HOW TO LOSE BELLY FAT FOR GOOD

Dr. Dennis Clark
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BellyFatScience.com
How To Lose Belly Fat For Good E-Book

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This book is for educational purposes only. It is based on my own personal research and on my interpretation of published scientific research. I am not a medical doctor and I do not provide medical advice.

As per recommendations (demands) by the U.S. Food and Drug Administration (FDA), I must state the obvious: This book is not intended as a substitute for medical advice of physicians. The information provided here is designed to help you make informed decisions about your health. However, before following any dietary recommendations in this book or any other diet regimen, you should consult your physician.

Regarding your choice of physicians, the best starting point is generally a naturopathic doctor or other health practitioner who has been trained for natural approaches to diet and health. Consider FDA-approved drugs and surgeries as desperation measures of last resort.
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INTRODUCTION

*Belly fat loss is not difficult!*

Or at least it shouldn’t be. Your body is already perfectly adapted to being lean and healthy. If you happen to have a little excess fat – or even a lot – all you have to do to get rid of it is take advantage of your own ready-made biology.

How to do exactly that is the subject of this book.

The diet and weight loss industry is a gigantic monster market that is worth billions of dollars every year. It includes weight loss clinics, bariatric surgeries, diet pills, fitness centers, books and DVD programs, a vast array of supplements, and way too many skinny so-called gurus to shake a stick at. Almost all of it would be unnecessary if replaced with just a little common sense about biology.

Yet the obesity epidemic continues to expand (sorry, couldn’t resist the pun there). It has become so bad that every new book cites the latest statistics on the downfall of our health due to it. All I will say in this regard is that the problem has grown to the point that *politicians* have become involved. This is a sure sign of trouble to come, which is also unnecessary in the face of common sense.

By the fact that you are reading these words now, you are on the right track for sorting out truth from fiction about diet and health. You are also about to learn what it takes to have the slim and healthy body that you are supposed to have, and how to keep it that way for as long as you want.

**WARNING:** Since I am a research scientist and retired university professor, I have a predisposition to teach and explain what I think is important based on research. Whenever you come to a section in the book where you think I have provided too much technical detail, just skip over it until you find the underlying recommendations that you seek. Go ahead, I won’t take it personally.

My ultimate goal for this book is that you come away with a lifestyle approach that benefits you in the best way possible. When you live the lifestyle that is meant for you, based on human biology, you will discover that ‘weight loss’ is a silly phrase that has no meaning. You will simply never be overweight again.
This book offers a particular slant on weight loss that is, as much as possible, rooted in scientific research. The reason for this approach is not because science has all the answers. You will come to understand that soon enough. No, the reason is because I am a research scientist who loves to dig out research that seems to be important for you, then explain it sufficiently for you to decide whether it is beneficial to you.

Scientists like me owe our educations and our research funds in large part to taxpayer support, although most of us aren't interested in, or aren't good at, explaining to the taxpaying public what we do. Consider my effort here as a way to at least partially rectify the gap between research science and those of you who are impacted by it.

A couple of things that you should be aware of regarding scientific research, especially when it comes to using human subjects, is that: 1) almost all studies are flawed in some significant way; and, 2) science has very few solid, research-based answers for most of the questions that you might ask about weight loss, fitness, and overall health.

This does not stop experts from offering advice, though. Indeed, government experts have used scientific research to foist two of the biggest diet boondoggles on the American public that have ever been created. The first was the USDA Food Pyramid, launched in 1992 and supposedly improved in 2005 as the MyPyramid. The second was the current program backed by former First Lady Michelle Obama, called ChooseMyPlate, which came out with a lot of hoopla in 2011.

The Food Pyramid and MyPyramid were abominations against human health, and ChooseMyPlate was not much of an improvement. This comment will become clearer to you as you read through this book. In fact, you may even come to agree with me that, when it comes to health, the federal government is not your friend.

Here is a glance at what these recommended diets look like.
Books about weight loss and fitness generally start out with an extensive explanation of why the author is an expert whom you should believe, accompanied by stories about the successes of people who have taken their advice.

The good news is that you don’t have to read through much of that here, since I am not a weight loss or fitness expert at all. What I do instead is wade through scientific research, books, and articles, and provide explanations about them that you can understand. Then you can decide for yourself whether you want to take action on their conclusions.

You can therefore view what you learn here as a foundation to empower yourself to make your own health choices. Toward that goal, I will explain enough here so you can judge the perspectives that I provide. At the very least, you will become better at sorting out some of the loud marketing hype and a few of the yammering experts who often make a habit of contradicting one another.

In case you really have nothing better to do and feel that you absolutely must know more about me, then you can skip to the end of this book for some biographical information and an overview of my professional background (see ‘About the Author’).

One thing about me that you might identify with is that I gained weight over a period of time – about 10 extra pounds every decade since starting college in 1966. One day I finally got fed up looking at that fat guy in the mirror and launched a personal crusade to find out what I could do about getting back to my old slim and energetic self.
That’s how I discovered the first of many surprises related to weight gain and weight loss.

**The Weight Gain Surprise**

Let’s skip the suspense here and get to what my first surprise was, because it may surprise you, too. It was this: *people do not get fat because they are lazy or slothful.* In fact, plenty of folks who exercise regularly and eat the way their doctors and nutritionists advise are fat. Take a look at the entrants in any weekend 10K race and you will see loads of fat people who are well-trained for the race. Probably not morbidly obese, mind you. Just fat. These are people who have trained by running 25 to 40 miles per week for several weeks or months and are in great shape for running a 10K. Fat people often beat me in these races.

It has nothing to do with the relatively short distance, either (only 6.2 miles). Later I will explain a study about a group of obese people who trained for 18 months to run a marathon (26.2 miles) and basically stayed fat all the way to race day. Exercise is clearly not all that it is cracked up to be for weight loss.

These were not slothful people! *And you aren’t slothful, either!*

The primary challenge in preventing and reversing weight gain is simply knowing what the right lifestyle choices are, then making them. Exercise can help, just not all types. Eating right can help if you know what and when to eat. Supplements can help if you take the right ones for your body.

Now let’s dig in to some good resources to find the advice that will be of greatest benefit to you.

**Information Overload**

You can learn anything about anything in the current Great Age of Google. You can, for example, search on the term ‘weight loss’ and get more than 460 million results. If you have your Google search set to the default of 10 results per page, this means that there are ‘only’ 46 million pages of information about weight loss on the internet. Can they all be right? Of course not. In fact, since this vast
amount of information is not reviewed for quality control, most of it is probably useless.

How about books? At least books might be reviewed by editors and maybe by experts in the subject material before they are published. Books are a resource that narrows the possibilities down quite a bit: a search for books under ‘weight loss’ at Amazon comes up with nearly 75,000 results.

Wait, there’s more! PubMed, the free medical research database from the U.S. National Institutes of Health, lists more than 56,000 publications that include the term ‘weight loss’.

These are some of the main resources that you have access to, although plowing through even a small portion of them would be information overload. Here is what I do: focus on books that contain scientific references, then examine the best references that support the author’s views. For example, one of my favorite books is Good Calories, Bad Calories (subtitled, ‘Challenging the Conventional Wisdom on Diet, Weight Control, and Disease’) by Gary Taubes. Of equal importance is his more recent trimmed down and updated book, Why We Get Fat and What to Do About It. Both of these provide robust lists of scientific references.

These and many other books that I have read are great sources for the information that I offer in this book. You will find a bibliography of my key references in APPENDIX D: RESOURCES AND LINKS.

Regarding research articles, the ones that are most important for making clear points about weight loss, health, and fitness will be summarized at appropriate places in this book. The articles that I cite will include full reference data.

You may notice that this book is not typical of ‘diet’ books. You will not find a lot of fluff. No introductory chapters with scads of personal stories like you find in all those popular diet books. Testimonials and stories, after all, are just a common marketing ploy to convince you of the truth of what they say. In reality, the only important testimonial is your own. You have to determine for yourself how well certain advice works for you. It doesn’t matter one whit that someone else lost a
gazillion pounds in just 12 days, or whatever amazing results were achieved by other people.

Celebrity endorsements are also missing here. They are just another paid-for marketing ploy that has nothing to do with what you can achieve. It doesn’t matter that Charles Barkley has been successful with Weight Watchers or that Marie Osmond dropped 50 pounds on the Nutri-System program.

The approach in this book is a scientific one as much as possible. Scientific research is a wonderful starting point for understanding how your body works and what you do that influences your health. This is what I enjoy knowing about and explaining to the public.

The main challenge for scientists, however, is a lot like the main challenge for the public – i.e., determining what is true when results from different studies contradict one another. Is the low-fat Ornish diet best, or the low-carb Atkins diet? Is eating 6 small meals per day better than eating 2 or three larger ones? Does aerobic exercise drive weight loss better than resistance exercise? All of these are supported by scientific research.

Do calories really matter?

My favorite diet myth, which I will explain in detail later, is the ‘calories in/calories out’ advice that falls so easily out of the mouths of experts so often that you probably feel that you have to believe it. Indeed, it has become dogma of mythical proportions. The notion that you have to ‘burn’ the same number of calories as you consume, to maintain your ideal weight is, unfortunately, false. In fact, it is ridiculous.

Almost any choice that you make can be correct according to research. You can lose weight on many different kinds of diets. More than likely you have already experimented with more than one, with some success. I’d bet that the reason you are reading this book, though, is because, regardless of whatever you have done previously, you are fat again. Maybe even fatter than ever.
Regardless of your weight management history, I guarantee you right now that the information in this book will provide you with enough advice to get and remain slim and healthy for as long as you want. And you won’t have to do anything radical to accomplish it.

This is not an ordinary book about losing weight or dieting. This is a book about fundamental lifestyle choices that underlie good health and are based on human physiology and scientific research.

**Some Encouraging Words**

Let’s not mince words here. The reason that you are reading this book right now is because you are fat. The good news is that you are not fat because you are slovenly or weak in some way. Such an accusation is a common myth that has been perpetrated on the public for so long that it has become medical dogma. Don’t believe it.

The bad news isn’t all that bad, either. It is simply that you are fat because you don’t know how to be ‘unfat’. Otherwise you would already have the slim and healthy body that you used to have, or that you always wanted.

Now let’s get into some straightforward recommendations...
Belly Fat Science Take-Home Lessons

You will find periodic take-home lessons throughout this book. These lessons summarize the main points and the most important strategies for you to adopt for taking advantage of your own fat loss biology.

Rather than have you search for them, or only encounter them when first introduced, I decided that it might be more helpful for you to avoid the hassle and the suspense of finding them by listing them all here, at the beginning. In many ways this list of lessons is a manifesto for what you want to know and do for reducing fat and living a long and healthy life.

If all you do is adopt the following lessons, regardless of whether you even read another word in this book, you will be successful.

THE LESSON (p. 15):

A calorie is not what you’ve been led to believe. Counting calories as part of a dietary strategy makes no sense whatsoever biologically. The concept of ‘calories in/calories out’ for weight management is one of the most ridiculous myths ever foisted on the public.

THE LESSON (p. 18):

You do not get fat because you overeat. You overeat because you are getting fat.

THE LESSON (p. 21):

There are plenty of obese people. There are plenty of senior citizens. Obese citizens do not live as long as non-obese citizens.
THE LESSON (p. 22):

Overfat and obesity are caused by hormone and enzyme imbalances. This means that fat metabolism is a matter of biochemistry, not a matter of calories.

THE LESSON (p. 24):

Visceral fat (belly fat, abdominal fat) is the key indicator of your fat metabolism. The less you have, the better off you are. The best way to keep track of visceral fat is by measuring your waist. No fancy equipment or blood test needed.

THE LESSON (p. 30):

Getting lean and healthy, and staying that way for life, requires that you do the right things in four main areas: 1) eating style; 2) exercise; 3) stress management; and, 4) supplementation. Your body’s response to each of these areas depends on your age, gender, metabolic and health status, hormone balance, genetics, and many other factors that influence your metabolism.

THE LESSON (p. 36):

Spacing meals to include a fasting period that starts at about 4 hours after you eat is crucial for taking advantage of the anabolic (muscle-building) effects of insulin and the anabolic and fat-metabolizing effects of hGH. The ideal strategy is to allow 5-6 hours between meals. Do not snack.

THE LESSON (p. 39):

Finish dinner early enough in the evening to allow at least 3 hours before bedtime without eating. Do not snack. Allow a
minimum of 12 hours of overnight fasting before your first meal on the following day.

THE LESSON (p. 40):

Do a 24-hour fast 1-2 times per week. Fasting is the bedrock of your fat loss, your long-term weight management, and your overall health and longevity.

THE LESSON (REPEATED) (p. 53):

Do a 24-hour fast 1-2 times per week. Fasting is the bedrock of your fat loss, your long-term weight management, and your overall health and longevity.

THE LESSON (p. 62):

Eat only foods that provide high nutrient density. This means primarily whole foods that are not too starchy or sugary, including vegetables, meats, and some fruits. Certain frozen foods are more nutritious than their fresh counterparts in supermarkets. Staying low on carbohydrate intake gives you the best chance for long-term, sustainable fat loss and general health.

THE LESSON (p. 65):

Include fiber – both soluble and insoluble – from whole food sources at every meal. The minimum amount of daily fiber intake should be 20-25 grams. Consuming 35 grams or more is even better.

THE LESSON (p. 67):

Getting into ketosis and staying there is the most important key for directing your metabolism to burn more fat than you store.
Reducing your carbohydrate intake is the most straightforward strategy for doing so.

THE LESSON (p. 72):

Fructose, especially from high-fructose corn syrup, is one of the top two most dangerous food additives of all time. Avoid it like the plague.

THE LESSON (p. 74):

Aspartame (Nutrasweet) is the other one of the top two most dangerous food additives of all time. Also avoid it like the plague.

THE LESSON (p. 84):

Eat as much fat as you like, especially the good stuff. Watch carefully that you include an abundance of omega-3 fatty acids and that you reduce your intake of omega-6 fatty acids.

THE LESSON (p. 86):

The best approach to starting a low-carb eating style is to crank up your fat intake. Dietary fat is the miracle worker for getting your metabolism going in the right direction, not protein. In fact, too much protein will slow you down.

THE LESSON (p. 87):

The initial steps toward ketosis lead to a loss of excess body fluid and accompanying electrolyte minerals. The most crucial electrolytes that you must replace are sodium, potassium, and magnesium.
THE LESSON (p. 90):

A low-carb, high-fat approach is great. A high-carb, low-fat approach can also work. Fat and carbs together lead to metabolic disaster.

THE LESSON (p. 94):

Fat-fasting gets you into ketosis at warp-speed. Use it best whenever you are stuck or stalled or whenever you just want to move your fat metabolism along in a big hurry. Expect spectacular results.

THE LESSON (p. 103):

Exercise is absolutely crucial for a healthy metabolism. However, the common belief that you can exercise off fat is ridiculous. The function of exercise is to improve insulin sensitivity, thereby making your body build muscle at the expense of visceral fat and liver fat. The two best exercises are: 1) appropriate resistance training (weightlifting) no more than once per week; and, 2) sprint interval training (cycling, running) 1-3 times per week. These are the most efficient ways to exercise for building muscle and endurance.

THE LESSON (p. 107):

The most well-researched supplement for inducing healthy metabolic changes is green tea. The best preparations are those that contain a green tea extract combined with phytosome delivery technology. This excludes green tea beverages and green tea powdered herb products.

THE LESSON (p. 112):

The best supplement combination for building muscle is: L-arginine and certain complementary amino acids, HMB (beta-
hydroxy beta-methoxybutyrate), and creatine. Nothing else is comparable.

Now for some details behind all these lessons...
Myths About Calories

The biggest myth about calories is the old dogma of ‘calories in/calories out’, meaning that you have to burn the same number of calories as you consume to maintain your weight. The number of calories in must equal the number of calories out. One corollary is that you must consume fewer calories than you burn if you want to lose weight. Another is that consuming more calories than you burn will lead to weight gain.

The logic and rationale of these statements make them believable, don’t they? Of course they do. Unfortunately, they are wrong. These statements would only be correct if your body acted like a furnace, as many diet gurus suggest. Nothing could be further from the truth.

Understanding the realities of calories and why they hardly matter requires some explanation.

What Calories Really Are

A calorie is a unit of heat. Heat is not directly useful metabolically. Once a calorie is released, there is no putting it back. It dissipates as heat.

Scientists have a very specific definition of a calorie. With some variation, the simplest way to say it is that a calorie is the amount of heat that is required to raise a cubic centimeter (milliliter) of water one degree Celsius, at room temperature and at sea level.

Saying that you can consume calories is like saying that you can eat heat.

Nutritionists, medical doctors, fitness trainers, and many other experts who should know better, incorrectly equate food calories to metabolism. This simple-minded reasoning goes something like this: The calories contained in the food you eat provide energy, in the form of calories, for you to live. Now that you know what calories really are, you can understand that the only thing they can do is provide heat. They are important for maintaining body temperature, but that is all.
The Nonsense of Food Calories

Do you know how we measure calories in food? We incinerate them in an instrument called a bomb calorimeter. When a substance is completely combusted, until nothing but the charred remains are left, it has released all of the calories that it contained. A bomb calorimeter measures how much heat is released upon complete combustion, which is expressed in calories.

Oh, by the way, the term ‘calorie’ commonly applies to two different quantities. One is the definition above (i.e., raising 1 cc of water 1 degree Celsius). The other is 1,000 times that amount – the amount of heat required to raise 1 liter (1,000 cc) of water 1 degree Celsius. Technically, to be clear about which is which, the small calorie is written with a lower case ‘c’ (calorie), and the larger calorie is written with an upper case ‘C’ (Calorie). You will also see Calories expressed as kilocalories (thousand calories).

A Calorie is therefore 1,000 calories or one kilocalorie.

You undoubtedly already know something about calories in different food groups. Carbohydrates are 4 calories per gram, protein is 4 calories per gram, and fat is 9 calories per gram. To be correct, though, these are Calories (kilocalories). Maybe it is just too scary to use small calories. Imagine having a 100-gram (3.2 oz) piece of chicken breast and realizing that it contains more than 400,000 calories! Or that your daily caloric intake that is rated 2,000 Calories is really 2,000,000 calories!

Who could even eat 2 million calories in a month, much less in a day?

Regardless of how you label food, using calories or Calories, it is nonsense to suggest that they provide you with nearly the amount of heat that they yield in a bomb calorimeter. The whole business of keeping track of calories, as measured in a bomb calorimeter, for weight loss is so often misused that I am astounded.

The underlying reason is that you can never, ever get all the energy out of food. At the most you might get 10 to 20% of the potential energy (calories from complete combustion) through your fuel-harvesting metabolism. Certainly never greater than 30%. Sometimes you won’t get any calories at all.
At least a dozen factors determine what the efficiency will be for you from any particular food at any particular time.

**THE LESSON:**

A calorie is not what you’ve been led to believe. Counting calories as part of a dietary strategy makes no sense whatsoever biologically. The concept of ‘calories in/calories out’ for weight management is one of the most ridiculous myths ever foisted on the public.

**A Ridiculous Comparison**

Consider this: in a calorimeter a gram of starch will yield the exact same number of calories as a gram of cellulose, which is indigestible fiber. As you and I both know, starch is a source of food calories for people. In contrast, cellulose is not.

A calorimeter will get the same number of calories from equivalent amounts of potato and celery (correcting for water content). Obviously, your body couldn’t possibly do that.

**What’s Really Important About Food**

Instead of comparing the metabolism of food to a furnace or calorimeter, it is much more meaningful to talk about what happens to different foods when they are digested, how they get into different kinds of cells (e.g., fat vs. muscle), and what happens to them once they are there.

For a surprising example of what this means, compare the two nearly identical sugars, glucose and fructose. Following their metabolic fate is much more meaningful regarding their roles in diet than just keeping track of their calorie content. In fact, these two sugars have identical caloric potential – 4 Calories per gram. However, glucose goes into many different tissues – most notably muscle and brain – and intact fructose never escapes your liver.
The consequences of these differences are that glucose serves the metabolism of your entire body, whereas fructose has to be converted to something else before you can do anything with it. That something else is largely fat. In simpler terms, fructose will make you fat much faster than glucose will.

Can you now guess what one of the biggest problems is with consuming foods that contain high-fructose corn syrup? Yup, you're right -- they are highly fattening. You will see much more about this semi-synthetic sweetener later. For now, just know that getting it out of your diet is an important step forward for weight loss.

By the way, once you understand what is truly important about foods of all kinds, which is clearly not their calorie content, you will be very clear on why calories have nothing to do with obesity. Chew on that comment for a while (pardon the pun), because this is the kind of thinking that will guide you to success in any weight loss or fitness program that works for a lifetime.

Besides, as you will learn later, your best eating style only partly depends on how much you eat. What you eat and when you eat are even more important than how much you eat. You can stop worrying about calories.

Unless you have your own bomb calorimeter in the kitchen, leave the calorie counting up to biochemists like me.

*Consuming Calories is NOT the Problem*

The most important take-home lesson from this little tangent on calories is this:

**Calories do not make you fat.**

This may seem like a bold statement, since the notion of getting fat by eating too much has reached brainwashing proportions. Almost everyone says that you get fat by eating too much, so it must be true ... right? **Wrong!**

Don’t misunderstand: You can overeat.
However, by saying that you get fat because you overeat is what scientists call a ‘cause and effect’ statement: *Overeating causes fat.*

Unfortunately, the true cause and effect are reversed in that statement. The truth instead is: **Getting fat causes overeating.**

This statement – i.e., reversing the cause and effect of getting fat – may come as a surprise to you, although obesity researchers have known it since the first half of the 20th century.

The latest book by Gary Taubes, *Why We Get Fat and What to Do About It*, provides an extensive explanation about the cause and effect of getting fat. The key modern studies that show we overeat because we are getting fat, not the commonly believed opposite, began at the University of Massachusetts in the early 1970s, in the laboratory of Professor Gary Wade.

Here is what he discovered in female rats whose ovaries had been removed:

- When they were allowed free access to food, they would eat voraciously and quickly become obese. (This would seem to confirm the dogma that eating too much leads to obesity.)

- When they were placed on a strict diet after surgery – having access to only the amount of food that they would have consumed had they never had the surgery – they got just as fat just as quickly. (The conclusion from this experiment is that they didn’t get fat because they ate too much. After all, they didn’t have access to enough food to overeat. They got fat anyway.)

- Rats whose ovaries were removed and were on a restricted diet also became sedentary. They only moved around when going after their food.

Removing ovaries, of course, results in removing the main source of estrogen. Could this be the driving force behind their getting fat and slothful? Here is what Prof. Wade found out:
• When they were injected with estrogen after surgery, they did not eat voraciously, even with free access to food, and they did not become obese or slothful.

What these experiments show is that obesity is caused by an abnormal fat metabolism, in this case one induced by a loss of estrogen. The same thing happens in women who have the same surgery (removal of ovaries) or who go into menopause.

The main point of this explanation is that abnormal fat metabolism causes obesity, not excess calories. Many factors can cause abnormal fat metabolism, not just loss of estrogen. After all, men and women both get fat. Other hormones can be involved. Not everyone responds to hormonal changes in the same way. You will learn about the role of hormones in fat metabolism a little later.

THE LESSON:

You do not get fat because you overeat. You overeat because you are getting fat.
Early Death: Getting Fat Eats You Up

Obesity will probably shorten your life.

The best data confirming this claim came from a study of 900,000 people over an average of 10-15 years. This was a correlation (‘epidemiological’) study that provided this overall summary: Moderate obesity (BMI of 30 to 35) was associated with an average lifespan reduction of 3 years; severe obesity (BMI of 40 to 50), an average lifespan reduction of about 10 years.

Obesity isn’t the only factor in this kind of study. Obesity is linked to other predictors of early death, such as diabetes and cardiovascular disease. Let’s keep it simple for the moment, though, to get an idea on why obesity might be a cause of early death.

We can find a good explanation by asking the question: How do obese rats (or any other lab animal) or humans accumulate fat even when dieting?

In directly personal terms: How do you get fat even when eating less?

You have a Basal Metabolic Rate that is the amount of energy you need each day just to keep your body and all of your organs functioning well. This is your minimum daily energy requirement, typically expressed as kilocalories (kcal) per day. Any physical activity that you undertake requires additional energy. Your total metabolic rate depends on your total mass, age, gender, lean body mass, physical activity level, the types of food you eat, and a balance of hundreds of hormones and enzymes. (We will talk about all of these factors and what you can do about them later.)

Whew!

What happens when you get fat? The demands on your metabolism increase. You require more daily energy because you are larger.

What happens when you require more daily energy, then decide to go on a reduced calorie diet? You are eating less, but your body still has energy needs to fulfill. Something has got to give.
What you’ve been told in this situation is that by eating less you will somehow convert some of your excess fat into energy. In other words, your metabolic needs will be satisfied by burning fat. That is the dream world of most dietitians, nutritionists, doctors, trainers, etc., etc., etc. Supposedly all you have to do is cut down on eating and your body will miraculously start using up your excess stored fat.

This simple-minded approach ignores the fact that you get fat because of abnormal fat metabolism. Recall the rats that were ovarectimized and fed a restricted calorie diet. They ate less and got fat anyway. It is as though fat has a mind of its own. It is going to take all the energy it can, even when there isn’t really enough food. If there isn’t enough energy to around, then the rats stop moving – they become slothful.

If you have ever had the experience of cutting down on what you eat for the purpose of losing weight, you can probably relate to those poor rats. You may have succeeded in losing weight initially, then couldn’t keep up with the diet and gained all your weight back. It is guaranteed that whatever you lost in weight, it did not entail loss of fat. However, whatever weight you gained back did increase your body fat content.

What happened to you, and what happened to those ovarricetimized rats and to those people in the obesity vs. lifespan study, is that your abnormal fat metabolism stays on course while your energy demands are fed by the rest of your body. You literally consume your lean body mass to satisfy the growth of your fat mass.

In the extreme, rodents that are fed less and less, until they starve to death (don’t do THAT experiment on yourself!), die with their fat intact. By the time they die, they have consumed as much muscle tissue, including that of heart and other organs, as they needed for fuel.

The same thing happens in humans. If you are fat and do not eat enough to satisfy your metabolic needs, your fat will steal whatever it can from muscle and organs. You will be sacrificing your heart and other organs for the sake of keeping your fat happy.
How can “eating too much” have any meaning when your fat is intact even in the face of a starvation diet? *The concept of “eating too much” is completely meaningless!*

You get fat because your fat metabolism has its own agenda. It is fat metabolism that has gone wrong. It is so powerful that your body will consume its own muscle and organs, ultimately leading to organ failure (heart attack?) and early death.

Just to keep your fat happy.

**THE LESSON:**

*There are plenty of obese people. There are plenty of senior citizens. Obese citizens do not live as long as non-obese citizens.*
Why We Get Fat

Just in case you skipped down to this section for the quick answer to your most important question, here it is: *Hormone and enzyme imbalances make you fat.*

This is a seemingly simple statement. However, you probably want to know what to do about such imbalances so you can get rid of the excess fat, right? The simple answer is to get your hormones and enzymes back into balance, although it is probably not obvious how to do so.

Your body has hundreds of hormones and thousands of enzymes that control your metabolism. Keeping them in balance is the path to good health, although their sheer numbers make this an overwhelming task. Let’s start by looking at a few that have the greatest impact. Once you get a good handle on what they are and what you have done to create imbalances, you can better understand what you must do to rebalance them.

**THE LESSON:**

*Overfat and obesity are caused by hormone and enzyme imbalances. This means that fat metabolism is a matter of biochemistry, not a matter of calories.*

*Good Body Fat vs. Bad Body Fat*

*Weight* and *fat* are general terms. Both are easy to measure. You can quickly find out your weight on an ordinary bathroom scale. You can almost as quickly determine your body fat percent on the same scale if it has a bioelectric impedance device inside, or you can do the same with a handheld device. Neither of these physical measures is consistently valuable in predicting health outcomes. We simply measure them because they are easy to measure.

This doesn’t stop the weight loss industry from breathlessly citing weight and body fat as if they are the end-all and be-all of health. This industry has even blessed us with other numbers that are supposedly useful, such as Body Mass Index (BMI), which is based on weight and height. For example, a BMI of 32 is supposed to be too high for general health. Yet this is exactly what Arnold
Schwarzenegger’s BMI was when he dominated the Mr. Universe contest. An interior offensive lineman in the National Football League can easily have a BMI of 40. (OMG! He’s gonna die any second!)

What weight, body fat percent, and BMI fail to consider is total body composition, which means the components of lean body mass as well as the components of fat mass. It’s not too complicated to differentiate between muscle mass and bone mass, although you won’t be able to do it at home. The bigger challenge, though, is to differentiate among three kinds of body fat. This is also the most meaningful knowledge you can have regarding your metabolic health when it comes to fat metabolism.

**Subcutaneous fat** makes up about 80 percent of your body fat. This is what appears around women’s butts and thighs and gives them a womanly figure. (Sorry, ladies – that is where you are supposed to have plenty of fat.) Men have it, too. Just not as much. Subcutaneous fat correlates with longevity. That’s right ... the more you have, the longer you are likely to live. This is a good fat.

