”¹¹

Dr. Reggie Gaudino tells the same story about Queen Victoria, and he questions why we have lost that knowledge and how it may be linked to the way in which we disempower women and their needs. What was once used as a means to help women in labor, or those who had painful menses or those who suffered from sexually transmitted diseases was utterly removed from the American pharmacy by the 1930s, as both Gaudino and Russo explain.

“I think what has happened is that we buried all that information,” Gaudino says. “We created this demonic association with a plant that was sacred. And all these religious texts, somehow it got turned around into something evil, and this idea was fed to the people who needed something to believe in because we were coming out of the Great Depression.”

Ending the struggle for women in pain

In the last few years there has been an explosion of research into the ways in which CBD can positively effect women's health.

Deep infiltrating endometriosis (DIE) is a gynecological disease that is characterized by chronic pain and rapidly growing benign tumors in the womb, called fibroids. Fibroids can also begin to grow throughout a woman's body, as her endometrial cells find their way through the bloodstream. In essence, this disease causes uterine tissue to grow everywhere and anywhere, and when the affected woman menstruates, this tissue can break down and bleed in the same way that it does in the uterus, causing intense pain.

At the Asana Group, the leading global cannabinoids research hub in the field of women's health run by Lumír Hanuš in Tel Aviv, Israel, researchers have found that CBD has exactly the effect that Sir John Russell Reynolds said it did in the 1890s.¹² CBD has antifibrotic properties in addition to its ability to ease pain, which means that when women with DIE take this treatment, they are more likely to be released from symptoms and their bodies will stop producing excess uterine tissue.¹³

In more than 95 percent of cases, patients who suffer from DIE are prone to very severe pain, and therefore they are usually recommended for extreme surgery, including the removal of the uterus and fallopian tubes, which means they are sterile.¹⁴ Women

who have endometriosis are much less likely to be able to bring a baby to term than those without the disease. Medical management, however, is insufficient as it is associated with high rate of recurrence and only partial relief of symptoms including chronic pain.¹⁵

What's interesting, however, is that Asana Group researchers have found that endometriosis is linked to what Russo has called an endocannabinoid deficiency (ECD). In other words, they've discovered that women with endometriosis have lower levels of CBI receptors in their endometrial tissue, which means that there is a direct relationship between endometriosis and the endocannabinoid system: uterine cells grow freely throughout the body because these patients' systems simply aren't picking up their natural stores of internal CBD.

And there are other very common women's ailments that can be culled through regular CBD use, says Russo. "Migraines are clearly more common in women than men, and this was one of the main uses of cannabis before prohibition," he says. "Additionally, fibromyalgia is much more common in women than men, and we're seeing now that cannabis can be remarkably effective for that disease. The National Pain Foundation did a survey several years ago in which they queried over thirteen hundred people with fibromyalgia.¹⁶ Patients reported that the three FDA-approved medicines to treat fibromyalgia were extremely ineffective compared to cannabis. The fact is unless a patient feels that a medicine is helping them, they're not going to use it. That's what we have to go on: the fact that people are taking this and reporting benefit. It deserves more scrutiny."

Acknowledging that ECD exists, and that its effects on women's health and well-being are so devastating, is an important step toward women's health equity. CBD not only provides a novel approach for developing badly needed new treatments for endometriosis, this research also provides validation of the monthly menstrual pain and emotional anguish that so many women feel,

which has been traditionally diminished by health care providers. While Russo does not advocate smoking cannabis, he says that CBD inhalations or supplements may achieve the same goals for pain reduction.

Amina Cordano agrees. “My hope and dream is that every day we can wake up and take a multivitamin that includes a low dose of cannabinoids, as a preventative, like a pill a day will keep the doctor away,” she says. “I can’t wait to see that happen. It’s just the way of the future.”

Cordano knows that, as a woman, she wasn’t taken seriously when making decisions for herself and her own treatment, something that she suspects will change as more people discover CBD as well as the possibility of an endocannabinoid deficiency.

“I felt very harassed and very pushed into treatment here in Sacramento. I felt like I needed to step away and really come up with the treatment plan that I wanted to do for myself, for my own life. And because I was leaning toward cannabis medicine, I was very harassed. I would get threatening phone calls telling me that I would die if I didn’t go to chemotherapy right away. But I listened to myself, and that was the turning point.”

Masterman-Smith says, in summing up her case, that he is amazed at the extent to which she’s emerged free from the pain of cancer as well as the emotional and physical effects of stepping away from a traditional form of treatment. “Amina has recovered from her ovarian cancer and has been cancer-free for two years. She has no evidence of disease.”

It’s her goal to help others with cancer, Cordano says, now that she’s moved to the other side of treatment. “I’m going to teach chair yoga and massage to people who are going through chemo and radiation,” she says. “I just graduated from doing two hundred hours of yoga teacher training and so I’m going to one of the dispensaries to offer this service and to raise awareness about self-care and its role in healing from cancer.”



10

WEIGHTED ISSUES

THE NUMBER of obese children in the United States between the ages of six and eleven has more than tripled over the past three decades.¹ Almost 30 percent of all children under the age of nineteen in the United States qualify as overweight, with an additional 13 percent reaching the rate of obesity. That rate goes up to 71 percent overweight for adult males and 62 percent for adult females, with obesity rates reaching well over 30 percent for both, making us one of the fattest nations in the world. In 2018, the American Diabetes Association (ADA) estimated the total costs of Type 2 diabetes, a preventable disease, to the American public rose to \$327 billion in 2017 from \$245 billion in 2012, a 26 percent rise in only five years.² We're spending hundreds of billions more than that to treat cardiovascular disease, obesity and the many types of cancer that have been linked to weight-related inflammation.

The reality is that we don't even know that we're overweight. As a recent US Department of Health and Human Services

national household survey report demonstrates, the data suggests we're significantly off track. Even though some of us claim to know what is necessary to control our weight, the fact is that there is a lack of follow-through, knowledge or ability.

"Americans' knowledge and good intentions are not reflected in behavior," the DHHS states. "Compared to adults' own self-perceptions of their weight, their body mass index scores (derived from self-reported height and weight) show that adults are actually heavier than they believe themselves to be. At the same time, of those self-reported being overweight, at least seven in ten adults in all age groups are currently trying to lose weight."³

Many researchers believe that an increase in fast foods, processed foods, engineered foods, artificial preservatives and food additives have set the stage for the prevalence of these diseases. Many of us believe that we can prevent diabetes and related weight diseases by simply making better choices.

That may not be the case at all.

We may actually trace our path to obesity back to something else entirely, related not only to our policy choices but also to that low-level trauma that we're repeatedly experiencing.

Our children's lunches: A pathway to obesity

In 1946, the National School Lunch Program (NSLP) was created to ensure that children consumed nutritious food and to eradicate childhood hunger.⁴ The NSLP provided funding for each state to establish, maintain, operate and expand not only lunch programs but also nutritional education programs for children and their families. The federal government had determined, having witnessed the effects of hunger and malnutrition in adults and children across the population during the Great Depression,

that there was a direct relationship between malnutrition and the capacity of children to develop, learn and become contributing members of society. That government understood the link between the health of our children and the future success of our country.

But let's be clear, this program wasn't just about feeding children.

The NSLP was linked to federal policies after the end of the Second World War that managed surpluses created as a result of changes to supply and demand when the war ended. The government was storing the surplus of farm commodities it purchased through the Farm Bill in order to stabilize prices, and the public demanded release of this food to feed the majority of the population that was hungry and malnourished due to the economic situation. The government determined that stored surplus farm commodities were to be utilized for food first by the armed forces and institutional settings, and then by schools, thereby setting the stage for the NSLP to be operated under the auspices of the US Department of Agriculture.

By the mid-2000s, the NSLP was widely criticized. The food at offer was carb-heavy, fat-laden and laced with sugar in order to feed children at the lowest possible cost. Even worse, the program was targeted at children who come from families with limited household incomes that depended on the NSLP for nutrition, thereby setting up these children for disease and a lack of ability to succeed.⁵

In the best interest of Americans in 2010, Congress enacted the Healthy, Hunger-Free Kids Act (HHFKA), which called for a revision of school-nutrition standards to align with the 2010 Dietary Guidelines for Americans by increasing quantities of fruits, vegetables and whole grains; establishing calorie ranges and limiting the amount of trans fats and sodium that these children ingest. The HHFKA prevented the sale of food that did not fit into

the guidelines and made recommendations to remove vending machines and other temptations from school properties. Today, and several iterations of the program later, the NSLP provides low-cost or free lunches to more than 31 million students at 92 percent of US public and private schools.⁶

With these changes, it was assumed that the food provided by the NSLP would meet required standards and that the overall health of Americans would improve.

That didn't happen.

What we know is that the vast majority of schools that already participated in the NSLP still sell food that is not associated with the program. Even though there is a mandate to restrict the use of junk food, half of the schools in the program are likely to be utilizing vending machine sales, with schools with the lowest poverty concentration the most likely to do so. Competitive foods, such as vending machine and a-la-carte offerings, are generally poor-quality foods that students like and will purchase, which means that the possibility of enforcing the rules and converting these offerings to nutritional foods is not being addressed.

This is a business issue, and it's also a policy issue. As field researchers Dr. Jennifer Woo Baidal and Dr. Elsie Taveras from Harvard School of Public Health's department of nutrition explain, only a few years after its inception, HHFKA is at risk of being undermined by schools where administrators want to benefit from deals with Big Food.

"Some school officials, food-industry advocates and the School Nutrition Association (SNA, a professional organization that represents school-lunch programs and whose members include food manufacturers) have raised concerns about increased food waste, decreased school-lunch participation, difficulties in meeting whole-grain and sodium goals and potential for increased operating costs," Woo Baidal and Taveras explain. "In response, the House of Representatives included waivers for school-lunch

nutrition standards in its fiscal-year 2015 Agriculture Appropriations Bill. The provision would allow schools with a six-month net loss of revenue to opt out of providing the healthier meals outlined by the HHFKA.”

These decisions impact the poorest and most vulnerable children in our country. As these children age, they require additional health care due to an increase in all kinds of illnesses, including obesity, diabetes and cardiovascular disease. All of these diseases are related to one thing: inflammation.

Inflammation and the endocannabinoid system

Dr. Nick DiPatrizio is a neuroscientist based at the University of California at Riverside. His state-of-the-art lab uses analytical, genetic, surgical, biochemical, molecular, pharmacological and behavioral models to test how and why we eat too much of the wrong things for our bodies.

“It’s been feast or famine up until only very recently in human history,” DiPatrizio explains. “It’s always been evolutionarily advantageous for animals, including humans, to consume high-energy nutrients. The problem is that, in our modern cultures and Western societies, we consume high-fat, high-sugar diets. Our drive to consume these high-energy foods for survival have become maladaptive and dysregulated, and this leads to diet-induced obesity, Type 2 diabetes, metabolic disease, as well as a whole other host of other disorders.”

Understanding how the endocannabinoid system fits into the equation offers a way for us to control our food intake. DiPatrizio calls the endocannabinoid system a safety net, because it’s heavily involved in controlling our attraction to high-energy foods.

“In the gut, during and after a meal, we release what are called peptides from our small intestines, and these basically stop us

from eating more. Peptides tell us that we're full. We've recently found that endocannabinoid receptors, which line the inside and the outside of the intestines, can produce these peptides."

The connection between endocannabinoid receptors and our eating patterns is complex and still unfolding, but as DiPatrizio explains it, it's critical to understanding why so many Americans are overweight. His experiments have shown that when people are provided with a higher-fat diet, for example, this creates a preference for high-energy foods. In modern environments where food is plentiful, however, this can lead to an excess of signals in the brain that lead to compulsive eating and promote obesity. The endocannabinoid system also controls movement of food throughout the intestines, which can either speed up or slow down our metabolism.

We know a lot about the way in which THC affects our appetite. Most people are aware of the phenomenon called the "munchies" that affects those who smoke marijuana, as DiPatrizio notes, which is why THC is so commonly used to combat nausea and lack of appetite associated with chemotherapy and other medical treatments. It wasn't until recently that we began to understand how this phenomenon works and how it can actually inform weight loss as well as weight gain.

As far back as the nineteenth century, physicians mentioned the increased appetite that accompanied cannabis use.⁷ Later on, the effect of marijuana on food intake was studied by a military research group in Panama in 1933, where soldiers using cannabis were shown to eat much more than others and reported feeling hungry long after others were sated. Those taking part in these later studies showed a preference for sweet and savory foods and a tendency to eat long after their hunger waned.

DiPatrizio says that, in his lab, he's shown that a rise in endocannabinoids doesn't necessarily lead to long-term weight gain,

however. When his subjects took CBD or THC consistently, they tended to be less overweight than those who took it once in a while. This is likely because, once a person's endocannabinoid system is in order, it returns to that needed state of homeostasis. If you're overweight or underweight, endocannabinoids can help you regulate your body so that you can find the right balance.

“The endocannabinoid system regulates mood, emotions, pain, appetite, you name it, it regulates it. Every organ is regulated by it,” DiPatrizio says. “Pick an organ system in the body, the endocannabinoid system is indeed present and there controlling its activity.”

