

REVISED AND EXPANDED

The Wahls Protocol[®]



A RADICAL NEW WAY
to Treat All Chronic Autoimmune
Conditions Using Paleo Principles

TERRY WAHLS, M.D.

FOUNDER OF THE WAHLS RESEARCH FUND

with Eve Adamson

PRAISE FOR *THE WAHLS PROTOCOL*

“There are very few books that have had the impact of *The Wahls Protocol*—for the first time, autoimmune conditions such as multiple sclerosis could be treated causally instead of reactively, supportively instead of suppressively. Now Dr. Wahls has written a revised and updated edition of her classic book, which includes new research, new testimonials of success, further clarification and simplification of her protocol, and most important, preventive treatment for autoimmune and other chronic conditions. This book is a must-read for all of us who want to see the end of the threats of multiple sclerosis and other chronic illnesses.”

—PROF. DALE BREDESEN, AUTHOR OF THE *New York Times* BESTSELLER *The End of Alzheimer’s*

“Terry Wahls, MD, is one of the rare health experts and bestselling authors who not only walks the talk but actually *researches* the talk. Her rigorous clinical trials address diet quality, track microbiome and gene expression changes over time, and answer lingering questions that we all have about multiple sclerosis and other autoimmune conditions. Her newly revised book, *The Wahls Protocol*, is a classic in the emerging field of personalized lifestyle medicine and should be required reading for every medical student, practitioner, and patient who cares about their health.”

—SARA GOTTFRIED, MD, *New York Times* BESTSELLING AUTHOR OF *Younger*

“In *The Wahls Protocol*, Dr. Wahls provides elegant firsthand validation that diet truly represents the most powerful medicine. This book is totally supported by the most leading-edge research and provides a beacon of hope when compared to the ever-changing landscape of pharmaceutical recommendations for multiple sclerosis.”

—DAVID PERLMUTTER, MD, #1 *New York Times*—BESTSELLING AUTHOR OF *Grain Brain*

“Groundbreaking! Once you understand why you need to eat for health, Dr. Wahls delivers a detailed road map, guiding you step by step. This will be life changing for many.”

—ROBB WOLF, *New York Times*—BESTSELLING AUTHOR OF *The Paleo Solution*

“Whether or not you struggle with autoimmune diseases, I can’t recommend *The Wahls Protocol* highly enough. Dr. Wahls provides a clear, in-depth, copiously researched dietary and lifestyle protocol to help you take charge of your health and your life. An absolute must-read book.”

—JJ VIRGIN, CNS, CHFS, *New York Times*—BESTSELLING AUTHOR OF *The Virgin Diet*

“Dr. Terry Wahls is an incredible teacher, researcher, and physician who has turned her healing success into the Wahls Protocol, which can benefit many people. I’ve supported her work through the years because she is evidence-based, encourages colorful eating with copious plant foods, and recognizes the need to incorporate high-quality, nutrient-dense foods that will help prevent disease. In this new book, she addresses some of the more current topics in nutrition such as ketosis, fasting, the impact of the microbiome, as well as

epigenetics. She is always on the pulse of what is new and provides a balanced perspective.”

—DEANNA MINICH, PHD, CNS, IFMCP, RESEARCHER, EDUCATOR, AND AUTHOR OF *Whole Detox*

“In *The Wahls Protocol*, Dr. Terry Wahls offers a revolutionary way of reversing multiple sclerosis: nutrient-dense food. She does this artfully, combining scientific evidence with her own exceptional story of personal triumph over severe MS. You’ll find many tools for healing in this accessible book, from detailed recommendations and recipes to much-needed hope and encouragement. It is a must-read!”

—MAYA SHETREAT, MD, INTEGRATIVE PEDIATRIC NEUROLOGIST AND AUTHOR OF *The Dirt Cure: Growing Healthy Kids with Food Straight from the Soil*

“Terry Wahls is a hero to many for her discovery that a nourishing ancestral diet can heal multiple sclerosis. In *The Wahls Protocol*, Terry sets forth a straightforward plan for achieving good health through good food. Not just for MS patients, *The Wahls Protocol* is a fascinating tale that proves the wisdom of Hippocrates: ‘Let food be thy medicine.’ Try it, it works!”

