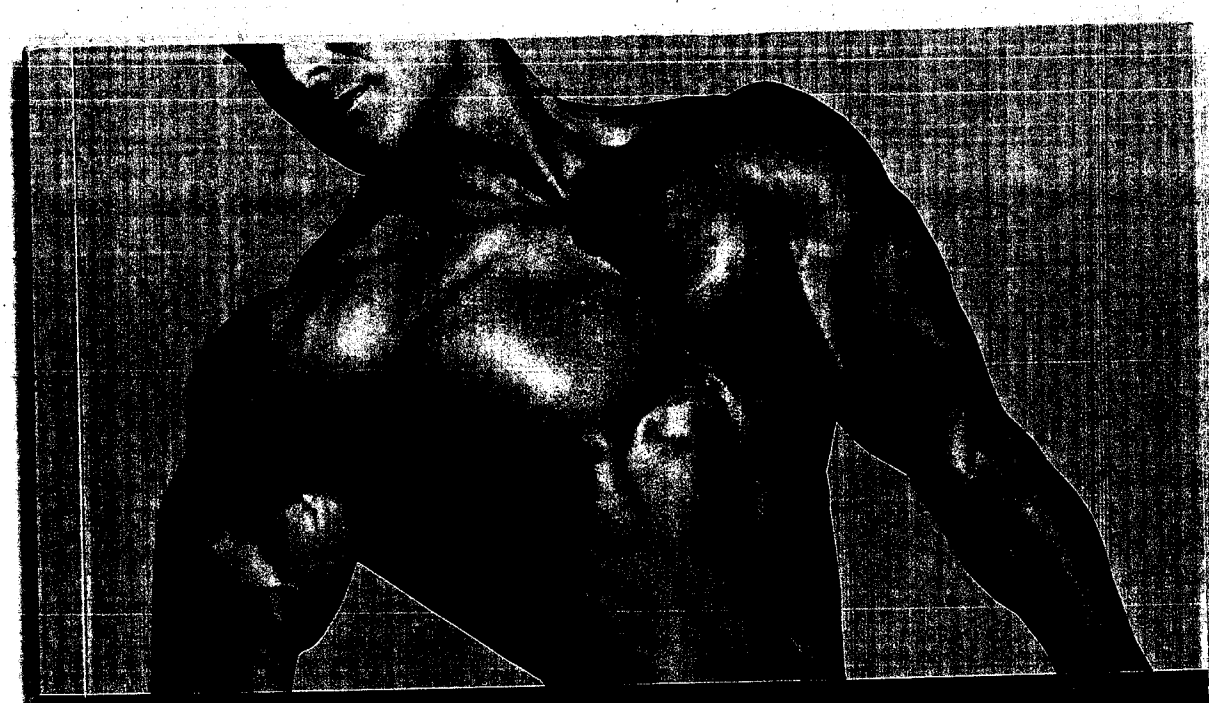

NO MISTAKES

Nutritional Guide to Building Your Best Body Ever!

