



EAT RICH LIVE LONG

**USE THE POWER OF LOW-CARB AND KETO
FOR WEIGHT LOSS AND GREAT HEALTH**

IVOR CUMMINS & JEFFRY GERBER, MD

RECIPES BY RYAN TURNER

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In memory of my father, Nicholas J. Cummins, one of the countless secret diabetics who were never diagnosed. He passed away at seventy-two following many years of poor health—long before the knowledge in this book could have saved him. Also in memory of Dr. Joseph R. Kraft, who half a century ago could have told my father all that he needed to know.

—IVOR CUMMINS

In memory of Dr. Alexander C. Szabo Jr., a family physician and dear friend who devoted his life to helping others. Like so many, he thought he was healthy, yet he was suddenly lost to us at the age of sixty-two due to a massive heart attack.

—JEFF GERBER

FOREWORD

You may wonder how it came about that a third of us are outright obese, half of us are overweight, diabetes is at epidemic proportions, and many of us are taking statins. Strangely enough, this sorry state we find ourselves in came about as a consequence of intense focus on a single molecule: cholesterol.

Everyone has heard of cholesterol, but what really is it? Cholesterol is a waxy molecule essential for life. So important, in fact, that virtually every cell can make it. It is the main structural component for all the cells and tissues in the human body. Without it, the body would, in the words of Shakespeare, “melt, thaw and resolve itself into a dew.” It plays a major role in bone building, is the main building block for adrenal and reproductive hormones, and is needed to synthesize the bile salts required for proper digestion, and the brain and nervous system are both highly dependent upon it for optimal function. The list of cholesterol’s virtues goes on and on. Because it is necessary for life, the body itself manufactures around 80–85 percent of the cholesterol it requires, with the other 15–20 percent coming from the diet.

Given the enormous importance of this single molecule, it beggars belief that it is also the most maligned molecule in the body, accused of causing heart disease, stroke, and a host of other problems. How did an indispensable molecule, made by the body itself, get such a horrific reputation? More importantly, how did fear of cholesterol lead to the epidemics of obesity and diabetes we’re in the midst of today?

Largely thanks to the efforts of just one man.

More than a half century ago a research scientist named Ancel Keys concluded that heart disease was caused by elevated cholesterol in the blood. It wasn’t such a far-fetched notion, because the plaque in diseased coronary arteries contains a fair amount of cholesterol, so it was a reasonable hypothesis that cholesterol in the diet would end up in the blood and could then find its way into the lining of arteries. But after careful study, Keys concluded the fat in the diet, not cholesterol, was the real culprit. Keys dominated the field of nutritional research, especially where dietary fat, cholesterol, and heart disease were concerned. It is impossible to overestimate the influence his theories exert on us still today. His influence was such that Keys appeared on the cover of *Time* magazine in 1961. By this time, the battle against saturated fat was fully engaged, and “heart-healthy” polyunsaturated fats were the new

darlings of the nutritional world. Fifteen years later, the McGovern Committee formulated the first Dietary Goals of the United States, which hewed closely to the ideas put forth by Ancel Keys: keep the fat low and keep it polyunsaturated. “Saturated fat” became a dirty word. In fact, it became not just a dirty word but a dirty word grouping. It was almost never written as “saturated fat” but instead as “artery-clogging saturated fat.”

So how did all this create the obesity and diabetes epidemics now flourishing?

It did so by completely changing the dietary patterns people had followed for generations. At the time the first nutritional guidelines came out, people in the United States had been following the same diet for decades with fairly stable levels of obesity and diabetes. The new standards exhorted people to reduce fat intake to 30 percent of calories and bump carbohydrates to between 50 and 60 percent. The assumption was that reducing fat, especially saturated fat, would reduce the incidence of heart disease.

But heart disease didn’t really go down. What happened instead is that body weight went up and people started developing obesity and diabetes at epidemic rates.

Despite the epidemic burgeoning before their eyes, most physicians and dietitians still focus on cholesterol levels. And in their misguided way—thanks to the legacy of Ancel Keys—they encourage their patients to cut the fat, especially saturated fat, and increase the carbohydrates to try to drive their cholesterol levels ever lower. The sad, but predictable, result is an inexorable increase in weight and perhaps the onset of diabetes.

But though most medical and nutritional practitioners continue these ineffectual and counterproductive practices, there are a growing number who have veered from the crowd-think majority and are actually turning their patients’ lives around.

The two authors of this book, both amateur athletes, initially fell victim to the antifat fervor but were ultimately able to break through the bias, see through the fallacies, and regain their health. Dr. Jeffrey Gerber, a practicing physician in Denver, Colorado, who struggled with his weight, finally immersed himself in the science of weight gain and loss, and now he has a practice devoted to helping others achieve the success he himself found. Ivor Cummins, an engineer from Dublin, Ireland, decided to take a systems-based approach to figuring out his own cholesterol issues after his doctor couldn’t explain them.

Jeff now shares his experience treating thousands of patients with other physicians, spreading the knowledge he's gained in treating lipids and other metabolic illnesses with a low-carb diet, and Ivor's in-depth analysis of every aspect of the lipid hypothesis has become an online legend in his Fat Emperor series of YouTube lectures. Both of them now lecture internationally on low-carb nutrition and its impact on lipids and the constellation of disorders related to insulin resistance and inflammation.

The book you hold is the outgrowth of their diverse experience. It contains an enormous amount of priceless information that is truly life changing. You will learn everything from a simple test for diabetes to an inexpensive procedure that actually visualizes the degree of any plaque you might have in your coronary arteries. And with the nutritional advice provided, you will be given a road map to ditch your excess weight, reverse your diabetes, and clean your coronary arteries—all while following a diet rich in all the foods you probably thought you could never eat again. You'll end up smarter, thinner, and with vastly improved health to carry you through a long and productive life.

Michael R. Eades, M.D.
Incline Village, Nevada

INTRODUCTION

No one wants to be fat—everyone wants to be slim. The vast majority of us are not lazy, nor are we mindless gluttons. People are overweight, despite their best efforts, because what they've been taught about the causes of obesity is simply wrong. In this book, we'll identify the real causes of obesity and ways to overcome it.

Both of us, Ivor and Jeff, struggled with weight control for decades. I, Ivor, should have known better. I have a degree in biochemical engineering and have specialized in leading complex problem-solving teams for more than twenty-five years, which led to my achieving the rare role of “technical master” in a huge corporation—so figuring out the ins and outs of complex systems (such as those involved in body weight) and how to optimize them is second nature to me. Jeff should also have worked it out sooner, with his enormous experience as an MD running a family-medicine practice for more than twenty years. He worked hard trying to manage the obesity explosion among his patients and identify addressable root causes. But in spite of our technical and medical experience, even we fell for the fake solutions: We exercised and systematically starved ourselves on many, many occasions. We dutifully lowered our dietary fat intake. We consumed complex carbohydrates like good boys. We ate more fruits and vegetables. We tried it all, and we failed, just like most of the population.

I competed in many Olympic-distance triathlons. These required a grueling regimen of intense training, which helped me to lose weight. But the weight always came back a few months later. The same thing happened for most of my friends. When I eventually researched the biochemistry of human metabolism and weight control, the situation at last became clear, and the fatal flaws in the official advice were unmasked. Fortunately, the actual fix was reasonably straightforward, and since then, I have been able to easily control my weight with minimal exercise, for the first time in my adult life.

Jeff had the exact same weight-off-weight-on experience with his chosen sport of competitive tennis. When he did his own research into the biochemistry of weight control, it changed the way he ate and the way he treated his patients. You'll find stories of patients who've had immense success under Jeff's guidance throughout this book.

For fifty years, we've all been taught that eating a low-fat diet and burning more calories are the keys to losing weight and getting healthy. This dogma has failed. The data indicating why has been misinterpreted or ignored for decades, protecting the low-fat emperor from embarrassment. One reason for this speaks directly to human nature itself. Health authorities and researchers simply couldn't accept that they had made an enormous error—especially when the error had negative implications for millions of people. As a result, most people are still not clear on the best science-based strategy for health and weight loss.

In this book, we will lay out the reality of what science really says. We are all machines—complex biochemical machines. Engineers know that all complex machines rely on many feedback loops, some of which are critical for proper functioning. Appetite and weight control have several of these crucial loops, and you must identify and understand these feedback loops in order to fix your body. We will explain all of them in this book.

We will guide you to lower your intake of inflammatory carbohydrates and enable you to target the least-inflammatory fuels for the human machine. You will learn how to safely increase your intake of healthy fats from natural sources. All this is not just helpful but *necessary* for healthy weight loss. But even if you're not looking to lose weight, the steps we recommend will improve your health and productivity and help you achieve a longer life in which to enjoy your new vitality.

As we shall see in Chapter 1, our opportunity to embrace healthy fats was stolen from us by human folly. This book reverses many decades of bad nutritional science and sets the record straight on what science tells us will deliver optimum nutrition for weight loss and longevity.

HOW TO USE THIS BOOK

We've organized this book with the aim of building from an overview of health and nutrition to specific steps you can take to improve your health and finally to a more detailed explanation of the scientific truth about insulin and mortality, cholesterol and heart disease, important vitamins and minerals, and much more.

