The Anabolic Solution™

The Definitive Metabolic Diet, Training, and Nutritional Supplement Book for Recreational and Competitive Powerlifters

By Mauro G. Di Pasquale, B.Sc., M.D., M.R.O., M.F.S.

Table of Contents

About the Author

I am presently a licensed physician in Ontario, Canada, specializing in Nutrition and Sports Medicine.

I have an honors degree in biological science, majoring in molecular biochemistry and genetics (1968), and a medical degree (1971)—both from the University of Toronto. I am certified as a Medical Review Officer (MRO) by the Medical Review Officer Certification Council (MROCC), and as a Master of Fitness Sciences (MFS) by the International Sports Sciences Association (ISSA). I am also a member of the American Academy of Sports Medicine.

I was an assistant professor at the University of Toronto for ten years (1988 to 1998) lecturing and researching on athletic performance, nutritional supplements and drug use in sports.

I was a world-class athlete for over twenty years, winning the world championships in Powerlifting in 1976, and the World Games in the sport of Powerlifting in 1981, Canadian champion eight times, Pan American champion twice, and North American champion twice. I was the first Canadian Powerlifter to become a World Champion and first Canadian Powerlifter to total 10 times bodyweight in any weight class and I'm the only Canadian to ever total ten times bodyweight in two weight classes.

Over the last four decades I have had extensive exposure to athletic injuries and disabilities, and ergogenic and nutritional supplement use by athletes. I have been chairman/member of several national and international powerlifting, bodybuilding and Olympic weight lifting sports federation medical committees. Over this period of time I have acted as a consultant, medical advisor, drug testing officer and technical expert on the pharmacology and pathophysiology of sports, nutritional supplement use and drug testing.

I was the Medical Director to the World Wrestling Federation (WWF) and World Powerlifting Federation (WPF) and the acting MRO for the National Association for Stock Car Auto Racing (NASCAR).

At present, I am the President of the International United Powerlifting Federation and the Pan American (North, Central and South America, Bermuda, the Bahamas and the Caribbean Islands) Powerlifting Federation.

I have written several books dealing with diet, nutritional supplements and the use of ergogenic aids by athletes. In 1995, I wrote two books: *Powerlifting Supplement*

Review is a review of nutritional supplements and, *The Anabolic Diet*, was an attempt at setting up a working high fat, low carb diet for powerlifters.

In 1997, I wrote *Amino Acids and Proteins for the Athlete – The Anabolic Edge* published by CRC Press. I have also written and am preparing chapters for several books on nutrition, sports medicine, substance abuse, fitness and weight training. At present I'm working on several other books including a comprehensive nutritional supplement manual.

In the past thirty-five years I have written several hundred articles on training, diet, nutritional supplements, and drug use in sports for many magazines and association journals. I've written for and had regular monthly columns in all the popular powerlifting and fitness journals including *Muscle and Fitness*, *Flex*, *Men's Fitness*, *Shape*, *Muscle Media*, *Muscle Mag International*, *IronMan*, *Powerlifting USA* and many smaller publications.

From 1996 to 1999 I was involved in writing, research and product development for Experimental and Applied Sciences (EAS) and *Muscle Media*, and was a member of the EAS Scientific Advisory Panel.

I've contributed chapters on diet and nutritional supplements to several fitness, weight and sports medicine books as well as books on anabolic steroids and substance abuse. The latest chapters on nutrition appears in *Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition* and in *Nutritional Applications in Exercise and Sport*, both edited by Judy A. Driskell and Ira Wolinsky and published in 2000 and 2001 respectively by CRC Press.

I'm in the process of finishing the nutritional, nutritional supplement and ergogenic aids section (about half the book) in the second edition of *Serious Strength Training* scheduled to be released this coming Spring by Human Kinetics.

In the past three decades I have been on several Editorial Boards for various fitness and strength magazines and was the Editor-in-Chief of a two quarterly international newsletter on sports nutrition and ergogenic aids.

I am an international consultant for amateur and professional athletes and sports bodies on all aspects of training, nutrition and supplementation, and I am also an international consultant and expert witness for amateur and professional athletes and sports bodies, private corporations and companies, and government agencies on legal matters relating to nutritional supplements, and the use and abuse, and drug testing of anabolic steroids, growth hormone and other ergogenic drugs.

I hold seminars and lecture all over the world on diet, nutritional supplements and training. In the past I have lectured and held seminars in many North American cities, and all over the world. I also formulate engineered, cutting edge, scientifically validated nutritional supplements for various companies that are sold under their specific labels. Most recently, I formulated a new group of nutritional supplements meant to combat nighttime post absorptive catabolism and enhance the anabolic and recuperative effects of sleep. I'm now working with several prominent researchers from the US and several other countries. Those in the US include doctors at Harvard Medical School and the Massachusetts College of Pharmacy and Health Sciences.

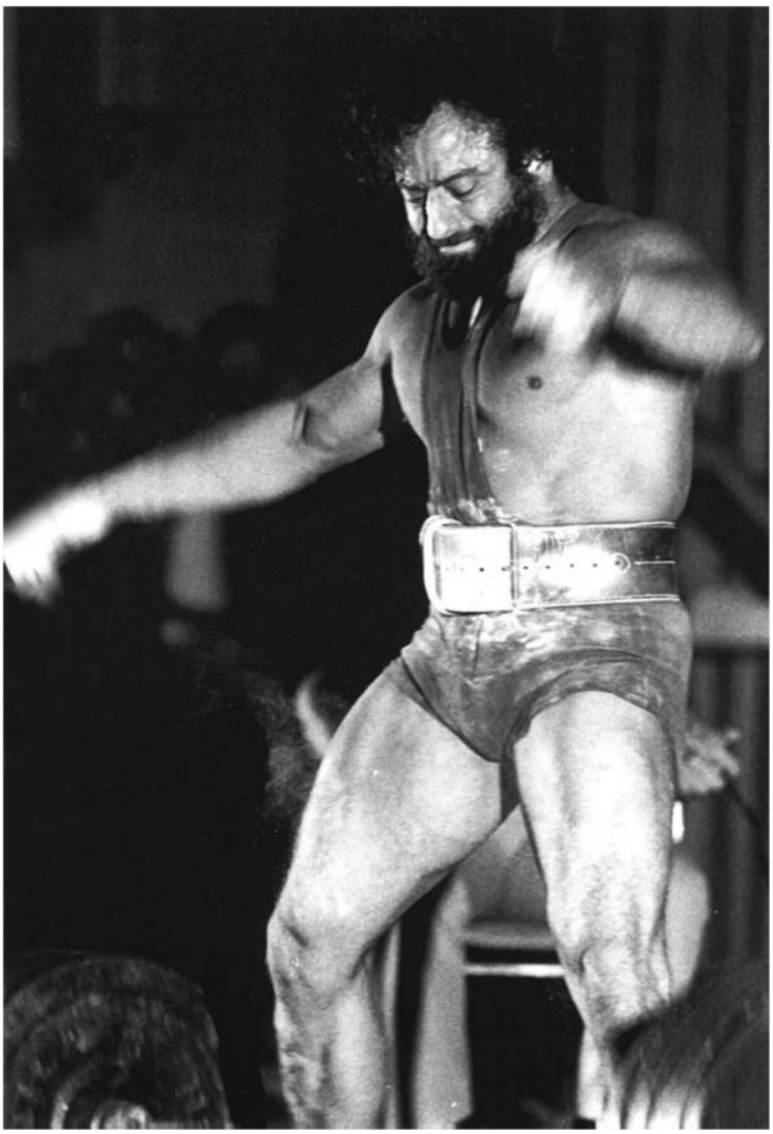
I formulated a complete nutritional supplement line, which includes over 25 cutting edge products designed to work with the Metabolic Diet and to maximize body composition, athletic performance and the beneficial effects of exercise. These formulations were done using the latest scientific and medical information, along with the knowledge and expertise I've accumulated in the last four decades. I've tried to use the best ingredients available regardless of costs to form products that are superior to any on the market today. These supplements, plus my latest book, *The Metabolic Diet* along with related books and e-books (**www.MetabolicDiet.com**), form the nutritional backbone of some of my new international ventures.

I'm now in the process of releasing new supplement formulations for my new international Signature Series of nutritional supplements and developing my two web sites, **www.MetabolicDiet.com** and **www.CoachSOS.com**. The goal of the new sites is to provide specific and detailed training, diet and nutritional supplement schedules for anyone including those who just want to lose some weight and/or bodyfat, to those who want to train for a specific activity or sport, including recreational sports, team sports, powerlifting, Olympic events, and all the various other power and endurance sports.

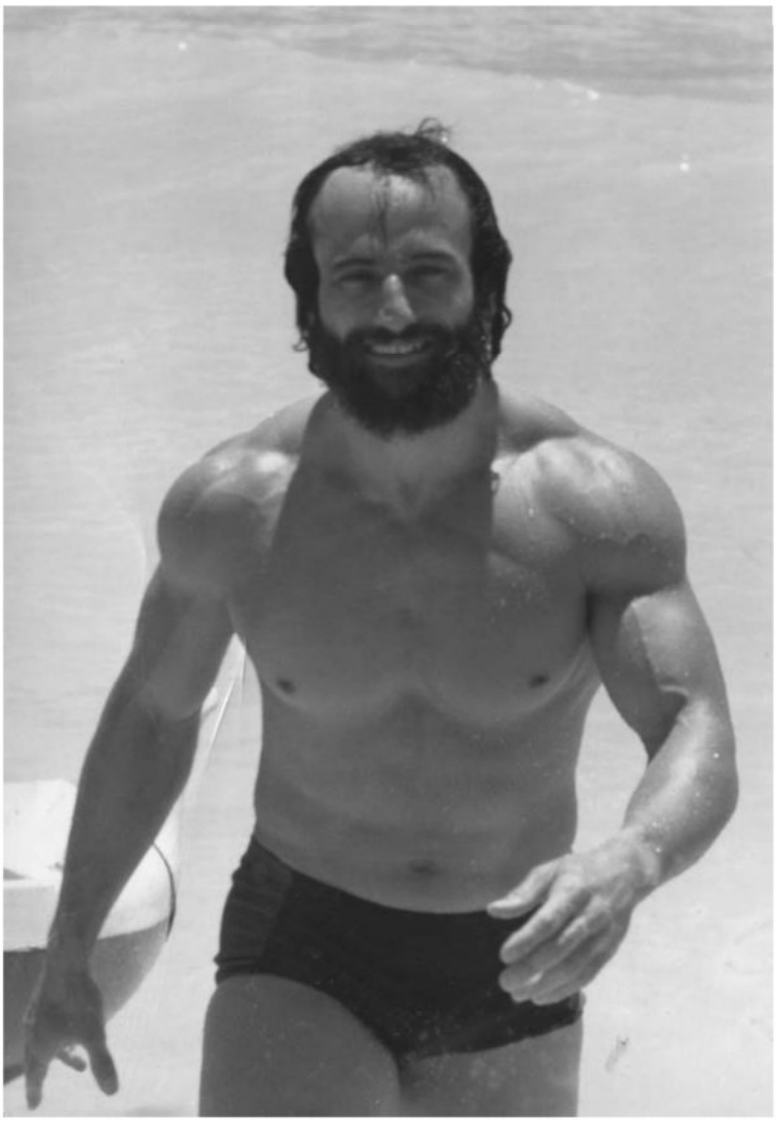
My new book, *The Anabolic Solution*, written for both recreational and competitive powerlifters, is an attempt on my part to present the ultimate cutting edge, training specific, diet and nutritional supplement guide geared to maximize muscle mass and minimize bodyfat. In fact my Anabolic Solution is so effective that it offers the only viable alternative to the dangerous use of muscle building drugs such as anabolic steroids, growth hormone, IGF-I, clenbuterol, thyroid, insulin, and countless others.

Photo Archive

My wild lifting days—picture taken in 1982, weighing around 195 lbs and getting ready to attack a 780 lb deadlift. At that bodyweight I had no neck to speak of. Neck measurement at that time was 19.5 inches.

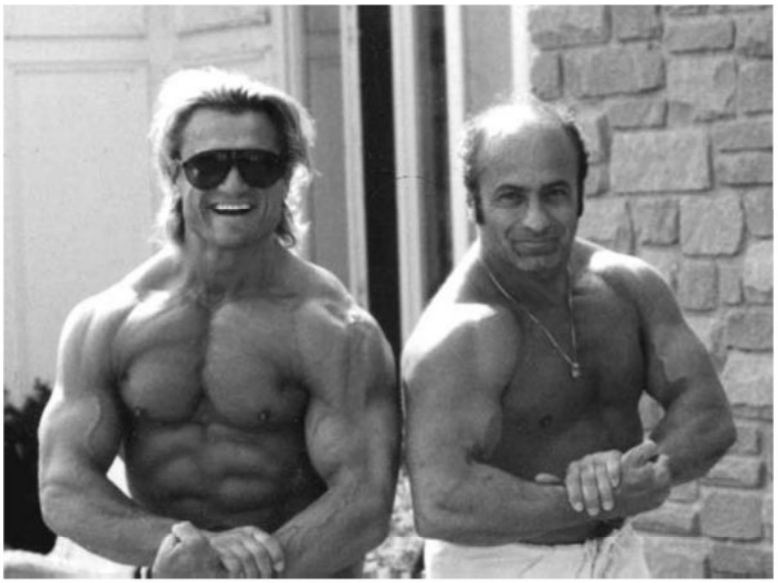


At the Beach in 1986—weighing about 185 lbs at 7% bodyfat. And I still had hair.



Eddie Robinson and I in the summer of 1996, outside 10K Fitness—my gym in Cobourg, Ontario, Canada. My bodyweight was just over the 200 lbs.

Tom Platz and I comparing pipes at my house in Cobourg in the Summer of 1996.



Picture taken in 1999 at the beach in Ecuador with some friends. Part of my South American trip as President of the Pan American Powerlifting Federation.

Formal picture taken in the fall of 2000.

Preface

I meant *The Anabolic Solution* to be a simple guide for powerlifters on how to best use the Anabolic/Metabolic Diet to maximize strength and muscle mass, and for those other than superheavyweights, to minimize bodyfat. But it has become much more.

First of all it is a simplified guide on how to use the Metabolic Diet and my targeted line of nutritional supplements in the different training phases. It's also a valuable source of information on nutrition and supplements and on macronutrient metabolism—how macronutrients are used and interconverted by the body. As well, it's an extension of my two major web sites, **www.MetabolicDiet.com** and **www.CoachSOS.com**. You'll also soon be able to log on to **www.AnabolicSolution.com** where we'll be both posting information as well as directing you to relevant sections in my other sites.

I've written this book to make it easy to understand and follow. But parts of this book are also quite technical. I felt it was important to present some of the more technical information so that you can understand how everything fits together and, as such, make more rational nutrition and training decisions, and make better progress.

So how should you use this book? It all depends on your level of knowledge and expertise. The best way for the uninitiated or less experienced powerlifters, at least for the first reading, is to just read the instructional parts and leave the technical details for another reading or for referencing down the line.

Since the Metabolic Diet is the cornerstone of my Anabolic Solution, I thought I'd put in some of the basic and starting information for the Metabolic Diet right at the start. Thus the introduction will immediately detail everything you need to get an overview of how and why the diet works, and to get going on the diet ASAP. In fact I have overdone it in some ways in order to get certain points across, to the point where I maybe even repeat myself once or twice.

By doing it this way it gives you the kernel of information you need to get started ASAP or at least to get enthused enough to read anything else you need to know. Later chapters will have more details and explanations on how to best combine the Metabolic Diet with periodized training and the use of nutritional supplements. The more technical information can be read at leisure or on a need to know basis.

Whatever you read and in whatever sequence you read it, just remember that the basic principles behind the Anabolic Solution are easy to understand and follow. Also remember that the principles espoused in this book are based on solid scientific principles and research, and real world use.

Introduction

The Anabolic Solution

The Anabolic Solution is all about manipulating lean body mass and bodyfat. And it does this by affecting metabolic changes and altering the body's anabolic and the catabolic hormones and growth factors.

Since it's muscle, not fat, that moves the heavy weight, the aim of any powerlifter should be to hit the top allowable weight in their weight class with a minimum of bodyfat, unless you're a superheavyweight. In the supers being the heaviest you can be is an advantage for two reasons. The extra weight, even if it's mostly fat, can be a big help in the squat and to a lesser in the bench and lift, and no matter how much fat you put on some muscle always comes with it.

But the Anabolic Solution is more than just the best natural way to reach your powerlifting goals. By duplicating much of what people get from the use of ergogenic and body composition changing drugs the Anabolic Solution is a safe, effective, and natural alternative to the use of these drugs.

The "just say no" to drugs mantra adopted by so many in our society is an exercise in futility, especially in the powerlifting, bodybuilding, fitness and sporting circles. What we need, instead of all the naysayers, is a viable alternative to drug use. And that's just what we have in the Anabolic Solution.

Besides offering the best powerlifting system in the world, and a viable alternative to drug use, the Anabolic Solution explains both the art and science behind the use of the Metabolic Diet and sophisticated nutritional supplements, explaining why and how they work and how they can best be used.

The Metabolic Diet is a revolutionary one that uses macronutrient shuffling to accomplish its strength and body composition magic. The effects of the Metabolic Diet are synergistically enhanced by the use of sophisticated, targeted nutritional supplements in various training phases.

In this book, we'll show you when, where, why and how to use the Anabolic Solution to get results you never thought possible without the use of drugs.

Why Natural is Better

When you use drugs you're short-circuiting your body's normal processes. By providing hormones and other substances from outside the body, you shut down the internal mechanisms that would normally produce that substance. This is easier to understand if we use the analogy of a factory producing some goods. If we provide the goods that the factory would normally make, then there is no need for the factory to be operational. If the factory is shut down long enough then sometimes it's hard to get it up and running since we have to round up the workers and raw materials, and get everything working at peak efficiency again.

The same things happen to our internal factories when we provide outside hormones and drugs. Whatever processes are involved in making these compounds, or in doing the things that these compounds do, are thus no longer needed so they're essentially shut down. This can result in long term and sometimes a permanent imbalance in the body that can be harmful to your health.

An example would be the use of anabolic steroids in males. Their use shuts down all the hypothalamic, pituitary and testicular (evidenced by shrinking testicles) processes involved in the production of testosterone. After they're discontinued, in the time period during which the body is getting back to normal, most of the results and advantages of using drugs, are invariably lost. But it can be even worse than never having gone on the drugs since, in some cases, the systems never really return to normal.

On the other hand by maximizing the stimulation or activation of your internal factories, similar to how they would naturally be stimulated in the first place, you would be maximizing the input, the operation, and the output of your own body, making it hum along at peak efficiency.

As well, by staying natural, we avoid the possible short- and long-term consequences of drug use. These include short and long term changes in hormonal, metabolic and homeostatic processes and possible tissue and organ dysfunction. The long-term consequences of using some of the ergogenic and body composition changing drugs are yet to be determined but may well result in significant cardiovascular, hormonal, and carcinogenic (cancer producing and/or promoting) consequences.

We'll have a bit more to say about all this in Chapter One where we describe the Metabolic Diet in some detail. Couple the effects of the Metabolic Diet with the use of effective nutritional supplements, and use these in specific ways in different phases of training and you've got a natural, safe, and effective system for making progress and reaching your goals, without drugs.

Just keep in mind that by using drugs you force your body to adapt in ways that it's not meant to, and that the changes brought on by drug use may have significant short- and long-term consequences. By using the Anabolic Solution your body is in control, and changes in ways that are compatible with short and long term health with results that are comparable to those obtained with the use of drugs.

The Metabolic Diet

The cornerstone of the Anabolic Solution is the Metabolic Diet. so we'll work on that first. While in most books have you sift through a lot of introductory, basic, and theoretical information before you get to the part you're really interested in, that's not the case here. We're going to tell you what you need to know in this introduction.

Metabolic Diet Set Point

The first thing I want you to understand about the Metabolic Diet is that it's a living, breathing entity, and not a static diet like all the rest. In other words it takes into account the differences in the ability to use carbohydrates and fats that exist in people, and allows them to individualize the diet to suit their own unique metabolism. As such, at the heart of the Metabolic Diet is the notion of your **Metabolic Diet Set Point**.

YOUR METABOLIC DIET SET POINT IS THE LOWEST LEVEL OF CARBS THAT YOU NEED TO FUNCTION OPTIMALLY, WHILE AT THE SAME TIME MAXIMIZING BODY COMPOSITION.

The fact that you can figure out the best level of carbs that suits your metabolism while at the same time maxing out your ability to increase muscle mass and decrease bodyfat, makes the Metabolic Diet a "Holy Grail" of diets.

For some people, those that are efficient fat oxidizers and have little need for dietary carbohydrates, the Metabolic Diet Set Point will be less than 20 grams a day. For a small number of people, the Metabolic Diet Set Point may well be high enough that it ends up being a high carb diet. Most, however, fall somewhere in between, usually between the 30 to 100 grams of dietary carbs per day. Almost as important as the amount of carbs is the timing of the carb intake.

When you have to increase the level of carbs in your diet it will take a while before you discover what your carb set point is (see Problem-Solving Guide). I've found that it takes people an average of about two months to find their ideal dietary carb level.

Once you discover your Metabolic Diet Set Point, you can fix your diet at that level for several months while you work on changing your body composition.

The Metabolic Diet is based on three steps and principles that explain how it works and why it's the best diet for maximizing strength and muscle mass, and minimizing bodyfat.

1. In order to change your metabolism to burning fat as your primary fuel, you replace the carbs you're eating now with protein and fat, without changing the calorie level. The body adapts to the lack of carbs by priming up its fat burning machinery—increasing lipolysis and the oxidation of free fatty acids.
2. Once you're fat adapted (i.e. your body depends mainly on both dietary and bodyfat, not carbohydrates or muscle protein, to produce the energy it needs) you can cut calories by cutting the amount of fat in your diet.

   As the amount of fat in the diet naturally decreases, the body then uses bodyfat as its primary fuel.
3. Changing your metabolism to a fat burning one, and cycling from low carbs to a short phase of high carbs, allows you to naturally maximize muscle mass and minimize bodyfat. This is done by manipulating the major anabolic, anticatabolic, and fat burning hormones including testosterone, growth hormone, insulin, insulin-like growth factor I (IGF-I), cortisol, and thyroid.

The Three Priorities of the Metabolic Diet

1. Priority number one in the Metabolic Diet is switching your metabolism to burning fat as its primary fuel. This is done by limiting dietary carbohydrates and providing ample dietary fat. During this adaptation stage you don't really need to change your normal caloric intake. Simply substitute protein and fat for your former carbohydrate calories. An easy way to do this is to stick to mainly meat, chicken, fish, eggs, hard cheeses, salads (watch the carbs in the dressing, and no croutons) and whatever vegetables you want (except for the starchy vegetables like potatoes, carrots and peas). As far as what to drink, that's easy too. Water, diet drinks, coffee and tea (with cream and artificial sweetener only) are about it. That means no juices or any sugared drinks.

2. Once you're fat adapted, the next priority is to vary your calories to suit your goal. To increase muscle mass you increase your daily caloric intake by increasing fat and protein in your diet. It's usually a good idea to do a controlled weight gain first and then to drop that extra bodyfat while maintaining most of the muscle you packed on while you gained weight.

3. The third priority is to refine your physique so that you're muscular and lean. To lose bodyfat while at the same time maintaining muscle mass, you slowly decrease your caloric intake and at the same time your fat intake. By providing less calories and dietary fat, your body will use its fat stores, not muscle, more and more to make up any energy deficits. In some circumstances, because of lower dietary fat levels, your diet may contain only moderate or even low levels of fat, mainly in the form of the essential and monosaturated fatty acids.

Metabolic Diet – Four Practical Steps for a Quick Start

1. Replace the carbs you're eating now with protein and fat—don't drop your calorie level right at the start.
2. For the first cycle, stick to the low carb phase for a full 12 days before beginning the high carb phase.
3. When you carb up, end carb loading the minute you start smoothing out.
4. Once you're fat adapted (usually after the first two weeks, change the calorie level depending on the training phase you're in. (i.e. Mass, Strength or Cutting Phase.)

THE METABOLIC DIET WORKS BECAUSE…

- Your body learns to burn fat instead of carbs.
- Your body continues to prefer fats as you drop calories, mainly in dietary fat and, depending on your dietary carb intake, some carbs, always keeping protein high to spare muscle.
- As calories drop, bodyfat becomes the main fuel even if you lower dietary fat dramatically.

ALSO…

- Cycling from low carbs, high fat to high carbs/lower fat manipulates the anabolic and fat burning hormones and processes in the body to increase strength, and maintain or increase muscle mass while at the same time decreasing bodyfat.

REMEMBER…

- You teach the body to burn mainly bodyfat in preference to carbs and protein.
- By shifting from a low carb diet on weekdays to a higher carb diet on weekends, you manipulate the muscle building and fat burning processes and hormones.

CHAPTER ONE

Dietary Carbs and Fat – Views Are Changing

I've advocated a lower carb diet for over three decades because I always felt that it was the best diet to maximize muscle mass and minimize bodyfat. I feel that each one of us has what I call a carbohydrate set point—the lowest level of carbs that you need to function optimally, while at the same time maximizing body composition. In most cases this level is quite low, at least relative to present thinking.

Both my earlier Anabolic Diet and now my more sophisticated Metabolic Diet and Anabolic Solution take the low carb equation to a level above all the other low carb diets, not only because the carb level is matched to each person's individual genetic makeup, but also because it involves a macronutrient shift. This shift from low to higher carbs is meant to increase the anabolic effects of the diet by making use of the anabolic effects of insulin while at the same time limiting the effect of insulin on fat metabolism.

The lower carb, phase shift diet that I developed (initially as the Anabolic Diet) and refined into the present Metabolic Diet, has caused some skepticism because of the low fat craze that has enthralled North Americans the past twenty years. But the winds of change have been sweeping over us recently and we're all starting to look at the low fat, high carbohydrate mantra with more skepticism and less acceptance.

There are many reasons for this new acceptance of a higher fat, lower carbohydrate diet. For one, the last two decades, during which the low fat, high carb lifestyle was king, have seen an unprecedented rise in obesity, the exact opposite of what was supposed to happen.

We're also realizing that fats are not the villains they've been made up to be. The results of a study published in July 2002, showed that the long term use of a low carb diet resulted in increased weight and fat loss, and a dramatic improvement in the lipid profile (decreased cholesterol, triglycerides and LDL, and increased HDL levels).[1]

As well, we're finding out that different kinds of fat can have varying effects, many beneficial (except for trans fatty acids—a type of fat found in margarine and many processed and fast foods) on serum lipids.[2] Even stearic acid, one of the major saturated fats in beef, which has been a target for low fat fanatics, has shown in a

recent study to not have any adverse effects on cholesterol levels.[3] While the oleic acid in beef has been shown to lower LDL cholesterol.

Recently there has been an increased emphasis on the importance of essential fatty acids and monosaturated fats (such as olive oil) to both our health and body composition. As well, we're seeing that high carb diets have adverse effects on serum lipids,[4] both the triglycerides and, partly because of the low fat part, cholesterol (unsaturated fats like olive oil are good for you and tend to elevate levels of HDL—the "good" cholesterol, and lower LDL levels—the "bad" cholesterol).

Effects on Body Composition

On top of all this, a number of reputable researchers have published studies that back up much of what I've been saying all along about the effects of low carb diets on body composition. The newest study to add credence to my views looked at body composition and hormonal response to a low carbohydrate diet[5], and published In July 2002.

That's not to say that there hasn't been other research showing that a low carb diet results in a significant fat loss and an increased retention of muscle mass, either alone or in comparison to a high carb diet.

For example back in 1971 a group of researchers looked at the effects of three diets that had the same calorie and protein levels, but varying fat and carbohydrate levels.[6] They found that as the carbs in the diets went down, there was an increased weight and fat loss. In other words, the men that were on the lower carb diets lost the most weight and bodyfat.

In 1998 another study, this time involving obese teenagers, came up with similar results.[7] After 8 weeks on a low carb diet, the teens not only lost significant amounts of weight and bodyfat, but they even managed to increase their lean body mass.

In the 2002 study a six-week carbohydrate-restricted diet resulted in a favorable response in body composition (decreased fat mass and increased lean body mass) in normal-weight men. The results of this study indicate that a low carb diet mobilizes and burns up bodyfat more than a high carb diet, while at the same time preserving muscle mass magical words to almost everyone I know.

While this research backs up the first part of my dieting program, the second aspect, the macronutrient shift, has yet to be studied. This is about to change, however, as I'm in the process of working with some top researchers on this aspect of the diet.

Preliminary results are showing the advantages of this phase of the diet, and I'll be releasing these results in future issues of *Muscle Media*.

Dietary Fat is Not the Enemy

Even though views are beginning to change with many people, it's still the same story. In fact you've heard it all before. Everybody from the American Medical Association to the media trendsetters to that so-called "expert" at your neighborhood gym has been saying the same thing for the last three decades. Fat is bad; carbohydrates are good. If you want to get the body you've been working so hard for, you've got to focus on those carbohydrates and keep fat to an absolute minimum.

So you dedicate yourself to living by the percentages the "lowfat experts" give you. 55 percent carbs, no more than 15 percent fat, you load up on turkey and chicken, you separate the egg whites, you surgically remove all visible fat from any piece of meat, you always broil—never fry.

But you've been living a lie.

The fact is, the high carbohydrate diet favored by so many powerlifters can actually work against them. They bulk up on all those carbs and end up packing on a tremendous amount of bodyfat. Then, when it's time to cut, too much muscle ends up being left in the gym along with the bodyfat.

Strength levels and personal motivation drops. You can become irritable, maybe even depressed. By the time that contest you've been working so hard for comes around, you often look no better than you did for the last contest. You may even look worse.

And that diet, to say it's inconvenient and strict would be a drastic understatement. In a world where eating makes up a great part of our social life, the regimen of a high carb, low fat diet can quickly make you a social outcast.

That's not to say that you can't make progress toward your goals with a high carb diet. You can, somewhat. But you can also find yourself plateauing or even losing lean body mass. And if you try and get as lean as you can, you can suffer a dramatic loss in muscle mass. It's even worse if you're trying to get contest ready. As you count down toward contest time, panic can set in. You take drastic measures to compensate for the state you're in and end up losing weeks of training.