BY VINCE ANDRICH

With Robert Thoburn - Foreward by Stephen Adelé

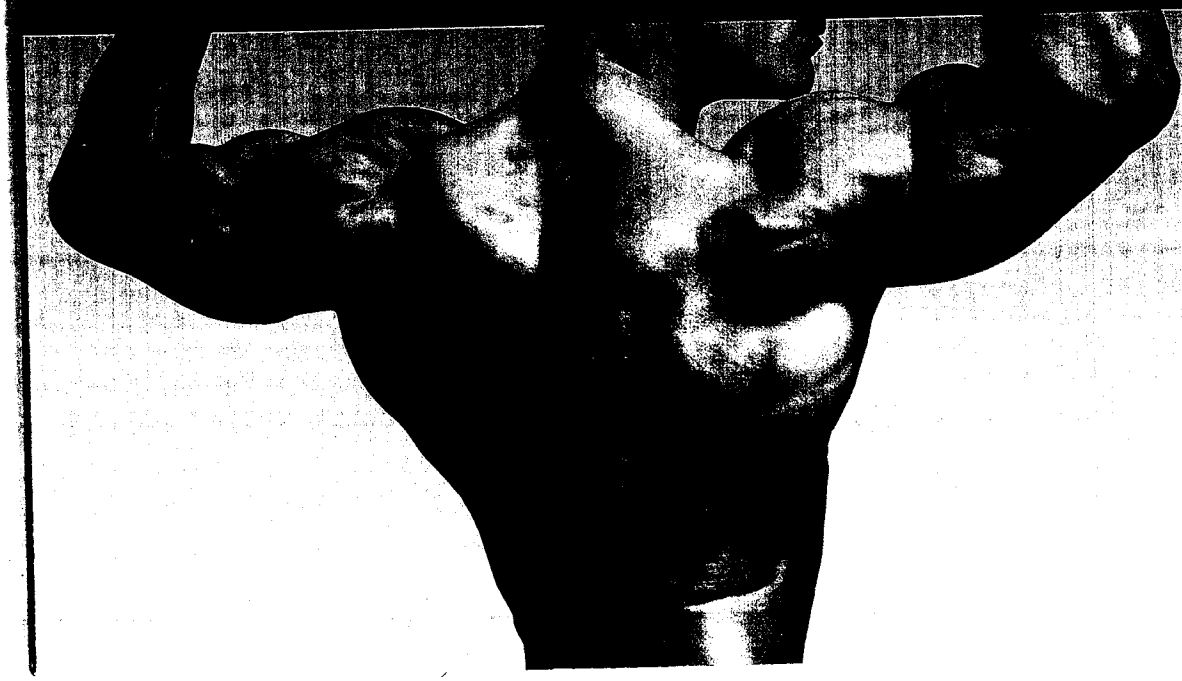

TABLE OF CONTENTS

Chapter 1

"A Brief History of Bodybuilding Nutrition: Save Years of Trial and Error by Understanding the Past."

In this chapter we will briefly evaluate some of the most common diets practiced by bodybuilding athletes just like you. This will enable you to distinguish the *No Mistakes* methods from those of the past . . .and those methods yet to come.

We feel it is vitally important to read this section in full. Our motivation is that great thinkers often look to the past for answers. It is through this history of trial and error that new philosophies can emerge and be fully understood.

You are literally defined by the food that you eat...

Like every other tissue in your body, your muscles are composed of molecules built from common chemical elements—carbon, hydrogen, nitrogen, oxygen, sulfur and others. These elements make up the structure of the food you eat at every meal. It should therefore come as no surprise that when it comes to building bigger, stronger muscles, the quality and quantity of food you eat will greatly affect the outcome.

Perhaps this is why you decided to pick up this guide. Indeed, if you put together your meals haphazardly, not even the most powerful muscle building supplements or training regimen will bring about the radical changes to your physical appearance that you are truly capable of. That being said...

"What's the "Ideal" Way to Eat for Year-Round Size, Strength and Leanness?"

What constitutes the best year-round eating approach for bodybuilders and similarly focused fitness enthusiasts? For many of us, solving this problem has been like figuring out the meaning of life. That is, until now.

First, let's dispel a widespread myth. Despite what you may have been led to believe, (perhaps due to contest-time photos in the pages of glossy bodybuilding magazines) bodybuilders do not maintain extremely low levels of body fat (3 to 5 percent) year round. Even elite bodybuilders, who regularly compete, do not maintain this small percent of body fat all year. To keep the same weight is unrealistic and may certainly bring your muscle-building progress to a grinding halt.

On the other hand, many dedicated bodybuilders can maintain an impressive 7 to 9 percent body fat level year round while enjoying "fast-lane" muscle-building progress. To do so, you need to adhere to nutritional guidelines specific to **Cosmetic Bodybuilding™**. Don't let the name fool you. This is not some fluffed up BS name for a weekend warrior program (although they need this term just as bad). It is the core reason most of us train and eat obsessively; thus, it defines our ultimate goal, which is primarily making cosmetic changes to our bodies.

Cosmetic Bodybuilding™

You're certainly not alone. Like the two of us, and virtually all women and men reading this guide, your training and eating habits are intended to make cosmetic changes to your body. You want to improve your physical appearance by making your muscles bigger (possibly a lot bigger) and/or losing the fat covering them up from view.

Strength, power, aerobic capacity—these and other measures of fitness are of substantially less importance to you, if at all. And this is fine. In fact, it's critically important that you realize the difference between your cosmetic goals and those of the performance-oriented person—the triathlete, the power lifter, the mountain biker, etc. The nutritional and training guidelines for you as a cosmetic bodybuilder are often worlds apart from those of the endurance athlete or others engaged in a sport where physical performance is what really matters.

To create a body that is a work of art, your "performance criteria" is the mirror. If you want to turn heads, all the time, you'll need to properly manage your nutrition and exercise 24/7. Unlike many team sports, there is no party after every "winning" workout or meal. The game is always ON. And for most of us, the top of our game is ***always one striation, peak or separation away.***

Strangely enough, for years registered dieticians and so-called nutritional experts with letters behind their names have lumped dietary guidelines for athletes together, or very nearly so. Yet the cosmetic bodybuilder is quite a different beast...

Nutrition for Athletics & Endurance

The dietary considerations for athletes who are focused on endurance performance or capacity, are not necessarily the same as for bodybuilders (like us) who solely want to build bigger, leaner muscles for a better-looking body.

For the endurance athlete (and perhaps many strength athletes), a diet deriving 60-70% of its calories from carbohydrate, 20-30% from protein and 10% from fat will probably be adequate. Furthermore, the type of each nutrient consumed may not be so important. For instance, the bodybuilder who is advised to avoid high-glycemic (fast-absorbing), refined carbohydrate; the potential "cosmetic impact" of such foods may be of little concern for the endurance athlete. In fact, these foods frequently offer a manner of convenience that is highly desirable to this individual.