—PAUL JAMINET, PHD, AUTHOR OF *Perfect Health Diet* AND EDITOR IN CHIEF OF THE *Journal of Evolution and Health*

“I’ve long recommended that *anyone* diagnosed with MS who is also interested in health and healing research the work of Dr. Wahls online, but the game has now changed. *The Wahls Protocol* will be the go-to resource for anyone suffering from MS or another autoimmune condition who is ready to fight back. Dr. Wahls outlines a clear-cut, stepped approach to dietary and lifestyle changes—supported by her extensive research and testing of the plans—that will put *anyone* on a path to better health. Whether you have MS or not, *The Wahls Protocol* is a gold mine of easy-to-follow, real-food nutritional guidelines that will leave you feeling so amazing it’ll make you wonder how you ever ate any other way.”

—DIANE SANFILIPPO, BS, NC, *New York Times*—BESTSELLING AUTHOR OF *Practical Paleo*

“*The Wahls Protocol* is one aha after another of how Terry Wahls’s realizations may help you in your health journey. Not only will you be captivated by what you read, you’ll also learn how to be healthier. Highly recommended.”

—DR. TOM O’BRYAN, CREATOR OF A GRAIN OF TRUTH: THE GLUTEN SUMMIT

“Terry Wahls’s new book is one of the most important books on health ever written. That’s not a hyperbolic statement, just plain fact. If doctors would take this incredible information to heart (and into their practices), the health crisis in this world would be over—the cancer industry crushed and the rise in autoimmune conditions would fall. True health reform is contained within these pages. I cannot recommend a book any more highly. Bravo, Dr. Wahls!”

—LEANNE ELY, CNC, *New York Times*—BESTSELLING AUTHOR OF *Saving Dinner*

“Terry Wahls does an amazing job at highlighting the importance of micronutrients (vitamins, minerals, and essential fats) as an integral part in preventing and reversing

disease. Her story is incredible and brings hope to millions needlessly suffering. *The Wahls Protocol* is a must-read for anyone looking to reverse autoimmune conditions naturally.”

—MIRA CALTON, CN, AND JAYSON CALTON, PHD, AUTHORS OF *Rich Food, Poor Food*

“The best treatment for multiple sclerosis, autoimmunity, and chronic disease is teaching people how and why to eat and live for optimal health. By combining the latest science with the all-important factors of nutrition, exercise, and healthy lifestyle, *The Wahls Protocol* goes beyond conventional treatments and empowers you with real solutions.”

—ANN BOROCH, CNC, AUTHOR OF *Healing Multiple Sclerosis: Diet, Detox & Nutritional Makeover for Total Recovery*

“Dr. Wahls engages us with her personal story of triumph over multiple sclerosis while educating us on the importance of a nutrient-dense diet for our cellular health. You will find yourself drawn in and inspired to take control of your own health as Dr. Wahls shares her experiences, knowledge, and compassion. The three levels of *The Wahls Protocol* provide a concrete plan—including both feasible diet and lifestyle changes—to help you on your road to recovery.”

—SARAH BALLANTYNE, PHD, AUTHOR OF *The Paleo Approach*

“*The Wahls Protocol* is essential reading for anyone suffering from a chronic disease and wanting to regain their health. All the therapies which restored Dr. Wahls to well-being are described in detail and are succinctly summarized in the appendices. The huge amount of scientific information, clear explanations, and practical advice make this book an invaluable resource and indispensable reference.”

—ASHTON EMBRY, PHD, PRESIDENT OF DIRECT-MS

“Only Terry Wahls, MD, could have written a book as important as *The Wahls Protocol*. Her discovery of a path to recovery from disabling multiple sclerosis after failing to respond to the traditional medical approach is not only a story of great personal triumph but a manifesto of hope for many others with various chronic illnesses for which drug therapy has not worked. This is a book that provides a program that can be applied by anyone who is searching for solutions to health challenges.”

—JEFFREY BLAND, PHD, PRESIDENT AND FOUNDER OF THE PERSONALIZED LIFESTYLE
MEDICINE INSTITUTE

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*To Jackie, who has sustained me through the challenges
and joys of this life*

A NOTE TO THE READER

MANY OF THE Wahls Warriors who generously contributed their stories and are quoted in this book have included their actual names and locations, but a few prefer to remain anonymous, so some names and locations have been changed to protect the privacy of those who desire it.