So, why are you torturing yourself? Especially when there is an alternative that can pack on muscle while keeping bodyfat at a minimum. It's called the Metabolic Diet

and, while it flies in the face of what most powerlifters have been led to believe, it could be the answer to your prayers.

The Metabolic Diet

Unlike the high carb diet that can work against the body's system of growth producing hormones, the Metabolic Diet maximizes the production and utilization of the Big Four growth producers—testosterone, growth hormone, insulin-like growth factor I (IGF-I) and insulin—and does it naturally. It also shifts the body's metabolism from that of a sugar burning, fat producing machine to that of a fat burning machine. With the body packing on extra muscle and simultaneously burning both dietary and stored bodyfat, the powerlifter finds himself twice blessed.

The Metabolic Diet stresses an initial high fat/high protein/low carbohydrate approach to nutrition. Many in the general public will dismiss it out of hand citing the popular beliefs that fat is a prime component in heart disease, cancer and obesity. Likewise, many powerlifters have come to assume the dietary fat smoothes the powerlifter out and blurs definition.

They couldn't be more wrong. Dietary fat, when utilized properly as in the Metabolic Diet, can be the key to growth and success. And while some will see the Metabolic Diet as a new, revolutionary, even dangerous approach to nutrition, its basics actually originated with the dawning of mankind.

The Primitive Diet

First let's clear up a widely held misconception that ancient man was a herbivore who turned his nose up at all meat in favor of the available plant life. Current vegetarians often claim that theirs is the most natural and ancient diet known to man in an effort to gain converts, but it's simply not true.

In fact, archeological evidence shows that man's earliest tools were put to use, at least in part, in the dressing of meat. In many areas, the diet of primitive man was made up almost entirely of animal products. The continued affection for meat demonstrated by the monkeys and apes that are our primate cousins today is also testament to early man's dietary preference.

There's a good reason for all this. It's called survival. Meat is a far superior source of amino acids than plant life. It's also high in vitamins A, E and B complex. Vitamin B12, while plentiful in meat, is not found in vegetable products. Red meat is loaded

with iron that is easily absorbed, unlike iron that is present in many plant sources. As well, red meats are excellent sources of potassium, zinc and magnesium.

Fat, whose benefits we will discuss throughout this book, is also readily available in meat and not in plants. Along with many other uses, including the fact that it is tasty and adds to the palatability of food, fat is necessary for proper breakdown and use of vitamins A, D, E and K in the body.

Meat is, indeed, one of the most nutritious substances on earth and it's been held in high esteem by civilizations throughout history. It has even played a big role in religious ceremonies. In the early days of recorded history meat was offered to the prevailing Gods through "burnt offerings" and the Bible reports on feasts held in conjunction with these animal sacrifices.

So when we're talking about "natural" or "primitive" diets we're not talking about the eating habits of vegetarians. We're talking about meat eaters who came to understand early the importance of meat in the daily diet. Man's earliest diet probably consisted mainly of meat supplemented by periodic feedings of carbohydrates. It was only with the development of agriculture a mere 10,000 years ago that any large change took place.

In the nearly 5 million years of man's existence before that, man was largely carnivorous and lived off animal flesh. At its crudest, this meat diet bears a strong resemblance to the Metabolic Diet we'll be providing you with. All we've done is taken this primitive diet and brought it into the modern age making use of modern science to adapt it and perfect it for maximum health, fitness, and development.

In response to this, some people will argue that the domesticated meats available today are fatter than the wild meats consumed by our ancestors and also fatter than the meat from wild animals today. While this is true, it's only a matter of degree. In the Metabolic Diet the quantity of fats is as important as the quality since we use the increased fat intake to shift our metabolism and thus make constructive use of the increased amount of polyunsaturated, monounsaturated, and saturated fats without incurring any of the potential bad effects.

The point I want to make here is that meat is not inherently bad. Our ancestors ate meat to some degree for many thousands of years and we're genetically built to make maximum use of all it has to offer. On the other hand, we also have the capabilities to manage and use various kinds of plant food. After all, our evolutionary process has taken us through many dietary phases where both meat and plant foods were in our diet in various proportions in a continuum between the two extremes: the all meat diets to all plant diets.

If we look at the overall picture and take into account the various phases of man's evolution, the one lesson to take home when we discuss our ancestors' eating patterns is that because of varied eating patterns, man has had to undergo a diverse evolutionary process. As a result of this process we have the genetic ability to use fats, including stored bodyfat, as our main energy source, an ability that is not utilized fully by those of us on today's high carbohydrate diets.

The Establishment Will Not Like the Metabolic Diet

Don't expect the Metabolic Diet to be hailed widely by major food industries in our society. Go down the aisles of any supermarket today and all you'll see on the shelves are various fancy ways to package carbohydrates. On the other hand, meat is simple. And while you can package it different ways, it is harder to disguise or package for big profits. It wouldn't be in the interest of the major food industries to support this diet. The bottom line rules.

A similar situation exists with the run of the mill vitamin and nutritional supplement industry. Most of the supplements they tout will be of little use here. That's because when you're on this diet you need supplements that do more than the cheap formulations (but not necessarily cheap in price), that bottom-line oriented companies supply.

On the other hand, there are supplements that will give you a big boost in achieving your goals. The ones that I'll be suggesting are my own line of supplements that are high tech and specially designed for the needs of the powerlifter dialed into the anabolic lifestyle. These supplements, which are far beyond the useless ones that the powerlifting and fitness supplement industry often stocks on shelves, will give you the edge in maximizing the anabolic and fat burning effects of exercise and the Metabolic Diet's benefits.

Most of today's nutrition experts who think that the quality of a diet should be measured in its high carb, low glycemic carb content, won't be pleased with this diet either. After all it goes against many of their most sacred, but misguided, beliefs.

Also, the Metabolic Diet isn't as nitpicky as most diets out there and so it's easy to follow. You will be eating meat during the weekdays supplemented by a wide variety of other delicious foods. And when the weekend comes, virtually anything goes.

While you may have to give up that lasagna or ice cream during the week, you can have it during the "carb loading" portion of the diet that comes every weekend. Unlike both the high fat and the permanent low carb diets, you aren't forced to give up your favorite foods forever on the Metabolic Diet.

The History of the Metabolic Diet

Prior to 1990 most powerlifters, bodybuilders, and in fact most athletes, followed a diet that was high in protein and complex carbs and low in fat practically all year round. The only thing that varied, except when they fell off the diet, was the calories—higher when they were trying to gain muscle mass and lower when they were cutting up. As such the staple power and muscle mass diet, especially among bodybuilders and most powerlifters, consisted of a lot of high protein foods such as egg whites (the yolks, as nutritious as they are, were considered verboten as they contained some fat), broiled or baked skinless chicken, tuna packed with water and of course lots of oatmeal and rice.

All that has changed in the past decade. Ever since I introduced my Anabolic Diet to the powerlifting community in the early 1990s, many bodybuilders, powerlifters, and even endurance athletes have gotten off the high carb/low fat bandwagon and gone on cycling lower carb, higher fat diets, maintaining the high protein edge. These athletes, and their numbers are increasing daily, have found that they can get more of what they're looking for, whether it's increased strength, increased mass and definition, or increased endurance, on my diet than on the "traditional" high carb diets. Although we'll cover the basics and how-to below, the *Metabolic Diet* book (available at **www.MetabolicDiet.com**), outlines the diet in more detail. There is also a lot of supportive material and many articles, not to mention my complete Metabolic Diet Supplement line, on both of my main websites, **www.MetabolicDiet.com** and **www.CoachSOS.com**.

The Metabolic Diet is not a new diet. Some of the principles have been in existence for several decades. For example, back in the 1960s a group of bodybuilders used a low carb diet with great success. However, it wasn't well refined at the time, nor did it feature the critical aspects of hormonal manipulation and stimulation I've added. But it concentrated on meat consumption with very few carbs and these bodybuilders were pleased to find themselves maintaining maximum muscle with very little bodyfat.

In fact, the diet produced some huge men back in the 60s. They didn't have all the components of the diet perfected and didn't get the "super-ripped" look bodybuilders work for today, but nonetheless, the diet produced some big, big men. Unfortunately, the trendy diets stressing high complex carbs, high protein and low fat swept through the bodybuilding community so thoroughly that these earlier experiments in a high fat approach were wiped out.

As often happens, the blinders went on to alternatives to the high carb movement and the higher fat, low carb diet was ignored by most people. I was the exception. I began working with the diet as an active powerlifter in the 70s and used an earlier version of the Metabolic Diet on my way to becoming the International Powerlifting Federation (IPF) World Champion in powerlifting in 1976 and the World Games Champion in the sport in 1981.

Anabolic Steroids

At the time I was working on and using the Anabolic/Metabolic Diet, the world of professional sports began their campaign against anabolic steroids. Strict drug testing began soon after in the world-class powerlifting community and the cry went out for some natural alternative to steroids.

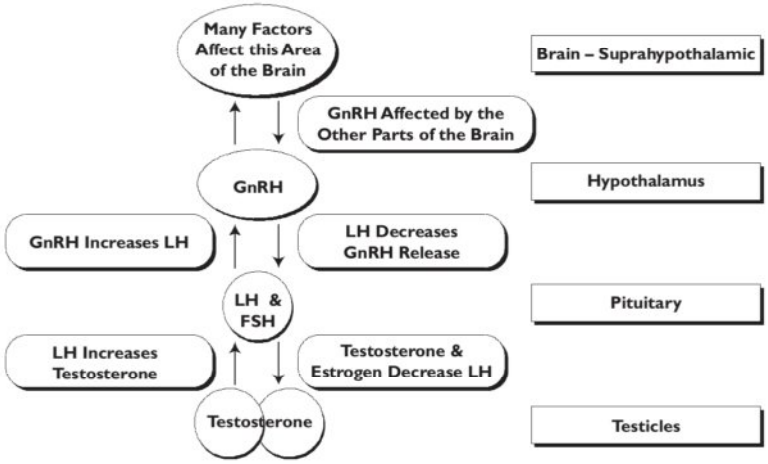
By that time steroids had assumed a place as "wonder drugs" among powerlifters and other athletes. Physically, steroids had been shown to have a remarkable effect on muscle growth and strength. Psychologically, they provided users with an aggressive, contentious mindset very useful in competition and training. The fact that they swept through the powerlifting and other sport communities, where getting a competitive edge was so important to winning, was not surprising.

Unfortunately, steroids were found to have some severe side effects. Moodiness and an unhealthy aggression toward others that could extend to violence (known as "'roid rage") were widely reported in sporting journals. Links to heart disease, liver cancer, kidney disease and sterility were also discovered. With the evidence mounting, and of course with some hysteria by the media, there was a mass move to shut down their use in the international sporting arena.

Then in the early 1990s, because of some drug allegations against Vince McMahon and his sports federations, I was asked to handle the talent of both the World Wrestling Federation (WWF) and the World Powerlifting Federation (WPF). Making sure that the athletes didn't use drugs wasn't enough. We had to provide a viable alternative, especially for the professional powerlifters that were in the WPF.

It was into this void that I stepped with my Anabolic Diet and the new approach to dieting I had been working on. It wasn't an easy task. The World Bodybuilding Federation wanted their athletes to get clean but maintain muscle mass and stay cut up and in competition shape. This was a tall order.

The Hypothalamic-Pituitary-Testicular Axis (HPTA)



Abbreviations:

- GnRh – Gonadotropin Releasing Hormone
- LH – Luteinizing Hormone

One of the major problems was to get the hormonal systems of the bodybuilders back on track producing testosterone naturally. This was very difficult because steroids shut down the testosterone producing system in the body. The hypothalamic-pituitary-testicular axis (HPTA – see Figure 1), the axis that controls testosterone production, ceases to function and extreme measures may be necessary to get testicles working again. It often takes a long time to recover and, in some cases, a user may never recover and be doomed to treatment with artificial steroids or testosterone for the rest of his life.

Steroids can also make the athlete lazy. He'll get growth with marginal training methods but find the road much tougher when he gets off steroids and has to do all the work himself. Metabolic diet or not, it may take him a while to get back up to speed with proper training methods.

Then there is the diet itself. Like any diet, if you don't follow it, you're not going to get results. Some bodybuilders and powerlifters who had been cruising on steroids for a long time found it difficult to replace the ease of steroids with a diet that required some commitment.

Finally, some people chose to believe that a natural program could replace steroids (and the dozens of other drugs, such as growth hormone, IGF-I, insulin, thyroid hormone, diuretics, etc.) immediately and offer the exact same results. There is no way this can occur. Over a short time period, no diet is going to replace steroids. But over the long term, the Metabolic Diet, coupled with high tech nutritional

supplements, has proven to be a very effective alternative to steroids providing the same kind of results without the "Russian Roulette" nature of steroid usage,

By 1990, I had come out with my book *Beyond Anabolic Steroids* and begun to provide articles for a variety of fitness, bodybuilding and powerlifting publications on the subject. A few years later, I started writing on my new diet system and in 1995 wrote *The Anabolic Diet*. The response to the Anabolic Diet and the newer Metabolic Diet has been remarkable. In a world where steroids are a real gamble, both in terms of competition and health, the Anabolic Diet and Metabolic Diet both gave the bodybuilders and powerlifters who used it that natural edge they were looking for.

But I am not a crusader for "Just Say No" in this area. Hysteria is not my stock in trade. Anabolic steroids do have their place. In fact, I've been involved in research testing steroids for use in AIDS patients. They could play a role in maintaining body mass and strengthening the immune system in these patients thus allowing them to better resist the opportunistic diseases that are so deadly to them.

I also fully realize that steroids and other artificial means for growth and performance are still used widely in the athletic community. They give the athlete the edge he's looking for and, for many, they'll gladly risk their health and the sanctions that can come from steroid use for the performance benefits they can bring.

It should be pointed out that the Metabolic Diet can be used in concert with steroids. You will get results. Indeed, you can do most anything with steroids and achieve some gains. But, though the Metabolic Diet will help you to some degree, your use of steroids will keep you from maximizing some of the endogenous anabolic hormones the diet seeks to stimulate, particularly endogenous testosterone.

Bottom line: the Metabolic Diet is really meant for the natural athlete who wants to be the best he can be naturally, but it works for anyone, with or without drug use. And, while it's much easier and convenient to stay on than the high carb diet, it will still require some dedication and the will to properly execute it. The key to success in the diet is to make sure you take your body through a "metabolic shift" where you'll begin to use dietary fat and bodyfat instead of carbs and muscle protein as the main fuel for your body. To do this, you'll have to follow the diet very closely, especially at the beginning.

The battle that the drug-free athlete engages in is not an easy one. He must face up to drug-using and abusing competition and drug-based competitive standards in every contest. What the Metabolic Diet does is to give him the same kind of benefits the drug user obtains.

By introducing anabolic drugs or agents into his body, the drug user increases the circulating amount of anabolic hormones and other compounds, which in turn produces the desired anabolic effect of muscle growth. The Metabolic Diet does the same thing, only instead of introducing the anabolic substances from an exogenous source outside the body, the diet stimulates the production of anabolic hormones IN THE BODY. It is LEGAL and it is SAFE.

Best of all, it's a SURE THING. If you follow the diet, IT WON'T FAIL. It may sound bizarre, it may counter everything you've ever been led to believe about diets, fat and carbohydrates, BUT IT WORKS. It is a biochemical inevitability. You WILL get the combination of increased strength and lean body mass with less bodyfat you're looking for if you follow the diet properly.

And you'll get it naturally, without the dangers of steroids.

Given the trials and tribulations most of us have experienced with their "diets", what more can you ask from a nutrition program?

Competing Diets

In the last 40 years I've seen a lot of accepted dietary 'truths' come and go. The most important thing I've learned in all this time is that you have to keep an open mind and be flexible enough to adjust your views according to the never-ending parade of new facts and information that surfaces on the scene.

The high carbohydrate, low fat, low to moderate protein diet is an outdated diet who's time has almost run out. Even though the attitude of those in the know towards these kinds of diets has changed, the new diet information has not reached the kind of critical mass it needs in order to become the logical successor to the diet crown.

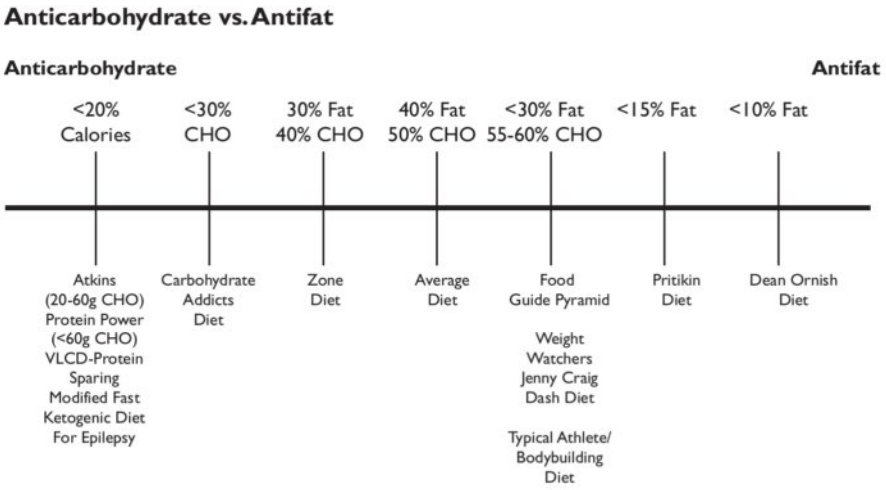
So while I, and many others, believe that the Metabolic Diet is the most advanced, scientifically based diet plan on the planet, there's still a vocal majority that hasn't discovered the vital facts and, as such, still sticks to the high carb, low fat idioms.

However, I know that a paradigm shift will soon occur as the new dietary information hits the critical mass and becomes accepted by the majority of people as the best diet for those who exercise and want to increase their strength and muscle mass and decrease their bodyfat levels.

The Options

There are all kinds of diets out there. Low fat, high fat, low carb, high carb, low protein, high protein, hospital, vegetarian, limited food, wine lovers diet, and all the mixes and matches you could imagine. The more popular ones are the high carb, low fat diets, the low carb diets and the high protein diets (see Figure 2—anticarbohydrate vs. antifat). All these diets have several subsections that treat the macronutrients differently but for our purposes we can lump them together under the broad categories.

Anticarbohydrate vs. Antifat



The High Carb, Low Fat Diet

The high carb, low fat diet is the most popular diet on this planet. That's due in part to the fact that this diet is mostly plant based and thus readily available to people all around the world, especially those in third world countries. It also has been the subject of a lot of research and is espoused by the American Dietetic Association and other health professionals. The premise behind this diet is that by cutting down on fat you cut back on the one macronutrient that provides the most calories, therefore you lose more bodyfat. Not only that, the weight of popular opinion is that fat is bad and lowering dietary fat makes for a healthy heart.

Unfortunately these lines of thought are flawed. First of all by cutting down on dietary fat, you actually burn less bodyfat and tend to lose more muscle. So, by cutting back on calories you'll lose weight but a lot of that will be muscle. The end result isn't pretty since, in trying to maximize your muscle mass/bodyfat ratio to get in contest shape, you're going to end up losing a lot of that hard-earned muscle and strength.

There are also some health concerns regarding the high carb diets. Recent studies have shown that the high carb diet raises serum triglycerides and lowers HDL and as such can lead to an increase in cardiovascular disease. And if that's not enough, the low fat diets can be too low in the essential fatty acids and may result in a problem with the absorption of the fat soluble vitamins including vitamins A, D, E and K.

High Protein Diets

There are various kinds of high protein diets. Some are based on low fat and low carbs, and more along the ketogenic diets, such as the Atkins' Diet. Others are based on moderate carbs and fats, like the Zone Diet, or high to moderate carbs and low fat, and are just a variant of the high carb, low fat diets mentioned above.

In all cases the high protein levels are useful for those who exercise or are involved in sports. However, those that are low in fats and/or high in carbs run into the same problems as mentioned above with the high carb, low fat diets.

Low carbohydrate diets such as the Atkins' Diet and other strictly ketogenic diets are great for losing body weight and dealing with some health issues such as glucose resistance and diabetes. However, long-term strictly ketogenic diets tend to result in decreased muscle mass. That's because they don't allow alternating periods of lower and higher carb days. These alternating periods allow for favorable changes in the anabolic and fat burning hormones.

The Zone Diet is a good all round diet that stresses lower carb and fat levels and higher protein levels than is found in general diets. It's a good diet for losing weight while at the same time maintaining muscle mass. In fact, it's pretty close to the Moderate Carbohydrate Phase of the Metabolic Diet. Unfortunately, the Zone Diet suffers from the same fatal flaw as all the other diets out there.

None of them are fully satisfactory because they're all static diets based on fixed macronutrient content. The fact is that the one-diet-for-all approach just doesn't work genetically.

The Metabolic Diet on the other hand is a flexible living entity that is able to adjust to your needs, while at the same time finding the optimal carb level for maximum muscle mass and fat burning capability, and peak strength and efficiency. By using the Metabolic Diet you can dial in your metabolism to the kind of diet that's best for you.

Diet Books

Most of the diet books on the market today are so similar that the same person could have written them. This includes books by physicians, PhD's and all the Jenny Craig/Susan Power types. They all offer variations of the diet high in complex carbs and fiber and low in fat. They also push exercise, lifestyle and behavior changes. Regrettably, none of these diets have much chance for success when the novelty has worn off and motivation wanes.

The reason they don't work is that they are basically all the same and usually depend on the personality of the writer rather than any real differences in the diets. Once a dieter has tried one of them they've tried them all, no matter how well they are disguised. None offer the novelty and biochemical advantages of the Metabolic Diet where you can lose bodyfat in even stubborn areas while maintaining or even improving muscle tone and body shape. Unlike the rest, the Metabolic Diet is not a fixed diet and is the first diet that can be adjusted to suit your metabolism.

You also have to remember that a lot of these books were written by people who had weight problems themselves and lost the weight through the use of personalized methods. Because of this, they're wildly evangelical in their praise and biased to flaws in their diets. There is very little, if any, science or research support for many of the claims they make.

And most important, none of these people, including the Zone man himself, is any kind of athlete, never mind a powerlifter. So they don't have an idea of what's needed to maximize strength and muscle mass.

CHAPTER TWO

The Metabolic Diet

The Metabolic Diet is the Holy Grail of diets in that it is the first scientifically based diet that can be adjusted to suit your individual and unique metabolism. It is the first diet that understands that each individual has a different genetic make-up and as such needs a personalized diet.

METABOLIC DIET

- Is scientifically based.
- Not a fixed diet like all the others.
- Is the first diet that can be adjusted to suit your metabolism.

Benefits of the Metabolic Diet

More Muscle, Less Bodyfat, and It's All Natural

For more than 20 years the American public has been told to watch its fat intake or suffer the consequences. The national "fat hysteria" got so bad that back in 1989 the National Academy of Sciences advised everybody, regardless of the presence or absence of risk for coronary heart disease, to go on a restricted diet low in fat. The Lords of Lowfat loved this and the food industry proceeded to take advantage of the situation, as they always do, and come out with a whole new line of "lowfat" or "fat free" products, many of which were neither.

Why groups such as premenopausal women and children, who are largely immune to coronary heart disease, should go on such a restricted diet was not explained. Meanwhile, other complex, interlinking causes of coronary heart disease, like lack of exercise, obesity, stress, genetics, and caloric intake went largely ignored. Fat was the culprit. Any possibility that dietary fat could be utilized in the cause of good health and physical performance was conveniently dismissed.

As a result, people began eating those carbs. They began watching what they ate. Above all, they became aware of the fat they were eating and did their best to avoid

it like a plague. And, guess what? As a society we got fatter than ever. We're getting fatter all the time. The heart attack parade hasn't stopped. What's wrong with this picture?

Meanwhile, bodybuilders and powerlifters didn't seem to be getting the kind of growth they were looking for from all those carbs. Sure, they got big, but they also gained fat. By contest time, they were most often right about where they'd been before they started the whole diet cycle. The siren song of steroids became ever more inviting.

But now, you've got an alternative. A healthy and effective one. It's called the Metabolic Diet and it's been striking telling blows against the Lords of Lowfat and getting powerlifters the growth they want without all that added bodyfat. In this chapter we'll outline the many benefits to be gained from the Metabolic Diet and begin to look at the reasons why it works. By its end, I don't think you will be too tempted to return to that high carb diet.

Physical Benefits

Increasing Strength and Lean Body Mass WITHOUT Anabolic Steroids: This is one of the real advantages of the Metabolic Diet. As described in the previous chapter, the diet does many of the same things hormonally that steroids do, only naturally inside the body and without the risks.

Decreasing Bodyfat Without Sacrificing Lean Mass: Unlike the high carb diet, when you gain weight on the Metabolic Diet much less of it is bodyfat and much more of is muscle. We've found that, far from what you've been led to believe, eating fat doesn't lead to getting fat. In fact, high dietary fat is instrumental in increasing lipolysis or the breakdown of fat and the resulting loss of bodyfat. We've also found that the powerlifter will maintain more lean body mass during the cutting phase of a diet.

On the high carb diet, if you train correctly and do everything else right, you'll find that when you lose weight, about 60 percent of it is fat and 40 percent muscle. You may get down to your weight class but you will have lost more muscle and kept have more fat than you could have. On the Metabolic Diet, we've found those percentages go way down to 90 percent fat and 10 percent muscle, and that's a real benefit for the powerlifter who wants to maintain muscle as he cuts down. With the high fat diet, you get down to the weight you want but find yourself maintaining a lot more lean body mass. You're bigger and stronger.

Take two athletes, one on the high carb diet and one on the Metabolic Diet, have them gain 10 pounds and you'll find the one on the Metabolic Diet gaining the larger

percentage of muscle. Likewise, when you lose weight the athlete on the Metabolic Diet will lose far less muscle than the athlete sold on high carbs. Which diet would you rather be on?

Feeling Stronger While Losing Bodyfat: This stands to reason: strength is proportional to muscle mass. When you're on the high carb diet sacrificing lean mass to get your bodyfat level down, you are obviously going to feel weaker. Because the Metabolic Diet cycles in a carb loading phase every week to stimulate insulin production and trigger growth, you also don't find yourself getting into the psychological doldrums you get following one diet all the way through each week. There's a variety in your diet and this will aid you in being more energetic and committed than you would be on the high carb diet.

Maximizing the Effects of Endogenous Anabolic Hormones: This diet maximizes the serum levels of testosterone, growth hormone and insulin to promote growth. It basically conditions your hormonal system to create an endogenous (natural) anabolic (growth producing) environment. It tries to maximize the effect of these 3 anabolic hormones 24 hours because, contrary to popular belief, you don't only get stronger and form muscle just after a workout but, if you do it right, during a workout as well.

This is one of the most remarkable effects of the Metabolic Diet and it doesn't come easy. Many hormones are reactive to others. For instance, as insulin goes up growth hormone may decrease. If insulin decreases, growth hormone will increase. The two substances generally don't work together, but they can. If you can increase both substances, you'll get a better anabolic effect than with an increase in one substance alone.

Later we'll provide some supplements that you can use with the Metabolic Diet that will help in increasing insulin, testosterone, growth hormone and IGF-I as needed. For example, **Exersol**, which is made up of three formulas targeted for use before, during and immediately after your workouts. This is especially important because of the decrease in serum testosterone and growth hormone that can occur during and after a workout.

At the cellular level in the body, you need the anabolic hormones elevated so they'll drive amino acids into the cell for protein formation. That's how you get growth. The Metabolic Diet, the weekly cycling it incorporates, and supplements will work to do this before, during and after your workout.

Increase in Strength: On the Metabolic Diet you'll usually find that as you're losing weight and bodyfat, strength increases. Most powerlifters find this amazing. They know that when they lose weight they're also losing muscle and strength. But with the

Metabolic Diet they're losing far less muscle and that, in combination with the fact that their body is working in an anabolic environment, makes them stronger. They can't believe it when as they watch their weight go down, mainly as a result of losing bodyfat, their strength increases at the same time.

Decrease in Catabolic Activity in the Body: The Metabolic Diet results in lower levels of cortisol, a hormone secreted by the adrenal glands that breaks down muscle (catabolism) and uses it for energy. The supplements we'll be adding to the diet will also decrease muscle breakdown during and after the workout while increasing insulin and growth hormone levels at critical times to promote an anabolic effect. Put simply, you'll be breaking down less muscle while adding more.

PHYSICAL BENEFITS OF THE METABOLIC DIET

- Increasing strength and lean body mass without steroids
- Decreasing bodyfat without sacrificing lean mass
- Maximizing the effects of endogenous anabolic hormones
- Increasing strength while losing bodyfat
- Decreasing catabolic activity in the body
- Avoiding the health problems of the high carbohydrate diet
- Improving contest-to-contest and year-to-year/no plateaus
- Endurance increases

Avoiding General Health Problems Associated with the High Carbohydrate Diet: Carbohydrates will increase insulin levels and thus produce an anabolic (muscle building) effect when used properly. In the Metabolic Diet, we use a carbohydrate loading phase on the weekends to do just that. But when insulin is chronically high or yo-yos up and down due to a diet consistently high in carbs, it becomes a lipogenic (fat producing) hormone and begins to lay down fat on the body—and plenty of it. That's why it must be controlled. You'll note that on the Metabolic Diet the individual will increase carbohydrate consumption on the weekend only to the point when he begins to lay down fat. Then it is back to the high fat diet before any damage is done.

This is why you tend to lay down so much more fat on a high carb diet. With insulin uncontrolled, you lay down fat indiscriminately. The chronic elevation of insulin also tends to deposit that fat in the thighs and other fat-plagued areas of the body causing the cellulite buildup that particularly drives women crazy.

The increase in plaque buildup in the arteries that leads to heart attacks also appears to be a symptom of the chronically high carb diet. If you stay away from the simple sugars and junk food you can limit the damage, of course. It would be hard to severely criticize someone who eats a lot of vegetables, salads and potatoes.

Still, all those carbs will lead to fat buildup unless you regulate it as we do in this diet. Carbs are only increased to the point that they will have a beneficial effect on lean body mass. By spiking insulin production through carb loading on the weekends we can speed the movement of nutrients through the bloodstream and into muscle. Amino acids are driven into muscle cells where they can form the building blocks for protein and ultimate muscle growth. But before the insulin levels have been elevated too long and fat begins to be laid down in bulk, the carbohydrates are cut off and insulin is brought under control.

It's a Lifestyle

The Metabolic Diet is a lifestyle, one that you can keep up year round. It's very comfortable because it's natural. It punctuates high fat periods with regular carb sessions in much the same manner as our ancient ancestors' diet.