Inflammation is one of the most important processes related to the endocannabinoid system control mechanisms. We hear a lot about the fact that inflammation is bad for us. What inflammation actually refers to is an excess of lymph production in the body; the more that our cells and tissues are in crisis, the more that our body works hard to flood itself with lymphatic fluid to provide a soft buffer at the cellular level. It literally creates a pillow effect over every part of your body that hurts.

Over time, this fluid causes what is called oxidative stress on the body, which means that our cells are under constant strain to function. Technically, therefore, when we are constantly affected by inflammation, this can lead to stress in our arteries and heart, autoimmune diseases, diabetes and cancer, as well as allergies and anaphylactic shock.⁸ Being overweight, sometimes, isn't just a lack of willpower or the preponderance of fat in the body; sometimes it's that our body is experiencing so much strain that it becomes filled with fluid at the cellular level. Inflammation is therefore increasingly recognized as an underlying factor in many chronic disorders.

“Inflammation comes from a cascade system that is designed to protect us,” Gaudino says. “Let's take the example of banging your foot when you're, say, playing a sport. Typically, your foot will

swell up with fluid as a protection reaction to guard that part of the body from further injury or further attack. That makes sense. But when your body is under generalized strain, or when it gets triggered by something like an insect bite, then the entire body reacts. That's why, typically, inflammation is not a localized thing, unless it's a sports injury. If you have a disease, inflammation is system wide, and the entire body tends to respond."

As Dr. Reggie Gaudino explains, what we do know about CBD and body regulation is that it can directly decrease inflammation, no matter the cause.

This excess of fluid is why inflammation leads to a lot of disease conditions, if the body can't find homeostasis again. When we're under constant emotional stress, the reality is that homeostasis is hard to achieve, notes Gaudino. For this reason, inflammation almost always results in a cascade reaction from which it's almost impossible to recover. As Gaudino points out, however, this is where CBD can help. "It's the endocannabinoid system's job to maintain the balance of all the other systems and decrease inflammation. Both THC and CBD can treat inflammation very effectively. In fact, they actually probably have a higher efficacy for inflammation reduction than corticosteroids do." Corticosteroids are hormonal drugs that stimulate the activation or deactivation of our metabolism. This can either speed up or slow down our body's processes so that it's easier to heal, but they come with massive side effects such as skin and eye damage, weight gain, depression and cardiovascular risk.

While we know for certain that our endocannabinoid receptors help us choose the food we eat and process the food in our bodies, as well as lessen inflammation throughout the body, scientists still have a lot of work to do. Even though this work is ongoing, what Gaudino and DiPatrizio suggest about the role of endocannabinoid receptors in finding our bodies' highest level of efficacy rings

true. We have the opportunity to regulate our systems so that they are not under constant attack.

“We’ve only just scratched the surface, I believe, over the past few decades,” DiPatrizio says, when it comes to the question of how we can directly create CBD protocols to help people who are overweight. “There are many wonderful open questions, of course, that we still have to address.”

Nonetheless, study findings have begun to answer these open questions. There have been years of chemical analysis research conducted which suggest that the endocannabinoid system has a role to play in telling the brain when and how to eat.⁹ It can also tell the body when and where to store fat, to convert sugars into fat and when we might need to become more active.¹⁰ Being able to control the endocannabinoid system could allow people to make better choices, control eating disorders and ensure that we have stronger and healthier metabolisms.

There has been a social shift taking place with respect to the way in which communities engage with food production and use, which is another question that we need to address.

Efforts such as the Healthy, Hunger-Free Kids Act of 2010, the USDA Nutrition Standards in NSLP, the 2013 Nutrition Standards for All Foods Sold and other federal legislation have been made in the recognition that the effects of school policies, advertising and industrial food production need to be balanced. There is a social drive to ensure that these changes take place and that there are tools available for those who are in a position to ensure compliance with the recommended policies. Schools can benefit from helping children and youth understand how food production and consumption works, so that they are better able to make their own decisions about their health.

The social context of food and nutrition is broader than simply that of personal choice and the influence of family and

government policies, however. We need to address the challenges that the American population has faced over multiple generations when it comes to our eating habits and how these are connected to political and corporate choices. We have to shift the social determinants of health that affect vulnerable young people. Direct action is needed in coming to terms with the obesity epidemic that affects children around the country.

11

DON'T BELIEVE EVERYTHING YOU THINK

FOR HUNDREDS of years, until Magellan circumnavigated the globe, conventional European wisdom held that the Earth was flat.

“It had been known for thousands of years that the Earth was round,” Dr. Ethan Russo says. “The ancient Greeks knew this, and they actually pretty accurately predicted the diameter of the Earth. One way that they knew this was, as a seafaring nation, when a ship is coming into port, the first thing you see is the top of the mast. Then you see the sails. Eventually you see the hull of the ship. This could only happen if ships are coming over an arc. If people get high enough in the mountains it’s possible to discern the curvature of the Earth. There were people that have known forever that the earth was round, but church dogma was different.”

Galileo Galilei (1564–1642) was an Italian scientist who challenged the ideas of Aristotle about the way in which the Earth

moved in our universe and introduced the concept of time into ideas about motion. Around 1609, Galileo worked with a lens grinder to take two lenses and place them at opposite ends of a metal tube, making a design for a telescope, which was created originally by Dutch scientists, that was more accurate and usable. Through this device, Galileo discovered craters on the moon, the moons of Jupiter, sun spots, the rings of Saturn and the phases of Venus. He determined that the Earth's moon was not a source of light but rather of reflected light, and he found that nebulous stars were, in fact, actually a number of small stars clustered together. He used the term *magnitude* in describing the brightness of the fixed stars. In doing so, he confirmed the earlier theory, put forward by Polish philosopher Nicolaus Copernicus, about the revolution of the Earth around the sun. Galileo also believed in the idea of matter being composed of small particles, because it seemed to be consistent with the nature and behavior of matter.

Galileo reported his findings in his book *The Starry Messenger*. Criticism of Galileo's observations began immediately, and he was summoned by the Catholic Church to Rome and ordered to desist teaching Copernican theory. The authorities at Rome would not even look through his telescope. Why not?

This wasn't just a struggle between faith and reason. Galileo was one of the faithful, arguing in favor of what he called natural philosophy and that new scientific discovery did not contradict the deeper meanings of the Holy Scriptures. He believed that the wise man should seek the true meaning of the scriptures and that sense experience and necessary demonstrations beautifully revealed this truth.

None of his arguments mattered to the Church leaders or the broader society, however, because of the intrinsic view of the unknown that perpetuated Galileo's culture. Observing something that could not be seen with the naked eye, such as the

movement of the Earth, may have felt like seeing apparitions or hearing voices: preposterous and mad. But even more so, his ideas threatened the status quo. They threatened the Church's stranglehold on scientific thought and its ability to hold the confidence of its faithful. If someone other than the Pope was correct about the world, then the whole infrastructure of the Church and its influence and power could dissolve.

In 1633 Galileo was formally interrogated for eighteen days by Church men who were determined to see his theories derided as the work of the Devil. To mitigate his possible punishment, he confessed that he may have made the Copernican case too definitively and offered to refute it in his next book, but the Church decided that Galileo should be imprisoned indefinitely under the tenets of the Inquisition. In a formal ceremony at the church of Santa Maria Sofia Minerva, Galileo was given both physical and religious punishment and sentenced to house arrest in Sienna until his death in 1642.

The Church finally pardoned Galileo for his so-called crimes in 1983.

Science, reason, and fear

"I think the number one explanation is prejudice," Russo says when asked why CBD is off the table for so many health practitioners. "It's in scholarly journal articles. There are thousands of studies that have been completed. What CBD isn't in, to the extent that it needs to be, is the textbooks and the curricula of courses in medical school."

As Russo states, science can identify truth long before it's generally accepted by the rest of us, and that includes our physicians. Family doctors have a practical education, but they're generally

not researchers. As we've already discussed, doctors aren't privy to the millions of health care findings that are revealed by researchers every year. Unless they're seeking out new ideas on their own or they're pushed toward new beliefs by Big Pharma, they're likely not to hear about the nuances of peer-reviewed research findings and how these can be applied in a medical practice. The human body is made up of trillions of cells that align with each other in patterns to form tissue, which, in turn, create the organs in our body. Each organ uses its own set of tissue, which requires specific processes and chemical reactions in order to function. The more we collectively learn about the science of the human body, the more it may not actually be possible for any one doctor to truly understand each of these processes.

Perhaps even more germane to this challenge is the limited amount of time that health care providers have to help us get well. The average general physician has a fifteen-minute window in which to listen, assess, diagnose and prescribe a definitive solution to each patient. They're seeing dozens of patients in a row, and they have to rely on their medical traditions and shorthand to get through their days efficiently.

Prescribing CBD requires health care providers to dig deep and really listen to patients, and it requires going against allopathic conventions to look beyond the traditional Western medical education process.

So why don't they? What are doctors afraid of?

Economic privilege and the common weed

To understand what we do and do not know about the human body, we have to unpack tradition from science. Both can be valid means by which to treat people and gain access to health.

The problem is that of privilege.

As Dr. Reggie Gaudino says, there's a split down ethnic and cultural lines as to what kinds of medicines are considered to be respected by physicians. "Indigenous populations that I've had the opportunity to talk with are saying that they've always used cannabis medicines. This is indigenous populations from around the world, not just the Hopi Nations who have been known for this kind of care. There are a lot of people, a lot of indigenous cultures poised and looking at what is happening in this research space, but the division comes down to color. People of color believe in CBD, but yet the fork in the road to general acceptance is largely created and controlled by people who are not of color."

Like the story of Galileo whose scientific discoveries threatened the Catholic church which, at the time, controlled great swathes of the world's resources, CBD feels threatening to those who control our financial resources in the United States, mostly because it can be grown at home.

Let's go back even further in the CBD story to see where this privilege may have developed.

Hemp, like other medicinal plants, was once part of a range of plant medicines that were passed down from generation to generation. We know that traditional plant medicines that we've ignored in the past actually pass muster when it comes to clinical trials. Ginseng (*Panax ginseng*), in its berry and root forms, has long been used in traditional Chinese medicine as a means to regulate bodily functions including the digestive and endocrine systems. In recent years, ginseng has been shown to decrease blood sugar, total blood cholesterol and triglycerides.¹ Empirical studies have demonstrated that the use of cinnamon, bitter gourd, fenugreek and ivy gourd can have varying hypoglycemic effects, as well as effects on the ability of individuals to respond positively to overall diabetes treatments.² We've used plants like

yarrow, for example, for wound healing, decreasing inflammation and infection, reducing scarring, creating hormonal balance, fighting mastitis and managing blood pressure. We've also used feverfew, digitalis, garlic, chamomile, as well as saffron and St John's wort (which we've already discussed) among many thousands of other plants, to solve common health problems. You may know about white willow bark, which contains the plant molecule that we use in Aspirin. All of these plants contain active molecules that we've replicated in labs as pharmaceuticals for products that we take daily.

At the heart of the use of these plants, therefore, is our collective wisdom. And, collectively, we've cultivated these plants and brought them with us on our travels in populating the earth, especially hemp.

"We went everywhere with hemp because this plant could go everywhere," Gaudino explains. "It can grow in marshes, it can grow in the Himalayas, it can grow in the desert. As well, it has so many functions: we raised seed from it, we could eat it and we got fiber from it to make clothes. We knew early on, at least four thousand years ago, that it could be used as medicine. In ancient Egyptian, Sumerian and Chinese texts, we find symbols of the cannabis leaf and writings about how they used it as an oil, in poultices and on our backs. It's been found entombed in earthenware with ancient Chinese tribal leaders."

The hemp plant became not only important to human existence, but it became sacred as well. Ethnobotanist Nancy Turner, from the University of Victoria in Canada, is one of the world's leaders on how indigenous populations engage with the plant world, and she explains that, often, to these indigenous communities, humans are considered the weakest link in our known world. Plants, like animals, are seen as sacred because they are strong, and therefore these species have a duty to care for humans. In

turn, Turner says, “We have obligations, as we do to our human relatives, to care for the plants and animals that we depend on.”

What we call weed, Turner shares, is linked to the Anglo-Saxon word *woad*, which meant herb.³ Although *woad* is now aligned specifically with the plant *Isatis tinctoria*, this wasn't always the case. In fact, *woad* is likely related to the Latin *vātēs* (“seer, prophet”) and the Old Irish *fáith* (“seer”), representing how magical, and how deeply needed, we once believed plant medicines to be: they showed us the way to a better future. The origin stories that we have for cannabis and other plant medicines, therefore, are linked to our spiritual connection with the Earth. Weeds of all kinds, including cannabis, which is so commonly known by that term, were once valued and treasured as herbs, and, as Turner laments, most of us have lost the knowledge that goes with them. It is this indigenous focus on our reciprocity and shared caregiving with plants that is at the heart of the question of privilege.