Nutrient composition of recipes and menus were calculated with Nutrition Data System for Research (NDSR) Database Version 2012 © Regents of the University of Minnesota, at ncc.umn.edu/. Nutrient totals include all ingredients except those listed as optional. When a choice of ingredients is presented, the nutrient composition for the first item was used in the calculations. Reasonable effort has been made to check the accuracy of this data; however, variations in natural and manufactured foods as well as deviations from the stated recipe or menu ingredients, amounts, and preparation methods will impact the nutrient composition. All nutritional values should be considered approximate. Conclusions regarding the nutritional adequacy of the diets are based on the sample menus shown and the current nutritional recommendations for women in my age group (51 to 70 years), who have higher calcium intake requirements than premenopausal women, or men under the age of 71. Note that nutritional recommendations are otherwise relatively similar between age groups. Always consult your health care provider to discuss your personal diet and nutritional needs and have these concepts adapted and personalized to your circumstances.

Disclaimer

Medicine and nutrition are ever-changing sciences. As new research and clinical experience broaden our knowledge, changes in nutrition recommendations, treatment, and drug therapy are

required. The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication. However, in view of the possibility of human error or changes in medical sciences, neither the authors nor the publisher nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information. Readers are encouraged to confirm the information contained herein with other sources.

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PREFACE TO THE REVISED EDITION

MUCH HAS HAPPENED since the first edition of *The Wahls Protocol* was published in 2014. When I first found myself in the spotlight and under the scrutiny of my professional colleagues, I received a lot of pushback about the contents of this book (and my TEDx talk). Since then the world and the priorities of science and medicine have changed dramatically. Today there is a huge amount of research published about the influence of diet and lifestyle on human health. This is no longer a new or controversial topic. We have gone mainstream. Other concepts have become popular topics of research as well, such as the microbiome and the gut-brain axis, which directly influence human health, and which are largely shaped, fueled, and influenced by both food and lifestyle.

What has driven this change? To a large extent, you have. It was difficult to get our first paper published, which described the preliminary data on the first ten subjects in our trial who had secondary progressive MS and who, with the implementation of the Wahls Protocol, experienced a statistically (and more important, clinically) significant reduction in fatigue. Now, research like this is hardly unusual, and that is because you wanted to know. You demanded answers. You knew, instinctively, that food and lifestyle influence health. You wanted options beyond the latest disease-modifying drugs. You wanted to take control of your own health. That has led doctors, scientists, the media, and those who fund research to sit up and pay attention. The National MS Society (NMSS) monitors social media to understand the interests and needs of their constituency—people with MS. When *The Wahls Protocol* was first published, there was a dramatic uptick in the mentions about diet, exercise, lifestyle, and the Wahls Protocol, which eclipsed all the mentions about all the drug disease-modifying therapies! This ultimately led the NMSS to have a wellness conference, and they invited me to attend. They had 45

scientists and 45 patients with MS (I was a twofer). I urged the NMSS to create a new peer review process for dietary intervention studies, since it is a very different science from drug development. I also urged the NMSS to create resources so patients would know about the Wahls diet, the Swank diet, the Mediterranean diet, and gluten-free diets, including the limited research behind each diet and the potential benefits and risks of each diet.

The NMSS¹ did create those educational resources and did make diet and lifestyle interventions for wellness a research priority. They also funded our research lab to conduct a study comparing the Swank diet to the Wahls diet, with a million-dollar four-year grant.² We will be analyzing the data in 2020 and presenting our results once the analyses are completed. That is because of you.

Since 2014, we have been busy. We have had all of our subjects complete twelve months of the protocol. The second paper was published, which also showed significant reduction in fatigue and improvement in quality of life. The third paper showed reduction in anxiety and depression scores, and improved verbal and nonverbal reasoning.³ All this is remarkable.

Next we completed a randomized controlled trial, but this time, our subjects had relapsing-remitting multiple sclerosis only. People were randomized to receive diet instruction right away, or at 12 weeks. We measured clinical outcomes at baseline and 12 weeks, and demonstrated that our diet was associated with significantly less fatigue, improved quality of life, and improved motor function.⁴

We recently published another paper that showed our diet increased HDL (“good”) cholesterol and that this was associated with less fatigue in MS patients. Further dietary analysis will be coming in a future paper.⁵

After that, we did a randomized controlled trial comparing the original Wahls Diet to the Wahls Paleo Plus ketogenic diet, to investigate whether the ketogenic version was more beneficial than the original Wahls Diet. The results of this study will be forthcoming in a future publication.