You also don't give up anything on this diet. You can have that meat and cheese on the weekdays and on the weekends load up with your favorite carbs. It's not torture like most other powerlifter diets. You want to party and have a beer on the weekends? Go ahead. All foods are available, albeit at the right time of the week, on this diet.

Meanwhile, if used properly, this diet will allow you to keep your bodyfat levels under control and at a level that can be easily decreased when getting ready for competition or just trimming back.

And, if you responsibly follow the diet and stay with it, each time you go through the cycle or complete your Pre-Competition phase you should be able to improve cycle to cycle. Instead of plateauing, as so many powerlifters do, you'll improve contest to contest and year to year.

Performance and Endurance Increases: We've also found that for many athletes endurance actually increases on the high fat diet. Again, this runs counter to popular belief that exercise endurance is related to the amount of carbohydrate stored in the muscle and that a low carb diet decreases performance.

In the high carb/low fat diet, the athlete begins training and as the glucose in the blood is used, liver glycogen is mobilized to maintain blood glucose while at the same time the glycogen or carbohydrate stores in the muscle are also used for energy. Also,

there is an increase in fatty acid oxidation and glucose formation from gluconeogenic precursors, mostly mobilized from muscle. Basically, as exercise continues your body depends more and more on burning fat and muscle for fuel. Unfortunately, when you're on the high carb diet, your body isn't as efficient at burning fat and, unless some carbs are constantly supplied, you end up burning more protein (muscle) and less fat than you should.

Once you've shifted over on the high fat diet, though, your body is primed to use fat for energy.[8] In fact it uses up less of the stored glycogen in the liver and muscle and depends more on fat for its energy source. The glycogen is preserved and used when it's really needed rather than being wasted on lower level activity where fat is an effective energy substitute.

Fat becomes almost like sugar to the body and it will favor utilizing fat stores over muscle and liver glycogen stores for energy. In this way, less fat is stored by the body and more of it is used. The body is much less likely to make fat and more likely to burn it off.

And it gets even better if you exercise. That's because when your fat adapted muscle fibers undergo a shift of the energy substrate from carbohydrates and protein (i.e. muscle breakdown) to fats, and use glycogen even more economically during physical exercise, a higher percentage of lean body mass is the result.

Explaining why this happens gets a little technical. For those who are interested read on for a few pages. For those who just want the meat (pardon the pun) skip this part and carry on with the next section—Maximizing the Effects of Endogenous Hormones.

While I've been espousing the benefits of my Anabolic/Metabolic Diets for increased strength, athletic performance, and endurance for over three decades, it's only in the past ten years or so that many of my views and theories have been substantiated by research. While more studies are needed, I'll give you a brief synopsis of what the literature shows so far.

In theory there are several reasons why the Metabolic Diet should increase performance in powerlifting and high intensity weight training. The first is because fat adaptation, and macronutrient shuffling, as is done in the Metabolic Diet, consistently increases intramuscular triacylglycerol (IMTG) levels and this energy source is used right from the word go as you start training. Also the availability of free fatty acids (FFA) in the blood begins much sooner in those that are fat adapted as opposed to those who are carb adapted.

The combination of immediate and increased use of IMTG and blood FFA and the concurrent decrease in the use of glycogen and glucose, both intracellular and from the blood, leads to dramatic and important changes in the energy mechanisms involved in fueling exercise. In particular there is an increased anapleurotic response, reduced glycogen use and elevated plasma FFAs (increased availability of plasma FFAs is associated with attenuated glycogen use during whole body exercise).

Normally muscle glycogen utilization is most rapid in the early stages of exercise and decreases later in exercise secondary to reduced glycogen availability. Studies have shown that in prolonged exercise, the reduced carbohydrate oxidation observed in the second 120 minutes of exercise was a function of attenuated muscle glycogen use.

In the Metabolic Diet, there is an increased IMTG content in muscle and, if done properly, an increased muscle glycogen level as well, at least for two or more days after carbing up. The bottom line is that the glycogen, even when high, is spared and theoretically this should translate into increased anaerobic AND aerobic performance.

The Metabolic Diet also increases glycogen levels to above normal levels for a few or more days after a carbup phase.

On the endurance end, several studies have found that animals, rats and dogs in particular, adapted to a high fat diet have increased endurance capacities[9,10] and, unlike what happens on a high carb diet, do not have a decrease in endurance capacity even after recovery from a previous exhausting workout.[11] The latter condition seems to be due to the increased storage and utilization of intramuscular triglycerides (fatty acids), while the former is due to the increased use of free fatty acids as fuel and to glycogen sparing.[12]

A similar tendency to increased endurance has been found in fat adapted humans,[13,14] although some studies (in both animals[15] and humans[16]) have not shown any improvement in exercise performance or endurance. The problem with most of the studies that did not show any performance enhancement secondary to fat adaptation is that in people on a constant high fat, low carbohydrate diet, muscle glycogen content is compromised. And even though there is less reliance on glycogen, this lower glycogen content likely is a factor in limiting performance.[17]

While some studies have shown that endurance exercise is optimized by following a Metabolic Diet suggest ting a macronutrient shuffle (carb loading after adaptation to a high fat diet[18]), others have not.[19] More studies are needed to examine the issues involved. Especially needed are studies that examine the effects on exercise intensity, endurance and perceived exertion when a long-term fully fat adapted athlete carb

loads on a cyclical basis, as occurs in the Metabolic Diet.[20] More studies are also needed to determine the effects of fat loading on exercise performance.[21]

Maximizing the Effects of Endogenous Anabolic Hormones: This diet maximizes the serum levels of testosterone (even in women[22]), growth hormone and insulin (the Big 3) to help keep the muscle mass as you shed fat.

This is one of the most remarkable effects of the Metabolic Diet and it doesn't come easy. Many hormones are reactive to others. For instance, as insulin goes up, growth hormone may decrease. If insulin decreases, growth hormone may increase. The two substances generally don't work together, but they can. If you can increase both substances, you'll get better results than with an increase in one hormone alone.

Later we'll provide some supplements that you can use with the Metabolic Diet that will help in increasing insulin sensitivity, testosterone, growth hormone and IGF-1 as needed. Some of you will be very serious about your goals and may be seeking to take the advanced path a competitive powerlifter normally takes. Others will just be interested in keeping the body big and strong and fat levels down.

Whatever your goals, you'll find the Metabolic Diet an effective tool for increasing strength and muscle mass and keeping bodyfat levels to a minimum.

Decreases In Catabolic Activity in the Body: By "catabolic" we mean forces that break down muscle and use it for energy. When existing muscle is broken down, your body will lose its tone and may become flabby. The Metabolic Diet, accompanied by proper exercise actually results in the body producing lower levels of cortisol, a hormone secreted by the adrenal glands that leads to catabolism. By lessening catabolism we insure that the body retains important muscle mass and tone while you lose weight in the Cutting Phase.

It has been shown that the carb-loading phase of the diet results in decreased cortisol levels. In one experiment the hormonal effects of muscle carbohydrate loading manipulations followed by a carb-poor diet were studied.[23] Carb loading provided decreased levels of cortisol not only during the carb-loading phase but also in the following carb-poor time period.

The Metabolic Advantage

At this point, a little biochemistry lesson may be in order so you can get a better idea of why the Metabolic Diet is superior to the competition. Adenosine triphosphate (ATP) is the source of energy for all metabolic activity in the human body. In order to get the energy the body needs for muscle contraction, breathing, brain cell function

and virtually all other activities, ATP must be generated. People have gotten the idea that you must have the glycogen and the glucose that comes from carbohydrates for the body to produce and replenish ATP and survive.

What people don't understand is that the body can produce glucose without taking in carbs (**gluconeogenesis**) and that protein and fat can be used to provide energy and replenish ATP. It is a misconception that you must have dietary carbs to function. This is likely only true in some cases where a person may be genetically challenged as far as utilizing fats efficiently. And even in these cases it's unlikely that there will be a need for the extremely high levels of dietary carbs now being called for by various groups and agencies.

When carbohydrates make up the bulk of your diet, you basically burn the glucose (and other sugars which, like glucose, enter the glycolytic pathway) from the carbs as energy. Glucose enters the bloodstream and it's either used for immediate energy or stored as glycogen in the liver and muscles (remember our discussion of insulin earlier?). The glucose not stored as glycogen is made into triglycerides (bodyfat). When needed for energy, the stored glycogen is converted back to glucose and used up directly by cells or transported through the bloodstream to other body cells for conversion and used as energy.

When fat and protein make up a greater part of your diet, your body no longer relies on those large amounts of glycogen or glucose for energy. A good part of your energy comes from the use of free fatty acids in your diet or from the breakdown and oxidation of bodyfat. As we discussed, some of the energy will come from gluconeogenesis, the formation of glucose mainly from glycerol and amino acids. Instead of burning all the stored glycogen or glucose for energy, the body burns free fatty acids or triglycerides (the storage form of the free fatty acids) and the glucose that it makes.

Basically, a diet high in fat activates the lipolytic (fat burning) enzymes in your body and decreases the activity of the lipogenic (fat producing) enzymes. Dietary free fatty acids and triglycerides become the body's main energy source. The triglycerides are broken down to free fatty acids and some of the fatty acids are metabolized to ketones, which in turn can be used for energy by body cells. The use of ketones for energy is especially important to the brain that can only use glucose and ketones for energy. In short, the free fatty acids and ketones take the place of glucose and the triglycerides act like glycogen.

When carbs are the main form of energy to the body, the body produces insulin to process and store it. This is all well and good but, as we discussed earlier, one of the problems with insulin is that it activates the lipogenic (fat producing) enzymes in the body and decreases the activity of the lipolytic (fat burning) enzymes. What this leads

to is an increased storing of bodyfat and a decrease in the amount of stored fat that will be burned.

The exact opposite occurs on the higher fat/lower carb diet. After undergoing the "metabolic shift" from being a carb-burning machine to a fat-burner, lipogenesis (the production and laying down of fat on the body) decreases, and lipolysis (the burning of both dietary and bodyfat for energy) increases. You're burning fat as your primary fuel, and instead of using glycogen or breaking down precious protein, you'll burn off the fat on your body for energy as needed.

This can have a big effect on overall bodyfat, and research documents the fact that while on a higher fat, lower carb diet, weight loss is due to the almost exclusive loss of bodyfat.[24] In one study of ideal-weight human subjects, it was found that higher fat diets were accompanied by a very strong lipolytic (fat-burning) effect.[25] In another study focusing on obese subjects, it was found that, when offered high-carb/relatively low-fat diets or lower carb/relatively higher fat diets, the subjects on the lower carb diets lost significantly more fat.[26] Though prevailing wisdom would predict that the higher fat diet would simply make people fatter, they actually lost more weight on a high fat diet.

It may sound crazy, but that's the way the body works. Contrary to what most people believe, fat oxidation is regulated primarily by carbohydrate intake rather than by fat intake.[27] Once you've adapted to a higher fat/lower carb diet, fat doesn't beget fat. Despite what you've been told, a properly designed diet higher in fat and lower in carbs doesn't put fat on; it takes fat off.

Similar results have occurred in animal studies.[28],[29] Meanwhile, I've seen the positive effects of a higher-fat diet time and time again in my own practice. The fat melts away. At the same time, as a bonus, body tone can be improved markedly thanks to the "protein protecting" nature of the diet.

Protecting Protein

One important by-product of the "metabolic shift" that takes place when you move from a high carb to a good, higher fat/lower carb diet is that fat protects protein in the body. When you're utilizing carbs as your main source of energy, the body tends to save its bodyfat and will preferentially take muscle protein, break it down and form glucose from it to burn as energy when the immediate energy stores are exhausted. This is why on a high-carb diet a significant amount of muscle catabolism can take place.

Exercise should play a role in any diet. Every doctor or fitness expert will tell you that. If you want to come anywhere close to getting the kind of weight loss you want and shaping up your body, exercise is a necessity. Unfortunately, with the high-carb/low-fat diet, once you've exhausted carb based primary and secondary energy stores you're going to start burning some muscle for fuel when you're working out.

The fact is that anytime you're exercising and the body needs energy it will break down what it needs, including muscle, to supply that energy. One of the ways athletes fight this is to sip glucose drinks during a workout. The body will not need to break down muscle as much for energy because it has an outside source of energy constantly coming in. The problem here is that with the constant glucose ingestion you get chronically elevated levels of insulin and a decrease in the oxidation of bodyfat. Instead of losing fat by exercising you're actually preserving it.

Fat works in the same way as glucose when you're on the Metabolic Diet. It protects the muscle by serving as an alternative, a more available source of energy and it does this without having to take in more calories since the body has learned to oxidize bodyfat to provide that needed energy. So now when you exercise you don't need to take in carbs to spare your muscles. Your body will burn up your excess bodyfat to provide the energy it needs to exercise, at the same time sparing muscle protein.

On the high-carb diet you may find yourself in a gym, happily working away, but you'll be sacrificing muscle in the effort. If you look around you'll find examples of people who seem to be at the gym all the time, working on the treadmill or step machines and doing some weight training, but they just don't look the way they should.

They may be slender, but their bodies lack tone and they're stringy or shapeless. With all the work they're doing they should be looking like one of the covers of the magazines they've got in front of them while they walk the treadmill, but they're actually burning off muscle and sacrificing tone. You can bet they're not on a low carb, high fat diet.

The Metabolic Diet works against this tendency. Some muscle will be burned, but available fat will serve as an alternative to muscle as an energy source so a minimal amount will be lost.

What we're concerned with here is "catabolism" or the breakdown of muscle tissue. Again, I know it may sound strange, but although most people think that exercise only creates muscle it also breaks it down. Research upholds that the Metabolic Diet could well also be called the "Anti-Catabolic Diet." Along with enabling the body's hormonal system to better burn fat it decreases the amount of muscle that could be lost during a workout or just during day to day activities, by protecting muscle

protein. This is obviously very important to someone wanting to maximize strength and lean body mass.

Research has shown that the ketone bodies (beta-hydroxybuterate and acetoacetate) burned for energy in a higher fat/low-carb diet, actually decrease protein catabolism.[30] A study done on laboratory rats also showed that a combined treatment with insulin, testosterone and a high fat/high protein diet led to decreased loss of muscle protein caused by the catabolic hormone corticosterone.[31] Another showed higher protein gains and lower fat gains for rats on a high-fat diet.[32] The implications for similarly decreased catabolism in humans with the higher fat/lower carb diet are obvious.

As well as increasing lean body mass and strength the Metabolic Diet also works to give you a more aesthetic physique. While strength is paramount in powerlifting, it doesn't hurt to look good as well.

In my own practice, I've also noticed that bodyfat seems to be more mobile when the Metabolic Diet is being used. As discussed above, when you begin to lose weight you often have a very hard time losing it in problem areas like the thighs, buttocks and stomach. Weight seems much more evenly lost throughout the body on this diet. Problem areas are much more easily attacked.

I've worked with many patients who get skinny from the waist up when they diet. The stored fat in the buttocks, inner thighs and lower abdomen areas that refused to budge. No diet has ever successfully slimmed these areas. But with the Metabolic Diet they lost fat evenly throughout these areas. Much of the cellulite that has bothered these people throughout their lives disappears and this encourages them to take their weight loss and maintenance efforts further.

Fat distribution also seems more evened out with the Metabolic Diet. What fat remains on the body seems to be distributed more equally on the frame. You just don't have those pockets of fat that plague people. Fat is distributed in a more pleasing ratio across the body making any bodyshaping efforts on your part that much easier.

METABOLIC BENEFITS OF THE METABOLIC DIET

- Burning fat instead of glucose promotes lipolysis (fat breakdown).
- Burning fat instead of glucose decreases lipogenesis (fat production).
- Without dietary fat, the body stores fat in excess.
- Muscle protein and body tone are protected.
- Bodyfat is more mobile and pleasingly distributed—decreases cellulite.

CHAPTER THREE

Why it Works

The Metabolic Diet works because it changes some of the basic metabolism in your body so it becomes a fat burning machine. Cellular metabolic flux (as we'll illustrate) is dramatically altered when we change the dietary macronutrient content. Some pathways become more active than others and some processes dominate in the production of energy.

In all cases, the body will adapt to the macronutrient content of any diet as long as the diet provides certain essential nutrients.

ADAPTATION

- The body will adapt to the macronutrient content of the diet, no matter how extreme.
- The only stipulation is that the diet must provide certain essential macronutrients and micronutrients.

First of all it's important to realize that there are no essential sugars or carbohydrates. Also the reasons given for why we need carbohydrates are faulty. For example, one of the main reasons is that the brain depends on them to function properly. In fact lactate is the preferred substrate for neurons and these brain cells can also metabolize ketones effectively. As well, other cells in the central nervous system cater to the main brain cells and supply them with energy derived from other nutrients. For example it has been shown that astrocytes shuttle nutrients to neurons.[33,34]

THERE ARE NO ESSENTIAL SUGARS OR CARBOHYDRATES

- There are essential and conditionally essential amino acids and essential fatty acids.
- There are no essential carbs because, like the non-essential amino acids and fats, the body can produce glucose and carbohydrates endogenously.

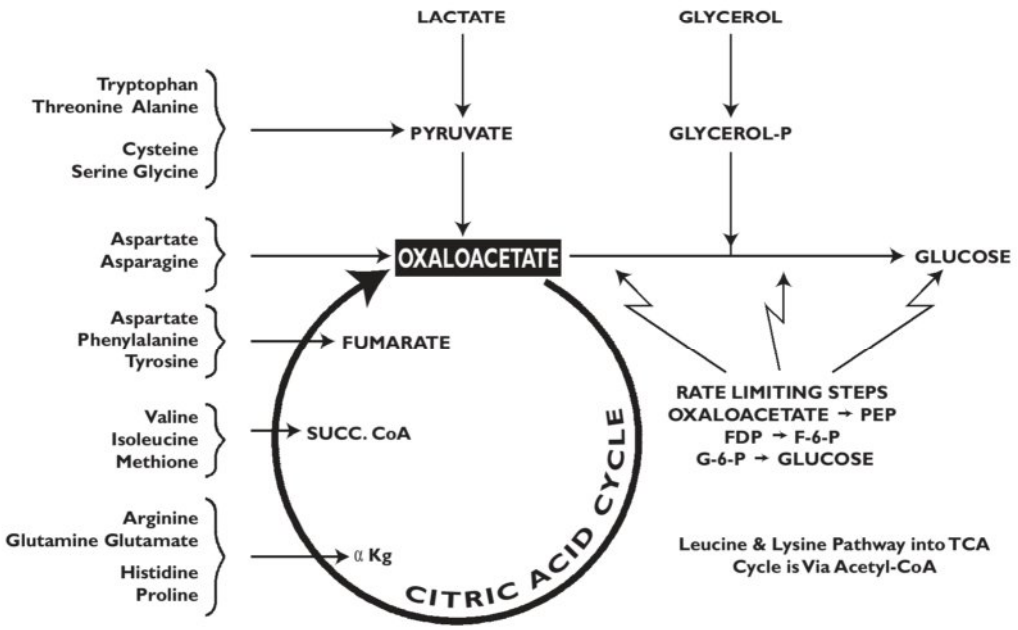
SO WHY DO WE NEED CARBOHYDRATES?

- Most common argument is that they're necessary for the brain. **Not so!**
- Brain can metabolize lactate and ketones as well.
- Lactate (and other nutrients) also shuttle from astrocytes to neurons.
- Glucose can be produced as needed.

Also glucose can be produced as needed by a process called gluconeogenesis. In this process other nutrients, including amino acids and glycerol (the backbone that makes up much of our bodyfat) can be converted to glucose or used directly as energy.

Although somewhat complicated, the illustration below shows how the body produces glucose internally from other substances including the amino acids, glycerol (source can be from the breakdown of bodyfat or from the diet), lactate, and pyruvate.

Entry Of Precursors Into The Pathways Of Gluconeogenesis



Because there are common pathways for the metabolism of all three macronutrients, variations in the macronutrient content results in adaptations that will allow the

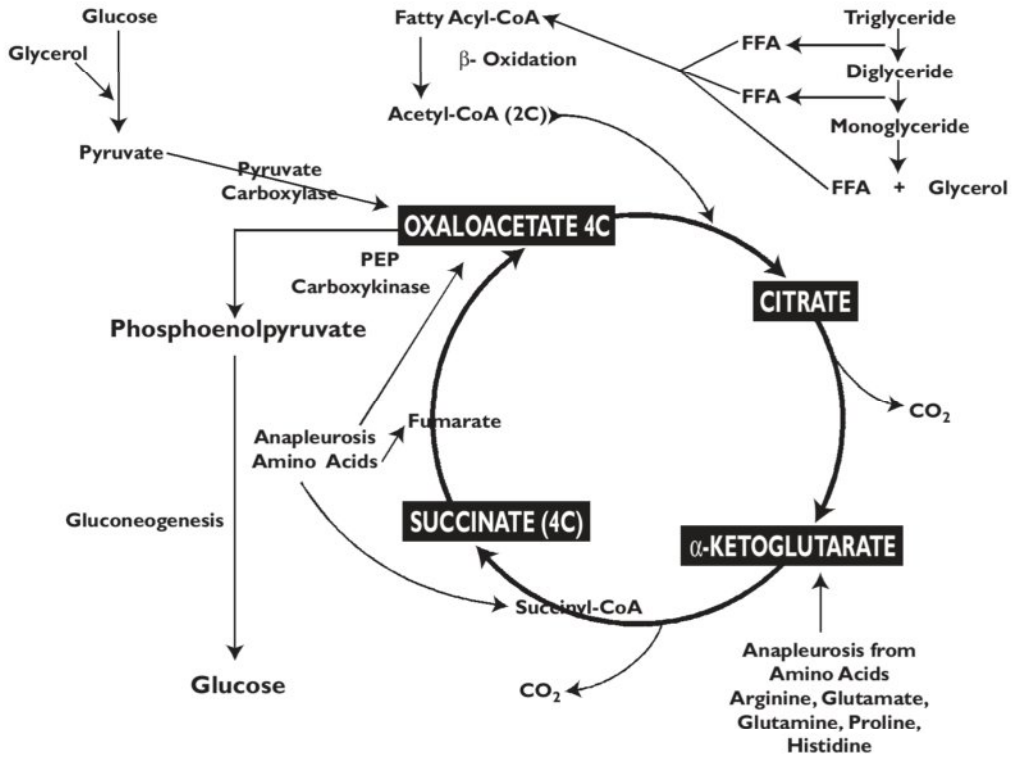
efficient production of compounds and substrates for energy production and body maintenance.

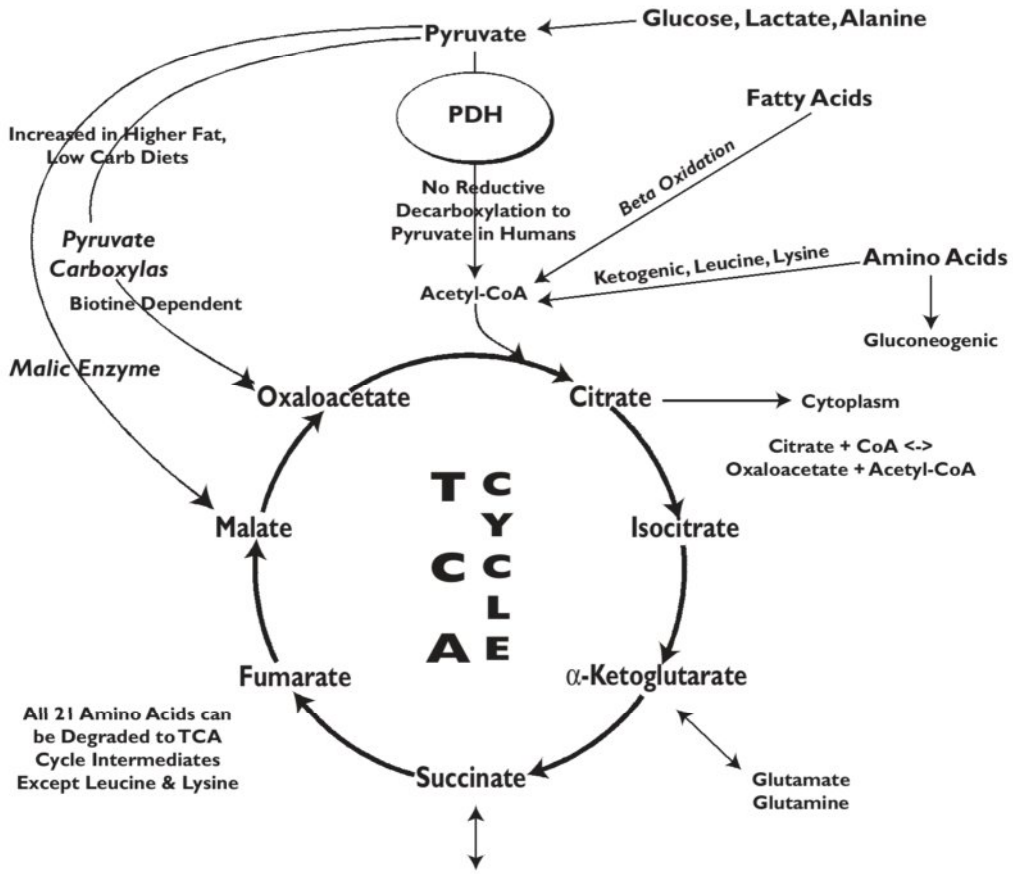
COMMON PATHWAYS FOR MACRONUTRIENT METABOLISM

- Regardless of the macronutrient mix, the end results and the final pathways are the same.
- Interconversion of macronutrients, usually at some energy cost (conversion of protein to fats), and with some exceptions (inability to produce glucose from free fatty acids—although you can, to a limited extent, with triglycerides and bodyfat), is ubiquitous.

These next two diagrams shows how glucose, free fatty acids, glycerol and amino acids are broken down to provide energy.

There is No Net Glucose Synthesis from Lipid (Except from Glycerol Portion – 10% By Weight)





The Metabolic Diet controls the major muscle building and fat burning hormones in the body to maximize muscle mass and minimize bodyfat.

These hormones include testosterone, growth hormone, IGF-I, insulin, thyroid, and cortisol.

REGULATING LIPOLYTIC ACTIVITY

Major hormones are:

- Catecholamines (epinephrine and norepinephrine).
- Insulin.
- Glucagon (more in forming ketones).
- Growth Hormone.
- Testosterone.

The Metabolic Diet also increases the activity of hormone sensitive lipase (HSL), the enzyme that breaks down bodyfat (lipolysis).

HORMONE SENSITIVE LIPASE (HSL)

Adipose tissue lipolysis is stimulated through a cascade of cellular signals, resulting in activation of HSL.

Controlling the formation (lipogenesis) and breakdown (lipolysis) of bodyfat isn't enough. We have to insure that the fat broken down is also used up by the body for energy (beta oxidation or fat oxidation) rather than used simply to reform bodyfat.

BETA OXIDATION OF FATTY ACIDS

- The other side of the fat equation.
- Lipolysis is of no use if the fatty acids are not used up.
- A paradox.

Not only does the Metabolic Diet increase fat breakdown but it also increases the use of fat as fuel for the body's energy needs. It does this in part by increasing GH, IGF-I and testosterone levels and partly by controlling the increase and sensitivity of insulin.

INCREASE IN BOTH LIPOLYSIS AND FAT OXIDATION

- Must have both otherwise may be counter productive.
- For example, a recent study shows that ephedrine like compounds increases lipolysis but decreases fat oxidation so that overall effect may be an increase in bodyfat.

  Mora-Rodriguez R, Hodgkinson BJ, Byerley LO, Coyle EF. Effects of beta-adrenergic receptor stimulation and blockade on substrate metabolism during submaximal exercise. Am J Physiol Endocrinol Metab. 2001 May;280(5):E752-60.

The Metabolic Diet also increases the anabolic and anticatabolic hormones in the body including growth hormone, IGF-I and testosterone (including an increase in the androgen receptor and binding).

Other Hormones and Compounds

While we've dealt with the effects of the Metabolic Diet on several hormones and functions, there's much more to the story of how the Metabolic Diet works.

Some of this has to do with the way the Metabolic Diet manipulates other lesser know, but very important hormones and compounds in the body, including leptin, ghrelin, and the hypothalamic hormones neuropeptide Y, agouti gene-related protein (AGRP), proopiomelanocortin [giving rise to the active α-melanocyte-stimulating hormone (α-MSH) peptide], and cocaine and amphetamine-regulated transcript.

Leptin is produced mainly in fat cells, although both endocrine and neuroendocrine tissues also express it, and has effects on almost every system in the body. It acts primarily through central pathways suppressing appetite and increasing the metabolic rate. It also seems to have significant endocrine and neuroendocrine effects (such as it's effects on the pituitary, thyroid, adrenal, and gonadal axes). As well it has some peripheral effects, particularly it's effects on increasing insulin sensitivity, and on the gastrointestinal and immune systems.

Leptin levels are regulated, among other things, by overall fat mass and by higher calorie and carb intake. Cut back on food and your leptin levels drop. This tells the body, among other things, that you need to find food (hunger increases), conserve energy (metabolic rate decreases), and preserve energy stores (especially bodyfat). In other words your body is preparing for the worst scenario: starvation. Increase your food intake and leptin levels promptly rise doing a lot of good things like decreasing hunger and increasing metabolic rate, but some bad things like increasing bodyfat.

The interesting thing about leptin, at least from our viewpoint, is that it reacts much faster than any significant changes in body composition. That is leptin will increase or decrease before there are any changes in bodyfat levels, which it helps to bring about. That means that there is usually a time gap between increases and decreases in leptin and the following changes in bodyfat.

We make use of this phenomenon in the Metabolic Diet on the weekend when we increase both our calorie and carb intake—something I suggest later on when talking about the Cutting Phase. It's in this phase that leptin levels are affected because of the decreased calorie intake. Increasing carbs and calories jumps the leptin levels back up for the weekend carb phase, with all the benefits of leptin but without the adverse effects on bodyfat.

Ghrelin is a recently discovered peptide that is primarily produced by the stomach. It stimulates GH secretion but it also stimulates feeding and increases the formation of

fat cells, at least in rats. In one recent study, low carb, high fat intake reduced ghrelin levels, and as such decreased appetite and fat formation. This is one of the ways that the body limits fat formation on a high fat diet. Again on the weekend, by increasing calories and carbs, we can make use of ghrelin quick effects of increasing appetite and GH levels, but avoid the slower effects of ghrelin on increasing fat cell mass.