Let's consider the shift from common land to proprietary land that took place in Western countries about a thousand years ago. The commons were lands that were made available for everyone to use and were designed for the creation of shared agricultural resources. From medieval times, the ruling classes had an obligation to provide land for everyone to use, including forests, fields and rivers, but in return for these resources, all citizens were obliged to take care of them. The commons had a distinct historical importance because it allowed peasants who did not own land a relative degree of freedom in providing for their families, by using the commons to graze their animals and by using forests to forage for food and to hunt.

With the rise of commercial society in the West, however, the idea of shared resources began to wane. By the Middle Ages, the Church and the ruling classes began to divvy up the land for their own use. Instead of being owned by everyone, land was owned by

individuals. Under the former social contract, even with all of its limitations, the supreme direction of the general will allowed for all people to work together for a common cause. By the Enlightenment, land ownership became sacrosanct; those with land were seen as not only economically but also morally pristine citizens. Privilege was, therefore, being provided to some but not to others, which included rights to economic well-being as well as political rights. This meant that those without access to privately owned resources such as land could not vote and therefore could not protect themselves and their families from exploitation.

There were protests to this new way of life, one that split the haves from the have-nots, even during the Enlightenment. Individuals like Jean-Jacques Rousseau, the Swiss philosopher, who wanted to defend their right to freedom from oppression challenged this new status quo. He wrote a book in 1754 called *Discourse on the Origin and Basis of Inequality Among Men*. “The first man who, having fenced in a piece of land, said, ‘This is mine,’ and found people naive enough to believe him, that man was the true founder of civil society,” Rousseau wrote sarcastically. “From how many crimes, wars and murders, from how many horrors and misfortunes might not any one have saved mankind, by pulling up the stakes, or filling up the ditch, and crying to his fellows: Beware of listening to this impostor; you are undone if you once forget that the fruits of the earth belong to us all, and the earth itself to nobody.”⁴

What Rousseau meant was that the shift away from the commons delegitimized the idea that we are a part of an ecosystem and that we have a right to share the bounty of farm, forest and field.

Winning the medicine game

Eventually, ownership of the land, Turner explains, meant that plants too became owned by those who owned the land. And those plants that grew in the wild, the weeds that were viewed as the community's traditional medicine and food systems, were suddenly not perceived as legitimate.

When we look at our social environment today, the focus of businesses on winning at all costs makes it almost impossible for leaders, employees and other stakeholders to take other important matters into consideration, such as people, the environment or even the need for ethical behavior. There are no moral tenets that guide decisions around the acquisition or use of resources that are connected to the idea that we have a responsibility to the land. Despite the fact that there are laws in place, businesses also do their best to work around these laws. Individuals aim to acquire wealth in an unchecked way, and there is a significant polarization between rich and poor that has been caused by the greed of the wealthy to continue to acquire resources, especially the control of land and money.

A hemp crop that delivers value for clothing, building, designing, medical care and much more became a weed because it grew everywhere. It couldn't be contained. Hemp slowly lost its healing and its spiritual value; it became an afterthought. Plants that were exclusive, or that couldn't easily be used or accessed by the majority of people, were those that became prized and privileged.

Alex Chwaiewsky, founder and CEO of Blue Sky Botanicals, a Canadian hemp company, says that this weed should still be considered a magical plant. "There are so many native leaders who call hemp the green buffalo," Chwaiewsky explains. "It really provided for people in the same way the buffalo provided."⁵

Using hemp fiber for clothes may even have been a pathway to health. “Historically, we didn’t bleach our fabrics,” Gaudino explains. “Scientific terminologies, phagocytosis and pinocytosis, mean ‘self eating’ and ‘self drinking,’ which means that our cells have the ability to absorb through the surface. So, when you wove hemp, you were touching the fibers, you were wearing unbleached and natural clothes, and, chances are, we actually would sweat and absorb some of the cannabinoids in doing so.”

Chances are that Gaudino is right. We actually have a history of absorbing chemicals from our clothes, such as in so-called mad hatter’s disease—which was caused by the mercury once employed in felting hats—and the deaths caused by arsenic used to dye women’s dresses a bright green both in the nineteenth century. Our bodies are sponges. The skin is one of the first places to show signs of toxicity and sometimes called the third kidney because it functions much like the kidneys. The skin receives one-third of all the blood circulated in the body, which means that it can easily absorb what we place next to it.

When we stopped wearing hemp with regularity and stopped processing it for other daily uses, says Gaudino, we actually may have increased our collective risk for disease. “We have evolved with hemp. You know, around one hundred years ago, we saw a tremendous increase in disease. A lot of those diseases are inflammation-based. What happened one hundred years ago? Cannabis became illegal. In 1937 you could still get cannabis tinctures from the Sears and Roebuck catalogue, and it was a ubiquitous medicine in our pharmacopeia until then. And when we stopped working with hemp fibers, which were also made illegal, everything changed.”

Russo agrees with Gaudino and says that at the same time that we were dismantling our common access to land, the way we eat also changed. “The American diet is very pro-inflammatory.

A healthy human diet is one that weighs more heavily toward anti-inflammatory compounds. Our diet is also poor in fruits and vegetables, particularly ones with bioactive compounds, pigmented plants with bioflavonoids that help reduce the risk of cancer and balance the bacteria in our guts. We've lost our anti-inflammatory diet use of probiotics, fermented foods, prebiotics and vegetable matter that feeds the good bacteria."

In short: we've largely discarded our natural way of being and all of the traditional knowledge that goes along with it.

Thinking differently

Here's where we often get it wrong.

The greatest good of society is not served through the rampant acquisition of individual wealth and resources, which creates barriers between what is profitable and what actually works to protect us.

Without personal and societal checks and balances in place, such as a focus on duty or the pressure of civil society or legal frameworks, there is a risk that there will be ongoing issues related to the unrestrained, so-called progress of our American society toward industrialized solutions for our health.

The Scottish economist Adam Smith (1723–1790) is considered the inventor of our modern capitalist system. He's the man to whom we owe our American Dream. Living in the Enlightenment period, Smith interpreted the idea of economic health and social welfare in a broader way. Smith, in his book *The Wealth of Nations*,⁶ incorporated a social and political critique of the kind of free capitalism that we've adopted in the United States, and which drives Big Pharma. Despite his ideas about the need for industrial production and his contention that a freer form of trade would

create economic growth, in that it would create jobs and increase the middle class, Smith also believed that all people must benefit in a well-run economy. He put forward the idea that if a product could become less expensive for everyone through industrialization, this would also create a social benefit.

But Smith's vision for capitalism isn't borne out in real life: in the United States, we have increased the wealth of a very few by dividing our wealth rather than sharing it. And, we apply that same industrial vision to medicine, even though it goes against our instincts and our traditions honed over thousands of years of practice.

Winning the medicine game should not be about making the process faster. It shouldn't be about making drugs accessible only to the wealthiest among us. It shouldn't be driven by the kinds of assumptions found in our day-to-day medical care in physicians' offices.

"I think people need to educate their doctors," Russo says. "They hate it when a patient comes in with what's called, in French, the *malady du petit papier*. The sickness of the little paper. What it means is the patient is trying to teach the doctor something. It was considered indicative of neurosis in the patient, which itself is an outmoded term. This is a movement that's been driven by the patients."

Some people do educate their doctors successfully.

Complementary and alternative medicine (CAM) practices are health care options that include forms of support that are not typically used in Western medical communities, such as massage therapy, acupuncture, traditional Chinese medicine, yoga practice, naturopathy, nutritionism or herbalism.⁷ Many patients and health care providers use alternative treatments together with conventional therapies, which together have become known as complementary medicine.

The premise behind these alternatives is that a medical care provider has to treat the person as a holistic unit in need of health rather than as a collection of body parts and diseases. The physical evidence shows that these health care modalities can be very effective. For example, a patient's need for lifestyle and nutrition changes after the onset of Type 2 diabetes may be better served through the care of a naturopath or nutritionist rather than a family doctor, as has been shown in empirical studies of diabetes care, because of their focus on these areas.⁸ Similarly, in a randomized controlled trial with patients with multiple sclerosis, it was found that there was a significant increase in overall health and range of movement when they engaged in yoga therapy led by a nurse practitioner, which decreased their need for medication and hospitalization.⁹ These are only a handful of examples of medical practices that seem to be on the edge of rational thought, and yet they work in statistically significant ways.

In the United States, patients are educating their primary care doctors on the use of CAM and CBD. Recent studies have shown that CAM is increasingly being used: approximately 28.9 percent of respondents reported using at least one form of complementary medicine even though the clinical effectiveness of unconventional methods has been controversial among many medical professionals.¹⁰

As a whole, CAM patients tend to be younger, female and better educated than the average patient, especially in the United States and Europe.¹¹ Women may be more likely to look into varied health care options because they are already on the opposite side of existing power structures: they self-educate in order to find options not presented to them by the male-dominated health care system.¹² Women have less privilege in the scientific community and as patients, and so they tend to forge their own less traditional medical path.

At the same time, more people in general are trying out these therapies, especially as some of the modalities have begun to be used on a large scale in some areas of the world. A broad review of costs and health care outcomes in Europe has shown that using CAM, even with elderly patients with complex needs, can lead to approximately one-third lower health care costs to the system as a whole and decreased mortality rates for the population. To this end, in Switzerland, the Netherlands, and even in the United Kingdom, five main streams of CAM (anthroposophic medicine, homeopathy, neural therapy, phytotherapy and traditional Chinese medicine) are covered by the mandatory health insurance system. The financial and physical care outcomes are so substantial that more countries are trying out this method of addressing both costs and benefits for care.

The bottom line, as Turner explains, is that we no longer trust our instincts when it comes to plant medicines. What we get our pleasure from, what satisfies us and what heals us can be easily drawn from the natural world, and yet we are fixated on material things, things we have to create in a lab or a factory or both. We have a prejudice against indigenous forms of knowledge because we believe that faster, more efficient and more expensive life solutions are better solutions. We think that value equals financial wealth, when, at the heart of our shared cultural history, we once were so committed to our relationship with plants that they became part of our spiritual truth.

Medicine wheels, or stone circles with spokes like a wheel, represent the values of connection between people, between clans and between human beings and nature for many subcultures within Indigenous communities in North America. Medicine wheel teachings are said to be the first and most ancient First Nations teachings, and the wisdom of the circle at one time provided spiritual and socio-behavioral guidance to an individual, as

well as healing. These are a reminder of the power that can be harnessed to create balance for the physical, mental, emotional and spiritual aspects of human life.¹³

We can find this balance, but, as Gaudino warns, humanity has come to a fork in the road. “Down one path is cannabis and salvation, down the other path is destruction. I’m not saying this to be alarmist, but we have to break that stigma.” CBD provides that balance for many people, and like the medical practices of our ancestors, it is related to ritual and our history of plant medicine, spiritual commitment and practice. It’s part of a new way of thinking about slowing down the process of identifying and treating disease. It’s linked to preventative and holistic care for the human body and our environment. Even better, it shifts us away from the American tendency to muscle through medical care with an obsessive, tunnel-vision focus.

We need the unbridled freedom to do what’s logical and, to me, that means challenging our own thinking about plant medicines.



12

MECHOULAM'S LEGACY

“IT SOUNDS like a snake oil to save the world,” Martin Lee says. “CBD is great, everybody should take it. It’s going to fix every thing in your life. Make everything better. Fix your kitchen sink. Your car will run better. But the thing is that there is real science underpinning the utility of cannabis in multiple different ways and multiple different contexts. And I think that’s unique.”

Lee is the co-founder and director of Project CBD, an educational cannabis science organization and the author of the outstanding book *Smoke Signals: A Social History of Marijuana*, which won the American Botanical Council’s James A. Duke Award for Excellence in Botanical Literature. He’s also the co-founder of the media watch group FAIR (Fairness & Accuracy in Reporting). He knows how far we’ve come since Dr. Raphael Mechoulam and his research team discovered the endocannabinoid system, and he knows that we still have a long way to go.

“You know, you have these conflicting perceptions,” he explains. “A lot of the discussion has been about whether medical cannabis

really works or is just a front for stoners. But once CBD entered the picture that changed the whole discussion. Now, it's not a question of whether CBD has medical value. The World Health Organization basically gave CBD a clean bill of health.¹ The question is: how do we use it for the maximum therapeutic effect?"

Despite all of the barriers there is a shift taking place, and more people are becoming aware of the benefits of CBD and other plant medicines. Let's start with the World Health Organization (WHO). Based in Geneva, its role is to direct international health within the United Nations' system and to lead partners in global health responses. It is the world's arbiter of best practices in health. WHO oversees the implementation of policy through their publication of International Health Regulations and publishes medical reference classifications for governments around the world, including the International Statistical Classification of Diseases; the International Classification of Functioning, Disability and Health; the Global Code of Practice on the International Recruitment of Health Personnel and the International Classification of Health Interventions. They're also the first port of call for global non-governmental organizations such as the Red Cross and Red Crescent for health care standards for people living in crisis situations.