**Brown fat** (aka, brown adipose tissue or BAT) is also a good fat. It is especially abundant in newborns (‘baby fat’). The amount of BAT diminishes so drastically as we grow into adulthood that not too long ago the medical folks believed that, after growing up, we didn’t have any at all. Now we know that most of us have a little deposit of it around our upper chest and neck. Obese people have less than the non-obese. We also know that BAT is loaded with mitochondria (brown from the iron in them) and that it gets energy from storage fat. It is fat that directs the burning of fat. You can bet your bottom dollar that drug companies are working around the clock to discover ways to increase the activities of BAT. (All you really have to do, though, is ice down the back of your neck or lay shirtless in some snow or an ice tub to really get BAT going. No fuss, no muss, no drugs. Just teeth-chattering cold.)

**Visceral fat** (aka, abdominal or belly fat) is the evil one. This is the fat that appears inside your abdomen, where it doesn’t belong. It is also the fat that accumulates in your liver, which is a huge no-no for your health. As the abundance of visceral fat rises, so does the size of your waistline.
THE LESSON:

Visceral fat (belly fat, abdominal fat) is the key indicator of your fat metabolism. The less you have, the better off you are. The best way to keep track of visceral fat is by measuring your waist. No fancy equipment or blood test needed.

Your Most Useful Do-It-Yourself Measure of Health

Ideally what you really want to know about your health status, relative to your fat metabolism, is how much visceral fat you have. Neither your weight, BMI, body fat percent, nor any other health baloney that people have come up with can tell you that. Anything that is based on weight or an overall body fat percentage is, at best, misleading. At worst, completely wrong.

The great news is that you can tell something important about your visceral fat by just looking at yourself. Specifically, by looking at your waist. If you want to get technical, then measure it. If you want to get really nerdy, then measure your waist and your hips, and calculate their ratio.

Of course, if you are like me you will still keep track of numbers. I might be obsessively analytical with my daily, sometimes multiple times per day, recording of my weight and body fat percent. Nevertheless, what I am most satisfied with is my shrinking waist.

Even though keeping track of your waist size won't give you exact numbers with two decimals, this is by far the best do-it-yourself way to track your health. Anything more than a 40-inch waist for men or a 35-inch waist for women indicates too much visceral fat, which is correlated with insulin resistance and all the health disasters of the metabolic syndrome that accompany it. Likewise, men should stay below a waist-to-hip ratio of 1.0, and women below 0.8. Smaller waists and lower ratios are much better.

At the moment, unfortunately, the majority of studies on obesity and its friends are still locked into weight, body fat, and other typical yet nearly useless indicators. Keep that in mind as you read the rest of this book. It may take quite a
while before the massive ‘weight loss’ industry morphs into the ‘waist shrinking’ industry.

**Myths About Cholesterol**

Any concern about weight loss or fat loss always seems to come with a side discussion about cholesterol. You undoubtedly know about all the fear-mongering on this topic. The fear is well-fed by Big Pharma, whose main interest is to make sure that every man, woman, and child takes cholesterol-lowering drugs for life.

The politics of cholesterol, unfortunately, has nothing to do with human health. Indeed, research on cholesterol and cardiovascular health has a long and controversial history, starting in about 1950. Since that time the following details have emerged:

- Arterial plaque contains cholesterol
- The most abundant substance in arterial plaque is calcium
- About 50% of heart attack victims do not have clogged arteries
- About 90% of heart attack victims have no previous cardiovascular symptoms
- Cholesterol is important for proper functioning of cell membranes
- Dietary cholesterol has almost no effect on serum cholesterol levels
- Cholesterol levels are easy to measure
- Cholesterol levels are easy to control by synthetic drugs called statins
- Statins block the synthesis of CoQ-10, which is crucial for heart health
- There is no such thing as ‘bad’ cholesterol
- Low cholesterol levels, especially when induced by statins, are associated with neurological disorders such as Parkinson’s Disease and ALS
- High cholesterol levels do not predict heart disease or mortality
- **The only factor that characterizes ALL cardiovascular disorders is inflammation** [note my emphasis here]

Several years ago the federal government, with the helpful guidance of the pharmaceutical industry, adjusted its guidelines for managing cholesterol levels. At that time the definition of what was considered too high changed from 300
mg/dL to 200 mg/dL (i.e., milligrams of cholesterol in each deciliter of blood serum, which is a little more than 12 ounces). Under the old guidelines, roughly 13 million people in this country were recommended to take cholesterol-lowering medications. The new guidelines brought this number to 36 million people, which almost tripled the market for cholesterol-lowering statin drugs. How convenient for Big Pharma!

The bottom line is that the widespread use of statins is clearly based on a false premise that cholesterol causes heart disease. Nevertheless, annual sales of statins worldwide exceed $25 billion. The issues of cholesterol and human health disappeared from the realm of wellness long ago and have been replaced by issues of money and politics. This is in spite of the well-known and lengthy list of side effects of these drugs, including unexplained muscle weakness, cramps, twitching, slurred speech, difficulty in walking or motor skills, nerve pain, depression, memory loss, and impotence. Indeed, this money machine continues to grow in spite of recent research on two drugs, Zetia and Vytorin, which shows that they don’t even work.

Cholesterol and overall lipid (fat) balance is still important, because every cell membrane in your body depends on cholesterol and other lipids for proper functioning. The way your cells handle lipids says a lot about your general state of health. Controlling them with drugs is simply not the best choice for real wellness. It you have been frightened into taking statin drugs, it is time to find a doctor who will work with you to get off of them.

Several natural approaches will ensure that you are on the right track. Since inflammation is at the root of cardiovascular disease, the most important strategy that you can adopt, which also offers benefits against many other chronic conditions, is to address inflammation through a combination of good anti-inflammatory and fiber supplements, the right eating plan, optimal exercise, stress and lifestyle management, and hormone balance. In other words, the whole theme of this book.

By the way, the measure of total cholesterol is supposedly enhanced by dividing it into high-density lipoprotein (HDL, a protein with cholesterol attached to it) and low-density lipoprotein (LDL, another such protein). Now we even have at least two kinds of LDL. One is a larger, more buoyant type (Type A), which accounts
for about 80 percent of circulating LDL. The other is a smaller, denser type (Type B), which accounts for the other 20 percent of circulating LDL. Type A has no cardiovascular risk associated with it, whereas Type B supposedly does. Knowing just your total cholesterol and HDL and LDL levels alone, without knowing the distribution of Type A vs. Type B LDL, is useless as a measure of your health.

Keep uppermost in mind, though, that your cells depend on all forms of lipoprotein-bound cholesterol and that circulating cholesterol does not cause cardiovascular problems. **The root cause of cardiovascular disease as stated in bold above (twice) is inflammation, NOT cholesterol.**

Did you notice in the list above that arterial plaque also contains an abundance of calcium? Gee, why isn’t anybody worried about too much circulating calcium? Just imagine the craziness if Big Pharma were to come out with calcium-lowering drugs as a solution for cardiovascular disease. Cholesterol or calcium. Pick one. Regardless of what you blame, it comes from the same failed logic.

Now, rather than leaving you hanging on the edge of your seat about this ‘new’ issue – i.e., inflammation – everything that you read from here on in this book addresses the causes of and strategies against it.

**CAUTION ABOUT STATIN DRUGS:** As a consequence of inhibiting natural cholesterol biosynthesis, statin drugs also inhibit the biosynthesis of CoQ-10. This substance is crucial for heart health. If you are taking a statin drug, your doctor should also have advised you to supplement with CoQ-10, preferably the reduced form (i.e., ubiquinol). If not, well … you might want to get a doctor who is more knowledgeable about actual human health. Your life may depend on it.
How to Get and Stay Lean

Correcting your fat metabolism does not have to be complicated, in spite of the myriad hormones and enzymes involved. Getting your metabolism on track simply requires that you know and do the right things in a few areas of your life. These include:

- Eating Style
- Effective Exercise
- Stress Management
- Supplementation

Advice on how to address each of these components for influencing your metabolism forms the crux of this book. Even if you skip the rest of the book, or read through and don’t grasp the technical explanations, it won’t matter when you adopt the advice here in How to Get and Stay Lean.

What Will Work for You?

Your age, gender, metabolic and health status, hormone balance, genetics, and many other factors influence your metabolism. These factors will therefore influence how your body responds to the advice in this book. Certain advice, such as eliminating wheat from your diet, is uniformly applicable to everyone. Other advice, such as when to eat, will vary among different people for optimum results. Indeed, the range of responses from one person to another can be quite broad within the same time frame.

Think about it for a moment. Some contestants on The Biggest Loser drop weight much faster than others. Subjects in the recently over-hyped book, The Digest Diet, ranged from losing just a few pounds in the 21-day program, up to 26 pounds, or more than a pound a day. The latest testimony for that book is by Adrienne Farr, who dropped 18 pounds.

These are the upper-end results. Even seemingly well-designed scientific studies, such as this one published in 2011, yield broad results, as shown here:
According to the details in the journal article cited above, subjects lost between 5.5 and nearly 38 pounds during the 36-day study. The greatest weight loss occurred in those who started out the heaviest. Note that almost the same pattern appeared for body fat loss, which is what we really ought to know about. Some folks dropped a lot more fat mass than others. In addition, fat loss did not correspond perfectly with weight loss.

Although scientists like to report statistics, such as averages and standard deviations, with statistical significance (aka, ‘P’ values), the question is whether a certain strategy will work for you. In the case of the above study, I found out how
well it applied to me by doing the protocol myself. I ended up dropping 25 pounds and 8% body fat in 30 days. In my experience, therefore, this is the most effective protocol that I have ever found for effective weight/fat loss. I will explain more about this protocol in the next section.

The point is that different approaches to eating, exercising, supplementing, and anything else you can do all have a likelihood of success that depends on you. The recommendations that I make here, based on the best science that I have found on fat metabolism, are the best ones with the greatest chance to work for most people.

If you are in the category of ‘young male’ (18-30 years old), you have the greatest chance for success in changing your metabolism, since you already have certain hormones and enzymes that you can easily influence to do your bidding. On the other hand, if you are a woman who has reached menopause, you will discover more challenges in righting your metabolic ship than do other folks.

(In case you are interested, I have put together a short report, *Brief Guide to Menopause Hormone Balance*, which accompanies my booklet on nutrition at HerbScientist.com. You can request a copy at no charge here: [Complete Nutrition.](#)

Not to fret, though, since there are always additional ways to tweak your metabolism regardless of age, gender, or even genetics. (Yes ... you can change your genes! Be sure to read what that means and how to do it, under Your Genes Are Not Your Destiny, later in this book.)

Now let's get started on the good things that you can and should be doing for yourself for achieving that healthy leanness that you want and deserve.

**THE LESSON:**

Getting lean and healthy, and staying that way for life, requires that you do the right things in four main areas: 1) eating style; 2) exercise; 3) stress management; and, 4) supplementation. Your body’s response to each of these areas depends on your
age, gender, metabolic and health status, hormone balance, genetics, and many other factors that influence your metabolism.

Hormone Rebalancing: Special Case of the HCG Protocol

A few years ago – specifically when I weighed 30 pounds more than I do now and had 8 percent higher body fat – a doctor friend of mine first told me about what he called, the ‘HCG Diet’. Since I was getting more than a little disgusted looking at that fat guy in the mirror, I decided to find out more about it. I was so impressed with what I discovered that I did the protocol myself and, within 30 days, dropped 25 pounds and 8 percent body fat.

Since then I have made it a point to help others to learn about this protocol and how to use it for their own success in weight and body fat management. In fact, what I summarize here is taken from the book that I wrote on this topic, which you can read more about for yourself at this link: HCG DIET – THE NEW DEFINITIVE GUIDE.

The hCG protocol is the only approach to fat loss that specifically harnesses the power of a native hormone to reduce abnormal fat. Here is a little summary of what it is all about.

HCG stands for Human Chorionic Gonadotropin, which is a protein hormone that occurs naturally both in males and females. It is best known as the hormone produced by pregnant women. During pregnancy, hCG guides the woman’s metabolism to harvest energy from stored fat. Research shows that it works similarly in men and non-pregnant women to promote the same fat-burning metabolism.

Although the hCG weight loss diet has become very popular lately, it is not a new protocol. In fact, Dr. A.T.W. Simeons designed and published his major report on the complete program in 1954. Although this report gained some attention at that time, it took several years before the hCG protocol caught on in a big way. An increasing number of desperate dieters now are turning to hCG to help them finally be successful in losing unwanted pounds of fat for good.
Dr. Simeons reported that patients taking hCG could drastically reduce their food intake without experiencing the typical hunger pang, weakness, headaches, and irritability that occur on a very low calorie diet. Furthermore, Dr. Simeons also found that patients did more than just lose weight. They lost abnormal (visceral) fat and reshaped their bodies the way they were supposed to look. These results happened regardless of whether patients exercised.

If you have followed one diet after another, repeatedly experiencing weight loss followed by weight gain, it is because standard weight loss diets do not specifically get rid of abnormal fat. They instead lead you also lose normal fat, which you need for good health. Loss of healthy fat demands that you put it back on. Loss of abnormal fat does not.

HCG helps reduce the craving for food by metabolizing stored fat. In other words, when you use hCG, your daily need for metabolic energy is met partially by the food you eat and partially by the fat that you burn. Without hCG, the Simeons diet is a starvation diet; with hCG, it is not.

One fabulous indicator for getting energy from your own abnormal fat is body reshaping. When abnormal fat disappears, so does the double chin, potbelly, and excess flab around hips, thighs, and arms. Furthermore, since this fat is used up properly, you do not get saggy skin when you begin to shrink.

Fat loss is the target. However, Dr. Simeons also reported that his patients lowered their cholesterol levels, decreased their blood pressure, normalized their sugar metabolism and sometimes even reversed type 2 diabetes, and improved their skin elasticity.

Furthermore, hCG resets the hypothalamus part of the brain, which helps to rebalance a variety of hormones. Hormone imbalance is one of the most important factors that leads to gaining abnormal fat in the first place.

People can generally expect an average loss of 0.5 to 1.5 pounds per day while on the hCG protocol. Women typically lose fat more slowly than men do. The main drawback to using this protocol is that it must be limited to no more than 40
or so days at a time. Beyond that point your hypothalamus becomes resistant to the hormone signal, which simply means that it stops working. Fat loss stops.

It takes about 6 weeks from prior use for any resistance to hCG to disappear. If any substantial fat and weight loss is the goal, then the protocol must be repeated as often as necessary to achieve the goal. A 100-pound weight loss, for example, might require four or more runs through the protocol, each with a 6-week recovery period before the next run.

CAUTION ABOUT FAKE HCG PROTOCOLS: Real hCG is a prescription substance that can only be authorized through a doctor who has a license to prescribe. Over-the-counter products at Walgreen’s, supermarkets, roadside stands (yes, I have seen them!), and such are not allowed to contain any real hormone. This includes the cheap homeopathic products that sell for 30 dollars per bottle all over the internet.

You can see more details about some of these products in my blog on hCG in these posts:

- **Warnings About HCG Drops**
- **Does Homeopathic HCG Work?**
- **Homeopathic HCG Contains No Hormone**

HCG PROTOCOL DISCLAIMER: The FDA still has not approved hCG for use in weight loss. Therefore comments here are not to be taken as official medical advice, nor as a diagnosis or treatment for any medical condition. Nevertheless, over a period of more than 50 years, tens of thousands of people have used hCG successfully for losing large amounts of weight quickly and healthfully.

IS THE HCG PROTOCOL NECESSARY? Absolutely not. In fact, part of the impetus for this book is to provide long-term solutions for achieving a healthy lifestyle without any such special treatments such as the hCG protocol. Another part of that impetus is to provide a strategy for those who have arrived at their target through the hCG protocol to stay there for good. No rebound weight gain. No yo-yo dieting.
The optimal role of the hCG protocol, therefore, is as a fat loss accelerator. You can, as I did, use it to drop a bunch of weight and fat in a hurry. Then you can adopt the lifestyle changes recommended in this book to keep yourself slim and healthy for the rest of your life.

For comparison, you can expect the hCG protocol to help you drop a half-pound to a pound per day, versus dropping 1-2 pounds per week when making the right lifestyle changes as described in this book. You can reach your goals either way, just in different time frames.

If you are doing some quick math, you may realize that it could take about a year for you to drop on the order of 100 pounds, either with the hCG protocol or with the lifestyle changes recommended here. It is not quite that simple, of course, although this gives you an idea of how you can start comparing the two.

In my case, I was very happy to take off 25 pounds and 8 percent body fat in a single month, then finally get to where I really wanted to be as I modified my lifestyle to continue losing fat by eating right, exercising effectively, managing stress, and taking the right supplements.

Now let’s get to those lifestyle changes, shall we?

Eating Style

Everything you do for reducing fat and keeping it off centers around eating. Eating right will get you the results you want, and eating wrong will undermine everything else you do. Notice that ‘eating style’ is not the same as dieting.

By now you know that ‘dieting’, which is just another way of saying ‘eating less’, will not work for fat or weight management, except perhaps in the short term. Moreover, short term success from calorie restriction is at the heart of yo-yo dieting, whereby weight regain hits back with a vengeance. Formerly lost weight returns and often exceeds the original overweight starting point. Even people who have had surgery to induce weight loss (gastric bypass, etc.) – which is an absolutely brutal strategy for forcing calorie restriction – regain lost weight, as if the surgery never happened. Now that is depressing!
It should be no surprise, therefore, that calorie restriction should not be your first consideration for losing weight. Indeed, of the three components of eating – that is, 1) when to eat, 2) what to eat, and 3) how much to eat – the most important is when to eat, followed by what to eat. The least important is how much to eat. Oh, food quantity is important. It is just far less important than the first two components.

**When to Eat**

Why is this the most important component of your eating style? The answer centers on what happens to hormones when you have a meal. The two most crucial hormones are insulin and human growth hormone (hGH). Here is what scientists have known since 1963, summarized in the following graph:

![Variations in Insulin and HGH During Feast-Famine Cycle](image)

**From: Nature 199 (1963): 913-915.**

Insulin, of course, is the famous protein hormone that most people know as the key to metabolizing blood glucose. It is secreted from the pancreas, starting as soon as a meal is anticipated and spiking within the first hour of eating. Insulin, however, is much more versatile that most people realize. It is the most important
starting point for understanding what you must do for maintaining a healthy metabolism.

The reason that insulin occupies such a central role in a healthy metabolism is because it guides glucose into the liver, into skeletal muscles, and into fat tissue. It is like a ‘master decision maker’ on where glucose goes. It has to remove excess glucose from the blood, which would otherwise become toxic. In doing so, it has to put that glucose somewhere. Wouldn’t you just love know how to control what your insulin decides so that you get more glucose into muscle tissue and less into your fat cells or your liver? **BINGO!** That’s like saying, “**OK, insulin...today I want you to build more muscle for me.**”

**Ideal Meal Spacing**

That is exactly what you do, in effect, when you follow the right eating pattern. This is because of the relationship between insulin and another of the key protein hormones, hGH. As the graph above shows, response to a meal can be viewed in three phases. The first phase, which is well-known to the public, sees a rise in blood sugar and a responding spike in insulin over a time span of about 2 hours after the meal.

During the second phase, from about 2 to 4 hours after the meal, levels of blood sugar and insulin start to drop and levels of hGH start to increase. This is the period of time after a meal when the combination of insulin and hGH acts to build up muscle protein.

The third, or fasting, phase begins about 4 hours after the meal. During this phase hGH remains at a high level, while insulin almost disappears. **This is the phase when hGH acts solely to direct the metabolism of fat as fuel.**

**THE LESSON:**

Spacing meals to include a fasting period that starts at about 4 hours after you eat is crucial for taking advantage of the anabolic (muscle-building) effects of insulin and the anabolic and fat-metabolizing effects of hGH. The ideal strategy is to allow 5-6 hours between meals. Do not snack.
If you do a little math here, you may immediately realize that spacing meals that far apart doesn’t always provide for enough time in the day for three meals. Surprise! Human physiology is not adapted for handling three meals per day. The whole notion that you should eat three meals per day is a modern creation. Moreover, it is a false premise.

Isn’t it interesting that the entire mega-industry built on breakfast cereals and other non-foods is based on this false premise? Once again we have a common belief – that is, you must eat three meals per day – a concept that is fueled by the sales and marketing departments of food manufacturers. This concept is designed to benefit their financial bottom line, not your waistline ... or any other aspect of your good health, for that matter.

Keep in mind that several other hormones besides insulin and hGH are also put into play once you have a meal. The graph and explanation above about what happens when you eat is just a starting point for understanding what to do for a healthy metabolism.

Notice that, as you read earlier, the ‘calories-in/calories-out’ dogma of human metabolism is so oversimplified as to be completely off base in light of the hormonal responses to food. Indeed, the more you know about the complexities of metabolism, the more ridiculous such dogma about calories becomes.

By the way, guess what happens when you follow the common advice to eat several small meals per day, supposedly to ‘fuel your fat-burning furnace’? Just take a look at the graph again and you will see that a high-frequency of meals will interrupt the muscle-building phase (phase 2) that you should be getting from the combination of insulin and hGH. And you will never reach the fasting phase when hGH directs the metabolism of fat, at least not during waking hours. The typical recommendation to eat breakfast, a mid-morning snack, lunch, a mid-afternoon snack, dinner, and an evening snack is a recipe for a metabolic disaster.

Also consider the negative impact of eating too often. When you eat sporadically throughout the day or eat a series of small meals, your liver has no time to use its stored glycogen (glucose storage polymer) or generate energy. The resulting state of prolonged insulin response completely shuts off the metabolism of fat
(i.e., puts you into permanent fat storage mode) and stops weight loss in its tracks. This is also a fast track to insulin resistance and diabetes. Furthermore, one of the responses of such an overburdened liver is the synthesis of excess amounts of cholesterol, even when the diet contains no cholesterol.

Is it any wonder that diabetes, obesity and high cholesterol have reached epidemic levels in modern western society?

**Too Hard to Make It 5-6 Hours Between Meals?**

Feeling weak or hungry before the next meal may mean that one or more of the following apply to you:

- You didn't eat enough at the previous meal
- You ate too much carbohydrate at the previous meal
- Your fitness level is too low
- Your digestion is poor
- You have a sluggish and congested liver, with weak adrenals
- You have an exhausted metabolism and most likely fibromyalgia
- You already have diabetes

All of these have to be addressed if you are ever to return to a healthy metabolism.

**Importance of Not Eating After Dinner**

Your longest fasting period during a 24-hour day is, of course, routinely at night while you are asleep. It is important to allow at least three hours after dinner, before bedtime, and to avoid after dinner snacks, because prime fat-burning time is at night. This is when you can and should take advantage of hormone response to fasting, specifically the response by hGH. By doing so, in fact, you can use night-time sleep as the best time for metabolizing fat. However, it only works well when you don't eat for a period of about 12 hours after your final meal of the day.

During the day most fat metabolism comes from food or from circulating fat in the blood. Your metabolism in daytime comes primarily from readily available
supplies, not from storage. By about nine hours after dinner, these supplies are most likely used up, at which time your body will start to dip into storage reserves. This shift is enhanced by the highest daily spike in your hGH levels, which normally occurs about two hours after you get to sleep. The intensity of this spike is diminished considerably if you have had a bedtime snack.

As you sleep you gradually begin to harvest the effects of your night-time hGH spike by using a higher proportion of fat for fuel. In fact, research shows that these effects build to an optimum level between 9 and 12 hours after dinner. This only happens, though, when you stop eating after dinner. This is crucial for driving the metabolism of stored fat – i.e., to accelerate fat metabolism during this prolonged period of fasting.

After-dinner snacking, a little bit of ice cream for bed, a midnight snack ... all of these will shut off your prime fat-burning time. This is a fact of your normal biochemistry. If you have trouble keeping to this pattern, you either have an underlying health problem or bad habits that you have to overcome, or both.

THE LESSON:

Finish dinner early enough in the evening to allow at least 3 hours before bedtime without eating. Do not snack. Allow a minimum of 12 hours of overnight fasting before your first meal on the following day.

If this lesson seems to undermine that old adage about breakfast being the most important meal, then so be it. It is a silly old adage, anyway. And it is not that old, either. Your ‘breakfast’ is whatever you eat to break your overnight fast, regardless of what you call your first meal of the day. Just make sure that you have your first meal of the day at least 12 hours after the previous evening’s dinner.

Fasting – The Best Fat Loss Strategy EVER!

This is the most extensive and probably the most important section in this book. It describes what is likely to be the most crucial, yet least used strategy for fat loss, weight management, and overall good health.
Not to worry, though ... I am not going to advocate crazy fasting for days or weeks at a time. That’s nuts. Nonetheless, you can speed up your road to recovery from overweight and overfat, and from almost all of the diseases of modern civilization, by fasting just a bit longer than overnight after dinner.

All it takes is a fasting period of about 24 hours. That is just dinner to dinner for most of us. Doing such a fast 1-2 times per week is almost miraculous in what it can do for your fat metabolism and for your health in many ways.

What follows is an overview of why fasting is more beneficial than almost anything else you can do. The take-home message is, however, very simple:

**THE LESSON:**

Do a 24-hour fast 1-2 times per week. Fasting is the bedrock of your fat loss, your long-term weight management, and your overall health and longevity.

In fact, I can say unequivocally that:

**YOUR BODY REQUIRES REGULAR FASTING FOR A MINIMUM OF ABOUT 24 HOURS AT A TIME FOR OPTIMIZING ANYTHING ELSE YOU DO FOR MAINTAINING YOUR WEIGHT AND BODY FAT COMPOSITION, FOR STAYING HEALTHY, AND FOR LIVING AS LONG AS YOU ARE SUPPOSED TO.**

Pardon the seemingly overdramatic use of bolding, italics, and all caps. However, the importance of regular, prolonged (24-hour) fasting simply cannot be emphasized enough. If the only change you make in your life is to adopt the advice in this section, even ignoring absolutely everything else you have ever read, anywhere (including in this book), you will still come out way ahead toward getting and staying slim and healthy for the rest of your life. **WOW!**

One of the hottest current topics in human health research is Intermittent Fasting (IF). A Google search on IF will yield more than 4 million results. PubMed lists just under 500 research articles on IF.
You will undoubtedly get overwhelmed by bouncing around all those gazillions of pages on IF and digging up those hundreds of research articles, so I am going to provide you with a brief synopsis (from that fount of all knowledge, Wikipedia), followed by an explanation of how to do adopt it and why you absolutely must do so.

**Intermittent Fasting on Wikipedia (in italics as follows):** *Intermittent fasting (IF) is a pattern of eating that alternates between periods of fasting (usually meaning consumption of water and sometimes low-calorie drinks such as black coffee) and non-fasting.*

*There is evidence suggesting that intermittent fasting may have beneficial effects on the health and longevity of animals – including humans – that are similar to the effects of caloric restriction (CR) ([more on this later](#)). There is currently no consensus as to the degree to which this is simply due to fasting or due to an (often) concomitant overall decrease in calories, but recent studies have shown support for the former. Alternate-day calorie restriction may prolong life span. Intermittent fasting and caloric restriction are forms of dietary restriction (DR), which is sometimes referred to as dietary energy restriction (DER).*

Fasting is the simplest method our body has for maintaining its energy balance. We store food energy when we eat, then use it when needed between meals. Based on what we know about our Paleolithic (‘cave-man’) ancestors, humans are adapted for periods between meals that can last anywhere from a few hours to a few days. In comparison, the main problem in modern times is that too often we eat without giving ourselves a chance to metabolize our stored energy.

*This means that we are overfed, not because we eat too much overall, but because we eat too often.*

Unfortunately, we have a highly limited capacity for storing carbohydrates – fewer than 5-10 grams total in the form of glycogen in muscle, liver, brain, and other organs. This means that energy storage beyond that amount defaults to fat. This default fat storage is doubly unfortunate because we seem to have an unlimited capacity for storing fat. Not just a few grams here and there, but pounds and pounds of it. If you have ever seen someone who is morbidly obese – let’s say
about 6 feet tall and weighing around 300 pounds – as much as half of that person’s weight, or 150 pounds, can be fat.

That is the result of eating too often.

In light of this truth, any and all diets that claim you can eat as much as you want, whatever you want, and often as you want are 100 percent wrong. I would even say criminally wrong, but that might be too strong for you to believe.

**The Phenomenal Health Benefits of Fasting**

A fellow researcher by the name of Brad Pilon has put together an extensive overview of intermittent fasting, including a complete list of scientific articles that point to the many health benefits of fasting. If you are interested in the details, his program is called [EatStopEat](#), a summary of which you can find by clicking on that link.

The main benefits are:

- Reduces body fat and body weight
- Helps build and maintain skeletal muscle mass
- Reduces blood glucose levels
- Reduces insulin levels
- Increases insulin sensitivity
- Increases lipolysis (fat breakdown) and fat oxidation
- Increases Uncoupling Protein-3 mRNA
- Increases adrenaline and noradrenaline levels
- Increases glucagon levels
- Reduces chronic systemic inflammation from food-related stress
- Increases cellular cleansing
- **Increases growth hormone levels (the biggest benefit of all?)**

This is a very impressive list, wouldn’t you say? Of course, some of those items may be unfamiliar to you, so here are brief explanations of what they mean.
**Reduces Body Fat and Body Weight**

As you read earlier, post-meal levels of blood glucose, insulin, and growth hormone are keys to a healthy metabolism as long as you space your meals at least 5-6 hours apart. Growth hormone is the same key hormone that kicks in when fasting after dinner for a minimum of 12 hours. And, no surprise, extending an after-dinner fasting period until the next day’s dinner, or about 24 hours, further drives a healthy metabolism. This is at the core of reducing body fat and body weight by fasting.