I cannot overstate the significant ways our research has changed research into this area.⁶ Other investigators are now talking about our work. Since *The Wahls Protocol* was published, there have been hundreds of scientific papers about diet and MS published and

available on PubMed. Only a few involve actual clinical trials, and most of these came from our lab.

I also have collaborations with other scientists here at the University of Iowa to investigate how our protocol impacts the microbiome and vision function. We are also developing collaborations with MS researchers at other universities who have expertise in lipids, metabolomics, vitamin K and vitamin A, and brain structure analyses. We have more data to analyze and more papers to write.

In addition to my research, I remain committed to public education. I have created a website and newsletters, recorded my lectures, and given lectures around the country. I do webinars, interviews, radio shows, and talk shows. One of the highlights of my career was when I was awarded the 2018 Linus Pauling Award, presented to me by the Institute for Functional Medicine, for my contributions as a researcher, teacher, clinician, and patient advocate. (You can read more about this at terrywahls.com/i-did-all-that-i-could/.)

I have joined the faculty of the Institute for Functional Medicine, teaching dietary approaches to reduce neuroinflammation and neurodegeneration for the IFM advanced practice module on energy. I lecture for the American Academy of Anti-Aging Medicine. I also work with philanthropists who believe in our mission of testing how therapeutic diet and lifestyle interventions create health and control neuroinflammation and neurodegeneration. I travel across the country and around the world, teaching the public, clinicians, and research scientists about the use of therapeutic diets and lifestyle to create a more healing environment for our cells.

Many health professionals who had been forced to stop working because of their health challenges discovered my work and restored their health. During that journey, they too have found new purposes. They have often transformed their clinical practices and have become certified Wahls Protocol Health Professionals. They have shifted the focus of their clinical work toward using therapeutic diet and lifestyle within the realm of their clinical expertise. We have in-person and virtual health professional training programs, which you can also learn about at terrywahls.com.

I also have a small private practice where I complete comprehensive assessments and provide six months of support to help people implement the recommendations. Details of the types of programs I offer can be found on my website.

And now I can offer you a revised, updated version of *The Wahls Protocol*. This edition is full of new information, including new scientific developments, furthered understanding of old concepts, more references to more new research, and more things you can add to your Wahls Protocol arsenal. I've also included some new recipes, new testimonials, and my assessment of what is new and important in the world of health and wellness. I've also expanded many of the discussions in this book to apply to people with chronic diseases other than MS, as I meet and learn about people using the Wahls Protocol to resolve a wide variety of health challenges. Even if you read this book before, it's worth another look now so you can keep up on the latest developments and tools available for you.

We are very optimistic about the future. We have just recently published four papers with one more under review.⁷ All are about the role of diet in multiple sclerosis. Three analyze data from our previous studies. The others look at how diet composition may influence MS-related symptoms and disease activity. And other scientists are now also making the case that diet and lifestyle factors impact the risk of developing autoimmune issues, including MS.

I could not have done any of this without my Wahls Warriors behind me. We will always have more to learn, but the more we learn, the more you can benefit, and the more you can benefit, the more the world changes. Our epidemic of health is spreading—it's contagious, indeed, and I can only hope that someday, the knowledge that food, movement, and lifestyle are the most important factors for health will be the standard of care in every doctor's office and every clinical trial the world over.

This revised edition is my thank-you. I want to take you along with me into the future. No matter what else is happening in the world, I have hope because I see how far you have come, how much more you demand, how dedicated you are to change—and how that has changed the world for the better.

INTRODUCTION

I USED TO RUN marathons and climb mountains in Nepal. I've competed multiple times in the American Birkebeiner 54-kilometer cross-country ski marathon (once while pregnant), earned a black belt in tae kwon do, and won a bronze medal in women's full contact free sparring at the trials for the 1978 Pan American Games in Washington, DC. I used to feel invincible.