The 80's Show

As you may already be aware, diets during the 1980's that derived up to 70% of a person's calories from carbohydrate were in vogue. This high-carbohydrate model gained popularity during the aerobics boom of the same era. Support also came from the scientific community that studied the effects of dietary carbohydrates on athletic performance (e.g., glycogen "loading"). This research provided strong (though at times contradictory) evidence that a high-carbohydrate diet could have beneficial effects on endurance performance and capacity.

Cosmetic Bodybuilding™ is quite a different story since it does not require the dietary carbohydrate intake that might be necessary to support optimal performance during endurance sports (e.g., long-distance running or triathlons) or team sports such as football, soccer and basketball. *Thus, many bodybuilders (excluding extreme "hard gainers") following high-carbohydrate diets had to rely on strict calorie counting and intense cardiovascular workouts to achieve the lean, muscular appearance they desired.* This era moved us into what is now known as...

Low-Carbohydrate Dieting — The Sequel

Stated earlier was the observation that the media plays a large role in influencing the popularity of many dietary practices. It should then come as no surprise that much like the fashion industry, styles come and go and often resurface as "new". This appears to be the case for the latest trend of low-carbohydrate dieting.

Yet unlike an overly simplistic trend in fashion that may make regular bottom jeans passé and bellbottoms hip, low-carbohydrate eating does have a plausible scientific premise (more on this later). This has made it the darling of the bodybuilding supplement industry—once again. It has even resurfaced for sedentary folks who use variations of this diet, such as that popularized by Dr. Atkins.

It is important to note that as far back as the 1960's, bodybuilders relied heavily on limited carbohydrate diets to show off their muscularity.

However, bodybuilders are not exactly sedentary. Indeed, because of the relatively high-intensity, high-volume nature of the training we use to build and maintain muscle we rely on stored carbohydrate energy (glycogen) substantially more than do sedentary folks, though less than endurance athletes. In any case, the important point here is that...

Low-Carbohydrate Diets are Not New!

It is important to note that as far back as the 1960's, bodybuilders relied heavily on limited carbohydrate diets to show off their muscularity. However, as a consequence of this dietary practice, many of the bodybuilders of this era lacked modern-day muscle fullness and striations. Just look at the old black and white photos of Arnold Schwarzenegger and his cohorts during his glory days of bodybuilding to see what we're talking about.

One of the reasons bodybuilders of previous eras lacked the muscularity we see today may be that these individuals bulked up during the off (i.e., non-competitive) season and later resorted to severe carbohydrate restriction in an effort to shed body fat and water weight rapidly. In addition, the re-introduction of carbohydrates (e.g., as with pre-contest preparation) was more of a hit-or-miss art than a predictable science and many athletes simply did not do so ("peak") properly.

Contemporary Diet Trickery

In an attempt to remedy the negative impact of severe carbohydrate restriction on one's physical appearance and performance, many diets presented to bodybuilders over recent years have recommended periodic carbohydrate overfeeding (or gorging) to replenish body carbohydrate stores. Such diets include, though are not limited to: The Rebound Diet by Michael Zumpano, The Anabolic Diet by Dr. Mauro Di Pasquale, The Cyclical Ketogenic Diet by Lyle McDonald and the Anabolic Burst Cycling of Diet and Exercise (ABCDE) by Bill Phillips and Torbjorn Akerfeldt.

Now we are not here to say that these diets cannot work (they can certainly be made to over the short term). Rather, we wish to point out that, practically speaking, such dietary guidelines are not easily maintained over the long haul and are much less effective and more troublesome than alternative approaches.

Lessons for the Carbophobic Bodybuilder

Simple thinking tells us that since carbohydrates deliver calories (4 per gram), this nutrient can play a role in promoting fat gain. In addition, carbohydrates are a primary driver for increases in insulin levels, which plays a role in reducing fat burning (more on this later). In an effort to get leaner, carbohydrates have become the primary macronutrient that have been reduced in many bodybuilders' diets. For some, it has meant an abandonment of any and all dietary carbohydrate in a desperate effort to lose weight or become leaner. The result is that muscles lose size, shape and energy. Workouts can become almost non-existent and your physique appears flat and small. This is why in our opinion these carte blanche reductions in total carbohydrate intake (especially "slow-burning", low-glycemic carbs) are often too aggressive and leave bodybuilders with nowhere to go.

The typical rationale is that if a bodybuilder accelerates fat loss by reducing carbs from 400 to 300 grams per day, then 200 must be better. The trouble is that when fat loss stalls, the bodybuilder is compelled to take in less than 200 grams of carbs per day to resume fat loss. Yet research shows that the body soon begins to show resistance to these extreme dietary efforts. At this point, the stage is set for your body to use protein from muscle tissue to provide additional energy. Needless to say this is not the ideal situation for anyone who wants to change his or her body composition for the better.