The nice thing about this expected result is that you can see it the day after fasting. On the morning after a 24-hour fast, dinner to dinner, you can expect to weigh from 1-3 pounds fewer than before the fast. Most of this quick loss is water weight that insulin causes you to store. Fat loss is a slower and steadier process, accounting for no more than 1-2 pounds per week. People who are larger will lose this weight faster, as will people who are younger. Men tend to lose it faster than women.

**Here is a bonus about fasting for weight loss:** Studies comparing short-term fasting vs. low and very low calorie diets show that fasting leads to more weight loss. Furthermore, people who lose weight by short-term fasting generally maintain most of their weight loss even after a year. Contrast this with the typical weight regain and yo-yo effects of low calorie dieting. Most people on low-calorie diets regain all of their lost weight, and often more.

**Helps Build and Maintain Skeletal Muscle Mass**

Skeletal muscles are the ones like biceps, triceps, abs, quads, calf, etc., etc., that you want to keep strong for your overall fitness. Unfortunately, exactly how you should do so is a never-ending source of confusion and bad advice that makes it difficult to know what is best. I will tell you about the role of exercise later. However, for now let’s look at the effects of fasting on muscle mass.

First off, research is very clear that periodic 24-hour fasting will NOT cause you to lose muscle mass. Since muscle loss is a very slow process, it takes long-term low calorie or starvation diets to cause it. Periodic short-term fasting will not.
Likewise, muscle building is also a slow process. Or at least it should be when you do it properly. This eliminates almost all advice from bodybuilders and their websites. If you want to look like Sylvester Stallone and Arnold Schwarzenegger, who are a couple of my favorite old guys (i.e., my age), then you will have to do what they do: use performance enhancing drugs (PEDs). Growth hormone injections are probably your best choice, especially if you are older, if that is what you want to accomplish. There is no need to choose that path, though.

Assuming that you do not want to pursue PEDs for muscle building, what else can you do? Intermittent fasting, of course!

At the moment there is a small, very interesting body of evidence showing that fasting can stimulate the anabolic (muscle-building) effects of dietary protein in combination with resistance exercise (weight-lifting). Indeed, the synthesis of new skeletal muscle tissue responds better to intermittent protein intake as opposed to steady daily consumption.

This knowledge base begs for further study. Nevertheless, so far fasting does seem to provide a unique and superior choice for building muscle while at the same time losing body fat. At the very least it is clear that intermittent fasting is better than traditional dieting for building muscle.

**Reduces Blood Glucose Levels**

Glucose is the sugar that circulates in your blood. Blood glucose levels normally stay in the range of 70-140 mg/dL (milligrams per deciliter) of blood as long as you are healthy. Your fasting blood glucose level (i.e., lowest during the day, before your first meal), should be no more than 85 mg/dL for optimum health. (Modern medicine apparently thinks that 95 mg/dL is a healthy lower limit. However, the inflammatory load on your body at a constant level of 95 mg/dL or above, day in and day out, is more damaging to your long-term health than most doctors realize.)

Eating too often causes your body to struggle in its effort to keep up with a continuous supply of blood glucose. It leads to a constant inflammatory load and all of the diseases in the Metabolic Syndrome (obesity, type 2 diabetes,
hypertension, cardiovascular disease, and blood lipid imbalances). **Continuous elevated levels of blood glucose also make your body age faster.**

Even a very short period of fasting (12-18 hours) is sufficient to drive blood glucose to normal fasting levels. So even if your 24-hour fasting period is a little short, you will still reap the benefits of fasting to reduce blood glucose. Regularly giving your metabolism a break from eating is the key.

**Reduces Insulin Levels and Increases Insulin Sensitivity**

If all you do is keep your insulin spike down and raise your insulin sensitivity, a whole lot of what you want to do metabolically would just fall into place. Insulin is the key protein hormone at the head of a cascade of hormones and enzymes that guides your overall metabolic health.

You know by now that insulin is like the first responder when you eat. Insulin is at the head of a control system that directs your body to store food energy in the form of glycogen or body fat, to drive blood glucose into fat or muscle cells. Chronically high levels of insulin, from eating too often, keep you in fat storage mode. Moreover, it prevents you from releasing fat from storage. *(By the way, almost nothing you can do in the way of exercise can overcome the negative effects of chronically high levels of insulin.)*

Furthermore, chronically high insulin levels lead to insulin resistance, diabetes, constant inflammation, cardiovascular disease, and certain types of cancer.

The great news about fasting is that as little as one 24-hour fasting period will drastically reduce your insulin levels. In fact, regular 24-hour fasting even enhances and restores insulin sensitivity that may have built up due to a chronic overabundance of insulin.

This is especially important if you are diabetic, or if you are one of the millions of Americans who are unknowingly heading toward diabetes right now. Regular fasting can put you back on the right path to getting your body to produce and utilize insulin properly. No one is allowed to claim a cure for diabetes, according to FDA regulations. The purpose of the FDA in this regard is to foster a system that promotes the use of synthetic prescription drugs for controlling (not curing)
diabetes. Recommending regular fasting as a potential cure for diabetes would therefore be ‘illegal’. What fasting can do for diabetics and pre-diabetics is, nevertheless, amazing. I’m just saying.

**Increases Lipolysis (Fat Breakdown) and Fat Oxidation**

Stored body fat can only break down once it is released from fat cells. This breakdown is called ‘lipolysis’. Lipolysis begins when triglycerides that are stored in fat cells are cleaved into their component fatty acids plus glycerol. (‘Triglyceride’ means three fatty acids chemically bound to a molecule of glycerol.)

Once these fatty acids are released into your bloodstream, they can eventually be used as energy for muscle and organs. This is an oxidative process – i.e., fat oxidation – that converts the chemical energy stored in fatty acids into cellular energy. This is the energy that cells need to grow, reproduce, and maintain themselves.

That is the physiological explanation for what you want your body to do in order for you to lose fat. When resting, in a fasted state, your muscles first use any stored glycogen that they have put away. As glycogen gets used up for muscle metabolism, muscles begin to switch over to fat oxidation. Muscles are a big component of your basic metabolic rate, so fasting to induce fat oxidation literally turns muscles into fat burning machines.

The net effect is that fasting directs your body to stop storing fat and start burning fat. According to published research studies, a 24-hour fasting period increases by more than 50 percent the amount of fat released from storage and oxidized. This is a significant boost in fat burning in such a short period of time.

In fact, recent research even shows that certain hormones and enzymes of fat metabolism respond more readily to short periods of fasting than to exercise. Incredibly, what this means is that fasting for about 24 hours actually does a better job than exercising when it comes to stimulating some of the key hormones and enzymes of fat oxidation.
Increases Uncoupling Protein-3 mRNA

It often seems as though dozens of hormones and enzymes control the fate of our fat, which is true. The roles of certain of these become clearer as research uncovers what they do. One of the more important recent discoveries is the effects of fasting on one particular protein called Uncoupling Protein-3 (UCP3). When muscles begin to burn fat, the levels of UCP3 increase.

The cool thing about this protein, at least for geeky scientists like me, is that the genes that control the synthesis of UCP3 ramp up their activity, as measured by their mRNA levels, by at least 5-fold within the first 15 hours of a fasting period. And this gene expression continues to increase for even up to 40 hours of fasting.

Aside from all that molecular biology jargon, the point is that fasting promotes the activity of genes that are involved in the oxidation of fat.

Increases Adrenaline and Noradrenaline levels

Adrenaline (epinephrine) and noradrenaline (norepinephrine) are neurotransmitters (nerve hormones) that are released from the adrenal glands in response to stress. These are the so-called ‘fight or flight’ hormones. Their levels also rise in response to fasting and to intense exercise.

They direct the release of glucose from glycogen storage, thereby accelerating glycogen depletion and increasing subsequent fat oxidation. It is one of your body’s strategies for making sure that you have sufficient blood sugar and fuel from fat to meet the demands of cellular metabolism.

Increases Glucagon Levels

Glucagon is the hormone whose effects oppose those of insulin. Insulin levels increase in response to eating. Glucagon levels increase in response to fasting.

Insulin causes you to store food energy. Glucagon causes you to causes you to burn fat.
Glucagon, like insulin, is secreted from your pancreas. The primary role of glucagon is to maintain your blood glucose levels in the absence of food – i.e., during periods of fasting. This is crucial for keeping your blood glucose from getting too low. When you head into glycogen depletion during fasting, glucagon directs the mobilization and oxidation of fat to make up for the reduced availability of storage carbohydrate.

Fasting, therefore, switches your body to a ‘glucagon-dominant’ metabolism that leads to fat loss. In this respect, fasting creates a balance between this ‘glucagon-dominant’ metabolism and the ‘insulin-dominant’ state that you go into after eating.

**Reduces Chronic Systemic Inflammation from Food-related Stress**

Inflammation is your body’s response to injury. When it is acute or sudden, such as a cut, bruise, sprain or broken bone, inflammation is important for healing and tissue repair. Pain, redness, swelling, and scarring all indicate that the healing inflammatory process is underway.

Lower-level, chronic exposure to damaging stimuli, however, leads to inflammation throughout your body – called chronic systemic inflammation. Chronic systemic inflammation is, unlike the healing inflammatory process with acute injury, tremendously detrimental to your health and well-being. **Chronic systemic inflammation underlies all of the diseases of civilization.**

The most common source of chronic inflammation in modern times is overeating. Let me emphasize that this means eating too often, not necessarily eating too much overall. The excess body fat that we store as a result of eating too often is a stressful burden that causes the inflammatory response. It stems from too much blood glucose and too much insulin.

And it is a vicious cycle. Inflammation occurs continuously, as long as there is excess fat. Excess fat is maintained continuously, as long as there is inflammation.
Fortunately, the levels of many of the markers of chronic inflammation – such as C-reactive protein, insulin, blood glucose, tumor necrosis factor, leptin, and interleukin-6 – can be reduced by regular short-term fasting and subsequent weight loss.

**Increases Cellular Cleansing**

Cells have a limited capacity for accumulating or removing metabolic junk. Some by-products of metabolism can be transported out of cells and ultimately eliminated through our excretion processes. However, cells have a particularly hard time with accumulated protein debris.

The way healthy cells work is that certain proteins, called chaperones, bind to junk protein and move it into special cell bodies called lysosomes for degradation. The process has a fancy name, ‘autophagy’, that means to eat oneself. Our cells are supposed to eat themselves, so to speak, regarding accumulated junk proteins.

In simpler terms, our cells have tiny little garbage men (or women) whose job it is to keep cells free of garbage. Unfortunately, in the too-often-fed state these same garbage people are overwhelmed and unable to keep up with all the junk. The result is that any cell can accumulate so much ‘garbage’ that it ultimately ceases to function and dies.

Indeed, one of the latest notions about aging is that, when too many cells accumulate so much junk that they cease to function, then we cease to function ... i.e., we die. Lots of age-related problems pop up on the way to that endpoint. This puts a premium on two things for overall health: 1) reduce the amount of cellular debris that our cells have to dispose of, primarily by not eating so often; and, 2) do whatever we can to ramp up our cellular autophagy.

Guess what? Item number 1 leads to item number 2! (Autophagy also ramps up when you are in ketosis, which depends on what you eat. More on this later, in the section on **What to Eat**.)
Properly functioning autophagy is now thought to be an essential process for slowing down aging. On the other hand, improperly functioning autophagy is now thought to be one of the main problems behind accelerated aging.

The good news about autophagy is that you can give your body a great chance to help all those little garbage people by fasting. The bad news is that eating too often stops those little guys from doing their job. Autophagy can be viewed as an ON/OFF switch, whereby fasting turns it ON and eating turns it OFF.

Note that even small amounts of food can turn the switch OFF. A recent study found that consuming just a 10 gram dose of amino acids diminished the markers of autophagy in people who had been fasting. Keeping the switch ON, therefore, means taking in no food at all during a fasting period.

Research on the effects of fasting on neurological diseases such as Alzheimer’s Disease and Huntington’s Disease also show that fasting leads to a particularly significant boost to autophagy in the brain. At present fasting seems to be a very promising strategy for getting rid of accumulated toxins in brain cells.

Autophagy is also necessary for maintaining muscle mass. This is the process that enables muscle fibers to eliminate accumulated junk proteins so they can be replaced with the fully functional proteins that make muscles stronger. On the other hand, insufficient autophagy leads to the degeneration and weakening of muscle fibers.

**Increases Growth Hormone Levels (the biggest benefit of all?)**

Our own growth hormone (aka, human growth hormone, or hGH) is like the granddaddy of all hormones. When hGH is at the right levels, at the right times, everything that you do for getting slim and healthy works better.

Unfortunately, hGH is one of those many protein hormones whose levels diminish as we age. The quickest fix, although not recommended for everyone, for reversing low hGH levels is taking hGH injections. Doing so gives you a tremendous boost in muscle mass, skin tone, fat loss, and almost anything else you can name that seems to go south as you age.
The shining example of what taking hGH injections can look like is the actor, Sylvester Stallone. Even if you aren’t a fan, you can appreciate how good Stallone looked alongside Arnie and a slew of other over-the-hill action heroes in their movie, *Expendables 2.*

I’m not recommending that you take hGH injections, though, even if you can afford them it (hGH ain’t cheap!). You can boost your own synthesis of this hormone in several ways involving eating style, exercise, stress management, and supplementation. I will tell you more about the roles of exercise, stress management, and supplementation later. For now, let’s look into the role of eating style, specifically – you guessed it! – fasting.

You’ve seen a graph earlier that showed a pattern of eating whereby hGH levels started to climb and peaked more than 4 hours after a meal. This minor after-meal spike is just one way that you can boost your hGH levels.

Another way to boost hGH levels is by short-term fasting, which can result in a 6-fold boost in hGH levels. A key difference between boosting your own levels by fasting vs. taking hGH injections is that fasting will never lead to higher levels of the hormone than you are supposed to have. Another key difference is that boosting your hGH levels by fasting raises your body’s sensitivity to the fat burning effects of hGH more than if you injected it. In other words, your own internal hGH production is much better for fat loss than hGH injections.

Professional athletes who take hGH injections – does Barry Bonds come to mind? – often take more than their natural production would have been. The result is an odd assortment of symptoms, particularly something called acromegaly (‘giantism’). It is caused by an overgrowth of connective tissue and facial bones, which shows up as a bigger head, protruding brow and jaw bone, excessive body hair, and enlarged feet and hands. Isn’t all that silly when all you really have to do is a 24-hour period of fasting once or twice per week?

We have known for more than 50 years that fasting triggers what is called the ‘growth hormone response’, which is what stops potential muscle loss during fasting. In fact, hGH is the only anabolic hormone that is boosted by fasting.
Elevated hGH levels during fasting also drive the burning of fat for fuel. It starts about 4 hours after a meal (as noted earlier) and continues for as long as the short-term fast lasts. Moreover, by burning more fat while fasting, you have a reduced need for glucose as a fuel source. The net results is that your blood glucose levels stabilize at a lower level.

The bottom line is that fasting induces the release of hGH from your pituitary gland, which drives the use of fat as fuel. In contrast, eating inhibits the release of hGH, which prevents the use of body fat as fuel.

It should be no surprise at this point that the obese have lower levels of hGH. Being overweight and eating too often can suppress hGH release by as much as 80 percent of what it should be. Any fat loss program MUST therefore entail boosting hGH levels back to what they should be. Fat loss programs that fail to do so are doomed to failure.

**Does Intermittent Fasting Equate to Caloric Restriction?**

One of the hottest current topics in human health research is Calorie (or Caloric) Restriction (CR) for health and longevity. If you search Google on CR you will get 1.5 million results. PubMed lists nearly 2,000 research articles on the CR diet and its effects.

The interesting thing about all that research is that CR and IF have been found to offer comparative health results, although they are not the same thing. Many people nevertheless confuse the two.

Before digging into CR, let’s take a look at the synopsis of it on Wikipedia:

**Calorie Restriction on Wikipedia (in italics):** *Caloric restriction (CR), or calorie restriction, is a dietary regimen that is based on low calorie intake. “Low” can be defined relative to the subject’s previous intake before intentionally restricting calories, or relative to an average person of similar body type. CR without malnutrition has been shown to work in a variety of species, among them yeast, fish, rodents and dogs to decelerate the biological aging process, resulting in longer maintenance of youthful health and an increase in both median and maximum lifespan.*
No clinical trial has been performed involving humans. Two trials have been performed involving primates, but have not demonstrated increases in median lifespan.

Now maybe you can see why the confusion between IF and CR. They are often mentioned in the same breath and compared with one another as if they are the same thing. They are not.

Health benefits of CR and IF seem to be the same, even though we don’t really have any solid experimental results on the longevity and long-term health effects of CR in humans.

Here is what is most important for you to know about CR vs. IF: First, CR typically means knocking out about a third of what you normally eat. Imagine your dinner plate loaded with food. Then imagine carving it into thirds and tossing out one of those thirds. Do this for every meal, forever. Eat two-thirds of the amount of food that you would normally eat.

The most widely known advocate of CR in modern times was Roy Walford, M.D. He was interviewed about CR for a segment on 60 Minutes a few years ago. The thing that stands out in my mind about that interview was his comment that he was hungry all the time.

In contrast, whenever I have a day of fasting (usually from dinner one night until dinner the next night), I am hungry for a morning or a morning and afternoon, tops. My usual pattern is to have a 24-hour fast twice a week, which means that I am hungry for no more than about 12 hours each time, and usually not even that long. On non-fasting days I eat to satisfaction. This is the typical pattern and experience of those who practice IF as a component of their eating style.

This sure beats being hungry all the time, wouldn’t you say? Of these two approaches – IF vs. CR -- for weight management, fat metabolism, and overall health and longevity, I’ll take IF any day.
THE LESSON (REPEATED):

Do a 24-hour fast 1-2 times per week. Fasting is the bedrock of your fat loss, your long-term weight management, and your overall health and longevity.

What to Eat

The best advice from all the ‘diets’ that have ever been created either have or should have one core recommendation: *Eat only whole foods as much as possible.*

The alternative is processed foods. Keep in mind that processed foods are food chemists’ dreams, made to satisfy all kinds of criteria that have little or nothing to do with healthy metabolism. Junk foods are a good example. The worst of the junk foods, as far as ruining your metabolism goes, are those made from refined carbohydrates (including sugars).

The obvious junk foods are clearly candies, cakes, pies, sweet rolls, and the like. However, your body will take just as hard a hit metabolically from the not-so-obvious junk foods that include breads, pastas, bagels, breakfast cereals (even if they do not contain added sugar), the majority of nutrition bars, dressings and sauces, tortillas, chips, *ad infinitum.*

What is left? Most, but not all, of the whole foods are. However, there are some ‘whole’ foods that are also the products of human design that are not very healthy, either. The worst of these is modern dwarf wheat. It doesn’t matter whether it is in the form of a whole grain or a refined flour product. *Consuming modern dwarf wheat in any form will seriously undermine your metabolism.* For a growing segment of the population it will even be toxic. Gluten sensitivity and celiac disease are just two of the many consequences of consuming wheat. See a more detailed explanation about wheat later in this book, in the section, *The Case Against Wheat.*

As far as what to eat, most of what I follow and recommend to others entails the best parts of the following:
• Atkins Diet
• Paleo (‘Caveman’) Diet
• Primal Blueprint (by Mark Sisson)
• Duke University’s ‘No Sugar, No Starch’ Diet

The summary in APPENDIX A is primarily the Duke University ‘No Sugar, No Starch’ Diet, with a few changes. My recommendation is to take the information in APPENDIX A (DUKE UNIVERSITY NO SUGAR, NO STARCH DIET) and APPENDIX B (FOODS FOR INDUCING FAT METABOLISM) as the fundamental core of the best foods to eat for a lifetime of health and slimness.

**What You Should Know About Dietary Carbohydrates**

All of the above eating styles share a low-carb theme. They also share the logic that humans are adapted to eating foods that were available before agriculture began. In other words, what people ate before about 10,000 years ago.

Your body uses carbs, predominantly in the form of glucose (blood sugar), mostly in your liver, brain, muscle, and certain other organs. However, you do not have to consume carbohydrates to be healthy. Indeed, it is nearly impossible to suffer from a carbohydrate deficiency, because protein and fat can be converted into glucose. Your body will have all the glucose that it needs even when you have **no dietary glucose** whatsoever.

The subject of dietary carbs, however, has become so controversial that getting the right information takes a lot of luck and persistence. It is a simpler task, though, when you grasp what scientists already knew before this subject became as deranged and politicized as it is now.

Let me point out some interesting scientific observations that will illustrate what I mean.

**Historical Examples of Low-Carb Health Benefits**

• William Banting was a London undertaker in the Victorian era, who for 20 years had been unable to stop his ever-increasing obesity. He finally reached a point where he had to walk downstairs backwards, and could
not even reach down to tie his own shoelaces. He eventually started going deaf and losing his sight. Finally, an ear specialist (an ear specialist!) informed Banting that all Banting's his ailments were caused by obesity. The specialist advised Banting to follow a diet that led to a huge amount of weight loss and relief from all his health problems. Impressed with his newfound health and slimness, Banting published his experiences and diet advice in his "Letter of Corpulence" manifesto. It represents the first low-carbohydrate diet ever published. The Banting diet is what would now be described as high protein, high fat and low carbohydrate, with no calorie restriction'. Even though Banting was not a medical professional, his experiences, explanations, and predictions for what to expect from his diet were ultimately corroborated by medical research almost a century later.

- In the first half of the 20th century, anthropologists began to study the carbohydrate-restricted diet of Inuit tribes in northern Canada and Alaska. The typical diet reported by Harvard researcher Vilhjalmur Stefansson consisted primarily of caribou meat, supplemented with about 30 percent fish, 10 percent seal meat, and 5-10 percent polar bear, rabbits, birds and eggs. Plants were eaten only in cases of dire necessity. The Inuits were perfectly healthy on this diet. Stefansson himself spent a decade on this diet during his studies. In a follow up experiment back in the U.S., he and explorer Karsten Anderson followed the all-meat diet for a year, during which they were examined by doctors at Bellevue Hospital in New York. They remained perfectly healthy and even improved in some indicators throughout the year. The first question that occurred to me when I found this information was, Why did they not get scurvy from vitamin C deficiency? Vitamin C was destroyed in the meat when it was cooked, and they had no plant material to provide it, either. For the moment I will just say that our concepts about vitamin deficiencies are not completely correct, particularly in the case of vitamin C.

Historical Examples of Carbohydrates vs. Health

- Over the past 130 years, every culture worldwide that began incorporating processed carbohydrates into their diet acquired diabetes, cardiovascular disease, and obesity, starting about 20 years after these foods became a
part of their diet. In addition, people who were healthy based on their native, whole-foods diets developed these same diseases of civilization when they moved to cities where they adopted a modern diet.

- Starting in the 1940s the Pima Indians north of the U.S.-Mexico border changed their diet from one that traditionally consisted mainly of slow-release carbohydrates (e.g., tepary beans, nopal cactus) to one of high levels of processed (fast-release) carbohydrates. Now more than 50% of adults over the age of 35 suffer from adult onset diabetes and more than 95% of the population is overweight.

This is a very short list just to illustrate the point about carbohydrates, especially those that are processed (flour, sugar, etc.). This list could go on for hundreds of examples of the same pattern: processed carbs are the culprit causing overweight, obesity and bad health. You don’t really have to get too technical about what this means for you: go low-carb.

**AMPK: The Enzyme King of Energy**

Let’s jump ahead from all that historical stuff and put some modern science behind what people have known from the whole-person perspective for more than a century. The topic is: AMPK. (You can see why biochemists like to abbreviate names when you see the whole name of this enzyme: adenosine monophosphate-activated protein kinase.)

Understanding AMPK shows why cellular energy is not so easily tracked by calories. The key energy ‘currency’ of cell is more appropriately measured in the form of a high-octane molecule called ATP (adenosine triphosphate). It is made from its precursors, AMP (adenosine monophosphate) and ADP (adenosine diphosphate).

The food we eat is the source of energy that drives the formation of ATP. AMPK monitors the balance among ATP, AMP, and ADP and determines whether the cell should be using or storing energy. What we know is that, in times of energy demand such as fasting or caloric restriction or exercise, AMPK has to ramp up to keep ATP levels up enough to keep us alive and well. This up-regulation of AMPK is what drives numerous health and longevity benefits. Benefits accrue
when AMPK directs the formation of new ATP by harvesting energy from glycogen (stored glucose) and body fat.

In fact, AMPK activation encompasses the following changes:

- Increases glucose uptake: We want to get glucose out of the blood and into the cells to burn.
- Increases glycolysis (glucose breakdown): We need to break down glycogen (stored sugar) to get the glucose to yield metabolic energy.
- Increases fatty acid oxidation: An obvious one. We want to start burning fat to replenish the depleted energy stores.
- Increases formation of new mitochondria: We want to make more mitochondria to burn fat and generate as much ATP as possible.
- Inhibits gluconeogenesis (formation glucose): We don’t want to spend energy making more sugar – we want to burn it.
- Inhibits glycogen synthesis: Same thing – we don’t want to store sugar, we want to burn it.
- Inhibits fatty acid and cholesterol synthesis: We don’t want to spend too much energy making fat and cholesterol.
- Inhibits insulin secretion: We want insulin to be low, so that we can move stored fat and sugar to where it needs to be burned.

In contrast, when we are in a constantly fed state from eating too often or exercising too little, all of these processes are reversed.

The message about AMPK, therefore, is that keeping it activated is a good thing.

How does this relate to what you eat? This is where two interesting studies out of the University of Colorado help us modernize our view of the effects of food composition.

In the first study, 21 lean healthy, non-diabetic subjects (11 men, 10 women; avg age 27.8 yrs; avg wt 147.4 lbs), were all started on the same diet for five days (i.e., 30% fat, 50% carbohydrate, 20% protein). They were then split into two different groups, both of which consumed 40% more calories for the next five days. These five-day overfeeding diets were either low-carb (50% fat, 30%
carbohydrate, 20% protein) or low-fat (20% fat, 60% carbohydrate, 20% protein). A month later they came back and switched diet groups for what is called a cross-over comparison (to see if any changes were consistent due to treatment effects).

Although there were no changes between the diets in several ways, a most amazing difference was discovered regarding AMPK activity. The low-carb/high fat diet induced a significant increase in AMPK activation, whereas the high-carb/low-fat had no effect.

**AMPK activation, which is what you want as much of the time as possible, increases significantly on a low-carb diet.**

In the second study, eighteen obese subjects (8 men – 10 women; avg age 32.4 years and avg wt 227.3 lbs) once again started on a five-day baseline diet. After these first five days, they were split into two groups for the next five days. One group went on a low-fat, high-carb diet (20% fat, 60% carb, 20% protein) and the other group went on a low-carb diet (50% fat, 30% carb, 20% protein). In addition, both diets were cut back to 30% of the calories in the baseline diet.

As expected, AMPK activation went up significantly in the low-carb/high-fat group. However, in spite of severe caloric restriction, AMPK activation in the low-fat/high-carb group was basically unchanged.

The surprise was that AMPK activation, which normally increases during caloric restriction, was apparently stopped in its tracks by a high-carb intake.

**This might explain why it is so difficult to lose weight on a low-calorie, high-carb diet.**

Now I wonder what they would have discovered if the so-called low-carb diet was really low-carb. People who follow a true low-carb eating style consume less than half the carbs of what ‘low-carb’ groups had in these studies. The effects on AMPK activation are most likely even better than the results showed.

It would also be nice to know what happens over a longer period of time and with a larger group of subjects. We will have to wait and see.
Meanwhile, I am going to continue being kind to my own AMPK levels with my low-carb eating style, so my AMPK will continue being kind to me. How about you?

**If It’s White, Don’t Bite**

My favorite saying is simple, "If it’s white, don’t bite." This includes potatoes, breads, pastas, polished rice, bagels, and white foods that are disguised as something that they are not. Beware, for example, of whole wheat bread and other so-called ‘whole food’ products that contain enriched flour as the main ingredient. The list includes all chips, cookies, cakes, pretzels, and bagels. The number of these kinds of fattening foods is seemingly endless.

**Here is a guarantee:** When you start out and continue your day with high-protein meals containing plenty of fat, following a meal-spacing and fasting pattern of greatest benefit to your health, you will lose weight effortlessly and your body fat percentage will drop.

You will feel more energetic, you will feel better overall, and you will look better. Indeed, you will also feel better because you look better!

The good news about an eating style that follows the basic tenets of eating the way that we are adapted to eat doesn't require any of the kinds of sacrifices that typical diet plans do. You can eat well, never suffer from hunger or deprivation, and watch your waist, arms, and thighs shrink down to the size that you want them to be.

First a little common sense. Eat foods that offer high nutrient density. If you've heard the advice that shopping for food around the perimeter of a supermarket is best for you, then you have a great start on knowing what will help you the most. This just means buying fresh fruits, vegetables, and meats. However, there are some exceptions whereby fresh may not be the best option.

One example is in regard to frozen foods, some of which can be more nutritious than their fresh counterparts. The underlying reason involves when produce is
picked and how it is handled between the time of harvest and when it appears at the supermarket.

Fruits and vegetables are often picked before they are ripe, stored cold, and fumigated with ethylene gas to speed up ripening just before they are put on the produce shelf. The result is that they look good and yet have less flavor and less nutrition than they should. Your best test for which produce was picked before it was ripe is simply a taste test. Tomatoes are a good example. Supermarket tomatoes are almost entirely flavor-free. That means that they also offer little in the way of nutrition.