Then I developed multiple sclerosis. After decades of troubling symptoms I tried to ignore, I was finally diagnosed in 2000. By that time, the disease had a good footing in my central nervous system. My health decline progressed rapidly. Within two years of my diagnosis, I could no longer play soccer with my kids in the backyard. By fall 2002, walking from room to room for my hospital rounds exhausted me, and by summer 2003, my back and stomach muscles had weakened so much that I needed a tilt/recline wheelchair. Within three years of initial diagnosis, my disease had transitioned from relapsing-remitting multiple sclerosis into secondary progressive multiple sclerosis. In that phase, disability slowly progresses despite increasingly aggressive therapy. By 2007, I spent most of my time lying in a zero-gravity chair. I was 52 years old.

Everyone with multiple sclerosis has a story—the years of clues and strange symptoms that finally, in retrospect, make sense. Those with other autoimmune diseases, as well as other chronic neurological, medical, and mental health issues, have their stories as well. It is in the nature of most chronic diseases and health conditions that symptoms accumulate slowly, bit by bit, over the course of decades. Long before there can be a diagnosis based on discernible damage to the organs and systems of the body, the disease is progressing. This is what happened to me. As a doctor, I was compelled to find answers: a diagnosis and a cure. As a patient, I was compelled to save my own life.

Like most physicians, I had always been focused on quickly diagnosing my patients, then using drugs and surgical procedures to treat them—that is, until I became a patient myself. This turned my whole understanding of health care on its head. Conventional medicine was failing me. I saw that. I was heading toward a bedridden life.

But I wasn't willing to give in or give up. Since the first doctor ever treated the first patient, physicians have used self-experimentation, either to prove a scientific point or to treat themselves when the conventional treatments of the day were not enough. In that tradition, and in the face of this chronic, progressive disease for which I knew there was no cure, I began to experiment on myself. What I didn't expect were the stunning results I got from my self-experimentation: I did much more than arrest my disease. I achieved a dramatic restoration of my health and function. What I learned changed forever how I saw the battling worlds of health and disease. It changed me as a doctor, and it saved me as a patient.

More than a hundred years ago, Thomas Edison said, "The doctor of the future will give no medicine, but will interest his [or her] patients in the care of the human frame, in a proper diet, and in the cause and prevention of disease." This became my new course, my passion, and my mission. I understood health and disease in an entirely new way. I became a new person, both physically and emotionally, both personally and professionally. I also became passionately committed to helping other people become new people, too.

My Diagnosis

The stress and pressure of medical school may have been what triggered my first symptoms in 1980, years before I had any idea what they were. I would eventually call them "zingers"—intense stabs of facial pain. They lasted just a moment and would come on randomly, sometimes in waves, the episodes building over a week or two and then gradually fading over the next several weeks. They were most likely to happen during my busiest and most brutal hospital rotations, with shifts lasting thirty-six hours and allowing for little sleep. Over the years they became steadily worse,

resembling electrical pain that felt like a 10,000-volt cattle prod sticking me in the face.

At the time, I thought the episodes of face pain were an aggravation, nothing more. I thought it was an isolated, unexplained problem—one of those medical mysteries that don't really require solving. Even as a doctor, I didn't think much about it. I was too busy with my own patients to dedicate too much diagnostic thought to myself. I certainly never suspected an autoimmune problem.

The shocks of facial pain were my first symptom, but that first incident was not likely the moment when multiple sclerosis began its relentless march through my central nervous system. For at least a decade before that moment—probably two decades, in retrospect—my brain and spinal cord had been under siege from “friendly fire”—my own immune system attacking the myelin that insulated my nerves. I couldn't feel it at first. In many cases, autoimmune attacks are mostly asymptomatic for years. Nevertheless, I know now that it was already happening.

As the years passed, I became a mother, first to my son, Zach, then to my daughter, Zebby. The rigors of parenting and full-time work distracted me, but unbeknownst to me, my multiple sclerosis clock was ticking. This was a clock I did not hear, even though I developed other alarms, like visual dimming, along with more of those excruciating zingers to the face. I had no idea what was in store for me. I fully expected to be an active, adventurous, vibrant woman for at least forty more years. I imagined mountain climbing with my children, even as a white-haired old grandma. I never thought my unexplained symptoms would have anything to do with something as basic as my mobility or as crucial as my ability to think clearly.

One evening at a dinner party, I was talking to a neurologist and I happened to mention that I perceived the color blue somewhat differently in my right and left eyes. Blues were a bit brighter when I used my right eye than if I used the left. She seemed interested.