In 2017, as Lee explained, WHO created a medical reference classification for CBD. This document suggests that governments around the world decriminalize CBD so it can be used in medical contexts. They have also recommended that it be employed in a number of health therapies, a full list of which is in the appendix to this book but includes treatments for Alzheimer's disease, Parkinson's disease, multiple sclerosis, Huntington's disease, hypoxia-ischemia injury, pain, psychosis, anxiety, depression, cancer, nausea, inflammatory diseases, rheumatoid arthritis, infection, inflammatory bowel and Crohn's diseases, cardiovascular diseases

and diabetic complications. The WHO standards are only the first step, however, in bringing CBD to the forefront of our medical care discourse.

Awareness and change for the better

“A lot of what we’ve learned is connected to anecdotal evidence,” journalist Ricardo Baca explains. It’s not that we don’t have research, but new evidence is coming forward every day from users who find their own path to CBD. “Kids, seniors, parents, using a topical oil or a lotion or a salve . . . they’ve found tremendous medical efficacy. We’ve seen its efficacy and power when it is applied to a senior citizen’s arthritic hand or a child with Dravet syndrome. But we’re coming off of eight decades of propaganda and we just don’t know everything yet. It’s not just about one cannabinoid or one terpene: it’s all these things coming together and creating a specific effect.”

Baca is referring to what is known as the entourage effect, and it’s something that researchers like Dr. Reggie Gaudino are only just starting to explore and capture in terms of their medical applications.

“Cannabinoids are actually a member of a larger family of molecules called terpenoids,” Gaudino explains, talking about a class of organic compounds that are the oldest group of small molecular products synthesized by plants. “It’s a five-carbon chain called an isoprene. Terpenoids, cannabinoids and flavonoids [plant pigments] are all built from the same starting building block. When different enzymes come together, there’s a pathway in this chain, and all of these are likely to be medically important.”

What this means is that we need the whole plant, and not just a single part of it, in order to gain all of the benefits that cannabis

medicine has to offer. This doesn't mean that we have to take THC with our CBD, but when we isolate some molecules from all of the other healthy molecules available in hemp plants, we're not necessarily going to get the best opportunity to move toward wellness.

Here's the science. Cannabigerolic acid (CBGA) is actually the first cannabinoid in the pathway. Then, enzymes convert CBGA into tetrahydrocannabinolic acid (THCA), cannabidiolic acid (CBDA) and cannabichromenic acid (CBCA).² CBGA is effective in treating glaucoma,³ Huntington's disease⁴ and cancer,⁵ for example. Taking all of these molecules together maximizes our benefit, and this is the entourage effect in action. But we're only just scratching the surface of what might be developed in the future.

"Those are the three main cannabinoids," Gaudino says. "But there actually many, many cannabinoids. We've identified between eighteen and twenty-two in distinct cannabinoid synthesis, and we know that there are at least one hundred and forty-four cannabinoids. By that, I mean that these molecules have different sequences so most likely they make different things."

As Gaudino explains, cannabidivarin (CBDV) and tetrahydrocannabivarin (THCV) are CBD derivatives that may not only treat nausea⁶ but also Parkinson's⁷ and Alzheimer's.⁸ Gaudino is exploring these molecules in his work for a very specific reason. His mother was a nurse, and his father was a surgeon, so he comes from his own health care legacy. But when his father had a stroke, Gaudino immediately gave him CBD and CBG. If stroke patients receive CBD and CBG, with their neuro-regenerative properties, within a few weeks they've been shown to have fewer long-term symptoms.⁹

But, for Gaudino, future research has to shift the status quo for cannabis if we're going to be successful at fully taking advantage of this plant. "We focused on THC," he says. "Chances are if we had a more diverse approach to research, rather than focusing on the recreational use of cannabis, we may have seen plants with other

cannabinoids as well. Unless we go back out there and find the original plants we might not ever know what we've lost. CBD is one of the things that managed to be saved. We found something and people jumped on the bandwagon. All of these cannabinoids have a medical efficacy that we have been missing for the last eighty years.”

A new world of health care: Patients leading the way

Veterinary science is another one of the growing areas of influence in cannabis medicine, and yet it's mired in the same kind of social, legal and political challenges that affect human treatments using CBD.

Holistic veterinarian and scientist Dr. Gary Richter is the author of the bestselling book *The Ultimate Pet Health Guide*, and he can't advocate for CBD's use. If he does, he risks having his license taken away. What he does do, however, is support animal owners through their CBD process. He does this because, in recent years, there has been a definitive increase in the number of requests he has had for cannabis medicine for dogs, cats and other animals at his California practice.

“My veterinary practice is really surrounded by and defined by integrative medicine,” Richter says, which is related to what we call CAM for human health care. “I practice both conventional Western medical care as well as what some people might call holistic alternative care, acupuncture, herbal therapy, these sorts of things. So you know, for me as a veterinarian, I'm always looking for new ways I can help my patients. Looking at cannabis as medicine was a natural progression.”

Richter has had some first-hand experience observing what happens when his patients turn to CBD to treat their pets.

Changing demographics, new lifestyle trends and a shift in American attitudes toward pets have led to a significant increase in pet health care spending in the last few years. Expanding disposable incomes, higher educational levels and more awareness of a range of lifestyle options has resulted in a new kind of pet owner who views their pet as a close member of the family.¹⁰ This has created a new world of pet care in which CBD becomes an option, especially for intractable diseases such as cancer.

“One of my patients was a dog diagnosed with lymphoma. This dog had cancer and received all manner of care: supplements, medications, chemotherapy,” Richter explains. “With cannabis therapy, this dog has lived well past anybody’s expectation of how long it should have lived with lymphoma. The dog lives a great life. When our expectations are so far exceeded, and when we see it happen over and over and over again and cannabis is involved, it’s hard not to connect those two dots.”

Dr. Sari Prutchi-Sagiv is the director of technology transfer, pharma and diagnostics at Mor Research in Tel Aviv. As one of Dr. Raphael Mechoulam’s legacy scholars, she’s the first to say that patients have led the way to one of the most important breakthroughs in CBD care. Prutchi-Sagiv’s work centers on what is called graft versus host disease (GVHD), and it’s one of the most serious and deadly conditions in the world, affecting the most vulnerable patients: those who have received bone marrow transplants to treat aggressive forms of cancer like leukemia and lymphoma. In GVHD, donor blood cells attack the recipient, which can eventually lead to internal bleeding, liver failure and likely death. It’s an autoimmune disorder and it is the most common cause of long-term complications and rejection of new organs after a transplant.

“In my work, I manage pharmaceutical inventions,” she says. “We’re the biggest HMO here in Israel. We have 5 million patients

in fourteen hospitals. One doctor approached me because he had an idea. Some of his patients undergoing bone marrow transplant felt better with medical marijuana, and he wanted to see if cannabidiol would help. So he approached Mechoulam and he called me, and I started managing this project.”

Running four different clinical trials with ninety patients with acute or chronic GVHD, which has an 80 to 100 percent mortality level, Prutchi-Sagiv was astonished when she found how quickly and easily CBD, taken every day for a month, had an effect.

“We had excellent results. In one trial, we reduced incidence of GVHD from fifty to seventy percent to twelve percent of patients,” Prutchi-Sagiv shares. “In another pre-transplant trial, when patients took CBD seven days before transplant and thirty to one hundred days afterwards, zero patients acquired GVHD. I have never seen such a significant result before. It’s incredible.”

Mechoulam’s legacy, and his call to action, extends far outside of Israel, as more people hear about his work. Steve DeAngelo, the American medical cannabis leader, recently felt called to meet the man himself in Tel Aviv. DeAngelo asked, given what we know about the role of the endocannabinoid system in maintaining homeostasis and how widespread the endocannabinoid system is in the human body, whether it would be reasonable to assume that cannabis will be effective for every medical condition known to humankind.

“There was a not-too-long silence and Dr. Mechoulam said, ‘Yes, I think that would be a fair statement,’” DeAngelo says. “Cannabis isn’t just the most important medical breakthrough since the discovery of germ theory. Cannabis is the most important medical breakthrough since the discovery of medicine. There is no other medicine that we know of on the planet that is effective for such a wide range of medical conditions, that has so few and such gentle side effects to it. I don’t think it’s an exaggeration

to consider that cannabis may be the most valuable medicine that we have on the planet today.”

Mechoulam shared a new story with DeAngelo about the effects of CBD on the residents of an Israeli nursing home. “All of them reported an improvement in mood. All of them reported a reduction in nightmares. So there’s some very consistent effects. But then there were some different effects that varied from patient to patient, from person to person. People who were overweight dropped weight and came closer to their ideal body mass index. Nursing home residents who were underweight gained weight and came closer to their ideal body mass index. It didn’t do the same thing in everybody’s body, but what it did do was restore everybody’s body to its state of natural balance.”

Our roles, our lives

It’s really important for people to understand themselves and understand the plant so they can do the best job of representing themselves to physicians and researching their own needs, Gaudino recommends.

CBD is the master regulator, and using it is all about finding and maintaining balance, that essential homeostasis that allows us to thrive and survive. Using the whole plant can allow us to gain access to the entourage effect. There is no one-size-fits-all fix with CBD, however, and we have just as much research to do on what cannabis *won’t* help fix as we do on determining where it will lead to better health. As Gaudino explains, for example, some people have allergic reactions to CBD. There are also those whose systems will react badly for other reasons. As Janie Maedler shares, some children with epilepsy react badly to certain forms of CBD, and therefore it’s really important to work with a trained doctor or

cannabis consultant to know exactly what is right for each person and each disease trajectory. Everyone's endocannabinoid system is based on their own genetics and their own physical response.

We can't just rely on researchers to find all of these answers for us. As Mechoulam's legacy shows, researchers need our help in bringing these ideas forward and moving CBD research in the right direction. Mechoulam was the first person to ask questions. I believe that the future that we're seeking is one where we can continue his conversation. The more that we ask questions, the more that we can slowly shift the status quo. The more that we ask questions, the more that we can decrease the legal, physical and social barriers to effective plant medicines. The more that we ask questions, the more that we can increase access to CBD.

We may not always have the right answers, but we always need to be on the lookout for better questions to find the route to health and happiness.



13

PURSuing HAPPINESS

AMERICANS ARE the most voracious consumers in the world. It can easily be said that we focus on money, rather than true health, to define our personal happiness.

At the same time, our politics, beliefs and fears tie into our individual and collective perception of safety and the stressors that we face. We're resorting to mental and physical health prescriptions more than ever. Our behaviors, thoughts, fears, aspirations, memories and beliefs, and their associated health issues, are largely a result of social, physical and mental patterns.

Social scientists have long explored the causal links between physical health and economic security. We've talked about these links at length in this book in terms of the social determinants of health. The fact is that the more economic security we have, the healthier we tend to be, which means that this money-health connection has its foundation in reality.

The opposite is also true. According to the WHO, stress-related disorders will be the second leading cause of disabilities by the

year 2020.¹ As WHO explains it, stress impairs physical and mental functioning, which results in more work days lost, increased impairment at work and a high use of health care services. The disability caused by stress is just as great as the disability caused by conditions such as hypertension, diabetes and arthritis.

We know that many Americans experience an immense amount of stress. In fact, the APA shows that 76 percent of Americans are burdened with financial stress.² The US Department of Health and Human Services states that 35 percent of middle-class Americans have dealt with a physical symptom of stress such as anxiety, changes in weight, sleeplessness, low energy and irritability.³

What if we believed we could be well? What could the US look like if we decreased our level of stress, strain and mental illness? We can decrease our reliance on Big Pharma and on a system that tells us that we are constantly unwell. Good news doesn't sell ad space. A lot of the most surprising and life-changing findings from leading scientists are hidden because our health care system emphasizes how it can make money, rather than how it can change our daily habits and incorporate basic shifts in what we eat and how we move.

We need to find ways to heal ourselves that are based on evidence from medical research, but we have to start by looking critically at what actually makes us happy, rather than what we think will solve our problems.

What is happiness?

There is a fundamental adaptability within the human experience that lends itself to feel the full spectrum of happiness.

The idea of happiness, or subjective well-being, is linked to a number of life factors.⁴ To researchers, happiness is called hedonic adaptation. Ultimately, we all live at a neutral level of happiness;

adaptation allows us to weather the natural ups and downs of life.⁵ In other words, there is not one point at which happiness is optimal for all people. We don't all love the same things, and we won't become happy if we achieve specific goals. There are a series of challenges and benefits that cause a human to feel more positive and more negative. People either have or lack the ability to adapt to these issues and boons as they come.

Hedonic adaptation is related to social contexts as well as to actual events that happen in a person's life. These social contexts and differing cultural norms have an effect on how people view their experiences and values. Although it may be obvious that social factors are important to our perception of happiness, what may be less obvious is the fact that negative experiences are also important—sometimes more so. When there are equal numbers of positive and negative experiences in a relationship between spouses, for example, we are likely to believe that the relationship is a negative one.⁶ Just like the media, we tend to focus on the bad news rather than the good.