It is beyond the scope of this book to cover any of the hormones and other factors we manipulate either via the Metabolic Diet or the use of various supplements. Suffice it to say that many of these were taken into account when I wrote the Metabolic Diet and formulated my line of advanced supplements.

How it Works

The Metabolic Diet – Fat Burning and Muscle Sparing

The Metabolic Diet works because it:

- Switches your metabolism to burn fat instead of carbs as its primary fuel.
- Maintains the fat burning as you drop calories so that the energy needed is obtained mainly from bodyfat not glycogen or muscle protein.
- Spares protein and maintains or allows you to build muscle mass.

The first step in the Metabolic Diet is switching your metabolism to burning fat as its primary fuel. This is done by limiting dietary carbohydrates and providing ample dietary fat. During this adaptation stage you don't really need to change your normal caloric intake. Simply substitute protein and fat for your former carbohydrate calories.

The second step, once you're fat adapted, is to vary your calories to suit your goal.

To increase muscle mass you increase your daily caloric intake by increasing fat and protein in your diet.

To lose bodyfat while at the same time maintaining muscle mass, you slowly decrease your caloric intake and at the same time your fat intake. By providing less calories and dietary fat, your body will use its fat stores, not muscle, more and more to make up any energy deficits. In some circumstances, because of lower dietary fat levels, your diet may contain only moderate or even low levels of fat, mainly in the form of the essential and monosaturated fatty acids.

THE METABOLIC DIET WORKS BECAUSE...

1. The body learns to burn fat instead of carbs.
2. It continues to prefer fats as you drop calories, mainly in dietary fat and some carbs, always keeping protein high to spare muscle.
3. As calories drop, bodyfat becomes the main fuel even if you lower dietary fat dramatically.

ALSO...

Cycling from low carbs, high fat to high carbs and lower fat manipulates the anabolic and fat burning hormones and processes in the body to maintain or increase muscle mass while at the same time decreasing bodyfat.

REMEMBER...

1. You teach the body to burn mainly bodyfat in preference to carbs and protein.
2. By shifting from a low carb diet on weekdays to a higher carb diet on weekends, you manipulate the muscle building and fat burning processes and hormones.

CHAPTER FOUR

The Metabolic Diet Plan

In this section, you will learn how the Metabolic Diet can be used to maximize strength and lean body mass, while in later chapters we will cover the details on how to use the diet in the various training phases. First, although we covered how and why the Metabolic Diet works in the previous section, let me clear up a few misconceptions some people may have about the diet.

Insulin

First, let's make it perfectly clear that, unlike other diets that espouse a constant low carb intake and consider it as such, insulin is not the enemy. We're not mounting a campaign against it. In fact, it's only a problem when it's chronically high or yo-yo's such as it does on a carbohydrate-based diet.

INSULIN

Has a persistent and dramatic effect on decreasing lipolylis. The effects of insulin persist even when insulin levels return to baseline values.

In fact, in the Metabolic Diet we make use of the anabolic effects of insulin while at the same time avoiding it's bad effects on bodyfat.

Unchecked, insulin adversely effects bodyfat by decreasing the breakdown and increasing the accumulation of bodyfat. What you want to do with insulin, and what this diet focuses on, is to increase it at the appropriate time and place so it works to add muscle mass and maximize it's anabolic potential by, among other things, increasing the flow of amino acids into muscle cells.

INSULIN MUST BE CONTROLLED FOR

- Beneficial effects of insulin on protein synthesis and muscle metabolism.
- Beneficial effects of insulin on glycogen supercompensation.
- Counter productive effects of decreased lipolysis and increased lipogenesis.

What we don't want is fat built up at the same time. That's why insulin secretion is controlled and limited. Instead of the chronically elevated insulin levels of the high-carb diet, the Metabolic Diet carefully manages insulin during the dieter's week so you get it's anabolic benefits without packing on all that unwanted fat.

CONTROL THE EFFECTS OF INSULIN BY…

- Only allowing controlled increases in insulin for the desired effects on protein synthesis.
- Attenuating the effects of insulin on lipolysis and lipogenesis.
- Accomplishing pulses of insulin and controlled insulin increases at variable times on weekends.
- Increasing GH (and testosterone) at the same time as insulin. For example prior, during and after training.

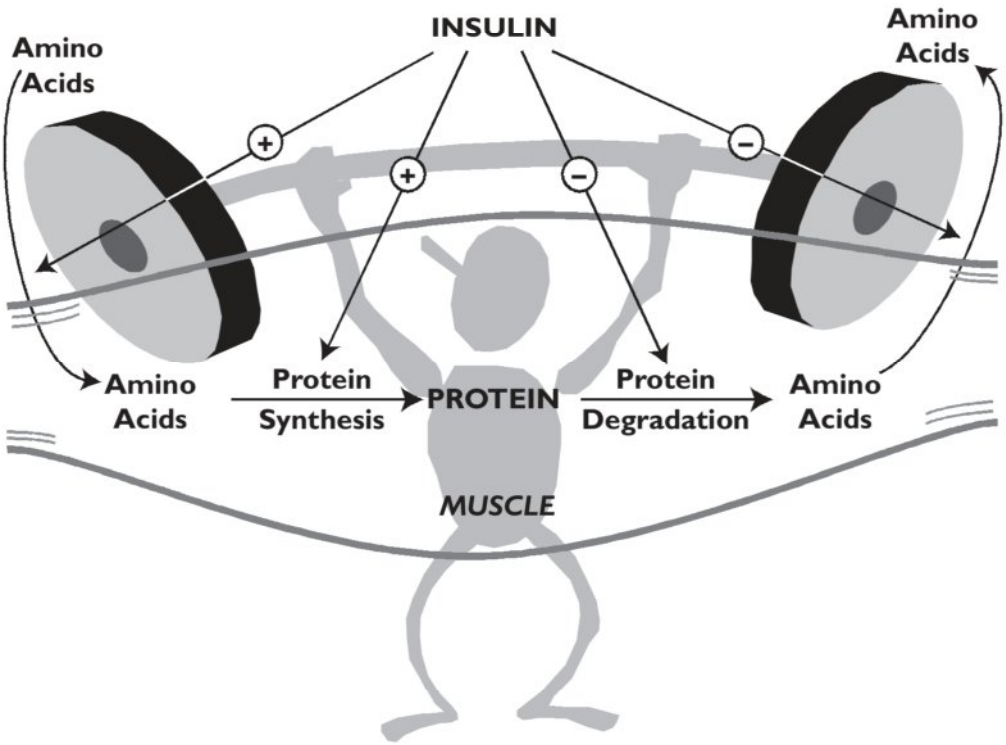
Another plus of the Metabolic Diet is that there is a decreased effect of insulin on fat metabolism even during the carb-up phase.

EFFECTS OF INSULIN ON FAT METABOLISM

After the phase shift on the Metabolic Diet there is a decreased effects of insulin on fat metabolism EVEN DURING THE CARB-UP PHASE.

Insulin also works its anabolic magic hand in hand with testosterone and growth hormone (GH). GH is very important because of its positive effects on increasing protein synthesis and decreasing muscle breakdown. During the weekdays when you will be on the higher fat/higher protein/lower carb portion of the diet, insulin levels stay fairly steady and don't fluctuate wildly, and growth hormone secretion increases. Along with stimulating a great environment for body shaping, GH also induces cells to use fat instead of sugar for energy, thus increasing the burning off of bodyfat and limiting its production.

Sites of Insulin Action On Muscle Protein Metabolism



Growth hormone acts almost like a "starvation" hormone. When your body is in trouble or when you are threatened or in a dangerous situation, GH kicks in to mobilize stores of energy in the body to deal with stress and increased energy needs. GH levels also increase under the stress of exercise.

Usually insulin works to decrease the secretion of GH, but it appears that the body sees the great increase in carbs and insulin during the weekend portion of the Metabolic Diet as a stressful situation, much like exercise, and GH can actually increase with insulin. In this way, we potentially can get the positive effects of increased growth hormone both during the week and on at least part of the weekends.

Testosterone, Growth Hormone and Insulin-Like Growth Factor I (IGF-I)

METABOLIC DIET INCREASES GROWTH HORMONE, IGF-I AND TESTOSTERONE

- Increased GH and IGF-1 secondary to decreased carb intake and amino acid effects.
- Increased testosterone due to higher fat, higher protein and lower carb intake.

Testosterone, also critical to increasing muscle mass and strength, responds well to the Metabolic Diet. Preliminary research in this area has found testosterone is positively linked to dietary fat. In one study, premenopausal women placed on low-fat diets experienced decreased levels of both non-protein bound estradiol and testosterone (although postmenopausal women didn't experience the same deficiency).[35] In another promising study, animals fed diets high in cholesterol or fish oil experienced increased testosterone production over those fed a low cholesterol diet containing linseed oil.[36]

BIOAVAILABLE TESTOSTERONE

- Increased by diets high in fat and protein.
- Decreased in Vegan diets (as is IGF-I)
- Decreased in diets high in carbs.
- Decreased if soy protein substituted for meat protein.

(Habito RC, Montalto J, Leslie E, Ball MJ. Effects of replacing meat with soyabean in the diet on sex hormone concentrations in healthy adult males. Br J Nutr 2000 Oct;84(4):557-63.)

A recent study showed that in older men, the consumption of a meat-containing diet (like we recommend on the Metabolic Diet) contributed to greater gains in fat-free mass and skeletal muscle mass with resistance training than did a lacto-ovo vegetarian diet.[37]

Overall it has been my experience that there is an acute anabolic effect on muscle when a short-term lower carb diet is alternated with carb loading. Cellular hydration is maximized by the water and carb loading intracellularly, and insulin sensitivity is increased leading to an intense anabolic stimulus. Constant fluctuations make for an

anabolic effect unparalleled by any other diet. This anabolic effect allows you to increase strength and muscle mass, or at least maintain it, as you lose bodyfat.

Along with increasing the anabolic process in the body, it is also important to insure that the muscles you've developed are not broken down. To do this you want to maximize the anabolic hormones such as testosterone and GH, and minimize the production and effects of catabolic hormones, the most critical of which is cortisol (cortisol also promotes fat storage). Much of this is done naturally through the Metabolic Diet. Since bodyfat stimulates cortisol production,[38] less cortisol is secreted, as bodyfat is lost.

ANABOLIC ACTION OF THE METABOLIC DIET

- Increases in bioavailable testosterone and in the androgen receptor.
- Increases in GH, IGF-1 and IGFBP-3 and in tissue levels of IGF-1 isoforms.
- Decreases cortisol levels.
- Increases in concert with controlled insulin.

Psychological Control

Along with the hormonal control, you'll also find the Metabolic Diet providing for psychological control. The wide mood swings and irritability you can get on a carbohydrate-based diet can also increase cortisone. In fact, psychological stress can be a prime component in its production.

The Metabolic Diet, in part by controlling insulin, can put a stop to the mood swings and irritability that plague the carb diets. It also minimizes the hunger, frustration and social stress created by other diets. Let's face it—any diet can be difficult. It involves changing lifestyles and any change can be stressful. But the flexibility, convenience and simplicity of the Metabolic Diet go a long way toward getting rid of the stress that normally accompanies a diet.

The Complete Picture

If you're going to give the Metabolic Diet your maximum effort, you'll also need to get your training and nutritional supplements in gear. The diet itself—through the "metabolic shift" of changing the body over to a fat-burning machine instead of a carbohydrate-burning, fat-producing one—will give you the basis for creating a strong, muscular body, with a minimum of bodyfat. Supplements will give you that extra edge to help get the maximum anabolic and fat loss effects out of the diet and

training. Training, if it's done right, will obviously provide the basis for both the Metabolic Diet and the targeted supplements to do their magic. As such it is important to get all three in sync to give you the best strength results for a given weight class.

These three tools used together—the Metabolic Diet, a solid exercise program and a savvy approach to nutritional supplements—provide a "can't miss" scenario for success.

Getting Started

Before going on the Metabolic Diet you should get a complete physical from your doctor. You should also have some blood work done, including a complete blood count, cholesterol levels (total, LDL, and HDL), TSH (a test for thyroid function), fasting blood sugar, serum uric acid, serum potassium, liver function array and BUN. Your doctor may want to go beyond this but he'll let you know if you should have more done.

Your Cholesterol

As for the cholesterol issue, because you are burning fat for energy, much of the cholesterol and saturated fats that could cause a problem are used up in the process. Studies have even shown that along with increasing the utilization of fat as an energy source and providing for weight loss, the Metabolic Diet can even reduce serum cholesterol.[39]

In fact, the results of a study published in July 2002, showed that the long term use of a low carb diet resulted in increased weight and fat loss, and a dramatic improvement in the lipid profile (decreased cholesterol, triglycerides and LDL [the bad cholesterol], and increased HDL [the good cholesterol] levels).[40]

In my patients, I've consistently found a reduction in serum cholesterol and an improvement in the cholesterol and triglycerides profile on patients who are on the Metabolic Diet and are losing or have lost weight.

A typical example is one patient who has been on the diet for two years. The table below outlines the changes in his lipid profile before he started the diet and after being on the diet for two years. During this time he has lost over thirty pounds while increasing his muscle mass, and presently weighs a muscular fit 200 lbs.

Table of Lipid Profile

	Nov 96	Normal Range	Nov 98	Normal Range	Comments
Total Cholesterol	236	160-240	220	175-260	Total cholesterol is down
HDL	22	31-59	64	32-60	Good cholesterol is up
LDL	191	90-171	141	104-179	Bad cholesterol is down
Cholesterol/HDL	10.7	<5	3.4	<5	Total cholesterol to HDL is down
LDL / HDL	8.7	1.52-5.52	2.21	1.73-5.59	Ratio of LDL to HDL is down
Triglycerides	123	10-150	72	10-150	Triglycerides are down

As you can see his lipid profile improved dramatically while on the higher fat/lower carb diet. His lipid profile taken two years ago would have put him in the high-risk category for coronary artery disease while the recent lipid profile puts him in the very low risk category in all the parameters presently used to assess this risk.

In this case, the patient was not all that careful in the type of fats he ate and did not take any oil supplements. He relied heavily on red meat. While some improvement would be expected from the weight loss and exercise, it's obvious that being on the Metabolic Diet did not adversely affect his lipid profile.

On the other hand, it never hurts to keep track on your cholesterol level whenever you change diets and even more so if you have or have a tendency toward a cholesterol problem. Cholesterol levels are largely determined by individual metabolism and body chemistry, and genetics play a strong role. If you've had cholesterol problems in your family there's a good chance you may have them, too. And if you have a chronic problem with cholesterol you need to talk to your doctor about how this may be affected by the Metabolic Diet, and what you can do to limit any adverse effects. Frequent monitoring of your lipid status will let you know where you stand and if changes need to be made.

There are a number of adjustments you can make to the Metabolic Diet to control your cholesterol intake, if needed. Marine oils, flaxseed oil, olive oil and other nutritional supplements will help. Meat restriction may also be necessary. But, again, this is something you need to work on with your physician. If the Metabolic Diet seems like the answer to you, you'll have to put your heads together to devise a plan

where you can benefit from the weight loss and toning advantages the diet provides while keeping cholesterol in check.

Also remember that the Metabolic Diet is as much a moderate to low fat diet as it is a high fat diet. It all depends on where you are at as far as the diet itself.

For example if your serum LDL and/or HDL levels are adversely affected by the diet at the beginning when you're adapting to burning fat as your main fuel, or when you're bulking up and taking in more fat, then the problem may correct itself as you modify the carb level to suit your metabolism or when you are in the process of decreasing your bodyfat such as when you go into a definition or cutting phase.

The solution to cholesterol levels that are worse on the high fat part of the diet is actually quite simple and is inherent in the way that I set up the Metabolic Diet. Keep in mind that the higher fat levels used initially in the Metabolic Diet are to help bring about the transition from carbs to fats as the main fuel for the body. Once this transition occurs fats are not as important as they once were.

In fact, if you do follow a high fat diet to go through the initial fat adaptation or to bulk up, you must then lower the dietary fat levels as you shift gears to burn off that unwanted bodyfat. To do that you usually have to gradually drop your daily calorie intake, which means dropping your dietary fat intake, since you obviously can't decrease carb intake much as it is already low, and you have to keep protein levels high to maintain muscle mass. Thus you have to lower your dietary fat intake progressively until you reach your goal. As such, the Metabolic Diet moves from a high fat diet to a moderate and even a low fat diet depending on how low you drop your daily calorie intake.

I've found that once fat adapted, lowering dietary fat, as long as carbs are kept low, doesn't change the use of fat as the body's primary fuel. The body simply goes from using dietary fat to using endogenous fat as the preferred fuel. And that's one of the primary goals of the Metabolic Diet.

So, if you're having cholesterol problems, the solution is obvious. You have to decrease your intake of saturated fats as much as possible and make up any calories that you lack with foods high in polyunsaturated/monosaturated fats (making liberal use of flax and olive oils), and high protein, lower saturated fat foods (for example steaks are okay but you have to take off all visible fat. Cutting back on egg yolk consumption but keeping the egg whites, is also a good idea).

Keeping Track

Along with getting the physical and blood work we also urge you to weigh yourself and get a bodyfat analysis before you begin the diet. Scale weight loss is important but so are inches. You should understand that there are times when, for a variety of reasons, you might not be losing much scale weight but you're subtracting that unsightly bodyfat. It will help keep your enthusiasm high in these moments if you know that progress is being made in other areas and your body is toning up. I've devised the Metabolic Index™ to help you keep track of your progress. By plugging in your weight, height and bodyfat level, you'll get a good idea of whether or not you're losing bodyfat regardless of the changes in body weight.

In addition to keeping track of the Metabolic Index, you might also want to keep track of your body measurements. Especially important are your waist, hips, upper thighs, chest and upper arms. These measurements will give you an idea of how your body is responding to the diet and where you are losing weight the fastest. It will also give you an idea of where your problem areas may be and where you may have to concentrate exercise to get the body you want.

Secondly, measurements will be helpful for motivation when you are retaining fluid or not losing weight for some other reason and will complement the Metabolic Index. If you see those waist and hip measurements going down, despite the lack of weight loss, it will show you, along with the changes you'll see in the Metabolic Index, that you're making progress.

Finally, you should review the use of any medications you may be on. If you're on diuretics, you may want to use them only as needed due to the higher fat/lower carb diet's ability to help you shed water.

Most Type 1 and Type 2 diabetics will usually have to adjust their insulin or oral diabetic agents, perhaps decreasing them during the low carb portion of the diet, and going back to their normal dosages on weekends.

You should check your glucose levels at various stages of the diet until you become familiar with the effect of the diet on blood glucose. It's important to check with your doctor and keep checking as you continue the diet and lose weight so that you are aware of your status and can make changes where needed.

The Diet – Where to Start

Although you can start the Metabolic Diet from two very different starting points, I suggest that those who want to maximize strength and muscle mass and minimize

bodyfat take the more strict, less complicated route. The original strict approach will allow you to most efficiently find your unique, optimal dietary carb level.

The strict, low carb phase can last anywhere from two to several weeks and allows you to determine if you are an efficient fat user and as such can do quite nicely without too many carbs. If that's true, then you're all set to carry on with the low carb five day, two day phase shift regimen. By carefully monitoring how your body reacts to the carb level you're on and then making any necessary adjustments in carb intake, you'll eventually arrive at that magic dietary carb level that's just right for you. It's important to realize that the Metabolic Diet is not a static process but a dynamic progression in which you have to be actively involved in order for it to work. If you take an interactive part in the process you'll discover enough about yourself and your metabolism to achieve your fondest body weight and fat loss goals.

The initial part of the Metabolic Diet in which we determine just how your body functions under carb deprivation, is meant to be a testing ground for a person's capability for utilizing fat as a primary fuel. Those who are efficient fat oxidizers will do very well in this phase of the diet. Those who aren't may find that they will not be able to cope as well on this strict part of the diet and will do much better as the carb levels are raised in subsequent weeks.

The Metabolic Diet is designed to be a phase shift diet. That is, the weekdays are lower carb, while the weekend is higher carb. However, that's not the way it works in the first two weeks.

The best way, by far, to approach the first two weeks is to stay low carb for the first 12 days and then carb up on Saturday and/or Sunday. Doing it this way will give your body the incentive to make the shift from burning carbs to burning fat as its primary fuel. It will also tell you very quickly if you are totally unsuited for bottom level low carbing.

THE METABOLIC DIET – THE BASIC STEPS

1. Replace the carbs you are eating now with protein and fat—don't change the calorie level at first.
2. At first, stick to the low carb phase for a full 12 days before beginning the high carb phase.
3. End carb loading the minute you start smoothing out.
4. Once you are fat adapted, change the calorie level depending on the training phase you are in.

THE METABOLIC DIET – ONGOING

Once you are fat adapted (usually after the first two weeks):

- **Phase 1** – 5 day, low carbohydrate, high fat, high protein diet.
- **Phase 2** – 12 to 48 hours high carb, lower fat diet.

Strict or Assessment Phase

The Number of Grams of Carbs Allowed and the Percentage of Calories to Come From Fat, Protein and Carbs

	Carbohydrate Intake	% Fat	% Protein	% Carbs
Weekday Maximum	30 grams	40 – 60%	40 – 50%	4 – 10%
Weekend (12-48 Hour Carb Load)	No real limit	20 – 40%	15 – 30%	35 – 60%

The initial, adaptation phase of the Metabolic Diet is really quite simple. It calls for a dedicated higher fat/high protein/low-carb diet from Monday all the way through to the following Friday (a total of 12 days) before carbing up.

THE FIRST TWO WEEKS

- The metabolic shift occurs from lower carb and higher fat intake.
- 5 days is enough—as shown in recent research.
- 12 days is better.
- First carb load best on the second weekend.

During that time, except for those who are exceptionally uncomfortable (fatigue, weakness etc.), you'll be limited to 30 grams of carbohydrates maximum per day. Fat should be set at roughly 50-60 percent and protein set at 30-40 percent. Follow this criteria during the initial 12-day phase of the diet and for the ensuing 5 weekdays of following weeks, assuming you're biochemically suited to this low level of carbs.

GUIDELINES FOR THE STRICT OR ASSESSMENT PHASE

- 50 – 60 % fat
- 30 – 40 % protein
- 30 grams carbohydrates

Then, come the second Saturday and subsequent Saturdays, you perform the big turnaround. You go through a higher carb phase of the diet and do the big carb up anywhere from 12 to 48 hours over the weekend and following weekends. Set your fat intake at 25-40 percent, your protein intake at 5-30 percent and carb intake at 35-55 percent. As you will see further, these levels should be adjusted to match and maximize individual body chemistry and needs.

The whole process is very similar to what athletes call "carbohydrate loading". You hit the carbs relatively heavily and this allows you to be very sociable in the dietary sense. You can eat those foods you've been missing during the week.

GUIDELINES FOR THE CARB-LOADING PERIOD

- 25 – 40 % fat
- 15 – 30 % protein
- 35 – 55 % carbs

Basically what we're doing here in the initial or adaptation phase is limiting carbs during the first two weeks. Then, all of a sudden, the second weekend hits and you're stuffing yourself with carbohydrates. Insulin levels will rise dramatically. In fact, it's been shown that the higher fat/low-carb diet phase of the diet makes the insulin response to the high carbs even greater than it normally would be.[41,42]

The first thing your body does in response to this exaggerated carb loading is stuff the muscles with glycogen and begin to firm up. This is the portion of the diet that insures you'll have an attractive foundation and not just a softened shell to shape when all that fat comes off. You'll find yourself rather relaxed during this period because all those carbs will be raising serotonin in your body.

But once you get back into your regular routine on Monday you'll quickly find yourself energized and ready to take on the world. If you're exercising (and you should be) you'll find yourself feeling especially upbeat, healthy and motivated.

During both Monday and Tuesday your system will be working hard, burning off all the increased glycogen you gained over the weekend, and continuing to burn fatty acids. Overall, you'll experience a rise in fat burning and body shaping potential. Then, Wednesday to Friday, with glycogen limited again, you'll depend much more on your primary fat burning metabolism to maximize fat loss and body toning.

Needless to say, your body goes through a big transition weekly with this diet, whether or not you stick to the strict carb levels or increase your dietary carbs to a level where you'll function best. That's why it's important to know when to stop on the weekend. If you find that you have an unlimited appetite on the weekend, that's okay. You'll kick the insulin into gear that much faster. But you must be careful. Some people will have a tendency to begin laying down bodyfat faster than others.

That's why you have to be aware of the point at which you begin to feel puffy and bloated. This point will vary greatly from person to person. Some people will feel hardly any response in appetite from the increased insulin. Others, however, will experience wide insulin swings and find themselves hungry and eating all the time.

That's why I list 12-48 hours as the carb load on the weekends. This could be cut back to even less than 12 hours for people whose appetites become insatiable or for people who tend to begin laying down bodyfat relatively early in the carb loading phase. The important thing is knowing when you've had enough. When you start feeling puffy and bloated and can even sense the fat coming on, it's time to go back to your weekday high fat/low carb routine.

SHORT AND LONG-TERM LOADING ON WEEKENDS

Depending on your response you might want to load on low glycemic carbs for 48 hours, or perhaps only 12 hours using high glycemic carbs, or anything in between.

Granted, it may take you awhile to interpret your body and realize when it's telling you it's time to change phases. This point will vary widely from person to person and, while it may be easy for one person to interpret body cues, it may be harder for another. If you're having trouble with this, make the change earlier in the weekend and see how you look and feel the next week. As always, patience is the order of the day. Experience will eventually teach you to interpret your body very well and know when you're putting on fat.

Also, keep in mind that the percentages listed in the boxes for fat, protein and carb consumption are optimal numbers. If you've never done any real diet planning before, you may have a bit of trouble reaching them at first. If so, don't worry. By shooting for the 30-gram carbohydrate limitation and 40% minimum fat level in the diet during the early weeks, you'll make the "metabolic shift" necessary for initial success.

The First Month

In fact, we don't want you making a lot of changes in your diet in the early weeks. Any diet, even the strict or assessment part of the Metabolic Diet, is going to be hard enough to adapt to. So don't change the amount of calories you're eating. Don't get into some serious bodyshaping regimen or otherwise make it hard on yourself. In these first weeks, simply concentrate on picking a certain calorie level you'd like to work at and then getting used to replacing the carbohydrates you eat with fat and protein.

DON'T COUNT CALORIES AT FIRST

It's most important to go through the Metabolic Shift from a primarily carbohydrate burning metabolism to a fat burning one. This involves an activation of the enzymes and mechanisms involved in lipolysis, beta-oxidation of fats, ketone utilization by the CNS and other tissues, and gluconeogenesis.

STARVING YOURSELF IS COUNTER-PRODUCTIVE

The effects of cutting calories too much exaggerates fatigue and other symptoms that may be blamed on the Metabolic Shift.

If you're having trouble determining if you're at the initial 40% minimum fat level (the level of fat in the usual North American diet), focus your diet on meat dishes. This should insure that you're getting enough fat. Above all, the most important thing in the early days of the diet is to determine if you can make the "metabolic shift" to become a fat-burning machine. Don't do anything fancy until you've gone through the shift.

To insure that you go through the "metabolic shift" as quickly and efficiently as possible, do not carb load during the first weekend. If you can, continue the higher fat/low carb phase during that time.

Let me repeat this because it is important. I want you to begin the higher fat/low carb phase of the diet on a Monday. Then continue that phase, if you can, all the way through the first weekend and second week. On the second Saturday following the beginning of the diet, you'll do your first carb loading. By beginning the diet with 12 days of high fat/low carb consumption, the metabolic shift will occur quickly, and with certainty, in those who are or can become efficient fat oxidizers.

Hypothetically, some dieters may decide to begin the diet on Wednesday and then immediately begin carb loading two days later. This isn't nearly enough time to make the metabolic shift. Do not do it.

If you go the first 12 days on the higher fat/low carb cycle before performing a carbohydrate load, you'll be fine. It may be a little difficult, but it will get the job done. Doing it this way will ensure that the Assessment Phase accurately assesses whether or not you can function efficiently on dramatically reduced carbs.

However, if you find that going the 12 days is a bit too rough, then shorten it to as little as five days. A recent study has shown that 5 days is enough for most people to fat adapt.[43] The authors of the study concluded that "5 days of exposure to a high-fat, low-CHO diet caused clear changes in fuel substrate utilization during submaximal exercise and that this fat adaptation persisted through a full day carbohydrate load. At least some of these changes were independent of CHO availability because enhanced capacity for fat oxidation persisted despite restoration of muscle glycogen stores." A follow-up study by the same center confirmed the effects of a high-fat diet and CHO restoration on metabolism.[44] So going 5 days isn't all that bad as long as you stay steady on the 5 day, 2 day shift for at least a month.

FAT ADAPTATION

THE CRUX OF THE METABOLIC DIET

➲ A study shows that fat adaptation occurs after five days of being on the Metabolic Diet and persists during one day of carbing up.

Burke L. et al. Effect of fat adaptation and carbohydrate restoration on metabolism and performance during prolonged cycling. J Appl Physiol 89; 2413-2421.

How and When to Increase Dietary Carbohydrates

I've found it usually takes about three to four weeks on the phase shift part of the Metabolic Diet to see if we can survive and thrive on this low level of dietary carbs or if we need more carbs throughout or just at one time or another. However, for the sake of assessing whether or not the strict Metabolic Diet suits you I decided to do it 2 weeks at a time. If, after the first two weeks you feel okay, then you merely carry on with the 5+ days at 30 grams and 1-2 days in the higher carb phase.

If you're mildly to moderately tired and otherwise affected then you go through another 2 week assessment phase to see if things even out. If you're severely affected then you go on to one of the variation diets where you selectively take in more carbs depending on when you're feeling punk.

If you feel good from Saturday to Wednesday and start to get tired and generally unwell by Thursday, then a Wednesday carb-spike day should work well for you. So on Wednesday you should increase your carbs to at least 100 grams and usually more. You might try incorporating between 0.5 to 1 gram per pound of bodyweight of carbohydrates and see how you respond.

If you're okay most of the time but just don't have enough energy for your workouts, then you might try taking in around 50 to 100 grams of carbs after your training. You can vary the amount of carbs you use after exercise by using anywhere from 10 to 150 grams and see what works for you. The type of carbohydrate you use also makes a difference in this case. For various reasons I've found that the use of a combination of high glycemic and low glycemic carbs works best.