Lessons for the Carbophobic Bodybuilder (cont.)

Concerning carbohydrate intake, the risk of fat gain is ONLY problematic if:

* You are a sedentary person or a bodybuilder that either does not train hard enough or frequently enough to expend the extra calories.*
* You eat too much high-glycemic (fast-absorbing, insulin-spiking) carbohydrate per meal.
* You eat too much total carbohydrate (of any type) per meal.
* If your caloric intake exceeds your caloric expenditure, regardless of carbohydrate intake, your body fat will increase in size with time.

*NOTE: Training for the bodybuilder and its relationship to the Glucose Economy™ concept (discussed later) will be covered in detail in the essential companion guide, called the *No Mistakes Training Guide*.

A Renaissance in Simplicity

Contrary to popular belief, there are many female fitness enthusiasts and male bodybuilders who remain lean and hard, year round, while enjoying rapid muscle building progress. **What is their secret?**

The "No-Diet Diet"

What we have found is that these individuals seem to intuitively stick to pretty much the same eating plan all the time. This plan is unusually simple and can be maintained quite easily for the long term. Hence, the distinction from diet. A diet is a device that can only be used for the short term due to limitations inherent in its design and the design of the human body (including the psyche)! The long-term eating plan we refer to the "no-diet diet" will be explained in the chapters that follow, where we reveal...

Chapter 2

"The Nutritional Answers You've Been Waiting For!"

The above discussions, coupled with the fact that so many of you are likely sick and tired of seeing little or no results from your workouts, sets the stage for a reawakening in bodybuilding nutrition. That's how we think you'll see the *No Mistakes Nutritional Guide*. We assure you that its pages are free of antiquated or rehashed notions and marketing BS.

We'll Put You on the Right Path

We're going to help you become a bodybuilding biochemist of sorts. In the comfort of your own home, without asking you to recite complex metabolic pathways, you'll come to truly get the science of eating. In the pages that follow, you'll learn how to put together meals (your next one, for instance) that will make your muscles bigger, leaner and stronger, workout after workout.

It will be simple and painless.

NOTE to Professional Trainers, Nutritionists and Researchers:

It bears repeating that this guide will not cover true athletic nutrition or short-term approaches to weight or fat loss (i.e., "diets"). What we will delve into instead are some of the scientific principles at the root of your body's most important metabolic choice, where to store the food you eat (i.e., into muscle vs. fat). This important event is often referred to as "nutrient partitioning" (a term coined by our friend and protein nutrition expert Dr. A. Scott Connelly). Understanding how many of the factors play into the end result will put you well ahead of your peers in the fitness profession.

Along the way, you'll discover an incredible new theory of nutritional metabolism that has tremendous implications for bodybuilders and other fitness enthusiasts concerned about their physical appearance. Rest assured, once you've finished reading this guide, food will never look the same again...nor will your body!

Finally, No More Mistakes!

Combined, the two of us have nearly four decades of bodybuilding experience. In that time, we've tried an incredible number of approaches and made an incredible number of mistakes. Here are some examples of things you'll learn that will help you avoid the pitfalls we made. See if you recognize any of them.

* Why eating too little carbohydrate is an outdated sacred cow that can send you into a dismal, over training downward spiral and cause your muscles to wither away!
* Why eating more protein than you "need" can drive your fat-burning rate through the roof! It's not as simple as the "calories in, calories out" reasoning suggests!
* Why the conversion of dietary carbohydrate into fat is not the primary reason you gain body fat!
* Your body's favorite fuel is not what you thought it was! You'll be shocked when you find out.
* What? Virtually all protein supplements and foods build only "half" a muscle? It's true! Find out how to get the other half.
* Why you don't need to starve yourself to get lean. Women listen up!
* Why some carbs are more likely to end up as new muscle tissue as opposed to fat.
* Why all fats are not the same. Some are most useful stored on your body!

The above represents only a sample of what you'll learn by reading this non-conventional (some might say "anti-conventional") nutritional guide. The knowledge we share within the pages that follow reflect the following observation; we now realize that we could have achieved our current physiques in a small fraction of the time we actually did and with much less nutritional pain and suffering.

The *No Mistakes Nutritional Guide* is a tell-all story in this regard. We share with you never-before-revealed nutritional secrets (many of which are taken directly from real-world bodybuilders and fitness enthusiasts) that will allow you to smash through sticking points and unlock your bodybuilding potential. To do this, you'll first need to come to understand . . .

Your Body's Carbohydrate Fuel "Bank"

The typical "try it and see" approach to bodybuilding nutrition yields hit-or-miss results and snail-like progress for most of us. Then why do so many of us struggle in this way?

One reason is that nutrition for Cosmetic Bodybuilding™ is grossly misunderstood. However, a deeper review of the problem exposes the fact that most of us have never been taught what is arguably the most important secret of human metabolism. Robert has coined it the Glucose Economy™.