In Part 1, we focus on a clear-sighted explanation of where the world went wrong in understanding what dietary strategies prevent disease. We cover the main errors of the past so that you can understand where the mistaken low-fat (and hence high-carb) dogma came from. We then move on to identifying the real dietary culprits—what foods really promote disease and cause

obesity (not to mention problems losing weight). We also summarize the dietary approach that will enable you to use food as medicine in order to lose weight, avoid or resolve chronic diseases such as heart disease and diabetes, and improve longevity.

With a firm grasp of how nutrition really works, you will be ready to implement the ten action steps laid out in Part 2. We have broken this part into chapters on the overall plan, the first week on the plan, and the second and third weeks on the plan. Focusing specifically on the first week helps you create a great foundation, and we've tried to ensure that this first week has a straightforward focus on the most important change—diet—without worrying too much about other factors, such as meal spacing and exercise (although these are also important, of course). After the first week, we'll focus more closely on these further measures in weeks two and three to complement the core dietary changes and propel your success.

Part 3 is a more detailed narrative of the science supporting all of the strategies outlined in Part 2. It is possible to use just Parts 1 and 2 to transform your health and weight. However, your success over the long term will be greatly enhanced by understanding *why* these strategies are so important. Part 3 tells the fascinating scientific story around dietary carbohydrate, fat, and protein. We will demystify all of the confusion of the past fifty years and give you the real scoop on why combining these dietary components in a certain way will increase your longevity. There is also crucially important information in Part 3 explaining how you can verify that your plan is working properly. For example, we explain what various cholesterol metrics mean and the power of the CAC scan to verify that you have successfully tackled the risk of heart disease. Part 3 continues with a comprehensive summary of important vitamins and supplements, and it closes with an overview of your long-term health strategy, with tips for success and troubleshooting advice for some pitfalls that you may encounter.

We also put particular care into the appendixes. There's a great section on books, websites, and other resources that talk about health and nutrition, and another on navigating sweeteners on a healthy diet. And if you're as fascinated by the science behind nutrition as we are, you'll want to make sure to take a look at appendixes C, D, and E. These include some fascinating science on cholesterol and lipoproteins, glucose, and polyunsaturated fats—it's not necessary to know all this in order to have great success with the Eat Rich, Live Long plan, but it will be of great interest to many of you who want to dig even deeper.



1

**SICK AND TIRED OF
BEING UNHEALTHY**

“ Let me ask you something. If the rule you followed brought you to this—of what use was the rule? ”

—Cormac McCarthy,
No Country for Old Men

CHAPTER I

WE'RE GETTING HEAVIER AND HEAVIER

For two hundred thousand years, our body's appetite and weight-control systems functioned well. They even worked during the US boom years from the 1940s through the 1970s, when food was just as abundant as it is today. And just like today, almost everyone had an automobile—we weren't walking everywhere—and jogging and gym-going were relatively rare. Our systems still worked. Then, for some reason, they failed: we started getting heavier and heavier.

Most people are now overweight. Only a third of American adults have escaped the obesity epidemic.¹ Shockingly, children have succumbed to the epidemic in huge numbers as well. But the obesity is only part of what has befallen us. We also have an epidemic of chronic disease to tackle. Diabetes, heart disease, cancer, and Alzheimer's are ramping up in spite of enormous advances in medical technology that tackle them. So, after twenty millennia, how was our species transformed in two short generations? After two decades of investigation, what answers has modern science given us? We have all heard the "experts" wrangling over the "key drivers of obesity": Animal fat. Sugar. Processed food. Television. Whatever.

Eventually, most of the so-called experts found a happy consensus. Conveniently, they blame the victims. It has been all about "calories in versus calories out." People simply need to "move more and eat less." It has centered for decades on "reducing your dietary fat." As we shall see, this was actually the worst advice that we could have been given. All through the years, the media faithfully repeated this message until we became numb. The bloated bodies all around us are testament to its failure.

Finally, today the failed dogma of the past is being subjected to rigorous scientific research. In this book, we will share the truth with you.

FITTING THE EMPEROR'S SUIT

Let's be honest with ourselves. In spite of massive improvements in medical technology, the health of our population is declining.² Millions of non-overweight people are now harboring hidden fat in their organs, which leads directly to countless surprise heart attacks every day and contributes to Alzheimer's disease, diabetes, many cancers, and most of the diseases of modernity. Today's generation of young people is the first in human history that may live shorter lives than their parents.³ This is in spite of continued advances in medical technology. Heart disease rates are spiraling out of control.⁴ Diabetic dysfunction is everywhere.⁵ What's more, the vast majority of diabetic people go undiagnosed—whether they are slim or fat. And it can all be traced directly to the advice to consume a low-fat diet.

We'll look at the faulty research involved in the recommendations for a low-fat diet, going all the way back to the 1960s, in the next chapter. Here, let's take an overview of the role the government and other health authorities played in promoting a low-fat diet.

In the 1960s, during the era of heart disease investigation, it was theorized that fatty foods were to blame for heart disease because of fat's putative ability to raise cholesterol, which was associated with a higher risk of heart disease. No one really had a clue about how humans metabolized healthy natural fats back then, but they barged ahead as if they did. While researchers wrestled with the question, the low-fat diet gained some powerful proponents in the 1970s.

In 1977, a Senate committee led by George McGovern issued *Dietary Goals for the United States*, which would become the *Dietary Guidelines for Americans* that we know today. The report was driven and supported by the American Heart Association and many other respected parties. It promulgated low-fat guidelines primarily, despite questioning by some notable experts. For instance, Philip Handler, the president of the National Academy of Science, asked a pivotal question: "What right has the federal government to propose that the American people conduct a vast nutritional experiment, with themselves as subjects, on the face of so little evidence?" No answer came forth. The politicians and publicists of the day decided that there was no time to gather proof of the low-fat theory's correctness. So Handler was ignored by the Senate committee he addressed, and its report officially promoted a low-fat diet for all Americans. And then we embarked on a long, slow car crash. The whole world went down, since most other countries also adopted the American nutritional guidelines—even France, where *cuisine minceur* became popular, if only briefly.

In the early 1980s, hundreds of millions of dollars was spent on trials to prove the theory that fat is bad because it raises cholesterol. These trials failed spectacularly—dietary fat does not meaningfully raise cholesterol in the majority of humans.⁶ The authorities, however, chose to ignore these results.⁷ Low-fat had already been sold to the world, and the authorities were not inclined to admit that they were wrong. The emperor could not be exposed as naked.

Since the low-fat mistake was forged into policy, obesity rates have mushroomed, and type 2 diabetes is the signature disease resulting from the fatally flawed fat theory. The number of people with type 2 diabetes has gone from less than 1 percent of the US population in the 1960s to approximately 12 percent today. And for every person diagnosed with diabetes, there are several more people who are undiagnosed. The explosive growth of type 2 diabetes will collapse our health systems in the coming decades. Bad scientific methods, groupthink, and hubris have created a modern monster.

The researchers in the 1980s convinced themselves that something was wrong with these experiments showing that dietary fat doesn't meaningfully impact disease rates. This was not true, however—if dietary fat were related to chronic disease, these experiments would have shown it. But the misguided low-fat message had been parroted by every me-too nutrition “expert” for more than a decade, and it had been enthusiastically adopted by the heads of the processed food industry. The profit potential coming from low-fat fare was enormous, so our hormonal weight-control systems were about to take a serious beating. Unsurprisingly, the obesity and diabetes epidemics really began soon after the low-fat guidance was foisted on the population.

For decades, the American Heart Association (AHA) pushed the low-fat message. But today, the AHA is saying something quite different. In their massive 2015 report *Heart Disease and Stroke Statistics*, they buried a bombshell in the text.⁸ It says that five huge randomized controlled trials have demonstrated that *total fat consumption does not affect rates of coronary heart disease or stroke*. Wow. The AHA is now acknowledging that there is no evidence to support the low-fat advice. They are finally coming clean.

But there is another bombshell in their report. They state that each 5 percent of saturated fat in your diet that you replace with carbohydrate is associated with a 7 percent higher risk of coronary heart disease.

So you don't even need us to convince you. The AHA itself has switched sides! And it is not just the AHA who are putting their gears into reverse. Other primary authorities are also quietly acknowledging their big mistake. In May 2015, the new *Dietary Guidelines for Americans* was revealed—and dietary cholesterol and natural fats had been dropped from the no-no lists. The Academy of Nutrition and Dietetics also pushed the low-fat fad with gusto for many

decades, but now they too are waking up to the truth: “Saturated fat is to be *de-emphasized* from nutrients of concern, given the lack of evidence connecting it with cardiovascular disease.” Cholesterol was also dropped from their list of “nutrients of concern.”

After fifty years of delusional diet dogma, we are finally seeing the return of scientific sanity. It’s about time—and it’s not too late for us to improve our health.