“You'll have multiple sclerosis someday,” she said. It was the first time anyone had ever said those words to me. My father died the next morning, and so her words were forgotten in the chaos of grief. Years later, I recalled those prescient comments.

The day my wife, Jackie, noticed I seemed to be walking strangely, I didn't believe her. I didn't even notice until she insisted we go for a three-mile walk to the local dairy for ice cream. She wanted to prove her point, and she did. By the time we got back, I was dragging my left foot like a sandbag. I couldn't pick up my toes. I was exhausted, nauseated, and scared. I scheduled an appointment with my physician.

I spent the next few weeks going through test after test, dreading each result. Some tests involved flashing lights and buzzers. Others involved more electricity and more pain. There were more blood tests. I said little and feared much. Everything came back negative, which was a relief, but deep down I knew the truth: there was something wrong with me.

Finally, we were down to the last test: a spinal tap. If there were oligoclonal-band proteins (an indicator of excessive amounts of antibodies) present in the spinal fluid, then the diagnosis would be multiple sclerosis. But if this test was also negative, then I likely had what they call "idiopathic degeneration of the spinal cord" (meaning they don't know the cause). Considering the long list of potential diseases I had faced, this seemed like the best option. I was hopeful.

When I got up the next morning, I knew that the results should be in my chart. I could get into the clinic medical records from my home computer through remote access. I brought up my medical record on the screen and went to the laboratory section. Positive. I stood up. I paced. Two hours later, I logged onto the system and checked again. Five times I looked up my results, hoping they would somehow change. They never did.

It was official: I had multiple sclerosis.

My Decline

In summer 2000, I moved with Jackie and my children from Marshfield, Wisconsin, to Iowa City, Iowa, to accept a joint appointment as assistant professor at the University of Iowa and chief of primary care at the VA hospital. Because I was newly diagnosed with multiple sclerosis, I was taking Copaxone, which my physician had prescribed. Like most patients, I relied entirely on my physicians for treatment decisions. Even though I was a physician

myself, I had been conditioned to believe that specialized physicians know best. I had to step back and be the patient now, at least in terms of my own care. Besides, what did I know about multiple sclerosis? It wasn't my area. I was seeing the very best people and getting the very best treatments available, so I assumed I was doing all that I could do.

I was also determined not to let my diagnosis influence my new job. I vowed not to let anyone know—not to show any weakness. I was in a leadership position with plenty of challenges, and I loved it. I enjoyed teaching the medical students, and my children were thriving in their new home. I thought I was doing pretty well, and so did my doctors. I even began to imagine I might never get much worse. I dreamed I might not even have to confess to my kids that I had multiple sclerosis. Nobody had to know!

But as is typical for MS, my disease progressed. When my right arm and hand became weak, my doctors gave me steroids to suppress my immune cells, and my strength slowly returned. But this was the beginning of a slow and steady decline. I could see it. Jackie could see it, and so could the kids. They've since admitted that sometimes it was embarrassing to have me around because I was less and less mobile. Sometimes they wished I wouldn't attend their activities, and that made me feel guilty for wanting to be there. It was a strain on the whole family, and I felt responsible. It was all my fault. I was supposed to be the provider, and I was slowly losing my ability to manage my own body. It had been only two years since my initial diagnosis, but the change in me was dramatic.

Then something happened that altered the entire course of my life. In 2002, my neurology doctor at the Cleveland Clinic noted that I was slowly getting worse and suggested I check out Ashton Embry's website, Direct-MS, at direct-ms.org. Dr. Embry is a geologist with a PhD whose son has MS. Dr. Embry's son improved dramatically by changing his diet, so Dr. Embry became an active and vocal proponent of the link between diet and multiple sclerosis. This was the first I'd heard of such an idea—or at least the first time I paid attention. Although it sounded suspiciously like “alternative care” to me—being a conventionally trained doctor, I didn't put much stock into what I saw as fringe medical practices—this was a

suggestion from my *neurologist*, so I took her seriously. I decided to check it out.