Another component of happiness linked to perception is that of the memories that we create from our experiences. People are likely to create memories to fit old experiences based on new points of view. This is a common way of thinking about the world. We have a propensity to want to see ourselves in the best light, so we will develop a filter for what we believe about ourselves and our experiences to achieve that goal over the long term.⁷

What seems to be true about life is that it is never altogether happy, even at our most pleasant moments. We have a propensity to look for what might go wrong or who might not have our best interests in mind, even when we are enjoying success or having a wonderful day. An example of this is a situation where an individual has received a promotion at work. Although that person has probably worked very hard for the promotion and has received recognition and possibly a raise in salary, they may also feel like

they are a target for jealousy from their colleagues or even their family members. The individual may feel that people will go out of their way to distance themselves because of their new social status. This example demonstrates both the idea of hedonic adaptation and the idea that negative experiences are important to our perception of happiness.

Age can also have a direct effect on happiness, in my opinion, and this impact can change over the course of a life. When we are young, we may be happier because we have fewer responsibilities, but we may also be less happy because we have less power and agency. As we grow older, we may face very specific hardships based on being in school or in trying to get a job, or in dealing with the death of family members. We have specific life experiences that are related to our age group as individuals and as a cohort living in a generation.

There is also a connection between the early social experiences we have as children, happiness factors and how we perceive the value of social experiences once we arrive at adulthood. Over time, we can begin to appreciate the link between the depth of the social relationship and how we feel, both positively and negatively. We assess what we will do with the information we receive from our interactions with others.

Social contexts are invariably connected to economic, personal and environmental factors, so it is not simply the existence of relationships that matters. For example, if someone were to lose their job and become unemployed for a long period of time, this would affect not only how they felt about themselves but also how others would tend to think about them. The change in social context based on this economic factor would likely have an effect on the relationship.

The underlying theory behind these kinds of social changes is linked to what are called affective events.⁸ In other words, people

have a tendency to shift their emotional self-concept when they are in specific situations, which can impact their relationships and the way that they see themselves as valued by social connections and by society as a whole.⁹

At what price happiness?

When we talk about happiness, therefore, we can see that there are many different factors at play, but that our jobs can play a big role in how we perceive ourselves and our relationships with others. Here in the United States, the more that we work, the more that we garner the approval of others. The more that others like us, we think the happier we'll be.

But why is that? And what does all of this have to do with CBD?

In the United States, our hedonic adaptations, the source of our happiness, can be linked to our cultural connection with capitalism. This means that money comes first: before our health, before our well-being and before any other happiness factor.

But I'm getting ahead of myself. Let's go back to something we talked about earlier: the Protestant values upon which our country was founded, and that work ethic that we share as Americans. Our founding fathers intended the United States to be a democracy like no other. We had escaped the hierarchical, theocratic controls of our English ancestors, and we wanted to do something entirely new: create a republic where people would have the freedom to vote as they chose. At the time, what was to become the US was inspiring to others around the world. At the end of the French Revolution in 1779, which was not much different from our own, France ended up mired in another form of dictatorship, albeit one without a regent, in the form of Napoleon Bonaparte. Even England suffered through massive internal reforms with respect

to the powers of Parliament under George IV at the beginning of the nineteenth century, eventually giving way to a true democracy.

The US, however, was going to be different, and the difference that people believed set it apart was, strangely enough, religion. While the separation of church and state is a tenet that our founding fathers may have held dear, the reality was that the US was profoundly influenced by religious belief.

Let's unpack this claim. The French political pundit Alexis de Tocqueville, writing in the decades shortly after our constitution was settled, suggested, using the US as an example of a great democracy, that it was necessary to pursue a religious life in order to ensure a high rate of democratic intent and practice in a community.¹⁰ The rationale for his argument that religion was an essential component of democracy is that it allowed for a decrease in what he termed individualism. As de Tocqueville writes, when people are too focused on their own needs and desires over those of others, they are less likely to become part of a democracy. As well, even when a democracy was in place, as de Tocqueville explained, people would be more likely to be interested in the aim for material wealth, simply because, without an aristocratic hierarchy that guaranteed wealth, there would be a need for its acquisition for human security. To this end, he writes, religion, especially if it were organized, would serve as a way to provide a counterbalance to materialism, and it would also decrease religious fanaticism at the same time. This is because, at the heart of the matter, de Tocqueville believed that religion would force people to consider the needs of others over their own needs, and therefore a search for goods or money would become secondary. An American democracy, to de Tocqueville, was one in which the population wasn't interested in consumption or wealth at all.

Here's the challenge: de Tocqueville may have been completely wrong about the United States. An entirely different perspective was offered by Max Weber, a German economic sociologist, about

a century later.¹¹ An American democracy, to Weber, was one in which the population was *entirely* interested in consumption or wealth. As Weber argued, the reason that capitalism, in its present form, existed in the United States in such extremes was because of what he called the Protestant work ethic. When the Puritans came to what is now the United States and founded their colonies, they did so to escape what they believed was religious persecution in Britain. These were the religious extremists of their time, and they believed that the ability to gain access to capital, whether goods or money itself, was an outward representation of God's approval of their life choices.

Money provided proof that God wanted Protestant values supported—values such as hard work, frugality and thrift. When someone was rich, Weber suggested, it meant that they were in God's grace, because they followed God's law. People who were poor, therefore, were those who weren't protected by God because they were intrinsically bad people.

The political mandate of democracy and the religious mandate of the Puritans became conflated. These mandates came to be associated with the acquisition of goods and financial wealth, as noted by Weber, even if this was not explicitly stated. At the same time, what was evident from the sixteenth century onward was that, in both Protestant Europe and what became the United States, there was an increased polarization between the rich and the poor that was predicated by the tacit rules of the Protestant work ethic.

Weber's point of view is one that reveals the true nature of what we can see is the focal point of the American Dream: to make more money. This focus has led to more extreme forms of materialism and religious fanaticism over time, rather than less.

This is one of the means by which capitalism is dysfunctional. Its essential meanings have been distorted over time because people assume that our current capitalist economic system is a natural economic system grounded in our biological function as human

beings, i.e., we acquire goods to feel safe and protected. This view exposes capitalism's unique nature, which is private, exclusionary and for profit. These concepts are new and not natural to human society. In other words, personal happiness is not necessarily best achieved through capitalism, even though we are likely to believe this to be true in the present day.

Cash reserves, health reserves

If it is so problematic, why do we do equate happiness with making money? Why do we use capitalism as a primary political and economic tool when it leads to such blatant inequality? Why do we continue to think that it is good to acquire things, rather than focus on our psychological and physical health?

Ultimately, our ideals, bound up in the American capitalist democracy, have global effects. Mass production has required the creation of cheaper forms of labor. New forms of neoliberal mass production have, lately, only been able to be sourced in poorer countries of the world, since there are unions and other policy protections in place in developed countries. We have fractured our personal happiness. To this end, because of cultural and economic differences between workers around the world, globalized companies can take advantage of poor communities where people are desperate for jobs. The people who work for large multinationals have few choices but to continue to work, because the role of every capitalist enterprise is to decrease its costs as much as possible and bring value to shareholders. Workers in these areas may consider their employer to own their time, and they are doing everything they can to fulfill that commitment to those whom they serve because they have no other means of providing for their families or themselves.

We can do capitalism better. New and more explicit forms of social economy have also arisen in the capitalist age, including the recognition of more extensive democratic rights, the rights of marginalized groups and the need for managing externalities such as climate change. Capitalism is both the positive and negative cause of these developments. On the positive side, the push for personal interests and protection within capitalism can be definitively linked to the idea of personal rights that has led to social justice reform. On the negative side, the push for corporate greed has also led to social justice reform through the development of unions, legal reforms and environmental protection agencies. The challenge then is that we need to shift the way that we think about who we are and what we do, and how we calculate what makes us happy.

CBD is a big part of this process.

The pursuit of true happiness

We are at the beginning of a sea change in how we perceive values in the United States. Awareness about the role of cannabis in our culture is a touchstone for many, and just one of the examples of how we are changing the way we think.

In 1969, only 12 percent of the US population supported the legalization of recreational marijuana use, as per a Gallup poll, but by 2000, this number was 30 percent.¹² By 2015, 58 percent of people in the US, and 71 percent of young adults between sixteen and thirty, supported marijuana legalization. The support of legalization is likely to continue to grow.

And it's not just cannabis that is linked to these social changes. Public opinion on other social issues is moving inexorably toward greater tolerance. Two NBC News/*Wall Street Journal* polls show

that, in the middle of the 2004 presidential election, the public, by better than a two-to-one margin, opposed same-sex marriages. In 2012, in the same poll, on the same question, most favored it.¹³

Think carefully about that. The gay marriage issue is something emotionally rooted in the mesh of supposedly fast-held American beliefs, most generally emanating from learned religious dogma. So then how is it that an issue so influenced by religion and so deeply “learned” can undergo such a dramatic public belief shift in just a few years? This is a brilliant example of how humans are far more capable of changing their deeply held beliefs than we give ourselves credit for.

Cannabis advocate Steve DeAngelo has been a part of the industry throughout its modern history, and he believes that we’re looking at a social shift that will eventually help us redefine what matters to us as Americans. “There’s something that is going on with this plant in the world today that is bigger than any of us can really figure out,” DeAngelo says. “All around the world, wherever I go, in Israel, in Canada, in Chile, in Spain, I find people like myself who have been called by the cannabis plant, and who have become passionate about telling the truth about it, about educating people and who commit their lives to this plant. I think that there’s something bigger going on. I don’t think we’ve really figured out what it all means yet, but it has something to do with leading us—and when I say us, I mean every human being on this planet—back to nature and a more balanced kind of life. It has something to do with making sure that we grow a little bit of wisdom and a little bit of kindness.”

Andrew DeAngelo, his business partner and brother, agrees. “One of the things that I feel our modern world needs more of is real human connection and community. We have all these devices and platforms and we can communicate with each other, but we have a crisis of loneliness. I think that cannabis really is

a wonderful vehicle for creating community. The two greatest things about my job are helping people with their illnesses and helping them feel better. I feel much more whole as a human being having this community that I can connect to on a daily basis. It's made me a happier person. Every day I wake up excited to go to work. I've got a wiggle in my stride. I'm thrilled to be able to do this. I feel very blessed to be able to do this."

We sometimes talk about the possibility that the world can be a much better place in a short period of time. Some people believe serious, deep-rooted social change happens only gradually, as new generations of more tolerant young people take over the dashboard of government and business control. While that slower process plays a major role in how society evolves, there are two other important factors.

Exponential Factors. With ever-increasing frequency, our society is interacting in a feedback loop with our technology that has increased the cycle of social change to its fastest-ever pace. Policy makers and public office candidates can take opinion polls in hours and respond to that data with modified policy proposals. We can organize political revolutions via the internet in days, such as transpired in the Arab Spring. Misinformation is also easily distributed and propagated. Raw and uncensored news flows around the neural network of the web so fast that those in power are forced to consider taking a fresh new approach: honesty, equity and transparency. Social scientists, as we've seen in this chapter, are now seeing evidence that social programming, such as our learned prejudice toward gay people,¹⁴ is much more plastic and able to rapidly adapt than older social theories were able to predict.

Punctuation Events. We also know that biological evolution interacts with itself in feedback loops. The long cycle loop is slow. As life competes for limited resources, it relies on genetic mutations to better adapt each new genus and species to slow

growth environmental change, such as climate patterns, ocean water levels, salinity levels, tectonic plate movement and other major factors.¹⁵ The lifeforms then act upon the slow evolutionary processes to further guide new mutations. The short cycle feedback loop comes from abrupt, out-of-nowhere environmental change: a punctuation event.¹⁶ For example, an asteroid impact can dramatically change the carbon dioxide level of the atmosphere within a day. Life rapidly responds, with certain species showing a higher propensity to adapt and change behavior without the need for genetic mutation. The rapid overnight behavior mutations in these groups allows those members to survive. In other words, successful survivors of punctuation events linked to environmental change tend to have more plasticity in their behavior patterns. There are many examples of this in nature, but humans are by far the most successful species at rapid behavior mutation without the need for physiological genetic adaptation or modification. We're literally built to change our behaviors and our minds—quickly.

Despite our entrenched social dogma, these emergent systems tend to be fairly autonomous and free of central control from any person or group. At an increasing rate, this emergent informational lifeform is relying upon and exploiting our natural evolutionary ability to rapidly change. Our powerful survival skill of behavior and belief plasticity determines the rate of behavior evolution.

Here's another way to think about all this. We like to talk about how our understanding of the universe is exponentially changing, along with our resulting technologies. Could the human species be embarking upon an evolutionary punctuation event with regard to social tolerance? In less than one generation, will we witness an exponential rate of change in the way that we perceive plant medicines so that we can begin to move toward wellness?

It's only a matter of time before a paradigm shift in global behavior takes root via simple evolution. And when it does, it's fair to expect it to occur with blinding speed, due to the increasing tendency toward rapid change of all systems. As Steve DeAngelo says, the ability of cannabis to engender a dialogue in our minds, look at ourselves, evaluate our past actions and help us become the people we most want to be is its most precious attribute.

Our species is capable of a shift to a less selfish and more tolerant society. Such a paradigm shift to kindness and understanding is a slam dunk, because, at its core, it better ensures survival.