DIANA'S STORY

Diana is a patient of Jeff’s who suffered badly from all the low-fat advice. She had a long history of being overweight and had attempted countless diets to improve her situation. Many of these were fads that would create a small temporary loss. All of them included some element of reducing fat intake. Of course, Diana, like most people, gained the weight back in no time. On one occasion she drove herself to successfully lose a lot of weight with a low-fat, reduced-calorie regimen. She realized she would have to eat low-fat and starve herself for the rest of her life. Deep down, she knew that was never going to happen. She lost her will to stick with the diet, regaining all of the weight she’d lost and then some.

At 210 pounds and suffering from back and joint pain, she was too tired to enjoy any healthy exercise. So she went to Jeff for advice. Jeff quickly diagnosed her with prediabetes—her blood sugar was significantly elevated. Diana had a family history of diabetes and knew something had to be done. Then and there she resolved to try something completely new—to follow Jeff’s advice and consume a high-fat diet. Jeff explained that this would address her prediabetes problem—and it would be highly appetizing and sustainable in the long term.

The results were dramatic and highly motivating. Diana lost more than 50 pounds in the following twelve months, with her appetite remaining under easy control. She is no longer driven by constant hunger, and she is no longer prediabetic. The joint pain that had plagued her has faded away. She was able to drop the melatonin she previously required for sleep, and she now gets eight hours of refreshing sleep nightly. Her constipation disappeared. Her periods became regular and her painful cramps went away. Other benefits she felt include mental acuity, improved energy levels, a settled stomach, and lack of breathlessness when exercising.

Jeff has countless patients who have transformed their health, weight, and productivity by dumping the low-fat obsession. Diana’s experience is typical of the benefits that accrue. Jeff’s primary health-care intervention is to switch people away from the official nutritional advice. He is having enormous success with this science-based strategy, saving hundreds of people from chronic health problems and early mortality.

CHAPTER 2

SEVEN WAYS TO TWIST THE TRUTH

The low-fat dietary confusion highlighted in the last chapter did not come about by chance. It was driven remorselessly by that most dangerous of things: an idea. The idea became a theory and then, over time, dogma. It is important to know how this occurred because we are being misled by this same theory to this very day. The theory was “proven” using some deceptive and unsound scientific methods. Truth became mangled as groupthink took over the world of nutrition. And it was all based on simplistic interpretations of how the food groups interacted with our bodies. So that’s where we’ll start, with some basic definitions of the elements in food and their characteristics.

All food is composed of three macronutrients: fat, carbohydrate, and protein. These are what provide us with energy, in the form of calories, and nutrients.

FATS

- ▶ Fats are energy-dense at 9 calories per gram.
- ▶ They are concentrated in many highly nutritious foods, including fatty meats, eggs, cheeses, nuts, avocado, olives, and coconut.
- ▶ Fats are also found in ingredients created through high-volume, industrial chemical processes; these are not at all good for you:
 - Vegetable oils, low-cost, supposedly healthy polyunsaturated fats that are extracted from seeds in a multistep industrial refining process
 - Hydrogenated fats, vegetable oils chemically altered to make them more solid at room temperature; often used in baked goods
- ▶ There are many essential fats that our body needs but cannot make—we have to consume them to be healthy. There are also many fat-soluble vitamins that our body requires fats to absorb. Fat is crucial for health!
- ▶ According to the Institute of Medicine, the minimum amount of dietary fat humans require is around 20 percent of dietary intake. That means that at least 20 percent of your calories each day *must* come from fat. If you approach zero, you will soon become ill.

PROTEIN

- ▶ Protein is low in energy density at 4 calories per gram.
- ▶ It is concentrated in many healthy whole foods, including meat and fish, eggs, cheese, nuts, and some vegetables and plant foods.
- ▶ Protein supplies the molecular building blocks our bodies use to make muscle and other tissues.
- ▶ The minimum human requirement for protein is around 15 percent of dietary intake, or 0.4 gram per pound of body weight. This equates to around 55 grams (2 ounces) per day for an adult weighing 150 pounds. If you approach zero protein intake, you will soon become very ill. Protein also affects our appetite: if we don't get enough, we tend to keep eating until we do.

CARBOHYDRATES

- ▶ Like protein, carbs are low in energy density at 4 calories per gram.
- ▶ All carbs are broken down into glucose, which the body either uses for fuel or stores—mostly as body fat.
- ▶ Carbs are abundant in many healthy whole foods, including vegetables, some nuts, fruits, and roots and tubers such as potatoes.
- ▶ Carbs are also abundant in wheat, which humans began using on a large scale approximately eight thousand years ago, making it a more recent addition to our diet than the foods listed above.
- ▶ More modern still are highly processed carbohydrates: refined sugar and refined wheat flour and all the foods they're found in—soft drinks, candy, chips, bread, pasta, baked goods of all types, breakfast cereal, and more.
- ▶ The three bullet points above on foods that contain carbs start with the more slowly digested carbs, which can have beneficial nutritional effects—they can assist the function of your gut. At the bottom of the list are sugary foods that can destroy the function of your gut. In terms of your health, this distinction matters a lot.
- ▶ The minimum human requirement for carbohydrate is effectively 0 percent of dietary intake. *That's right—zero—you don't have to eat any carbs at all.* Your body can easily synthesize all the glucose it requires. So—unlike with fats and protein—as your carbohydrate intake approaches zero, there is no known scientific reason for you to become ill. The exception is if the foods you're eating are all missing a key nutrient—vitamin C, for example, is classically associated with fruit. But you can get vitamin C from organ meats and low-carb vegetables, too. In short, unlike fat and protein, carbohydrate is not a necessary part of the human diet.

All that may be surprising. It certainly doesn't match what we've been told for decades about health and nutrition. So given that dietary fat is a key essential nutrient and carbohydrate is not, why did authorities decide that dietary natural fats could be the primary source of risk for heart disease and other diet-related health problems?

Unfortunately, they all fell for the low-fat theory that had been knocking around in the 1950s, although it was highly contested in the scientific community at the time. But what really planted the seeds for the low-fat era was a crucial event: the theory attracted a true champion, an extraordinarily influential champion, who was set to change the course of history. He took a complex issue and simplified it to the point that he created a lie.

THE ELEPHANT IN THE ROOM

There's an old parable about four blind men and an elephant. None of the men has encountered an elephant before, so each feels a different part of the elephant to try to determine what it is. One feels the trunk and thinks the elephant is like a snake; another feels its side and thinks it's a kind of wall; the third feels a leg and thinks it's a pillar; and the last feels the tail and thinks it's like a rope. Each man has a piece of information that's pretty convincing, and each feels that he has enough data to make a judgment. *But each blind man doesn't know what he doesn't know.* None of them have enough information to see the big picture, so each one gets what an elephant is like totally wrong.

In the 1960s, an influential blind man grasped onto a trunk and would not let go. He was absolutely, positively sure that he held a snake in his hands. He believed with fervor that his nutritional villain was causing the world's heart disease problems, and over time he convinced many people that his villain was the primary driver of heart disease.

This blind man's name was Ancel Keys. The villain he held onto was dietary fat, particularly saturated fat. He convinced the world that this dietary fat from natural sources was the thing we should all fear, thereby setting in motion the biggest mistake in the history of nutritional science. The world is only now beginning to recover from his mistake, and very slowly at that.

ANCEL KEYS AND HIS LOUSY RESEARCH

To verify that something actually causes a specified result and isn't just associated with it, there are three primary pillars of proof that must be demonstrated.

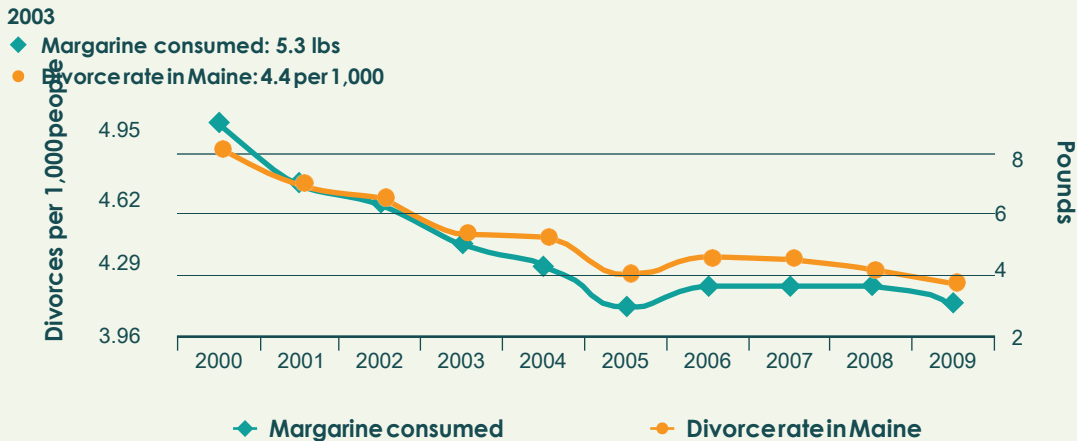
The first pillar is *associational evidence*. This is essentially some kind of indication that two things have an association. It is hardly even a pillar because it is so weak—it only suggests that there might be a relationship between two things; it doesn't prove that one thing causes the other. You've probably heard it said that "correlation does not imply causation," meaning that just because two things are linked doesn't mean one causes the other—for instance, the divorce rate in Maine correlates with the per capita consumption of margarine, but it would be absurd to suggest that one causes the other.¹ One should *never* say that X causes Y using associational evidence alone, and yet the vast majority of nutritional studies you see in the media are teetering on this one weak pillar of evidence.

