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HOW TO LOSE BELLY FAT (and keep it off!)

Dr. Dennis Clark

HOW TO LOSE BELLY FAT AND KEEP IT OFF

DISCLAIMER

The FDA requires that all sources of information regarding your health must be accompanied by a disclaimer. It goes something like this:

The purpose of this book is to increase your knowledge about wellness and how to achieve it naturally. Information here is not intended as medical advice and it is not meant to diagnose or treat any individual's health problems. You should not discontinue any course of medical treatment or undertake any new treatment without first consulting your own healthcare practitioner.

Of course, the FDA is a rogue government agency that is accountable only to Big Pharma. So take this disclaimer with a huge grain of salt.

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FOREWORD

Just a little heads up before you dive into the book:

This is NOT a diet book.
It's a *lifestyle* book.

Sure, you'll see some recommended foods and eating styles. They're important.

However, food choices go hand-in-hand with how you live – what I call your lifestyle choices.

Staying slim and healthy is about much more than what you eat.

You already know that food is the underlying theme of many popular diet programs. It's why they routinely fail.

How you metabolize food is the key. And that's impacted by just about everything you do over every 24-hour period of your life.

It's all guided by basic human biology.

One more thing – as the title of this book states, it's about losing ***belly fat***. That focus rests on the insidious nature of fat around your middle. It's much more than a cosmetic issue. It's a whole-body health issue.

Nevertheless, addressing the fat around your middle also encompasses excess 'cosmetic' fat elsewhere – hips, thighs, fanny, and arms.

So get ready for a wild ride into what makes you tick and how to capitalize on the tools Mother Nature gave you for living a long, healthy life as a slimmer you.

Now dig in!

Dennis

INTRODUCTION

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's 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's 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. And it's completely unnecessary in the face of common sense.

By the fact that you're reading these words now, you're 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 the rest of your life.

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 you seek.

Go ahead, I won't take it personally.

My ultimate goal for this book is for you to come away with a lifestyle approach that benefits you the best way possible. When you live the lifestyle that is meant for you, based on your own biology, you'll discover that 'weight loss' is a silly phrase without real meaning.

This book offers a particular slant on ***fat loss*** as opposed to weight loss. They're not the same thing, even though they're used interchangeably. (I do it myself.).

My approach to fat metabolism is rooted in scientific research. The reason for this approach is not because science has all the answers. You'll 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, 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 from taxpayer support. Unfortunately, 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 pay for it and are impacted by it.

A couple of other things that you should be aware of regarding scientific research, especially when it comes to using human subjects, is that:

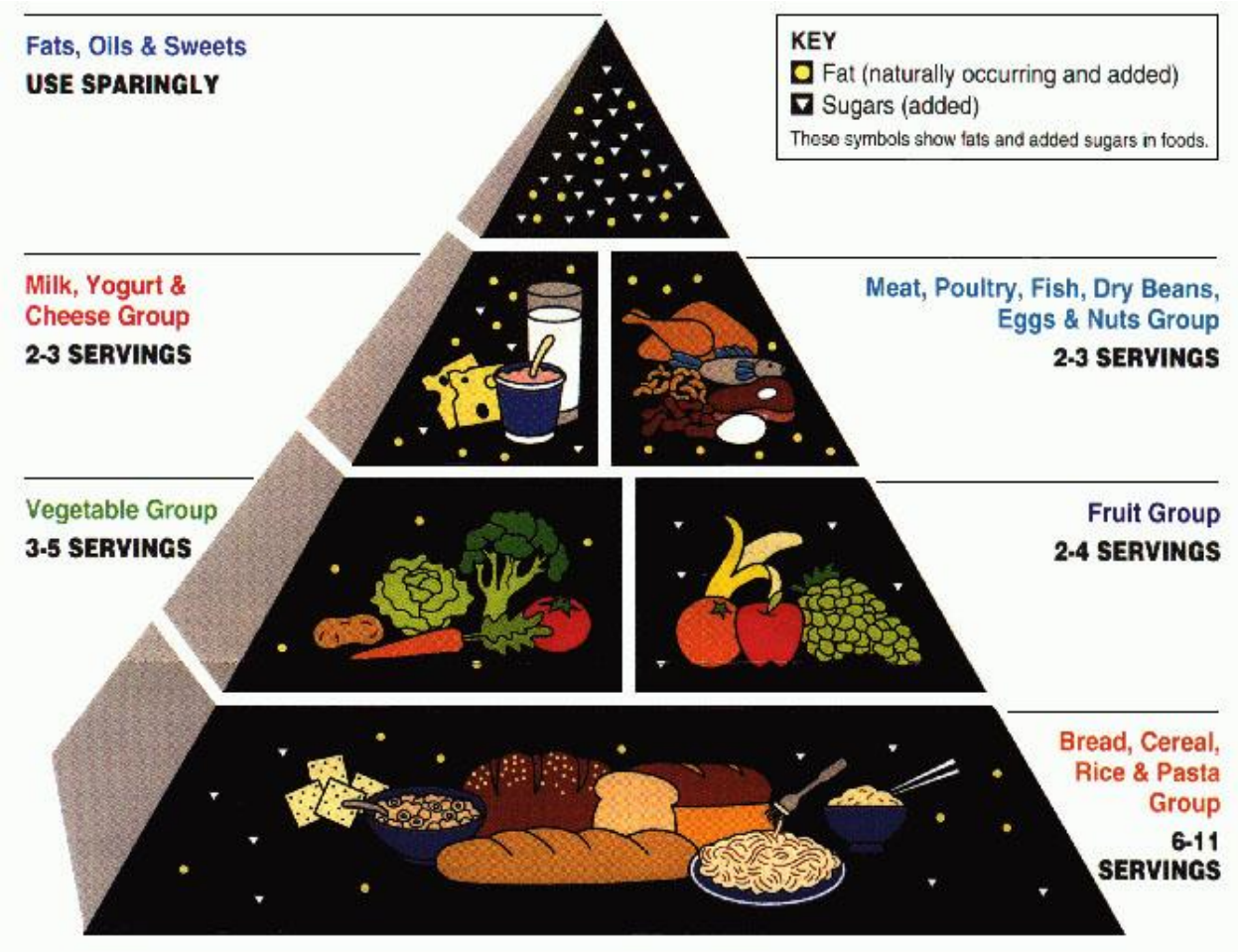
1) Almost all studies are flawed in some significant way.

2) Science nevertheless provides some solid, research-based answers for most of the questions that you might ask about fat loss, fitness, and overall health.

Federal Recommendations to Die For

Government ‘experts’ have used cherry-picked 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.

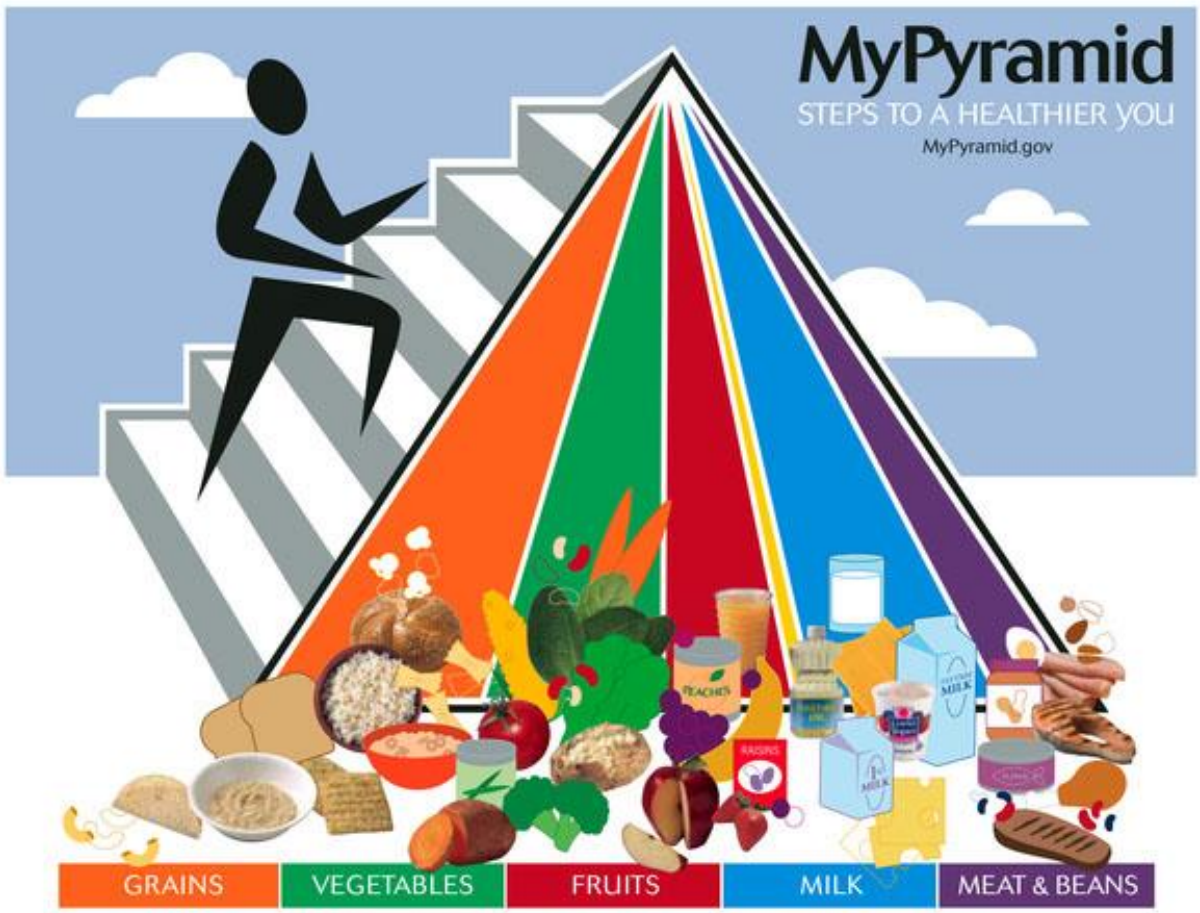
Typical of federal health recommendations, it was created by a committee beholden to a number of food lobbies. It doesn’t really represent healthy eating as much as those lobbies who won – mostly the dairy, grain, and sugar industries. In case you don’t recall it, this is what it looked like.