14

THE NEXT CHAPTER IN AMERICAN HEALTH

BEFORE SHE goes for a run every morning, Sarah Daniels decides whether or not she needs to take CBD. She thinks about how her body is feeling and whether her mind is at ease. As a long-distance runner, she knows that if she's not in the right frame of mind, she won't be able to get through that last mile. She also understands that, at the end of the road, every runner faces the kind of inflammation and pain that CBD can calm almost immediately.

“Cannabis can increase your ability to be present with your body and to let go of the cognitive stress that's hard to get away from, so that you can exercise more successfully,” she says. “I'm not talking about a high, I'm talking about finding a minimum effective dose level to help shift our mindsets and transition out of our hectic lives in Western society.”

But Daniels isn't just any fitness buff with good habits. She's a graduate research clinician at the Zach Walsh Lab in Canada, studying what she calls the super-additive effects of cannabis to exercise, stress and our overall health management. She bases all of her personal and professional decisions around the use of cannabis on evidence-based research. Daniels practices mindfulness meditation and yoga in addition to her running, and she's been certified in the art and science of ganja yoga, which has been aligned with thousands of years of yoga practice in India.¹ Daniels not only has industry sponsorship for her research, but she's secured matching funding from the government of Canada to see how health practices can be enhanced with the use of CBD and THC.

"Yoga has health benefits, but there are significant barriers to access including existing health issues, joint pain, attentional difficulties such as ADHD, or just busy minds, and overall pain management that can get in the way," Daniels shares. "Cannabis medicines can enable people to participate in exercises like yoga in the first place, which can then allow them to build the capacity to reduce pain long term."

Not only does CBD and THC help people get into healthy habits, but Daniels says that the research around exercise has actually changed since we've discovered the endocannabinoid system and that endocannabinoid deficiencies exist. We used to think that exercise led to the release of endorphins, as she explains, but we're now looking at the endocannabinoid system as a deep part of that process. When we have an endocannabinoid deficiency, we may not be able to gain the mental strength to begin a life change that can result in health. "Adding exogenous cannabinoids can give people a boost when they're starting out lower than they should be," Daniels says.

The transtheoretical model of health

We need that boost.

In the United States, we have some of the highest levels of what is called metabolic syndrome in the world. Metabolic syndrome is just that: the way that we live drives down the ability of our metabolism to cope, and we end up with obesity, diabetes, symptoms of cardiovascular disease and respiratory disease, as well as behavior-related illnesses such as HIV. Among people with literally any kind of mental illness, the risk of physical disease increases by at least two times, and HIV prevalence may be increased by as much as eight times.²

The less happy we are, the more likely that we will spiral into poor health.

All of these issues are linked to self-care. When we don't care for our bodies, we are exposed to hyperglycemia, elevated triglyceride levels, cholesterol and hypertension, which, over time, can result in exposure to disease.³ When we have poor health, we also get depressed. There is a difficulty in coming to terms with the level of powerlessness that many people with mental illness feel in managing their own care. What this means is that the first step toward self-care is not necessarily putting a mental or physical health plan into action, but rather supporting the development of self-efficacy among those who are vulnerable to metabolic syndrome. This is because many Americans see their physical health or the quality of their medical care as beyond their control and in the hands of others.⁴

All of this means that there is a reciprocal relationship between metabolic syndrome and mental illness. The higher the level of physical distress, the more likely that there will be a mental health impact. In addition, the incidence of a mental health issue is likely to lead to a lack of self-care, which can result in metabolic

syndrome over the long term. Self-efficacy requires that people have options and choices, rather than direct instructions, so that they will be able to succeed on their own by learning what works best for them. If people do not engage in self-care chronically for years on end, however, they will keep their bodies in a state of subconscious fear, which will break down into a disease condition linked to a lower-functioning immune system and inflammation response.

Let's face facts. There are a number of underlying reasons why individuals continue to practice poor health habits. There could be a lack of knowledge about self-care, but the reality is that many individuals continue to engage in harmful habits because it is inconvenient to change, or because it is easier to continue on the same path without challenging oneself to pursue a better future and positive health outcomes. Health education programs, doctor recommendations or even friends and family can help to influence the way in which people consider their health habits and can shift them toward a new way of managing their health, but only if people choose to participate.

The transtheoretical model of change is what most health professionals use to help people shift their own health status quo and engage those in poor health to move toward self-care. This process includes five stages of health behavioral change, which are precontemplation, contemplation, preparation, action and maintenance. Individuals must embark upon each stage so that they will build the foundation for self-care over the long term, rather than just start and stop.⁵ This is important so that the process does not have to be repeated, and so that individuals in need of health habit changes feel confident and secure in making these shifts.

Health advocates know that this model must be individualized for each person. The stages of change identified by the transtheoretical model suggest that different interventions should be

targeted to people at different stages of readiness, for example, to exercise.⁶ In other words, not everyone is ready to begin to make a change.

Let's take what Daniels suggests about the use of cannabis for exercise and apply it here. If someone is in the precontemplation stage, the initial psychological hurdle to change may be significant. If someone is already in the contemplation stage, which means that they have begun to think about shifting their behaviors to protect their own health, then using CBD might provide the tipping point to the preparation stage by breaking down a few of the barriers. The movement toward a positive health plan is often a slow one. This does not mean that it will be unsuccessful. It is important to recognize that health is not only a matter of action but also of psychological readiness and self-belief. Therefore, in finding a solution to this problem, an individual may benefit from the support that cannabis medicine has to offer them. A barrier to both the use of cannabis and to exercise, however, is each individual's social context.

Let's take exercise first.

People who are vulnerable to metabolic syndrome are likely to be more effective at self-care when they have access to social groups that provide long-term support.⁷ Social support networks can help the individual in coming to terms with the stress and strain of their physical health conditions, help them achieve their goals and alleviate the isolation of mental health issues as well.⁸ By finding a pathway to social support, those with mental illnesses can address some of their most substantive issues related to self-care.

We know that cannabis also engenders social barriers. "Using cannabis is not a socially encouraged behavior," Daniels explains. "For a lot of people, cognitively they may be able to understand that there are medical benefits, but there's such a strong pervasive

message that it's not a helpful thing. But you don't have to use cannabis to the point of impairment. The opposite is actually true. The point is to bring yourself into balance.”

This return to the idea of homeostasis is at the heart of health, and we have to shift our social context about the use of plant medicines like CBD, so that we can support a change toward wellness as a nation.

Changing our health and wealth

I believe that we can create a positive cycle of personal growth, rather than stress, with the help of CBD and other plant medicines, and by shifting how we think about self-care.

There's a cyclical effect, which goes back to our discussion about the economy in the last chapter. If you can achieve physical and mental health, you will have the stamina to work harder and work smarter, and you will be able to manage your money better than ever before. If you can manage your money, you'll decrease your stress levels and increase your resistance to disease and daily strain.

As the United Nations reported in 2013, good nutrition and exercise can be the foundation for health and well-being, physical and cognitive development, as well as economic productivity.⁹ If you can take stock of what causes you stress, states the APA (as we discussed in the first few chapters of this book), you'll be on your way to changing your life for the better. But how do we alleviate that stress?

Cannabis medicines, specifically CBD, can be one pathway toward our health as a nation.

Dr. Reggie Gaudino thinks that our social context is already changing in that direction. “I think a hundred years from now,” Gaudino states, “we will have returned to plant-based medicines

in general. I think we are going to see an increasing number of people who start to take responsibility for their own health and become present in their own well-being. Cannabis helps with well-being because of its ability to lead us toward physical and mental homeostasis. When you're in balance, your entire body is better. The evidence is coming out. We already know that, in those states where legal cannabis exists, there is less drinking, less opioid addiction and fewer suicides. It's just a matter of time before we begin to associate cannabis with reductions in a bunch of other things as well. You can't argue with data."

The data is there, not only for cannabis medicines but for many other kinds of plants that can work in our favor. These alternate therapies are still grounded in evidence-based medicine in the same way that psychopharmacology is; the difference is that they may simply be less known or popular because of the social context of care that privileges Big Pharma.¹⁰ As noted by the Royal College of Psychiatrists in the UK, vitamins, minerals and animal and plant products, such as cod liver oil, can have a positive effect on the body and the mind.¹¹ What's missing in the equation, however, is that while the impact of these CAM approaches may be beneficial to people in need of health care solutions, patients are often not provided with the right alternatives that will make an impact on their lives.¹²

The data is there, and it's significant, but people are simply not hearing about it on a daily basis. There are even more cannabinoids that are coming to light in research every day along those anandamide chains, like CBG, CBN and many others. As Andrew DeAngelo posits, something has to shift and soon. We have to make significant changes, not only in terms of our own lives but in how we organize our nation and how we define ourselves as Americans, so that we can understand how to find these medicines and put them to work.

“We’re all in this rat race right now trying to chase all this wealth, all this individual materialistic greed,” DeAngelo suggests. “Greed is the organizing principle on the planet Earth right now. It’s an important part of the human experience—it motivates us to create things and innovate—but we’re out of balance.”

Gaudino agrees. “All of these cannabinoids have a medical efficacy that we have been missing for the last eighty years,” he says. “But there are so many cannabinoids and plant medicines that we haven’t even begun to scratch the surface. Chances are there are other plants, other than cannabis itself, with other cannabinoids as well. CBD is only one. We found something, but we’re on the verge of finding even more.”

What is that something more?

Recent research has revealed that there may be deep connections between the practice of mindfulness, positive brain function and immunity from disease that creates new ways of moving toward self-care. Studies have indicated that brain electrical activity before and after an eight-week mindfulness meditation program can cause both brain function and immune levels in the body to change. The type of mindfulness program is not relevant, according to these studies. In fact, the same results have been found within the brain activity of both Buddhist meditators and Christian nuns.¹³

This is similar to Daniels’s ganja yoga and cannabis exercise practice research. “There are a lot of yoga purists who say that it’s inappropriate to use ganja on a spiritual yogic path, as using an external product isn’t true enlightenment,” Daniels says. “But let’s face reality. Most yoga today is more physically based. There’s a workout focus. A cannabis yoga approach to practice is very slow, feeling into your body and connecting. It uses small micromovements that act to counteract the sitting that we do all day long, and adjustments to bring us back to balance.”

Daniels suggests that an intrinsic spirituality could be a part of our lives, but in a different way than in the past. We need to move away from the idea of looking for a higher power to solve our problems as we did at the beginning of the American experience, and toward a contemporary definition of spirituality that brings together four components: a connection to self, others, nature and the universe in which we live. We need to honor who we are and the world in which we play a role. In this way, we can move toward a positive self-care psychology, subjective happiness and meaning in life.

Daniels may be onto something. A number of different experimental studies in the United States have indicated that the daily practice of mindfulness and the awareness of our role in the universe may also help improve memory and cognition, mood and overall mental health. A study at Wake Forest University School of Medicine found that even brief mindfulness training over a span of four days can significantly improve visuo-spatial processing, working memory and executive functioning.¹⁴

Why does this happen? Dr. Andrew Newberg, MD, is the director of research at the Jefferson-Myrna Brind Center for Integrative Medicine at Thomas Jefferson University in Philadelphia. He explains that the reason that these results occur with such consistency is that mindfulness may contribute to neural plasticity.¹⁵ Neuroplasticity, as we've talked about earlier in the book, is the ability of the brain to adapt to new stresses over time. Newberg suggests that the brain activity of people who practice mindfulness may be positively affected by greater blood flow, which can clear plaque from neural arteries, allowing the brain to function better. This, in turn, positively affects the entire body and its functions.

While Newberg stresses that more research is necessary, he states that findings from the last five years demonstrate that the

practice of mindfulness is likely to have a significant impact on our ability to remain healthy. For this reason, he recommends the practice of mindfulness as a component of a healthy life plan.

The first tenet of the Yoga Sutra, Daniels explains, is that we need to diminish the chatter, or *vrttis*, of the mind in order to witness our true self. Anyone who has tried to meditate knows this is much easier said than done, but the reality is that CBD can help to bridge that gap. We may be closer to self-realization and finding harmony than we think.

“I think that the key to longevity, to living a long and happy life,” Andrew DeAngelo says, “is having a community of people that you connect to, that you care about. That you love and who love you and who accept you for who you are. I think that cannabis can play a big part in bringing that sense of connection and community to the world again, so that we can create a sustainable planet and sustainable economy from which everyone can benefit. As more of us get our endocannabinoid system in line, the more we’ll create community together. The more we get together, the more we’ll be able to overcome our differences with each other and love our planet, love our home and create a sustainable way of being with each other. That’s the real promise of CBD.”

15

FINDING FREEDOM

IF THERE are any synthetic or plant-based medicines that are deserving of the lofty term *miracle*, it would indeed be CBD.

It's been a long time since a new molecule, one that has such a broad spectrum of applications, has entered the world food supply. For almost five hundred years, we've waited for the sixth member of this rarified pantheon of plant molecules, and every new discovery about it astounds.

The miracle aspect of this plant medicine is threefold.