The second pillar is *mechanism evidence*. Here you have to demonstrate that your cause makes *technical sense*—that it is physically probable that one thing should cause the other. But that alone doesn't prove it is significant, especially if there is bias to defend a prevailing theory. Mechanism evidence is regularly exaggerated to defend dogmas.

The third pillar is *experimental evidence*. When it comes to medicine, this refers to evidence obtained through a randomized controlled trial, the gold standard for determining cause and effect without bias. A randomized controlled trial changes a single factor and demonstrates a clear change in outcome, showing that that factor is a causal one. It is the only pillar that might

Figure 2.1. While the change in margarine consumption correlates with the divorce rate in Maine, obviously a change in one doesn't cause a change in the other. Source: Tyler Vigen, *Spurious Correlations*, www.tylervigen.com/spurious-correlations.

Divorce Rate in Maine Correlates with Per Capita Consumption of Margarine



technically stand on its own, but the danger with using the third pillar alone is that the experiment might be poorly designed, some interactional factors may be missed and therefore not controlled for, or the experimenter may inappropriately change several things at once.

The strongest case for a cause-and-effect relationship is made when you have all three pillars of evidence solidly in agreement.

Of the three pillars required, the associational pillar is the most dangerous to lean on—it is the very lowest quality of evidence possible. And now we get to the problem with Ancel Keys: the evidence he used to blame dietary fat for cardiovascular disease was made up almost exclusively of associational data.

PILLAR ONE: AN ASSOCIATIONAL DISASTER

Ancel believed in his heart that dietary fat (particularly saturated fat) was a key cause of coronary heart disease (CHD). He bolstered this belief by highlighting *associations* between dietary fat and CHD. (Even though at the time, in the 1950s, CHD was associated as or more closely with many other things, like sugar and latitude/sun exposure.²) No scientist should ever come to a conclusion based primarily on associational evidence, but Ancel Keys did—and the whole world followed him into the void.

Ancel's offending theory is known as the diet-heart hypothesis, and it basically states that dietary saturated fat increases levels of cholesterol in the blood, and high blood cholesterol in turn increases the risk of coronary heart disease.

We will deal with the cholesterol part of this theory in Part 3. But what about the claim about saturated fat, which fooled the world for fifty years?

Embarking on his association fest, Ancel put together his Six Countries Study. In this statistical confection he observed a relationship between the percentages of dietary fat in the diets of six handpicked countries (the United States, Japan, Italy, England/Wales, Canada, and Australia) and their death rates from CHD.

This of course is merely a correlation, showing that fat content in the diet appears to associate or correlate with deaths from CHD. It is a near-meaningless pillar of nothing. Also, he had selected which countries to use in the study—the exact opposite of what happens in a randomized study, in which the participants are chosen at random to prevent researcher bias from affecting the outcome.

And what if we stood back and looked at all of the data available at the time of the study? Figure 2.2 on the following page shows the complete data available when Ancel began to mislead the world.

The Selected Six Countries

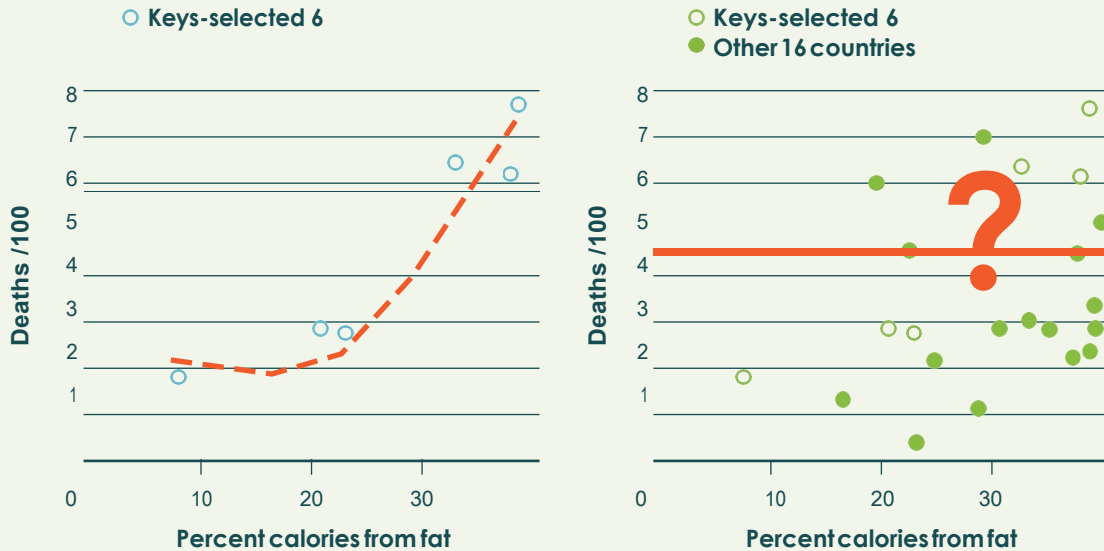


Figure 2.2. Source: J. Yerushalmy and H. E. Hilleboe, "Fat in the Diet and Mortality from Heart Disease: A Methodologic Note," *New York State Journal of Medicine* 57, no. 14 (1957): 2343–54.

Though an association between dietary fat and CHD in these particular countries would mean little, there wasn't a consistent association in the first place. But Ancel appeared to have bewitched himself with this contrived pillar of association. Justly, in spite of his personal passion, Ancel did not get very far in the scientific community with his Six Countries analysis—in fact, he was humiliated at a World Health Organization gathering of scientists, and an excellent paper was published in the *New York State Journal of Medicine* that eviscerated his correlational capers.³

Ancel was furious. So how did he proceed? He designed and executed the Seven Countries Study, which looked at the diets and disease rates of United States, Japan, Italy, Finland, Netherlands, Yugoslavia, and Greece. This study would artfully place dietary fat at the scene of the crime and seal its fate for decades.

Scientific studies and experiments can be constructed to tell whatever story you want to be told. If the initial results don't support your desired outcome, the data can always be statistically tortured to say what you want.

Ancel designed his experiment in such a way that he didn't need to torture things too much afterward, but he did strap the data into a chair and slap it around a bit. By personally choosing the regions for the Seven Countries Study, Ancel could largely predict the outcome of the study. It therefore

appeared to deliver a real answer the way a proper experiment might. But nothing could be further from the truth.

We won't summarize the Seven Countries Study here. The bottom line is that it was simply another associational study, propped up with cherry-picked countries. It included only 12,700 men—no women—and it sampled only a percentage of the dietary information for these men.⁴ So do we have a similar modern study that analyzes much larger numbers of both men *and* women? One that covers a much larger range of countries, to avoid the cherry-picking that creates misleading results? One that, although associational, is at least capable of *properly* analyzing the associations for our review? Luckily, we do.

In August 2017, the results of the Prospective Urban Rural Epidemiology (PURE) study were published.⁵ This seven-year study used modern methods and technology to examine the very same questions around dietary fat and disease that Keys looked at. But in marked contrast to the Seven Countries Study, the PURE study tracked 135,335 men and women across eighteen countries. So it was essentially a massively more dependable test of the fat theories. You might say it was a huge modern upgrade of a sloppy old study. So what did this PURE analysis conclude?

It came to the opposite conclusion of Ancel Keys's Seven Countries Study.

PURE found that neither coronary heart disease nor mortality in general were associated with intake of overall fat or saturated fat. In fact, higher saturated fat intake was associated with benefits such as lower stroke rates. However, carbohydrate did not fare so well: higher carbohydrate intake tracked with increasing mortality. Which was exactly what the American Heart Association quietly acknowledged in their 2015 report *Heart Disease and Stroke Statistics*, based on statistics relating to 344,696 men and women.

But sadly, fifty years of fat phobia have done untold damage to our perceptions of diet and disease. The Seven Countries Study has a lot to answer for.

For anyone who wishes to enjoy a detailed account of the shenanigans in Ancel's Seven Countries Study, we highly recommend *The Big Fat Surprise* by investigative journalist Nina Teicholz. Deservedly a *New York Times* bestseller, it is a gripping historical account of how the world was cleverly duped into fearing fat, and it was one of the first mainstream publications to make a comprehensive argument that saturated fats have been unfairly maligned.

As we will discuss later, many recent studies have revealed that higher saturated fat in the diet is associated with lower heart disease rates. Does this mean that saturated fat could actually reduce heart disease? Maybe, maybe not. We cannot tell from associational data. Associational data is best used to disprove a theory or correct another, weaker associational study. Just as the PURE study has nicely demonstrated.