It took more than a decade to see the results of a growing hue and cry from the public, backed by solid research, objecting to poor health outcomes from following the Food Pyramid.

Gee, who would have guessed a diet resting on a foundation of 6-11 servings a day from the bread, cereal, rice, and pasta group might be bad for human health? Apparently everyone except the committee who recommended it.

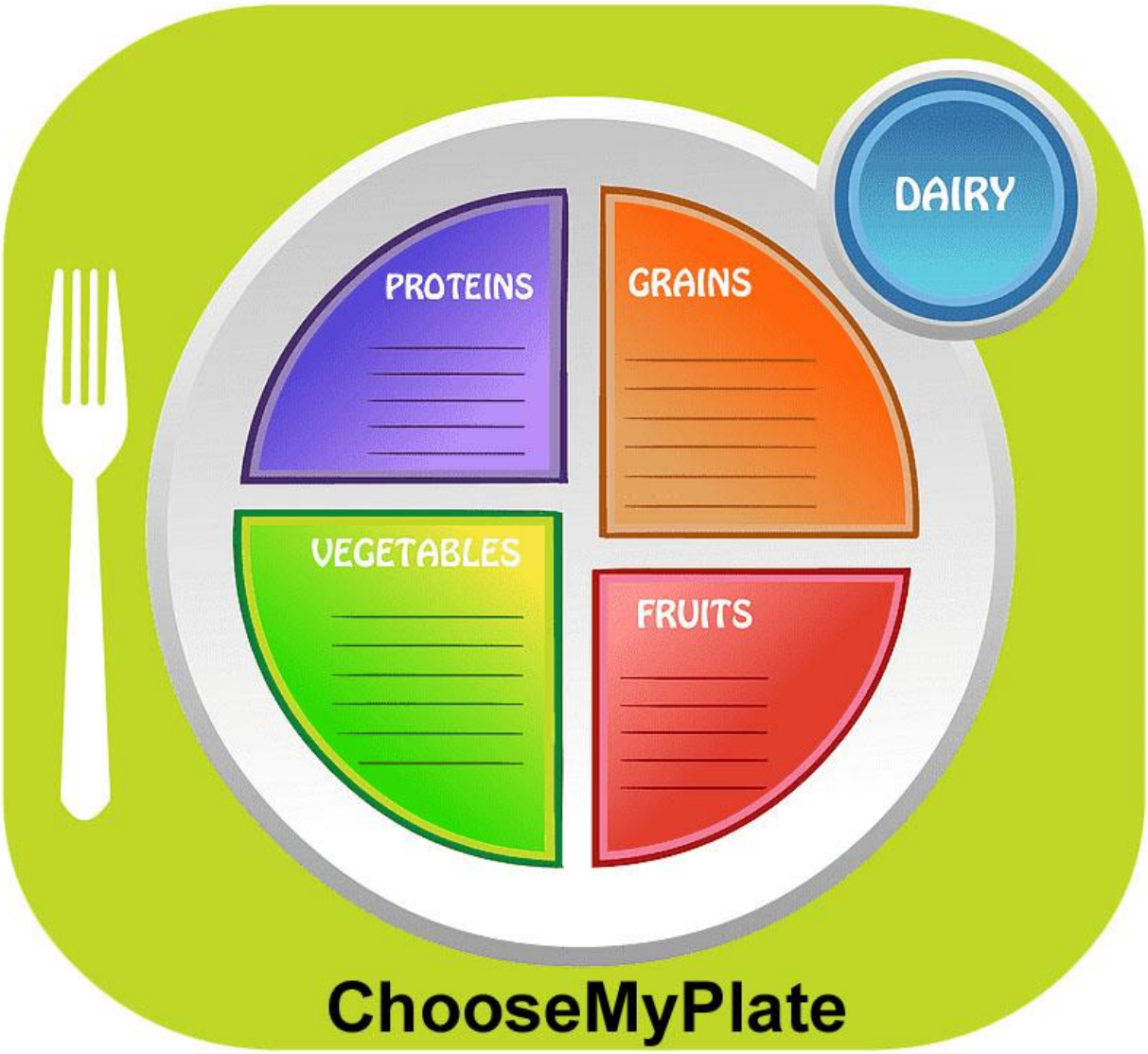
The Food Pyramid was then tossed out in 2005, to be replaced by the MyPyramid instead. As shown below, it unfortunately didn't really change the recommended foods. It was just a snazzier graphic, with an added emphasis on physical activity (that guy on the stairs).



As expected, poor results ensued once again – just like with the Food Pyramid. No surprise there.

Finally, First Lady (at the time) Michelle Obama got involved with nutritional recommendations for children. It led to her endorsement of the population-wide ChooseMyPlate program in 2011.

ChoseMyPlate arrived with a lot of hoopla and yet another snazzy graphic.



On hindsight, the Food Pyramid and the MyPyramid were abominations against human health. Recommendations based on ChooseMyPlate weren't 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.

Evaluating Diet Wisdom

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 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'll explain enough here so you can judge the perspectives I provide. At the very least, you'll become better at sorting out some of the loud marketing hype and all 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' at the end of this book).

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.

My First 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 into some good resources to find the advice 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 results 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 isn't 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's 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* 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've read are great sources for the information that I offer in this book. You will find a bibliography of my key references in the Resources and Links section toward the end of this book.

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 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 to influence 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 six small meals per day better than eating two or three larger ones? Does aerobic exercise drive weight loss better than resistance exercise? Opposing answers to all of these questions are supported by contradictory scientific research.

Do Calories Really Matter? *No!*

My favorite diet myth, which I'll 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 you have to believe it. Indeed, it's become dogma of epic 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's ridiculous.

You'll understand the reasoning behind that statement later, in the chapter on the Myths About Calories.

Some Encouraging Words

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.

Let's not mince words here. The reason that you are reading this book right now is because you're fat and you don't want to be. 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 you believe it.

The bad news isn't all that bad, either. It's simply that you're 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 see how you can get there...

FAT LOSS BIOLOGY: TAKE-HOME LESSONS

You'll 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 pay heed to the following lessons, regardless of whether you even read another word in this book, you'll be successful.

LESSON 1. 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.

LESSON 2. You don't get fat because you overeat. You overeat because you're getting fat.

LESSON 3. There are plenty of obese people. There are plenty of senior citizens. Obese senior citizens do not live as long as non-obese senior citizens.

LESSON 4. 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.

LESSON 5. 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.

LESSON 6. 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 (partially), and many other factors that influence your metabolism.

LESSON 7. 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 your growth hormone (hGH). The ideal strategy is to allow 5-6 hours between meals. Do not snack.

LESSON 8. 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.

LESSON 9. 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.

LESSON 10. (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.

LESSON 11. 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.

LESSON 12. 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.

LESSON 13. Fructose, especially from high-fructose corn syrup, is one of the top two most dangerous food additives of all time. It will ruin your metabolism in many ways. Avoid it like the plague.

LESSON 14. Aspartame (Nutrasweet) is the other one of the top two most dangerous food additives of all time. It will also ruin your metabolism in many ways. Avoid it like the plague, too.

LESSON 15. 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.

LESSON 16. 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.

LESSON 17. 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.

LESSON 18. A low-carb, high-fat approach is great. A high-carb, low-fat approach **may also work**. Fat and carbs together lead to metabolic disaster.

LESSON 19. 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.

LESSON 20. 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, swimming) 1-3 times per week. These are the most efficient ways to exercise for building muscle and endurance.

LESSON 21. 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.

LESSON 22. 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 incoming calories must equal the number of calories burned. One (incorrect) 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 **absolutely 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.

The following discussion is an abbreviated version of what I explain in the bonus booklet I promised you. In case you lost the link to it, you can still download it here:

Calorie Counting Madness:
Surprising Truths About Weight Loss (2nd Edition)

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 required to raise a cubic centimeter (i.e., a 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. That's 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 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 (kcal, a thousand calories).

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

You undoubtedly already know something about calorie ratings in different food groups. Carbohydrates are rated as 4 calories per gram, protein as 4 calories per gram, and fat as 9 calories per gram. To be correct, though, these are Calories (kilocalories). Maybe it's just too scary to cite small

calories. Imagine having a 100-gram (3.2 oz) piece of chicken breast and realizing that it can yield more than 400,000 calories! Or that your daily caloric intake that's 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's nonsense to suggest that they provide you with nearly the amount of heat 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 calories 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.

A Ridiculous Comparison

Consider this: in a bomb 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.

In other words, a bomb calorimeter will yield 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’s much more meaningful to talk about what happens to different foods when they’re digested, how they get into different kinds of cells (e.g., fat vs. muscle), and what happens to them once they’re 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 (kcal) per gram. However, glucose goes into many different tissues – most notably muscle and brain – and intact fructose never escapes your liver. At least, not until it’s converted to triglycerides.

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 the form of triglycerides. 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 - those foods are highly fattening. You’ll 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 fat loss.

By the way, once you understand what’s truly important about foods of all kinds, which is clearly not their calorie content, you’ll 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'll 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.

That 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.

Key modern studies show we overeat because we are getting fat, not the commonly believed opposite. This concept originated 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.

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 (BMR) that's 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'll 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're 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's 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.

That's what constitutes 'magical thinking'.

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's as though visceral fat has a mind of its own. It's going to take all the energy it can, even when there isn't really enough food. If there isn't enough energy to go around, then the rats stop moving - they become slothful.

If you've 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's 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 ovarectimized 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 harvested as much of their own muscle tissue, including that of heart and other organs, as they needed for fuel.

The same thing happens in humans. If you're fat and don't eat enough to satisfy your metabolic needs, your fat will steal whatever it can from muscle and organs. You'll 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's fat metabolism gone wrong. It's so powerful that your body will consume its own muscle and organs, ultimately leading to organ failure (e.g., heart attack) and early death.

Just to keep your fat happy.

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's probably not obvious how to do so.

Your body has hundreds of hormones and thousands of enzymes controlling 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.

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's where you're *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's 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. In other words, BAT 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's 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.

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's 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're like me, you will still keep track of numbers. I might be obsessively analytical with my daily recordings, sometimes multiple times per day, of my weight and body fat percent. To satisfy my obsession I use either this bathroom scale/body fat scale combo or this handheld body fat analyzer. (They're the least expensive scales I could find.)

Nevertheless, what I'm most satisfied with is my waist size.

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 making 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 to lower cholesterol levels in the first place.