Dr. Embry's website was full of scientific references, which I began to read one by one. The articles were from peer-reviewed journals, written by scientists from highly respected medical schools. This wasn't "soft science." This wasn't "fringe." This was legitimate research. It was difficult science, too. A lot of it was in fields outside my expertise, or it relied on basic science concepts that hadn't been part of my medical training. I had trouble absorbing everything, and the MS-related brain fog didn't help. There was so much new information—how did I not know about any of this? After a lot of intensive reading, I determined that Dr. Embry was not a charlatan and that maybe he was onto something. What if diet could have a major impact on MS? I had spent years leaving my health in the hands of doctors while continuing to decline, so this idea fascinated me. I could control what I ate. It seemed too easy and too good to be true. I had to know more.

Dr. Embry's website was the first place I heard about Dr. Loren Cordain. Dr. Cordain linked changes in the human diet to the development of chronic disease in Western society. He had published a number of articles and had also recently published a book for the public called *The Paleo Diet: Lose Weight and Get Healthy by Eating the Foods You Were Designed to Eat*. This level of reading, geared for the general public, was much easier reading than the technical scientific papers I'd been slogging through.¹ I began to absorb information more quickly: molecular mimicry, leaky gut, lectins, immune modulation (I'll talk about all these things later in this book). I began to see where Dr. Embry and Dr. Cordain were going with their theories. I began to consider that what we eat might actually have a major, rather than a minor, influence on how our bodies work.

I was particularly interested in the idea that excessive carbohydrates and sugars in our modern diet lead to excess insulin and inflammation. The evidence that the original human diet could possibly improve my MS was compelling, but switching to this kind of diet would be a major change for me. I had been a vegetarian since my college days and I loved my beans and rice. I loved making

bread. Could I really cut out grain, dairy, and legumes, the current staples of my diet?

But I wanted to arrest my disease more than anything else. I wanted to keep walking, working, and playing with my kids. I decided to try it. Meat was back on the menu, and I gave up the now-forbidden foods I loved so much. At first the smell of meat was nauseating to me. I started slowly, adding meat to soup in small amounts. With time, it got easier.

I was hopeful about this change, but despite this switch to what Dr. Cordain called a Paleo diet, my decline continued. I was frustrated. It wasn't working! I couldn't play soccer in the backyard with my kids without falling. I couldn't take long (or even short) hikes with the Boy Scouts or Girl Scouts. Then it became harder to take even short walks with Jackie. Fatigue became more and more of a problem. I was disappointed, at times despondent, and tears came at inconvenient times. But I was also determined. I didn't want to give up on the idea that there were things I could do to help myself. Some of the entries on Embry's website said that recovery took five years. I realized I could not expect an overnight miracle, so I stuck with the changes. Even if progress would be slow, my new dietary regimen came with its own sense of empowerment.

Meanwhile, I rearranged my schedule to avoid walking. My doctor told me that it was time to get a scooter, and then changed his mind and suggested a tilt/recline wheelchair because of the worsening fatigue. He also suggested I try taking mitoxantrone, a form of chemotherapy. When that didn't help, I switched to a new, potent immune-suppressing medication called Tysabri; but before I went in for my third injection, Tysabri was pulled from the market because people were dying from the activation of a latent virus in their brains. After this, my doctor suggested that I take CellCept, a transplant medicine, which would suppress my immune cells. I often had mouth ulcers after that. My skin was grayish. I started every day tired, and despair gnawed at me each night as I lay in bed. Jackie, Zach, and Zebby were my lifelines. Jackie would hold me and tell me we'd get through everything together. We often discussed our kids and how they were absorbing the ways that we dealt with what was happening. For their sakes, I didn't want to let my discouragement and fatigue show.

Though I had resisted getting the tilt/recline wheelchair, it actually felt liberating once I had it. I was able to go outside and stroll (or rather, roll) with my family as we hiked around the county park or the neighborhood. It did make my life easier. It weakened my back muscles, however, and the more those muscles atrophied, the more time I spent in bed. I didn't talk about it much, but I thought it likely that eventually I would become bedridden. Sitting at my desk at work was exhausting. Then I found a zero-gravity chair, designed like the NASA chairs used during space flights. When I was fully reclined, my knees were higher than my nose and gravity held me in the chair. I had one for my office and another for my home. That helped with the fatigue a great deal, but this wasn't how I wanted to live my life. I was getting through life day by day, but I couldn't accept that this would be my future.