As you'll soon discover, the Glucose Economy™ concept enables you to visualize your body as a carbohydrate fuel "bank". The status of this bank largely determines whether you are getting leaner or fatter with each passing moment; whether your muscles are bursting with size, shape and striations or appear flat, smooth and soft.

The Glucose Economy™ concept can be used to explain how any diet can be made to work or fail (and why some tend to be more inclined to do the later). In this sense, it offers us a Unified Theory of Dieting™. Fail to take control of your Glucose

Economy™ and you essentially place your body's appearance and its performance in the hands of fate. That's not a situation you want to be in, now is it?

This nutritional guide will allow you to master your Glucose Economy™ and related nutritional concepts quickly and easily. No longer will you need to guess or suffer through the progress-halting mistakes we did. Hence *No Mistakes*. A foolproof roadmap to building muscle and losing fat as fast as possible—much, much faster than you are now. You'll see changes in the mirror and receive compliments from friends (and strangers) unlike anything you've experienced before.

> "Understanding the concept of your Glucose Economy™ is key to your bodybuilding progress. Your body brilliantly fights to preserve this energy economy all day long, whether you're eating, sleeping, working out or somewhere in between."
> –Vince Andrich

A Chain is Only as Strong as The Weakest Link

This phrase may be trite perhaps, but true. This old adage explains why even a small inefficiency in your eating approach can amplify into a failure to gain pounds and inches of muscle (or failure to lose pounds and inches of fat) when repeated over weeks or months.

Conversely, correcting such inefficiencies can reward you with dramatically faster progress. In order to correct your eating mistakes and avoid making them ever again, you've got to understand the nutritional goal your body strives to achieve moment to moment. That's the Glucose Economy™. It's simple to understand and once you do, you'll see changes to your appearance as soon as tomorrow! You'll make designing meals an art form that allows you to sculpt lean, hard muscle, to the fullest extent possible, workout after workout. People will notice.

Let's get the sculpting started!

Chapter 3

"The Glucose Economy™: How to Overcome Insulin Spikes and Stabilize Your Blood Sugar to Maximize Fat Loss."

A Hardwired Human Fuel Gauge

Eating performs numerous biological functions. But there's one that tops the charts: food provides energy; something physicists define energy as "the capacity to perform work". In particular, food provides you with energy in the form of carbon (C), one of nature's most common elements. Your body's favorite source of it is a 6-carbon molecule known as glucose (see "Details" below).

The Glucose Economy™—your body's total supply of glucose is what largely determines whether you're getting leaner or fatter, whether you're sleep walking through your workouts or flying through them. This concept is as radical as it is powerful. The Glucose Economy™ is like a fuel gauge that is hardwired into every moment of your existence. Use it wisely and your physique will always stick head, neck and shoulders above the maddening crowd!

"Details" (optional reading): Blood Sugar

Glucose is more commonly known as "blood sugar". The molecular formula of glucose is $C_6H_{12}O_6$. Like many chemicals found in nature, the glucose molecule exists in more than one form. We call these forms isomers.

If you were to draw the chemical structure of a molecule of glucose on a piece of paper and place a mirror beside it, you would see its mirror image. This mirror image is nearly identical to the original molecule, save for a very small difference in the way its constituent atoms are oriented in three-dimensional space. In more simple terms, you can think of this pair of glucose isomers as being like a pair of gloves: the right hand glove is a mirror image of the left hand glove; yet they can't be superimposed on top of one another perfectly. That's why the left hand glove fits the left hand, but not the right, and vice versa.

We differentiate between the two isomers of glucose by using the terms L-glucose and D-glucose. D-Glucose is the form of glucose made by your body and provided by the food you eat. The "D" stands for "Dextrorotatory", referring to the direction this isomer of glucose rotates a certain form of light. Thus, occasionally you will see D-glucose referred to as "Dextrose".

Energy Management and the "Totem Pole" of Fuels

Your body has an economy, of sorts. This economy is based not on finances, but on fuel—glucose, in particular. Strict management of the Glucose Economy™ is its top priority, as running out of this preferred energy source would have dire consequences.

> You can take advantage of this metabolic "seesaw" to design meals that allow you to consume more calories while burning more fat and promoting faster muscle growth!

Yes, as much as we blame glucose and other dietary carbohydrates (i.e., sugars and starches) for our body fat woes; glucose is "high-man" on the totem pole of fuels "burned" or oxidized by your body. The more glucose you consume—typically in the form of sugars and starches found in the foods you eat—the more glucose your body burns. Simultaneously, it burns less in the way of fat and protein.

Conversely, as your Glucose Economy™ shrinks (e.g., between meals, overnight and during exercise), the fuel mixture shifts: You burn progressively less glucose and more fat. This spares the small amount of glucose that is available for those tissues that really need it (see "Details" below). You can take advantage of this metabolic "seesaw" to design meals that allow you to consume more calories while burning more fat and promoting faster muscle growth!