Cholesterol and overall lipid (fat) balance are 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. If you've been frightened into taking statin drugs, it's 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 (including obesity), is to address inflammation through a combination of good anti-inflammatory foods and 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 for reducing 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're 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

Ah, now we're getting to the core value of this book.

Correcting your fat metabolism doesn't 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. Just get started!

What Will Work for You?

Your age, gender, metabolic and health status, hormone balance, genetics (in part), 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:

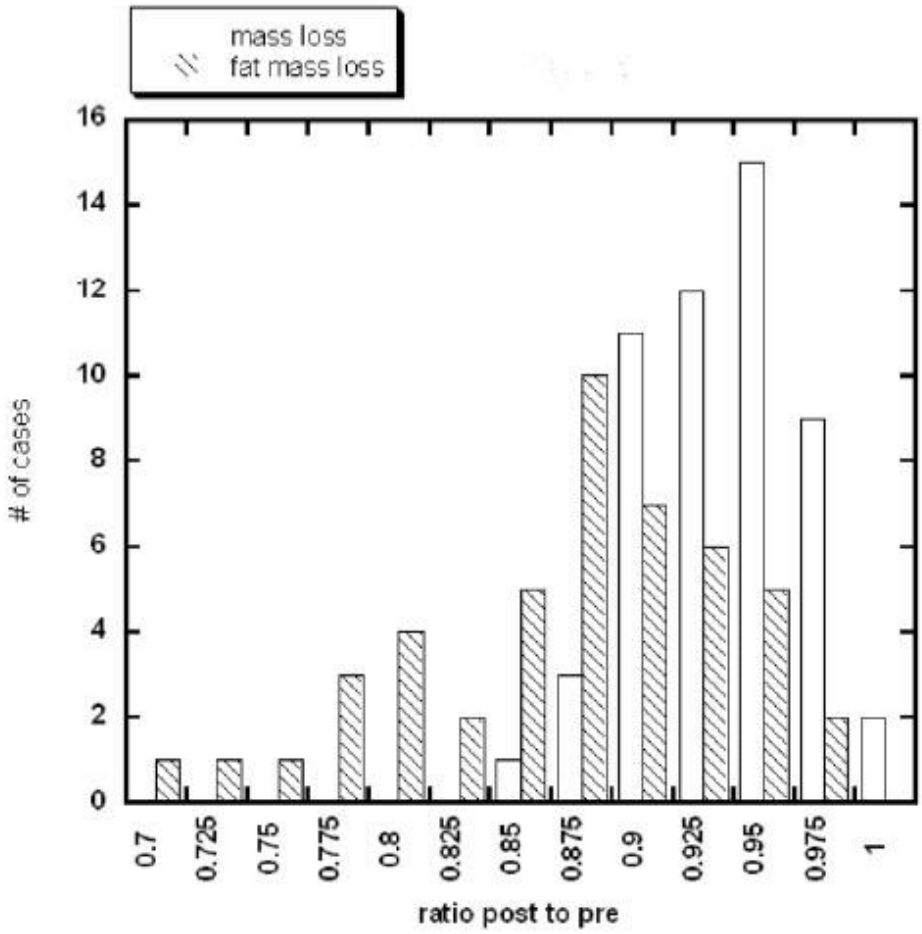


Figure 1. Distribution of the weight reduction and fat mass loss in all subjects participated in 36 days of the dieting program.

From: Int. J. Med. Sci. 2011; 8(6):445-452.

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've ever found for effective weight/fat loss. I'll 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've found on fat metabolism, are the best ones with the greatest chance to work for most people.

If you're 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're a woman who has reached menopause, you'll discover more challenges in righting your metabolic ship than do other folks.

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, in the chapter, 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 to achieve the healthy leanness that you want and deserve.

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 naturopathic 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 my website, BestHCGWeightLoss.com, and the book that I offer there (*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's a little summary of what it's all about.

HCG stands for Human Chorionic Gonadotropin, which is a protein hormone that occurs naturally both in males and females. It's 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's 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 pangs, 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've followed one diet after another, repeatedly experiencing weight loss followed by weight gain, it's because standard weight loss diets do not specifically get rid of abnormal fat. They instead lead you to 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 visceral 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 don't 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 45 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 per bottle all over the internet.

HCG PROTOCOL DISCLAIMER: The FDA still hasn't 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're 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's 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.

***NOTE:** The popularity of the hCG diet attracted so much attention from federal regulators over the years that pharmacies have slowly been forced to quit making it available for that purpose. At this moment, that includes the compounding pharmacy that I once used for helping hundreds of people over the past 17 years or so. However, making the right lifestyle choices, as described in this book, make it a moot point. In other words, you don't need it once you get your metabolism going in the right direction.

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

EATING STYLE

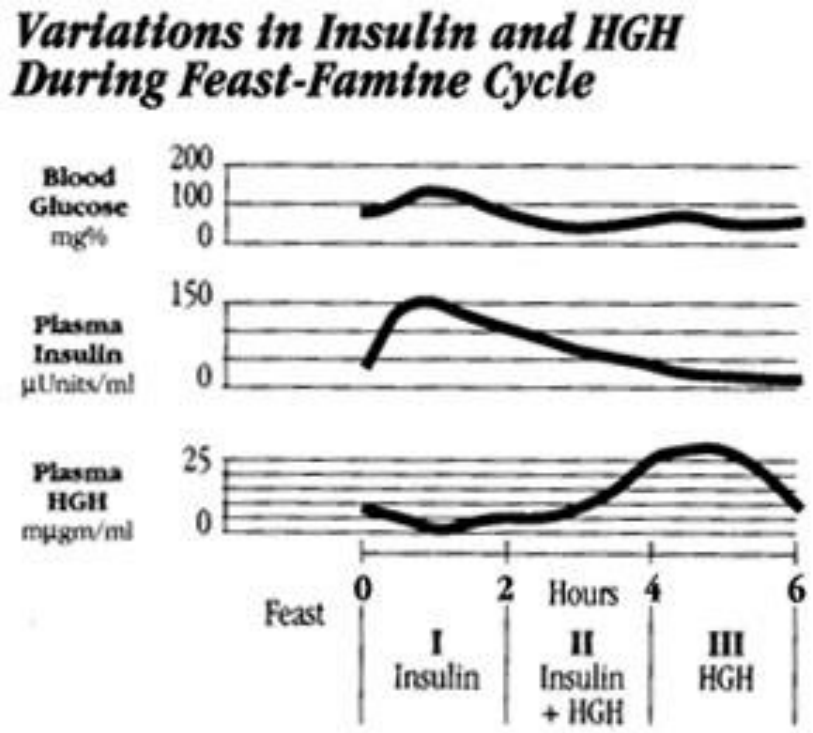
Nearly everything you do for reducing fat and keeping it off centers around eating. Eating right will get you the results you want, and eating wrong will undermine everything else you do. Notice that ‘eating style’ is not the same as dieting.

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’s 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’s 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. Two of the most crucial hormones are insulin and human growth hormone (hGH). Here’s what scientists have known about them since 1963, summarized in the following graph:



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

Insulin, of course, is the famous protein hormone most people know as the key to metabolizing blood glucose. It's 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 than most people realize. It's one of the most important starting points for understanding what you must do for maintaining a healthy metabolism.

The reason 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's 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 must put that glucose somewhere. Wouldn't you just love to 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."***

That's 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 shown in that graph, growth hormone (hGH). As the graph 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 corresponding spike in insulin over a time span of about 2 hours after the meal.

During the second phase, starting 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.***

If you do a little math here, you may immediately realize that spacing meals so 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 rests on a false premise about how often we need to eat.

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 – that violates our basic biology. This concept is fueled by the sales and marketing departments of food manufacturers. It's 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 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?

Now keep this in mind: 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.

Your longest fasting period during a 24-hour day is, of course, routinely at night while you're asleep. It's 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 responses 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've 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 stored for fuel. In fact, research shows 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.

If this lesson seems to undermine that old adage about breakfast being the most important meal, then so be it. It's a silly old adage, anyway. And it's 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'm 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's 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.

In fact, I can say unequivocally that:

> *YOUR BODY REQUIRES REGULAR FASTING FOR A MINUMUM 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 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'll undoubtedly get overwhelmed by bouncing around all those gazillions of pages on IF and digging up those hundreds of research articles, so I'm going to provide you with a brief synopsis (from that fount of all knowledge, Wikipedia), followed by an explanation of how to adapt to 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). 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's an all-too-common 50% body fat composition!

It's the result of eating too often.

In light of this truth, any and all diets claiming 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.

A fellow researcher by the name of Brad Pilon (author of *Eat Stop Eat*) 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.

Let's take a look at some of these benefits (as an additional incentive for you to adopt an IF program of your own).

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 key fat-burning hormone kicking 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's 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. They are the basis for keeping you strong for your overall fitness. Unfortunately, exactly how you should build and maintain muscle is a never-ending source of confusion and bad advice. I'll 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're older, if that's what you want to accomplish. However, there's no need to choose that path.

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

At the moment there's 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's clear that intermittent fasting is better than traditional dieting for building muscle.

Reduces Blood Glucose Levels. Glucose is the sugar circulating 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're 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'll 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 drop your post-meal insulin spike quickly (see graph above again) 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 and 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're diabetic, or if you're 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's released from fat cells. This breakdown is called 'lipolysis'. Lipolysis begins when triglycerides stored in fat cells are cleaved into their component fatty acids plus glycerol. ('Triglyceride' means three fatty acids chemically bound to the 3-carbon molecule, glycerol.)

Once these fatty acids are released into your bloodstream, they can eventually be used as energy for muscles 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’s 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 they’ve put away. As glycogen gets used up for muscle metabolism, muscles begin to switch over to fat oxidation. Muscle metabolism is a big component of your basal 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 it. According to published research studies, a 24-hour fasting period increases by more than 50 percent the amount of fat released from storage. This leads to 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 controlling 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 up to 40 hours of fasting!

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

Increases Adrenaline and Noradrenaline levels. Adrenaline (epinephrine) and noradrenaline (norepinephrine) are neurotransmitters (nerve hormones) 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’s one of your body’s strategies for making sure 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 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’s 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 the healing inflammatory process is underway.

However, lower-level, chronic exposure to damaging stimuli leads to continuous 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 you store as a result of eating too often is a stressful burden leading to the inflammatory response. It stems from too much blood glucose and too much insulin chronically.