PILLAR THREE: IGNORING THE EXPERIMENT REALITIES

We'll be addressing elements of the second pillar in Part 3 of the book. For now, suffice to say that the mechanism evidence for the low-fat theory was based on mistaken beliefs around the importance of cholesterol and the idea that dietary fat had an important influence on it. So let's go straight to the third pillar here: the experimental evidence. Remember that this is the most powerful evidence. It can provide proof on its own, without associational or mechanism evidence. Experimental evidence supporting the low-fat diet would have been crucial to have before directing the world's population to jack up their carbohydrate intake.

There actually were good experiments—proper randomized controlled trials—on dietary fat and heart disease in the 1960s and 1970s. These trials were all carried out on human subjects, so their results are particularly important. Sadly, they were ignored.

The problem was that these experiments showed that dietary fat was not significantly linked to heart disease. These gold-standard experiments *disproved* the diet-heart hypothesis! The leaders who were pushing the low-fat theory did not like these results, so the experiments were ignored. (British researcher Zoe Harcombe published a paper in the esteemed *British Medical Journal* whose title says it all: "Evidence from Randomized Controlled Trials Did Not Support the Introduction of Dietary Fat Guidelines in 1977 and 1983.")

One notable trial in 1973 even had its results withheld from publication.⁶ Eventually, the study was quietly published in a modest journal in 1989, a full sixteen years after its analysis was completed. The results were not published for so long because, as recounted by the principal investigator of the experiment, Ivan D. Frantz Jr., "We were just so disappointed in the way they turned out."⁷

More randomized controlled trials on the diet-heart hypothesis were run in the 1980s and 1990s. They had the desperate goal of showing even a tiny problem with dietary fat. Hundreds of millions of dollars were invested to get the required results. The trials all failed to change mortality outcomes, even though some were biased to "help" the hypothesis.

The most notable trial was carried out at enormous cost—several hundred million dollars—and ran for nearly ten years.⁸ It reduced total fat intake

significantly, to approximately 20 percent, and saturated fat down to a paltry 7 percent. This was a major achievement, as lower-fat diets like these are unpalatable for most people. So what resulted from this huge intervention? There was no improvement in heart disease rates, or any health outcome for that matter—it was a total failure. (It did manage to significantly reduce LDL cholesterol levels, but as we'll discuss in Chapter 11, LDL levels are a poor predictor of heart disease.)

There was also an interesting fact in the final report that speaks to the lack of any benefits seen from this reduction of fat: “Levels of high-density lipoprotein cholesterol, triglycerides, glucose, and insulin did not significantly differ in the intervention vs comparison groups.” These are very important biometrics that should have been the focus all along. Instead, total cholesterol and LDL were the focus, even though they are weak and often misleading, as we'll see in Chapter 11. In focusing on improving these metrics over the important ones, the researchers made a serious error. This scientific error was one big reason why their experiments were doomed to fail.

Many other large trials had similarly useless results. Eventually researchers simply gave up trying to prove that a low-fat diet had any value—but they certainly did not give up *saying* it had value.

Dietary fat was never within a mile of being convicted as a cause of heart disease. None of this was acknowledged, and nothing was learned. Authorities went on promoting the low-fat lunacy in spite of having no worthy evidence. But let's now meet the substance that was used to replace natural dietary fat. A substance that is only now being fully banned as toxic for human consumption.⁹

FRANKENFATS: A TOXIC SOLUTION TO A NONEXISTENT PROBLEM

Natural saturated fat—the kind found in animal foods, nuts, olives, and other healthy whole foods—has been consumed by humans for millennia. It's an excellent ingredient in a huge range of tasty foodstuffs. But once natural fats started to be vilified by low-fat proponents, what substance was chosen by the industrial food complex to replace them?

In the face of fat phobia and with the ancestral saturated fats out of favor, industry had to find a solution they could sell. They would gladly have used cheap refined polyunsaturated oils—soybean and corn oils, among others—but polyunsaturated oils are unstable, which means they don't have a long shelf life, and they don't give foods the firm texture that their saturated cousins do. Luckily for industry, there was an available solution that perfectly fit the bill.

In the early 1900s, the food industry figured out how to convert cottonseed oil into a stable semisolid product through a process known as hydrogenation. This was achieved in huge industrial chemical plants. The high temperatures, pressures, and solvents used made this “vegetable shortening” rather toxic for humans, but nobody realized this at the time. The tortured molecules delivered the required properties of solidity and shelf life. And it was filthy cheap to produce. That was all that mattered.

And so, since 1911, we have been eating these industrially synthesized saturated fats known as partially hydrogenated oils. It turns out that hydrogenation creates molecules called trans fats that we now know are directly linked to coronary heart disease. So, ironically, these products contributed to the explosion of heart disease for which Ancel Keys and his acolytes blamed natural saturated fats. And yet, in the 1980s, their production was ramped up to replace natural saturated fats. Our food supply became flooded with these “frankenfats.”

Attempting to beat evolution at its own game has had consequences. The effects of these mass-produced substances on heart disease and overall health is hard to quantify. Before they were largely banned, however, we all ate plenty of them for decades in “heart-healthy” margarines and spreads, low-fat foods, and all the copious sugar-laden junk foods of the era.

Trans fats have finally been deemed unfit for human consumption. The restrictions took place in a series of actions from the early 2000s on around the world, starting with Denmark.¹⁰ As trans fats were removed from the food supply, however, natural fats were not given a pardon to replace them. So now industry is attempting to replace partially hydrogenated oils with some mixture of the following:

- ▶ modified hydrogenated seed oils
- ▶ genetically modified seed oils
- ▶ interesterified seed oils

The new frankenfats, in other words. All of the above are made through new industrial chemical processes. We'll see how harmful these are to humans, but we must be patient. Going from past experience, it may take decades before we discover exactly how much harm they cause us.

But even without the hydrogenation that makes them solid and shelf-stable, there are huge questions remaining around the health of vegetable oils. Should we be consuming them in any form, rather than simply eating real food? No, as we will see in Chapter 4 (and in even more disturbing detail in Appendix E).

THE FINAL INSULT: SWEET POISON DESCENDS

The other main replacement for natural fats truly planted the seeds for disaster.

In 1977, *Dietary Goals for the United States* officially told us to jack up the percentage of carbohydrate in our diet to 55–60 percent of our caloric intake. This gave the food industry the opportunity to provide a major new source of processed carbohydrate. What form did this mass of new carbohydrate take?

The food industry released an enormous mushroom cloud of refined wheat flour and sugar, including the especially odious high-fructose corn syrup. It entered most processed food products with frightening speed. With the delicious flavor and mouthfeel of natural fat banished, pretty much everything got a shot of refined grains or sugar to sweeten it or improve the texture. And without fat's natural satiating effects, refined carbohydrates created a new era of hunger—and a major business benefit to the food corporations. It wasn't just waistlines that started growing. The hunger that these products created drove food revenues also.

Another industry was also set for enormous revenue growth. The pharmaceutical industry massively exploited an explosion of chronic disease driven by the new food supply. Two of the biggest industries in the world made out like bandits from the low-fat diet fad. For we had unwittingly replaced an imaginary poison—natural fats—with very real ones—trans fats, refined grains, and sugar. However lacking in any robust science, the low-fat age began in earnest. Nothing would ever be the same again.

THE WILD-GOOSE CHASE

And that's how we embarked on a fifty-year wild-goose chase, before finally realizing that it was never really natural fats that caused our problems in the first place. Now we can start addressing the real issues. But our task ahead has been made extremely difficult because we are now burdened by the host of fake foods and carby trash littering the landscape.

Between food-industry marketing and the steady drumbeat of media messages explaining that red meat and eggs are deadly, Americans have gotten the message, all right. Apparently around 36 percent of Americans believe that UFOs are real, but only 25 percent believe that there's no link between natural fats and heart disease. We are more willing to believe that we've been visited by creatures from outer space than we are to believe that these foods full of natural, healthy fats are not harmful. These are foods that humans have been eating ever since we became human—foods that arguably are responsible for our *becoming* human.

DENNIS'S STORY

Jeff's patient Dennis has always struggled with being overweight. When he was a kid, his aunt would bring a grocery bag full of Entenmann's pastries to the house every Wednesday afternoon. They would never last until the following Wednesday whenever Dennis was around.

Although he was an active and athletic kid, Dennis was always borderline obese. He joined the Marine Corps when he was eighteen years old, 5'8" and 185 pounds. Boot camp quickly took 50 pounds off his frame, and after thirteen weeks of running, hiking, and other "fun" activities, he graduated at a trim 135 pounds. The problem really came when diet and exercise became his responsibility.

After his four-year tour ended, he went right back to nearly 200 pounds. He managed to control his weight at around 200 pounds until he married and had a son. With the stress of running his own business and taking care of his new family, combined with typical lunches of pizza or subs and potato chips, he ballooned. Within a couple of years he was weighing in at 260 pounds, and his blood pressure, triglycerides, and cholesterol numbers were astronomical. He was only thirty years old, but he looked and felt much older. He became depressed and desperate. A friend's wife was a nurse and recommended an experimental drug known as fen-phen. The drug enabled him to get back to 200 pounds, but its side effects and risks were starting to become known, and soon it was banned. Without the drug, the hunger crept back. Dennis gained back 40 pounds within a

year. Although he now followed a "food pyramid" diet, he remained fat and hungry. He resigned himself to his fate, thinking that this was just how he was made.