The Essential Energy Source: Glucose

Your brain isn't the only part of your body that relies heavily on glucose. Your eyes, your kidneys, the red blood cells that feed you with oxygen—and other cells and tissues are also dependent on glucose. Your muscles, by contrast, can rely on fat for fuel, thereby sparing the glucose that is available for those tissues that truly need it.

"How Big is My Glucose Economy™?"

It is important to understand that compared to the amount of fat you carry on your body (even if you're very lean), your Glucose Economy™ is quite small (Cahill, 1971). Normally only about 4 grams (g) of glucose, which is roughly a teaspoonful, floats around in your blood. In technical terms, this translates into a blood glucose concentration of about 5 mmol/L. [The term "mmol/L" refers to the number of molecules of glucose (5 mmol) per liter (L) of blood.]

Substantially more glucose is efficiently tucked away in the form of highly branched chains, termed glycogen, found most abundantly in your liver and skeletal muscle cells as compared to blood levels. Still, your glycogen storage capacity is limited, unlike your virtually infinite capacity to store fat.

Rarely will your blood glucose level increase by more than 1/2 teaspoon (1.5 to 2 g) and even then, only very briefly (Acheson et al., 1982). Within an hour of eating, it will usually have returned to normal. This fairly tight control becomes even more evident when you realize that a typical meal can easily dump 50 g -150 g or more of glucose into your body.

Insulin and the Glucose Economy™

Management of your Glucose Economy™ is achieved, in part, by the hormone known as insulin. Insulin is the "King" of energy storage (Morand et al., 1993; Hussain et al., 1995). In addition to its roles in vitamin and mineral traffic, insulin promotes the storage of the carbohydrate, fat and protein calories you consume. Insulin is released from your pancreas in response to meal ingestion and the detection of blood-borne nutrients (most notably, glucose) obtained following their digestion.

You can think of insulin as a biological "messenger" of glucose sent ahead to arrange this fuel's use and storage (i.e., as glycogen). Reaching your body's tissues via the bloodstream, insulin molecules "dock" themselves onto insulin receptors embedded within the outer layer of insulin-sensitive cells. These insulin-receptor interactions trigger a cascade of events that continue deep inside the cell. In regards to carbohydrate calories, the result is an increase in glucose metabolism.

More specifically, insulin stimulates the transport of glucose into the cell, its oxidation and storage as glycogen. Simultaneously, the oxidation of fat (fatty acids) is suppressed. Noteworthy is the fact that the vast majority of the glucose provided by the food you eat is transported into your skeletal muscle cells (Baron et al., 1988) (a.k.a. muscle "fibers"), which are perhaps the most important insulin-sensitive cells in your body.

The Rise and Fall of Glucose and Insulin

Whereas your blood glucose level comes down fairly quickly after a meal, insulin is a little more sluggish. Even after eating only a small portion of carbohydrate, with blood glucose levels increasing very slightly, insulin levels can rise dramatically. It can take roughly more than 2 hours for insulin levels to fall back to normal. In summary, the more carbohydrate ingested, the greater this effect tends to be (Jenkins et al., 1981).

When healthy people consumed a meal providing just under 300g of carbohydrate, insulin levels were still 300% above normal 7 hours later (Taylor et al., 1993). In contrast, their blood glucose levels increased by only about 1.5 g and rapidly returned to normal (Taylor et al., 1982).The lesson to be learned is that foods that cause the greatest increments in blood glucose can cause marked, long lasting increments in your insulin level. The implications this can have for your physical appearance will become apparent in a few moments.

"Won't Carbs Make Me Fat?"

This is a widespread belief that you may think about yourself. Indeed, many people believe that carbohydrate can be turned into fat. Hence the popular, albeit overly simplistic perception that sugars and starches (the form of carbohydrate most commonly eaten) are fattening. But this isn't entirely true. Let's set the record straight. Practically all of the carbohydrate you eat ends up going down two roads: (1) the glucose it provides is burned or oxidized as fuel and (2) the glucose is stored as glycogen (Acheson et al., 1982; Hellerstein, 2001).

Even when healthy people consume a meal containing an unusually large serving of carbohydrate—nearly 500 grams—most of it gets stored as glycogen and the rest is burned as fuel (Acheson et al., 1982; Flatt et al., 1985;Taylor et al., 1993). In fact, the more carbohydrate you eat, the greater the tendency to oxidize glucose and store it as glycogen (Flatt et al., 1985).Again, this occurs mostly in your muscle cells (Baron et al., 1988) under the influence of insulin.

Dietary Carbohydrate is Not Destined to Become Fat!

If you think the statement above sounds too good to be true, think again. Contrary to popular belief, dietary carbohydrates tend not to be converted into fat (Acheson et al., 1982; Flatt et al., 1985). Since this message has been promoted heavily in recent years you may ask "Why not?"