And it’s a vicious cycle. Inflammation occurs continuously, as long as there’s excess fat. Excess fat is maintained continuously, as long as there’s 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 proteins and move them into special cell bodies called lysosomes for degradation. The process has a fancy name, ‘autophagy’ - meaning 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 to OFF. A recent study found that consuming just a 10 gram dose of amino acids (ca. 2 tsp.) 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 shows 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 enabling muscle fibers to eliminate accumulated junk proteins so they can be replaced with the fully functional proteins for making 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 you take hGH injections, 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'll 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 that graph earlier showing 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're 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's 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've 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 (muscle building) hormone 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've reduced the need for glucose as a fuel source. The net result 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 ignoring that 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's what's 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, MD. 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'm 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 I'm 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.

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's left? Most, but not all, of the whole foods. 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's 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'll 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 subsection, 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

All of the above share a low-carb theme. They also share the logic that humans are adapted to eating foods 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's 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's a simpler task 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 a high-fat, low-carb diet with a smattering of protein. And no so-called '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.

Another example comes from 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% fish, 10% seal meat, and 5-10% meat from polar bears, 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 (most mammals make their own vitamin C) when it was cooked, and they had no plant material to provide it, either. For the moment I'll 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 big part of their food choices. 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 carb-heavy diet.

In addition, 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 in that tribe 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 made from processed sources (flour, refined 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***.

The AMPK Story. 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 cells is more appropriately measured in the form of a high-octane molecule called ATP (adenosine ***tri***phosphate). It's made from combining phosphate with its precursors, AMP (adenosine ***mono***phosphate) and ADP (adenosine ***di***phosphate).

The food we eat is the source of energy driving 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 high 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 of 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 we can move stored fat and sugar to where it needs to be burned.*

In contrast, when we're 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 food for the next five days. The 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's 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 the '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'll have to wait and see.

Meanwhile, I'm 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. That's one of my favorite saying I picked up from a naturopathic doctor many years ago. It refers to 'white' foods, including potatoes, breads, pastas, polished rice, bagels, and a smattering of foods that are disguised as something they aren't. Beware, for example, of whole wheat bread and other so-called 'whole food' products containing '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's 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'll lose weight effortlessly and your body fat percentage will drop.

You'll be more energetic, feel better overall, and look better. Indeed, you'll also feel better *because* you look better!

The good news about an eating style following the basic tenets of eating the way 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 you want them to be.

A little common sense. Eat foods providing 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,

meats, and seafoods. 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's handled between the time of harvest and when it appears at the supermarket.

Fruits and vegetables are often picked before they're ripe. Then they're stored cold and fumigated with ethylene gas (a plant ripening hormone) to speed up ripening just before they're 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 they also offer little in the way of nutrition.

On the other hand, fruits and vegetables 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 with nothing else (except maybe some salt), on the ingredient list would be a good choice.

Except for certain frozen fruits and vegetables, packaged foods in general are horrible. Just keep this in mind: Companies making 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,* Zucchini,* Squash,* Leafy Greens of all kinds ... indeed, anything that you can find that isn't starchy or sweet.

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

FISH: Flounder, Salmon, Mackerel, Sardines, Shellfish of all kinds, Sole, 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.

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.

Keys to Eating Fruit. Although fruits are on the ‘approved’ list above, ***they contain sugar***. Sometimes lots of 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.

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 freed-up fatty acids as fuel.

The main by-products 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.

The bottom line 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 the first choice when it's 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 do 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 in The Atkins Diet Revolution, is 20 grams per day.

This is an ultra-low amount of carbs per day, so it's 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's designed to induce ketosis as quickly as possible so you can get into fat burning mode.

Once you're 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.

Experimenting on yourself is the only way to find out what your limit is. You can follow your level of ketosis inexpensively with the use of Keto-Stix (or similar name), which are easy to find in any pharmacy. Consuming fewer

than 20 grams of carbs a day for two weeks should take you to the max. Then slowly adding carbs back into your diet, keeping track of your ‘Stix’ level, will tell you how much carb intake you can tolerate and still stay in ketosis.

Now here’s a really neat, fairly recent discovery about ketosis: It 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’s 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's toxic. You can simply agree to do so now, and skip this section. Or you can read below to find out why it's 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's 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 because of its low glycemic index. In reality, it's 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's 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 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 the formation of 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.

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.

Chronic Ethanol Exposure	Chronic Fructose Exposure
Hematologic disorders	
Electrolyte abnormalities	
Hypertension	Hypertension
Cardiac dilatation	
Cardiomyapathy	Myocardial infarction
Dyslipidemia	Dyslipidemia
Pancreatitis	Pancreatitis
Malnutrition	
Obesity	Obesity
Hepatic dysfunction	Hepatic dysfunction
Fetal alcohol syndrome	Fetal insulin resistance
Addiction	Habituation, if not addiction

That's enough about fructose itself. This is a huge subject that could be enough for a whole book. I think 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 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 so sweet it's do die for. In this case, 'to die for' doesn't carry its 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's 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 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's 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, isn't natural, since it doesn't 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's why HFCS is so much worse than fructose. It's hard to avoid.

Let's be clear on this. 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 subsidies already do enough of that.)

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):1894-1900). 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 don't. 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.

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. Then 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. It offers a wonderful laxative effect, if that's what you want from your sweetener.

The king of the artificial sweeteners when it comes to ruining human health is aspartame (Nutrasweet). The primary reason is that it's 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, 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's also written a book on it titled, While Science Sleeps: A Sweetener Kills, explaining 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'll 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 it's 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 Case Against Wheat. 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 ...

"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, *Guns, Germs, and Steel: The Fates of Human Societies*.

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 this type of 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's no escaping it, then welcome to the 21st century.

Personally I'm a little conflicted about modern dwarf wheat. While I'm 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' book, *Wheat Belly*, with the bad news. It's 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's 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's labeled 'whole grain' or not.

Second, and maybe even more insidiously, is wheat gluten. Gluten is a storage protein. Modern wheat 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’ll probably be surprised at how good you look and feel within just a few weeks.

One more thing about wheat. I would be remiss if I didn’t point out the rampant use of the herbicide glyphosate on wheat. Glyphosate is the active ingredient of Round-Up.

Wheat is the 4th-most heavily sprayed crop with glyphosate. The damage to your health of this sinister toxin can come from many modern crops. Wheat is just one of them. This is just a heads up for your general consideration. You can see a more complete explanation of this toxin in a blog post I wrote not too long ago, here: Glyphosate Toxicity – Government Approved Lies That Keep On Giving.

The point is, avoid wheat. It’s not fit for human consumption.

How Much to Eat

Unfortunately, almost all the advice that you'll find on how much food to eat entails the concept of calories as metabolically useful units. As I already explained earlier, 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's 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's 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 Chili 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."

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 disastrous.

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 (greater thermic effect). It takes the least amount energy to get energy out of processed carbs (lesser thermic effect). 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's 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's 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 that works is: ***eat slowly 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's 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 don't 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're 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's 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's 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

Almonds	21
Chicken/Turkey Breast	33
Crab	19
Eggs	12
Lamb (Shoulder)	36
Lean Beef	37
Legumes (avg.)	9
Lobster	26
Peanuts	24
Pecans	9
Pork Loin	30
Sunflower Seeds	21
Tuna	30

GETTING TOO MUCH PROTEIN? If you recall the earlier section on the Miracle of Ketosis, you know 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're eating lean cuts of meat, such as skinless chicken breast, or if you're supplementing your diet with protein shakes low in fat (they generally are). Getting enough fat is easy enough to remedy if you're 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're probably okay if you're eating protein in especially fatty cuts of meat. Bacon is great. If you're eating beef, be sure to get cuts that are well-marbled with fat, then eat the fattiest parts first. Besides, that's 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're classified together based on the fact that they do not dissolve in water. The only difference between the group called fats and the group 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's solid (a fat) on my kitchen counter during the winter, when the room temperature is slightly lower. It's 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, doesn't 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 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's 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 consuming 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 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's 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).

You won't just get a strong dose of omega-6 fatty acids from nearly all commercial vegetable oils. You'll also get a dose of highly processed oils. Beautiful, golden oils like corn oil and canola oil aren't in their natural state. They are chemically manipulated to look that way.

The only 'common' plant oil I use is cold-pressed extra virgin olive oil. I otherwise cook with coconut oil, butter, or (my favorite) the lard I've saved from bacon.

This table will give you an idea of what to choose. Note that, even though cottonseed oil is NOT really fit for human consumption use, it's used in a lot of canned products.

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

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're not regularly eating kidney, liver, brain, intestine, marrow, heart, etc., then pay very close attention to which plant oils you're consuming.

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

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 2-week Induction Phase of the Atkins Diet.

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's especially true as you ramp up the carbs. This is because, as you begin to store more glycogen, you'll 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'll 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 you need for metabolic health. It's 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're 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're 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're 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.

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's critically important to consume more salt***.

By the way, if you have high blood pressure or are taking medications to lower your BP, note that the traditional advice to cut back on salt is just plain idiotic. This advice is still common in mainstream medicine. If you really want the lowdown on the history of this utter stupidity, and the actual value of consuming more salt, take a look at this book (available online): *The Salt Fix: Why the Experts Got It All Wrong - and How Eating More Might Save Your Life*, by Dr. James DiNicolantonio.

Feel free to salt your foods. Put a smidgeon of sea salt into each glass of water 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're used to. And keeping drinking extra water.

Sodium is tied to **potassium**. You'll lose a lot of both as you enter low-carb metabolism. Although keeping your sodium levels up also helps maintain potassium levels, you'll 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're on blood pressure medications, though, first ask your doctor if it's okay for you to take potassium.

Most people are already severely deficient in **magnesium**, especially if they're 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 mg 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 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!

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'd be partly correct. Here's 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):

FAT → beta-oxidation in liver → ***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:

CARBOHYDRATE → glycolysis in liver → ***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 → beta-oxidation in liver → ***acetyl-CoA***
PLUS
CARBOHYDRATE → glycolysis in liver → ***acetyl-CoA***

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 this doesn't happen from 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've been puzzled, as I have, when hearing stories and seeing studies of people who survive on only fruit. They're 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 era is that you can live a perfectly healthy life on a high-carb diet, at least in the short term, as long as you consume little or no fat.