One word of caution: don't take any carbs prior to working out. That's because carbs at that time will decrease GH and IGF-1 production and effect, increase insulin and decrease the use of bodyfat as a primary energy source during training. The ideal pre-workout supplement is my Resolve (see below), which has no carbs but is meant, among several other things, to selectively increase growth hormone and insulin simultaneously to maximize their synergistic anabolic effects while minimizing insulin adverse effects on lipolysis and free fatty acid oxidation.

If you're tired and feel bad for most of the low carb weekdays then you can try and double the carb intake to 60 grams per day on the weekdays to see if this helps. If that doesn't help, then increase the carb intake by 30 grams per day once a week for as many weeks as it takes for you to feel normal and function optimally.

Most people who have to increase their daily carbs usually level off between 100 and 200 grams per day. I've found that about one-half to one gram of dietary carbs per pound of bodyweight per day is the norm in those who are relatively poor fat oxidizers. In a small number of cases it may be necessary to work up to as much as 3 grams of carbs per pound of body weight, depending on the individual and the activity that he or she is involved in.

When you have to increase the level of carbs in your diet it will take a while before you discover what your carb set point is (see Problem-Solving Guide). I've found that it takes people about two months on the average to find their ideal dietary carb level. Once you discover your Metabolic Set Point, you can fix your diet at that level for several months while you work on changing your body composition.

Varying Your Daily Calories

Some people find it difficult to stick to a daily calorie limit but may find it easier to work on a weekly calorie limit so that, on some days they can take in more calories while on others they can take in less. If you're strict about your weekly calorie intake there's no reason to count calories on a weekly rather than a daily level. In fact some powerlifters find that they make even better progress by keeping the body guessing rather than having it adapt to fixed daily calorie intake.

VARYING CALORIES

- Work on weekly calorie intake and vary carbs every other day, or every third day, or whatever suits you.
- For example, total weekday calories is set at 3,000 x 5 = 15,000 calories. You can take 2,000 one day, 3,000 next, 5,000 next, 2,000 next and then on the last weekday take in remaining 3,000.

Problem-Solving Guide

Steps to take to determine your carbohydrate set point – the ideal level of dietary carbs for your body.

By following this short guide you can determine just how much and when to take the carbs your body needs to function optimally.

If you're feeling fine:

1. I'm starting on a 2-Week Assessment Phase of the Strict Metabolic Diet to see how well I do on the 30g Carb Weekday, 150g+ Carb Weekends.
2. I've been following the 30g Carb Weekday, 150g+ Carb Weekends for 2 weeks now and I'm doing well. What do I do now?

   ➔ You're an efficient fat burner and your system has made the shift successfully. At this point you can start with the weekly 5 day 2 day phase shifts, limiting your carbs during the week and then increasing your carbs over 1 to 2 days of the weekend.

If you are feeling tired:

I'm feeling tired and I need some help with the carbohydrate part of my diet.

1. I only have low to moderate tiredness at this time so I will do another 2-week Assessment Phase to see how well I do?

   ➔ Yes. Carry on with another assessment phase. In most cases this extra 12 days usually results in a success on the diet and a disappearance of the tiredness. Make sure that you're taking my **MVM**, a multiple vitamin and mineral formula, and then some, that I formulated specifically for those on the Metabolic Diet. Taking MVM will eliminate some of the causes of tiredness that are not due to a difficulty switching from a carb based metabolism to a fat based one.

2. I'm still tired after the second 2-week assessment phase. What do I do now?

   ➔ The next step is to determine when you're tired and increase your carb intake appropriately.

3. I'm tired all the time.

- ➔ Increase your daily carb intake by 30 grams per day until the tiredness disappears. Once you've reached a level of carbs that works for you try to slowly cut back on the daily carbs until the tiredness returns. Then increase the carbs up slightly until you feel normal.

4. I have 'Mid-Late Week' tiredness that makes it difficult for me to do a good workout on Thursday and Friday. What do I need to do?

   - ➔ Try a 'Mid-Week Carb Spike' of an additional 120g+ of carbs just on Wednesday evening and see how well you do.

5. I did the 'Mid-Week Carb Spike' and/or increased my daily carbs so I'm not tired normally but I still lack energy during training?

   - ➔ You need to take from 30 up to 100g of carbs half an hour after training, as part of your post training nutrition, to combat this lack of energy on training days. This should increase your muscle glycogen levels for subsequent training days and give you all the energy you need to train. Don't take carbs prior to training as this will increase insulin levels and decrease fat burning and GH release.

6. I tried increasing my carb intake after training but I'm still lacking energy during training, so what can I do?

   - ➔ Increase your daily carbohydrate intake by 30 grams a day until the tiredness disappears.

TROUBLE SHOOTING GUIDE AND EXPERIMENTING WITH FOODS

Increasing carbs:

- ➲ Increase daily carb intake by 30 grams or more at a time.
- ➲ Midweek Carb Spike—a few hours to all day.
- ➲ Carbs added after training. Spike in muscle glycogen, intramuscular fatty acids and protein synthesis.

What to Eat

I'll provide some information on what to eat in this book but for more specifics, and especially for over 175 pages of information on foods, including various tables, comprehensive calorie, protein, carb and fat charts, and extensive example diets at every calorie level you'll need to get a copy of the more than 500 page Metabolic

Diet. Some of this information is also available on my site www.MetabolicDiet.com. For example, the two-week sample diets can be found at this address: http://www.metabolicdiet.com/mdiet_index.htm.

WHAT TO EAT

- **Weekdays**—Any high protein, low carb foods—meats, fish, eggs, cheeses, low carb vegetables—most except big beans, corn, carrots, peas.
- **Fiber in all forms**—both soluble and insoluble.
- **Weekends**—Almost anything goes. Time limited. Go back to the low carb phase as soon as you start smoothing out.

During the weekdays, there are plenty of options for high fat/high protein/low carb foods available. Virtually any meat is okay, and most of you will focus on steak, hamburger, pork and other red meats on the diet. In addition, venison, fish (of great importance as you will see later), lamb, shrimp, lobster, chicken, turkey, and other white meats are also okay. So are canned sardines, tuna, shrimp, herring and anchovies.

Almost any kind of cheese is fair game as well. Use the full fat and non-skimmed milk varieties. Keep in mind that cheese spreads, cottage and ricotta cheese are higher in carbohydrates. Brie, Camembert, Muenster, Gruyere and Monterey jack are very low in carbs and good for the diet.

Whole eggs are great. Deviled eggs can be a good snack food to keep in the refrigerator to use. Butter and poly- and monounsaturated oils are fine (subject to certain restrictions outlined below). Nuts and seeds like walnuts and sunflower seeds are also good, but keep track of the carbs. So are condiments such as salt, vinegar, oil, and mayonnaise, although we urge you to use oil (especially olive oil) and vinegar dressing most of the time. Most other commercial salad dressings are in the vicinity of 7 percent carbohydrates.

Sugar is going to be a problem for people with a sweet tooth. You can end up craving it, especially during the assessment phase of the diet. Look to appease any cravings along this line with low carb drinks and desserts with artificial sweeteners. However, avoid sorbitol and fructose—remember sugar free doesn't necessarily mean carb free. Be sure and check the labels. Diet soft drinks are fine.

You can also put sugar free Jell-O™ (no carbs, uses artificial sweetener) to good use. Topping it with carb-free whipped cream may be just what you're looking for to gain

control. It has no carbs and many people on the Metabolic Diet have found it quite successful in appeasing any cravings. Just be sure to check the labels on whipping cream containers to make sure carbs haven't been added.

Another factor to consider is that, even if you have cravings, you're only putting off satisfying them until the weekend. You can eat basically anything then. We're just partitioning or separating foods here. We're not saying you can't have lasagna; you just have to wait for the weekend. That's a lot better than other diets where you're basically stranded on Low-Fat Island or, in some cases, Low-Carb Island for the rest of your life.

This can also work for you psychologically. Foods you love can give you a goal. Just get to the weekend and you can have that slice of apple pie. You're giving yourself something to look forward to and it can even be fun. This doesn't present the kind of depression and boredom you get eating the same thing over and over, week after week, month after month. You don't have to come up with an elaborate set of recipes to keep yourself sane.

When you get to the weekend, do what you want! Fill up the tank on the foods you want. Satisfy those cravings. Some people will go overboard at the beginning of the diet and eat until they're nearly sick. Most will overdo it to some degree, but this is fine. It gets easier as you go.

Once they've been on the diet awhile, most people won't have that strong desire for ice cream or onion rings anymore. They'll eat them but they won't pig out and, as they start adjusting their diets and dialing them in for maximum progress, they'll begin to see some real improvement and acquire some real knowledge about the way their body works and how adjustments can be made to achieve their goals.

The Metabolic Diet can also be adjusted depending on special circumstances, for example the changes you can make if your serum cholesterol is not where it should be. (See section above on Your Cholesterol.)

Here Are Just A Few Of The High Fat/Low Carb Weekday Foods You Can Eat On the Metabolic Diet

➲ Steak	➲ Hamburger	➲ Sausage	➲ Venison
➲ Salmon	➲ Lamb	➲ Shrimp	➲ Lobster
➲ Chicken	➲ Turkey	➲ Tuna	➲ Herring
➲ Anchovies	➲ Cheese*	➲ Eggs	➲ Butter
➲ Oils**	➲ Walnuts	➲ Pot Roast	➲ Pastrami
➲ Bacon	➲ Mayonnaise	➲ Salt	➲ Diet Soda
➲ Jell-O™***	➲ Hamburger	➲ Sunflower Seeds	

* **Full Fat/Low-Carb**
** **Poly and monounsaturated fats such as is found in nuts, olive oil, flax seed oil**
*** **Sugar-free**

KEYS TO EARLY DIET SUCCESS

1. Do not worry about calories.
2. Take a fiber supplement.
3. Watch for hidden carbs.
4. Do not mix diets.
5. The first week is the toughest—Stick it out.

When to Eat Your Carbs

WHEN TO EAT YOUR CARBS

- ➲ Can be flexible.
- ➲ Throughout the day in form of low glycemic vegetables.
- ➲ At one time as a reward.
- ➲ After training.

A real question that comes into play on the higher fat/low carb portion of the Metabolic Diet is when to eat your carbs during the day. Some people spread them

out, others get most of them in one meal. Again, the answer has to do with personal preference. You can eat your carbs at any time of day and it won't matter, as long as you don't go above the 30-gram carb limit.

Some people find eating their carbs throughout the day makes them hungrier and lazier. They'll feel sluggish. They get that "turkey dinner syndrome" where they finish and all they feel like doing is laying on the couch. This isn't good, especially for a busy person who needs to feel motivated and energized during the day.

Many people believe that our eating patterns have become counterproductive in modern society. The average American eats a lot of carbs during the day and the insulin and serotonin responses mentioned earlier can become very pronounced. At times of the day when you need to be productive and alert, in the early afternoon for instance, you will be sleepy and lethargic from all those carbs and the resulting hormone and neurotransmitter rush.

For those people it would be better to save the carbs for later in the day. That's what a lot of people do on the Metabolic Diet. They'll keep the carbs minimum during the day and find their energy levels much increased as a result. Then they'll come home at night and have the bulk of their carbs with dinner. The carbs at dinner will find them unwinding in the evening hours, relaxing and sleeping like a baby at night.

It's interesting to note that one of the trends in business today is toward a more streamlined lunch. Those huge, three-martini lunches are no longer the norm. Executives and employees are eating and drinking more sensibly in the middle of the day and finding productivity rising as a result. This comes not only from time saved at lunch but also from the improved attitude that comes with getting rid of all those carbs and alcohol at noon.

Another good time to take your carbs is after exercising. For a few hours after exercise there is a window of opportunity when hormonal factors are just right for rebuilding muscle. Taking carbohydrates during this time period spikes insulin levels and increases protein synthesis, thus maximizing the effects exercise has on strengthening and toning your body.

A few carboholics who are on my diet reserve their carbs for the evening. They eat almost no carbs during the day so they can have their 30 or so grams at night in the form of ice cream or a chocolate bar. That's okay as long as you don't go over your daily carb quota.

Experiment

EXPERIMENT

- The Metabolic Diet is all about adjusting the diet to suit your metabolism.
- As such, experimenting to see what works best for you is the cornerstone of the Metabolic Diet.
  - Can do it on a weekly basis so that each week can be a learning experience
  - Vary protein, fat and carbs and the times you take them.

Personal experience and individual body chemistry will have a great deal to do with how you structure the diet. Different people will have differing responses to the carb-loading portion of the diet. The length of that carb-loading period may vary greatly as a result.

The 30 gram carbohydrate limit is also not written in stone. It serves as a good guide and should be adhered to when beginning the diet, but some people may find that they can later increase carb intake to as high as 50 grams per day and still do fine. Others may find that anything over 20 will make them feel sluggish. I've also found that people on the higher calorie diets, mainly seen in the Mass phase, can take in a little over 30 grams and still be okay and we've accounted for this in the higher calorie sample diets. Once you've made the "metabolic shift" and made the diet a part of your life, you can experiment to find what works best for you.
Fat levels may also be experimented with to some degree. Some may find optimum results going as low as 30 percent fat on the diet, but you must beware. You can't go too low, especially at first when your body is going through the shift from utilizing fats instead of carbs as its primary fuel.

Taking in a lot of protein helps, but not without the fat. Without enough dietary fat, even if you're limiting your carb intake, your body won't "learn" how to use fat as a primary fuel. Your body will basically say, "I'm not going to get rid of this stuff because I may need it later." Limit fat in your diet and your body wants to lay it on as a way of keeping it around. You end up cutting dietary fat but adding bodyfat.[45] A powerlifter recently told me that he tried to make the shift to burning bodyfat as the main fuel (one of the goals behind the Metabolic Diet) by going on a high protein low-carb, low-fat diet, basically an all protein diet. He began doing the egg whites, boiled chicken breasts and canned tuna in water routine, but with no carbs, and, while he ended up losing fat, his body shriveled up. He looked awful.

The fact is that your body needs the fat to adjust to burning fat while at the same time sparing muscle. Increasing dietary fat intake will increase your body's use of both

dietary and bodyfat as a primary fuel by increasing the levels of enzymes needed for increased fat breakdown and decreasing the enzymes involved in storing bodyfat. The bottom line is that you're basically losing bodyfat by increasing the fat in your diet.

So don't worry too much about your overall fat percentages because they usually will take care of themselves unless you mistakenly, at least at first, try to limit your fat intake. Of course you can make some adjustments depending on how you're responding to the diet, but be careful. Remember, if you don't give the body enough fat you won't make the shift to a fat-based metabolism and your body will lose its shape, which is exactly what you don't want.

This may sound like nonsense, but it's not. Give the bodyfat and it will use that fat and burn off bodyfat. When you're fat adapted the body is into metabolizing fat as a primary fuel so that even if you cut back on dietary fat, your body will still burn fat and spare muscle, only this time it will get the fat it needs from your bodyfat.

One of the good things about this diet is that you don't have to become paranoid and keep elaborate charts to get that proper amount of fat in your diet. In fact, if you're diligent about eating your red meat and other animal food — bacon, ham, steak, burger, fish, etc., and in using olive oil — you shouldn't have to worry about hitting the 40-60% fat and 40—50% protein ratios listed above. It will naturally happen.

Again, it's important to realize that individual experimentation will play a large role in aspects of the Metabolic Diet. The diet should be varied to provide the optimum level of performance and success for the individual. We're all different to some degree according to body chemistry and needs. No two human beings are alike, neither will two human beings implement this diet entirely alike. As you make the diet a part of your daily lifestyle, experiment with it to find the best way to execute the diet for you.

Eating Out

I have a friend who's been on the Metabolic Diet for several years now. Frequently we go out to eat together during the week and he's got the right approach down to a fine art. He looks the waiter in the eye and says "I want a T-bone steak and nothing else!" Most often the waiter will look at him and say, "But you get a baked potato, vegetables, bread . . ." "AND NOTHING ELSE," he breaks in and repeats. Wait staff may have a little difficulty understanding this at first but usually, with repetition, your specific request will sink in.

The fact is that my friend wisely doesn't want the extras on his plate. He doesn't need the temptation. The meat is fine by him. He feels great, sticks to his diet and feels good when he's through. If he eats that potato, bread and coleslaw, he won't. Order what you want regardless of what the waiter says. If he tries to tell you that you're wasting your money, tell him he's wasting his time.

During the week, you should be staying away from those carbohydrate foods so keep them out of sight and out of mind. Leave them off your plate; otherwise, you might be tempted to "sample" them.

On the weekend, everything is different. All that bread, potato and salad are fair game. Depending on how you've got your diet structured, you can order them twice. Just keep them off your plate during the week.

EATING OUT

- Only a problem during weekdays.
- Be specific when ordering so that the waiter doesn't bring carbs to the table to tempt you.
- If it's a problem, don't eat out until you have more control.

Doing it Your Way

Varying Carb Intake

Besides experimenting with different foods and schedules there are various other ways you can fine-tune the diet so that it fits in with your metabolic abilities. While all of us posses the ability to use fat as our primary fuel, some are more able than others are. This is because we all have different genetic capabilities and though some have it in them to be efficient fat burners, some of us don't.

You'll know after the first few weeks if you're among the few who have difficulty adjusting and using fats as a primary fuel. These people tend to have a tougher time making the switch, can feel tired and are easily exhausted by physical activity. It seems that they just run out of gas shortly after their weekend carbup.

That's because they're metabolism prefers carbs to fats and can't seem to make do on the five day, two day shift. During the weekend they carb load and feel okay for

the first few days of the week but when their glycogen reserves are used up they often feel like they've been hit by a truck.

Just because your body prefers carbs and can't operate as well on fats doesn't mean you have to abandon the Metabolic Diet. It just means you have to change the amount and timing of your carb intake so that the maximum amount of fat is burned along with the necessary carbs. If you can find the minimum carb intake that you need to function normally then you can benefit from the Metabolic Diet.

Now let's say you've done the first two months but still don't feel right, even though you're using the right supplements and doing everything right. You may be tired much of the time, especially Wednesday to Friday and your training may be suffering because you've lost the enthusiasm and stamina you once had. It's time to fine-tune your carb intake. You can do this in one of several ways.

Increasing Your Weekday Carb Intake

One way is to gradually increase your daily carb intake (by about 10 grams per day) until you reach a level where your symptoms improve. For most people that level will be somewhere between 50 to 100 grams of carbs per day.

It's just as important to time your carb intake, as it is to increase the amount of carbs you take in. Besides finding the baseline carb level you also have to find the best time to take these carbs. For people who have to raise their carb levels, I find the best time to take the extra carbs is before and after training. For example you might want to take 20 to 30 grams of carbs prior to training, along with the pretraining supplement, and another 20 to 30 grams after training along with your post training meal or meal replacement powder.

On the other hand, you might find that your low point is in the evening after you've worked a long day. In this case a carb spike right after work might be your best bet. Or you just might want to spread out the extra carbs throughout the day. Whatever works best for you keeping in mind that you're looking for the least amount of daily carbs to do the job.

Another important factor here is the kinds of carbs. High glycemic carbs are absorbed very quickly and give rise to a rapid insulin rise. In most cases increasing the lower glycemic carbs by increasing your vegetable intake is the best route to take. For most people doubling or even tripling the carb intake in this way helps them over the low carb hump, and doesn't seem to affect their weight and fat loss while at the same time they don't experience carb cravings. If these same people take in carbs from

other sources, say from dairy products or high glycemic foods, it can stop their weight and fat loss and make them hungry.

For some people, eating higher glycemic carbs may work best prior to and after training. Everybody is different so it's important to experiment with different foods. But be careful; keep an eye on how you look and the progress you're making. If you're losing ground then it's not for you and you have to rethink what you're doing.

The Midweek Carb Spike

Some people may find that what they need is a midweek "carb spike". This replenishes their glycogen stores and holds them over until the weekend. You can do the carb spike in several ways.

One way is to dramatically increase your carb intake for that day by either taking it in all at once (like a pancake and syrup feed) or spread it out over the day, using either high and/or low glycemic foods. One popular way is to take in a mini-carb load lasting an hour on Wednesday morning. During the "carb spike" most people concentrate on loading up with high glycemic foods and take in between 200 to 800, sometimes as many as 1000 calories in that hour. Once you've had your midweek carb feed, you should head right back to low carb land.

For some people, a midweek jolt of carbs can be very productive for those interested in advanced body shaping or building. The increased blood sugar and subsequent insulin spike will increase muscle and liver glycogen dramatically, give you an extra energy "kick", and drive amino acids into muscle cell for increased development. As long as you go right back to the Metabolic Diet, you'll avoid lying on unwanted fat.

In all cases where you increase your carb intake during the week, it's important that you subsequently curb some of your carb intake over the weekend. That way you won't be overdoing your long-term carb intake. For example you might only want to carb load one day over the weekend or even skip the weekend carb up altogether.

Short-term Loading on Weekends

On the weekends you're usually pretty free to take in whatever foods you like. In general you'll be increasing both your calories and carbs without too much worry over what kinds of foods you eat. However, there are some caveats.

For some, two days of carb loading may be too much, especially if you go overboard and eat everything in sight. One of my male patients used to keep his calorie level at

about 2000 calories per day during to weekdays and jump to 10,000 calories per day the weekend. Needless to say we had to curtail his carb overload on the weekends so he could reach his weight and fat loss goals.

Also, some people can get pretty sensitive to carbs and find that after carb loading for one day they don't feel right. They bloat out, feel tired, and just don't function very well. In these cases it's best to carb up for only one day or even part of one day and then get back on the higher fat/low-carb diet. This will make the diet a 6-day low carb, 1-day high carb experience, but if this works for you then it's the way to go. Again, the length of carb loading depends on the individual. The important thing is to experiment with the length of your weekend carb load and learn what works best for you.

Eating foods very high in glycemic value with less fat will generally lead to a shorter, more intense carb load. You'll almost certainly start to lose tone and retain water sooner, often before the 24-hour mark. By using lower glycemic carbs, or combining foods (such as pasta mixed in with protein and fat), you'll take longer to load. You may want to experiment with both of these approaches to see what works best.

Keep in mind that it's important to document aspects of the diet and their effects on your body. It may be inconvenient or even painful, but if you're interested in getting the most out of your efforts, you've got to chart your progress and the ways you respond to changes in the diet. Make notes to yourself on when you begin to smooth out during the weekend, what you were eating, how many calories you were eating, and any other essential information.

Keeping your own diet log will give you a record of what you've done and give you added confidence with the moves you make in training and diet. This is the way you'll really dial in the time when you look best and how to get that look. You may back off on the documentation after being on the diet for some time and becoming familiar with it, but you'll still want to make at least weekly notes on your findings as you proceed.

Long-term Loading on Weekends

Some people will cheat in the other direction on this diet and they'll pay for it. They get to Thursday and then suddenly decide they're going to start their carb load on Friday. They continue it on through Sunday and, guess what? Their body shifts back to a carbohydrate metabolism. Three days is too much. At that point, you're running a risk of losing the fat burning advantage this diet gives you. Long-term carb loading is not a good idea.

But the higher fat/low-carb diet is forgiving. If you're at a birthday party in the middle of the week and don't want to be anti-social, you can have that piece of cake. Likewise, business or social conditions may warrant a high carb meal during the week on occasion. Don't worry about it. As long as you get right back on the higher fat/low-carb diet you won't find your body shifting back. After you've been on the diet for a while it will usually take at least three days of continuous carbs for the metabolism to shift back.

In fact, the longer you're on the Metabolic Diet, the more time it seems to take to go back to a carbohydrate metabolism. For those who have been on the diet for years, it may eventually become as difficult to make the switch back to burning glucose for energy, as it was to go through the metabolic shift to become a fat-burner.

The Metabolic Diet suppresses the glycolytic pathway used by the body when carbs are the primary energy source. At the same time, the lipolytic (fat burning) pathway is activated. The longer you are on the diet, the more carbohydrate loading it seems to require to activate the glycolytic pathway fully again. Even if you go out on the road and you're forced to change diets for a week, you can generally return to the diet without going through another metabolic shift if you've become a Metabolic Diet veteran.

The Metabolic Diet may even be accident-proof. One Metabolic dieter who'd been on the diet for several months began limiting most of his carbohydrate consumption to a bowl of ice cream at the end of the day. Several months later he suddenly took a close look at the package and found he was eating double the carbs he thought he was. Yet he never spilled back over to the glucose metabolism. It seems that, through the suppression of the glycolytic enzyme, his body had set a new level of tolerance for carbohydrates.

Not that we suggest you double your carb intake during the weekdays. This is just to say that the Metabolic Diet doesn't make you pay dearly for any mistake. After shifting over on the diet, it will generally take a minimum of 3 days of carbs to do serious metabolic damage.

Varying Calories

Many powerlifters have found that if they do the same workout every day, their body becomes used to it and no longer respond. They don't get stronger. They plateau. You may eventually find this to be true in your own exercise program.

It's the same with the Metabolic Diet. If you eat the same exact amount of calories every day, you may eventually start to lose the effect of the diet. That's why you

should try to do some varying of calories on a day-to-day basis. Stairstep them. If 2000 calories a day is your goal, try taking 3000 calories one day, 1000 the next, 2500 the day after that and so forth. Count your calories on a weekly basis instead of daily. Be unpredictable. Don't let your body get used to the same caloric intake daily. By doing this you keep the body guessing so that it doesn't make some adverse hormonal changes, or drop the basal metabolic rate (BMR) to accommodate the drop in calories.

STAIRSTEPPING – 3,000 CALORIE DIET

➲ Monday	3,500 Calories
➲ Tuesday	2,000 Calories
➲ Wednesday	3,000 Calories
➲ Thursday	4,000 Calories
➲ Friday	2,500 Calories
Total	**15,000 Calories(3,000/day)**

You can also vary those calories on the weekend. A good rule of thumb at the beginning is to increase calories no more than 25 percent over your weekday allotment but, once experienced with the diet, you're on your own. However, you do have to be careful. If you take in a lot of calories, especially the high glycemic variety, you may find yourself laying down fat very quickly.

Extreme Variance

Some have tried extreme increases in calories during the weekend and experienced success. Those dieters who want to maximize lean body mass and lose bodyfat rather than lose weight mainly use this method. They get to Saturday and intuitively sense that it's time to shake their metabolism loose. They'll take in up to 10,000 calories on Saturday, maybe cut it in half on Sunday, and experience a huge insulin spike. They'll get a big effect as far as bodyshaping but, because they go right back on the higher fat/low-carb diet on Monday, insulin will be limited before it begins to encourage much laying down of fat.

The dieter may end up gaining up to 10 pounds or so from the extra sugar and water, but the high fat/low-carb diet will find him dropping the water weight quickly as the week progresses. By Friday, he'll have increased weight to a strategic degree but won't have overdone it, and the increase will be maximum muscle and minimum fat.

Low Protein Weekends

After being on the diet for a while, you may want to begin treating the weekends as a high carb/higher fat exercise while paying less attention to protein. Some people who have been on the diet for an extended period have found that a weekend diet of around 40-45 percent fat, 50-55 percent carbs and only 7-10 percent protein can produce excellent results.

The added fat aids in slowing the release of glucose in the blood, thus avoiding sugar rushes or crashes that can leave you feeling spent and irritable. By using lower glycemic foods with increased dietary fat, you'll also be able to extend the length of your carb load and not feel the puffiness and bloating that should signal its end. As for the protein, you're getting enough during the week to get through the weekend with no problems.

As well, studies have shown that protein utilization after relative protein restriction rebounds to higher levels than was present prior to the restriction. Studies have also shown that in times of protein depletion, the body likely conserves muscle protein and increases the burning of fat stores for energy. This adaptation is usually lost when bodyfat stores near exhaustion.[46]

In summary the weekend protein break won't have any adverse consequences on your attempts to build a more muscular body, and may in fact enhance the process of fat loss.

Follow That Instinctive Voice

If you are on a minimal calorie diet, you have got to listen to that instinctive voice in your body and do what it tells you to do. If it says eat, eat. As minimal as your caloric intake may be, you are trying to manage it, not starve yourself.

This is another area where the higher fat/low-carb diet has an advantage over the competition. On the high-carb diet, if you are in a negative calorie intake situation (where your body requires more calories for weight maintenance than you are putting in), you will use up the carbs you are eating for energy very quickly. After that, the primary source for energy will be mostly protein and some fat. On the high-carb diet, you can find yourself losing a lot of muscle tone because of the body raiding protein for energy. Not so with the Metabolic Diet, where there is fat available to burn instead of protein. Protein is thus saved and so is muscle.
Remember, too, that fat is satiating. It delays the onset of hunger and you feel fuller after you eat it. You will also experience fewer cravings when you have made the

metabolic shift to being a "fat burner". These characteristics can be most helpful in a situation where you are burning more calories than you are taking in.

KEYS TO SUCCESS ON THE METABOLIC DIET

- Don't seek a weight loss at the beginning.
- Caloric intake will vary between individuals.
- Try to lose 1.5 – 2 pounds weekly.
- Keep track of inches as well as pounds.
- Use calipers to measure bodyfat.
- Weigh/measure no more than once weekly.
- Don't pick an ideal weight.
- Goals are 18 percent bodyfat for women/10 percent for men.
- Rely on the mirror more than the scales.
- Don't change your lifestyle or habits once you reach your target weight.
- Experiment with caloric intake to find a proper maintenance level.
- Experiment with foods.

CHAPTER FIVE

Good and Bad Fats

Using Your Head

Before we get into the specifics of how best to mentally approach the Metabolic Diet, you'll need to become better acquainted with its basics. Only by "using your head" to intelligently choose foods and keep yourself motivated and committed will you achieve the most progress and success.

One key to your success will be in understanding the difference between "good fats" and "bad fats", maximizing the former, minimizing the latter and eating the different kinds of fat in the proper proportions. While some of the information in this chapter may be somewhat technical, the recommendations and applications will be easy to understand and apply.

What Are Fats?

For many years, most diet gurus have been preaching the ills of dietary fat. The fact is that dietary fat is essential for good health. They are necessary for the proper absorption, transportation and function of the fat-soluble vitamins A, D, E, and K. Lipids (a general term for all types of fats) are used by the body to produce hormones and other substances than can aid good health and protect against degenerative diseases. They're also an excellent energy source, much superior to the fruits, vegetables and other carbs the experts keep hailing at the expense of other foods.