On the other hand, fruits and vegetables that are destined for freezing are allowed to ripen more fully before harvest, thereby providing more nutrient value than their fresh counterparts. The main caution for buying frozen foods, however, is to watch out for additives and hidden empty calories. Frozen peas with lots of preservatives, food dyes, so-called ‘natural’ flavorings, and even sugar would NOT be a good choice. Frozen peas that have only frozen peas, and nothing else, on the ingredient list would be a good choice.

Except for certain frozen fruits and vegetables, packaged food in general is horrible. Just keep this in mind: Companies that make packaged foods have only one purpose – to get you to buy their foods. The brightly colored packaging, artificial flavoring and coloring, excessive amounts of salt and sugar, marketing strategies, and product positioning on the shelf at your eye level are all designed for you to take the item off the shelf and buy it. Notice that not one of these tactics has to do with nutrition or food quality. This is why packaged foods are generally not helpful for any kind of fat reducing eating plan. This especially includes packaged meals for weight loss programs!

**Top Recommended Foods**

Use your common sense, as stated above, and keep in mind that the most important guiding principle for choosing foods to help you reduce fat is nutrient density. Dieticians, naturopaths and other doctors, good professional trainers, and nutritionists mostly agree that the highest nutrient density comes from several categories of foods: vegetables, fruits, meats, fish, poultry (including eggs), herbs and spices, and seeds and nuts. The best of these are listed below.
• VEGETABLES: Arugula, Avocados,* Bell peppers, Broccoli, Cabbage, Carrots, Leeks, Onions, Romaine lettuce, Scallions, Mushrooms, Spinach, Tomatoes,* Leafy Greens of all kinds ... indeed, anything that you can find that is not starchy or sweet; Zucchini,* Squash*

• FRUIT (with limits based on sugar content – see below): Apples, Bananas, Blueberries, Cherries, Grapes, Grapefruit, Oranges, Pomegranates, Strawberries

• FISH: Catfish, Flounder, Salmon, Shellfish of all kinds, Sole, Tilapia, Tuna ... this list is also almost endless. (If at all possible, avoid farmed fish. They are nutritionally inferior to wild caught fish.)

• MEAT AND POULTRY: Beef, Lamb, Pork, Chicken, Turkey, Game Hens, Duck, Wild game of all kinds

• HERBS AND SPICES: Basil, Black pepper, Cardamom, Chives, Cilantro, Cinnamon, Cloves, Garlic, Ginger, Parsley, Turmeric ... this list truly is endless.

• NUTS AND SEEDS: (raw, unsalted) Almonds, Flaxseeds, Sesame seeds, Walnuts, Pecans, Cashews, Macadamia nuts, Sunflower seeds, Pistachios, Hemp nuts

• OTHER: Eggs (as many as you want every day)

*The USDA has somehow managed to confuse the public as to what are fruits vs. vegetables. Botanically speaking ‘vegetables’ that contain seeds are technically fruits. This includes avocado, squash, cucumber, and tomato, among many others.

THE LESSON:

Eat only foods that provide high nutrient density. This means primarily whole foods that are not too starchy or sugary, including vegetables, meats, and some fruits. Certain frozen
foods are more nutritious than their fresh counterparts in supermarkets. Staying low on carbohydrate intake gives you the best chance for long-term, sustainable fat loss and general health.

Now imagine this: As you start your day, what kind of delicious meal could you create by selecting from the above list? Notice that the list contains no typical breakfast foods. No cereal, no bagels, no sweetened yogurt or low-fat anything, no junk food of any kind.

Why is Fiber So Danged Important?

Fiber is commonly thought of as that indigestible stuff that comes in fruits and veggies. This is true, although it is much more beneficial that you might think. First, it does indeed help move things along in your digestive tract. That’s good.

What fiber also does is:

- Forms a gelatinous barrier between food and the intestinal wall, thereby slowing down the absorption of glucose, which limits the rate of insulin release.

- Acts as a natural cholesterol regulator by binding to and pushing fat-laden bile through your digestive tract faster.

- Increases the speed of transit through your GI tract so that PYY (the fullness hormone signal) responds sooner. You feel full faster.

- Exerts a beneficial influence on the profile of your friendly gut bacteria. This is a crucial component of overall digestive health

- **BONUS**: Dietary fiber is associated with a significantly reduced risk of colon cancer.

Who wouldn’t want more fiber? As you can tell, fiber is much more than an inert substance that goes in one end and out the other. The question is, how much
should you include in your eating plan? The answer hinges partly on the amount and partly on the type of fiber.

Regarding the amount, the national average is around 12 grams per day. Our federal government’s USDA guidelines recommend 20-25 grams per day. The ‘Fiber Queen’, Brenda Watson goes to great lengths in her book, *The Fiber35 Diet: Nature’s Weight Loss Secret*, in advocating 35 grams per day. She makes it sound as though this is a good amount, even though it may seem like a lot. However, scientists estimate that Paleolithic humans consumed about 100 grams per day.

All kinds of experts make this out to be a more complicated issue than need be. I have even seen advice on how much fiber is recommended, to the gram, for different adult age groups, for men vs. women, and for women who are pregnant or breastfeeding. Really now! All you really have to know is: more is better. Certainly more than 12 grams per day, probably at least 35 grams per day, and even up to 100 grams per day. An effective Paleo diet would be on the high end, much higher than most modern recommendations.

Regarding the type of fiber, there are two: soluble and insoluble. Soluble fiber just means that it dissolves in water. Insoluble fiber means that it doesn’t. Each has a different impact. Soluble fiber slows digestion and absorption and acts as the foodstuff for your friendly colon bacteria. Insoluble fiber has a laxative effect that speeds up the passage of food and waste through your digestive tract.

It would be even more complicated for experts to recommend how much soluble vs. insoluble fiber to have every day. The best strategy is probably to keep it simple and consume plenty of high-fiber foods. You can see a chart of foods with their fiber content if you are looking for guidance (APPENDIX E: FIBER CONTENT OF FOODS).

Generally, though, just use your common sense and eat foods with fiber. By the way, one way that people commonly undermine the beneficial effects of fiber is by juicing. The problem is that blender blades completely destroy the integrity of insoluble fiber. The effect is to separate soluble fiber from being embedded in insoluble fiber. This reduces the ability of soluble fiber to function as a barrier between food and the intestinal wall, which means that blood glucose is
absorbed faster, thereby driving insulin levels to skyrocket. This is not what you want to happen.

WORD OF WISDOM: A low-carb/high-fat eating style, especially during periods of ultra-low carbs for inducing ketosis, demand special attention to getting sufficient fiber. One of the most common complaints about the Atkins Diet, for example, is constipation. This is almost always due to not getting enough fiber.

THE LESSON:

Include fiber – both soluble and insoluble – from whole food sources at every meal. The minimum amount of daily fiber intake should be 20-25 grams. Consuming 35 grams or more is even better.

Keys to Eating Fruit

Although fruits are on the ‘approved’ list above, they contain sugar. Sugar is sugar, no matter the source. Sugars are, of course, naturally occurring sweeteners in fruits. Most fruits are laden with sucrose, glucose, or fructose, and often a combination of all three. The keys to eating fruit without undermining your fat metabolism and overall health are just two: 1) consume them whole so you benefit from getting whole-fruit fiber along with the sugar (slows down absorption of sugar in the gut); and, 2) eat more fruits with lower sugar content and fewer fruits with higher sugar content. Pay special attention to keeping your intake of fructose as low you can.

As a guide, take a look at the list of common fruits and their sugar content in APPENDIX C: SUGAR CONTENT OF COMMON FRUITS AND JUICES. This list gives you a good idea of which fruits you can eat more of and which you should eat very little of. Notice that dried fruits are off the charts for sugar content and that fruit juices are even worse. Much, much worse.

The Miracle of Ketosis

The top goal of our metabolic machinery is to provide fuel to keep us alive and healthy. Unfortunately, the frequency that we now eat, combined with the
generally poor composition of our foods, has messed up what is supposed to be an elegant system for taking in food energy, directing it to where it is needed, and storing whatever is left over.

As mentioned earlier, fat is stored as a triglyceride, which is three fatty acids hooked onto a glycerol molecule. The metabolism of most interest for fat loss involves unhooking the fatty acids from glycerol and using the free-up fatty acids as fuel.

The main byproducts of this fat breakdown are ketones. Ketones are a rich source of energy for your muscles, brain, and heart. Indeed, ketones are a fabulous stand-in for glucose in the brain. Furthermore, ketones are the preferred fuel for the heart, boosting its work to about 28 percent greater efficiency.

Finally, ketones reduce the need for glucose, which diminishes any conversion of protein to glucose. The net effect is that the metabolism of fat has a muscle-sparing effect.

All this means is that fat is the perfect fuel. The metabolic trick for driving the burning of fat instead of glucose, therefore, is to keep your carb intake low enough to promote the production of ketones from fat. Your body makes glucose is the first choice when it is available, so what you want to do is to make it less available.

When you reach that point, you are ideally in a state of ketosis.

How low in carb intake to you have to go to get into ketosis? The number of grams per day of carbohydrates for inducing ketosis will vary based on your metabolism. However, the key number that works for most people, which was first outlined by Dr. Robert Atkins for the Atkins Diet, is 20 grams per day.

This is an ultra-low amount of carbs per day, so it is not a general recommendation for a lifetime eating style. The Atkins Diet calls for a 20-gram carbohydrate maximum per day for just 14 days, in what is called the Induction Phase. It is designed to induce ketosis as quickly as possible so you can get into fat burning mode.
Once you are humming along in ketosis, you can stay in fat-burning mode as long as you do not eat more than a certain amount of carbs. This number, once again, depends on your metabolism. It can routinely range anywhere from 80 to 120 grams per day.

THE LESSON:

Getting into ketosis and staying there is the most important key for directing your metabolism to burn more fat than you store. Reducing your carbohydrate intake is the most straightforward strategy for doing so.

Now here is a really neat, fairly recent discovery about ketosis: Ketosis helps cells eliminate debris from accumulated junk protein, just like autophagy does. What this means is that ketosis aids the proper functioning of cells to extend healthy cellular and organ life. Guess what it means when your cells and organs are healthy and live longer? Right...YOU are healthy and live longer!

Here is your choice: Stay in ketosis, keep your cells properly free of debris, promote a longer and healthier life span for your cells, organs, and whole body. And the whole time you end up losing body fat. Just stay in ketosis by following a low-carbohydrate eating style.

Isn’t nature great!

What NOT to Eat

Certain foods and synthetic chemicals, mainly artificial sweeteners, are so prevalent that it bears repeating advice on what to avoid. Even if you have heard this before, a small handful of foods and food additives are so widely available, and so heavily marketed, that you must keep your defense up against them if you are going to get and stay slim and healthy for the rest of your life.

The most obvious and most common ones are processed carbohydrates (commonly available as flours), especially anything that contains wheat gluten or wheat starch (breads, pastas, crackers, cookies, almost all baked goods – the list
is endless), cereal grains of all kinds (wheat, rice, oats, rye), starchy plant-based foods (potatoes, yams, sweet potatoes), sugars, and artificial sweeteners.

None of these recommendations for what not to eat should surprise you. However, two particular items in that list are far worse for you than you can imagine: 1) a sugar called fructose; and, 2) an artificial sweetener called aspartame.

They are so bad for you that they will undermine much more than your weight management. They will ruin your health. Here is what you should know.

**Fructose Ruins Everything You Do**

Now for my diatribe against fructose. The message here is that you must cut fructose out of your diet as much as possible. It is toxic. You can simply agree to do so now, and skip this section. Or you can read below to find out why it is so bad for you, which hopefully gives you the incentive to cut it out of your diet or at least severely reduce your consumption of it.

First the basics. Fructose is a simple sugar that gets its name because it is the main sugar in fruit. It also occurs in stems, in leaves, in roots and in other underground parts of plants, and in nectar. Fructose is one of the two component sugars of sucrose, or common table sugar. The other is glucose. Of these three, fructose is by far the sweetest.

Now the myth: Fructose is a better choice for dietary health than other sugars because it has the lowest glycemic index. It does, indeed have a very low glycemic index of 19, compared with 100 for glucose and 68 for sucrose. However, it is by far the worst possible sugar for dietary health. The myth is that it is a healthier choice for you than other sugars. It is quite the opposite. **Fructose is toxic.**

The glycemic index is merely a measure of the effects of carbohydrates on blood sugar levels. As such, it is an arbitrary number that has nothing to do with the true food values and actual metabolic fates of different carbohydrates in the body. It is a big mistake to think that the glycemic index has any bearing on how sugars are metabolized.
The key for understanding the effect of dietary fructose on health comes from its impact on the liver, not on levels of blood sugar. For comparison, start with what happens to glucose. For each gram of glucose that you ingest, about 80 percent of it gets distributed for use as a source of energy for all of the organs of the body. The remaining 20 percent is metabolized in the liver, mostly going into carbohydrate storage in the form of glycogen.

In contrast, for each gram of fructose that you ingest, none of it is distributed as a source of energy anywhere outside the liver. About 30 percent of it gets converted into fat, or more than 60 times as much fat as the conversion of glucose into fat. Many more things go wrong due to too much fructose in the liver, including all of the diseases of the Metabolic Syndrome: obesity, type 2 diabetes, hypertension, cardiovascular disease, and dyslipidemia (high levels of triglycerides and LDL cholesterol). Excess fructose in the liver even leads to high levels of uric acid, which can cause gout and which is at the root of hypertension (high blood pressure).

Furthermore, excess fructose in the liver causes liver insulin resistance, which causes the pancreas to unload even more insulin, which leads to increasing insulin resistance on the path to type 2 diabetes.

Fructose has its greatest impact in raising triglyceride levels. Scientists call this fructose-induced lipogenesis, which just means that fructose leads to fat. Credit for this discovery goes back to 1916. Substantial research throughout the 1960s, 1970s, and 1980s documents how it works.

Oh, and one more thing about fructose, as if all the above isn’t enough: excess fructose leads to leptin resistance, which means that the so-called master fat hormone no longer works to help your body regulate the metabolism of fat.

**Fructose and Alcohol Are a Lot Alike**

By now you should be getting the idea that consuming fructose makes you fat, more than any other sugar. Indeed, regular consumption of fructose is much worse than that. In many ways it leads to the same health problems as does alcohol.
If you still aren’t convinced to cut fructose out of your diet as much as possible, maybe this comparison of the effects of alcohol and fructose will help.

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<td>Hematologic disorders</td>
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<td>Electrolyte abnormalities</td>
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<td>Hypertension</td>
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That is enough about fructose itself. This is a huge subject that could be enough for a whole book. I think that you get the idea, though. If you really want to learn more about what happens to make your body go wrong due to fructose, take a look at Robert Lustig’s new book, *Fat Chance: Beating the Odds Against Sugar, Processed Food, Obesity, and Disease*. I’ll give you a hint on that book’s main message: Don’t eat sugar, especially fructose.

**High Fructose Corn Syrup is to Die For**

In this case, ‘to die for’ doesn’t carry it usual meaning that something is so good that you can’t live without it. No, in this case the meaning is that high fructose corn syrup (HFCS) *will kill you*. Read on.

HFCS, which is NOT all natural, is perhaps the most evil substance ever created and foisted upon an ignorant public. (It is tied with aspartame for being the most evil, which I will tell you about later.) Knowing what we know about fructose, we might justifiably be a bit surprised that HFCS has become so widely accepted in the U.S. as a sweetener in hundreds of foods and beverages. The underlying reason that HFCS is so all pervasive, in spite of its danger to our health, is due to marketing propaganda by the ubiquitous and highly subsidized corn industry.
Is HFCS even worse than fructose alone? First consider how HFCS is made. It takes a 15-step process, starting with extracting starch (a glucose polymer) from corn kernels and taking it through a series of stainless steel vats and tubes, requiring a dozen different mechanical processes and chemical reactions, including at least one step that uses a genetically modified (GMO) enzyme. The result is a mixture that is 90 percent fructose, which is then combined with regular 100 percent glucose corn syrup to produce a clear syrupy liquid that is roughly as sweet as table sugar. This is a mixture that does not occur naturally in corn.

What all this means is that corn naturally produces mostly glucose, not fructose. HFCS comes from corn indirectly, through a multi-step process that converts glucose to fructose. It is natural in the sense that it is a natural sugar. However, HFCS is not natural in the sense that it is derived from corn. HFCS, therefore, is it is not natural in the sense that it does not occur in nature.

HFCS is, indeed, worse than fructose alone because of its rampant overuse as the main sweetener in thousands of foods and beverages. Such high use of HFCS is a boon to the corn industry even though HFCS is a bane to human health. The vast majority of sweetened foods and beverages are sweetened with HFCS. The widespread use of HFCS as a food and beverage additive has driven up the consumption of fructose, from an average daily intake of about 15 grams in the early part of the 20th century, to about 55 grams per day at present.

That is why HFCS is so much worse than fructose. It is hard to avoid.

Let’s be clear on this, though. Your good health, including your weight and body fat percentage, depends on avoiding this pervasive additive. Your main defense against it is being aware of where it is in your diet. You absolutely must read ingredients labels on all processed foods and drinks to see what the sweetener is. You must even read labels of products that may not seem to be sweetened. These include salsas, dressings, processed meats, flavorings of all kinds, and lots more. HFCS is commonly found in all of them. Read the ingredients labels!

Then take action. Specifically, put any product that you find to contain HFCS right back on the shelf. After all, your first loyalty is to support your own good health.
and that of your family, not the financial health of the corn industry. (Our federal government already does enough of that.)

THE LESSON:

Fructose, especially from high-fructose corn syrup, is one of the top two most dangerous food additives of all time. Avoid it like the plague.

Avoid Artificial Sweeteners

Getting a straight answer about the effects of artificial sweeteners by doing an internet search is a challenge. Too many opinions directly contradict one another, and definitive studies are rare. However, one study in particular shows what might be happening when you use them.

This study specifically examined the relationship between artificially sweetened beverages and long-term weight gain in more than 5,000 people who were already enrolled in a heart study. The research article based on this study was published by a research group at the University of Texas Health Science Center in San Antonio, in the journal *Obesity* (‘Fueling the obesity epidemic? Artificially sweetened beverage use and long-term weight gain’. 2008 Aug;16(8):1894-900). The overall results were that, regardless of gender; ethnicity, baseline weight category, or dieting, BMI consistently increased among users of artificial sweeteners over those who didn’t.

This may not be the definitive study, since most studies on this topic are not definitive, so those who accept its results seem to be opposed by just as many who do not. Generally, though, the weight of evidence in numerous smaller studies seem to bear out the advice that artificial sweeteners are a poor choice as a dietary strategy for weight loss.

Aspartame (Nutrasweet) Kills

Regardless of whether you accept the uselessness of artificial sweeteners for weight loss, as a group they are thought to cause numerous health disorders. Early on, saccharin got a black eye because of its potential for causing cancer.
Cyclamates came on the market and were soon banned in the U.S. (you can still get your cyclamate fix from diet sodas outside the U.S., though). Sucralose is now promoted as a ‘natural’ sweetener even though it is an artificially chlorinated derivative of sucrose. If offers a wonderful laxative effect, if that is what you want from your sweetener.

The king of the artificial sweeteners when it comes to ruining human health, though, is aspartame (Nutrasweet). The primary reason is that it is unstable just below body temperature. You will therefore see no baked goods containing it. When heated, such as when it goes into your body, it quickly releases methanol (i.e., wood alcohol), which gets converted further to formaldehyde. Methanol and formaldehyde are toxic even at ultra-low levels.

The history, politics, and health consequences of dietary aspartame have been the career-long focus of a colleague of mine at the university, the now retired Prof. Woodrow Monte. He has for years maintained a website with basic information on this topic at TheTruthAboutStuff.com, which is a site that I strongly recommend you visit. He has also written a book on titled, While Science Sleeps: A Sweetener Kills, that explains how the aspartame/methanol/formaldehyde triumvirate leads to some of the scariest of all the diseases of civilization.

While I would love to dig deeply into all that Prof. Monte shows about aspartame, I will instead just refer you to those links above and sum up the main problems with this artificial sweetener and its degradation products.

These are the diseases that Prof. Monte points to as being associated with aspartame, methanol, and formaldehyde: cardiovascular disease, autism and birth defects, Alzheimer’s Disease, multiple sclerosis, many types of cancer, especially breast cancer, and lupus, rheumatoid arthritis and other so-called autoimmune disorders. All of these diseases have increased in prevalence, in direct correspondence with the introduction of aspartame to the public and with its steadily increasing use.

Regarding the comparison of which is worse for you, fructose or aspartame, I'd say that it is a tie. The bottom line is never to consume even one molecule of aspartame, and severely reduce or eliminate any product that contains HFCS or other form of added fructose.
THE LESSON:

Aspartame (Nutrasweet) is the other one of the top two most dangerous food additives of all time. Also avoid it like the plague.

The Case Against Wheat

“The adoption of agriculture, supposedly our most decisive step toward a better life, was in many ways a catastrophe from which we have never recovered.”

Professor Jared Diamond

IN: Guns, Germs, and Steel: The Fates of Human Societies

Do you ever feel bloated and gassy, have stomach pain, constipation and/or diarrhea, or brain fog, sometimes accompanied by aching muscles or joints? If so, you may be suffering from gluten sensitivity. If you think this is a possibility, read on ...

Professor Diamond was referring to the historical change from a diet based primarily on fat and protein to one centered predominantly on carbohydrates, starting at the dawn of agriculture about 10,000 years ago. Cereal grains have been at the heart of our dietary carbohydrates for that entire period.

Ancient cereal grains did not do our ancestors much good. Modern cereal grains do us even less good. Fast forward to the mid-20th century and we see the appearance of what is called modern dwarf wheat. It now comprises about 99 percent of all wheat grown in the world today. A partial list of foods that are made of or contain wheat include:

- Baked goods such as pastries, doughnuts, pies, pretzels
- Baking mixes, powder and flour
- Beer
• Bread or bread crumbs
• Cereal
• Chicken and beef broth (cans and bouillon cubes)
• Condiments, salad dressings, and sauces
• Crackers
• Deli meats
• Falafel
• Fried, breaded chicken, fish, or other deep-fried foods
• Gravies
• Host (communion, altar bread and wafers)
• Hot dogs
• Ice cream
• Imitation bacon
• Meatballs or meat loaf
• Panko (Japanese breadcrumbs)
• Pasta, including couscous, gnocchi, spaetzle, chow mein, lo mein, and filled pastas
• Pie fillings and puddings
• Sausages
• Soups
• Soy sauce or tamari (unless gluten-free)
• Tabbouleh

If it seems like there is no escaping it, then welcome to the 21st century.

Personally I am a little conflicted about modern wheat. While I am proud to say that two botanists have ever received the Nobel Prize, one of them was Norman Borlaug, the creator of modern dwarf wheat. He was better known as the father of the Green Revolution, based on his work to develop dwarf wheat as a solution to world hunger. Borlaug’s hardier and more productive wheat is often credited with saving over a billion people worldwide from starvation.

That’s the good news.

Now comes Dr. William Davis with his recent book, Wheat Belly, with the bad news. It is two-fold. First, modern wheat is about 70 percent carbohydrate by
weight, in the form of a starch called amylopectin-A. This form of starch is called a supercarbohydrate because, gram for gram, it increases blood sugar to a greater degree than any other form of starch. In fact, it is converted to blood sugar more efficiently than nearly all the other carbohydrate foods, regardless of whether they are simple or complex. And it matters not one whit whether it comes packaged as ‘whole wheat’ – which can be almost anything according to our loosey-goosey federal regulations. Blood sugar shoots up the same whether it is labeled ‘whole grain’ or not.

Second, and maybe even more insidiously, is wheat gluten. Gluten is a storage protein. It is supposed to be in the grain. However, modern gluten is a mixture of new forms of gluten that arose as a result of genetic experiments to develop dwarf wheat. Gluten sensitivity is now rampant, and full-blown celiac disease has quadrupled over the past 50 years.

Wheat gluten causes intestinal inflammation. A survey of almost 30,000 patients from 1969 to 2008 showed a 39 percent increased risk of death in those with celiac disease, 72 percent increased risk in those with gut inflammation related to gluten, and 35 percent increased risk in those with gluten sensitivity but no celiac disease.

Furthermore, an estimated 99 percent of people who have a problem with eating gluten don't even know it. It masquerades as at least 55 different ‘diseases’, including osteoporosis, irritable bowel disease, inflammatory bowel disease, anemia, cancer, fatigue, canker sores, rheumatoid arthritis, lupus, multiple sclerosis, and almost all other autoimmune diseases. Gluten is also linked to many psychiatric and neurological diseases, including anxiety, depression, schizophrenia, dementia, migraines, epilepsy, and neuropathy (nerve damage). It has also been linked to autism.

Gluten sensitivity is actually now thought of as an autoimmune disease that creates inflammation throughout the body, with wide-ranging effects across all organ systems including your brain, heart, joints, digestive tract, and more.

How good is that low-carb eating style looking now, especially with the elimination of wheat from your diet? Oh, I forgot to mention that, when you
eliminate wheat, the side effects may include immediate relief from indigestion, bloating, bad skin, and ... what else? ... a protruding belly fat. And lots more.

Go ahead. Get rid of the wheat in your diet. You will probably be surprised at how good you look and feel within just a few weeks.

**How Much to Eat**

Unfortunately, almost all the advice that you will find on how much food to eat entails the concept of calories as metabolically useful units. This bit of silliness is ridiculous, especially when invoking that old dogma of ‘calories in/calories out’ – which is flat wrong.

Scientists, bless their hearts, have come up with a new twist on this theme, which helps a little bit. This is the concept of the *thermic effect* of food. It is all the rage in weight loss research now. Recent studies are almost required to keep track of the thermic effect of food, in addition to calories. Before going further on this topic, here is a concise, although jargon-laden, description of this concept from Wikipedia:

**Thermic effect of food on Wikipedia (in italics):** *Thermic effect of food, or TEF in shorthand, is the amount of energy expenditure above the resting metabolic rate due to the cost of processing food for use and storage. It is one of the components of metabolism along with resting metabolic rate and the exercise component. Two other terms commonly used to describe the thermic effect of food are dietary induced thermogenesis (DIT) and specific dynamic action (SDA). A commonly-used estimate of the thermic effect of food is about 10% of one's caloric intake, though the effect varies substantially for different food components. For example, dietary fat is very easy to process and has very little thermic effect, while protein is hard to process and has a much larger thermic effect.*

**Factors that affect the thermic effect of food**

*The thermic effect of food is increased by both aerobic training of sufficient duration and intensity and by anaerobic weight training. However, the increase is*
marginal, amounting to 7-8 cal per hour. The primary determinants of daily TEF are the quantity and composition of the food ingested. [my emphasis]

**Types of foods**

Raw celery and grapefruit are often claimed to have negative caloric balance (requiring more energy to digest than recovered from the food), presumably because the thermic effect is greater than the caloric content due to the high fiber matrix that must be unraveled to access their carbohydrates. However, there has been no research carried out to test this hypothesis and a significant amount of the thermic effect depends on the insulin sensitivity of the individual, with more insulin-sensitive individuals having a significant effect while individuals with increasing resistance have negligible to zero effects. [my emphasis]

The Functional Food Centre at Oxford Brookes University conducted a study into the effects of Chilli and medium-chain triglycerides (MCT) on Diet Induced Thermogenesis (DIT). They concluded that "adding chili and MCT to meals increases DIT by over 50% which over time may cumulate to help induce weight loss and prevent weight gain or regain."

**Processed foods and TEF**

Research has found that the thermic effect of food contributes to the fact that calories may not all be equal in terms of weight gain. [my emphasis] Sadie Barr showed that the consumption of processed foods led to a 50% decrease in postprandial [after eating] energy expenditure.

Just taking into consideration those parts that I’ve emphasized above, any advice about how much food you should be eating hinges on three factors: 1) the quantity and composition (types) of foods you eat; 2) your insulin sensitivity; and, 3) a calorie is not a calorie. Of these, food composition is the most important.

Consider this: if you could eat all the celery that you could possibly get down your gullet, what would the effect be on your metabolism? Yup, nearly nothing. On the other hand, what if you ate all the bread you could stuff down? The effect on your metabolism would be a disaster.
If you think about this new concept – i.e., thermic effect of food – does it help you figure out how much you should be eating per day? Sort of. It takes more energy to get energy out of protein. It takes the least energy to get energy out of processed carbs. The bottom line is that the total amount is not as important as the composition of your food.

Nevertheless, the amount of food you eat overall is important relative to how much your body either sends to or removes from storage. As presented earlier, it is much more important to space your meals properly and to do a 24-hour fast once or twice per week than anything else you do. And it is much more important to take in an abundance of protein and fat and a minimum of carbohydrate.

**How to Eat the Right Amount of Food**

This is easier than you might think, and it has nothing to do with counting or even keeping track of calories. The basic advice the works is: *eat until you feel satisfied, then stop.* This approach demands that you be mindful of how much you are eating.

One of the keys to your body’s response to food is a protein hormone called ghrelin, which is the hunger hormone. Ghrelin levels increase before meals, driving a feeling of hunger. Ghrelin levels decrease after meals, when hunger has been stopped.

By the way, ghrelin is a potent stimulator of growth hormone secretion from the anterior pituitary gland. It is a good thing, therefore, when you feel hungry before a meal or during a day of fasting.