If you never heard of a high-carb Paleo diet, it's 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.

If you're really going to imitate high-carb ancestral eating, just be sure to eat carbs only in season, in their natural environment. It works best the closer to the equator you're living. It works worst in winter in more northerly (or southerly) latitudes.

Eating papayas in Costa Rica in summer would be great. Eating them in mid-winter in New York would cause metabolic havoc.

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.

Now let's get back to focusing on dietary fat.

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 when 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 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 other folks 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 & apple dinner.

While this won’t 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 I first encountered in Dr. Robert Atkins’ book, *Dr. Atkins’ 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 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 on a rocket ride. 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, rotated among different days. These meals consist of the highest fat content in any foods you can easily find in any supermarket. Meaning approximately 85% fat.

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 I like. Dr. Atkins and many bloggers provide additional suggestions (e.g., sour cream, heavy cream).

You'll have to put up with some hunger. However, your warp-speed fat loss will be phenomenal. Don't worry if you fall short. Even a couple of days of fat-fasting is valuable for getting you back on track.

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 isn't 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 dark 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's 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've done the fat-fast one more time, with the same results. Woo-hoo! Still a trend!

THE REAL ROLE OF EXERCISE

The usefulness of exercise for burning fat is all over the map. Some workouts are beneficial, and some aren't.

What you want is *effective exercise*, so I'll start with that.

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.

What I mean by 'effective' is simply: the time and effort you put into it for the results you get out of it.

What I've discovered is two of the most efficient kinds of exercise known to be supported by good research. In other words, the most effective approaches. They will probably be a surprise to you.

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, CrossFit, and other insanities), and in general most advice about exercising to lose fat is just plain wrong. In my opinion, it's 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're 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's my example of what's wrong with that whole industry. (Unfortunately, it's just one example out of dozens that I could also cite here.)

First off, this is supposedly a 'cut above' other machines because it's patented. (I'll restrain myself from pointing out the gaping 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.

Note this: 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 being 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 a definition, based on changes that can accrue from exercise. It's this:

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 showing how and where this definition might apply. The first one is one of the most remarkable studies I've 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'll point out what is a big surprise for most people right after the abstract below. (Note my bolding below.)

Janssen GM, Graef CJ, Saris WH.1989. *Food intake and body composition in novice athletes during a training period to run a marathon.* Int J Sports Med. 1989 May;10 Suppl 1:S17-21.

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, where you jumped into marathon training expecting to lose 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 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 revealing the failure of exercise to reduce weight or body fat.

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

Saltin B, Nazar K, Costill DL, Stein E, Jansson E, Essén B, Gollnick D. *The nature of the training response; peripheral and central adaptations of one-legged exercise.* Acta Physiol Scand. 1976 Mar;96(3):289-305.)

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 VO_2 max (a measure of aerobic capacity) increased by an average of 23%

when measuring the exercised leg. The VO_2 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 VO_2 max only in the muscles of the leg that you exercise. You will not build aerobic fitness elsewhere in your body.

If you're 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 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 that 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 'CrossFit'.)

The Two Best Approaches to Exercise

So far you've 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!***

The two approaches I'm advocating here are: 1) an approach to resistance exercise (i.e., weightlifting) like you never seen before; and, 2) endurance training without slogging through long-distance running, cycling, stair-

stepping, rowing, or any other ‘typical’ endurance exercise you’ve ever heard of.

First, what’s truly useful about exercise?

THIS IS CRUCIAL: ***It improves your insulin sensitivity and makes you build muscle at the expense of visceral fat and liver fat.***

Think about that for a moment. 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 exercise to reverse those three problems – and that means doing ***effective*** exercise.

1) The Super Slow Method for Building Muscle

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’s ineffective. In fact, it’s detrimental to efficient muscle building.

What’s 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 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 only 12 minutes a week.

I call it the ‘Body by Science’ method, after the book by McGuff and Little. It’s also known as the Nautilus method, for which the original Nautilus machines were invented, and the Super Slow Method.

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 with specific machines (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’s 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’ll undermine your results. If you wish, you can alternate muscle groups each week so that no muscle group gets worked out more than every 14 days. And you’ll 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’m 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.

There are quite a few videos, so if you’re short of time or just want to get to the point, the core videos demonstrating the method are covered by Parts 1-4 of the Big Five Workout and by the two videos in the Big 4 Workout For Women.

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

2) The Short Burst Method for Building Endurance

The second of the two best ways to do effective exercise is sprint interval training (SIT). The simplest way to explain what this means is through a comparison with typical long-distance endurance training. One of the two most eye-opening studies on this topic came out of McMaster University in Ontario by a research group headed by Dr. M.J. Gibala. The other came out of a group headed by Professor Izumi Tabata at Ritsumeikan University in Kyoto, Japan.

The results of these studies turned out to be a big surprise to the exercise industry. I mean a REALLY big surprise. So big that most of the industry has yet to incorporate new training based on these studies.

The work by Gibala's group can be summarized simply by looking into one of his key studies, as outlined below. (Note my bolding.)

Burgomaster KA, Hughes SC, Heigenhauser GJ, Bradwell SN, Gibala MJ. 2005. *Six sessions of sprint interval training increases muscle oxidative potential and cycle endurance capacity in humans.* J Appl Physiol. Jun;98(6):1985-90.

Abstract

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 sprint interval training 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 cycling machines at my local LA Fitness have TV sets on the handlebars!) It's just not effective exercise.

What Tabata's group discovered, based on research with the Japanese Olympic speed skating team is even more surprising. Here is the original study of what has now become known as the Tabata Method. (Note my bolding again.)

Tabata, I., Nishimura, K., Kouzaki, M., Hirai, Y., Ogita, F., Miyachi, M., and Yamamoto, K. (1996). ***Effects of moderate-intensity endurance and high-intensity intermittent training on anaerobic capacity and VO_2 max.*** **Medicine and Science in Sports and Exercise 28(10): 1327–1330.**

Abstract

This study consists of two training experiments using a mechanically braked cycle ergometer. First, the effect of 6 wk of moderate-intensity endurance training (intensity: 70% of maximal oxygen uptake (VO_2 max), 60 min/d, 5 d/wk) on the anaerobic capacity (the maximal accumulated oxygen deficit) and VO_2 max was evaluated. After the training, the anaerobic capacity did not increase significantly ($P > 0.10$), while VO_2 max increased from 53 +/- 5 ml/kg/min to 58 ± 3 ml/kg/min ($P < 0.01$) (mean +/- SD). Second, to quantify the effect of high-intensity intermittent training on energy release, seven subjects performed an intermittent training exercise 5 d/wk for 6 wk. ***The exhaustive intermittent training consisted of seven to eight sets of 20-s exercise at an intensity of about 170% of***

VO_2 max with a 10-s rest between each bout. [That's it!] *After the training period, VO_2 max increased by 7 ml/kg/min, while the anaerobic capacity increased by 28%. In conclusion, this study showed that moderate-intensity aerobic training that improves the maximal aerobic power does not change anaerobic capacity and that adequate high-intensity intermittent training may improve both anaerobic and aerobic energy supplying systems significantly, probably through imposing intensive stimuli on both systems.*

The bolded sentence highlights the entire workout: reps of 20-second maximal intensity with a 10-second rest. One rep after another, for a total of 8 reps, adding up to a ***combined total of 4 minutes***.

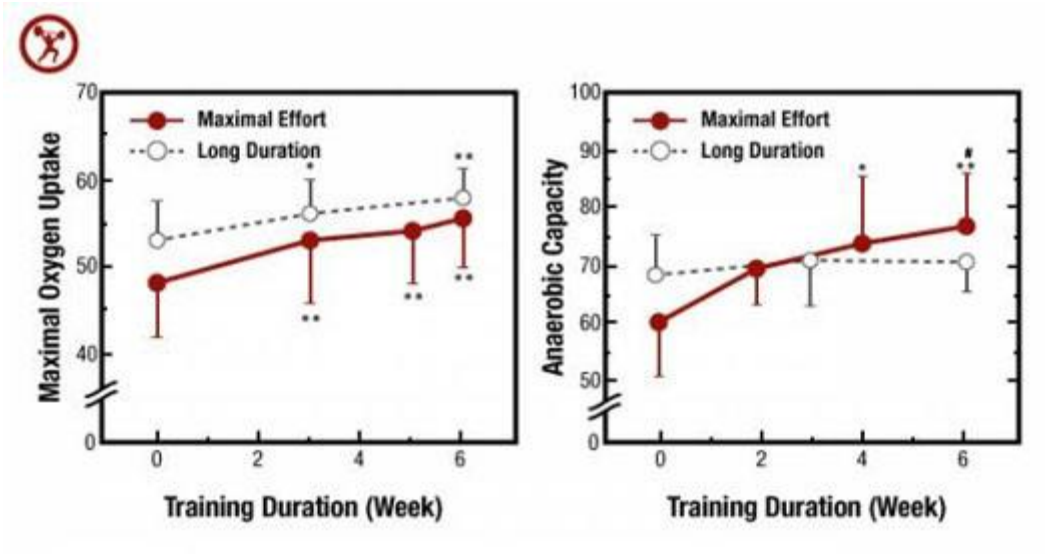
Before discovering this method, my standard sprint interval training workout was more Gibala-based: 8 reps of 1.5 minutes at ca. 15-16 mph, with a 2-minute rest (7-8 mph) between reps. This was either by running outdoors or by 'spinning' on a stationary bike indoors.

Now, using the Tabata Method, my intensity on a bike is 21-22 mph for 20 seconds, followed by complete stoppage for 10 seconds. Although my running 'speed' is difficult to quantify, my gasping level for running or cycling, on a scale of 1-10, is absolutely a 10.

The key is all-out, maximal effort.

Tabata compared a maximal-intensity group with a group that pedaled for an hour at 70 percent of VO_2 max, also 5 days a week for 6 weeks.
If you are doing the math, the maximal-intensity group worked out for 20 minutes a week, while the 'endurance' group worked out for 5 hours a week.

Here is what the results looked like for both groups in graphic form (explanation below): (Graph thanks to Craig Marker at BreakingMuscle.com.)