Then he heard about Jeff and decided to give it one more go. He was taken aback by Jeff's unorthodox approach to weight loss. Jeff told him that breads, cereals, pasta, and sugar had to go. To Dennis, it sounded bizarre and hard to imagine. But then Jeff also told him to start eating bacon, real butter, eggs, and many other "forbidden" foods. As soon as he committed to this change, he started dropping weight without any effort. Within six months he was down to 173 pounds—67 pounds gone. What's more, he was now off blood pressure meds for the first time in twenty years.

Dennis still struggles with his old desires for New York-style pizza and Krispy Kreme—and pies, cakes, and candy during the holidays. He has even gone through some cheat periods when he gained back around 10 pounds. But the crucial thing is that he now knows how to get back on track with high-fat real food. He also finds that the low-carb books and websites that have become popular over the last few years make the low-carb lifestyle much easier and more enjoyable. Having dumped the high-carb food pyramid, he can ski all day with his boys—and they wear out before he does. He is also grateful to his wife for creating new and wonderful low-carb recipes that keep him from drifting. He keeps safely away from the high-carb fare that was ruining both his health and his enjoyment of life.

CHAPTER 3

RESPECT YOUR INSULIN: WHY MOST WEIGHT-LOSS PLANS FAIL

“Those with cardiovascular disease not identified with diabetes are simply undiagnosed.”

—Dr. Joseph R. Kraft

Let's look at why most weight-loss plans fail. Importantly, we will also keep an eye on their long-term health implications. A diet for longevity and vitality is not all about weight loss. There are countless “normal weight” individuals who desperately need a corrected diet to avoid premature death. Perhaps not surprisingly, the ideal dietary regime for weight loss is the same one that will optimize health and longevity.

Any weight-loss diet must have two crucial elements. First, it must improve your body's existing appetite and weight control system. That is essentially why most orthodox dietary regimens fail: they ask you to restrict calories by eating less, tell you to burn away the calories you do eat by moving more, and often deprive you of fatty, protein-rich, and nutrient-dense foods—which would help return your appetite to a healthy level.

The other fundamental key to a successful diet is the ability to use fat as your body's preferred fuel. If a dietary regimen does not improve your ability to burn body fat efficiently, it will fail. The key is to switch from being a carbohydrate-burner to being a fat-burner. You will not achieve this transformation with a high-carbohydrate, low-fat diet—not even if the carbohydrates are so-called complex ones. As we'll explain later in this chapter, it simply doesn't work that way.

Let's start by looking at the two most common ways people are told to lose weight—follow a low-fat diet and “eat less, move more”—and why they don't work.

FOOL ME ONCE, SHAME ON YOU

Let's start with the first nutritional myth that's caused so many problems: that a low-fat diet is healthy and good for weight loss. When a low-fat diet was first proposed in the 1950s, it was under the misguided belief that it would reduce heart attacks. Since the 1970s, following a low-fat diet has also been the primary advice for weight loss and good health. Yet, as we talked about in the previous chapter, this advice is not based on sound evidence, and it's had very serious consequences. Low-fat ideology has contributed significantly to our current epidemics of obesity, diabetes, heart disease, and more. In a twist of irony, the low-fat diet was proposed as a solution to the obesity epidemic it helped create in the first place.

Here's how the story that a low-fat diet would help us lose weight was sold:

- ▶ Fat has 9 calories per gram, whereas carbohydrate has 4 calories per gram. Therefore, eating less fat and more carbohydrate will lower your caloric intake.
- ▶ Fat causes heart disease, and heart disease is linked to obesity, so fat probably causes obesity, too.
- ▶ Also, it's *called* "fat"—get it? So it stands to reason that it probably makes you fat.

We could go on, but the logic wouldn't get any better. So what was ignored in this overly simplistic thinking? The science of human metabolism, for starters. Body weight is controlled by an exquisite hormonal signaling system that includes everything from the food sensors in your gut to signals in your brain and other organs. The number of calories in fat is not relevant unless you are eating too much carbohydrate with it (for reasons we'll cover later)—a healthy human body will smoothly compensate for an increase in the number of calories consumed by increasing satiety signals. In other words, because fat has more calories per gram than carbohydrate, it also makes you feel full faster, so you end up eating less of it. The fact that it has more calories is the least relevant point.

There are many benefits to eating a higher-fat, lower-carbohydrate diet. It has overwhelmingly been shown to be better for weight loss than a lower-fat diet. This is not based on theory; it is based on direct experimental evidence from over fifty trials.¹ The reasons are many, but one important reason involves the master signaling hormone, insulin: unlike carbohydrate, dietary fat does not trigger a significant release of insulin, and controlling your insulin is the single best way to control your body weight—as we'll discuss later in this chapter. It is also the best way to achieve great health and longevity.

Even a slender person carries the vast majority of his or her energy stores in the form of body fat. It can keep you alive for many weeks or even months with no food. It is the master fuel our species evolved on. In contrast, our body's carbohydrate stores run out after a day or so.

We evolved to burn fat as a favored fuel. Carbohydrate is a flash fuel that must be constantly topped up. When almost no carbohydrate is available, however, we can get along just fine—we can smoothly burn dietary or body fat. For most of human existence, this was the evolutionary norm. The idea that natural fat sources could be toxic to humans was a false and contrived notion with no basis in evolutionary or physiological science. Avoiding fat in favor of carbohydrate will undermine your weight-loss efforts.

Fat is nutrient-dense in natural food sources. *But man-made fats and vegetable oils are not nutrient-dense.* Fat promotes satiety and minimizes inflammatory factors—if eaten in natural, whole foods that humans evolved eating.

FOOL ME TWICE, SHAME ON ME

The second primary concept for weight loss in the past couple of decades has been the “move more and eat less” dogma. It sounds plausible and feels sensible, just like the “lower your fat intake” paradigm. And yet it also ignores the realities of human metabolism.

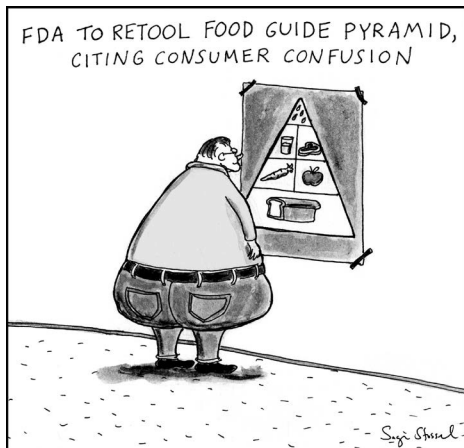
Let's examine the proposition piece by piece.

Move more. Exercise has many health benefits, but weight control is not one of them.² Yes, if you move more you will burn more calories—great. But you will also increase your appetite. There is no escaping this fact. Even after long months of painfully rigorous training, many people who take up running to lose weight are still fat—because they are now ravenous. Back in the sixties, runners were not fat. Even most of the paper-pushers who spent their time behind a desk were not fat. The “move more” mantra only helps reduce weight in the long term *if you also chronically starve yourself.* Which, of course, is unsustainable.

Eat less. Mild starvation and self-denial has its benefits, but *sustainable* slimness is not one of them. Yes, if you eat little enough, you will lose weight—try eating nothing for a week to prove this obvious fact. But you will also unleash hunger, which in itself is a core driver of our obesity epidemic. Back in the sixties, hunger was not such a terrible threat. The kinds of foods we were eating did not drive hunger to problematic levels—they did not cut the wires on our hunger control system. The kinds of foods we're eating now do.

The “eat less, move more” theory assumes that humans are like simple steam engines rather than complex, hormone-controlled machines. In simple steam engines, the “energy in” matches the “work out”—it is a relatively straightforward calculation. In contrast, human machines are vastly more complicated, with myriad control-feedback loops that change everything. “Eat less, move more” ignores these most important body mechanisms—the crucial feedback loops of hormones that control appetite and weight loss and gain—and the pivotal effects of the *type* of food we eat. That is why the vast majority of calorie-counting diets fail over the long term.³ They implement the unsustainable and entirely bypass the most important factors in the problem.

By Sage Stossel for
TheAtlantic.com.



The same type of flawed and simplistic thinking led to the recommendations that placed “complex carbohydrates” like breads and pasta at the base of the food pyramid. Ignoring the hormonal systems has led to serious unintended consequences, from obesity to diabetes and more.

BEATING THE SPRING

So what is it about the body’s feedback loops that’s so important to weight loss and good health? It all comes down to hormones. Hormones are powerful signaling molecules that control many functions in the body. Many, many hormonal control loops govern appetite and body weight.

Over the long run, the powerful effects of these hormones will beat willpower every time.

Imagine that you are stretching out a strong spring that’s attached to a wall. You can hold it for quite a while, perhaps, but eventually your arm grows tired and the spring wins. Understanding this fact, you lock the spring with a hook or fastener, so it will stay put without your constant focus and effort.