Stopping the ghrelin response is not necessarily all that happens when you eat, though. You and many others can still eat plenty of food even in the absence of hunger. This is easy to do when you do not feel satisfied as you eat, so you continue to eat. All you really need to do, however, is to slow down. In so doing, you allow another digestive signal, called peptide YY (PYY), to kick in. PYY tells your brain that you are satisfied.
The reason that slowing down your eating speed is so important is that PYY takes about 20 minutes to respond to food once you ingest it. When food goes into your stomach, it takes that long for the PYY ‘satisfaction’ response from your small intestine to bounce the feedback to your brain. Eat slowly and let it happen. Pay attention to how you feel when you eat slowly, and eat until you feel satisfied. Then stop.

What is really phenomenal with eating slowly, eating at the right times, and eating the right foods, is that you will not overeat. Likewise, you will not undereat. Healthy eating for fat loss could not be simpler.

How Much Protein?

Diet and weight loss programs mostly ignore this question, probably because it has no simple answer. Or, worse yet, they give you a simple answer that may not be appropriate for you. Protein intake, however, is pivotal for body composition because it has a greater impact on building muscle mass than either of the other two food groups. The right amount of protein will help you build muscle, which boosts metabolism and optimizes fat burning. Getting a leaner body, therefore, depends on how much protein you eat and what your body does with it. Throw out the governmental recommended daily amount of protein. Here is what you need to know.

In essence, the more you exercise, the greater your protein needs will be. On the low end, you may need only 0.8 grams per kilogram of body mass, and on the high end as much as 1.8 grams or more of protein per kilogram of body mass. If you weigh 150 pounds, this translates into 55 to 123 grams of protein per day (or about 1.9 to 4.3 ounces).

Note that, in paying attention to your protein intake, different high-protein foods contain different amounts. A lean 8 oz. steak, for example, might provide as many as 80-100 grams of protein. The table below gives you some guidance on some of the more common protein sources from whole foods that are loaded with protein.
Any amount of high-fiber veggies will offer considerably less protein. For the protein content of processed foods, just take a look at the Nutrition Facts label and see how much you get per serving (pay attention to what a serving is!).

### Amount of Protein (grams) per 100 Grams

<table>
<thead>
<tr>
<th>Food</th>
<th>Protein (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds</td>
<td>21</td>
</tr>
<tr>
<td>Chicken/Turkey Breast</td>
<td>33</td>
</tr>
<tr>
<td>Crab</td>
<td>19</td>
</tr>
<tr>
<td>Eggs</td>
<td>12</td>
</tr>
<tr>
<td>Lamb (Shoulder)</td>
<td>36</td>
</tr>
<tr>
<td>Lean Beef</td>
<td>37</td>
</tr>
<tr>
<td>Legumes (avg.)</td>
<td>9</td>
</tr>
<tr>
<td>Lobster</td>
<td>26</td>
</tr>
<tr>
<td>Peanuts</td>
<td>24</td>
</tr>
<tr>
<td>Pecans</td>
<td>9</td>
</tr>
<tr>
<td>Pork Loin</td>
<td>30</td>
</tr>
<tr>
<td>Sunflower Seeds</td>
<td>21</td>
</tr>
<tr>
<td>Tuna</td>
<td>30</td>
</tr>
</tbody>
</table>

### GETTING TOO MUCH PROTEIN? If you recall the earlier section on the Miracle of Ketosis, you know that the goal for metabolic efficiency in many ways is to kick your fat metabolism into high gear. Your strategy is to get into a state of ketosis.

While many people simply think that the more protein you take in the better, it has its limit regarding ketosis. Too much protein will stop ketosis in its tracks because of the liver’s ability to convert some of its protein into glucose (i.e., through gluconeogenesis). This is the glucose that will interfere with your ketosis.

This is particularly problematic if you are eating lean cuts of meat, such as skinless chicken breast, or if you are supplementing your diet with protein shakes that are low in fat (they generally are). Getting enough fat is easy enough to remedy if you are taking protein shakes, because you can add fat to them. Coconut oil, MCT oil, fish oil, or flax oil would be helpful. My choice is coconut oil. MCT oil and coconut oil are the best at driving up ketone production.
On the other hand, you are probably okay if you are eating protein in especially fatty cuts of meat. Bacon is great. If you are eating beef, be sure that you get cuts that are well-marbled with fat, then eat the fattiest parts first. Besides, that is where most of the flavor is!

**How Much Fat?**

Just a quick note about terminology, in case you haven’t heard this before: Fats and oils include a wide variety of chemical types. They are classified together based on the fact that they do not dissolve in water. The only difference between the group that is called fats and the group that is called oils is their melting temperature. Fats are so-called because they are solid at room temperature. Oils are so-called because they are liquid at room temperature. Coconut oil goes both ways. It is solid (a fat) on my kitchen counter during the winter, when the room temperature is slightly lower. It is liquid (an oil) during the summer, when the room is slightly warmer. You can therefore use the terms fat and oil interchangeably, as chemists like me do.

Consider for the moment what our pre-agricultural ancestors ate: meat, fish, nuts, fruits, and vegetables. This list has, with some variation, been popularized as the caveman or Paleolithic (‘Paleo’) diet. Just listing these food types, however, does not explain much about differences in their composition between Paleolithic and modern times.

Although carbohydrates have garnered much of the attention, and rightly so, what is often missed is the amount and composition of the fats that people ate so long ago. **We are perfectly adapted for living on dietary fat.** As mentioned earlier, studies of the Inuits by Stefansson in the early half of the 20th century showed how healthy a diet of almost all meat, with lots of fat, can be. Although it is difficult to estimate the percentage of dietary fat vs. other food groups in the Inuit diet, it was clearly ultra-low in carbohydrates.

Surveys of recent cultures that may simulate a Paleo diet show that, even up to 70 percent or more of food intake can be fat, with no diseases of civilization in sight. This is the formula for keeping insulin levels low. The higher the proportion of fat, the lower the insulin.
Talking about the *amount* of fat alone ignores the *composition* of fat. This is where the old-time Paleo diet differs tremendously from that of modern times. ‘Meat’ in ancestral times meant the whole carcass: muscle, organs, intestines, marrow. Everything except hooves, hide, and bones. Estimates are that the fat composition of such sources was high in monounsaturated fats.

Modern meat offers very little in the way of monounsaturated fats. The common sources of monounsaturated fats in our diet now are fish, nuts, flax seeds, avocados, and vegetable oils.

This is where it gets a little tricky. Common plant oils in our diet may provide too much of a type of polyunsaturated fat (oil) called omega-6 fatty acids and not enough omega-3 fatty acids. The average intake is a ratio of between 20:1 to 10:1 of omega-6 to omega-3. *This is highly inflammatory.* The ratio should be no more than 2:1, or better yet, 1:1.

It is best, therefore, to either focus on sources of monounsaturated fats that have a preponderance of omega-3 oils, or to supplement with omega-3 oils (e.g., fish oil). This chart will give you an idea of what to choose.

<table>
<thead>
<tr>
<th>Oil Source</th>
<th>Omega-6 Content</th>
<th>Omega-3 Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safflower</td>
<td>75%</td>
<td>0%</td>
</tr>
<tr>
<td>Sunflower</td>
<td>65%</td>
<td>0%</td>
</tr>
<tr>
<td>Corn</td>
<td>54%</td>
<td>0%</td>
</tr>
<tr>
<td>Cottonseed</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>Sesame</td>
<td>42%</td>
<td>0%</td>
</tr>
<tr>
<td>Peanut</td>
<td>32%</td>
<td>0%</td>
</tr>
<tr>
<td>Olive</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>Soybean</td>
<td>51%</td>
<td>7%</td>
</tr>
<tr>
<td>Canola</td>
<td>20%</td>
<td>9%</td>
</tr>
<tr>
<td>Walnut</td>
<td>52%</td>
<td>10%</td>
</tr>
<tr>
<td>Flaxseed</td>
<td>14%</td>
<td>57%</td>
</tr>
<tr>
<td>Fish</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

In sum, you can eat as much fat as you like, the more the better. Just keep an eye on the composition of those fats. If you are not regularly eating kidney, liver,
brain, intestine, marrow, heart, etc., then pay very close attention to which plant oils you are consuming.

By the way, there is still one very common food on the modern menu that offers the benefits of consuming the whole animal carcass. It is ideal as a component of a Paleo diet in the 21st century. That food? **Sardines!**

**THE LESSON:**

*Eat as much fat as you like, especially the good stuff. Watch carefully that you include an abundance of omega-3 fatty acids and that you reduce your intake of omega-6 fatty acids.*

**How Much Carbohydrate?**

At the beginning of your low-carb eating style, the best way to get your ketosis going is to keep your carb intake under 20 grams per day. This is the fundamental basis of the Duke University No Sugar, No Starch Diet. It is also the core of the 2-week Induction Phase of the Atkins Diet. You can design your eating style for this accelerated period of ketosis by following the Duke University program (APPENDIX A) and choosing foods based on their carbohydrate content as listed in APPENDIX B.

The common question of how much carbohydrate to include in your eating style, once you are in ketosis, has this unsatisfying answer: *it depends on you.* You can, of course, stay at 20 grams per day for the rest of your life. Or you can increase the amount to find out how much it takes for your progress to stall out or even—**EGADS!**—go backwards.

You may discover that even a tiny bit above 20 grams sends you back down the wrong road. Or you may discover that you can handle 50 or 80 or even 120 grams of carbs per day without negative consequences. When I say ‘negative consequences’ I mean weight regain, which is the easiest preliminary indicator of something going haywire with your fat metabolism.

As you read earlier, weight alone is a weak indicator of health. It is especially true as you ramp up the carbs. This is because, as you begin to store more glycogen,
you will also retain more body fluid. As many as 5 grams of water will be retained for every gram of glycogen. If you completely fall off the wagon – you won’t want to, will you? – you can put on several pounds in just a couple of days. Most of this will be water weight. In such case, you should get back on track in a hurry by dumping all the extra water and getting back into ketosis as fast as possible. (See the best ways for doing this are explained below, in the section, Fat Loss Accelerator: Short-Term Fat Fasting. Simply miraculous.)

Important Tips for An Effective Low-Carb Eating Style

Your body will take some time to adapt to this eating style, anywhere from a few days to 2-3 weeks. It depends on how effective your approach is and how much, if any, metabolic resistance to it you encounter. You will ultimately reap the rewards of better health, including reduced visceral fat (i.e., belly fat), more energy, greater capacity for exercise, and mental clarity. All without hunger. However, as you begin your path to such low-carb nirvana, you may find yourself easily fatigued, light-headed, having muscle cramps, and maybe even feeling a little irritable. You could also, off and on, see your lust for carbohydrates raise its ugly head.

Your body is simply retooling the enzymes and hormones that you need for metabolic health. It is a necessary process for replacing your carbohydrate metabolism with ketones as much as possible. During this period, if you lose your get up and go for your normal exercise, that’s fine. Just don’t exercise for a short time. Certainly don’t start a new exercise program during a period of low-carb adaptation.

Now, doesn’t it make sense that you shorten this period as much as possible? After all, why prolong the agony? The key for resetting your metabolism is ... drumroll ...

Crank up the fat.

When you are going low-carb, the choice you have is how much protein vs. fat for replacing dietary carbs. If you take a high-protein, moderate-fat approach your liver will convert more protein into glucose. This will keep your glucose machinery in fine form, although it will slow down and even stall your ketone production.
On the other hand, once you cut your carbs to the minimum, you can speed up ketone production by loading up on more fats. Eat fatty cuts of meat. Or at least eat the fatty parts first. Don’t be so silly as to remove chunks of fat from steak and leave them behind, like so many people do. If you leave anything on your plate, make it the leanest portions of meat that get tossed.

Eat all the skin on chicken, especially on the fattier dark meat. Boneless, skinless chicken breast is not your friend here. Have twice the number of bacon strips that you normally do (general health tip: eat only uncured bacon). And don’t cook it until all the fat is gone and all you have is a dry, crispy wisp of protein to crunch on. If you are having eggs, feel free to cook them in the bacon fat left in the pan. In fact, save whatever bacon fat you have left over and use it for cooking dinner later. Or cook in butter, lard, or coconut oil.

By the way, if you are really fond of those convenient protein shakes to start out the day, be sure to add some fat or oil to them. Coconut oil is one of the best additions, since this oil will speed up ketosis and help remove fat from your liver. (MCT oil, which is the major component of coconut oil, is also great here.) Before I discovered this advice, I was puzzled that my so-called health shakes (almost entirely protein) stalled my ketosis. Now I know why. As mentioned above, an abundance of protein without enough fat was simply directing my liver to make more glucose. It was as if I hadn’t been on low-carb at all.

THE LESSON:

The best approach to starting a low-carb eating style is to crank up your fat intake. Dietary fat is the miracle worker for getting your metabolism going in the right direction, not protein. In fact, too much protein will slow you down.

WARNING AND ADVICE: As your appropriate fluid balance begins to come around in the early stages of a low-carb eating style, your body will require more water intake. This is a good thing, since it indicates that your insulin sensitivity is getting better and your kidneys are not hanging on to so much excess fluid.
However, as your body eliminates excess fluids it also excretes three key minerals that you have to make up for. Here is what you should know.

Some of the symptoms of low-carb adaptation – fatigue, headache, cramps, lightheadedness when standing up – come from loss of sodium as you continue to excrete excess fluids. This means that it is critically important to consume more salt.

Salt your foods. Put a smidgeon of sea salt into each glass of water that you drink. Substitute a cup of boullion (1 cube in a cup of hot water) for one of your usual cups of coffee or tea. You have to take in a lot more sodium than you are used to. And keeping drinking extra water.

Sodium is tied to potassium. You will lose a lot of both as you enter low-carb metabolism. Although keeping your sodium levels up also helps maintain potassium levels, you will have to replace lost potassium. The easiest way is to take potassium supplements, no more than 100 mg at a time, up to 4-5 times over the course of a day. Potassium supplements are inexpensive and widely available in supermarkets and nutrition stores. If you are on blood pressure medications, though, first ask your doctor if it is okay for you to take potassium.

Most people are already severely deficient in magnesium, especially if they are overweight, insulin resistant, hypertensive or diabetic. The low-carb eating style will drive magnesium levels down even further. Sufficient magnesium levels will help regulate potassium levels, too.

The best way to get magnesium is by supplementation. A 300-400 daily intake of chelated magnesium is plenty. However, that amount may also have a laxative effect if taken at one time. If that happens (and you will notice it quickly), taking divided doses over the course of a day will negate that problem.

Make sure that your magnesium supplement is made of chelated magnesium – i.e. citrate, aspartate, or other ‘-ate’ (not carbonate!). Also doublecheck the label to get an accurate amount of how much magnesium is in each pill, not the total chelate. For example, 1,000 mg of magnesium aspartate gives only about 150 mg of magnesium. The rest is the aspartate.
One more thing: An important benefit from taking a magnesium supplement before bedtime is its relaxing effect. It will help you sleep!

THE LESSON:

The initial steps toward ketosis lead to a loss of excess body fluid and accompanying electrolyte minerals. The most crucial electrolytes that you must replace are sodium, potassium, and magnesium.

High-Carb Eating Style: A Surprising Paleo Perspective

Meat and potatoes...what a great combination, right? Wrong!

You might guess, based on the low-carb theme of this book, that a dinner of meat and potatoes is a no-no because of the high dose of carbs. You would be partly correct. Here is the view from the Paleo perspective – i.e., what pre-agricultural humans ate regularly and what it means for how we handle energy from food.

First, consider Paleo meat as a high-fat protein source, with emphasis on high-fat. The metabolism of fat in such a meal evolved to look like this (for you biochemists reading this, please excuse the highly simplified summaries in this section):

\[ \text{FAT} \rightarrow \text{beta-oxidation in liver} \rightarrow \text{acetyl-CoA} \]

In this process, acetyl-CoA is the metabolite from fat that goes into mitochondria, where energy from it is extracted for running all of cellular metabolism. In the case of excess acetyl-CoA, it would be converted to fat and stored for future use.

Now compare with this process:

\[ \text{CARBOHYDRATE} \rightarrow \text{glycolysis in liver} \rightarrow \text{acetyl-CoA} \]

This happened to Paleolithic humans when they had roots and fruits to eat. When these carb sources were abundant, plenty of acetyl-CoA would go into
mitochondria and any excess carb would be converted to glycogen or fat for storage. Insulin played a big role in clearing out excess carbs and helped put them into storage, as it does now.

People in the Paleolithic era either had high-fat meat or they had high-carb roots and fruits. They did not have them at the same time.

In modern times, we typically have fat and carb at the same meal. Indeed, we often have it at almost every meal, day in and day out, month after month, year after year.

Here is what happens after eating such meals:

\[
FAT \rightarrow \text{beta-oxidation in liver} \rightarrow \text{acetyl-CoA} \leftarrow \text{glycolysis in liver} \leftarrow \text{CARBOHYDRATES}
\]

What looks like a double-whammy energy bonus for mitochondria is actually a double-whammy overload of acetyl-CoA. This places an overwhelming demand on mitochondria that evolved to handle excess energy from fat OR from carbs in times of plenty – not from both at the same time.

This constant, repeated mitochondrial overload drives insulin resistance, fatty liver disease, and every other consequence of accumulating visceral fat that underlies the Metabolic Syndrome. It makes your mitochondria sick, your liver sick, and the whole rest of you sick.

You already know that this does not happen on a low-carb, high-fat eating style. Indeed, the story about the Inuits explains how a high-fat, all meat, basically NO carb eating style is perfectly healthy. This is because we evolved to handle fat or carbs, not both together. The Inuits avoided overloading their mitochondria by not consuming carbs with their high-fat diet.

Maybe you have been puzzled, as I have, when hearing stories and seeing studies of people who survive on only fruit. They are perfectly healthy, too. Their foods, however, contain little or no fat. This is because mitochondria evolved to handle carbs very well in the near absence of fats.
Mitochondria, unfortunately, have not evolved to handle fat and carbs at the same time. The lesson from the Paleolithic is that you can live a perfectly healthy life on a high-carb diet as long as you consume little or no fat.

If you never heard of a high-carb Paleo diet, it is because nobody is paying attention to this possibility. This probably has to do with worries about getting enough protein, essential fatty acids, fat-soluble vitamins, and the list goes on and on. Nevertheless, you could imitate such an eating plan, alternating between periods of high carbs (NEVER processed products!) and the better known low-carb, high-fat plan that is supposed to be the ‘true’ Paleo diet.

The Paleo surprise is that high-carb eating can and does work. High-fat eating can and does work. They just don’t work simultaneously.

As you can see, the truth about what is best for your health lies somewhere in between the modernized version of the Paleo diet and what this ancient diet truly was.

THE LESSON:

A low-carb, high-fat approach is great. A high-carb, low-fat approach can also work. Fat and carbs together lead to metabolic disaster.

Fat Loss Accelerator: Short-Term Fat-Fasting

If you weigh yourself obsessively, every day or sometimes more than once per day, like I do, you may have noticed a quick rise in weight by overdoing carb intake by just a little bit. This increase, of course, is mostly to do with the 5-fold increase in water retention for every gram of carb. Fortunately, even though this also indicates that ketosis has stalled, you can reverse the trend in a matter of days.

The first ‘trick’ comes from Dr. A.T.W. Simeons, the creator of the hCG diet protocol that you read about earlier. He discovered that his patients, after the hormone phase of the protocol, had to keep their carb intake low to stay at their
target weight. This eating style was especially important for a 21-day post-hormone phase.

Dr. Simeons also discovered that, if a patient partook of a little too much carb and regained 2 pounds or more, the extra gain could be removed within 24 hours. The strategy is simply as follows: After discovering the extra weight upon the morning weigh-in, immediately start a day-long fast, culminated by a dinner of steak and an apple. The fattier the steak the better.

Dr. Simeons called this the ‘steak and apple day’ and thousands of hCG aficionados know it by this name. When using it myself, even without the apple, I can drop all the excess gain from a mini-carb binge from the previous day – by the next morning. This means that I can drop several pounds within 24 hours. My record is about 3 and a half pounds. I know others who have made it past 5 pounds.

This is a remarkable reset trick for dumping excess fluid accumulation due to carbs. The only side effect is that the fluid excretion may require several visits to the bathroom during the night after a fast and a steak dinner.

While this will not return you to full ketosis, it puts you into a better position for doing so.

The second trick, which does indeed rocket you into ketosis, is a strategy that I first encountered in Dr. Robert Atkins’ book, New Diet Revolution. He called it ‘Fat-Fasting’. He based his advice on research that had been published almost three decades earlier.

The way Dr. Atkins explained it, and as many bloggers have described it based on their own experiences, optimal fat-fasting is as follows:

- Limit daily intake to 1,000 calories
- Get 90 percent of those calories from fat
- Get any remaining 100 calories from about 15 g of protein and 10 g of carbs
Ignore for the moment that, as you know by now, using calories as a measure of anything useful metabolically is a major flaw.

Dr. Atkins and many users of this fat-fasting strategy have generally reported spectacular results – drops of several pounds in just a few days. The Atkins diet protocol, however, only recommended it to be used for no more than 5 days at a time. Moreover, its application is supposed to be most beneficial for those who have such powerful metabolic resistance that they stall even during the Induction Phase of his diet (i.e., the initial 14-day ultra-low carb period).

Based on my experience, in spite of having no problem with metabolic resistance, I have discovered that fat-fasting is like putting fat loss biology on steroids. First off, in a practical sense, I transformed the caloric nonsense of this high-speed fat loss into measurable amounts of food and came up with the following daily meals that I rotated among different days. Note that a fat-fast allows for a maximum of 5 of these meals in any one day.

- **Meal 1:** 2 egg yolks (hard-boiled for convenience), mixed with 1 tbsp. of mayonnaise (must be a brand with the least amount of added sugar – read the labels)

- **Meal 2:** 1 ounce of macadamia nuts

- **Meal 3:** 2 ounces of liverwurst with a half ounce of pork rinds

- **Meal 4:** 1 ounce of light tuna with 1 tbsp. of mayonnaise and a half ounce of pork rinds

- **Meal 5:** 1 ounce of light tuna with 1 tbsp. of mayonnaise and one-half avocado

- **Note:** Substitute 1 ounce of cream cheese for mayonnaise if desired

These meals include the highest fat content of any of the foods that I like. Dr. Atkins and many bloggers provide additional suggestions (e.g., sour cream, heavy cream).
Example Personal Results from Fat-Fasting

You can find many testimonials to the helpfulness of fat-fasting by doing a Google search. As you can expect, individual results vary. Isn’t this always the case? This just means that how well it works for you is how well it works for you. The only way for you to find out is to do it.

Why only 5 days max? Nobody knows what happens after 5 days, so the worry is about the unknown. Why only for the metabolic resistant? Based on my experience, this is not a pre-requirement for doing a fat-fast.

With that out of the way, here is what my experience was:

**Day 1:** Starting at: 182.5 lbs; 23.2% body fat; ketostix reading (level of ketosis): nothing

**Day 2:** 181.6 lbs; no change in body fat; ketostix reading: trace ketosis

**Day 3:** 179.7 lbs; 22.7% body fat; ketostix reading: slightly more than trace ketosis

**Day 4:** 179.1 lbs; no change in body fat; ketostix reading: small amt. of ketosis (next level up from trace)

**Day 5:** 179.1 lbs; 22.5% body fat; ketostix reading: moderate (next level above small)

In the way of ‘what happened next’, I had a big prime rib dinner at the end of Day 5, including two squares of chocolate for dessert. The following morning I was at 180.0 lbs and proceeded to have a fasting day with a steak dinner. The next morning I weighed in at 178.8 lbs, and my ketostix reading had slipped back to ‘small’.

What does all this tell you? As statisticians love to say when their results are not statistically significant, “Oh, but there is a trend!” That is about all I can say by using myself as the sole data point. Nevertheless, I was happy to see positive results, in spite of not being metabolically resistant or obese. I dropped 3.4 lbs
and 0.7% body fat in less than 5 days. Most importantly, in my opinion, was the change in my level of ketosis from none at the beginning to moderate at the end. This amount of change normally takes me 7-14 days on the Induction Phase of the Atkins Diet.

So far I have done the fat-fast one more time, with the same results. Woo-hoo! Still a trend!

**THE LESSON:**

Fat-fasting gets you into ketosis at warp-speed. Use it best whenever you are stuck or stalled or whenever you just want to move your fat metabolism along in a big hurry. Expect spectacular results.

**Effective Exercise**

The operational term here is ‘effective’. Knowing what that means is crucial for knowing why exercise is important for your health and for choosing exercises that will benefit you the most.

Before delving into this topic, though, I must comment on...

**Exercise Idiocy – A Must Read**

Let’s get something straight right out of the chute: *You do not exercise fat.*

What this means is that a huge plethora of ab machines and other machines, exercise programs (ab crunches, sit-ups, push/pull-ups, P90x-y-z, and other insanities), and in general most advice about exercising to lose fat is just plain wrong. In my opinion, it is worse than wrong. It gives people a false sense of what is possible, which is guaranteed to fail.

I could spend quite a few pages pointing out multiple examples of the fundamental hoax of exercising off fat. However, one caught my attention recently, in a late-night infomercial about a piece of equipment called the Fluidity Bar (see fluidity.com if you are really curious about it).
Now let me vent a little about this thing. It represents all manner of exercise equipment and training advice, so it is my example of what is wrong with that whole industry. (Unfortunately, it is just one example out of dozens that I could also cite here.)

First off, this is supposedly a ‘cut above’ other machines because it is patented. (I will restrain myself from pointing out the gaping the holes in the patent approval process ... let’s just say that getting a patent is often meaningless, except for use in marketing hype).

Take a look at what the abstract of the Fluidity Bar patent actually says:

United States Patent: 7,608,029
October 27, 2009

_Free standing ballet bar exercise device_

_A free standing, height adjustable ballet bar exercise device is provided. The device comprises a pair of legs, telescoping support arms pivotally attached to the legs and supporting a horizontal ballet bar disposed between the support arms, a lower cross bar connecting the legs intermediate their ends, an upper cross bar connecting the support arms, a backboard pivotally attached to the upper cross bar and releasably attached to the lower cross bar, and a floor board hingedly attached to the bottom edge of the backboard and adapted to lay flat on a floor to support the weight of the user. Preferably the backboard and floor board are covered by soft mats._

_The patent is for a new design for exercise equipment. Notice that there is not one single hint in this abstract (nor anywhere in the entire patent) that this equipment does anything at all for fat loss or weight loss or any other physical attribute of importance._

Why do you suppose that is? Because it does nothing for fat loss or weight loss. You can imagine that my jaw dropped as I watched the infomercial. The creator of this machine according to the company website, by the name of Michelle
Austin (who is curiously NOT listed as one of the inventors on the patent), explained how working out with it could reduce arm flab. That’s right. All you have to do is reverse pull ups from a prone position and that unwanted hanging blob under your arms will miraculously disappear.

_Utter hogwash!_

Thanks for putting up with my vent. Now back to the calm, analytical scientist that I want you to see me as.

The point is that fat loss machines and fat loss exercises do not exist because _you do not exercise fat._

**The Definition of Physical Fitness ... Oops, There Isn’t One!**

The authors of one of my favorite books, *Body by Science*, started out their book by admitting that they could not find a universally agreed upon definition of physical fitness anywhere – not in medicine, not in general health care, not in physical training. This is in spite of the widespread use of the term in all of those fields and by the general public.

They suggested one, though, based on changes that can accrue from exercise. It is:

**Fitness:** The bodily state of being physiologically capable of handling challenges that exist above a resting threshold of activity.

Let’s look at a couple of studies that might show us how and where this definition might apply. The first one is one of the most remarkable studies that I have come across, because in one fell swoop it supports the above definition of fitness and, at the same time, shows how useless it is for weight loss.

Here are the details of the reference information, accompanied by the abstract from the original journal article. I will point out what is a big surprise for most people right after the abstract below.

Abstract

The change in diet and body composition was studied in a group of 9 female and 18 male subjects, starting a training program for 18 months with the ultimate goal of running the marathon. Mean daily intakes from 7-day dietary records for macro- and micronutrients were calculated at the start, after 1 year of training, and just before running the marathon. Anthropometric measurements were taken on the same occasions. In males the body fat mass decreased 2.4 kg, while in females no change in body composition was observed over the 18-month training period. Energy intake increased significantly in males from 131 to 159 kJ/kg/day. In women no significant change was recorded (141 to 147 kJ/kg/day). However, in both sexes CHO intake was significantly higher after 18 months (males 63.7-81.7 kJ/kg, females 68.0-81.9 kJ/kg). Also En% CHO increased significantly in males from 48 to 52 En% and in females from 47 to 55 En%. This extra energy intake of CHO in women was covered at the expense of dietary fat. These changes in food habits in both groups are favorable in relation to the nutritional guidelines for better cardiovascular health. Whether the sex difference found in economizing energy exchange as a response to an intensive training program is based on an increased food efficiency will require further investigation.

How does this fit the definition of fitness? The subjects in this study became fit to run a marathon – i.e., became capable of handling the challenges of running a marathon above a beginning resting threshold of activity (meaning, not being able to run a marathon). Nothing remarkable about that.

What if you started a running program, though, where you jumped into marathon training expecting to lose a weight along the way? Training for a marathon requires, based on the old days when I was crazy enough to do these kinds of things, running at least 25-40 miles per week. More is better, although I never did more than about 40 miles per week.
Now note where I have bolded the abstract. Men dropped 2.4 kg of body fat mass (ca. 5 and a quarter pounds) and women had no change. This is nearly nothing for men and actually nothing for women.