In the above figure, the graph on the left shows the results of oxygen uptake. It is a measure of aerobic efficiency. The solid red line is the maximal-intensity group while the dotted black line is the endurance group. Both groups improved their aerobic efficiency more or less equally (i.e., no statistical difference). This result was expected for the endurance group since they were specifically training for this goal. The results of the maximal-intensity group, however, came as the **big surprise** I mentioned earlier.

It's this: The graph on the right shows a measure of the anaerobic process. As expected, the maximal-intensity group improved their performance while the endurance group did not. This makes sense given that maximal intensity uses a lot more anaerobic processes, which therefore should become more efficient with this training.

Ultimately, the 4-minute maximal-intensity workouts had **better anaerobic benefits** as well as the **same aerobic benefits** as the endurance workouts.

Although I refer these results as a big surprise, the news about 2-in-1 benefits (aerobic AND anaerobic) was absolutely shocking. It still is.

That may explain why this work has been so widely ignored since it first came to light – way back in 1996!

A word of caution. Clearly the maximal-intensity Tabata Method is, well … **intense**. Be smart about it if you are not already at least a little bit in shape. That is my pseudo-medical advice.

Tabata's study was done with world-class athletes 5 days a week, which would be **very stressful** for you or me. Too much high-intensity exercise is counterproductive and even destructive.

For us weekend warriors, no more than 2-3 workouts a week are plenty. This frequency is especially important if you, like me, also do a once a week Body by Science style weight-lifting workout.

One more thing – be wary of fake Tabata protocols. Most workouts and programs claiming to use it do no such thing. Many workouts do advocate a 20-second on/10-second off protocol, but they are not maximal-intensity. These workouts can include everything from planks to kettlebells to quick-stepping. All of them might be good workouts. They are just mislabeled as Tabata workouts.

The biggest offenders are those advocating more than 8 reps. The litmus test is how long a workout lasts. **It should be limited to 4 minutes!**
I'm tempted to insert a video of one such workout here so you see what a fake Tabata workout looks like. However, there are so many out there that I will leave you to your own devices to hunt them down if you are really interested. Just don't fall for the Tabata hype. You don't need a book, a DVD, a yoga mat, kettlebells, or anything else except the equipment necessary for doing a maximal-intensity sprint.

Simply running will do. Or bicycling, rowing, swimming, sprinting up hills or stairs (with care!), jumping rope, or pushing a sled.

What can YOU Expect? A variety of elite athletes in different sports and at different levels have now been studied using the Tabata protocol. Results are consistent across the board.

What if you're not an elite athlete (except maybe in your own mind, like I am)? The good news is you can still benefit from a 'near-Tabata' workout, as Professor Martin Gibala's research group has discovered for the middle-aged sedentary crowd.

The Gibala protocol for sedentary folks was published in 2011. The reference and abstract are:

Hood, M.S., Little, J.P., Tarnopolsky, M.A., Myslik, F., and Gibala, M.J. 2011. *Low-Volume Interval Training Improves Muscle Oxidative Capacity in Sedentary Adults.* Medicine & Science in Sports and Exercise 43(10): 1849-1856.

Abstract

Introduction: High-intensity interval training (HIT) increases skeletal muscle oxidative capacity similar to traditional endurance training, despite a low total exercise volume. Much of this work has focused on young active individuals, and it is unclear whether the results are applicable to older less active populations. In addition, many studies have used "all-out" variable-load exercise interventions (e.g., repeated Wingate tests) that may not be practical for all individuals. We therefore examined the effect of a more practical low-volume submaximal constant-load HIT protocol on skeletal muscle oxidative capacity and insulin sensitivity in middle-aged adults, who may be at a higher risk for inactivity-related disorders.

Methods: Seven sedentary but otherwise healthy individuals (three women) with a mean +/- SD age, body mass index, and peak oxygen uptake (VO2 peak) of 45 +/- 5 yr, 27 +/- 5 kg/m2, and 30 +/- 3 mL/kg/min performed six training sessions during 2 wk. ***Each session involved 10 × 1-min cycling at ca. 60% of peak power achieved during a ramp VO_2 peak test (eliciting ca. 80%-95% of HR reserve) with 1 min of recovery between intervals.*** *Needle biopsy samples (vastus lateralis) were obtained before training and ca. 72 hours after the final training session.*

Results: Muscle oxidative capacity, as reflected by the protein content of citrate synthase and cytochrome c oxidase subunit IV, increased by ca. 35% after training. The transcriptional coactivator peroxisome proliferator-activated receptor gamma coactivator 1-alpha was increased by ca. 56% after training, but the transcriptional corepressor receptor-interacting protein 140 remained unchanged. Glucose transporter protein content increased ca. 260%, and insulin ***sensitivity, on the basis of the insulin***

sensitivity index homeostasis model assessment, improved by ca. 35% after training.

Conclusions: Constant-load low-volume HIT may be a practical time-efficient strategy to induce metabolic adaptations that reduce the risk for inactivity-related disorders in previously sedentary middle-aged adults.

Did you notice that bit about needle biopsy? Yup…these were some serious volunteers!

In case you are getting worn out on all this science-y stuff, the bottom line of this study is that even just 2 weeks of lower-intensity 'HIT' (6 workouts, 60% intensity, 10 reps, each rep a 1-minute exercise with a 1-minute rest) can boost the action of several enzymes in muscle metabolism (according to the muscle biopsies).

The icing on the cake in this study was the boost in insulin sensitivity.

That's a HUGE benefit!

There you have it. Tabata-style, Gibala-style, whatever you decide to do, keep it simple, don't overdo it, and get fitter any many ways.

One more thing. 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' (ancient) 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's important for all runners, not just seniors like me. It's 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?

How about just plain walking for fitness? Exercise by walking, of course, gets you fit for ... well, walking. Here's 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 of fat metabolism. Do a brisk walk as many times a week as you can. Hey, that's as easy as it gets, even though returns are relatively minor.

Even if you eschew all I've described about the benefits of the Body by Science resistance training and sprint interval training, you can still get plenty of benefits from just plain walking.

STRESS MANAGEMENT

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

Here's some perspective about stress, what's behind it, and what to do about it. It starts with the main 'stress hormone' – i.e., cortisol.

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'll 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, at the right time.

When cortisol levels come and go the way they're 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' – or sometimes the 'fight or flight' hormone - because it spikes during periods of stress. Like in the good ol' days when a quick burst of cortisol helped our ancestors escape from saber-toothed tigers. Well, that's how the story goes, anyway.

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? No prehistoric predators needed.

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's coming from and how to reduce whatever causes of it 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***.

Fasting may also help. A study published in the American Journal of Clinical Nutrition in 2007 (*A controlled trial of reduced meal frequency without caloric restriction in healthy, normal-weight, middle-aged adults.* Am J Clin Nutr. 2007 Apr;85(4):981-8.) showed that consuming just one meal per day – the equivalent of 24-hour fasting every day – significantly lowered cortisol levels over an 8-week period. This doesn't 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 for better sleep, 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. Ideally this means 7-8 hours of uninterrupted sleep, at night and in the dark – as dark as you can make the room.

Then get your healthiest burst of cortisol in the morning by going outside and looking toward the sunrise, rain or shine. This strategy destroys

whatever nighttime melatonin you have left and replaces it with cortisol to get your day started.

Search for advice on Google and get going on recommendations for getting better sleep. Personally my most effective strategies are taking sleep-enhancing supplements (primarily melatonin and/or CBD oil) and practicing meditation (specifically, Transcendental Meditation).

If you’re obese you have a disproportionately greater 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 an 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'm going to keep it simple for you. Rather than explaining the myriad supplements that I take myself, I'm going to explain just two approaches to supplementing for better metabolic health that I think are the most important in the biology of fat.

Changing Your Metabolism with Green Tea

Green tea is a miracle herb for many reasons. One is weight loss. Others include boosting a number of hormones in charge of healthy metabolism. It got my attention to the extent that I felt the need to write a post about it here: Green Tea Weight Loss Bonuses.

This is the key research on green tea that swayed me to use this supplement.

Di Pierro F, Menghi AB, Barreca A, Lucarelli M, Calandrelli A. 2009. *Greenselect Phytosome as an adjunct to a low-calorie diet for treatment of obesity: a clinical trial.* Altern Med Rev. 2009 Jun;14(2):154-60.

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 usually 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's 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 I'm referring to is called Greenselect Phytosome.

This preparation enhances the beneficial effects of green tea extract. It isn't green tea itself, as you would have as a drink, nor is it a green tea herb that consists of leaf powder. It's an extract that's bound to phytosomes, which simply represent a method for combining green tea extract with sunflower seed lecithin.

To find a product containing 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.

Or you can just take a look at the best product I know of, which I've used myself, by Thorne Research here: Thorne Greene Tea Phytosome.

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 Scwarzenegger in his Mr. Universe heyday. Nothing wrong with that. (Well, actually there is, although I'll leave that discussion for another day.)

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 protocols 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've 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 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's no need to make it that complicated unless you're 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's also very inexpensive.

Oh, about that comment 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 directly 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, isn't really impressive.

In fact, I wouldn't put that crap in my body on a dare. I can get my HMB elsewhere, thank you. Whichever brand names offer it changes over time, depending who deigns to pay the licensing fee (HMB is patented). You can find it by a Google search. My advice on products is simply to get HMB powder by itself, without any extra ingredients. It's cheaper that way, too.

Let me emphasize that last point. Many manufacturers include additional ingredients in their supplement formulations, with claims that somehow those 'extras' make the active ingredient better. They certainly make the product more expensive.

However, in the absence of research to prove it, I'd say all that extra stuff is unnecessary. Fortunately, a number of HMB brands provide just HMB and nothing else. The best ones aren't even in capsules – they're just powders.

The one I use is just HMB all by itself in powder form, from BulkSupplements.com, here. A daily half-teaspoon (ca. 1500 mg) is all you need.

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 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.

Adding creatine monohydrate powder to your HMB 'shake' ramps up muscle-building considerably. Once again, be sure to get just the powder, with no 'extras', such as this one (also from BulkSupplements.com) here.

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's 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:

1500 mg of calcium-HMB
2 grams of creatine monohydrate powder
Optional for younger people (non-‘seniors’): Amino acid mix of L-arginine-HCl (2 grams), ornithine alpha-ketoglutarate [OKG] (1 gram), and L-lysine-HCl (1 gram)*
2 tsp glucose powder (ca. 10 grams)

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

Just be sure you aren’t disrupting your ketosis too much, since this mix includes quite a bit of glucose. If you’re a little worried about it, then you’ll still do fine without any glucose at all.