Taking My Life Back

Getting into that wheelchair triggered something in me. I realized that conventional medicine was not likely to stop what was happening to me. I still hoped that the Paleo diet would make a difference, but I hadn't seen much of a change thus far. I decided to go back to reading the medical literature. I wanted to know if there was something I was missing—some other avenue, something the doctors had overlooked. I had come to accept that recovery was not possible, but maybe I could slow things down. I was through ceding my power to doctors and not seeing results. I needed to be more forward thinking. I vowed to research and study and exhaust every possibility, just in case there was some other answer for me out there, something that would delay a little longer the inevitable life as a bedridden invalid.

At first I began to read all about the latest clinical drug trials going on, but then I realized that those all involved medications that I'd be unable to get. This kind of knowledge would be only theoretical. So I started to think outside the box. I knew how science worked—I knew that studies on mice and rats are always the source of tomorrow's treatments, but that it's typically years, often decades, before anything becomes a matter for a clinical trial, let alone a standard of care. This was the cutting edge of the cutting edge, so I

began to look there. I wanted to know what the brightest minds were thinking and how they envisioned the future of diseases like mine.

Each night I spent a few minutes searching pubmed.gov for articles about the mouse model for MS. I knew that brains afflicted with MS shrink over time, so I also began reading about the animal models of other conditions with shrinking brains. I researched Parkinson's disease, Alzheimer's dementia, Lou Gehrig's disease (amyotrophic lateral sclerosis, or ALS), and Huntington's disease. I discovered that, in all four of those conditions, the mitochondria—small subunits within cells that manage the energy supply for that cell—stop working well and lead to early death of brain cells, causing shrinking of the brain. More searching led me to articles in which mouse brains and their mitochondria had been protected using vitamins² and supplements like coenzyme Q10, carnitine, and creatine.³

I didn't have anything to lose, so I decided to take action. I translated those mouse-size doses into human-size ones, then made an appointment with my primary care doctor. She looked over my list and decided the supplements were likely safe. She entered them all into my medication list, one at a time, to check for potential adverse interactions. There were none. I was excited about starting my new, experimental vitamin-and-supplement routine. I began to take them and was disappointed when nothing immediately happened. After a couple of months, I stopped taking them . . . and a few days later, I couldn't get out of bed! When I resumed the supplements, I could get up again. They were helping, after all! If nothing else, they seemed to be slowing my decline.

This was a ray of hope. Obviously, I thought, my body was getting something from those supplements that it wasn't getting without them—something it needed. This was a valuable clue.

Discovering E-Stim

My next discovery was in a completely different realm than food. I came upon a research protocol that used electrical stimulation of muscles to treat people who had become paralyzed due to an acute spinal injury. According to the research, the purpose of this therapy,

known as e-stim, was to maintain bone health and quality of life for these patients. Reviewing that research protocol made me wonder if the electrical stimulation might slow down my disability. I talked to a physical therapist who used this technology, and he warned me that it was painful and exhausting for the athletes who did it. He wasn't sure if it would help me, but he finally said he was willing to give it a test session.

During my first session, the therapist had me lie on my belly and applied the electrodes to my left paraspinal back muscles. I lifted my left leg off the table and held it there as he dialed up the electrical current. It felt like bugs racing across my skin. He kept dialing up the current. The bugs raced faster. It became more and more electrical, and then painful. After a minute my therapist asked if he could turn up the current again. This is the typical procedure because the brain releases endorphins and nerve growth factors that make the e-stim more comfortable, so after a few minutes, the pain lessens and patients can typically tolerate a higher dose of electricity. When that was done, we did my quadriceps muscles on my left leg, where I suffered particular weakness. After it was over, I had completed thirty minutes of "exercise" that was more rigorous than what I had been able to do in years. It felt like progress, so I began doing e-stim therapy three times a week.

Discovering Functional Medicine

Every night, after everyone else was sleeping, I continued to search the Internet, looking for more information that might help me. I was relentless. One night I stumbled onto the web page for the Institute for Functional Medicine and was immediately intrigued. This organization's goal was to provide clinicians like myself with a better way to care for people with complex chronic disease by looking at how the interaction between genetics, diet, hormone balance, toxin exposures, infections, and psychological factors contributes to the development of disease or the improvement of health and vitality.

This was exactly what I had been searching for since I'd hit the wheelchair. The institute had textbooks, conferences, and continuing education courses for physicians and other health care