In the 1980s I noticed that my running buddies never got slimmer, even when training for and completing marathons. The study above just formalizes my informal observation that running did nothing for their weight management.

I know that all this seems like a lot of scientific gobbledygook. Nevertheless, the fact is that the single study above simply represents the sum of dozens of studies that show the failure of exercise to reduce weight or body fat.

The second study I want to mention is a classic from 1976:


In this study, thirteen subjects were trained 4-5 times per week for four weeks on a stationary bike, using just one leg. At the end of the study the VO2 max (a measure of aerobic capacity) increased by an average of 23% when measuring the exercised leg. The VO2 max did not change at all when measuring the unexercised leg.

This study pointed to a specific metabolic adaptation at the muscular level in one leg and not the other, whereas dogma at the time (and at the present) predicted a central cardiovascular improvement. In other words, if you train by exercising one leg, you will boost your VO2 max only in the muscles of the leg that you exercise. You will not build aerobic fitness elsewhere in your body.

If you are reading between the lines, you might note that so-called ‘cardio’ workouts have nothing to do with ‘cardio’ and everything to do with what you do for the actual muscles that you are exercising.

In simpler terms, if you exercise by running, you become fit for running. If you exercise by cycling, you become fit for cycling. If you exercise by cycling with one leg, you become fit for cycling with one leg. The bottom line is that if you want to
be fit for something, you have to train for that something. Cross-fitness training is a myth. (Oops...there goes a whole sub-category of training programs, including one that is famously called ‘Cross Fit’.)

**The Two Best Approaches to Exercise**

So far you have learned that exercise for weight or fat loss doesn’t work, that all ab machines and their ilk are a rip-off, that aerobic exercise is not what you’ve been led to believe, and that cross-fit training is a myth. Is there anything really useful about exercise. **You bet!**

And is there any kind of exercise that is better than others. **You bet!**

First, **what is truly useful about exercise?**

*This is crucial: it improves your insulin sensitivity and it makes you build muscle at the expense of visceral fat and liver fat.* Think about this. All the problems of fat metabolism start with the development of insulin resistance and the buildup of visceral fat and liver fat. When it comes to exercise, therefore, all you really need to do is effective exercise to reverse those three problems – and that means doing effective exercise.

*The first* of the two best ways to do effective exercise is to build muscle through resistance training. This means lifting weights. However, at the outset I want you to be clear that lifting weights does not mean heading for the gym 3 or more times per week and doing multiple sets with multiple weights. You know what I mean: 3 sets of 10 reps for curls, 3 sets of 10 reps for bench press, etc., etc. That approach demands a huge time commitment, which is a major drawback that stops people from doing any exercises at all. And it is ineffective. In fact, it is detrimental to efficient muscle building.

What is most effective for muscle building by lifting weights is explained in great detail in the book, *Body by Science*, by Doug McGuff and John Little. The full title (and link to a detail page on Amazon) is: **Body by Science: A Research Based Program to Get the Results You Want in 12 Minutes a Week**. I highly recommend it to anyone who really wants to understand how and why you can get the results you want in 12 minutes a week.
The basic premise is that you have to recruit fast twitch, intermediate twitch, and slow twitch muscles simultaneously for optimum muscle building results. The fundamental approach for doing so is by lifting the right weights (i.e., the right muscle movements) very slowly to get the desired Time Under Load (TUL) with the right amount of weight.

One of the surprising keys to successful muscle building using the Body by Science method (and it is the best) is that you must allow your muscles to recover ... for a minimum of 7 days between workouts ... for maximum benefit. That’s right – if you work out more than once a week you will undermine your results. In fact, you can alternate muscle groups each week so that no muscle group gets worked out more than every 14 days. And you will still see maximum benefits.

Fortunately for us, the authors put together a set of videos that show exactly what that looks like and posted them for free access on YouTube. I am so impressed with this approach to exercise and the results that I have achieved with it that I listed and linked all of their videos on my health blog here: Surprise About Defining Fitness.

The videos are a fabulous resource because they provide visual instruction that is otherwise difficult to grasp from a book. Also, from my personal point of view, it gives me an easy way to explain one of the two best ways to work out for maximum benefit – meaning, I let those experts to the talking. All you have to do is go to my blog and watch the videos that I listed there.

The second of the two best ways to do effective exercise is sprint interval training. The best way to explain what this means is through a comparison with typical long-distance endurance training. The most eye-opening studies on this topic have come out of McMaster University in Ontario, by a research group headed by M.J. Gibala.

To keep things a little simple, here is just one of the McMaster studies, as summarized in the abstract of the journal article below. The results turned out to be a big surprise to the exercise industry, most of which has yet to incorporate new training based on it.
Parra et al. (Acta Physiol. Scand 169: 157-165, 2000) showed that 2 wk of daily sprint interval training (SIT) increased citrate synthase (CS) maximal activity but did not change “anaerobic” work capacity, possibly because of chronic fatigue induced by daily training. The effect of fewer SIT sessions on muscle oxidative potential is unknown, and aside from changes in peak oxygen uptake (Vo\(2\) peak), no study has examined the effect of SIT on “aerobic” exercise capacity. We tested the hypothesis that six sessions of SIT, performed over 2 wk with 1-2 days rest between sessions to promote recovery, would increase CS maximal activity and endurance capacity during cycling at approximately 80% Vo\(2\) peak. Eight recreationally active subjects [age = 22 +/- 1 yr; Vo\(2\) peak = 45 +/- 3 ml.kg\(^{-1}\).min\(^{-1}\) (mean +/- SE)] were studied before and 3 days after SIT. Each training session consisted of four to seven “all-out” 30-s Wingate tests with 4 min of recovery. After SIT, CS maximal activity increased by 38% (5.5 +/- 1.0 vs. 4.0 +/- 0.7 mmol.kg protein\(^{-1}\).h\(^{-1}\)) and resting muscle glycogen content increased by 26% (614 +/- 39 vs. 489 +/- 57 mmol/kg dry wt) (both P < 0.05). Most strikingly, cycle endurance capacity increased by 100% after SIT (51 +/- 11 vs. 26 +/- 5 min; P < 0.05), despite no change in Vo\(2\) peak. The coefficient of variation for the cycle test was 12.0%, and a control group (n = 8) showed no change in performance when tested approximately 2 wk apart without SIT. **We conclude that short sprint interval training (approximately 15 min of intense exercise over 2 wk) increased muscle oxidative potential and doubled endurance capacity during intense aerobic cycling in recreationally active individuals.**

Note that, as I’ve bolded above, the doubled endurance capacity occurred after only six sessions over two weeks. This is a very fast way to build endurance the next time you go to the gym for an exercise bike workout.
Oh, and note that the results from two weeks of SIT were also better than those of standard cycling training (the ‘control’). Although not stated in the abstract, standard cycling training is what you might expect – i.e., long distance riding for more than an hour at a time. Long, tortuous hours on the road (or exercise bike at the gym) are no longer necessary for building endurance. Indeed, they are not even as efficient as a few SIT sessions.

Doing a few indoor high-intensity cycling sessions, maybe even 2-3, seems easy enough, doesn’t it? Yeah, but to me it is boring. I love to run, so I have adapted the same principles of SIT cycling to SIT on foot – i.e., running. I achieved excellent endurance running fitness, as indicated by a personal record in a recent 10K race – by simply following this workout: 1-3 times per week; run (sprint) for 40-45 seconds; walk for about a minute and half; repeat sprint. Do a total of 10 such intervals.

The best part about the efficiency of SIT is that I don’t have to run 25-40 miles per week to stay fit for running. Just 1-3 SIT sessions per week, for a total of 10-15 minutes of actual running, provides all the endurance fitness that I want. Furthermore, during the super-hot days of summer here in Arizona, I can go indoors and get the same benefits from SIT by working out on a stationary bike.

You may also want to make a mental note that the common practice of doing hour-long light workouts on a treadmill, stationary bike, stair-stepper, etc. are nearly useless for any level of fitness. The most that some folks get out of this approach, based on my own observations, is that they can catch up on their reading or TV news. (The machines at my local LA Fitness have TV sets on the handlebars!) It is just not effective exercise.

You’ve probably heard that running is bad on your knees and other joints. This is true if you use the wrong running style, which has unfortunately been the common running style since the modern running shoe was foisted on an unsuspecting public in the 1970s.

In reality, humans are adapted to a running style that does not harm the joints. When I found out about it, I quickly adopted the new/old style and blogged about what it means. I even included a link to a truly eye-opening video from the Harvard University Skeletal Biology Lab in my post. The post and video explain
what the proper running style is and why it important for all runners, not just seniors like me. It is here: **Barefoot Running – Behold The Nuchal Ligament**. If you have any notion at all that you might like to run for maximum fitness and minimum stress or injury, this is a must-read blog post.

**How about just plain walking for fitness?** Exercise by walking, of course, gets you fit for ... well, walking. Here is what you can expect from a brisk walk:

During the first 15-20 minutes the stored sugar in muscle tissue, which is in the form of glycogen, is your main fuel. Beyond about 20 minutes, you begin to deplete circulating blood sugar (glucose) and free fatty acids. After about 40 minutes of brisk exercise, you start burning more of your stored liver glycogen and begin breaking down stored fats. A brisk walk of 60 minutes, therefore, gives you about 20 minutes in a low level fat metabolism. Do a brisk walk as many times a week as you can. Hey, that is as easy as it gets, even though returns are relatively minor.

**THE LESSON:**

*Exercise is absolutely crucial for a healthy metabolism. However, the common belief that you can exercise off fat is ridiculous. The function of exercise is to improve insulin sensitivity, thereby making your body build muscle at the expense of visceral fat and liver fat. The two best exercises are:*  
1) appropriate resistance training (weightlifting) no more than once per week; and, 2) sprint interval training (cycling, running) 1-3 times per week. These are the most efficient ways to exercise for building muscle and endurance.

**Stress Management**

Obesity is driven by stress. Stress is driven by obesity. Hmm.

**Cortisol: Gotta Love It, Just Not Too Much**

Cortisol is the key steroid hormone that links stress and metabolic disease, including obesity. On one hand you have to have it or you will die. On the other
hand, having too much too often will make you sick. The trick is to have just the right amount, in small doses and in short bursts.

When cortisol levels come and go the way they are supposed to, this hormone helps you from getting too dehydrated, improves memory and immune function, and reduces inflammation. Moreover, when cortisol levels go up, so do insulin levels. These two hormones work together, insulin directing your body to store fat and cortisol telling you where to put it.

As you already know, health problems arise from chronically high insulin levels. Likewise, health problems arise from chronically high cortisol levels. In fact, the double whammy is that, even though insulin and cortisol do different things in response to your food intake, they act synergistically to make the metabolic syndrome worse.

Cortisol is well-known as the so-called ‘stress hormone’ because it spikes during periods of stress. Our survival depends on this response. However, constant stress will cause continuously elevated levels of cortisol. If you experience stress regularly – which most people do every day of their lives – then you no doubt suffer from an overabundance of cortisol. Sleep deprivation, work-related stress, just driving to and from work, financial worries, job stress, concern about the economy, and many other causes lead to chronically elevated cortisol levels. Stressors seem almost limitless in modern times, don’t they?

On top of all that, cortisol has a predisposition for telling your body to gain weight, specifically as increased visceral fat!

Since stress comes from so many difference sources, and ruins your health in many ways, the trick is to know where it is coming from and how to reduce whatever causes of it that you can. Mentally reducing stress may include such strategies as meditation, hypnosis, breathing exercises, and many more. Physically, though, guess what...exercise is your best internal stress reducer.

of 24-hour fasting every day – significantly lowered cortisol levels over an 8-week period. This does not make fasting a certainty for lowering cortisol levels, although it raises the possibility.

Sleep deprivation is the most widespread source of stress in modern times. We simply do not, as a culture, get enough quality sleep. Sleep deprivation is epidemic. There are so many things that you can do, and so many experts explaining what they are, that I will simply say this: Find out how to get better sleep, and more of it, regardless of how you do it. Search for advice on Google and get going on it. Personally my most effective strategies are taking sleep-enhancing supplements (primarily melatonin) and practicing meditation (specifically, Transcendental Meditation).

If you are obese you have a disproportionately increased chance of suffering from sleep apnea. This highly dangerous symptom is like the elephant in the room when it comes to ruining sleep. If this is the case with you, addressing and fixing this condition trumps all other strategies combined.

Supplementation

Weight loss and fat loss supplements are, for the most part, an absolute waste of time and money. In spite of breathless marketing hype, most such supplements have little or no scientific research behind them and they fail to even make sense for human physiology. Prescription diet pills are no better, unless you look forward to the element of danger every time the FDA approves a new drug for you. I’ve touched on specific examples in a later section (What About Diet Pills?) to give you a tiny glimpse into the problems associated with such medical and nutraceutical scams. The topic is enough to fill a full book by itself.

The good news is that a certain few supplements are well-established to be beneficial for the metabolism that you want to improve. I am going to keep it simple for you. Rather than explaining the myriad supplements that I take myself, I am going to explain just two approaches to metabolic health that I think are the most important in the biology of fat.

Changing Your Metabolism with Green Tea
This is the key research on green tea that swayed me to use this supplement.


**Abstract**

A recently developed oral formulation in the form of coated tablets (Monoselect Camellia) (MonCam) containing highly bioavailable green tea extract (GreenSelect Phytosome) was tested in obese subjects (n=100) of both genders on a hypocaloric diet. Fifty subjects were assigned to the green tea extract plus hypocaloric diet, while the other 50 subjects followed the hypocaloric diet only. **After 90 days of treatment, significant weight loss and decreased body mass index (BMI) were observed in the group taking the herbal extract (14-kg loss in the green tea group compared to a 5-kg loss in the diet-only group); waistline was reduced only in male subjects.** Besides the effect on weight and BMI, biochemical parameters (LDL-, HDL-, and total cholesterol, triglycerides, growth hormone, insulin-like growth factor-1, insulin, and cortisol) were improved in both groups. Leptin, not tested in the diet-only group, was reduced in patients taking MonCam. Taking into consideration the high safety profile of the product and the total absence of adverse effects observed during and after the trial, MonCam appears to be a safe and effective tool for weight loss.

Note the bolded parts that summarize the key results. The core target in this study was weight, which dropped significantly. Waist size, which is not typically an issue in premenopausal women, was reduced only in male subjects. This is where men typically accumulate fat as visceral fat. In addition, improvements were found in a huge set of biochemical markers:

- Total cholesterol
- Triglycerides
- Growth hormone (hGH)
- Insulin-like growth factor-1 (linked to hGH levels)
- Insulin
- Cortisol
What really got my attention in this list is the boost in hGH. In the original article, the data showed an increase of 321% in the levels of this hormone. That is tremendous, especially for ‘mature’ folks like me, whose hGH levels seem to be dropping off of a cliff.

The green tea preparation that underlies this study is based on an enhanced-bioavailability technology called phytosomes. Specifically, the phytosome preparation of green tea extract here is called GreenSelect Phytosome.

What this means is that the beneficial effects of green tea extract are enhanced in the form of this phytosome preparation. This is not green tea itself, as you would have as a drink, nor is it a green tea herb that consists of leaf powder. It is an extract that is bound to phytosomes.

To find a product that contains GreenSelect Phytosome, my advice is to search on Google on the keywords, ‘GreenSelect Phytosome’, to find whatever is available. You will find a small handful of manufacturers who have licensing approval to use this ingredient. As an example, the one that I use is available at my online nutrition store here. NOTE: If you order from my site, be sure to use the login code, ‘dnc42’, to gain access.

THE LESSON:

The most well-researched supplement for inducing healthy metabolic changes is green tea. The best preparations are those that contain a green tea extract combined with phytosome delivery technology. This excludes green tea beverages and green tea powdered herb products.

Supplements for Muscle Building – Really!

Please ignore BodyBuilding.com and other nutso sources of information about how to build muscle. Unless, of course, you want to look like Arnold Schwarzenegger in his Mr. Universe heyday. Nothing wrong with that.
For the rest of us normal folks, muscle building can be significantly enhanced by supplementation if done right and if appropriate. Doing it right means following clinical protocol from published studies. Being appropriate means that some of it does not apply to seniors ... er, to mature folks like me.

Here is what I have found out...

**Boosting hGH with L-Arginine**

The best and healthiest muscle-building supplements have the effect of boosting growth hormone levels. You may recall that hGH injections would transform your lean body into a sculpted Adonis, or a 66-year old Sylvester Stallone. Unfortunately, hGH injections are not available to everyone, not cheap, and not always recommended.

Enter the field of supplements called ‘growth hormone secretagogues’. These are substances that are defined as inducing the release of hGH from the pituitary gland. Apparently one of the problems with keeping hGH levels up is that it gets stuck in that gland. Secretagogues promote its release into circulation.

Hundreds of products are now on the market that claim to be the ‘best’ hGH secretagogue ever created. However, the simplest and best-supported secretagogue based on lots of scientific research is plain old L-arginine. Yup, just a common amino acid.

A dose of L-arginine an hour before a weightlifting workout speeds muscle building. Indeed, one researcher simply took 10 grams of L-arginine before doing bench presses and no other exercise. Within 6 weeks she gained 5 pounds of muscle and dropped 25 pounds of fat.

Besides individual experiences like that, clinical studies have shown that various doses of L-arginine have a wide range of effectiveness. Based on these studies, the smallest effects can be expected at dosages of less than 3 grams per day. **The impact of L-arginine also shows a diminishing response with aging.** Furthermore, the greatest growth hormone responses to L-arginine occur in subjects with the lowest body fat composition and the highest aerobic capacity.
All this means is that the older you get, the less effect L-arginine has, and that the more fit and slim you are, the greater the effect is. That latter point is interesting because it highlights an upward health spiral. You take L-arginine to boost hGH and muscle-building, which makes you more fit, which enhances the effects of L-arginine.

Starting dosages for L-arginine as a supplement are 2 to 5 grams on an empty stomach one hour before exercise and before bedtime. Side effects may include stomach upset, nausea, and diarrhea. However, these can be minimized by starting at low dosages (1 gram) and building up slowly.

Enhancing Performance with Additional Amino Acids

Bodybuilders get even better results by combining L-arginine with other amino acids, such as L-ornithine, L-lysine, and L-glutamine. This is called amino acid stacking. When taken together, these amino acids have a synergistic effect on hGH release. However, there is no need to make it that complicated unless you are shooting for a Mr./Ms.Universe competition.

I’d say that just sticking with L-arginine by itself is sufficient. Besides, since this amino acid is so common and so widely available in capsule or powder form, it is also very inexpensive.

Oh, about that comment that I bolded above, regarding the diminishing effects of L-arginine with aging. It turns out that above about age 45, no amount of L-arginine seems to work. Even megadoses (which cause diarrhea at NASCAR-like speed) don’t work. I was so disappointed when I learned that. However, I discovered a way to get around it, which I will explain below.

Age-Defying Muscle Building: Listen Up Fellow Baby Boomers!

L-Arginine isn’t the be-all and end-all of muscle-building supplements, my fellow seniors. Our bodies, regardless of age, have one more shot at supplementation for successful muscle-building, regardless of whatever we do in the way of exercise. In fact, the one supplement that fits the bill works even in the absence of exercise.
Prof. Steven L. Nissen, in the Dept. of Animal Science at Iowa State University, got the ball rolling with his discovery of a metabolite of another common amino acid, L-leucine. Normally we can convert this amino acid to a metabolite called beta-hydroxy beta-methylbutyrate, or HMB (whew! Thank goodness for abbreviations!). This substance directly enhances muscle building. However, the natural conversion of L-leucine to HMB is a very slow process.

What Prof. Nissen discovered is that supplementing with HMB speeds things up considerably. In fact, the muscle-building benefits even showed up in a wonderful study of 70-year old women. Benefits accrued in this group even in the absence of exercise. This is a rare study because the bodybuilding industry is not really concerned with seniors. The main driving force behind this study was to address the loss of muscle mass that typifies aging.

The results were so positive that a major brand of senior supplements by the name of Ensure even created a new formula that includes HMB as an ingredient. (Never mind that it contains an ultra low dose of HMB or that all formulas of Ensure in general are basically sugar water with food dye.) The new formula, called Ensure Muscle Health, is not really impressive. In fact, I wouldn’t put that crap in my body on a dare. I can get my HMB elsewhere, thank you. Such as in the product that I use myself: HMB Complex. (Use access code, ‘dnc42’.)

**And the Best Combination is...**

As I dug deeper into what might work best for muscle-building, regardless of aging, I also ran into some phenomenal research on a much-maligned supplement called creatine. (Maligned because of idiots who abuse it and suffer the consequences.)

In fact, much to my delight, I ran across a study that was designed to find out whether creatine and HMB worked the same or have different mechanisms of action. What the researchers found is that creatine by itself helps build muscle and HMB by itself helps build muscle, as expected. The bonus is they also found that the two together have an additive effect.
Creatine works by enhancing the availability of phosphate for making ATP (remember that crucial energy molecule?). In contrast, HMB seems to have a muscle-sparing effect.

One more nice surprise about creatine is that the transfer mechanism that gets it into muscle can be boosted by adding glucose to the formula. Specifically, adding 5 grams of glucose to each gram of creatine leads to a 60 percent increase in phosphocreatine levels in muscle.

The challenge for me was finding purified glucose. It is not available as a supplement, and no other carbohydrate is as good as glucose for boosting creatine. I finally got the bright idea to look for it at a local brewing supply store, where I found it to be only 7 dollars for five pounds. No supplements are that cheap!

Taking all the research into consideration, here is what I determined to be the most effective formula of muscle-building. I mix it up in my own kitchen.

At least once per day, typically at bedtime, I take the following:

- 2 scoops of HMB Complex (1500 mg calcium-HMB plus assorted amino acids)
- 1/2 scoop of Creatine Monohydrate powder (i.e., 2 grams)
- 4 capsules of Growth Hormone Support by Pure Encapsulations (2000 mg L-arginine-HCl, 1000 mg ornithine alpha-ketoglutarate [OKG])
- 1 gram of L-lysine-HCl*
- 2 tsp glucose powder (ca. 10 grams) (Get it super inexpensively at any brewmaker’s supply store)

*L-Lysine is a useful for amino acid stacking with L-arginine from Growth Hormone Support; also counteracts the potential for L-arginine to induce shingles – trust me, you don’t want THAT problem.

*There you go, young folks and fellow Baby Boomers alike. That is the best there is for supplementation to build muscle.*
THE LESSON:

The best supplement combination for building muscle is: L-arginine and certain complementary amino acids, HMB (beta-hydroxy beta-methoxybutyrate), and creatine. Nothing else is comparable.
Your Genes Are Not Your Destiny

If you have ever thrown up your hands in disgust at the ‘fat’ genes that you got from your parents, there is new hope on the horizon. Although the DNA sequences of your genes are more or less fixed, it turns out that the way they operate – i.e., as a highly complex set of ON/OFF switches – responds to your environment. On the positive side, this includes your nutritional intake.

The field of study that examines how gene expression can be modified, and passed on to future generations, is called epigenetics. Some of the most exciting current ideas that researchers are pursuing involve the roles of epigenetics in inflammation, obesity, insulin resistance, type 2 diabetes, cardiovascular diseases, neurodegenerative diseases, and immune diseases.

It is no surprise that nutrition is turning out to be exceptionally important in epigenetics. After all, many nutrients and bioactive food components can alter the expression of genes at their most basic level. The stars of the show in early research include, methionine, choline, betaine, S-adenosylmethionine (SAM-e), resveratrol, genistein, sulforaphane, butyrate, diallyl sulfide, and B vitamins such as pyridoxine (B-6), folic acid (B-9), and the cobalamins (B-12).

These nutrients are commonly available as supplements and from the following foods:

<table>
<thead>
<tr>
<th>Epigenetic Nutrients</th>
<th>Food Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methionine</td>
<td>Sesame seeds, brazil nuts, fish, peppers, spinach</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>Leafy vegetables, sunflower seeds, baker's yeast, liver</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>Meat, liver, shellfish, milk</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>Meats, whole grain products, vegetables, nuts</td>
</tr>
<tr>
<td>SAM-e</td>
<td>Popular dietary supplement pill; unstable in food</td>
</tr>
</tbody>
</table>
Choline
Egg yolks, liver, soy, cooked beef, chicken, veal, turkey

Betaine
Spinach, shellfish, and sugar beets

Resveratrol
Red wine

Genistein
Soy, soy products

Sulforaphane
Broccoli

Butyrate
Produced in the intestine when dietary fiber is fermented

Diallyl sulfide
Garlic

As you can see, an eating style that includes meat and veggies (and maybe a glass of red wine each day!) has a lot more to offer than just biochemical cofactors. It offers a good chance that you can actually change the expressions of your genes in your favor.

Linking epigenetics to health is a very, very hot research topic these days, so stay tuned to any news you might hear on this topic. At the moment most of the suggestions are speculative or based mostly on animal models (those poor obese lab rats!). Nevertheless, even if you hedged your bets and put the list of sources here on your ‘to eat’ list, you’d be better off in many ways.

So eat your meats and veggies!

(NOTE TO VEGETARIANS: Your diet is deficient in vitamin B-12 and choline. You must supplement with these nutrients to take in any potentially useful amounts of them.)
What About Diet Pills?

If you have read even a little of what I have posted online, you will already know that I am not a big fan of synthetic drugs. Diet pills are no exception. Indeed, in my opinion, there is not a single FDA-approved weight loss drug that is acceptable. Furthermore, most of the so-called ‘natural’ diet pills are useless.

It is difficult for you to find good information on diet pills without being inundated by all their marketing hype. Nevertheless, you should know about them before you buy anything.

Many people undoubtedly have questions or curiosity about all kinds of diet pills. It is important, therefore, to know a little about how to evaluate diet pills on your own. To give you an idea of how to do so, here are a couple of examples of that I have researched myself.

Phentermine Reviews – Avoid It

Phentermine is a prescription drug that suppresses appetite. It is FDA-approved for treating overweight and obesity. This is must-read information before you consider taking it.

Phentermine reviews are abundant online. However, their purpose is mainly to convince you to get a prescription from your doctor and start taking it right away. Did you know that it is not recommended for long-term use? Nobody knows what it will do to you beyond two years of taking it.

Take a look at the highlights and lowlights about Phentermine summarized from Wikipedia (in italics):

(I have indicated in red font where you should be especially aware of the details about Phentermine.)

Phentermine, a contraction of "phenyl-tertiary-butylamine," is a psychostimulant drug of the phenethylamine class, with pharmacology similar to amphetamine. It is used medically as an appetite suppressant.
It is approved as an appetite suppressant to help reduce weight in obese patients when used short-term and combined with exercise, diet, and behavioral modification. It is typically prescribed for individuals who are at increased medical risk because of their weight and works by helping to release certain chemicals in the brain that control appetite.

**Medical uses**

Phentermine is used for the short-term treatment of obesity.

**Adverse effects**

Generally, phentermine appears to be relatively well tolerated.[2] It can produce side effects consistent with its catecholamine-releasing properties, e.g., tachycardia (increased heart rate) and elevated blood pressure, but the incidence and magnitude of these appear to be less than with the amphetamines. Because phentermine acts through sympathomimetic pathways, the drug may increase blood pressure and heart rate. It may also cause palpitations, restlessness, and insomnia. Additionally, phentermine has the potential to cause psychological dependence.

After short-term use, tolerance begins and can be followed by rebound weight gain.

In addition, its less common, but more severe, side effects include:

- Convulsions (seizures)
- Fever
- Hallucinations
- Hostility with urge to attack
- Bizarre behavior
- Mental or mood changes
- Exaggerated sense of well-being
- Irregular blood pressure
- Severe or persistent light-headedness, fainting or headache
- Periods of mania followed by period of depression
- Fast or irregular heartbeat
Overactive reflexes
Tremors, trembling or shaking
Panic
Restlessness
Severe nausea, vomiting or diarrhea
Stomach cramps
Weakness
Constipation
Primary pulmonary hypertension
Regurgitant cardiac valvular disease
Pounding in the chest or shortness of breath

History

In 1959, phentermine first received approval from the FDA as an appetite-suppressing drug. Phentermine hydrochloride then became available in the early 1970s. It was previously sold as Fastin from King Pharmaceuticals for SmithKline Beecham, but in 1998, it was removed from the market. Medeva Pharmaceuticals sells the name brand of phentermine called Ionamin and Gate Pharmaceuticals sells it as Adipex-P. Phentermine is also currently sold as a generic. Since the drug was approved, almost no clinical studies have been performed. The most recent study was in 1990 which combined phentermine with fenfluramine or dexfenfluramine and became known as Fen-Phen.

In 1997, after 24 cases of heart valve disease in Fen-Phen users, fenfluramine and dexfenfluramine were voluntarily taken off the market at the request of the FDA. Studies later proved nearly 30% of people taking fenfluramine or dexfenfluramine had abnormal valve findings.

Phentermine is still available by itself in most countries, including the US. However, because it is similar to amphetamines, it is classified as a controlled substance in many countries. Internationally, phentermine is a schedule IV drug under the Convention on Psychotropic Substances. In the United States, it is classified as a Schedule IV controlled substance under the Controlled Substances Act. In contrast, amphetamine preparations are classified as Schedule II controlled substances.
Phentermine is being studied in combination with other medications for obesity. One such combination is the appetite suppressant phentermine/topiramate (Qsymia or Qnixa). In 2012, the FDA approved its sale in the United States.