There you go, young folks and fellow Baby Boomers alike. That is the best I’ve found for supplementation to build muscle.

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's 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, with such modifications passed on to future generations, is called **epigenetics**. Some of the most exciting current ideas researchers are pursuing involve the roles of epigenetics in inflammation, obesity, insulin resistance, type 2 diabetes, cardiovascular diseases, neurodegenerative diseases, and immune diseases.

It's 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), folate (B-9), and the cobalamins (B-12).

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

Epigenetic Nutrients	Food Sources
Methionine	Sesame seeds, brazil nuts, fish, peppers, spinach
Folate	Leafy vegetables, sunflower seeds, baker's yeast, liver
Vitamin B12	Meat, liver, shellfish, milk
Vitamin B6	Meats, whole grain products, vegetables, nuts
SAM-e	Popular dietary supplement pill; unstable in food
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 about it. 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 foods 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've 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's 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's 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've researched myself.

Phentermine Reviews – Avoid It

Phentermine is a prescription drug that suppresses appetite. It's FDA-approved for treating overweight and obesity. This is must-read information before you consider taking it. (Which I wouldn't recommend.)

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's 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've bolded text below to indicate 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 know 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 Qnexa). 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 doesn't seem to be any compelling reason to take this drug. It's 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 back, regardless of its prior rejection by the FDA due to safety concerns. It's 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.

Phentermine has a chemical structure that resembles a class of neurotransmitters (brain and nerve chemical signals) that influence 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 alone 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%)
anorexia (loss of appetite) (13.3%)
memory problems (11.2%)

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.

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.

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's 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. 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's 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're 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 pill.

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 show the following, as summarized in a 2011 journal publication (reference information and article abstract in italics):

Wadden TA, Foreyt JP, Foster GD, Hill JO, Klein S, O'Neil PM, Perri MG, Pi-Sunyer FX, Rock CL, Erickson JS, Maier HN, Kim DD, Dunayevich E. ***Weight loss with naltrexone SR/bupropion SR combination therapy as an adjunct to behavior modification: the COR-BMOD trial.*** *Obesity (Silver Spring). 2011 Jan;19(1):110-20. Epub 2010 Jun 17.*

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's 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's 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, came up recently 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's the published abstract from that article (reference information and abstract in italics; I've bolded critical text):

Blom WA, Abrahamse SL, Bradford R, Duchateau GS, Theis W, Orsi A, Ward CL, Mela DJ. ***Effects of 15-d repeated consumption of Hoodia gordonii purified extract on safety, ad libitum energy intake, and body weight in healthy, overweight women: a randomized controlled trial.*** *Am J Clin Nutr. 2011 Nov;94(5):1171-81.*

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's instructive to see what they had to say (reference information and abstracts in italics; bolded text is mine):

Vermaak I, Hamman JH, Viljoen AM. ***Hoodia gordonii: an up-to-date review of a commercially important anti-obesity plant.*** *Planta Med. 2011 Jul;77(11):1149-60.*

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...

Whelan AM, Jurgens TM, Szeto V. Case report. ***Efficacy of Hoodia for weight loss: is there evidence to support the efficacy claims?*** *J Clin Pharm Ther. 2010 Oct;35(5):609-12.*

Abstract

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 marketing 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's what I've 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 I could find in the medical literature about acai on PubMed. The keywords 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 unique to the acai palm is *Euterpe oleracea*.

Here's the list of research topics, with their publications dates, on all of the nine articles about acai that had been published in reputable scientific journals at the time of my search:

- *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'm 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?

ADVANCED FAT LOSS BIOLOGY

Believe it or not, all the previous explanations and recommendations are simplistic in light of the real culprit behind obesity. You'll probably never hear this from any healthcare professional. It isn't even mentioned in any of the most popular weight loss programs.

Why?

Probably because it's relatively new and comes across as a bit complicated. I know you're smarter than that. Once you see what the problem really is, you'll understand what happened to your body and, more importantly, what to do about it.

What I'm referring to is **brain inflammation** leading to **leptin resistance**.

Leptin is a protein hormone that most people never heard of. Nevetheless, it's the star of the show in a 2009 book, *Mastering Leptin: The Key to Energetic Vitality, Youthful Hormonal Balance, Optimum Body Weight, and Disease Prevention*, by Byron J. Richards and Mary Guignon-Richards.

That's the first book on leptin that appeared since this hormone was discovered in 1994. Leptin is certainly the new kid on the block for weight loss. We are still uncovering how it works and what all it does.

If you were to pick a **master hormone**, one that influences all other hormones, it would be leptin. At this time we know much more about it than explained in the book cited above. Much, much more.

The main issue with leptin is that we can become resistant to its effects. When leptin resistance occurs, all bets are off for normal metabolism.

Leptin resistance is so impactful that it overshadows insulin resistance, by a long shot. In fact, insulin resistance is a consequence of leptin resistance. They go hand in hand. Leptin is the master. In fact, you'll never be able to overcome insulin resistance without first correcting leptin resistance.

And, since leptin signaling involves specific biochemical communication between fat cells and the brain, the wizard behind the leptin curtain is actually brain inflammation.

With all that said, I've put this section together for you to understand the biology of fat loss more deeply. Don't let the section title scare you. Although this is advanced stuff, I'm confident that you can grasp and apply it for optimizing your metabolism to burn fat.

Leptin Signaling Gone Awry

The easiest way to understand how leptin works is this: 1) leptin signaling originates when the hormone is released from fat: 2) once released, it gets sent to its target receptors, which are in a pea-sized portion of your brain called the hypothalamus.

Normally, the "signal" (leptin) goes from fat cells to the hypothalamus to tell your brain how much energy you need. The hypothalamus then instructs your body to either metabolize your existing fat or to eat more for your basic energy needs.

If all works well, your leptin receptors "see" the leptin well enough for your hypothalamus to instruct your body to keep running on the fuel you give it (i.e., food). This is a healthy condition that means you are appropriately **leptin-sensitive**.

Metabolism goes completely awry, however, when the hormone signal fails. This happens when you become **leptin-resistant**. This condition represents a failure of your leptin receptors to see the hormone, thereby turning the hypothalamic instructions into chaos.

Suffering from "Oprah-itis"

The most famous case of leptin resistance is the story of Oprah Winfrey's battle with obesity. Her weight has yo-yo'd so much that her metabolism is clearly way off base. Her main strategies have been to: 1) take the advice of her long-time idiot-in-residence, Dr. Oz; and, 2) join (and endorse) Weight Watchers.

At one time Oprah owned about 8% of the total stock in Weight Watchers. As one of the most famous celebrities endorsing this program, she had a vested interest in making it look good. It did look good, in fact, when she dropped 80 lbs. That was to be a temporary outcome, since Oprah's weight continued to yo-yo.

This is what I call "Oprah-itis." No matter what you do, unless you address the underlying leptin resistance behind obesity, you'll fail miserably – and repeatedly, just like Oprah.

To keep this story somewhat brief, I'll just say that Oprah's leptin resistance prevents her muscles from using a key protein (remember uncoupling protein-3, *UCP3*?) that depends on leptin sensitivity for directing energy usage. In other words, no matter what she does regarding food, her muscles remain energy starved. The net result is a false signal from her inflamed brain to the gut to eat more food.

It's a futile strategy that describes why Oprah's efforts to manage her weight fail over and over again.

Her story is a typical one revolving around her inability to become leptin-sensitive. As far as I know, neither Dr. Oz nor Weight Watchers has ever mentioned how she can regain the function of this all-important hormone.

About Exercise. I'll repeat – leptin resistance prevents muscles from getting fuel. As I said about Oprah, this means that muscles are energy starved no matter what you do. When you exercise in this state, the standard exercise cycle of 'tear down, then rebuild' simply doesn't work.

Exercising while leptin resistant does more damage than good. Instead of post-exercise rebuilding, what happens is your body recruits stem cells to repair tissues damaged by exercise. There's no true 'rebuilding'. Stem cells are what you need for all kinds of body repair as you age.

How crucial are your stem cells? Get this - depleting them by exercising when you're leptin resistant **will shorten your lifespan**. Pretty important, huh?

Exercising while leptin-resistant diminishes your body's natural health resources. You may see a superficial outcome (e.g., reduced weight, better

muscle tone, etc.) that will fool you into thinking that you're doing yourself some good. You aren't.

In reality, you're setting yourself up for a dangerous trend – i.e., bad health. **Bottom Line**: Hold off on exercising until you start seeing signs of returning to leptin sensitivity.

Now let's get into exactly what you must do for making that happen.

Resetting Leptin Signaling

The recommendations below don't just address obesity. By reestablishing your leptin sensitivity, you'll also avoid brain inflammation that leads to type 3 diabetes and neurodegeneration. (In case you haven't heard of type 3 diabetes, you probably know it by its more common name, Alzheimer's Disease.)

By the way, leptin sensitivity is crucial in many more ways than reducing obesity. After all, it's the master hormone. Addressing obesity, though, is a good place to start.

Here's the simple version of the steps that will get you back on track for healthy energy metabolism by resetting leptin signaling. Once you begin to become leptin-sensitive again, then the lifestyle recommendations from earlier sections in this book will work way, way better.

1) **First,** confirm that you are leptin-resistant. If you're obese (overweight by 30 lbs or more), then it's a certainty that you're leptin-resistant.

2) **Starting Each Day.** Eat three meals a day until your hunger and cravings begin to subside, then go to two a day. Eat as soon as possible every morning. Ideally this would be within 30 minutes of rising. Remember to space meals 4-5 hours apart and to allow at least 4-5 hours between your final meal of the day and bedtime. ***No snacking, ever!***

   This pattern is crucial for optimizing hormonal responses to food. Appropriate post-meal hormone balance is a key indicator of reduced brain inflammation.

Breakfast should be mostly protein (50-75 grams) and fat (unlimited amount), with fewer than 25 grams of carbohydrates (non-starchy and unprocessed). If this breakfast doesn't hold you until lunch, then up the protein content at the start of the day.

In the beginning of your leptin reset, the best breakfast food sources include pastured or organic eggs accompanied by meats, poultry, or fish. (My personal favorite breakfast meat is *lightly* cooked bacon, all by itself. Yum!)