First, we know that the reason cannabinoids act so profoundly on perhaps more than 30,000 different disease conditions is because the endocannabinoid system itself is a linchpin. It's enhanced by the entourage effect from all of the other cannabinoids working synergistically alongside it. That is, an enormous number of diseases are closely associated with the broad array of subsystems in the body that the endocannabinoid system controls. This is the system which controls mood, inflammation and a score

of other important bodily functions, which in turn can be mapped to a large host of diseases.

Second, it is remarkably safe. This is primarily because plant-based chemicals evolve in a biosphere with the kind of synergy and balance with which we have also evolved. It is not hard to understand why a chemical compound invented in the computer of a pharmaceutical company laboratory and then synthesized is not only foreign to the human body, but that the scientific method cannot, even in principle, discover all of the ways that this non-synergistic molecule can cause side effects, some of which only become apparent after many years. Evolution works in a gentle experimental process of trial and error and balance and synergy that takes millions of years to perfect. The endocannabinoid system, along with all the plants that interact with us in nature, is, in this sense, harmonious. This is in stark contrast to the risky experiment of placing a synthetic compound in the body that was produced overnight, relative to the synergistic process that nature exhibits over millions of years.

Third, this particular plant medicine is also produced by our own bodies. Using it optimizes our endocannabinoid system. Just as all roads led to the ancient city of Rome, countless “roads,” in the form of other bodily functions and related disease conditions, lead directly or indirectly to this system. It is crucial to our health for it to work well.

In the last days of writing this book, we still to continue to discover new ways that CBD can make us well. We’ve found that mice with pancreatic cancer that were treated with CBD alongside chemotherapy survived almost three times longer than those treated with chemotherapy alone.¹ Every year, 55,440 adults in the US are diagnosed with pancreatic cancer, with that disease inordinately affecting people of color. Professor Marco Falasca from Queen Mary University of London says that the low life

expectancy for pancreatic cancer patients has barely changed in the last forty years. “Given the five-year survival rate for people with pancreatic cancer is less than seven percent, the discovery of new treatments and therapeutic strategies is urgently needed. If we can reproduce these effects in humans, cannabidiol could be in use in cancer clinics almost immediately,” he says.

Journalist Martin Lee agrees. “You’re talking about life and death,” he says. “You’re talking about very difficult choices that people have to make. How am I going to deal with my cancer? Am I going to go the whole natural route? Make the decision based on information that’s reliable, that’s proven and that makes some sense, so you can make a determination. When you combine CBD with a standard chemotherapy agent, typically what happens is that it makes it work more powerfully, meaning they you don’t need to use as much. If you can pursue a course of treatment with a lower dose of a very toxic chemotherapy agent, because you’re combining it with cannabinoids CBD, THC or both, wow, that’s a great way of taking advantage of a drug interaction.”

In 2018, we’ve also found new ways for CBD to decrease tumor growth, inhibit and destroy cancer cells and decrease cancer cell migration.² We’ve explored how it can decrease and, in some cases, eliminate the effects of neurodegenerative disorders.³ We have also found that it can have extremely positive effects on patients with schizophrenia who have had difficulties with standard pharmaceuticals.⁴ We’ve started to unpack how CBD can solve the autoimmune impacts of multiple sclerosis on the human body.⁵

A new mission for health in America

My mission is to use plant medicine to heal a nation in mental and physical pain.

In the United States, we need a new set of rules. We need to make a radical difference in how we look at our health and our priorities for making ourselves well.

The US spends \$3.3 trillion on health care per year, and, as we now know, an enormous amount of our disease is directly caused by the pharmaceuticals and food chemicals we put in our bodies. Safe and often far more effective plant medicines should be displacing a large amount of the dangerous, side-effect-laden Big Pharma products. We need to prioritize individual health education. For those worried about their personal health and lifespan, this education and the resulting changes to how we live will result in a profoundly better life with less disease and longer lives. There is no higher calling than helping to alleviate our mental and physical disease state.

The first time that we heard about CBD in the mass media may have been when Janie Maedler's daughter Rylie's bone cancer reached the evening news. Even the story of Charlotte Figi, who was having 300 grand mal seizures a week, didn't permeate the media stratosphere until very recently. It took these children, however, to ensure that the message about CBD began to take hold.

Given the strain that we put ourselves under, I'm not proud to be an American sometimes, but I am grateful to be an American. I support our democracy, but I also need to argue that democracy and capitalism are not the same thing, and I believe that, when it comes to our health, these doctrines have become conflated. It would be easy for someone who confuses those two terms to accuse me of being anti-American or anti-democratic, but I believe that we benefit from our freedom to make choices that result in our health and wealth. While there are dogmatic practitioners of medicines on both sides of the herbology and allopathic medicine spectrum, patients and health consumers have long been being victims of the exaggerated hype presented as fact

from both sides. I'm grateful to be a part of this nation because, like all of us, I think we can do better.

I think we can achieve the health and wellness we deserve as human beings, and I think that we can achieve this with the mentally and physically soothing qualities provided by CBD.

But that's the thing: I think we're already doing it.

The world is maturing ethically as we shift from me to we, although sometimes it seems like that change is not happening fast enough. The thing about exponential change is that it sneaks up on you. We already know that the health landscape will change far faster than one can anticipate by looking at the last few years of research into CBD and its effects. The reason that we know we're at this tipping point is because we can see the critical mass shifting the status quo in the medical, research, social and even the political realms of our lives. Exponential change looks linear for a while, but we've recently entered into the inflection point, where an exponential curve shows its true colors of radical and nearly overnight sweeping change.

We talked about punctuation events earlier in this book. Remember, we're literally built to change our behaviors and our minds when we're exposed to a massive change in our world. But here's the amazing thing. Once we started on this pathway of change, the sharing of information between everyone on the planet, and their new needs and interests, is creating exponential growth of connection and consideration of plant medicine.

Consider this example.

You're deciding where to put nametags at each of the sixteen seats at a circular table for the immediate family members of a bride and groom at a wedding banquet. You play around with different combinations to make sure that the dinner conversation is as lively as possible. You may try one combination where you sit your mother next to your mother-in-law and decide that

that doesn't work. But how many possible ways can you arrange these people around the table? Exponential combinatorics tells us that there are about 21 trillion ways to position the people. Adding only one additional person to increase the table numbers to seventeen people increases the number of possibilities by 334,764,638,208,000 more than the original 21 trillion.

As we think about how the quantity of species and resulting complexity of a biosphere increases, the complexity of decision-making and information sharing in our world increases. As we add new websites and knowledge and humans exchanging information on the internet, the emergent flows of information, which are in no way the sum of the individual parts, grow at a rate so exponentially fast that all of the world's supercomputers could not possibly compute it or model it even if given a computation time equal to the age of the universe.

And it is this mysterious and non-computable form of emergent information, almost an intelligence, that is strongly guiding the evolution of this mind-like neural network formed by the unprecedented connectivity between members of the human species.

In this new punctuation event context, the appropriate role of government is not to enforce certain standards of morality through the restriction of medicines to a specific corporate-driven space. What the history of Prohibition has shown us is that the broad application of moral standards to a diverse population is likely to have deleterious effects, especially in a country where personal freedoms are highly valued. A moral high ground is not possible when people do not all share the same beliefs, and, in fact, historical evidence shows that imposing values and ideals fails because it makes a population question why that imposition is necessary. The reality of our collective psychology is that we, as human beings, want to push back against such controls. Instead,

the government needs to act as a social structure that is the ultimate safety net when things go wrong. Through preventative and reactive health care, those few who need help could be served without dampening the ability of the individual to choose their own life pathway.

Why is it that we are more mentally and physically sick than the rest of the world if our medical technology and our pharmaceutical solutions are supposed to be world-leading? Social beliefs have an impact on our physical and mental health, and money-driven corporations are allowed unprecedented freedom to profoundly influence the dietary behavior of an entire nation.

We need healing at a mass population scale, and we need it fast. We've let corporations take control of our health. We've taken drugs that cause depression, delusion and paranoia on a broad scale. We've eaten things we shouldn't. We have lived a life of self-inflicted trauma because of bigotry and sexism.

Even worse, we continue to feed the beast. We're sick, stressed and all fucked up. People are prematurely dying after living lives full of mental and physical pain. Our bipartisan, divided government isn't about to fix the health care crisis. Big Pharma and Big Food, which helped get us into this state of dire sickness, are entrenched in their do-harm-for-profit model. We constantly remind ourselves of the danger and fear out there, and now we're stuck with such a high level of subthreshold PTSD that our nervous systems are telling us there's constant danger out there. We feed off these processes more than most nations in the world. Our needs have not been met, and we don't know how to get out of the fearful place we're in.

As inarguable data shows, in large part, we Americans are wasting our health and enjoyment of life simply by virtue of what we put in our bodies. The problem is pandemic in this country. And the deep question is "Why?" If the science and statistics

are truly as clear as they are, how is it that our state and federal governments, doctors and nonprofit health organizations are not attacking the problem? How is it, in a democracy, that food and drug corporations can get away with preventing facts from being clearly communicated by health agencies and doctors there to protect us? We place too much authority over our health in the hands of doctors. If we're dying of diabetes or heart disease or suffering from depression, we typically see them for a few minutes to get prescription to a drug with serious side effects. Then we see them again until it's time for surgery or a harsher drug "upgrade."

I know that we're not going to solve these problems easily. The public should support the efforts of the lobbyists trying to do the right thing to change our laws. But as health consumers, we deserve better. As members of a democracy, we deserve better.

Old pathways to new knowledge

How much kinder, gentler and happier could America be if we weren't influenced by the psychosis and fear-inducing side effects of prescription opioids, amphetamines and antidepressants? What might we be like if we were more relaxed and stress-free as a nation?

As ethnobotanist Nancy Turner says, the United States has been shifting slowly but surely toward accepting Indigenous knowledge patterns about plant medicine and its value since the 1960s. By the 1990s, non-Indigenous people had started on a path to a definite revitalization and renewal in learning Indigenous knowledges. We know that there are medical care and self-care options available to us that we haven't considered for hundreds of years.

So let's do better.

Washington state biologist Jennifer Lanksbury is still concerned. She says that we need to look at the big picture. She says we need to be aware of the pharmaceutical products we use and how they make their way into the environment, because if we don't shift now, the toll will be enormous. "Humans take drugs in all the places that we live. Anywhere where there's a dense human population, you're likely going to be seeing these chemicals making their way into the water and the soil. Wastewater treatment plants can only remove some of them. We have to find a way to reduce the input of those chemicals into our waters because they're affecting all of us," she says.

Hemp is an unusual plant, though.

The same plants that we use to grow CBD act to actively pull up toxins from the soil that have been there for millennia.⁶ We're not going to use those plants as medicine, but they have the exact same effect on our ecosystems that they have on our nervous systems. Hemp has showed a phytoremediation potential of 126 grams of cadmium and 50 milligrams of chromium, and it directly degrades aromatic hydrocarbons, nitroaromatic compounds, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, dioxins, PCBs, PAHs and even nitroaromatic explosives at a rate that cannot even be compared to other agricultural crops like wheat or corn.

Hemp is environmental medicine.⁷ We can use hemp for healing and remediating the damage we have done by releasing toxic chemicals on every square inch of the land mass of this country that we hold so very dear. Hemp is one of the most logical solutions for our contaminated soils worldwide, as much as it can help us personally.

There is no top-down conspiracy in American health care.

The conspiracy lies within ourselves. We have simply chosen, in large part, not to educate ourselves on how to make ourselves

well, how to eat, how to live in our changing environment and what we can do to change our lives for the better. As a result, we have become sheep being herded by the mindless machine of a complicated system of laws that allows corporations to do what they're designed to do—make money in any way that is not illegal. By allowing ourselves to remain ignorant, and passing this responsibility to family doctors who are surprisingly uneducated on the medical literature connecting diet to disease, we end up allowing our two forms of power to go to waste: our voting dollars as consumers, and our power to create laws by calling our congress-people and using our political voting rights. Even as technology exponentially increases, our education about the most foundational cause of our alarming mental and physical health crises only improves at a snail's pace.

We deserve better. But it is up to us to take our health education into our own hands.

When we think about the impact of CBD on an individual, as we have seen in the case studies in every chapter of this book, we can observe that it changes lives. It makes the very ill well, and it offers a second chance at a happy, healthy life to some people who have been given a death sentence by their physicians. It's provided a lifeline to small children and to the frail elderly.

Stop for a second and think about what will happen when group of people are able to take CBD. A community. A nation. Think about our political conversations, our flows of goods and services, entertainment, international relationships and the way that we manage our relationship with our biosphere and everything in it, including plants and animals. Think about what could be possible if everyone had access to this plant medicine. To all plant medicines.

The only way to get there is through cooperation. How we cooperate is linked to our state of health and consciousness. How

we bring humanity back into harmony with ourselves, with others, with the world and the universe is connected to our ability to align ourselves with what is healing. Once we have healthy and happy cities and nations, we can begin to dance harmoniously with everything in our biosphere.

We must begin with our own bodies, with our own self-knowledge and awareness of what is possible.

Know that it is possible.



EPILOGUE

MY JOURNEY, FULL CIRCLE

LIKE TOO many children in America, I was brought up by a single mother on welfare. My mother, sister and I lived in a 300-square-foot studio apartment in a converted motel room with one bed and a hotplate. It wasn't much, but living in that motel located us in one of the better areas of Los Angeles where public schooling was well funded.