In this analogy, the spring is your hormonal weight-control apparatus, which is ancient and remorseless. Your arm is your willpower. It may be robust when you start, but eventually it weakens. Maybe a difficult time in your life will undermine your willpower. Maybe time alone will weaken it. Regardless, slippage is almost inevitable. Willpower eventually fails. We will teach you how to beat the spring by restraining it with clever “hooks” that you can create in your body.

First, it is crucial to understand that *food is information*. What you put in your mouth sets off an explosive cascade of hormonal signaling throughout your body. The most trivial aspect of food is its calories. It is the *type* of food

that is crucial to long-term weight-management success—as is the mixture of foods that make up your meals. What you eat determines how your body produces hormones that affect weight and health.

Many hormones work together and respond dramatically to the types of food you eat. Here's a short list of some major ones:

- ▶ Insulin (master regulator of glucose and fat-burning)
- ▶ Glucagon (controller of glucose release into your system, the yin to insulin's yang)
- ▶ Leptin (released by your fat cells to regulate appetite and more)
- ▶ Ghrelin (the hunger hormone, released by your empty stomach)
- ▶ GIP (stimulated by carbohydrate, released by your gut to trigger insulin and prime fat cells for energy take-up)
- ▶ GLP-1 (released in your gut to enhance the function of the pancreas, which makes insulin)
- ▶ PYY (released in your gut to control appetite and enhance pancreatic function)

AN INTRODUCTION TO INSULIN

Of all the hormones involved in weight control, insulin is the one to watch the most closely. Engineers live by the Pareto Principle, which says that 80 percent of a given problem is generally caused by 20 percent of the factors driving it. We need to focus on the *big* factors to be successful. Insulin signaling is one of those factors that can cause 80 percent of weight-control problems.

Insulin:

- ▶ rises rapidly based largely on signals emitted from your gut when you eat
- ▶ runs high in most people who are obese or have type 2 diabetes
- ▶ runs low in slim and healthy people (it may be high in slim people who are unhealthy)
- ▶ can be manipulated masterfully by the food choices you make
- ▶ is provoked most strongly by high carbohydrate intake—particularly refined carbohydrates
- ▶ is provoked to a lesser extent by protein intake
- ▶ is minimally provoked by fat intake
- ▶ can be badly disrupted by many nondietary factors, including poor sleep, stress, gut microbiome issues, smoking, and limited exposure to sunlight

Insulin is the master manager of glucose in the body: it moves glucose from the bloodstream into cells, which use glucose for energy. It also directly controls glucagon, which has an enormous effect on glucose production and release. Carbohydrate is essentially just glucose—a sugar molecule, or a bunch of them joined together. When you eat carbohydrate, your blood glucose levels rise, and insulin levels rise correspondingly. Insulin also tells the body not to burn fat—since more insulin means more glucose is available to use immediately as fuel. Insulin therefore dictates your ability to use fat as a fuel.

The most important goal you can have for weight loss or longevity is to *keep your insulin levels low*. This can be easy to do—when you eat the correct type of low-carb diet. Keeping insulin at low levels will enable this crucial hormone to perform its signaling functions optimally. Any dietary advice that doesn't account for insulin's effects will be deeply flawed.

Insulin in various molecular forms has existed for nearly a billion years. It has been doing its pivotal job in our bodies since the dawn of humanity. It manages the body's response to food, promotes fat storage, and prevents fat from being burned for energy when carbohydrate has been consumed. It is the last thing you want to provoke inappropriately.

For weight loss and longevity, you must respect your insulin!

WHAT YOU EAT MATTERS

All proper biochemistry textbooks acknowledge these fundamental properties of insulin. In spite of this fact, many of these textbooks still recommend a high-carbohydrate, low-fat diet for health and weight loss. This absurd contradiction is made possible by the fat-phobic lunacy that took over in the late 1970s and 1980s, as discussed in Chapter 1.

The supreme irony is that excessive glucose and excessive insulin can actually cause problems with the dietary fat you ingest. Many of the associations between fat and disease were created through this mechanism.

Remember that insulin prevents fat-burning. When insulin is driven higher by ingested carbohydrate, you cannot optimally burn any fat that you eat along with it. Insulin shuts down your fat-burning machinery. And with that machinery shut down, your body can't easily turn to stored fat for fuel when it's used up available glucose, resulting in more feelings of hunger. The spring will continue to exert its tireless pull.

What is the *worst* thing you can eat to provoke problematic amounts of insulin? A mixture of refined carbohydrate—for example, bread—and fatty

foods: for example, a grass-fed meaty hamburger. Actually, it's never okay to eat bread. The hamburger could be okay if eaten on its own. In fact, bread can *cause* the hamburger to become problematic. There is a synergy between macronutrients. The mixture matters.

The higher-carb, lower-fat regimen has another major problem. Carbohydrate-rich foods raise blood sugar levels. Insulin must be promptly raised to manage this blood sugar. Particularly in people who need to lose weight, the insulin response can overshoot the mark. This will drive blood sugar levels down in the hour or two following a meal. The natural response to this blood sugar drop is the triggering of hunger signals. Carbohydrate-rich foods are also poorly satiating to begin with—they don't fill you up and keep you feeling full. The overall effect is that you feel hungry again soon after a meal. The spring is difficult to ignore—it will whisper in your ear, “You really need and deserve a snack.”

RESISTANCE IS FUTILE

It is tragic that the people who really need to lose weight are generally the very people who have the greatest insulin-related problems, making it harder for them to lose weight. Overweight and unhealthy people normally have higher insulin levels, a condition known as hyperinsulinemia. Unfortunately, they also respond less well to insulin's orders, even though they have higher insulin levels—just as with any powerful drug, you can become resistant to the effects of insulin over time. This phenomenon is called insulin resistance. In fact, the majority of adult Americans now have an insulin resistance problem.⁴ And a shocking proportion of our children have it, too.⁵ A high level of insulin in the bloodstream with associated insulin resistance is the signature dysfunction of our modern age.

Anyone who needs to lose weight is highly likely to have some degree of insulin resistance. In contrast, slim, healthy people normally have low levels of insulin—they are insulin sensitive.

Most weight problems are underpinned by excessive insulin secretion. Moreover, type 2 diabetes is a manifestation of long-term insulin resistance. In type 2 diabetes, insulin resistance has progressed to the point that the body has lost control of blood glucose levels. Most heart disease is driven by diabetic vascular inflammation: high insulin and glucose levels damage the walls of your arteries, which leads to the buildup of materials in the artery walls. This process is called atherosclerosis, and it is the primary driver of heart attacks. Therefore, most heart disease is the result of being in a state of hyperinsulinemia and insu-

lin resistance. Interestingly, even recent mathematical models based on very large data sets illustrate this point.⁶ Many cancers are also tightly linked to hyperinsulinemia and its linked effects.⁷ Shockingly, most primary care doctors don't measure insulin levels during a regular checkup.

Many population studies clearly show that insulin levels have been rising for decades, as of course you would expect given the diabetes epidemic.⁸ In line with this rise, the decline in atherosclerosis rates since 1977, which was driven mainly by a reduction in smoking habits, stalled in 1994. Atherosclerosis rates then began to tilt upward again, in spite of continued smoking reduction.⁹ One recent report predicts that the menace of diabetes-induced heart disease will sink our collective health.¹⁰

The first step in any health and weight-loss strategy should be to lower insulin levels. Whatever achieves this goal will tend to resolve insulin resistance and improve weight loss. This may not be a magic fix for everybody with weight issues, but it is the clear first step. Ignoring this step is one of the primary reasons why most diets fail.

BECOMING SENSITIVE

There will be more on the science of insulin and its important effects in later chapters. In the meantime, let's look at the bottom line.

Nearly everyone can achieve healthy low insulin levels and become insulin sensitive. A low-carbohydrate diet is the place to start, but some people may need to take more substantial measures (as we'll discuss in Chapter 6).

THE PLAN FOR LOWERING INSULIN

How do you go about lowering your insulin? The core strategy, based on science, is to lower the carbohydrate levels in your diet. The secondary consideration is to moderate your protein intake to appropriate levels, based on your muscle mass and exercise level, since excessive protein can also raise insulin levels. Finally, the bulk of your energy needs should be supplied by healthy, nutrient-dense fats. There are also many nondietary factors involved, such as getting enough sleep, exercising, and managing stress. All this forms the core of the Eat Rich, Live Long program, and we'll talk about it in more detail in Chapter 6.

People with insulin resistance can't burn fat effectively. Who are the people with the biggest insulin issues? See if you can pick out the group which you are in:

- ▶ **Slim, insulin sensitive:** Low blood insulin, super fat-burner, high life expectancy
- ▶ **Overweight, insulin sensitive:** Low blood insulin, moderate fat-burner, good life expectancy
- ▶ **Slim, insulin resistant:** High blood insulin, poor fat-burner, poor life expectancy
- ▶ **Overweight, insulin resistant:** High blood insulin, very poor fat-burner, very poor life expectancy
- ▶ **Type 2 diabetes (regardless of weight):** High blood insulin, dreadful fat-burner, dreadful life expectancy

Did you find your group? It's tricky if you have never measured your insulin. Did you notice that body weight is a weak indicator for judging your health outlook? What really matters is your insulin and blood glucose status. That's why many health authorities have been confused by the results of studies looking at body mass index and life expectancy. The trends and outcomes from these studies are all over the place, *because they're measuring the wrong thing*. Body mass index isn't the crucial factor; insulin is.