**Trade Names**

- Adipex P (immediate release)
- Adiphene (India)
- Anoxine-AM
- Ionamin (slow-release resin, Australia, discontinued in the US)
- Duromine (slow-release resin, New Zealand, Australia and South Africa)
- Metermine (slow-release resin, Australia)
- Mirapront
- Obephen
- Obermine
- Obestin-30
- Phentremine
- Phentrol
- Phenterex
- Phentromin
- Pro-Fast SA
- Qsymia (with topiramate)
- Redusa
- Panbesy
- Phentermine Trenker
- Obenix
- Oby-Trim
- Teramine
- Zantryl
- Sinpet (MX)

There really does not seem to be any compelling reason to take this drug. It is dangerous, it becomes ineffective after overuse (whatever THAT is), which leads to rebound weight gain, and the only recent clinical studies of it entailed its combination with fenfluramine into the now infamous double whammy called Fen-Phen. Fen-Phen was taken off the market when it became obvious how dangerous it was.
Bad news all around, wouldn’t you say?

**Qnexa Diet Pills – New Danger On The Horizon**

Qnexa is coming, regardless of its prior rejection by the FDA due to safety concerns. It is another example of the new mixed drug combinations – in this case phentermine and topiramate – being touted as diet pills. Results are good, side effects are not.

**Qnexa - Phentermine and Topiramate Structures**

Phentermine has a chemical structure that resembles a class of neurotransmitters (brain and nerve chemical signals) that influences hundreds of nerve responses. The synthetic group called amphetamines, to which phentermine belongs, is a good example of artificial neurotransmitters that excite brain and nerve responses beyond normal.

Phentermine by itself is dangerous and not particularly impressive as a weight loss drug by itself.

What about topiramate (Topamax)? It has a long history of use as an anti-convulsant and treatment for epilepsy. This history provides a thorough survey of potential side effects, expressed as percent incidence here:

- paresthesia (numbness & tingling) (23.7%)
- upper respiratory tract infection (17.5%)
- diarrhea (16.8%)
- nausea (15.4%)
The side-effects most frequently leading to discontinuation of therapy with topiramate have been:

- psychomotor slowing (4.1%)
- memory problems (3.3%)
- fatigue (3.3%)
- confusion (3.2%)
- somnolence (3.2%)

One of the more recent, and scarier, developments regarding topiramate is its association with a statistically significant increase in suicidality and “suicidal thoughts or actions” in about 1 in 500 people who use it.

**Qnexa Weight Loss Results**

Clinical studies show Qnexa to be one of the better prescription diet pills based on results alone. The manufacturer’s phase 3 study, over a 56-week period, yielded an average of 14.7 percent weight loss (37 lbs) by obese patients.

**Qnexa Approval Status**

This is what got my attention in a big headline article in my local newspaper recently: *Weight Loss Pill May Get Approval*. The article stated that the FDA rejected the drug because it was associated with too many dangerous side effects, including suicidal thoughts, heart palpitations, memory lapses and birth defects.

In spite of the earlier rejection, On February 22, 2012, FDA advisors voted 20-2 to recommend that the FDA adopt Qnexa as an obesity treatment. Hmm.

What is going on here? Business as usual. Drug companies have invested a tremendous amount of money into the development of new drugs. They will do anything they can to capitalize on ‘collateral use’ of already approved drugs — in
this case combining phentermine and topiramate into a new formula for weight loss.

From what I’ve found out about this new drug, it will be approved soon, if it hasn’t been already. I’m not too thrilled about it, though. The weight loss results, as good as they are, do not justify the risk of side effects.

**Contrave Diet Pills Research Review**

Contrave diet pills are a combination of two different prescription medications, one first approved as an antidepressant and the other as a treatment for alcohol and drug addiction. The FDA first approved, then later rejected, this drug. You can bet that Contrave will eventually win approval again. Here is what you should know.

Two previously approved prescription drugs, the antidepressant bupropion (Wellbutrin, Zyban) and the addiction treatment naltraxone, were suggested to potentially have a synergistic effect for weight loss. Drug companies invest a tremendous amount of money to get a drug approved by the FDA (which costs more than half a billion dollars). They are constantly looking for new ways to use already approved drugs, which will help to offset development costs and to extend patents beyond their original expiration date (usually 17 years after being granted).

Contrave is a typical example whereby already approved drugs are combined, in hopes of providing lateral applications (i.e., other than original uses) that will gain FDA approval. In this case, the lateral application is for weight loss. As you can see from the overview at Wikipedia, Contrave was first approved, then rejected as a diet pills drug.

This is the summary of Contrave on Wikipedia (in italics):

*Bupropion/naltrexone (proposed trade name Contrave) is an experimental treatment for obesity in phase III clinical trials. Currently being developed by Orexigen in a sustained-release formulation, it is a combination of two approved drugs, bupropion and naltrexone. Both drugs have individually shown some evidence of effectiveness in weight loss, and the combination is expected to have*
a synergistic effect. In clinical trials, patients taking Contrave combined with diet and exercise lost more weight than patients taking a placebo and following the same diet and exercise program. On 31 March 2010, Orexigen submitted a New Drug Application (NDA) to the U.S. Food and Drug Administration (FDA) for this drug combination. On 7 December 2010, an FDA Advisory Committee voted 13-7 for the approval of Contrave, and voted 11-8 for the conduct of a post-marketing cardiovascular outcomes study. Contrave’s PDUFA date is 31 January 2011. Subsequently, on 2 February 2011, the FDA rejected the drug and it was decided that an extremely large-scale study of the long-term cardiovascular effects of Contrave would be needed, before approval could be considered. The recommended daily dose of Contrave is two (8 mg naltrexone/90 mg bupropion) tablets taken twice daily (4 tablets total - 32 mg naltrexone, 360 mg bupropion). Upon initiation, the drug will be started with a quarter-dose (or one tablet) for one week and a pill will be added to the regimen each week until the full recommended dose is reached on Week 4.

During phase 2 testing, different dosages were used in a once daily formula. These include:

16 mg naltrexone - 400 mg bupropion
32 mg naltrexone - 400 mg bupropion
48 mg naltrexone - 400 mg bupropion

The second dosage (32 mg-400 mg) on average showed the best benefit-to-risk ratio.

Treatment is designed to influence the hypothalamus in order to decrease food intake over an extended period of time. Studies of almost 700 patients, 90% female, ran up to 56 weeks. The control group, overall, lost 5% of their initial body weight, or 11-16 lbs. The experimental (medicated) group lost 20-23 lbs during the same amount of time. The average starting weight for participants was 223 lbs. Current medical weight loss medications average 5-22 lbs lost in 6 months.

It is always a curiosity to me when the control (untreated) group in a weight loss study also loses weight. That means that the control group is, indeed, treated – just not with the drug. Typically ‘control’ groups show weight loss because of the
diet they followed during the study. Note that this diet alone led to a loss of 5% (11-16 lbs) during one 56-week study. The Contrave-plus-diet combination led to a loss of 20-23 lbs during the same period.

Statistics, as usual, can be viewed in different ways. The technical details of the actual research shows the following, as summarized in a 2011 journal publication (reference information and article abstract in italics):


Department of Psychiatry, Center for Weight and Eating Disorders, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA.

Abstract

This 56-week, randomized, placebo-controlled trial examined the efficacy and safety of naltrexone plus bupropion as an adjunct to intensive behavior modification (BMOD). A total of 793 participants (BMI = 36.5 ± 4.2 kg/m²) was randomly assigned in a 1:3 ratio to: (i) placebo + BMOD (N = 202); or (ii) naltrexone sustained-release (SR, 32 mg/day), combined with bupropion SR (360 mg/day) plus BMOD (i.e., NB32 + BMOD; N = 591). Both groups were prescribed an energy-reduced diet and 28 group BMOD sessions. Co-primary end points were percentage change in weight and the proportion of participants who lost =5% weight at week 56. Efficacy analyses were performed on a modified intent-to-treat population (ITT; i.e., participants with =1 postbaseline weight while taking study drug (placebo + BMOD, N = 193; NB32 + BMOD, N = 482)). Missing data were replaced with the last observation obtained on study drug. At week 56, weight loss was 5.1 ± 0.6% with placebo + BMOD vs. 9.3 ± 0.4% with NB32 + BMOD (P < 0.001). A completers analysis revealed weight losses of 7.3 ± 0.9% (N = 106) vs. 11.5 ± 0.6% (N = 301), respectively (P < 0.001). A third analysis, which included all randomized participants, yielded losses of 4.9 ± 0.6 vs. 7.8 ± 0.4%, respectively (P < 0.001). Significantly more NB32 + BMOD- vs. placebo + BMOD-treated participants lost =5 and =10% of
initial weight, and the former had significantly greater improvements in markers of cardiometabolic disease risk. NB32 + BMOD was generally well tolerated, although associated with more reports of nausea than placebo + BMOD. The present findings support the efficacy of combined naltrexone/bupropion therapy as an adjunct to intensive BMOD for obesity.

Different statistical analyses showed the placebo group vs. the drug treatment group to differ in percent weight loss as follows (placebo is the first number):

- 5.1 vs. 9.3 percent
- 7.2 vs. 11.5 percent
- 4.9 vs. 7.8 percent

I don’t know what you think of these numbers. However, in my opinion, they are not very impressive for the drug treatment. How good the results are should be an especially important consideration when deciding whether they are good enough to put up with the side effects of treatment.

What the side effects might be is hinted at in the requirements that the FDA set forth before it will approve this drug again: “…an extremely large-scale study of the long-term cardiovascular effects of Contrave would be needed,…” Hmm. Do you think some cardiovascular problems showed up before? No doubt. I already feel sorry for the human subjects who will be in the ‘large-scale’ study.

Oh, and that comment about nausea…it turns out to happen in about 30 percent of those taking the drug. Great, huh?

At the moment, recommendations about this drug would be irrelevant. Contrave is still in the reapproval process and isn’t available. Nevertheless, whenever it does appear on the market – and you can bet it will – I will still hold a dim view of it.
Hoodia – The Myth Of Weight Loss

Lest you think that only synthetic drugs are bad, let me also give you an example of one of the most popular natural products on the market for weight loss. This is typical of diet pill supplement hype.

The good news is that Hoodia has been endorsed by Oprah herself. The bad news is that Hoodia scientific research fails to show that supplementing with this herb leads weight loss. Celebrity and other testimonials to the contrary, it simply does not work. Regardless of whether African hunters used it, they never used it for weight loss, and you shouldn’t either.

Hoodia is an interesting succulent (non-cactus!) plant of South Africa that seems to have been used by African tribesmen to stave off hunger while out hunting. In that respect it is a great herb if you plan to go hunting for several days without bringing any food with you.

On the other hand, if you are well-fed and overweight or obese, the logic of using Hoodia supplements to suppress your appetite and lose weight is simple-minded and weak. Here is what the most recent scientific research has to say about this topic.

Recent Hoodia Research

The body of published scientific research on Hoodia is anything but voluminous. Indeed, only 39 articles, some of which are not about scientific studies at all, currently appear in a search of the PubMed database.

Based on that search, only 3 articles address the topic of Hoodia vs. weight loss. Of these, only one entailed an experimental study of human subjects. Here is the published abstract from that article (reference information and abstract in italics):

Abstract

BACKGROUND: Extracts from Hoodia gordonii have been shown to decrease food intakes and body weights in animals and were proposed as a food supplement or ingredient for weight management.

OBJECTIVE: We assessed the safety and efficacy of a 15-d repeated consumption of H. gordonii purified extract (HgPE) relative to a placebo in humans.

DESIGN: Healthy, overweight women, who were stratified by percentage body fat, received either HgPE (n = 25) or a placebo (n = 24) for 15 d. Subjects were resident in a clinic for a 4-d run-in period and a 15-d treatment period in which they received 2 servings/d of 1110 mg HgPE or a placebo formulated in a yogurt drink 1 h before breakfast and dinner. Subjects were otherwise allowed to eat ad libitum from standardized menus.

RESULTS: There were no serious adverse events, but HgPE was less well tolerated than was the placebo because of episodes of nausea, emesis, and disturbances of skin sensation. Blood pressure, pulse, heart rate, bilirubin, and alkaline phosphatase showed significant (P < 0.05) increases in the HgPE group. Mean effects on ad libitum energy intakes and body weights did not differ significantly between the HgPE- and placebo-treatment groups (P > 0.05).

CONCLUSIONS: In comparison with a matched placebo, the consumption of HgPE for 15 d appeared to be associated with significant adverse changes in some vital signs and laboratory parameters. HgPE was less well tolerated than was the placebo and did not show any significant effects on energy intakes or body weights relative to the placebo. This trial was registered at clinicaltrials.gov as NCT01306422.

Isn’t it interesting that, not only did Hoodia fail to lead to weight loss, it was instead associated with significant side effects. Who in the world would want to take a diet pill supplement that leads to nausea, emesis (vomiting), odd skin sensations, and an increase in blood pressure and heart rate – then not work?
The Other Two Articles

Out of the 3 articles on weight loss, two were summaries or reviews – i.e., without original experimental data. Nevertheless, it is instructive to see what they had to say (reference information and abstracts in italics):


Abstract

Hoodia gordonii is a spiny succulent plant popularly consumed for its purported anti-obesity effect. Traditionally used by the Khoi-San of South Africa and Namibia as a hunger and thirst suppressant while on long hunting trips, the commercialisation of this plant has been highly controversial due to intellectual property rights and benefit sharing issues, as well as the fact that several prominent pharmaceutical companies involved in its development have withdrawn their interest. Quality control has been the main focus of scientific studies as the supply of H. gordonii plant material is limited due to its sparse geographical distribution, slow maturation rate, need for a permit to cultivate or export material as well as high public demand, contributing to adulteration of a large amount of products. Despite the isolation of numerous steroidal glycosides from H. gordonii, the main focus has been on the pregnane glycoside P57, considered to be the active ingredient and marker molecule to determine quality of raw material and products. *Publications based on scientific studies of key aspects such as in vivo biopharmaceutics, the biological activity of all chemical constituents, clinical efficacy, and especially safety are insufficient or completely absent causing great concern as H. gordonii is one of the most widely consumed anti-obesity products of natural origin.* This review offers an up-to-date overview of all the current available knowledge pertaining to H. gordonii achieved by systematic analysis of the available literature.

and...

Increasing rates of adult obesity and its negative health consequences are likely to become an increasing burden to the Canadian health care system. Consumers are looking for treatment options and often try the natural health products that are heavily promoted as safe, fast and effective. In this case report, MH, a 57-year-old overweight female wanted advice regarding whether she should use the natural product Hoodia to help her attain her weight loss goals. A literature search was conducted using Medline, EMBASE, the Cochrane Library, Natural Medicines Comprehensive Database and IPA from inception to March 2009. The internet, files of the authors and bibliographies of articles were searched for additional references. No published, peer-reviewed randomized controlled trials examining efficacy of Hoodia were found. Unpublished data from two small trials reported promising results with no adverse events. However, this leaves many unanswered questions regarding the use of Hoodia for weight loss such as the appropriate dose and duration, short and long term safety and use in patients with concomitant diseases. Literature suggests that some commercial products may not actually contain Hoodia at all. Additionally, Hoodia is not yet listed in the Canadian Licensed Natural Health Products Database meaning products sold in Canada may not meet Canadian regulatory standards. Upon discussing this information, MH decided not to use Hoodia, and other evidence-based recommendations were discussed.

The most telling quotes from these abstracts are:

From Blom et al (2011):

Publications based on scientific studies of key aspects such as in vivo biopharmaceutics, the biological activity of all chemical constituents, clinical efficacy, and especially safety are insufficient or completely absent causing great concern as H. gordonii is one of the most widely consumed anti-obesity products of natural origin.
From Whelan et al. (2010):

No published, peer-reviewed randomized controlled trials examining efficacy of Hoodia were found. Unpublished data from two small trials reported promising results with no adverse events. However, this leaves many unanswered questions regarding the use of Hoodia for weight loss such as the appropriate dose and duration, short and long term safety and use in patients with concomitant diseases.

The biggest surprise to me is that these reviews, and the 2011 study with human subjects, were all published since 2010. However, the industry that was built on Hoodia for weight loss started long before that. In fact, the first patent leading to this premature marketing frenzy was granted in 2002! It sure says something about the patent process, doesn’t it? Someday I’ll have to write a post about the (now 3) patents on Hoodia and why they really don’t mean anything. Stay tuned!

The Great Acai Berry Scam

Acai berry juice is a wonderful supplement for weight loss. Or is it? This subject turned to a full-on scam when Google slapped down hundreds of ads for sending people to fake blogs. These blogs were supposed to be by young ladies who miraculously lost weight by drinking acai berry juice. It turns out that the young ladies didn’t even exist!

In general weight loss supplements have been so tarnished by fraud that the FDA, bless their peanut-inspecting hearts, has decided to come down hard on companies that make them. (Do you think for a minute that this has anything to do with the FDA’s real job – i.e., to be the enforcement arm of the pharmaceutical industry? Nah, didn’t think so.) In my view, this subject warrants a lot of digging into actual research. So that is what I have done on the topic of acai scams and weight loss.

I started by digging into all of the research ever published on the acai berry. The following is a very brief summary of everything that I could find in the medical literature about acai on PubMed. The keywords that I used, which are the most important kind of terms to search for scientific research about any species of
plant, were the scientific name. In this case, the scientific name that is unique to the acai palm is *Euterpe oleracea*.

Here is the list of research topics, with their publications dates, on all of the nine articles about acai that have ever been published in reputable scientific journals:

- 2004 Anthocyanins and similar phytochemicals were isolated and evaluated for antioxidant activity and pigment stability.
- 2005 Several commercial and non-commercial samples of acai fruit pulp were found to have antioxidant activity; very little of this activity was due to the anthocyanins.
- 2006 Anthocyanins from fruits were found to be potent inhibitors of nitric oxide.
- 2006 Seed extracts show potent antioxidant activity, mostly from as yet unknown ingredients.
- 2007 Extracts of acai pits show vasodilator effect on rat tissue.
- 2007 Acai fruits have good nutritional value.
- 2008 Acai fruit pulp and oil inhibit growth of colon cancer cells in culture; effect is not due to anthocyanins.
- 2008 Class of phytochemicals called lignans discovered; showed protective effect on breast cancer cell cultures that were stressed by hydrogen peroxide.
- 2008 Showed acai pulp to be equivalent to applesauce in increasing plasma antioxidant capacity.

Note that the first one appeared in 2004 and the most recent one in 2008. More will be coming someday, I am sure. **Note also that not one single article has anything to do with weight loss.** In the immortal words of Pvt. Gomer Pyle, USMC, “Surprise, surprise, surprise!”

Hmm. A huge weight loss marketing program, based on no research whatsoever.

Isn’t real science fun?
DUKE UNIVERSITY NO SUGAR, NO STARCH DIET

This diet is focused on providing your body with the nutrition it needs, while eliminating foods that your body does not require, namely, nutritionally empty carbohydrates. For most effective weight loss, at least initially, you will need to keep the total number of carbohydrate grams to fewer than 20 grams per day.

The recommendation to consume under 20 grams of carbohydrates per day is adopted from the first two weeks of the Atkins Diet, which is called the induction Phase. However, it is too rigorous to stay under 20 grams of carbohydrates per day for the long term. It is also not necessary.

It is important to monitor your progress in a couple of ways. First, note that, as you lose weight, your fatty areas (waist, hips, and/or thighs) start to shrink. This is mostly water weight for the first week or so. Second, since this is a ketogenic diet, keep track of your level of ketosis by using Lipostix or Ketostix, which you can get at most pharmacies or supermarkets.

Once you do so for two weeks, though, you will know whether you have switched your metabolism to mostly fat.

Your diet is to be made up exclusively of foods in APPENDIX B: FOODS FOR INDUCING FAT METABOLISM. If the food is packaged, check the label and make sure that the carbohydrate count is 1 to 2 grams or less for meat and dairy products, 5 grams or less for vegetables. All food may be cooked in a microwave oven, baked, boiled, stir-fried, sautéed, roasted, fried (with no flour, breading, or cornmeal), or grilled.

The basic Duke University Protocol is as follows:

WHEN YOU ARE HUNGRY, EAT YOUR CHOICE OF THE FOLLOWING FOODS:

Meat: Beef (including hamburger and steak), pork, ham (un glazed), bacon, lamb, veal, or other meats. For processed meats (sausage, pepperoni, hot dogs),

APPENDIX A
check the label carbohydrate count should be about 1 gram per serving (and be organic and nitrate free if possible).

Poultry: Chicken, turkey, duck, or other fowl.

Fish and Shellfish: Any fish, including tuna, salmon, catfish, bass, trout, shrimp, scallops, crab, and lobster.

Eggs: Whole eggs are permitted without restrictions.

You do not have to avoid the fat that comes with the above foods.
You do not have to limit quantities deliberately, but you should stop eating when you feel full.

FOODS THAT MUST BE EATEN EVERY DAY:

Salad Greens: 2 cups a day. Includes arugula, bok choy, cabbage (all varieties), chard, chives, endive, greens (all varieties, including beet, collards, mustard, and turnip), kale, lettuce (all varieties), parsley, spinach, radicchio, radishes, scallions, and watercress. (If it is a leaf, you may eat it.)

Vegetables: 1 cup (measured uncooked) a day. Includes artichokes, asparagus, broccoli, Brussels sprouts, cauliflower, celery, cucumber, eggplant, green beans (string beans), jicama, leeks, mushrooms, okra, onions, pepper pumpkin, shallots, snow peas, sprouts (bean and alfalfa) sugar snap peas, summer squash, tomatoes, rhubarb, wax beans, zucchini.

Bouillon: 2 cups daily—as needed for sodium replenishment. Clear broth (consommé) is strongly recommended, unless you are on a sodium-restricted diet for hypertension or heart failure.

FOODS ALLOWED IN LIMITED QUANTITIES:

Cheese: up to 4 ounces a day. Includes hard, aged cheeses such as Swiss and Cheddar, as well as Brie, Camembert blue, mozzarella, Gruyere, cream cheese, goat cheeses. Avoid processed cheeses, such as Velveeta. Check the label; carbohydrate count should be less than 1 gram per serving.
Cream: up to 4 tablespoonfuls a day. Includes heavy, light, or sour cream (not half and half).

Mayonnaise: up to 4 tablespoons a day. Duke's and Hellmann's are low-carb. [Kraft is even better.] Check the labels of other brands.

Olives (Black or Green): up to 6 a day. Avocado: up to 1/2 of a fruit a day.

Lemon/Lime Juice: up to 4 teaspoonfuls a day.

Soy Sauces: up to 4 tablespoons a day. Kikkoman is a low carb brand. Check the labels of other brands.

Pickles, Dill or Sugar-Free: up to 2 a servings a day. Mt. Olive makes sugar-free pickles. Check the labels for carbohydrates and serving size.

Snacks: Pork rinds/skins; pepperoni slices; ham, beef, turkey, and other meat roll-ups; deviled eggs.

THE PRIMARY RESTRICTION: CARBOHYDRATES

On this diet, no sugars (simple carbohydrates) and no starches (complex carbohydrates) are eaten. The only carbohydrates encouraged are the nutritionally dense, fiber-rich vegetables listed above.

Sugars are simple carbohydrates. Avoid these kinds of foods: white sugar, brown sugar, honey, maple syrup, molasses, corn syrup, beer (contains barley malt), milk (contains lactose), flavored yogurts, fruit juice, and fruit.

Starches are complex carbohydrates. Avoid these kinds of foods: grains (even "whole" grains), rice, cereals, flour, cornstarch, breads, pastas, muffins, bagels, crackers, and "starchy" vegetables such as slow-cooked beans (pinto, lima, black beans), carrots, parsnips, corn, peas, potatoes, French fries, potato chips.
FATS AND OILS

All fats and oils, even butter, are allowed. Olive oil and peanut oil are especially healthy oils and are encouraged in cooking. Avoid margarine and other hydrogenated oils that contain trans fats.

For salad dressings, the ideal dressing is a homemade oil-and-vinegar dressing, with lemon juice and spices as needed. Blue-cheese, ranch, Caesar, and Italian are also acceptable if the label says 1 to 2 grams of carbohydrate per serving or less. Avoid “lite” dressings, because these commonly have more carbohydrate. Chopped eggs, bacon, and/or grated cheese may also be included in salads.

Fats, in general, are important to include, because they taste good and make you feel full. You are therefore permitted the fat or skin that is served with the meat or poultry that you eat, as long as there is no breading on the skin. Do not attempt to follow a low-fat diet!

SWEETENERS AND DESSERTS

If you feel the need to eat or drink something sweet, you should select the most sensible alternative sweetener(s) available. Available alternative sweeteners are: Splenda (sucralose), Nutra-sweet (aspartame), Truvia (stevia/erythritol blend), and Sweet ‘N Low (saccharin). Avoid food with sugar alcohols (such as sorbitol and maltitol) for now, because they occasionally cause stomach upset, although they may be permitted in limited quantities in the future. (Would recommend you stay away from all artificial sweeteners if able or use Stevia, Dr. Craig) [NOTE: The recommended sweeteners are all dangerous in some way, except for Stevia.]

BEVERAGES

Drink as much as you would like of the allowed beverages, do not force fluids beyond your capacity. The best beverage is water. Essence-flavored seltzers (zero carbs) and bottled spring and mineral waters are also good choices.

Caffeinated beverages: Some patients find that their caffeine intake interferes with their weight loss and blood sugar control. With this in mind, you may have
up to 3 cups of coffee (black, or with artificial sweetener and/or cream), tea (unsweetened or artificially sweetened), or caffeinated diet soda per day. [Diet soda? Not really recommended unless sweetened only with Stevia.]

ALCOHOL

At first, avoid alcohol consumption on this diet. At a later point in time, as weight loss and dietary patterns become well established, alcohol in moderate quantities, if low in carbohydrates, may be added back into the diet.

QUANTITIES

Eat when you are hungry; stop when you are full. The diet works best on a "demand feeding" basis—that is, eat whenever you are hungry; try not to eat more than what will satisfy you. Learn to listen to your body. A low-carbohydrate diet has a natural appetite-reduction effect to ease you into the consumption of smaller and smaller quantities comfortably. Therefore, do not eat everything on your plate just because it's there. On the other hand, don't go hungry! You are not counting calories. Enjoy losing weight comfortably, without hunger or cravings.

It is recommended that you start your day with a nutritious low-carbohydrate meal. Note that many medications and nutritional supplements need to be taken with food at each meal, or three times per day.

IMPORTANT TIPS AND REMINDERS

The following items are NOT on the diet: sugar, bread, cereal, flour-containing items, fruits, juices, honey, whole or skimmed milk, yogurt, canned soups, dairy substitutes, ketchup, sweet condiments and relishes. Avoid these common mistakes: Beware of "fat-free" or "lite" diet products, and foods containing "hidden" sugars and starches (such as coleslaw or sugar-free cookies and cakes). Check the labels of liquid medications, cough syrups, cough drops, and or other over-the-counter medications that may contain sugar. Avoid products that are labeled "Great for Low-Carb Diets!"
LOW-CARB MENU PLANNING

What does a low-carbohydrate menu look like? You can plan your daily menu by using the following as a guide:

Breakfast

- Meat or other protein source (usually eggs)
- Fat source – This may already be in your protein; for example, bacon and eggs have fat in them. But if your protein source is "lean," add some fat in the form of butter, cream (in coffee) or cheese.
- Low-carbohydrate vegetable (if desired) – This can be in omelet or a breakfast quiche.

Lunch

- Meat or other protein source
- Fat source – If your protein is "lean," add some fat, in the form of butter, salad dressing, cheese, cream, or avocado.
- 1 to 1 ½ cups of salad greens or cooked greens
- ½ to 1 cup of vegetables

Snack [skip snacking if at all possible]

Low-carbohydrate snack that has protein and/or fat.

Dinner

- Meat or other protein source
- Fat source – If your protein is "lean," add some fat in the butter, salad dressing, cheese, cream, or avocado.
- 1 to 1½ cups of salad greens or cooked greens
- ½ to 1 cup of vegetables
READING A LOW-CARB LABEL

Start by checking the nutrition facts.

- Look at serving size, total carbohydrate, and fiber.
- Use total carbohydrate content only.
- You may subtract fiber from total carbohydrate to get the "effective or net carb count." For example, if there are 7 grams of carbohydrate and 3 grams of fiber, the difference yields 4 grams of effective carbohydrates. That means the effective carbohydrate count is 4 grams per serving.
- No need to worry – at this point – about calories or fat.
- Effective carbohydrate count of vegetables should be 5 grams or less.
- Effective carbohydrate count of meat or condiments should be 1 gram or less.
- Also check the ingredient list. Avoid foods that have any form of sugar or starch listed in the first 5 ingredients.

Sugar by any other name is still sugar!

All of these are forms of sugar: sucrose, dextrose, fructose, maltose, lactose, glucose, honey, agave syrup, high-fructose corn syrup, maple syrup, brown-rice syrup, molasses, evaporated cane juice, cane juice, fruit-juice concentrate, corn sweetener.
FOODS FOR INDUCING FAT METABOLISM

These are the acceptable foods and beverages to be consumed during the initial two-week period of ultra low-carb eating that will get you into ketosis, meaning the net breakdown of fats. Source: Atkins Induction Phase Foods.

**All fish including:** Flounder, Herring, Salmon, Sardines, Sole, Tuna, Trout, Cod, Halibut

**All fowl including:** Cornish hen, Chicken, Duck, Goose, Pheasant, Quail, Turkey, Ostrich

**All shellfish including:** Clams, Crabmeat, Mussels*, Oysters*, Shrimp, Squid, Lobster

*Oysters and mussels are higher in carbs so limit to about 4 ounces per day.