For one, converting carbohydrate into fat requires a great deal of energy (Flatt et al., 1985), a commodity your body does its best to conserve. Secondly, this process is a waste of your body's most important fuel, which is glucose.The conversion of glucose into fat is essentially irreversible—for the human body, anyway. (Plants, by contrast, are capable of performing this metabolic feat.) By now you may be asking . . .

"Then Why Do I Sometimes Get Fat when I Eat Lots of Carbs?"

The metabolic truth of the matter is that just as you make "deposits" into your carbohydrate fuel banks, you must make the appropriate "withdrawals" to avoid gaining fat. Experienced bodybuilders intuitively know how to do this by adjusting the number of sets and reps they perform for each muscle group (i.e., training "volume"). Generally speaking, as you increase your training volume, the exercised muscles will incur a greater depletion of glycogen, thereby prompting an elevation in overall fat-burning metabolism (i.e., so as to preserve your threatened Glucose Economy™).

Here's another way of looking at it. If you consume large quantities of carbohydrate day after day and fail to burn it up with exercise, you'll eventually push your glycogen storage capacity to its limit. Recall that compared to your virtually infinite capacity to store fat, this glycogen storage capacity is pretty small (Cahill, 1971; Flatt et al., 1985). Generally speaking, the more muscle you carry and the more you exercise, the greater your glycogen storage capacity will tend to be.That's one of the reasons we pump iron, after all, isn't it?

Then again, remember that no matter if you are Mr. Olympia or an Ironman triathlete, if you consume too much carbohydrate, you will eventually incur a net fat gain—that is, you'll become heavier. However, even under these circumstances, the conversion of dietary carbohydrate into fat, per se, is not the major contributory factor (Hellerstein et al., 1996; Hellerstein, 2001).

The Fuel-Burning "Manifesto"

As we've discussed, eating carbohydrate affects your "seesaw" of fuel-burning (energy) metabolism. However, when managed properly, this metabolic manifesto can have a tremendously positive effect on your efforts to build your best body. Here's why.

You now know that eating carbohydrate tends to increase insulin levels more than does eating fat or protein. As sugars and starches in the food you eat pass across your tongue and become digested in your gut, blood glucose and insulin levels rise. In fact, your insulin level rises more than that of your glucose level and it takes longer to return to normal. The magnitude of this effect depends upon the type (i.e. slow or fast absorbing) and amount of carbohydrate you eat.

We've also learned that eating carbohydrate stimulates the oxidation of glucose and its storage as glycogen (Acheson et al., 1982). This is great news for bodybuilders who want the cosmetic benefits of fuller, harder, more striated muscles. This is due to glucose per se, as well as its metabolic messenger, insulin.

The "seesaw" aspect of this fuel-burning metabolism lies in the fact that carbohydrate (glucose) and insulin shift your body's fuel-burning mixture toward glucose oxidation and away from fat oxidation (Flatt et al., 1985; Hussain et al., 1995). At a blood insulin level less than that found following a "normal" meal, the breakdown of body fat can be reduced by some 50% (Bonnadonna et al., 1990; Jensen et al., 1989; Swislocki et al., 1987).

> You can go through each day burning both carbohydrate and fat at rates that, over time, cause your body fat to almost fall off. Since your muscles will be pumped with glycogen you'll be ready to hit the iron hard at each and every workout.

The priority of these metabolic events over those governing fat lies in the fact that your storage capacity for carbohydrate is much, much more limited.

So while eating carbohydrate will indeed prompt your metabolism to burn less fat, temporarily; it will also cause it to store and oxidize that carbohydrate. Again, if you learn to master your Glucose Economy™ (as you will with our recommended eating plan, discussed shortly), you can go through each day burning both carbohydrate and fat at rates that over time cause your body fat to almost fall off. Plus, your muscles will be pumped with glycogen and ready to hit the iron hard at each and every workout.

How Carbohydrate Impacts Your Fat-Burning Rate

If there is one lesson that you take from this guide to your kitchen table, it should be the Glucose Economy™ concept and its implications for your fuel-burning metabolism. In particular, eating carbohydrate suppresses your fat-burning rate. This means that you must balance your carbohydrate intake with your fat intake in order to see bigger, leaner muscles appear in the your mirror at the fastest pace possible.

Concerning carbohydrate calories, arguably the most important factor determining your ability to lose body fat is the quantity of carbohydrate you eat. (The type of carbohydrate you eat can also affect this outcome, as we will discuss later.)

To a point, the more carbohydrate you eat, the faster you oxidize glucose and the slower you oxidize fat.

This makes sense. When your top fuel, glucose, is abundant, it is oxidized in preference to less popular fuels, namely fat and protein. As the Glucose Economy™ shrinks, your body works down the "totem pole" of oxidized fuels: it burns progressively more fat and attempts to spare the small amount of glucose that is available for those tissues that are critically dependent on it.