Before you embark on our plan to lower your insulin, it is important to know where you are starting from. This is not difficult to find out. The simplest way is to calculate what's called your HOMA value, which indicates your level of insulin resistance, using one of the many online calculators. (There's a good one at www.thebloodcode.com/homa-ir-calculator.) All you need for this is the measure of your fasting glucose and fasting insulin. These tests can be requested in any doctor's office. With those numbers in hand, you can plug your fasting glucose and insulin values into the calculator and get the result. If it is below 1.0, you have low insulin resistance. Between 1.0 and 1.5 is marginal and may require some corrective action. Approaching 2.0 and certainly above 2.0 indicates significant levels of insulin resistance. These must be tackled using our plan.

People with type 2 diabetes have major problems burning fat as a fuel—they have high blood glucose and high blood fat levels simultaneously. Over half of the US adult population is now classified as prediabetic or diabetic. Anyone caught in these categories has serious problems burning fat. That means the majority of American adults have a fat-burning problem, which is an absolute disaster for the health of our citizens.

If these folks have problems burning fat, does this mean they should eat less fat? No—that is not how it works. Insulin resistance (and the trouble with fat-burning it brings) starts with eating too much carbohydrate relative to dietary fat. Remember the worst mix a human can eat: lots of carb with plenty of fat.

For weight loss and longevity—by way of lower insulin status and insulin sensitivity—it is important to burn fat as your primary fuel, and that means significantly reducing the amount of carb you eat. Eating this way will also enable huge improvements in appetite control, since fat is so satiating. You

MARY'S STORY

At sixty-eight years old, Mary believed she was healthy and hardly needed a checkup. Sure, she had been overweight for twenty-five years, which was frustrating. But compared to her three siblings, who were all suffering from full-blown type 2 diabetes, she seemed healthy. She had always been careful with her diet and had exercised regularly for the past forty years. But “careful” had meant following the standard advice to eat a low-fat diet filled with whole grains and vegetables. And because no diet she'd tried had worked, she no longer believed in them and had thrown away her scale years ago.

Jeff's exam showed a serious level of prediabetes, so he prescribed a tailored low-carb diet of 70 percent of calories from fat, 20 percent from protein, and 10 percent from carb. It sounded strange to Mary, but she was willing to try it in order to avoid medications. She asked Jeff, “How do I eat that much fat when I've been trying to eliminate fat for forty years?” His advice: eat an avocado every day; eat more nuts, espe-

cially macadamias; and consume healthy fats, including coconut oil, olive oil, and butter. Later, she learned about adding more delicious fats and the wonderful health benefits of eliminating grains.

Within a few weeks, all Mary's friends were commenting on her transformation. Her clothes were becoming loose and her skin was glowing. After nine months of the new healthy-fat lifestyle, she had lost 40 pounds, her blood pressure was back to normal, and she had great cholesterol numbers. What's more, she no longer had arthritis pain, frequent urination, or low energy.

On a recent visit with Jeff, she asked, “How long should I be on this diet?” Jeff answered, “For the rest of your life.” Mary was delighted. She is really enjoying her new lifestyle, which has freed her from obesity and serious health concerns and has given her renewed energy and vigor.

may even find that the increase in fat calories doesn't need to fully match the calories from carb lost from your diet. Pleasingly, your body fat can now become part of your fat-based fuel supply. This will particularly be the case after you have become "fat-adapted": after your body optimizes its fat-burning machinery and switches to preferring fat to glucose. This fat adaptation occurs in the first weeks of our plan and will be described in Part 2. When your body starts to rely primarily on fat for fuel instead of glucose, you'll be able to tap into your body fat stores in addition to dietary fat.

SAFE STORAGE IS EVERYTHING

Every time we eat, energy is stored in multiple different compartments in our bodies. That energy is then released steadily to fuel our activity when we are not eating. Think of your personal energy storage as a rechargeable battery in an electric car. When you eat, your batteries get charged up. Between meals, the batteries provide a steady release of energy to keep you alive. Let's briefly look at how carbohydrate and fat play into this process:

1. The glucose from food you eat is used for your body's immediate needs, and whatever remains is first stored in the *glycogen* battery. This glycogen reserve can hold around 2,000 calories' worth of glucose. These are short-term batteries—in the absence of food, they run out within a day or so. When glycogen is full, you will not be in a good state for the healthy burning of fat. *The healthiest state is one in which glycogen remains incompletely full.*
2. When the glycogen battery becomes full, excess glucose is converted into special fats that are released from the liver into the bloodstream. This process can drive up your "bad cholesterol" (LDL) and promote many other problems in the body. It is a very different phenomenon from the healthy processing of dietary fat. *The healthiest state is one in which glucose is not converted into these fats.*
3. The final storage depot is your body fat, or *adipose tissue*. The storage capacity here is huge, but most overweight people don't tap into it. *The healthiest state is one in which this battery is used almost exclusively.* To achieve this, you must stop drawing on glycogen (#1) and creating the special fats in your liver (#2).

Healthy dietary fats are the safest fuel in a well-formulated low-carb diet. They directly enable you to minimize your intake of glucose, and so achieve the optimization of 1 to 3 above.

In doing so, you can help keep your adipose tissue in good health and insulin sensitive.¹¹ When the cells of your adipose storage remain insulin-sensitive,

they protect the rest of your body from metabolic dysregulation. In contrast, following a poor diet will allow your adipose tissue to become insulin resistant. When this happens, it is often the first step in the process that leads to your whole body becoming insulin resistant. In this way, much of modern chronic disease originates with unhealthy fat cells. (If you're interested in learning more about the importance of healthy fat cells, it's explored in more detail in Appendix D.)

For the majority of people, the worst diet to drive problems in adipose tissue is a high-carbohydrate diet—especially when it includes substantial dietary fat, and particularly if refined sugar and/or processed vegetable oils are added to the mix.

The best diet to achieve desirable insulin sensitivity is essentially the opposite of the silliness we've been sold. The best diet is low in carb and has good quantities of satiety-inducing healthy fats and protein. With the ratios right, your insulin is optimized. Much of the rest will follow. Obesity and chronic disease can be prevented and even largely reversed.

ARE YOU A SUGAR-BURNER OR A FAT-BURNER?

Your body's cells do not burn both glucose and fat at the same time. In fact, the core fat-burning mechanisms are intentionally shut down when glucose enters your system. Mammals always prioritize burning glucose when it is present—which makes sense, because glucose is toxic to cells when it is at elevated levels. Note that we only carry about 1.5 teaspoons of glucose in our entire blood supply. If it rises much beyond that, it will damage the body's organ systems. Fat, on the other hand, is easy for the body to store and reuse. But fat is not easy to tap into if carb is the main part of your meals.

The standard American diet relies primarily on carb—in fact, the government has told us for decades to make “healthy whole grains” the bulk of our calories. And most Americans are sugar-burners. What are the major implications of this higher-carb dietary strategy?

1. You experience blood sugar and insulin spikes.
 - ▶ This downregulates the fat-burning machinery.
 - ▶ For many, this can promote a speedier onset of post-meal hunger pangs.
 - ▶ Over time, insulin spikes can lead to insulin resistance.
 - ▶ With increasing insulin levels, the negative aspects of the diet become magnified.

2. You miss out on the benefits of nutrient-dense foods high in healthy fat and protein.
 - ▶ For many, hunger pangs start sooner after meals that lack fat and protein.
 - ▶ This promotes larger, hunger-driven meals and snacking behavior.
 - ▶ A relative deficiency in fat-soluble nutrients can promote appetite to compensate for their lack.

Let's contrast the above with a diet that focuses on healthy fats and keeps carb intake low. The implications of this diet are as follows:

1. You will minimize blood sugar and insulin spikes.
 - ▶ This upregulates your fat-burning machinery and reduces your dependency on sugar.
 - ▶ It enhances smooth burning of body fat between meals, suppressing appetite and enabling you to skip meals without undue hunger.
 - ▶ Over time, your insulin resistance levels will fall steadily, and with them your risk of chronic disease.
2. You will gain access to a whole range of nutrient-dense foods, which will enhance your health and vitality.

The above is only a brief summary of the advantages that come with a high-healthy-fat diet. We will be exploring them in more detail throughout the rest of the book.

In short, a higher-carb diet promotes a sugar-burning physiology, which directly impedes your fat-burning ability. This is the very last thing that you want, for either weight loss *or* longevity. But the worst thing about being a sugar-burner over the long term is that it drives up your risk of acquiring the most prevalent disease in our world today, which in turn underpins the risk for most diseases of modernity—heart disease, diabetes, Alzheimer's, and many cancers. We call this disease state metabolic insulin resistance syndrome (MIRS)—and the last thing you want to be on is the MIRS diet.

“ The more insulin resistant one was, the greater the negative impact of a high-carbohydrate diet. ”

—Dr. Gerald M. Reaven