Components of lipids known as "essential fatty acids" (EFAs) are necessary building blocks for all cell membranes in the body. They also make up many of the more intricate structures inside the cells. The retina (which turns light into nerve impulses in the eye) and nerve synapses (which join the body's individual nerve cells) rely on EFAs for structure. These are the types of fat that are essential to life.

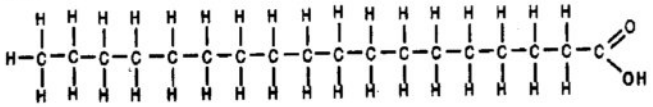
However, there are other fats that can actually destroy good health and lead to serious problems down the road. To understand the difference between these "good

fats" and "bad fats" we need to look at the basic chemical structure of fats to see how they vary.

Fats and oils (an animal or plant fat that is liquid at room temperature) are made up of a number of repeating molecular units. One molecule of fat consists of a single molecule of an alcohol called glycerol combined with three molecules of fatty acids. The fatty acids are made up of chains of carbon and hydrogen atoms with a methyl group (3 atoms of hydrogen, one carbon) at one end, chains of carbon and hydrogen atoms in the middle, and a carboxyl group (made up of carbon, oxygen and hydrogen) at the other end. The hydrogen atoms are connected to each carbon atom and their number and position determine the degree of saturation of the fatty acid and its shape.

Saturated Fatty Acid

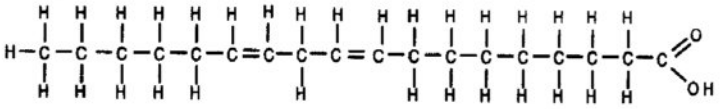
Stearic Acid (SA) [18:0]



Unsaturated Fatty Acid

Linoleic Acid (LA) [18:2w6]
'polyunsaturated'

Essential Fatty Acids

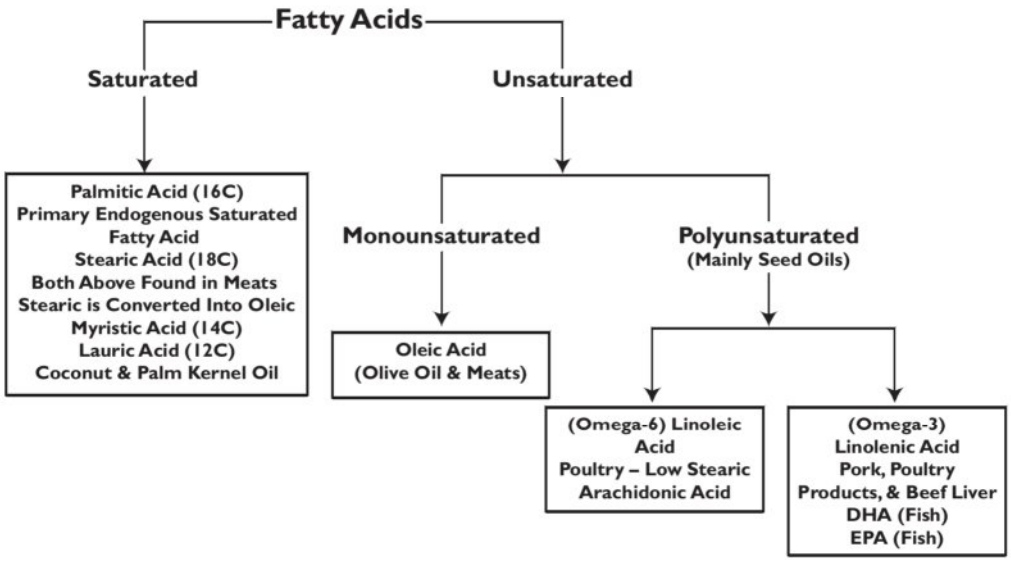


Fatty acids can be classified as either "saturated" or "unsaturated". In the diagrams above, you'll note that the "saturated" fatty acids contain carbon atoms that are linked to two hydrogen atoms. They are thus "saturated" with hydrogen atoms because they are linked to as many hydrogen atoms as possible. The term "saturated fat" refers to the hydrogen atoms attached to the carbon atoms.

In the "unsaturated" diagrams above, you'll note that a double bond joins several of the carbon atoms together. When a double bond is present, each carbon atom will only be attached to a single hydrogen atom. The carbon atoms are no longer connected to the maximum hydrogen atoms and are said to be "unsaturated". A "monounsaturated" fatty acid contains a single incidence of double bonds along its chain. A "polyunsaturated" fatty acid would feature two or more connections along its chain where two carbon atoms are double-bonded.

The hardness of a fat decreases with the increase in its double bonds. As a result, most of the liquid fats like vegetable and fish oils are polyunsaturated. Sometimes food producers will add hydrogen to the double bonds of a chain to make them less unsaturated in a process called "hydrogenation". In this way, vegetable oils can be hardened into shortening for use in cooking.

Common Fatty Acids



GOOD AND BAD FATS – USING YOUR HEAD

- **Good Fats**—EFAs, Fish oil, flax seed oil, GLA (EPO), Olive oil, some saturated fats.
- **Bad Fats**—too much saturated fats, trans fatty acids, MCTs.
- Fat content of foods can be changed.

Good Fats

The two essential fatty acids, linoleic acid (LA) and alpha-linolenic acid (LNA) (also called omega fats), are critical to health and must be supplied in a person's diet since the human body can't manufacture them.

Linoleic acid is classified as an omega-6 fatty acid. Omega-6 fatty acids are polyunsaturated fatty acids that have their endmost double bond six carbon atoms away from the CH3 end of a chain. Alpha-linolenic acid is an omega-3 fatty acid. Omega-3s are polyunsaturated fatty acids with their endmost double bond three carbon atoms from the CH3 end.

Many people do not get sufficient amounts of EFAs in their diets. Getting enough LNA seems to be more of a problem. This of course can cause health problems because these EFAs are necessary for growth, the integrity of cell membranes and the synthesis of important hormone-like substances called eicosanoids.
Now this is where we have to get very technical. But bear with me; the end result of this discussion will be easy to understand recommendations that will improve your health and the effectiveness of the Metabolic Diet.

The Eicosanoids: Piecing Together the Puzzle

Eicosanoids are physiologically active metabolites of EFAs with important effects on the immune, cardiovascular and central nervous system. Amongst these are prostaglandins and arachidonic acid, from which the eicosanoids are synthesized.

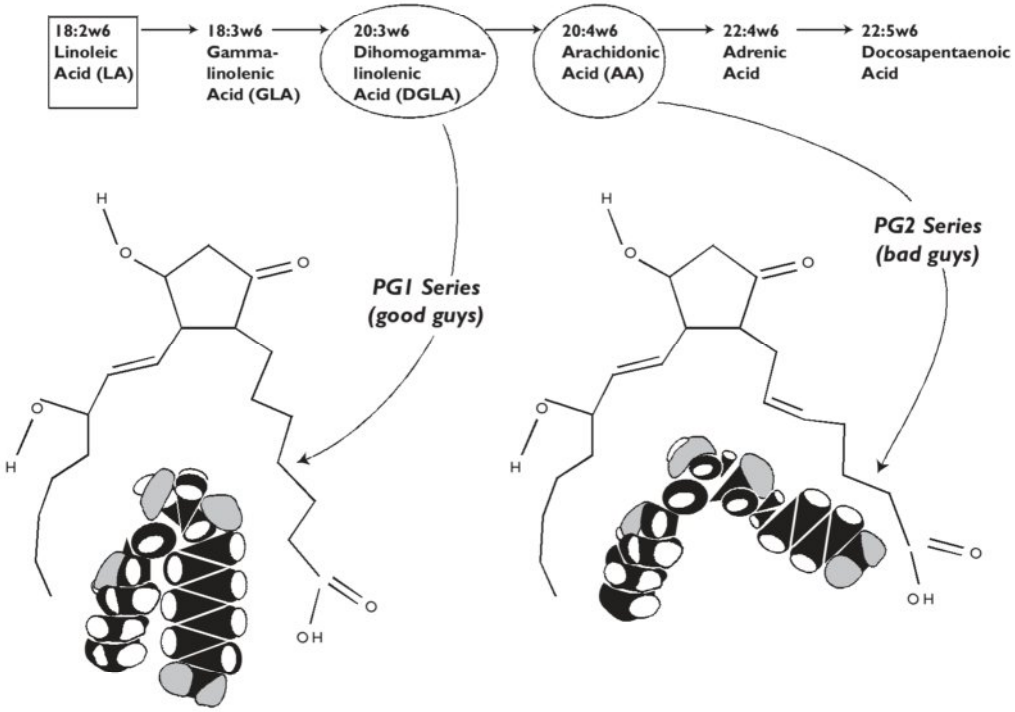
Eicosanoids act locally in and around the tissues in which they are produced. Virtually all cells in the body can form some of the eicosanoids, but tissues differ in enzyme profile and consequently in the products they form. They also differ in their ability to be affected by specific eicosanoids. Eicosanoids are not stored to any degree and must be synthesized in response to immediate need.

While it would be advantageous to be able to direct eicosanoid production so that good eicosanoids would be produced deferentially to bad ones, it is difficult to do so because of the complexity of eicosanoid production, actions and metabolism. Unfortunately, we don't know a lot about the dietary influences that affect the known eicosanoids and thus can make only limited use of any knowledge we do have.

For example, some of the bad eicosanoids, such as PGE2, a series two prostaglandin that increases platelet aggregation and inflammation and has adverse effects on the cardiovascular system, are derived from arachidonic acid. We could thus reason that by inhibiting the enzyme that catalyzes the synthesis of arachidonic acid, less PGE2 would be formed. As well, more metabolites would be present for forming some of the good eicosanoids, such as PGE1, a series one prostaglandin that has several favorable effects on blood clotting, inflammation, and the cardiovascular system.

We know that various factors such as eicosapentaenoic acid, glucagon and even cholesterol and alcohol can inhibit the formation of arachidonic acid or the formation of

From "Fats that Heal Fats that Kill" by Udo Erasmus, alive books Vancouver



PGE2 from arachidonic acid. However, utilizing this knowledge to manipulate the eicosanoids is difficult since we really need more information on the complex ways these compounds are formed, act, and are metabolized. Although we could possibly formulate a working game plan, it wouldn't be written in stone and has to be validated by ongoing research.

For example, prostaglandins can be both good and bad. Unfortunately, it is difficult to stimulate the good ones and not the bad ones. If we decrease the formation of prostaglandins from arachidonic acid we inhibit the formation of both good and bad prostaglandins. Of more relevance for dieters, it is not possible to differentially stimulate the production of PGI2, which has a lipolytic action, from PGE2, which has an antilipolytic action. Both prostaglandins belong to the series 2 prostaglandins and are formed from arachidonic acid.

At present, some treatment strategies using EFAs have tentatively been formulated to try and take advantage of the good eicosanoids. For example, omega-3 fatty acids found in fish oils can decrease production of some arachidonate metabolites and increase levels of certain prostaglandins. Feeding of these fatty acids has been used as a therapeutic strategy to diminish platelet aggregation.

Confused? So are most people, especially since all the pieces to the puzzle haven't all been uncovered. The gist of trying to modify your intake of the omega-6 and omega-3 fatty acids is that we can, by the use of a special diet, direct the flow of linoleic acid to the good eicosanoids instead of the bad eicosanoids. This may be done by increasing the transformation of linoleic acid to gamma-linolenic acid (GLA) and/or supplementing GLA by using GLA-rich oils, and directing the formation of the good eicosanoids instead of arachidonic acid.

There are many factors that can inhibit the enzyme delta-6-desaturase, the enzyme responsible for the conversion of LA to GLA. These factors include LNA (the other essential fatty acid), trans fatty acids (see below), stress and viral infections. By limiting these factors, more GLA can be naturally formed from dietary LA.

As well, there are many factors that can inhibit the delta-5-desaturase enzyme, the one responsible for the formation of arachidonic acid (AA) from dihomo-gamma-linolenic acid (DGLA). These factors include glucagon and EPA. Insulin increases the formation of arachidonic acid from DGLA and thus increases the formation of the bad eicosanoids.

So, in theory, dietary practices can limit the production or transformation of arachidonic acid and encourage the production and transformation of GLA, thus maximizing the production of good eicosanoids over the bad ones. It's difficult because we don't have many pieces of the puzzle to say if this is true. If further substantiated by research, this way of altering eicosanoid synthesis though changes in our intake of EFAs may well be one of the few coordinated practical uses of the complex scientific information on the eicosanoids. While we may not know for sure if what we're doing accomplishes the changes we'd like to see, we can make certain dietary recommendations that fit in to the available research.

In the Metabolic Diet, I discourage excess carbohydrate consumption and encourage the use of good fats in the diet, including the use of fish and fish oils and sources of GLA such as evening primrose and borage seed oils. At present, this is the best we can do is to make sure that enough and the right proportion of the EFAs and other members of the omega-6 and omega-3 fatty acids are present in the diet.

The omega-3s like LNA and eicosapentaenoic and docosahexaenoic acids (known as EPA and DHA respectively) are critical to anyone concerned with dieting. They increase fatty acid oxidation (burning of fat), basal metabolic rates, and lower cholesterol. Omega-3 fatty acids also provide an anabolic effect by increasing the binding of IGF-1 to skeletal muscle and improving insulin sensitivity, even on diets high in fat which have a tendency to decrease insulin sensitivity.[47] As well, fish oils may also have important implications for women prone to osteoporosis since they appear to decrease calcium excretion.[48]

Omega-3s also stimulate prostaglandin production. Prostaglandins are eicosanoids that regulate activity in body cells on a moment-to-moment basis and are involved in critical functions like blood pressure regulation, insulin sensitivity, immune system and anti-inflammatory responses. They're also involved in literally hundreds of other functions, many of which have yet to be fully identified in research. If you have a problem producing prostaglandins or experience an imbalance between the different kinds of prostaglandins, overall health can be radically affected.

The series three prostaglandins are formed from EPA. As well, EPA reduces the production of the bad prostaglandins from arachidonic acid. EFA deficiency can lead to high blood pressure, hormonal dysfunction, impaired immune function, coagulation problems, inflammatory changes, dry itchy skin, peripheral edema, and many other conditions.

Conjugated Linoleic Acid

Conjugated linoleic acid (CLA) is a mixture of isomers of linoleic acid, which is found preferentially in meat and dairy products that have undergone heat treatment, such as cheese, milks, and yogurt. Supplementation with four ounces of cheddar cheese daily was found to increase the ratio of CLA to LA by 130%.

CLA has been shown to have properties above and beyond those of linoleic acid. It has shown potential as a powerful anticarcinogen[49,50] and has potent antioxidant activity.[51] Recent studies have suggested that CLA may be toxic to human cancer cells in the body.[52] Of the vast number of naturally occurring substances that have been demonstrated to have anticarcinogenic activity in experimental models, all but a handful of them are of plant origin. CLA is unique because it is present in food from animal sources, and its anticancer efficacy is expressed at concentrations close to human consumption levels.

So now we have a better understanding of the types of dietary fats and their influence on health. We can now discuss the importance of EFAs in the Metabolic Diet.

Essential Fatty Acids and the Metabolic Diet

EFAs can be beneficial even if a deficiency doesn't exist and, if used properly, can increase overall health, help you avoid heart disease and lose bodyfat. Overall, the increased processing of foods in our society has significantly lowered the amount of EFAs in the average diet. Foods rich in EFAs are highly perishable and not deemed practical or profitable for most commercial preparations. The extra EFAs you'll get

from the Metabolic Diet, as explained below, is just one more reason for giving the diet a try.

Earlier in this book we talked briefly about the omega-3s as a positive factor in high-fat diets. They're found to a high degree in fish oils (as EPA and DHA) and have been hailed as a major factor in lowering serum cholesterol levels, preventing coronary heart disease[53,54] and perhaps even preventing or curing atherosclerosis.[55]

Marine oils are a big part of the diets of Eskimo tribes. Though their higher-fat diet would seem to make them prime candidates for heart disease and atherosclerosis, they've been found to be almost immune to cardiovascular problems, at least until Western dietary influences in recent years. Studies have centered on omega-3 fatty acids in the fish oils and their cardioprotective capacities as being central to this phenomenon.[56]

For the person on the Metabolic Diet, where fat and protein are found at high levels, the omega-3s can provide an excellent hedge against worries about cholesterol. Blood pressure, clotting, immune response, insulin resistance, and triglyceride levels are all positively affected.[57] Even in cases where dietary cholesterol is increased, omega-3s may aid in actually lowering serum cholesterol.[58] There is some evidence to suggest that in higher-fat diets aerobic exercise also reduces serum cholesterol[59] and thus may improve the effects of omega-3 rich fish oil on cholesterol.

LNA, EPA, and DHA can also enhance lipolysis (bodyfat breakdown)[60,61] and decrease lipogenesis (bodyfat formation).[62,63] The combined breakdown of stored bodyfat and decrease in additional bodyfat can have very positive results for the dieter. You actually end up making less fat and breaking down more of what's already on the body when using these oils. EPA also decreases some of the possible inflammatory effects of using GLA supplements. That's because GLA can be a precursor for AA and the addition of EPA reduces DGLA conversion to AA, thus reducing AA accumulation in some cells and tissues secondary to GLA supplementation.[64]

That's why I wholeheartedly support adding portions of fish and fish oil to your daily diet. And, while many foods contain more than one type of fatty acid, plant oils are usually richer in unsaturated fatty acid content than animal fat. It's not surprising, then, that flaxseed oil, nuts, seeds, and unprocessed vegetable oil are also rich in essential fatty acids.

That's also why I formulated an advanced EFA formula that contains all the "usual suspects" as well as other important ingredients. EFA+ is a multi purpose formulation designed to provide the full gamut of all the essential fatty acids that are so important in optimizing your metabolism, maximizing the anabolic and fat burning

effects of exercise, and decreasing the counter productive inflammatory response of exercise.

Fats and the Immune System

Besides the beneficial effects we've already discussed, fats can have dramatic effects on the immune system and can be used to treat patients with immune system problems. For example, it is known that the human immunodeficiency virus (HIV), is able to replicate in many human cells such as helper lymphocytes, monocytes/macrophages and glial cells. Monocytes/macrophages must be considered an important reservoir of HIV in the body and producers of cytokines such as interleukin-1 (IL1) and tumor necrosis factor (TNF).

These substances lead to a feedback loop that produces increased virus replication and a secondary production of other cytokines such as interleukin 6 (IL6) and granulocyte-macrophage colony stimulating factor (GM-CSF). These cytokines all together may be responsible for many clinical aspects of the HIV such as headache, fever, anorexia, subtle cognitive changes, and motor dysfunctions.

Omega-3 polyunsaturated fatty acids (omega-3-PUFA) are some of several compounds that can be used to both strengthen the host and attack the virus. Omega-3-PUFAs have been shown to have significant modulating effects on the immune system in both man[65] and animals.[66] Their ability to decrease IL1 and TNF production by monocytes/macrophages and consequently of IL6 and several proteins may have beneficial effects on many clinical manifestations of AIDS.[67]

In the literature there are many confusing associations of dietary fat and immune function. It's well known that low fat diets suppress the immune system partly because of the potentially low levels of dietary essential fatty acids. Conversely, a recent study has shown that high fat intakes do not have any deleterious effects on the immune system of the well-trained runners.

In fact, a new study shows those athletes who train hard and cut back on fat may actually increase their susceptibility to infections and inflammation. Researchers found that long-distance runners who severely restricted their fat intake ended up depressing their immune systems. Runners who ate medium and high-fat diets (composed of 32 and 41 percent fat, respectively) had no immune system problems. Protein was kept at 15 percent no matter which diet the runners were on. An increase or decrease of carbohydrates made up the difference in calories between high and low-fat diets.

The higher-fat diets may lower proinflammatory cytokines, free radicals and hormones and enhance the levels of anti-inflammatory cytokines. Cytokines are messenger molecules that call cells to start or end inflammation at a site in the body. The inflammatory process is the body's response to infection or injury; swelling and pain can result as this tissue-repairing process takes place.

While researchers have shown that moderate exercise appears to enhance the immune system, very high intensity exercise has a negative effect on the immune system. A study investigating the effects of training intensity on the immune system used marathon runners because this sport tends to cause overtraining. As was revealed, the incidence of lingering upper respiratory infections was high in these athletes. I point this out because many athletes who train for a contest, especially powerlifters and athletes competing in sports with weight classes, will select a low fat diet and tend to overtrain in this period. A moderate-fat diet would be a better choice as far as decreasing immune depression.

Bad Fats

There's a very popular misconception that commercial vegetable oils are a good healthy source for essential and non-essential fatty acids. Nothing could be farther from the truth. The fact is that most of those vegetable oils you see on the shelf of your local supermarket including corn, canola and soybean oils, have been hydrogenated or very heavily refined, and are so overly processed that they can be harmful to your health. Processing not only removes any useful properties the oil had such as EFAs or antioxidants, but depending on the processing can cause immune problems and predispose us to certain cancers.

The problem is that the natural poly- and monounsaturated fatty acids are reactive to light and heat and spoil readily. Even natural polyunsaturated fats, because they are unstable and oxidize readily, have been recently shown to have two serious drawbacks. First of all, they seem to promote certain cancers at a dietary concentration of 5% or more.[68] Secondly, while they can lower total cholesterol they can also lower the HDL[69] and thus increase the chances of coronary artery disease.

To make matters worse, polyunsaturated fats are usually treated in an effort to solve some of the problems associated with their commercial use. A process called hydrogenation has been used for decades to change natural oils into fats that are more solid and stable at room temperature, have a longer shelf life and are easier to use in certain foods and baked goods. Hydrogenation involves heating the oil in a vacuum and then forcing hydrogen through it under pressure. The process is continued until the required degree of hydrogenation is achieved.

Unfortunately, while hydrogenation and other methods used to refine or change oils, such as chemical solvents, bleaches and heat may be healthy for business, it isn't for our bodies. Not only do these processes destroy any natural qualities present in the natural oils, they create by-products that can be harmful to our health. Trans fatty acids, crosslinked fatty acid chains, and fragments of fatty acid chains produced secondary to hydrogenation can have significant adverse effects on blood cholesterol and can increase the risk of heart disease. By competing with EFAs these fats lead to EFA deficiencies and subsequently to a host of other health problems including diabetes, cancer, and weight gain.

Trans fatty acids have been the most widely researched of these toxic by-products. Trans fatty acids are found in refined vegetable oils, shortenings, almost all margarines and other oil-based foods, and even in baked and prepared snack foods such as cookies, crackers, and chips. Large quantities of unnatural trans fatty acids are also found as food contaminants during excessive heating of cooking oils for deep-frying and other excessive heat-requiring mass food preparation procedures. They've been found to raise overall cholesterol levels, lower HDL, decrease testosterone and insulin response, adversely affect liver enzyme activity and impair the immune system. They've thus been linked to heart disease, cancer, and other diseases associated with aging.

Much of the problem resides with the fact that the shape of a fatty acid is essential to its proper functioning. While trans fatty acids have the same exact number of carbon and hydrogen atoms as the original fatty acid (known as the "cis-fatty acid"), its shape has been greatly changed. This change in shape, from "cis" fatty acid to "trans", causes competition for existing enzymes. As a result, the cis-fatty acids are unable to carry out their proper biological role.

The amount of trans fatty acids, or other toxic by-products, found in a food varies according to the extent and nature of the processing. Generally, vegetable oil products that are hard at room temperature (like shortening or margarine) are more riddled with trans fatty acids than products that are liquid at room temperature (like vegetable oil).

Recently, several studies have pointed to the adverse health effects of hydrogenated fats and the trans fatty acids in them (especially hard margarines, but even soft margarines are suspect), including an increased incidence of heart problems[70] likely secondary to unfavorable changes in serum lipoprotein[a], a strong risk factor for coronary heart disease.[71]

In addition to the well-recognized roles of EPA, the lack of trans fatty acids in the traditional Eskimo staple diet may also be responsible for their cardiovascular health.

This diet contains cis-forms of the unsaturated fatty acids in physiologically optimal concentrations and is virtually totally devoid of unnatural and potentially hazardous trans and cis isomers of these fatty acids.[72] These differences in the Eskimo diet would likely ensure the synthesis of eicosanoids from dihomo-gamma-linolenic acid, arachidonic acid and eicosapentaenoic acid in balanced, optimal physiological concentrations.

Fats to Avoid

- All Margarines except those with low trans fatty acid content.
- Hydrogenated and partially hydrogenated oil products and foods (check the labels).
- Shortening.
- Old fats and oils of any type.

In summary, bad fats are fats that have been altered by processing and so that they compete with essential fatty acids and thus negatively affect cellular metabolism and structure. There is also some speculation that trans fatty acids may adversely affect insulin sensitivity, decrease fat oxidation and increase fat synthesis. All three of these effects would be counterproductive to anyone on the Metabolic Diet.

Foods containing significant amounts of trans fatty acids usually list hydrogenated or partially hydrogenated products in their listing of ingredients. These foods include baked goods, crackers, candies, almost all fried fast foods, potato chips, and other foods that have or are made with shortening, margarine or refined oils. Keep away from them as much as possible and use the fats recommended below.

Flaxseed Oil

Of the EFAs imbalances, LNA has created the most problems. Linoleic acid deficiency occurs much less frequently than LNA. Thus the diets of most people are much higher in LA than LNA. The excess LA seems to affect the biological action of LNA creating an even greater relative deficiency of LNA. With LNA and the other omega-3s responsible for most of the health benefits of EFAs listed above, this condition becomes even more serious.

One of the best-known sources of LNA (and a good source of LA) available is flaxseed oil (also known as flax oil or linseed oil). Hemp oil, another rich source of LNA (and LA and to a lesser extent GLA) is slowly becoming more available. Flaxseed oil

consists of 45-65 percent LNA, 15 percent LA, and a lesser amount of monounsaturated and saturated fatty acids.

Flaxseed oil can be an excellent source of LNA and I wholeheartedly support the addition of some flaxseed oil to any diet and, especially, the Metabolic Diet. However, there are some conflicting pieces of information that may limit the usefulness of flaxseed oil.

For example a recent study has shown that increasing dietary LNA (such as with the use of flaxseed oil) elevate tissue EPA concentrations in a predictable manner.[73] Now, we know that increased levels of EPA decrease the production of arachidonic acid and its metabolism into bad eicosanoids.[74] However, increased levels of LNA also decrease the production of GLA from LA because it inhibits the delta-6-desaturase enzyme that converts LA to GLA, and thus decreases the formation of certain good prostaglandins.

What can we conclude from all this? Well, it seems that while flaxseed oil is a good supplement to our diets, it shouldn't be overdone. Enough should be used to increase our natural production of EPA but not to decrease the formation of GLA from LA. Thus, as well as some flaxseed oil, I recommend the use of GLA and EPA, as detailed below.

If you use flaxseed oil then make sure it's fresh. Flaxseed oil, like other perishable foods, will spoil or go rancid very quickly. That's why it needs to be refrigerated and used soon after opening. Look in any good health food store or nutritional center and you'll find flaxseed oil in the refrigerated section. If you keep it refrigerated, flaxseed oil will generally last up to six weeks after it is opened.

I usually recommend a minimum of 5 grams of flaxseed oil per day to ensure you get the necessary EFAs. As well as the liquid form, flaxseed oil capsules are available and generally come in doses of 1 gram per capsule. Thus, you can use up to five capsules per day if no other flaxseed oil is used. Fresh unrefined flaxseed oil can also be added to a protein drink or salad (1-3 tablespoons) as a tasty way to supplement LNA.

Evening Primrose Oil and Borage Seed Oil

Both oils are rich in linoleic acid, vitamin E and GLA. Since GLA is a precursor for DGLA, which has been shown to be depleted by steroids, alcohol and other drugs, it has been suggested that GLA therefore provides protection for the liver. DGLA is easily produced from GLA and the use of GLA supplements may lead to the increased production of the good prostaglandins that help fight musculoskeletal inflammation,

decrease cholesterol and fluid retention, and have beneficial effects on several hormones in the body.

Thus GLA may be helpful for several reasons. Evening primrose oil, for example, has been used as treatment for a variety of problems including PMS, chronic fatigue syndrome. and arthritis. Since GLA is important for the production of several prostaglandins used to fight inflammation and muscle soreness in the body, it may be of great use to those involved in an advanced exercise program. If you suffer from any of these conditions you might want to give either oil a try.

In any case, for most of us, it's not a bad idea to supplement our diets with GLA. I usually recommend at least 500 mg of GLA daily. That usually translates to six or more capsules of evening primrose oil or three or more capsules of borage seed oil daily (evening primrose oil usually contains just less than half the amount of GLA as borage seed oil).

Fish and Fish Oils

Fish oils belong to the alpha-linolenic omega-3 series of fatty acids and are rich in eicosapentaenoic acid (EPA) as described above. While the body is able to convert alpha-linolenic acid to the longer chained EPA and DHA, it does so slowly. It makes good health sense to use fish oils since they are rich sources of EPA and DHA.

While increasing fat burning capabilities and lessening the amount of fat on the body, fish oils will also aid in limiting the breakdown of muscle tissue and adding muscle tone for increased body shaping. One of the ways that they do that is by increasing insulin sensitivity or on decreasing insulin resistance especially on high fat diets.[75]

They may also aid in lowering blood cholesterol levels, have vasodilatory effects (widening of the blood vessels), and may be protective[76] and perhaps even therapeutic[77] against certain cancers. EPA also seems to decrease the production of arachidonic acid (AA) from DGLA thus decreasing the production of some of the bad prostaglandins.

Fish oil also seems to have significant anti-inflammatory effects and protective effects on joint cartilage especially in arthritic conditions.[78] EPA and DHA seem to have some similar and independent effects on the body. For example, a recent study has found that DHA, rather than EPA is responsible for the anti-inflammatory effects of fish oil.[79]

The best way to obtain fish oil and thus your complement of these very important omega-3s is to regularly eat fresh fatty fish. For example, 100 grams (3.5 ounces) of

Atlantic salmon has about 1400 milligrams of omega-3 fatty acids (EPA and DHA). Thus a half-pound of Atlantic salmon will give you an excellent daily complement of omega-3s (equal to or more than 10 capsules of fish oil).