Protein shakes are less desirable. However, if you do use them, make sure they're comprised of whey protein concentrates (NOT isolates or hydrolysates).

If cooking with oils, use only butter, heavy cream, or coconut or palm oil. Absolutely avoid all of the most common commercial vegetable oils (corn, soybean, canola, sunflower, safflower, peanut, and olive) and nut oils.

Lunch and dinner can include a bit more carbs, although keeping the amount under 50-75 grams is best.

3) **Sleep.** Many hormones fluctuate on a 24-hour cycle called circadian rhythms. For restoring leptin sensitivity, what your brain does while you sleep is every bit as important as your eating pattern and food choices. This puts a premium on getting at least 7-8 hours of uninterrupted sleep every night. That's the basic requirement for making your nighttime sleep and your main brain repair hormone, melatonin, work best.

Preparing your brain for a good night's sleep begins at sundown.

One of the most crucial keys for getting good sleep is making your surroundings as dark as possible as soon as the sun goes down. If this is too inconvenient (Ha! Of course it is!), then wear blue-blocking glasses in the evening. That will at least reduce the negative impact of artificial lighting through your eyes. The use of tech devices of any

kind (TVs, cell phones, computers, notepads, etc.) will also disrupt your brain's preparation for good sleep.

Keep your bedroom as dark as possible – no stray lights from anywhere (e.g., clocks, cell phones, etc.). If you have trouble getting to sleep, meditate or focus on your breathing.

Even a light set of pushups or squats for 3-5 minutes may help.

4) **Sunshine.** Let be perfectly clear about this.

Sunshine is *THE MOST IMPORTANT INGREDIENT OF ALL TIME* for proper metabolism.

No matter what else you do, if you don't get the right amount of sunshine, at the right times, you'll likely never become leptin-sensitive again.

Humans evolved outdoors, in sunshine. Outdoor living is a key to a long, healthy life. Indoor living undermines everything we need for good health, especially when it comes to weight management and brain inflammation.

You absolutely MUST get enough sunshine in your eyes and on your skin to get its benefits for your own biology.

Unfortunately, in modern times, the medical establishment has foisted a fear of sunshine on the public. This fear has no basis in good science. It is, plain and simple, pure BS. Belief in this advice is the result of what I call "medical brainwashing."

For now I'll just say that everything you've heard about protecting yourself against the sun is grade-A stupidity. Wearing a hat and sunglasses or clothing of any kind, carrying an umbrella on a sunny day, lathering yourself up with sunblock (or make-up), staying indoors all day – all these comprise the worst modern lifestyle choices for your health.

On the other hand, research on the benefits of sunshine is a red-hot topic in science these days. Here's what you should know for taking advantage of it as much as you can.

Building a Solar Callus. Your skin is built to absorb sunlight. To do so efficiently, you must have a well-developed **solar callus**. This is the "callus" that enables your skin to withstand UV radiation without burning. People with a poor solar callus burn easily. People with a healthy solar callus can absorb massive amounts of the UV light that drives the synthesis of vitamin D3 in skin.

The best way to start building your solar callus is by getting early morning sunshine on your skin. Early morning sunshine provides a strong dose of infrared light (IR-A) before any of the sun's UV wavelengths (UVB, UVA) reach the Earth's surface. Morning light also provides a healthy balance of red and blue wavelengths that support skin health.

Emphasis here is on the **natural balance** of wavelengths in sunshine. Upsetting this balance with artificial lights or tech devices that have unnatural blue light spikes will undermine this process.

This is the point that dermatologists seem to be clueless about. Morning sunshine starts building your solar callus so you can reap the benefits of UV light later in the day.

The more fit your solar callus is, the more resistant you are to sunburn. A few minutes of sunshine in the early morning builds your ability to be in the sun without burning. In fact, you can "test" your solar callus by noting how long you can stay in the mid-day sun before you get that familiar feeling of the "burn."

As the day proceeds, more UVA light hits the surface of the Earth, followed by an increasing amount of UVB light (aka, the light you need for making vitamin D3).

Late afternoon light, approaching sunset, will also provide the right mix of infrared, blue, and red wavelengths for building your solar callus.

In short, building your solar callus depends on exposing as much of your skin to sunshine as possible, right after sunrise, all the way through the rest of the early morning. Depending on your skin type, you can start seeing signs of a better solar callus within a month or so. During that time your skin will also begin to darken, which is another indicator of your skin's ability to respond to sunshine appropriately.

One more thing. Certain kinds of pigments, called carotenoids, contribute to healthy skin by absorbing sunshine. The explanation for how they work is very complicated, so I'll just point out what the best carotenoids are for skin health.

They are the carotenoids, especially one called astaxanthin, that occur in seafood. Aha! More benefits of seafood!

You can actually see astaxanthin in foods, since it's a bright red-orange color. The most common food sources are krill and larger crustaceans (e.g., shrimp), certain types of algae, and wild salmon (i.e., NOT farmed).

You may already know that carotenoids are also produced by plants. However, plant-based carotenoids (e.g., beta-carotene) are much less effective for skin health than are carotenoids from seafood.

That's It in a Nutshell

Does any of my commentary in this book look like any weight loss advice you ever heard of? Probably not. Just keep in mind that you're resetting your fat-to-brain hormone signaling pathway – i.e., for leptin.

Everything else falls into place once you accomplish that.

Let me repeat: the most important ingredient for resetting leptin sensitivity is sunshine – in the right amount at the right time of the day. Without this ingredient, all food-based strategies for losing weight will ultimately fail.

Period.

What Can You Expect?

The most common change that you'll observe early in your leptin reset protocol is a shrinking of your waistline. An overall drop in weight soon follows. (At first this is just water weight, so don't get too excited about it right away.)

Dropping excess weight will continue past this point, ultimately reducing your body fat composition.

You'll also most likely notice a reduction in your hunger and cravings within the first 4-6 weeks.

Sweating pattern will change. When you're leptin resistant, profuse sweating at any time is common. When you're leptin sensitive, sweating is more normal – i.e., you sweat when you are supposed to sweat.

Expect better recovery from exercise once you reintroduce it into your fitness program. Your hunger and cravings will disappear. You'll awaken every morning refreshed and ready to tackle the new day.

Recommended Exercise

You can begin exercising in earnest as the expected changes ramp up. What you do for exercise, and how much you do it, are crucial. Ultimately, you will benefit most from the resistance exercises and interval training that I described earlier.

Increasing Physical Activity

Conventional medical wisdom correctly points out the value of physical activity. It doesn't have to be complicated, though.

One of the simplest activities for warding off weight problems is simply standing up. Standing helps you avoid a relatively new disorder called "sitting disease." The name tells you exactly what it is: disease arising from sitting too much.

Researchers have begun to find out what too much sitting really means. At this time it means being immobile for more than an hour at a time. The prescription is super simple. Just stand up for about 10 minutes of every hour of the day. That’s it!

In fact, at the beginning of your leptin reset, that’s the only thing that you really need to do every day physically. Note that working out at the beginning or the end of the day will not overcome sitting disease. Only standing up regularly will.

SPECIAL NOTE FOR MY FELLOW BABY BOOMERS

You may have noticed my comments here and there in this book about my age group – Baby Boomers. This group also includes older seniors.

Part of the reason for my comments entails what I discover for my own health that I like to pass on to my senior 'tribe'.

One thing I've discovered is my complete annoyance from mainstream medicine's view that aging is a disease unto itself.

This is utter nonsense.

Sure, many years of poor lifestyle choices will add up over time to make it look like aging is a disease. The really good news is that correcting those choices often slows down the aging process – and all so-called 'age-related' diseases.

We Baby Boomers can actually become younger biologically (not chronologically – that's a variable out of our control).

How to do that entails applying knowledge based on real human biology.

Just like the theme in this book as it applies to belly fat.

Toward that end I've created a monthly subscription newsletter, with each issue addressing the failure of conventional medical wisdom as it applies to us and what to do about it. It's very empowering, if I do say so myself.

Now, rather than explain more details here, I'll refer you to the explanation of what you can expect from what I've named my Boomer Health Reports at this dedicated page: Boomer Health Center.

When you get a chance, just go to that link to see what I mean by the blueprint for senior health that you'll probably never get from your doctor.

And let me know if you have any questions. (I posted a special email address for that purpose on that page.)

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've given you in this book. For the highly curious among you, I strongly recommend that you read all of the following books for yourself.

Great stuff!

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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. Just as a reminder, for your convenience, I've assembled them in the order they were presented, at this link on my health blog:

Body by Science Videos on HerbScientist.com

You'll 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 you need.

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's 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.

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’ll 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’ll know more about me than my mother does.

Enjoy!

DR. CLARK'S OTHER TOP BOOKS

HCG Diet: The New Definitive Guide

An updated guide to Dr. Simeons' protocol. It's the best information I could find about how to apply this hormone-driven weight loss strategy for permanent weight loss and the scientific research backing it up.

(It's the strategy that got me started down my slimming path after I finally got tired of seeing that fat guy in the mirror I mentioned earlier.)

This guide also includes a link to Dr. Simeons' 1971 revision of his original 1954 book (no cost).

In addition, you'll also get two popular recipe books as bonuses with your purchase, at no extra charge. One is my book, *HCG Diet Recipes: How to Get the Maximum Flavor and Enjoyment Out of Your HCG Diet Program* (normally $8.47). The other is, *What to Do After HCG Weight Loss: HCG Diet Phase 3 Instructions and Recipes for Success* (normally $8.97), by Eve Clark (yes, we're related – she is my lovely and brilliant bride).

Calorie Counting Madness: Surprising Truths About Weight Loss

Really an extended report rather than a full book. It provides a little more detail on a topic that I already explained earlier in this Fat Loss book, in the chapter, Myths About Calories.

Shingles Treatment at Home ($3.67)

My interest in shingles arose from two directions: 1) my longtime laboratory research leading to the creation of a patented herbal preparation for treating all herpes infections (shingles is the well-known later-in-life outbreak of the 'chickenpox virus' – aka, *Herpes zoster*); and, 2) my own personal experience contracting shingles (nothing like a personal experience to bring home work from the lab bench!).

Surprising Truths Behind the Coronavirus Pandemic ($5.00)

A truly shocking explanation of how this outbreak got started and how the virus actually does its damage. And Dr. Fauci never said a word about it!