Mom knew that getting a good education was our only chance to get out of poverty.

The transition to a nicer neighborhood had its benefits, but we were still poor. Trying to keep a roof over our heads and food on the table was a daily challenge. I was ashamed. I didn't want my mother to struggle. All I could think about was how I was going to help get my family and myself out of poverty.

I spent the next twenty years focused on how to become financially independent.

After a series of jobs, I took a leap in 1994 and started my own wellness company. It was a big risk, but the timing was perfect.

I tapped into our nation's need for wellness just as the country began to realize how desperately we, as a society, needed a new way of thinking about our bodies. Plant medicine became my life's work and, over a fourteen-year period, I worked every day, all day. With a great team, we built one of the country's largest private nutraceutical companies. While we made some mistakes along the way, we were a commercial success and I had accomplished my childhood goal. I was able to provide for my mother and my own growing family, and I was happy.

Even so, I wasn't fully fulfilled. In my drive to gain the security that money could offer me, I started to realize that my life was focused on work. It left little time for my family and for exploring my true passions.

In 2008, something shifted.

Just as I was at an inflection point in my life, I met Peter Diamandis, the founder of the X PRIZE Foundation and Singularity University. Peter is a medical doctor, an aerospace engineer and a consummate optimist, entrepreneur and educator. Peter also happened to be the co-founder and executive chairman of Zero Gravity, a company that operated weightless flights. Zero Gravity's planes were emptied-out commercial airliners outfitted with padded walls and floors in order to allow people to escape Earth's gravity and float weightlessly by doing a series of parabolic flights, just for fun.

For her tenth birthday, I treated my daughter, Kessely, to a Zero Gravity flight.

It was one of the most memorable activities that my daughter and I have ever shared together. It was spectacular. As the pilot maneuvered into the first of fifteen parabolas, 30,000 feet over the Nevada desert, we started to levitate off the floor. Peter led us through the whole experience, catching globs of water as they floated through the air and playing catch with Kessely as she flew through the air like Superman.

I had long had a deep interest in physics and technology, and this catalyzing moment, watching my daughter move through air like an astronaut, caught me off guard.

I wanted something deeper out of my own life, something different, something that would push me to my own limits just as Kessely had been pushed to hers.

What I didn't know, touching ground after the high that Kessely and I shared, was how pivotal meeting Peter would be to my future. A mere few days after that experience, Peter asked me if I would be willing to participate in an inaugural meeting at NASA's Ames Research Center in Silicon Valley to discuss the formation of Singularity University—an institution he wanted to create to explore the convergence of exponential technologies to solve some of the world's grand challenges. Peter had pulled together an all-star group of thought leaders including Larry Page, Pete Warden, Chris Boshuizen, Keith A. Powers, Sonia Arrison, Barney Pell, Joshua Schachter, Alex Fielding, Ray Kurtzweil, Moses Znaimer, Keith Kleiner, Michael Potter, Bob Richards, Stephanie Langhoff, Will Marshall, Philip Rosedale, George Smoot, Gary Martin, Mitch Menaged and many others to discuss how Singularity University could help create social impact at scale. The plan was to try to synthesize the convergence of exponentially evolving technologies like genome testing strong artificial intelligence, robotics and nanotechnology to do good for the world.

This was really the first time that I was exposed to this kind of thinking and, in that moment, at that meeting, something clicked inside.

I realized that I had been working so hard for so many years, but that it was now time to refocus my energy on how I could give back. I became completely enamored with the idea of exponential change and where our grand experiment of technology and humanity is heading. After exploring a variety of ideas, I realized

that, deep at my core, I was drawn to fundamental physics. The reason for my interest in this area, so desperately needed and so incredibly underfunded, was that I understood that grand unification theory could help us to address some of the world's most complex and challenging issues related to energy, our role in nature and our connections to the universe in which we live.

Herein lay the crux: I didn't have a formal education in fundamental physics or mathematics. I knew that, in order to make an impact on the field, I really needed to understand it first. The next day, I went to my office at Irwin Naturals and announced that I would be leaving.

I walked out, and for the next eight years I never went back. For some magical reason, I was able to let go. Once I let go, it was like a huge weight was lifted from my shoulders because I had found my passion. For the next three years, I spent all of my time studying fundamental physics, reading as many papers as I could and surrounding myself with as many wonderful scientists as possible. During this period, my company was doing well. I was able to use the profits from the company to fund research in the area. The result was the creation of Quantum Gravity Research, which is one of the largest groups in the world working on grand unification theory. We don't know if the grand unification theory we are working on will result in a major breakthrough, but we do know that it is a moonshot worth taking.

During this long period, I had never thought I would plunge back into the plant medicine business again. But then I met CBD.

I had heard about cannabinoids, but it wasn't really until I started taking CBD for back pain, and my mother started taking it during stage 4 of her cancer treatment, that I started to appreciate the power of this molecule.

I dove deeper and started researching and reading about how other people were using CBD and experiencing beneficial results

for a wide variety of physical ailments. I was struck by how cannabinoids can affect our psychological and emotional state, and I realized that there was a connection between CBD and my physics work. It may sound a little crazy, but here's how it all fits together for me.

My physics mission is ultimately about an expansion of consciousness on the planet so that we can feel comfortable, satisfied and compassionate enough to share resources and make the world a better place. When we have a country in mental and physical pain, we can't achieve that goal. We're tied up in stress, strain and barriers to positive change. I believe, having done all of my own personal research on CBD, that it and other plant medicines provide us with a pathway to alleviating that pain, and I feel a grave responsibility to share my experience with the world.

Unfortunately, during my research into CBD, I also found that there are several major market challenges. First, most people don't know about CBD, and if they do, they can't access it easily. Even when they can access it, they most likely can't afford it.

We need more education, easier access and cheaper prices in order to give people an alternative solution to what ails us, to provide the nation with effective plant-based medicine. I know a lot, based on my personal experience, about not being able to afford medicine and basic needs, and that's why I decided to step back into Irwin Naturals in order to carry out this promise.

My quest is to make CBD as affordable as we can make it, so that the people who need it most can access it. There are many new companies entering this space that are focused purely on profits, even if it means making CBD so expensive that most people can't afford it. My hope is that, by providing a higher quality product at a fraction of the cost, we can drive down CBD pricing across the board so that consumers will benefit. In order to provide consumers with more options, in addition to Irwin Naturals'

core offerings, the company is also launching several new product lines including HydroCanna, a plant-based line of skin care products; FloChi, a food and beverage line; and LoveMyPet, for the pets we love. We view this as part of our social impact mission.

Society tends to believe that corporations are about making money and nonprofits are about social service, but I know we can do better. Companies can and should provide a service to society, while still making a fair profit. We can come together and use corporations to make the world a better place. We know that, more often than not, companies that have a higher purpose have happier employees, more satisfied customers and better results.

Today, our company is buzzing with the excitement of a new purpose for coming to work: service to others, service to themselves and, most of all, love for their community and for people in need of health assistance.

I hope that you can join me in a call to action: take on the challenge of centering love in yourself, your family and friends, your business and in all aspects of your life. Together, we can reimagine what it means to be rich: rich in community, in wellness and in a dynamic, positive hope for the future. I think you will be pleasantly surprised at what you find.

Aloha,
KLEE IRWIN

APPENDICES

List of Abbreviations

ACP	American College of Physicians
ADA	American Diabetes Association
AMA	American Medical Association
APA	American Psychological Association
CAM	Complementary and alternative medicine
CBCA	Cannabichromenic acid
CBD	Cannabidiol
CBDA	Cannabidiolic acid
CBDV	Cannabidivarin
CBGA	Cannabigerolic acid
DEA	Drug Enforcement Administration
DIE	Deep infiltrating endometriosis
FAIR	Fairness & Accuracy in Reporting
FDA	Food and Drug Administration
GDP	Gross domestic product
GVHD	Graft Versus Host Disease
HHFKA	Healthy, Hunger-Free Kids Act

HMO	Health maintenance organization
NCAA	National Collegiate Athletic Association
NIDA	National Institute on Drug Abuse
NSLP	National School Lunch Program
OECD	Organisation for Economic Co-operation and Development
PTSD	Post-traumatic stress disorder
SNA	School Nutrition Association
THC	Tetrahydrocannabinol
THCA	Tetrahydrocannabinolic acid
THCV	Tetrahydrocannabivarin
REM	Rapid eye movement
SSRI	Selective serotonin reuptake inhibitor
WHO	World Health Organization
YPLL	Years of potential life lost

Overview of Diseases for which CBD May Have Therapeutic Benefits¹

Disease	Uses
Alzheimer's disease	Anti-inflammatory, antioxidant, antiapoptotic applications.
Parkinson's disease	Attenuation of the dopaminergic impairment.
Multiple sclerosis	Improved signs of EAE in mice, anti-inflammatory and immunomodulatory properties.
Huntington's disease	Neuroprotective and antioxidant in mice transgenic models; no significant clinically important differences in patients.
Hypoxia-ischemia injury	Short-term neuroprotective effects; inhibition of excitotoxicity, oxidative stress and inflammation.
Pain	Analgesic effect in patients with neuropathic pain resistant to other treatments.
Psychosis	Attenuation of the behavioral and glial changes in animal models of schizophrenia; anti-psychotic properties on ketamine-induced symptoms.
Anxiety	Reduction of muscular tension, restlessness, fatigue, problems in concentration, improvement of social interactions in rodent models of anxiety and stress; reduced social anxiety in patients.

Disease	Uses
Depression	Antidepressant effect in genetic rodent model of depression.
Cancer	Antiproliferative and anti-invasive actions in a large range of cancer types; induction of autophagy-mediated cancer cell death; chemopreventive effects.
Nausea	Suppression of nausea and conditioned gaping in rats.
Inflammatory diseases	Anti-inflammatory properties in several in vitro and in vivo models; inhibition of inflammatory cytokines and pathways.
Rheumatoid arthritis	Inhibition of TNF- α in an animal model.
Infection	Activity against methicillin-resistant bacteria.
Inflammatory bowel and Crohn's diseases	Inhibition of macrophage recruitment and TNF- α secretion.
Cardiovascular diseases	Reduced infarct size through anti-oxidant and anti-inflammatory properties.
Diabetic complications	Attenuation of fibrosis and myocardial dysfunction.

CBD Resources

CBD IS SAFE, but if you plan on taking it for a serious health issue, it's a good idea to collaborate with a trained clinician, such as a physician or cannabis expert.

The clinics whose experts were consulted for this book are listed here, but feel free to research the right solution for you and your health.

CBD and Cannabis Consultation and Products

BLUE SKY BIOLOGICALS

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Vancouver, BC, Canada V7Y 1G5

1-604-601-5617

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GUILD EXTRACTS

www.guildextracts.com

HARBORSIDE

Oakland Location

1840 Embarcadero
Oakland, CA 94606
1-888-994-2726
www.shopharborside.com

San Jose Location

1365 North 10th Street
San Jose, CA 95112
1-888-994-2726
www.shopharborside.com

JAYDEN'S JOURNEY

5054 Pentecost Drive, Suite E
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MEDI-CONE

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Appendix B

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Heriot, Bill	June 12, 2018	California
Hod, Yotam	July 22, 2018	Israel
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Maedler, Rylie/Janie	June 25, 2018	Delaware
Masterman-Smith, Michael	May 30, 2018	California
Mechoulam, Raphael	July 26, 2018	Israel
Meiri, Dedi	July 24, 2018	Israel
Molina, Siomara	June 13, 2018	British Columbia
Moskowitz, Michael	May 20, 2018	California
Prutchi-Sagiv, Sari	July 21, 2018	Israel
Richter, Gary	June 19, 2018	California
Russo, Ethan	July 16, 2018	Washington
Thiessen, Michele	June 14, 2018	British Columbia
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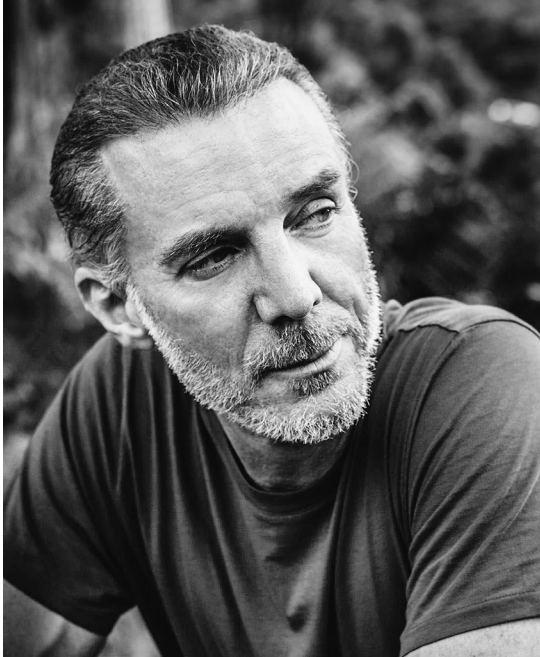
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