Any fish—be it shell, freshwater, ocean or whatever—contains some omega-3 fatty acids. There is evidence, though, that ocean fish is a better source than freshwater fish (except for lake trout) for omega-3s. Fish from the colder northern waters such as the North Atlantic is superior to that caught near the Equator, and shellfish have lesser amounts of the omega-3s than other fish. Of the commonly available fish, the ones that are highest in omega-3s are salmon, herring, sardines, mackerel, and bluefish. I usually recommend that one or all of these fish be eaten at least three to four times a week.

On the other hand, there is no need to jump overboard on fish or fish oil consumption. In one study, researchers observed no significant associations between higher dietary intakes of fish, or the omega-3 fatty acids fish contained, and the risk of coronary artery disease (CAD).[80] Although men who never ate fish seemed to have a slightly higher risk of CAD than men who ate a small amount, increasing fish intake from one to two servings per week to five to six servings per week did not substantially reduce the risk of CAD among men who are initially free of cardiovascular disease.

Although further studies will have to be done to see if the results of this and other studies are valid, a recent review concluded that fish oil likely has beneficial effects on coronary artery disease and myocardial infarction.[81] On the basis of the many studies showing the benefits of fish oil, I recommend that fish or fish oil be used every day if possible or, if not, at least every other day.

If you have problems with eating fish on a regular basis, then I recommend that you use a fish oil supplement such as salmon oil capsules. Generally, I recommend 2,000 milligrams of EPA a day. Fish oil usually contains 20 percent EPA and a lesser amount of DHA so 10 capsules a day of 1,000 milligrams of fish oil should give you the recommended amount. If desired, or if there is a personal or family history of CAD, more fish oil could be consumed, as there appears to be no adverse metabolic effects of long-term fish oil supplementation.[82]

Whatever the amount that you use, be careful to buy fresh fish oil capsules that are in an opaque container. If the capsules are fishy tasting, chances are they're partially rancid and shouldn't be used. Keep the fish oil capsules in the refrigerator and away from light and use them up as soon as possible, at least within a few months of purchase.

Monounsaturated Fats

Monounsaturated fatty acids (oleic acid is the main one that concerns us), are produced by the body and are found in fats of both plant and animal origin. Animal sources of oleic acid are usually found along with saturated fatty acids and include beef, pork, lamb, chicken, turkey, dairy products, eggs, and some fish (like eel and trout). Although the common belief that the fats found in the above foods is all saturated fats, this is not the case. Oleic acid makes up from 20 to 50% of the fats in these foods.

The plant sources include olive, canola (rapeseed), hazelnut, and peanut oils as well as the foods from which these oils are extracted and also almonds, avocados, pistachios, and macadamia nuts. As well many of the foods that contain or are cooked in the above oils have significant levels of oleic acid. This includes fried foods, salad dressings, baked goods and certain soups.

Monounsaturated fatty acids, especially oleic acid, seem to have some advantages over other fatty acids. A significant intake of monounsaturated fatty acids won't increase your risk of heart disease and may even decrease it by their effects on total cholesterol, HDL and LDL.[83] The body also seems to have an easier time metabolically handling oleic acid over the other monounsaturated fatty acids.

Canola oil contains erucic acid that may have some toxic effects. As well, because of its method of extraction, canola oil contains some deformed fatty acids. Studies have also shown that, unlike olive oil use that can decrease total cholesterol and LDL, canola oil has no such effect on blood cholesterol.[84]

For various reasons, olive oil seems to be one of the better fats to consume on the Metabolic Diet, but only certain olive oils are candidates. Like any other oil, any heat, chemical, solvents and other refining process ruins the health effect of olive oil. The best olive oil is the cold-pressed extra virgin olive oils since these oils are extracted by the use of gentle pressure rather than with the use of heat and solvents.

There is a body of epidemiological evidence that points to the health effects of olive oil.[85,86] As well, studies have shown that olive oil decreases atherogenesis.[87] Olive oil seems to be one of the players responsible for the health effects of the Mediterranean Diet,[88] perhaps partly because of the antioxidant effect of the absorbable phenols that are present in olive oil.[89,90] Additionally, very few pesticides and chemicals are needed to grow olives; therefore, you then have a source of fat that seems to have everything going for it. Olive oil is definitely a useful and necessary part of the Metabolic Diet.

Saturated Fats

Many of the foods recommended in the Metabolic Diet, such as red meat, eggs, and cheese and butter contain saturated fats. These fats do have a tendency to raise total serum cholesterol and LDL levels in some individuals, especially those with previous blood cholesterol problems. The increase in total cholesterol is mainly from an increase in LDL although there is also a small increase in HDL.[91]

However, not all saturated fatty acids have an adverse effect on total cholesterol. For example, stearic acid (the main saturated fatty acid found in beef) and medium chain saturated fatty acids have little or no effect on total cholesterol. Recent studies have shown that replacement of carbohydrates with stearic acid (as is done to some extent in the high-fat, low-carb phase of the Metabolic Diet) has little effect on lipid and lipoprotein concentrations in plasma.[92,93] As well, in these studies oleic and linoleic acids had beneficial effects on blood lipids by raising HDL and lowering LDL.

It's important to realize that recent research has shown that it is the oxidized forms of cholesterol and LDL that increase the incidence of cardiovascular disease (CVD) including CAD.[94] Thus, factors that decrease the tendency of LDL to oxidize (such as the use of monosaturated and marine oils) can negate any harmful effects a higher-fat diet may have on CVD.

As well, natural saturated fats do not have the toxic harmful effects seen with the use of trans fatty acids. They are mainly an effective and compact source of energy. Most of us have no real problem with these saturated fats—our bodies know how to deal with them.

Saturated fats are an integral part of the Metabolic Diet. If used properly, natural saturated fats will help you to lose weight and bodyfat. Any adverse effects that they might have on those susceptible to cholesterol problems are usually diminished by the fact that the dietary as well as the body's saturated fats are used as a primary source of energy, and therefore don't have a chance to do any harm. As well, other recommended fats can decrease or eliminate any adverse changes of the Metabolic Diet to total cholesterol, HDL and LDL.

Butter or Margarine?

Lately the marketing of low trans fatty acid margarines has confused the issue of whether you should use margarine or butter, or neither. At the heart of this debate are trans fatty acids, a type of fat found in margarine and many processed and fast foods. At one time, trans fatty acids were thought to be better for you than saturated

fat in butter. But some studies have found that trans fatty acids may be as harmful to your health as saturated fat and possibly worse. So does this mean you should switch back to butter? Most health experts say no. But they do recommend limiting trans fat in your diet.
But when you want to use butter or margarine, which is better? Most health experts say margarine, particularly the tub and squeeze-bottle kinds, which are more liquid. They usually contain less trans fat than do stick margarines. In addition, some manufacturers have developed margarine spreads and sticks that contain no trans fat. As is often the case, the key is moderation.

How Much and What Kind of Fats Do We Eat?

In a diet where fat plays the key role as it does in the Metabolic Diet, it's important to get a handle on just what kind of fats you should be looking for and in what proportion they should be eaten. Taking into consideration everything we've just said about fats, the following guidelines will make the Metabolic Diet healthier and more effective.

BE WISE WITH FATS

- Eat fewer processed baked goods and fried foods, especially fast foods.
- Bake, boil, microwave, poach or steam foods instead of frying them.
- Buy oils that are predominantly monounsaturated (olive or canola oils).
- Consume only fresh oils.

25 percent of your fat intake should come from olive oil and the EFA-rich foods mentioned above. These include nuts, seeds, fish, flaxseed oil, salmon oil, and unprocessed vegetable oils. The other 75 percent of your fat intake should come from high quality meats, chicken, eggs, cheese, pork, butter, shell and other fish, and associated foods. Also, make an effort to use the omega-3 enriched eggs and dairy products. Table 1 provides an easy way to judge the various fats in some common foods and oils.

You should do your best to avoid the "bad fats" listed previously. Margarine (because of its trans fatty acid content) and commercial processed vegetable oils are a no-no. Hydrogenated oil products and shortening, which are found in almost every processed food, should also be avoided.
In fact, any kind of oil that has been around for a while should be suspect, even fish oils. If they've been stored too long, there's a good chance they've oxidized to some

extent and can cause free radical damage in the body. As well, they likely contain altered fatty acid derivatives that are harmful to your health.

You should supplement your diet with GLA-containing oils (such as evening primrose or borage seed oils), unspoiled fish oil (if your intake of fish is lacking) and to a lesser extent flaxseed oils as discussed previously. You should make liberal use of extra virgin olive oil for preparing foods, salads, protein drinks and in any other way that you find palatable.

Fatty Acid Composition of Commonly Consumed Foods
(as percentage of total fatty acids)

Food	Saturated	Monounsaturated	Polyunsaturated
Butter, Cream, Milk	65	30	05
Beef	46	48	06
Bacon and pork	38	50	12
Lard	42	45	13
Chicken	33	39	28
Fish	29	31	40
Coconut oil	92	06	02
Palm kernel oil	86	12	02
Cocoa butter	63	34	03
Olive oil	15	76	09
Peanut oil	20	48	32
Cottonseed oil	27	20	53
Soybean oil	16	24	60
Corn oil	13	26	61
Sunflower seed oil	11	22	67
Safflower seed oil	10	13	77

Reading Between the Lines on Labels

How can you tell if a food product contains trans fat? When it comes to listing fat on food labels, manufacturers are required to only list total fat and saturated fat. Some also voluntarily list monounsaturated and polyunsaturated fat, but it's unlikely you'll see trans fat listed. Still, you may be able to tell if a product contains trans fat, even if it's not directly listed on the food label.

Look for the words "hydrogenated" or "partially hydrogenated" in the list of ingredients. These terms indicate that the product contains trans fat. However, you won't be able to tell how much trans fat is included.

If you want to learn more about good fats and bad fats and the effects they can have on your health, then I recommend you read *Fats that Heal Fats that Kill* by Udo Erasmus, published by *alive* Books, from British Columbia, Canada. This book, while being almost encyclopedic in scope, is easy to read and understand.

CHAPTER SIX

Tracking Your Progress

The best way to measure progress is by seeing how your lifts are going. If they're going up, then as long as you're not fooling yourself (you've got to be realistic), you're doing fine. It's important, however, that your measure is constant and that you're comparing apples to apples. For example if your max squat is up make sure that you're going to the same depth. It's no use thinking that your squat has gone up 40 pounds when you're going an inch higher.

Although you instinctively know when you're getting stronger (the weight feels lighter, you're adding weight, doing more reps, etc.) you should still use some objective measure to make sure that it's going in the right direction. The best way to do that is to measure your strength by doing your one rep max at the end of each Strength Phase.

An important part of making progress is to track it. And that means more than just keeping a training log of the lifts as you do them. It also means analyzing what you've done and planning ahead.

For example, after every competition I analyzed the mistakes I made and where I needed to make more progress, and then started planning on how this could be accomplished. Then I took a step back and started training according to the plan outlined in Chapter Seven. And although I didn't try and keep my peak after the competition, because I wanted to stick to my game plan, I knew what had to be done.

So the first step to measuring your progress is to figure out where you want to be. This is where REALISTIC goal setting is important. And it doesn't have to be fancy. It could be as simple as wanting to bench 10 pounds more by the end of your second Strength Phase, or as complex as wanting to increase your lifts by 10 percent for the next World Championships. The latter would include several smaller goals along the way.

You also have to have some flexibility in your game plan. While you're training, it's important to feel your way into the workout. By that I mean don't let the way you feel get in your way of getting a good workout. For example, let's say you were up partying the night before and the last thing you want to do is heavy squats. As if you weren't queasy enough as is.

The only way to gauge how ready you are to move the heavy weights is to start your warm-ups and see how they feel. If they're okay, move up as per plan and see how the heavier ones feel. If the weight feels lighter or alternately if you feel stronger than usual, then go for that extra mile, even as far as trying for a personal record. If not, try and stick to the game plan as close as you can. If the weights feel heavy and you just don't feel strong enough, back off AND DO THE BEST YOU CAN FOR THAT DAY. That'll do the trick. It always did for me because the next workout, or maybe even the one after that, I would do great.

You do need to set some goals, both short and long term, and this is important even if you don't compete. And you have to be both realistic and flexible. Flexible because you might have to adjust your long-term goal by using the short term ones as guidelines, resetting both the short and long term goals as needed. It's important that you reach high enough to stimulate you and your training, and just as important that you don't overreach and subsequently get discouraged.

The Mass/Strength Phase mini-cycles will let you know where you stand and are all important for on-going progress and reaching that long term goal. The feedback you get from the individual stairs will allow you to successfully get to the next floor.

One of the most important things I can tell you from my two decades of competitive lifting experience, is to try everything at least once and then STICK WITH WHAT WORKS FOR YOU. And that's not to say that what works for you won't change because to some extent it will since as you progress and try different things, you'll be adding to the list of what works and what doesn't.

Another important tip that has kept me in good stead over the years, is keeping an accurate training log. In the log I wrote down every rep and set I did for every workout. I also wrote in some brief notes, for example, if I had a cold, or was injured, or anything that might throw off the lifting for that day.

That training log should be by your side at all times while you're training, and one of the first things you should do after a training set (after you take off whatever is restricting the blood flow to one or more parts of your body), is to mark down what you did. The training log is invaluable for setting up your training schedule and for finding out what works for you. It's also invaluable to figuring out how you're coming along and if you need to make any changes in your short and long term game plans. I used to pour over my training log all the time, trying to figure out where I was going, comparing my present routine to past ones, and then figuring out if I needed to make some changes or just leave things as they were.

If I was making good progress and hitting personal bests, I'd analyze the previous few months of training to see what it was that was working so well. And at times when my training staled out, I'd look back again and see what it was that wasn't working and then comparing what I'd been doing to successful phases in the past.

A lot of people will tell you to always stick to the game plan, no matter what. While I agree with that, it's not always the best way to go. On days when the weight felt light right up into the heavier weights, then I'd go for a personal max. But you have to be honest and truly be feeling strong for you to do this. Don't psyche yourself up to think you're strong. You have to really feel it.

And remember, when you're training, don't let anyone or anything distract you. Leave all your problems at the gym or training room door because your sole purpose in life while you're training is to lift the iron in the best way you can, both physically and mentally. If your training space doesn't allow that, then change spaces until you find a situation that is 100% geared to training and training alone. Leave your cellular phone and beepers, and any other possible distractions out of your training space. As far as having conversations and chit chats, that's between you and your training partners—comrades that know when it's time to lift and when it's time to talk. All the others get a grunt and/or a NOT NOW look. Leave all the chit chatting and horsing around for after the workout.

Bottom line is that your training time is for training and nothing else.

Partial movements, bands, chains and other accessories work best for lifters who are using the present support equipment and to get the body used to increased stress over part of the movement. For example I used to do 1/4 squats with as much weight as possible, going up to 1200 lbs, just so the weight (when doing regular squats) would feel lighter when I took it off the rack and set up.

Measuring Your Body Composition and Tracking Your Progress

Another measure of your progress, at least in the battle to maximize your lean body mass in any weight class, is your bodyfat percentage. In my view, at least as far as reasonably low levels of bodyfat that's appropriate for powerlifters, the lower the better as long as you're maintaining strength and thus muscle mass.

The most accurate and scientific way to determine your bodyfat percentage is by hydrostatic weighing. This test is conducted in a special tank and compares your weight completely under (with all air exhaled out of your lungs) and out of water.

Hydrostatic weighing is based on the concept that the density and gravity of lean tissue is greater than that of fat tissue, so lean tissue will sink in water and fat tissue will float. While hydrostatic weighing is the best measurement, it can be costly, inconvenient and time-consuming. Other methods of determining bodyfat levels, such as the Bod Pod, a device that uses air displacement instead of water, while more convenient are also costly and unavailable to most of us.

Another way to measure bodyfat percentage is with anthropometric measurements. Measurements are taken with a measuring tape at sites where fat is usually distributed, such as the waist and thigh. Specific equations are used to calculate the bodyfat percentage. These measurements while less costly and easier to do but are not very accurate.

Overall, bodyfat percentage can best be measured with skin fold calipers. If done correctly calipers are an accurate, inexpensive and convenient way to measure the thickness of subcutaneous fat. This technique involves measuring fat levels in the body by assessing levels at certain key fat depots with the skin calipers. You can have the skin fold test performed by a professional, or you can do it yourself by purchasing the calipers, along with easy to follow instructions.

With the calipers you can determine your percentage of bodyfat by taking skin density measurements of the suprailliac area. This area is approximately one inch above the right hipbone about five inches or so to the right of and just below the belly button (see Figures 1 to 5 on page 98). As per the diagram, while standing firmly pinch the suprailliac skinfold between your left thumb and forefinger. Place the jaws of the calipers over the skinfold while continuing to hold the skinfold with the left hand. Then take your measurement as per the instructions and the diagram. Once you have the measurement refer to the bodyfat interpretation chart (included with the calipers) to determine your bodyfat percentage.

While knowing your bodyfat level is a step forward, it tells you nothing about your level of lean body mass. To get the complete picture and accurately measure your present status and progress we need to find out our Metabolic Index.

MEASURING YOUR PROGRESS

- Weight can be misleading—depending on fluid retention in the short term and on changes in body composition in the long term.
- Someone may weigh the same but have much higher muscle mass and lower bodyfat.

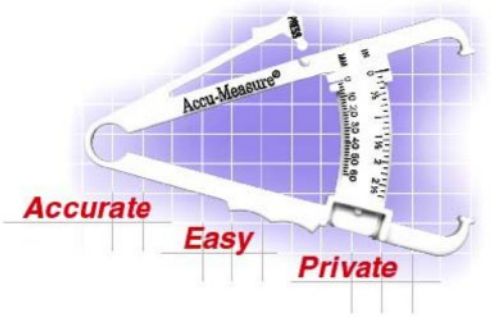
WAYS TO MEASURE BODY COMPOSITION PROGRESS

- Mirror.
- The way clothes fit.
- What people say.
- Body Mass Index—height and weight formula that can't take into account body composition.
- Measuring bodyfat is only a measure of fat loss.
- The Metabolic Index.

The Accu-Measure™ Calipers

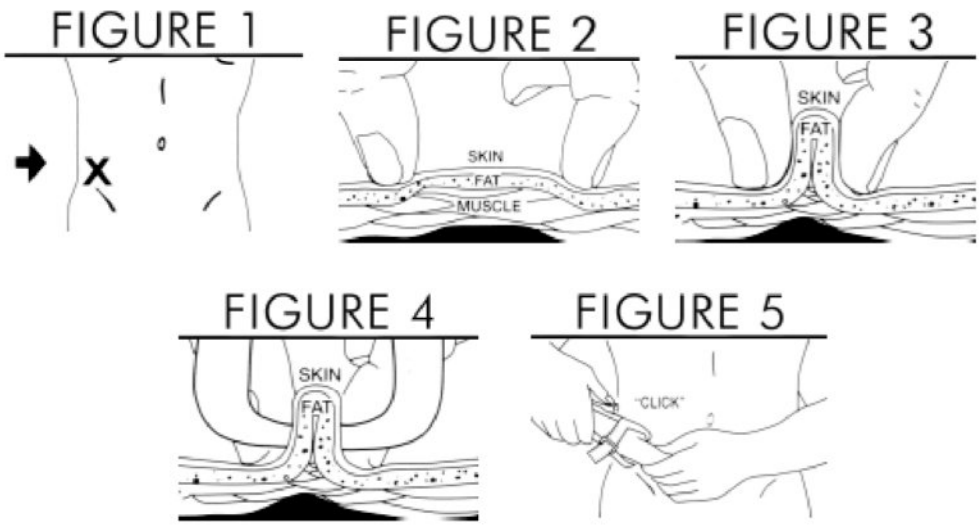
As previously explained hydrostatic weighing is the best way to measure your bodyfat percentage. The most accurate of the easy to use alternatives are the skin fold calipers.

For the purposes of the Metabolic Diet and to keep things as simple as possible, we will only measure one site. The Accu-Measure™ Calipers (available from www.MetabolicDiet.com) is a precision instrument which has been shown in comparative studies to be closer in accuracy to the "gold standard" underwater weighing than any of the more elaborate methods of measuring bodyfat (without the inconvenience, expense and trained personnel and lack of privacy that these other methods entail).



With the calipers you can determine your percentage bodyfat by taking skin density measurements of the suprailliac area. This area is approximately one inch above the

right hipbone about five inches or so to the right of and just below the belly button (Figures 1- 5).



As per the diagram, while standing firmly pinch the suprailliac skinfold between your left thumb and forefinger. Place the jaws of the calipers over the skinfold while continuing to hold the skinfold with the left hand. Then take your measurement as per the instructions and the diagram. Once you have the measurement refer to the bodyfat interpretation chart included with the calipers to determine your bodyfat percentage.

While knowing your bodyfat level is a step forward, it tells you nothing about your level of lean body mass. To get the complete picture and accurately measure your present status and progress we need to use my Metabolic Index.

The Metabolic Index

1999-2002 Mauro Di Pasquale, M.D.

THE METABOLIC INDEX™

- The **Metabolic Index** (MIDx) is the best way to measure your progress while you're on The Metabolic Diet. The MIDx takes into account all the variables that other methods can't. Not only does it address the height/weight issue but also the degree of bodyfat. With the MIDx you get a snap shot of your body composition and progress.
- The MIDx is a ratio derived by considering not only weight and height but your percentage of bodyfat. Just plug your information into formula, using the Metric System or the English Imperial System.

The Metabolic Index (MIDx) is the best way to measure your progress while you're on the Metabolic Diet. The MIDx takes into account all the variables that other methods can't. Not only does it address the height/weight issue but also the degree of bodyfat. With the MIDx you get a snap shot of your body composition and progress.

What is the MIDx and what does it measure? The MIDx is a ratio derived by considering not only weight and height but also your percentage of bodyfat. It uses a very easy formula for calculating. In fact, just fill in your weight in pounds, your height in inches and your bodyfat level as a percentage into the following formula and do the calculations.

FIGURING OUT THE MIDX

Body weight in pounds, divided by the height in inches squared, that result multiplied by 7,250, and the total results divided by the percent bodyfat.

➲ {(body weight in pounds) / (height in inches)^2 x 7,250} / % bodyfat.

Or if you are using the Metric system:

➲ {(body weight in kilograms) / (height in meters)^2 x 10.3} / % bodyfat.

In my case, using pounds and inches, my MIDx is 185 / (66)2 x 7,250 divided by 10%

(185 / 4356) x 7,250 / 10
MIDx = 30.8

An easier way to figure out your MIDx is to go to **http://www.metabolicdiet.com/index2.htm** and plug in your stats. Since it is so easy to do that you can check your MIDx often and use it as a guide and measure of your progress.

The MIDx is much more advanced than the commonly used and accepted body mass index (BMI). The trouble with the BMI is that it can't tell if you are overweight because you're fat or if you're heavier than they figure you should be because you've got more muscle mass than the average couch potato.

For example, even though I'm heavy for my height, I have a fair amount of muscle mass and a low bodyfat. So rather than looking fat I look trim and muscular. A couch potato with the same height and weight would definitely be fat. The big difference,

besides the obvious aesthetics, is that while the couch potato has to carry his fat, my muscle carries me.

If I use the MIDx, not only do I get a more realistic look at my body composition, but I can also track my progress to improving even further. Let's say that I go on the Metabolic Diet and get down to a minimal 175 lbs and 8% bodyfat. My MIDx would then be 36. The increase in the MIDx shows that at 175 lbs. and 8 % bodyfat I'm carrying less fat in proportion to my muscle mass than at 185 lbs. and 10% bodyfat. If I was able to increase lean body mass while losing bodyfat to the point of maintaining my weight, then the MIDx would increase even more. At 185 lbs and 8% bodyfat my MIDx would be 38.5. When the MIDx increases, regardless of the starting point, it shows that you are making progress because you are increasing the ratio between muscle mass and bodyfat by decreasing bodyfat and/or increasing muscle mass.

The important thing about the MIDx is that it will give you a starting point and from there an indication of how you're progressing every step of the way. Once you've established your baseline MIDx it is easy to objectively see if you're making progress and if you're losing bodyfat but not at the expense of important muscle mass. If the MIDx is going up, even minimally, you're making progress.

The higher the Metabolic Index, up to a point, the better your improvement and the closer you are to your goals. The lower the Metabolic Index is, the more room for improvement there is and a determination of just how much more you have to go to reach your goals.

The ideal for the average woman is different than the ideal for average man. For women the ideal is around 13 to 20 while for men it's between 22 to 32. In reality the final point doesn't really matter since it's the improvement that counts. As long as the index keeps going up then there is some improvement being made. Once the index gets above 18 for women and 32 for men you've looking at muscle mass and bodyfat levels that are too extreme for most powerlifters unless they also have bodybuilding aspirations. Competitive bodybuilders will be looking to get their MIDx well over 40. Olympia level bodybuilders will have a MIDx over the 100 mark.

In reality, the MIDx is an indicator that when you're losing weight you are close to maintaining or even increasing lean body mass as you lose bodyfat. In fact, the more lean body mass you have and the less fat the better the index. If someone loses even a lot of weight but loses too much lean body mass the index won't improve all that much. What that means is that even though the person has lost weight they look very flabby and therefore lost the weight by sacrificing muscle mass. This is exactly the opposite of what you want.

CHAPTER SEVEN

Periodizing the Metabolic Diet and Metabolic Diet Supplements

The Metabolic Diet will work for anyone who wants to gain strength and alter their body composition to gain muscle mass and lose bodyfat. That includes those who are just interested in being stronger to the powerlifter who wants to get into competitive shape.

In this section of the Anabolic Solution we'll discuss how to use the Metabolic Diet in different phases of powerlifting training and competition, and how and when to use some appropriate nutritional supplements for the fastest results. The starting point will be the Strict Phase of the Metabolic Diet. Carbs can be increased if need be after three to four weeks.

I will also give you some points for calculating starting calories for the various training phases, whether you are into them or not, since the information can easily be translated to whatever you're into. These values are not written in stone and serve only as starting points for your journey of self-discovery. Depending on your metabolism and situation, you will have to experiment to find what is optimal for you.

Training Methods for Powerlifting

Although periodization, in one form or another, is popular with powerlifters today, I feel that in many cases it is overdone.

Traditional Periodization Methods

The most common type of periodization, and one that has been used by some of the greatest lifters in the world, both past and present, can best be described as a linear progressive periodization scheme in which employ progressive gradual overload in all your core and assistance exercises.

Alternate Periodization Methods

First of all you don't have to periodize in the traditional sense at all. You can do what the Westside boys have done, very successfully I might add, and combine elements of mass, strength and body fitness by incorporating various aspects of training in the same training cycle. The innovative Westside Barbell periodization system is vastly different from the traditional powerlifting periodization that most lifters have followed in the past. And, as they try out different methods and routines all the time, it's constantly changing to some extent, although the core training methodology and theory basically stays the same.

In any case I consider the Westside Barbell training system, called by them Conjugated Periodization, a sort of combined undulating periodization with microcycles within one master macrocycle.

YOU CAN'T TRAIN EACH OF THE LIFTS THREE DAYS A WEEK FOR VERY LONG. AND NO MATTER WHAT YOU DO, BE CAREFUL THAT YOU DON'T OVERTRAIN.

In my view there are only five important diet/training phases, the Start-Up, Mass, Strength, Cutting and Pre-competition Phases, where adjustments will be made based on progress towards gaining more strength and muscle mass, and for the competitive powerlifter, towards a competition.

The Mass and Pre-Competition Phases will be familiar to most powerlifters—the mass phase being their day to day training and the Pre-Competition their peaking and weight loss (if needed) phase. The other phases may seem unnecessary to some and the five phases may not seem to be enough for others. In my view, the cycling of training, diet, and nutritional supplement use in each of these five phases is all that's needed to ensure the ultimate in powerlifting success.

A good powerlifting program is one that improves strength, period. Muscle size, density, and definition are secondary, although important in using that increased strength in the best competitive way. A training program can only be successful when it has these characteristics:

1. It is a part of a longer plan.
2. It is based on the scientific knowledge available in the field.

3. It uses the periodization of training (one way or another as against a linear constant gradual overload method of training) as a guideline for planning training from competition to competition and throughout the year.
4. It includes changes in diet and nutritional supplements to go along with the training.

The program must have short-term goals and long-term goals that are time/phase specific. Each training phase or time period has its own objectives, so it is necessary to adapt the diet and supplements to the goals of each time period or phase and to coincide with the overall plan.

The compilation of a plan with both short- and long-term goals must take into account the individual's background, physical potential, and rate of adaptation to the physiological challenges imposed by training.

Using the Metabolic Diet and Supplements in the Different Training Phases

If you're using the traditional powerlifting approach to training, and most powerlifters have and still do, then, in my view, there are only four basic training phases that are needed to reach your goal as far as strength and body composition, with a fifth phase added for competitive powerlifters. The goal in all cases, is to increase lean body mass and decrease bodyfat to some degree or another. The competitive powerlifter is at one end of the scale while the person who just wants a fit and toned body is on the other. While the goals may be different the path is the same. It's all just a matter of degree.

Some people add a rest phase, particularly after a competition. In this phase you basically chill out, eat, drink and be merry. Usually a few weeks is more than enough to regain some sort of physical and psychological balance after a grueling and stressful competition. Once you're rested a few weeks, or more, you start back into the Start-Up Phase.

1. **START-UP PHASE**
2. **MASS PHASE**
3. **STRENGTH PHASE**
4. **CUTTING PHASE**
5. **PRE-COMPETITION PHASE**
6. **REST PHASE**

For maximum results you'll have to use some nutritional supplements to complement the various phases of training and the diet. Like the training and diet, the intelligent cycling of your supplement use will allow you to get the best results possible. The supplements will enhance the anabolic effects of your training and the Metabolic Diet. Detailed information on each of the supplements is available in the Appendix.

This is Not a Training Book

It is important to realize that I have no aspirations about giving you comprehensive powerlifting and training information and routines. This is not a training book, but rather a nutrition book that shows you how to modify the Metabolic Diet and the use of my MD+ line of nutritional supplements to your training routines, whatever they may be. How you train (whether you never go above 60% of your one rep max, or you're trying max singles every workout), the exercises you do (again whether you only practice the three lifts or practice anything but the three lifts), the paraphernalia that you use, including special equipment such as bench/deadlift shirts, squat/deadlift suits, wraps, chains, bands, boxes, slabs (wood or rubber), full movements, partial movements, power rack, boxes, monolift, etc. is up to you.

But always have an open mind and keep experimenting with both innovative and conservative approaches to training. You're never good enough so that you can't improve even further.