**All meat including:** Bacon*, Beef, Ham*, Lamb, Pork, Veal, Venison

*Some processed meat, bacon, and ham is cured with sugar, which will add to the carb count. Also steer clear of cold cuts and other meats with added nitrates.

**Eggs in any style, including:** Deviled, Fried, Hard-boiled, Omelets, Poached, Scrambled, Soft-boiled

Eggs are one of nature's most nutritious creations. They should be a staple of your diet.

Feel free to get creative with your eggs: Add mushrooms and onions, or even green pepper. Top the dish off with feta cheese or add basil, oregano and other herbs.

Keep in mind that cheese does contain carbs, about 1 gram per ounce. You may have about 3 to 4 ounces of cheese per day. An ounce is about the size of an individually wrapped slice of American cheese or a 1" cube.
**Cheese including:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Serving Size</th>
<th>Grams of net carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue cheeses</td>
<td>2 T</td>
<td>0.4</td>
</tr>
<tr>
<td>Cheddar</td>
<td>1 oz</td>
<td>0.4</td>
</tr>
<tr>
<td>Cow, sheep and goat</td>
<td>1 oz</td>
<td>0.3</td>
</tr>
<tr>
<td>Cream cheese</td>
<td>2 T</td>
<td>0.8</td>
</tr>
<tr>
<td>Feta</td>
<td>1 oz</td>
<td>1.2</td>
</tr>
<tr>
<td>Gouda</td>
<td>1 oz</td>
<td>0.6</td>
</tr>
<tr>
<td>Mozzarella</td>
<td>1 oz</td>
<td>0.6</td>
</tr>
<tr>
<td>Mozzarella</td>
<td>1 oz</td>
<td>0.6</td>
</tr>
<tr>
<td>Parmesan</td>
<td>1 oz</td>
<td>0.9</td>
</tr>
<tr>
<td>Swiss</td>
<td>1 oz</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Vegetables:**

You should be eating approximately 12 to 15 grams of net carbs per day in the form of vegetables, which is equivalent to several cups depending on the actual carb content of the veggies you select.

1 cup is roughly the size of a baseball. Measure the following salad vegetables raw.

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Serving Size/Prep</th>
<th>Grams of net carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa sprouts</td>
<td>½ cup/raw</td>
<td>0.2</td>
</tr>
<tr>
<td>Arugula</td>
<td>1 cup/raw</td>
<td>0.4</td>
</tr>
<tr>
<td>Bok choy</td>
<td>1 cup/raw</td>
<td>0.4</td>
</tr>
<tr>
<td>Celery</td>
<td>1 stalk</td>
<td>0.8</td>
</tr>
<tr>
<td>Chicory greens</td>
<td>½ cup/raw</td>
<td>0.1</td>
</tr>
<tr>
<td>Chives</td>
<td>1 tablespoon</td>
<td>0.1</td>
</tr>
<tr>
<td>Cucumber</td>
<td>½ cup</td>
<td>1.0</td>
</tr>
<tr>
<td>Daikon</td>
<td>½ cup</td>
<td>1.0</td>
</tr>
<tr>
<td>Endive</td>
<td>½ cup</td>
<td>0.4</td>
</tr>
<tr>
<td>Escarole</td>
<td>½ cup</td>
<td>0.1</td>
</tr>
<tr>
<td>Fennel</td>
<td>½ cup</td>
<td>1.8</td>
</tr>
<tr>
<td>Jicama</td>
<td>½ cup</td>
<td>2.5</td>
</tr>
</tbody>
</table>
Iceberg lettuce 1 cup 0.2
Mushrooms ½ cup 1.2
Parsley 1 tablespoon 0.1
Peppers ½ cup/raw 2.3
Radicchio ½ cup/raw 0.7
Radishes 6/raw 0.5
Romaine lettuce 1 cup 0.4

The following vegetables are slightly higher in carbs than the salad vegetables listed above. They also provide important nutrients and add variety to your daily foods. Make sure you stay within the 12-15 grams of net carbs. Unless otherwise noted, measure these veggies after you cook them.

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Serving Size/Prep</th>
<th>Grams of net carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artichoke</td>
<td>½ medium</td>
<td>3.5</td>
</tr>
<tr>
<td>Asparagus</td>
<td>6 spears</td>
<td>2.4</td>
</tr>
<tr>
<td>Artichoke hearts</td>
<td>1 canned</td>
<td>1.0</td>
</tr>
<tr>
<td>Avocados</td>
<td>½ whole (raw)</td>
<td>1.8</td>
</tr>
<tr>
<td>Bamboo shoots</td>
<td>½ cup</td>
<td>1.2</td>
</tr>
<tr>
<td>Broccoli</td>
<td>½ cup</td>
<td>1.7</td>
</tr>
<tr>
<td>Broccoli raw</td>
<td>½ cup</td>
<td>0.8</td>
</tr>
<tr>
<td>Broccoli rabe</td>
<td>½ cup</td>
<td>2.0</td>
</tr>
<tr>
<td>Broccoflower</td>
<td>½ cup</td>
<td>2.3</td>
</tr>
<tr>
<td>Brussels sprouts</td>
<td>¼ cup</td>
<td>1.8</td>
</tr>
<tr>
<td>Cabbage</td>
<td>½ cup (raw)</td>
<td>1.6</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>½ cup (raw)</td>
<td>1.4</td>
</tr>
<tr>
<td>Swiss chard</td>
<td>½ cup</td>
<td>1.8</td>
</tr>
<tr>
<td>Collard greens</td>
<td>½ cup boiled</td>
<td>2.0</td>
</tr>
<tr>
<td>Eggplant</td>
<td>½ cup</td>
<td>2.0</td>
</tr>
<tr>
<td>Green String Beans</td>
<td>1 cup</td>
<td>4.1</td>
</tr>
<tr>
<td>Hearts of palm</td>
<td>1 heart</td>
<td>0.7</td>
</tr>
<tr>
<td>Kale</td>
<td>½ cup</td>
<td>2.4</td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>¼ cup</td>
<td>2.3</td>
</tr>
<tr>
<td>Leeks</td>
<td>½ cup</td>
<td>3.4</td>
</tr>
<tr>
<td>Okra</td>
<td>½ cup</td>
<td>2.4</td>
</tr>
<tr>
<td>Olives green</td>
<td>5</td>
<td>0.1</td>
</tr>
<tr>
<td>Olives black</td>
<td>5</td>
<td>0.7</td>
</tr>
<tr>
<td>Ingredient</td>
<td>Measurement</td>
<td>Carbs</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Onion</td>
<td>¼ cup</td>
<td>4.3</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>¼ cup</td>
<td>2.4</td>
</tr>
<tr>
<td>Rhubarb</td>
<td>½ cup</td>
<td>1.7</td>
</tr>
<tr>
<td>Sauerkraut</td>
<td>½ cup</td>
<td>1.2</td>
</tr>
<tr>
<td>Snow peas and snap peas in pod</td>
<td>½ cup with pods</td>
<td>3.4</td>
</tr>
<tr>
<td>Spaghetti squash</td>
<td>¼ cup boiled</td>
<td>2.0</td>
</tr>
<tr>
<td>Spinach</td>
<td>½ cup</td>
<td>2.2</td>
</tr>
<tr>
<td>Summer squash</td>
<td>½ cup</td>
<td>2.6</td>
</tr>
<tr>
<td>Tomato</td>
<td>¼ cup</td>
<td>4.3</td>
</tr>
<tr>
<td>Turnips</td>
<td>½ cup</td>
<td>3.3</td>
</tr>
<tr>
<td>Water chestnuts</td>
<td>¼ cup (canned)</td>
<td>3.5</td>
</tr>
<tr>
<td>Zucchini</td>
<td>½ cup</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Salad Garnishes

<table>
<thead>
<tr>
<th>Garnish</th>
<th>Amount</th>
<th>Carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumbled bacon</td>
<td>3 slices</td>
<td>0.0</td>
</tr>
<tr>
<td>Hard-boiled egg</td>
<td>1 egg</td>
<td>0.5</td>
</tr>
<tr>
<td>Grated cheeses</td>
<td>(see above carb counts)</td>
<td></td>
</tr>
<tr>
<td>Sautéed mushrooms</td>
<td>½ cup</td>
<td>1.0</td>
</tr>
<tr>
<td>Sour cream</td>
<td>2 tbs</td>
<td>1.2</td>
</tr>
</tbody>
</table>

### Herbs and Spices (make sure they contain no added sugar)

<table>
<thead>
<tr>
<th>Herb</th>
<th>Amount</th>
<th>Carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basil</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Cayenne pepper</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Cilantro</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Dill</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Garlic</td>
<td>1 clove</td>
<td>0.9</td>
</tr>
<tr>
<td>Ginger</td>
<td>1 tbs sliced root</td>
<td>0.8</td>
</tr>
<tr>
<td>Oregano</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Pepper</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Rosemary</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Sage</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
<tr>
<td>Tarragon</td>
<td>1 tbs</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Salad Dressings - Any prepared salad dressing with no added sugar and no more than 2 grams of net carbs per serving (1-2 tablespoons) is acceptable. READ THE LABELS! Or make your own.

Fats and Oils - There are no carbs here, but keep in mind that the serving size is approximately 1 tablespoon.

Butter, Mayonnaise (make sure it has no added sugar (some brands are loaded!),

Vegetable oils*, including: Walnut, Grape seed, Sesame, Sunflower, Safflower, Coconut

Those labeled “cold pressed” or “expeller pressed” are especially good and olive oil is one of the best. Note that soybean oil, canola oil and corn oil are not on this list because so many products are highly processed and are too high in their omega-6 oil content, which causes inflammation in your body.

*Do not allow any oils to reach overly high temperatures when cooking. Use olive oil for sautéing only. Use walnut or sesame oil to dress cooked veggies or salad, but not for cooking. The most stable oil for cooking is coconut oil.

Sweeteners

Atkins and other low-carb diets suggest a range of artificial and natural sweeteners. Natural, non-sugar sweeteners include sugar alcohols such as sorbitol, maltitol, erythritol and others. Artificial sweeteners include saccharin (Sweet ‘N Low), aspartame (Equal, Nutrasweet), and sucralose (Splenda). They are all unacceptable. They all cause negative impacts on human health. The worst of the worst of these is aspartame. It is a metabolic toxin. Never, ever let a single molecule of aspartame into your body!

The only acceptable non-sugar sweetener is Stevia. Just make sure that the product you use is clearly labeled with its carbohydrate content, since many powdered products contain added carbs. The liquid products do not.
Beverages, including: Clear broth/bouillon (make sure it has no sugars added), Club soda, Cream (heavy or light), Decaffeinated or regular coffee and tea, Diet soda (if the ONLY sweetener is Stevia – look for Virgil’s Zero sodas, usually in health food stores or in the health food section of major supermarkets), Flavored seltzer (must say no calories), Herb tea (without added barley or fruit sugar added), Unflavored soy/almond/hemp milk, Water (and plenty of it).
APPENDIX C

SUGAR CONTENT OF COMMON FRUITS AND JUICES

By the way, in case you are not up on your metric units, then here is a visual that will help you understand how much sugar you are consuming:

*40 grams of sugar (1 12 oz. can of Coca Cola) is about 5 teaspoons*

<table>
<thead>
<tr>
<th>Fresh Fruit</th>
<th>Total Sugars</th>
<th>Glucose</th>
<th>Fructose</th>
<th>Sucrose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>13.3</td>
<td>2.3</td>
<td>7.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Apricots</td>
<td>9.3</td>
<td>1.6</td>
<td>0.7</td>
<td>5.2</td>
</tr>
<tr>
<td>Avocado</td>
<td>0.9</td>
<td>0.5</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Banana</td>
<td>15.6</td>
<td>4.2</td>
<td>2.7</td>
<td>6.5</td>
</tr>
<tr>
<td>Blackberries</td>
<td>8.1</td>
<td>3.1</td>
<td>4.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Blueberries</td>
<td>7.3</td>
<td>3.5</td>
<td>3.6</td>
<td>0.2</td>
</tr>
<tr>
<td>Cantaloupe</td>
<td>8.7</td>
<td>1.2</td>
<td>1.8</td>
<td>5.4</td>
</tr>
<tr>
<td>Casaba melon</td>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherries, sweet</td>
<td>14.6</td>
<td>8.1</td>
<td>6.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Cherries, sour</td>
<td>8.1</td>
<td>4.2</td>
<td>3.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Elderberries</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figs</td>
<td>6.9</td>
<td>3.7</td>
<td>2.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>6.2</td>
<td>1.3</td>
<td>1.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Grapes</td>
<td>18.1</td>
<td>6.5</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Guava</td>
<td>6</td>
<td>1.2</td>
<td>1.9</td>
<td>1</td>
</tr>
<tr>
<td>Honeydew melon</td>
<td>8.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jackfruit</td>
<td>8.4</td>
<td>1.4</td>
<td>1.4</td>
<td>5.4</td>
</tr>
<tr>
<td>Kiwi fruit</td>
<td>10.5</td>
<td>5</td>
<td>4.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Lemon</td>
<td>2.5</td>
<td>1</td>
<td>0.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Lime</td>
<td>0.4</td>
<td>0.2</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Mamey Apple</td>
<td>6.5</td>
<td>1.1</td>
<td>3.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Mango</td>
<td>14.8</td>
<td>0.7</td>
<td>2.9</td>
<td>9.9</td>
</tr>
<tr>
<td>Nectarine</td>
<td>8.5</td>
<td>1.2</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td>9.2</td>
<td>2.2</td>
<td>2.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Papaya</td>
<td>5.9</td>
<td>1.4</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Peach</td>
<td>8.7</td>
<td>1.2</td>
<td>1.3</td>
<td>5.6</td>
</tr>
</tbody>
</table>
WHAT ABOUT FRUIT JUICES?

Let's take a look at the typical total sugar content of four of the most common juices on the market. These numbers represent the amount of sugar in 12 ounces of unsweetened fruit juice, compared with the amount in 12 ounces of Coca Cola. Keep in mind that almost all bottled juices have sugar added to them.

Grams of Sugar Per 12 Ounces of Fruit Juice

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Coca-Cola</th>
<th>Grapefruit</th>
<th>Cranberry</th>
<th>Orange</th>
<th>Apple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pear</td>
<td>10.5</td>
<td>1.9</td>
<td>6.4</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Pineapple</td>
<td>11.9</td>
<td>2.9</td>
<td>2.1</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>Plum</td>
<td>7.5</td>
<td>2.7</td>
<td>1.8</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pomegranate</td>
<td>10.1</td>
<td>5</td>
<td>4.7</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Passion Fruit</td>
<td>11.2</td>
<td>4</td>
<td>3.1</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Raspberries</td>
<td>9.5</td>
<td>3.5</td>
<td>3.2</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>Starfruit</td>
<td>7.1</td>
<td>3.1</td>
<td>3.2</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Strawberries</td>
<td>5.8</td>
<td>2.2</td>
<td>2.5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Tangerine</td>
<td>7.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomato</td>
<td>2.8</td>
<td>1.1</td>
<td>1.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watermelon</td>
<td>9</td>
<td>1.6</td>
<td>3.3</td>
<td>3.6</td>
<td></td>
</tr>
</tbody>
</table>

Dried Fruits

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Dates</th>
<th>Apricots</th>
<th>Figs</th>
<th>Mango</th>
<th>Papaya</th>
<th>Peaches</th>
<th>Pears</th>
<th>Prunes</th>
<th>Raisins</th>
<th>Raisins, Golden</th>
<th>Zante currants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64.2</td>
<td>44.6</td>
<td>38.9</td>
<td>73</td>
<td>53.5</td>
<td>44.6</td>
<td>49</td>
<td>44</td>
<td>65</td>
<td>70.6</td>
<td>70.6</td>
</tr>
</tbody>
</table>

WHO ARE THE HEALTHIEST FRUITS?

It's a tough question to answer, as the healthiness of a fruit depends on many factors, including its nutritional content, environmental impact, and personal preferences. However, based on the nutritional content alone, the healthiest fruits are those that are high in fiber and low in sugar. For example, pears, apricots, and peaches are relatively low in sugar compared to other fruits. Additionally, fruits that are high in antioxidants and vitamins, such as blueberries and strawberries, are considered healthy. Ultimately, the healthiest fruit is the one that best fits your diet and lifestyle.
Do you want to consume that much sugar by drinking something that is supposedly good for your health? **Absolutely not.** When it comes to the sugar hit, you might as well drink Coca Cola. You aren't going to THAT now, are you? Since you aren't going to drink them anyway, you won't have to worry about *adulterated* fruit ‘juices’ that have even more sugar, as much as double, triple, or even quadruple the amount in pure fruit juice.
APPENDIX D
RESOURCES AND LINKS

Bibliography of Primary Source Materials

Most diet books focus on calories as the end-all and be-all of weight or fat management. I would recommend none of them. However, a small handful of researchers, who think more clearly about humans as life forms and not as furnaces, have assembled excellent perspectives on how our bodies should work when we treat them right.

A fairly short list of source materials provides what I think is the best information available. These books, as listed below, provide much more detail than I have given you in this book. For the highly curious among you, I strongly recommend that you read all of the following books for yourselves. Great stuff!


*Body by Science Exercise and Fitness Videos*

All of the videos by the authors of Body by Science are available for free access on YouTube. For your convenience, I have assembled them in the order they were presented, at this link on my health blog:

[Body by Science Videos on HerbScientist.com](#)

You will get a lot more detail about research behind the Body by Science approach to fitness, with explanations about how it works, in the full book. However, if you just want to adopt the basic fitness program, these free videos are all that you need.
## APPENDIX E

### FIBER CONTENTS OF FOODS

Grams per portion as below.

<table>
<thead>
<tr>
<th>Fruits</th>
<th>Portion</th>
<th>All</th>
<th>Sol</th>
<th>Insol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple, w/skin</td>
<td>1 small</td>
<td>2.8</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>Apricots</td>
<td>4</td>
<td>3.5</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Avocado</td>
<td>1</td>
<td>9.6</td>
<td>4.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Banana</td>
<td>1/2 small</td>
<td>1.1</td>
<td>0.3</td>
<td>0.8</td>
</tr>
<tr>
<td>Blackberries</td>
<td>3/4 cup</td>
<td>6</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Blueberries</td>
<td>3/4 cup</td>
<td>1.4</td>
<td>0.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Cherries</td>
<td>12 large</td>
<td>1.3</td>
<td>0.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Dates, dried</td>
<td>2.5 med.</td>
<td>0.9</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Figs, dried</td>
<td>1.5 figs</td>
<td>2.3</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>1/2 med.</td>
<td>1.6</td>
<td>1.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Grapes</td>
<td>15 small</td>
<td>0.4</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Kiwi, w/skin</td>
<td>1 large</td>
<td>1</td>
<td>0.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Mango, flesh only</td>
<td>1/2 small</td>
<td>2.9</td>
<td>1.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Canta loupe</td>
<td>1 cup</td>
<td>1.1</td>
<td>0.3</td>
<td>0.8</td>
</tr>
<tr>
<td>Honeydew</td>
<td>1 cup</td>
<td>0.9</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Watermelon</td>
<td>1 cup</td>
<td>0.6</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Nectarine</td>
<td>1 small</td>
<td>1.8</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>Orange</td>
<td>1 small</td>
<td>2.9</td>
<td>1.8</td>
<td>1.1</td>
</tr>
<tr>
<td>Peaches</td>
<td>1 med.</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pear</td>
<td>1 small</td>
<td>2.9</td>
<td>1.1</td>
<td>1.8</td>
</tr>
<tr>
<td>Pineapple</td>
<td>3/4 cup</td>
<td>1.4</td>
<td>0.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Plum</td>
<td>2 med.</td>
<td>2.4</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Prunes</td>
<td>3 med.</td>
<td>1.7</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Raisins</td>
<td>2 tbsp</td>
<td>0.4</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Raspberries</td>
<td>1 cup</td>
<td>3.3</td>
<td>0.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Strawberries</td>
<td>1.25 cup</td>
<td>2.8</td>
<td>1.1</td>
<td>1.7</td>
</tr>
</tbody>
</table>

### VEGETABLES

<table>
<thead>
<tr>
<th>Vegetables</th>
<th>Portion</th>
<th>All</th>
<th>Sol</th>
<th>Insol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artichoke</td>
<td>med.</td>
<td>6.5</td>
<td>4.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Asparagus</td>
<td>1/2 cup</td>
<td>2.8</td>
<td>1.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Bean sprouts</td>
<td>1 cup</td>
<td>1.6</td>
<td>0.6</td>
<td>1</td>
</tr>
<tr>
<td>Vegetable</td>
<td>Measurement</td>
<td>Calories</td>
<td>Fat (g)</td>
<td>Fiber (g)</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------</td>
<td>----------</td>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>Beets</td>
<td>1/2 cup</td>
<td>1.8</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>Broccoli</td>
<td>1/2 cup</td>
<td>2.4</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Brussels sprouts</td>
<td>1/2 cup</td>
<td>3.8</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Cabbage, red</td>
<td>1/2 cup</td>
<td>2.6</td>
<td>1.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Carrots</td>
<td>1 med.</td>
<td>2.3</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>1/2 cup</td>
<td>1</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Celery</td>
<td>1 cup</td>
<td>1.7</td>
<td>0.7</td>
<td>1</td>
</tr>
<tr>
<td>Cucumber</td>
<td>1 cup</td>
<td>0.5</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Green beans</td>
<td>1/2 cup</td>
<td>2.8</td>
<td>1.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Kale</td>
<td>1/2 cup</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Lettuce, arugula</td>
<td>1/2 cup</td>
<td>0.16</td>
<td>0.04</td>
<td>0.12</td>
</tr>
<tr>
<td>Lettuce, chicory</td>
<td>1 cup</td>
<td>1.16</td>
<td>0.26</td>
<td>0.9</td>
</tr>
<tr>
<td>Lettuce, endive</td>
<td>1/2 cup</td>
<td>0.78</td>
<td>0.16</td>
<td>0.62</td>
</tr>
<tr>
<td>Lettuce, iceberg</td>
<td>1 cup</td>
<td>0.5</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Lettuce, radicchio</td>
<td>1 cup</td>
<td>0.36</td>
<td>0.07</td>
<td>0.29</td>
</tr>
<tr>
<td>Lettuce, romaine</td>
<td>1 cup</td>
<td>0.9</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Lettuce, watercress</td>
<td>1 cup</td>
<td>0.17</td>
<td>0.03</td>
<td>0.14</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>1 cup</td>
<td>0.8</td>
<td>0.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Pepper, green</td>
<td>1 cup</td>
<td>1.7</td>
<td>0.7</td>
<td>1</td>
</tr>
<tr>
<td>Spinach</td>
<td>1/2 cup</td>
<td>1.6</td>
<td>0.5</td>
<td>1.1</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>1/3 cup</td>
<td>0.8</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Tomato</td>
<td>1 med.</td>
<td>1</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Turnip</td>
<td>1/2 cup</td>
<td>4.8</td>
<td>1.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Yellow Squash</td>
<td>1/2 cup</td>
<td>0.7</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Zucchini</td>
<td>1/2 cup</td>
<td>1.2</td>
<td>0.5</td>
<td>0.7</td>
</tr>
</tbody>
</table>

**LEGUMES, NUTS, SEEDS**

<table>
<thead>
<tr>
<th>Legume</th>
<th>Measurement</th>
<th>Calories</th>
<th>Fat (g)</th>
<th>Fiber (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds</td>
<td>6 whole</td>
<td>0.6</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Black beans</td>
<td>1/2 cup</td>
<td>6.1</td>
<td>2.4</td>
<td>3.7</td>
</tr>
<tr>
<td>Black eyed peas</td>
<td>1/2 cup</td>
<td>4.7</td>
<td>0.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Brazil nuts</td>
<td>1 tbsp</td>
<td>0.5</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Butterbeans</td>
<td>1/2 cup</td>
<td>6.9</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Chickpeas</td>
<td>1/2 cup</td>
<td>4.3</td>
<td>1.3</td>
<td>3</td>
</tr>
<tr>
<td>Coconut, dried</td>
<td>1.5 tbsp</td>
<td>1.5</td>
<td>0.1</td>
<td>1.4</td>
</tr>
<tr>
<td>Coconut, fresh</td>
<td>2 tbsp</td>
<td>1.1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>Hazelnuts</td>
<td>1 tbsp</td>
<td>0.5</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Kidney beans, dark</td>
<td>1/2 cup</td>
<td>6.9</td>
<td>2.8</td>
<td>4.1</td>
</tr>
<tr>
<td>Kidney beans, light</td>
<td>1/2 cup</td>
<td>7.9</td>
<td>2</td>
<td>5.9</td>
</tr>
<tr>
<td>Item</td>
<td>Measurement</td>
<td>Protein</td>
<td>Calcium</td>
<td>Iron</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
<td>---------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>Lentils</td>
<td>1/2 cup</td>
<td>5.2</td>
<td>0.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Lima beans</td>
<td>1/2 cup</td>
<td>4.3</td>
<td>1.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Navy beans</td>
<td>1/2 cup</td>
<td>6.5</td>
<td>2.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Peas</td>
<td>1/2 cup</td>
<td>4.3</td>
<td>1.3</td>
<td>3</td>
</tr>
<tr>
<td>Pinto beans</td>
<td>1/2 cup</td>
<td>5.9</td>
<td>1.9</td>
<td>4</td>
</tr>
<tr>
<td>Peanuts</td>
<td>10 large</td>
<td>0.6</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Sesame seeds</td>
<td>1 tbsp</td>
<td>0.8</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>1 tbsp</td>
<td>0.5</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Split peas</td>
<td>1/2 cup</td>
<td>3.1</td>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>Walnuts</td>
<td>2 whole</td>
<td>0.3</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>
About the Author

The purpose of an author bio is to dazzle you and have you believe that he or she is an expert in something, whose every word you should believe. Doesn't that sound silly?

Nevertheless, for those of you who like this kind of stuff, here is a short version of my professional life that might satisfy you:

Dr. Dennis Clark holds a bachelor’s degree in Biological Sciences from Sacramento State College and a Ph.D. in Botany, specializing in plant chemistry, from the University of Texas at Austin. He spent his entire 30-year professional career in teaching and research at Arizona State University. He has also been Visiting Professor at the University of California and at the University of Heidelberg in Germany. He is currently an adjunct professor at the Southwest College of Naturopathic Medicine.

Dr. Clark is a leading expert on plant natural products chemistry and integrative medicine, an award-winning teacher, and co-author of a best-selling college textbook on botany. He has been awarded grants for his research from the National Science Foundation, the U.S. Department of Agriculture, and the Alexander von Humboldt Foundation. His studies have been published in dozens of national and international scientific journals. He has lectured at international conferences in the U.S., Canada, Mexico, Germany, Belgium, and England.

Dr. Clark’s journey into medical botany and natural health began when, as a young university professor, he found that his knowledge of plant chemistry could be used to explain how plant natural products affect human health. This led to his discovering which botanicals were best for enhancing the health of his family and friends. He soon found that his university students also wanted the same kind of information. Their ever growing demand for his science-based approach to natural health led to several new classes in integrative medicine, medical botany, and natural products pharmacology.
As Dr. Clark states, “I feel blessed to have a background that enables me to evaluate both the scientific literature and the popular press on natural medicines and to dig out, understand, and explain to the public how and why these medicines work. People should be able to get straightforward answers to simple questions about which natural medicines will work for them and what commercial brands are reliable for what they need. Unfortunately, these answers are not easy to find for people who do not have an extensive scientific background. My role is to provide this service, to bring the best research available on medicinal plants to the public’s attention, and to lead the way in the evaluation and development of quality products.”

Over the years Dr. Clark has gathered the best information available on natural approaches for preventing and overcoming many human disorders. These include herpes, obesity and overweight, menopause and hormone imbalance, cancer, osteoporosis, arthritis, stress, cardiovascular disease, diabetes, digestive problems, candida (yeast) overgrowth, and many others. He uses his expertise from many years of teaching, researching, and writing to provide the public his clear, powerful, and often entertaining views of a research scientist about being healthy naturally.

He is currently in demand as a guest speaker for local groups and radio and TV programs on many aspects of wellness.

Dr. Clark is also very active in his community, with particular interests in Tempe South Rotary and Twilite Toastmasters, both in Tempe, AZ.

Not dazzled yet? Read on...

If you really, really have nothing better to do, or if you are still unbearably curious about who is behind this book, or you are looking for even more stuff that makes me sound important, here are my suggestions.

Since there are hardly any secrets online, I suggest that you enlist the Mighty Google Machine to look me up. You can find almost everyone with a quick Google search these days. A couple of hints are: First, look me up as “Dr. Dennis Clark” — using the quotes for an exact match. Lots of Dennis Clarks are out there (I went to college with 6 of them!), and very few Dr. Dennis Clarks. Still, you
will get at least 130,000 hits on this search, not all of which are about me. I’m the Dr. Dennis Clark in Arizona.

Furthermore, in my career as a university professor, I used my first initial on all publications, books, etc. You can find an entirely other me, my professor persona, by looking up “W. Dennis Clark” — again, using the quotes for an exact match. That should come up with a little over 12,000 hits.

There, that ought to keep you busy for a while. If you look at all that stuff, you will know more about me than my mother does.

Enjoy!