Also keep in mind that although there are people who swear by their method of training, that does not mean it's the best one for you. It also does not mean it won't work for you. Sometimes it's not so much the training but the motivation and enthusiasm behind that training that pushes you to new heights. And as long as you don't get injured and you are making progress, then stick with it for as long as it works.

So while this is not a training book, I will cover some of the basics and will also toss in my two cents worth anytime I feel like it. After all I've been powerlifting for almost 40 years, on a competitive level for more than half of that time, and I've learned a little along the way.

On the other hand if you want to delve more deeply into the world of powerlifting, including training routines, articles, tips, editorials, what's popular, old time stuff, rants and takes on almost everything that involves powerlifting, then go to www.CoachSOS.com and head over to the powerlifting section. I'll be developing this site over the next few months so you will have to be patient at first.

I'm also planning to have some top-notch powerlifting coaches on hand to help you out and answer some of your questions, including a section for Powerlifting USA information, news, articles, and contest results. Although both my primary sites, which also includes www.MetabolicDiet.com, are up and running and contain a ton of information already, they will not be fully up and going until sometime near the end of 2002.

Training Basics

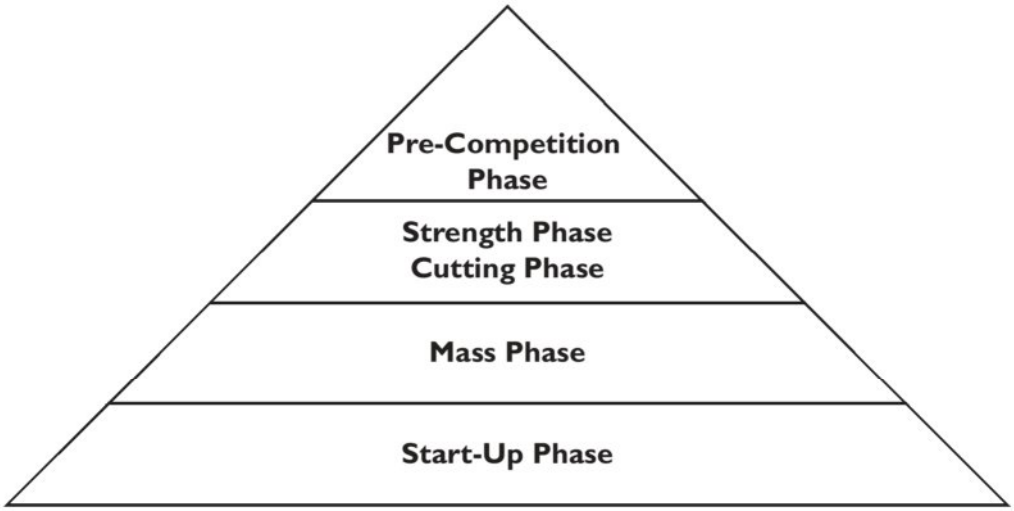
Although this is not a training book, some training basics are a prerequisite to using the diet and supplements to the best advantage and getting strong. As such I'll sparingly cover some of the more common questions you might have, and also a few odds and ends that I think are important if you want to train and compete effectively.

What Exercises Should I Do?

This depends on what phase you're in as far as your training. The more non-specific your training is, the more exercises you use. For example in the Start-Up Phase you may use a few dozen exercises just to get all the angles needed to get your body back into training synch. On the other hand, in the Pre-Competition Phase you'll stick mainly with the three competition lifts.

I always look at the number of exercises you do as a pyramid with the Start-Up Phase at the bottom with the most number of exercises, then the Mass Phase, then the Strength and Cutting Phases and the Pre-Completion Phase at the top because it involves the least amount of exercises.

The Training Phase, Total Exercises Per Workout Pyramid



How Often Should I Train?

How often you work out depends on where you are in your training. Initially you can get away with training the whole body three times a week. Then as the weights get heavier and you're more into training and perhaps gearing for competition, you'll be better off training certain parts of the body twice or even once a week. That's because you need more time to recuperate from the workouts. Generally the heavier and harder you train, the more time you need to recover. If you don't give yourself enough time to recover you'll end up getting overtrained and likely injured.

One of the hallmarks of the long-term successful powerlifters is that they'll give themselves enough time between training sessions so that they are at running at full capacity every time they train. They will take extra time between workouts if they feel they're not fully recovered. For example I found that my most productive training was done when I worked out long and heavy every 10 days with a "roundhouse" type of workout in between—lots of assistance work with no max training.

How Long Should My Workouts Last?

It also depends on the training phase you're in. Usually the more volume you do, the shorter the workout, and the higher the weights you use, the longer the workout. Also keep in mind that when I talk about training time I'm including the very first set you do, including stretches, to the time you hit the showers.

The Adaptation phase shouldn't be much more than an hour. The Mass and Cutting Phases an hour and half or so, and the Strength and Pre-Competition phases may last up to two hours or more. The reason for the time differences is that in the Adaptation

Phase you're working volume with relatively low weights. In the Mass and Cutting Phases you're doing more volume than the real heavy weights. Also you are doing more assistance exercises in which you're not maxing out weight wise.

The Strength and Pre-Competition Phases takes more time as you're moving the heavy metal and you need more time to rest between the sets. I made the best strength gains in my life when I worked out heavy (more on this later) for a four hour period every ten days. My other workout in between these heavy duty sessions, was about 2 hours long.

How Many Sets Should I Do?

I've always felt that you can't do both volume and intensity in the same workout. If you're going for volume you'll do more overall repetitions than you will if you're going after the heavy weights. For example, you may do the same number of sets in the Strength Phase as in the Mass Phase, but the number of repetitions per set will be much less in the Strength Phase. High volume, high sets and reps (usually from 8 to 12), works for the Mass Phase and results in more muscle mass. Low volume, high intensity training, may have the same number of sets or less, but you're only doing one to five reps.

How Long Should I Wait Between Sets?

Again, it depends on the training phase you're in and how heavy you're going. In the Start-Up Phase you can keep the rest interval as low as 30 seconds between sets and exercises. In fact you can even superset the exercises—for example do a set of curls, then a set of triceps presses without any rest between the curls and presses.

The heavier you go the more rest you need between sets, even if the set only consists of one rep. That's because it takes at least three or more minutes for the muscle energy systems to reset themselves so that you are ready for another heavy set.

What Assistance Exercises Should I Use?

You're probably getting tired of reading this, but, again, it all depends on the training phase you're in and what you're trying to accomplish with the assistance exercises—for example while in most cases the assistance exercises are used to bring up any of your weak points in your lifting, in some cases it might be to work around or even rehabilitate an injury.

You obviously do not need assistance exercises in the Start-Up Phase since you'll be doing some of everything and just trying to get into some sort of shape. It is the same in the Mass Phase since the workouts will be multiple body workouts and each workout will consist of exercises that work all the major muscle groups. In the Mass

Phase there really is no such thing as doing too many assistance exercises because, since you're not concentrating on doing the three core lifts, everything you do is really an assistance exercise. The aim here is muscle hypertrophy ALL OVER, and there's really no exercise that you cannot do.

In the Strength Phase and Pre-Competition Phases, however, when you're after maximum strength, and you concentrate on the big three, you can do too many assistance exercises if you are not careful. So besides hauling the heavy weight in the squat, bench press and deadlift, you will stick to a handful of assistance exercises and variations that will help you increase the poundages in the three core exercises. And you will do more of these really important assistance exercises and variations in the Strength Phase than in the Cutting Phase.

Another tip I can offer is to change your exercises, or at least the way you are doing them, every three to six weeks, depending on how often you train—up to six weeks if you're only training twice every ten days, and three weeks if you're training that lift two or more times a week. The reason for this is that I believe if you're working out right, you'll get all the strength gains possible from that exercise in that period of time. By anticipating and changing before you inevitably get stale, overtrained or injured, you'll make better progress.

What Are the Best Assistance Exercises?

In my view there are two basic types of assistance exercises. Ones that closely mimic the actual movement of one of the lifts, with just enough variation to work it slightly differently or work certain sections of it, to improve on your weak points. For example, in the squat this would include box squats, good mornings with heavy weights and an arched back, partial squats (from just above parallel to 1/4 squats), pause squats, and front squats (using the bar across the shoulders, or in the crook of the elbows—Zercher squats, or using the Manta Ray—my preference is with the Manta Ray and I dislike the Zercher squats since it seems to me they're for masochists only). This also includes the use of power racks, chains, bands, mats, boxes, shims, boards, slabs of rubber, etc.

The other type of assistance exercise is usually one that will work certain weak points without working much else. For example if your hamstrings are weak (and hamstrings in my view are more important for squatting strength than the quads) then you can do some stiff legged deadlifts or less effectively in my view, hamstring curls, standing or lying down.

This will vary from lifter to lifter because it all depends on what weaknesses you have and what works best for your leverages and body type. By trying various exercises and variations you can arrive at a handful of assistance exercises that work best for you.

You also have to decide whether to do the assistance exercises on their own, apart from the day you're doing the actual lifts (or variants of the main lifts), or after in the same workout. For example you might deadlift one day and do any deadlift assistance work a few days or more later. Or you might deadlift first (say five sets of five, or three sets of three at your max weight for that day, or even working up to your max single) and do any assistance exercises after you finish your deadlift routine.

Usually the best assistance exercises are ones that work the same muscles as the actual lift and in almost the same way but with enough differences to allow you to work your weak points. But first you have to find your weak spots before you can correct them. If we pay close attention to our lifts, both with and without support gear, it's easy to tell where your weak points are. It also helps to have someone who is experienced and knows what he is doing to look at the way you lift and point out where you're falling down, and hopefully help you out with some comments and suggestions on how to fix the problem spots.

For example, if you have trouble coming out of the hole, but can blast through almost anything once you get a few inches above parallel, then one of the best ways to improve your squat is to do below parallel box squats. Another is to do pause squats in which your training partners vary the weight on the bar in the descent, bottom and ascending parts of the squat.

For correcting the weak points in your lifting you can make good use of boxes, slabs, chains, bands, the power rack, and many other training aids, to work weak points, and also to vary your workouts so that you don't stale out, overtrain, or get injured. You can also work any lift, whether you're using accessory equipment or not, from different angles and stresses to work the bottom, top, or anywhere in between any of the three competition lifts.

Here's a list of some of the best assistance exercises for the three lifts. With most of these exercises, you can use bands, chains, various shaped bars, etc.

Squat

The best squat assistance exercises are those that are simply variations of the full squat movement, including box, pause, partial, front (I never liked them much—I hated the Zelcher front squats where you hold the bar in the crook of your elbows), high trap or Olympic, Safety Bar, and assisted squats. As well you can use chains and bands to any of these variations and on the full squat itself.

My favorites are the box squat below parallel varied with the box squat above parallel, assisted squats (your partner(s) either add or take weight off depending on

your sticking points), and 1/4 squats. As far as special bars, the Safety Bar is my favorite as I find it the most comfortable and versatile.

Leg press—this exercise works the quads the most so if that's a weak point with you then it's an exercise you should try out. . Keep in mind that in most lifters it is the hamstrings that need the most work.

Abdominal work.

Bench Press

Flat bench presses with some variations. For example feet off floor, different grip—narrower and wider than your usual grip.

Incline bench presses. I've gotten the best results with about a 30 degree incline and shoulder width grip.

Decline bench presses. I never found them useful but they're worth a try to see if they work for you.

Floor bench presses. I used to do these on occasion and found them useful. They are a favorite of the Westside Barbell group who use them as one of the lifts they max out with. They feel that they work the chest, delt and triceps in such a way as to help the bottom part of the bench press.

Partial bench presses with either slabs of hard rubber (which is what I used to use) or boards (which the Westside boys use).

Dumbbell bench presses.

Triceps work via triceps extensions and pressdowns. I found heavy partial dips worked well for me.

Deadlift

Heavy bent over rowing (best done with a real swing and using straps so you can really go heavy). This was my favorite assistance exercise and I worked up to over 500 lbs for six solid reps.

Stiff legged deadlifts (best done with a slight bend to the knee)

Deadlift off blocks both slightly above and below knee level

Power pulls off the rack (same as power cleans but you don't clean the weight, just get it as high as you can)

Good mornings (make sure you know how to do these properly before you pile on the weight)

Reverse forearm curls (mostly for working the grip and also the biceps to offset the greater triceps work done in powerlifting)

Chins behind the neck, or lat pulldowns (work the upper back)

Reverse Hypers –performed on a special bench invented by Louie Simmons of Westside Barbell Club. Puts less stress on the back.

Sled dragging. Done by the Westside boys for general all around body strength and conditioning and as an assistance exercise for the deadlift.

Training Partners

Nothing replaces a reliable, motivated, honest and experienced training partner. But they've got to be all four or they can be counterproductive. If they're not reliable they're no good to you. If they're not motivated, they might as well stay home. If they're not honest about evaluating your lifting they can cause you all kinds of problems. And if they're not experienced, they can increase your chances of getting injured.

Using Straps and Strengthening Your Grip

I'm not one of those lifters or experts that tell you to never use straps. If your strength on any given exercise exceeds your grip, then use straps. It is counter productive not to since you're not working the major deadlift muscles enough if you're letting your grip dictate the amount of work that can be done by these muscles.

I use straps to help my deadlift when my grip is the limiting factor. But to further strengthen my grip I worked the grip twice a week on it's own. I tried everything and found out that I can forget squeezing balls, grippers, paper mauling, and other grip strengthening exercises. While they may help increase grip strength, I never found they helped me to hang on to a heavy deadlift bar. The best thing I found for helping my grip was to work the grip twice a week by holding on to heavy barbells and dumbbells, both thick and thin, until they dropped out of my grip, and by hanging from a chining bar as long as I could with weights added to my body.

When do I use straps? I use them for regular deadlifts when I'm doing several heavy sets, usually for the last set or two. I use them when I do my favorite deadlift assistance exercise, bent over rowing. When I was in top shape I did partial heavy bent over rowing (not quite hitting my lower chest with the bar) with over 500 lbs for 3 sets of eight reps, usually at a bodyweight of around 185 lbs. My max doing full reps (hitting the chest each time) was six reps with just over 500 lbs. I also used straps for doing partial deadlifts off boxes about an inch above my knees. The straps allowed me to work with over 1200 lbs in this lift. All in all I used straps as part of my regular workouts for many years without their use hindering my grip.

What Warm-ups Should I Do? And What About Stretching?

I'm not a big fan of stretching. I guess I got turned off by seeing those jokers with the broom sticks working out with the wood for 30 minutes before they did their max 135 lb squats. But there's more to it than that. Stretching too much, especially past the normal range of motion and/or when you're cold, will set you up for injuries. And frankly you don't need to stretch prior to lifting unless you're also into ballet.

I'm also not a fan of doing any kind of extensive warmup prior to lifting. Two or three good warm-up sets before getting into the serious lifting is all you really need. Do a couple of warm-up sets in the specific exercise you're doing before you get on with the serious weight. The best way to do the first few sets is to feel it out, go to the limits of the lift, hold it there for a few seconds, make sure you're in the groove. The warm up sets give you the flexibility and balance you need to do the lift properly and allow you to get your neural mechanisms in gear so that you will be able to control and better handle the heavier weights.

For example in the squat, the first warm-up should be really light, maybe just the bar with a flywheel on each side (a 45 lb plate) for 10 slow deliberate reps. How many warm-ups you do depends on how much weight you intend to haul. If you are going for heavy doubles and singles then you may need four and likely more sets before you're ready. For example if I intended to double 700 lbs, I'd start with 225 lbs (I never liked starting off with just one lonely plate a side) and do 8 to 10 reps. Then jump to 315 for six reps, 405 for 4 reps, 495 for three reps, 565 for three reps, 615 for three, 650 for a double, 675 for a double and finally 700 for a double. In this set of squats, the first four would be warm-ups, while the other five would be work sets. You can do it with all kinds of different jumps but you get the picture.

How many warm up sets should you do? There's no set number. You should warm up until you feel comfortable with the exercise and are solidly in your lifting groove. Depending on how you feel that day, it may take a few more warmup sets before you get into the proper frame of mind to make those heavy lifts, both in training and competition.

Warm-ups become even more important if you're trying to train with one or more minor injuries or when you're feeling really tight. In cases like these the warm-up will either get you ready to lift the heavy iron, or tell you to throw in the towel and work your forearms and calves instead.

What About Some Cooling Down Exercises After A Heavy Workout?

What for? You're moving heavy iron, not doing aerobics. The best cool down exercise I found was trying to put my clothes back on and crawl out of the gym. On a more serious note, if you're doing some cardio/aerobics, this is the time to do it, not before your workout. Even better would be at a different time or on a separate day.

What Lifting Gear Should I Use?

I'm not going to go in detail on what gear to use. A lot of information will be available on my **www.CoachSOS.com** site. But the best advice I can give you is that if it's legal, use it. Otherwise all the other lifters will have a leg up on you.

That goes for squat suits (whether it's double ply, canvas, or whatever other material is allowed and which suits you), bench shirts (same), knee/wrist/elbow wraps, lifting belt, deadlift suit (such as the MAX DL made by Inzer – the one made by Marathon is no longer available), special briefs (like the Groove Briefs), deadlift shirts (like the Erector Shirt), special shoes for the deadlift and squat, and if it helps, even special socks.

I've got two basic rules when it comes to supportive gear. First of all, build your strength foundation without gear, then use the gear to take you to the next level. Secondly, make sure that you use the gear a lot and get comfortable with lifting in it. Most gear will change your groove and you have to get used to, and make use of, the difference before you use the equipment in competition.

My recommendation is to not use any special equipment with the lower weights and start using suits, shirts, and wraps as the weight gets heavier. For example you might wear a squat suit all throughout the squat lifts (not because it gives you a lot of support, although it does give some, but so that you're comfortable with how you have to sit into the squat when you are using the suit as against when you're not using it), but only put the straps up with the heaviest sets.

It's too bad that bench shirts can't be tightened in degrees. Ideally you would want to use a looser shirt and then tighten it up as the weight goes up. Since there are no adjustable bench shirts, the best you can do is either use the shirt for the heavier lifts or only use the shirt periodically and for a few weeks before competing. In my opinion you should make the support gear a regular part of your training, at least once you

are moving some heavy weights. You need to learn to work intimately with the gear to use it most effectively.

Beyond using a lifting belt (buckle or lever), wraps (knee and wrist), a squat suit, and a bench shirt, what else should you use? In my view you should get all the gear you can afford, and then some. Next in line would be supportive briefs, a deadlift suit and shirt, and special shoes for the squat and deadlift, and don't forget the socks.

What Supplements Should I Use?

I thought you'd never ask.

My MD Line of Targeted Nutritional Supplements

I formulated a complete nutritional supplement line, which includes over 25 cutting edge products designed to work with the Metabolic Diet and to maximize strength and body composition. These formulations were done using the latest scientific and medical information, along with the knowledge and expertise I've accumulated in the last four decades. I've tried to use the best ingredients available regardless of costs to form products that are far superior to any on the market today.

The supplements below can be used in the various training phases outlined below as well as the Max Effort and Dynamic Effort Phases of training used by the Westside Barbell Club.

Foundation Supplements

These are supplements that should be used in all stages of training. They offer the foundation upon which you can achieve your strength and body composition goals.

- **MVM** – a comprehensive, specially balanced multiple vitamin and mineral formula designed to provide full-spectrum nutrition with an emphasis on the needs of athletes and anyone who exercises.
  - Provides protective properties against marginal deficiencies of vitamins and minerals.
  - Optimizes the effect of training.
  - Acts as the foundation for your body's nutritional needs.

- **EFA+** – A complete essential and synergistic fatty acid formulation designed to provide the full gamut of all the essential fatty acids and other ingredients such as CLA that are so important to optimizing your metabolism, maximizing the anabolic and fat-burning effects of exercise and increasing recovery. The formulation acts to increase fatty acid oxidation, improve insulin sensitivity and serum cholesterol levels, aid in injury prevention and treatment, and support proper cardiovascular, nervous and immune system function.

- **Antiox** – A complex and complete antioxidant formulation that provides targeted antioxidant support to all tissues in the body including the musculoskeletal system and the liver. Besides the usual vitamin and mineral antioxidants, Antiox also contains glutathione, the most important, all-purpose, endogenous antioxidant in our bodies, alpha lipoic acid, co-enzyme Q10, quercetin, lycopene, resveratrol and grape seed extract.

  - Increases natural muscle recovery from the effects of excessive exercise.

  - Protects healthy tissues in the body.

Body Composition and Special Supplements

These supplements can be used for decreasing bodyfat while maintaining muscle mass and strength and for maximal weight and fat loss, and for specific needs and problems.

- **MRP LoCarb** – An engineered high-protein, low-carbohydrate and moderate-fat meal replacement powder containing an advanced protein blend, healthy fats, and a balanced array of vitamins and minerals. It contains no trans fatty acids, only 1 gram of saturated fat, and only 5 grams of carbs per serving. Of those 5 grams of carbs, 3 are a combination of soluble and insoluble fiber, leaving only 2 grams of carbs that are absorbed.

- **LoCarb Sports Bars** have the nutritional advantages of the **MRP LoCarb** meal replacement powders in a convenient and delicious bar. The bars can be used post-workout, or as a snack anytime since they can be easily kept nearby in your gym bag, desk drawer, glove compartment etc.

- **Joint Support** – The premier formulation for dealing with overtraining, muscle soreness and injuries. With its 36 synergistic ingredients, **JointSupport** decreases inflammation and maximizes muscle, connective tissue and cartilage repair and maintenance.

- **Metabolic** – Stabilizes your metabolism and hormones and reverses the adverse effects of severe dieting by decreasing hunger and increasing your metabolic rate.

- **ReNew** – Enhances the immune system, normalizes metabolism, improves recovery, and naturally supports thyroid, testosterone, GH, insulin and the function of the adrenal glands. It's especially useful for dealing with chronic workout fatigue, overtraining, and burnout.
- **Regulate** – The various insoluble and soluble fibers and other compounds contained in **Regulate** keep the intestinal tract healthy by clearing up irregularity problems and providing probiotic essentials, and have also been found useful as an appetite suppressant, to decrease cholesterol levels and increase natural insulin sensitivity.

Mass and Strength Supplements

These supplements are for the serious athlete who's after maximum strength and muscle mass.

Exersol is a three-phase exercise-oriented nutritional support system that takes the guesswork out of what supplements to use before, during and after training.

- **Resolve** or **Resolve Competition** – Preworkout Primer that optimizes the anabolic and fat burning effects of exercise.
- **Power Drink** – The Anabolic Fat Burning Rehydration Drink you use during training provides the nutrients necessary to maximize muscle mass by increasing the anabolic and decreasing the catabolic effects of exercise, and to decrease bodyfat.
- **Amino** – The Anabolic Amino Surge that quickly kicks protein synthesis into high gear by providing an immediate square surge of amino acids and insulin in that immediate post-exercise window of opportunity.

NitAbol involves 3 formulations to increase muscle mass and decrease bodyfat while you sleep.

- **TestoBoost** – Increases Testosterone levels naturally, without the use and side effects of the prohormones.
- **GHboost** – Naturally increases growth hormone and IGF-I to above physiological levels.
- **Myosin Protein Complex** – Provides long lasting nighttime protein nutrition that maximizes protein synthesis, decreases muscle breakdown.

Creatine Advantage – Keeps the energy system in high gear by not only increasing endogenous levels of phosphocreatine, but also by optimizing the glycolytic and TCA cycle energy processes. The added amino acids and dipeptides allow a natural increase in the absorption and utilization of creatine without carbohydrates, and increase the volumizing, anticatabolic and anabolic effect of the formula.

We'll cover the specific use of all of these supplements under the various training phases.

Start Up Phase

After a lay off or even when just starting out it's a mistake to get right into it. There's no place for any routine that immediately concentrates on increasing muscle mass or strength or cutting down on bodyfat. Both your body and mind have to be conditioned for the stress and strain of the other training phases. In short you need to build a sturdy foundation on top of which you can lay on layers of muscle.

As such, the Start Up training should consist of some progressive circuit type training. Doing one set after another of a number of different exercises, using a very light load for the first few sessions, is the way to go. You can gradually increase the weight and resistance but not to the point where you're ever going all out. As well, keep the repetions in the 12 to 15 range all throughout this phase and the training time under one hour.

How long should you stay in this phase. It all depends on how long it's been since you trained and how burned out you are. Usually two to six weeks is enough with 2 weeks for those who haven't peaked for a competition or aren't overtrained, and more for those that have had a rough go or who haven't been training for several weeks or months.

ADAPTATION

- Adaptation to training and diet, making it as easy as possible, is the hallmark of the Start Up Phase.
- Keep weight constant—shift in body composition.
- Need high level of dietary fat in this phase.

Nutrition for the Start Up Phase

We will make the assumption that you are beginning the Metabolic Diet during this phase, although this may not necessarily be the case it makes the most sense.

During most of the Metabolic Diet, you won't find yourself restricting calories much. In fact, some people may find they have a problem getting enough, especially in the Mass Phase. Even in other phases, many will find that with increased training and exercise, they can take in a huge amount without suffering any consequences. The only phase that usually requires a gradual reduction in calories is the Cutting (definition) Phase.

At the beginning, though, we want to make the switch as easily as possible. That is why it's important not to jump right in at a low calorie level. Often the fatigue and discomfort you may feel is simply from a lack of food rather than a lack of carbs. And if some of is from the actual metabolic switch, it's compounded if you are starving. Also I do not want you feeling bloated and suffering too much from the constipation and/or diarrhea that you may have as a result of the sometimes radical change in your macronutrient intake. Dieting, per se, often affects the bowels and can compound any effect that may come from starting on the Metabolic Diet.

That's why your STARTING POINT FOR DAILY CALORIES ON THIS DIET SHOULD BE 18 TIMES YOUR BODYWEIGHT in pounds (or 40 times your bodyweight in Kg). If you're 200 pounds, this would call for 200 X 18 or 3,600 calories a day during the weekday portion of the diet. This makes for a "static" phase where you lose some bodyfat, gain some muscle mass and maintain about the same weight. This is a phase where you'll be changing the ratio of internal masses to some degree but most of what you're trying to do is allow your body its easiest path toward adapting to the diet.

As you continue in this phase you should experiment with the formula above as a way of finding precisely where your "maintenance" level for calories is. This will let you know from what point you need to add or subtract calories for gains or losses in other parts of the diet. It's also not a bad idea to keep a 2-3 day diary of what you're eating and then have someone who has some expertise in diets look at it. That way you'll get numbers and foods you can best work with and figure what you need precisely for maintenance.

You'll need a fiber supplement when you first start the diet. One of the results of the Metabolic Diet is that the bowels must readjust to all that meat. The fats can act as a stool softener and you may experience some diarrhea. You'll need to firm them up with some fiber. The radical change in diet can also cause constipation.

Most of the problems we have found with people initiating the diet fall in this area and their failure to take the fiber necessary to harden stools or push processed food through the gastrointestinal tract. You may be able to get away with just eating bran but there's a good chance you'll need a supplement that contains the right blend of soluble and insoluble fibers to best get through this period.

But there's more to the story because soluble and insoluble fiber have other purposes. Fiber has multiple effects on both the body and the GI tract, and is thought to be useful in the management and prevention of high cholesterol and triglycerides, prostate problems and diabetes. Fiber becomes even more important as you drop your calories since it decreases hunger and keeps the bowels in synch, as well as providing some antioxidant effects from the digestion of the soluble fibers by gut bacteria, all of which become more important as you drop calories and the amount of food you eat.

As far as the phase shift, increasing the fiber in the diet decreases the absorption rate of the weekend carbs and dampens the effects of high glucose/insulin levels, as well as providing the above benefits.

The nutritional supplement line I formulated for the Metabolic Diet includes **Regulate**, a multi-ingredient low-carb supplement (none of the fiber is absorbed) meant to regulate the bowels and keep the whole intestinal tract healthy. Its combination of ingredients, including several soluble and insoluble fibers, work like a charm.

If you use a commercial product such as Metamucil™ be careful of hidden carbohydrates. Often, refined carbs are used to make them taste better so check the carb count on the package before purchasing them.

You will probably have to take the fiber supplement for the first few weeks to a month of the diet, or for some, for a few months. In most cases, by that time, your body will have fully adapted to the diet. If not, it's a good idea to stay on a fiber supplement on a regular or on an as needed basis.

As maintenance, some people have found that taking a meal high in fiber, like a Caesar Salad or some higher fiber vegetables, or even brain, on a daily basis will do the trick. This will provide about 7 1/2 grams of carbs and, as long as you stick close to overall carb limits, shouldn't present any problem. Especially after you've been on the diet for a while.

NUTRITION FOR THE START UP PHASE

- Begin first 12 days then weekend carb up then 5-6 days low carb and one to two days high carb.
- No change in calories, substitute fat and protein for carbs
- STARTING POINT FOR DAILY CALORIES ON THIS DIET SHOULD BE 18 TIMES YOUR BODYWEIGHT in pounds or 40 TIMES YOUR BODYWEIGHT in kg.

Watch For Hidden Carbs

The start up phase will run smoother and get you in gear quicker if you remember that refined carbs are hidden in almost everything you'll find on those supermarket shelves. Seasoning, ketchup, mustard, salad dressings, nuts, BBQ sauce, breaded or processed meats, gourmet coffee and sausages can all present a problem. These foods are renowned for hidden carbs and you've got to check the label to make sure what you're getting on this diet.

Likewise, watch out in restaurants. They'll sometimes use a watery sugar on the vegetables that will wreak havoc. Our society has got a sweet tooth and you're going to run into it at every turn during the weekdays. You'll have to be especially careful during this Start-Up Phase as you get used to the diet and learn where the trouble spots may be.

Do Not Mix Diets

Again, there may be a strong temptation to mix diets combining the Metabolic Diet with aspects of other diets including the high carb and low fat diets, and putting them together in your own personal Frankenstein stew. Don't.

Many people will go on the Metabolic Diet but try to be true to their old high carb master. They'll eat meat but it's all fish, chicken and turkey. While these foods may be quite nutritious and beneficial, even when used in the Metabolic Diet, they can't be used as a total replacement for good, old-fashioned red meat. They just don't have enough fat.

What you end up doing by taking on the turkey/chicken/fish holy trinity is going on a high protein, low carb, low FAT diet. Along with being even harder to stay on than the Metabolic Diet, this diet won't get you the advantages you're looking for from the Metabolic Diet. You won't burn the fat like you should. You won't have the energy. You won't build the mass.