This research suggests to us, why eating excess carbohydrate can make you fat. The problem is not carbohydrate being converted into fat. Rather, it is that eating carbohydrate stimulates metabolic pathways involved in the burning of glucose while it slows down those burning fat.

Stated another way, consider the quote below by Hellerstein (2001) commenting on a study by McDevitt et al. (2001) in which the conversion of dietary carbohydrate into fat was measured in women fed mixed diets containing an excess of carbohydrate.

"...Thus, the addition of **excess carbohydrate** energy to a mixed diet so that total energy intake exceeded total energy expenditure (TEE) increased body fat stores, but not by conversion of the carbohydrate to fat. Instead, the oxidation of dietary fat was suppressed and fat storage thereby increased."

"...Some conclusions should not be drawn. First, these results do not mean that extra carbohydrate energy represents "free" energy in terms of body fatness. By sparing fat in the body's fuel mixture, surplus carbohydrate energy will make people fatter, even though it is not directly converted to fat. The absence of significant de novo lipogenesis is bad news for high-carbohydrate dieters for another reason, in that the high thermogenic cost of de novo lipogenesis cannot be invoked as an energy dissipating feature of such diets. Second, the effects of carbohydrate-rich diets on macronutrient balances should not be confused with their potential effect on plasma lipids and atherogenesis."

The Most Fattening Combination: High-Carbohydrate and High-Fat

It should come as no surprise that the combination of high-carbohydrate and high fat can "fatten" even the most metabolically gifted persons. Unfortunately, this combination is common to nearly all of the world's favorite dishes.

As we previously discussed, the main culprit is the sheer amount of carbohydrate you consume due to carbohydrate's suppressive effect on fat oxidation. This increases the risk that fat eaten alongside that carbohydrate will be stored as fat on your body. As a corollary, the suppression of fat oxidation also impairs your ability to get rid of existing body fat.

Eating more fat does not substantially increase fat burning metabolism, but causes more of it to be stored (Flatt et al., 1985; Forslund et al., 1999).

Make Sense? If Not Please Read it Once More.

"...the main culprit is the sheer amount of carbohydrate you consume due to carbohydrate's suppressive effect on fat oxidation. This increases the risk that even a small amount of fat eaten alongside that carbohydrate will be stored as fat on your body. As a corollary, the suppression of fat oxidation also impairs your ability to get rid of existing body fat.

In the metabolic playground that is your body, dietary fat, as compared to carbohydrate, occupies the short end of the fuel-burning seesaw. Whereas dietary carbohydrate powerfully "leverages" or stimulates its own oxidation, fat does so only very weakly. That is, eating more fat does not substantially increase fat burning metabolism, causing more of it to be stored (Flatt et al., 1985; Forslund et al., 1999)."

A Solution to the Problem: Harnessing Your Fat-Burning Turbocharger

Of course, eating less carbohydrate is a powerful way to threaten your Glucose Economy™. Deficient in a more direct source of glucose (i.e., sugars and starches), your body strives to synthesize it indirectly from so-called "non-carbohydrate" sources. The glucose so produced is spared for those tissues that really need it by an increase in the burning of fat.

This process of making "new" glucose from "non-carbohydrate" precursors is termed gluconeogenesis. Contrary to popular belief, gluconeogenesis occurs all the time, even when you are well fed (Jungas et al., 1992). However, it occurs to a greater extent as your Glucose Economy™ begins to dwindle in size. Importantly, gluconeogenesis is an energy-consuming process and this energy is supplied by the burning of fat. You can harness this fat-burning "turbocharger" every time you sit down to eat a meal!

Gluconeogenesis and thus, fat-burning metabolism, is running at a snail's pace in most of us. This makes it easier to get fat. However, you're going to learn how to put yours into "high-gear". But first you must learn to overcome ...

Muscle "Meltdown"-Amino Acids as Glucose

What are the "non-carbohydrate" materials that your body uses to make glucose? One important gluconeogenic material is protein. In particular, the building blocks of protein, amino acids.

As a bodybuilder or serious fitness enthusiast, you are likely already aware of the importance of amino acids. Briefly, amino acids function like letters of the alphabet. They can be strung together in a myriad of combinations to yield "words" or proteins with unique form and function: hemoglobin, insulin, growth hormone and antibodies are just a few examples of proteins essential to human life.

Your body makes or synthesizes its own proteins from amino acids made available to it. The protein you eat provides amino acids, of course, as does the breakdown or catabolism of your own tissue protein (e.g., skeletal muscle protein). Certain amino acids can also be made "from scratch" (so-called de novo synthesis), provided your body has enough nitrogen (provided by other amino acids) and carbon (as from carbohydrate).

Alanine and Glutamine: Key Glucogenic Amino Acids

Certain amino acids in the protein you eat and in the protein that makes up your tissues (such as your hard-earned muscle), can be converted into glucose. We call these amino acids "glucogenic". Two key glucogenic amino acids are glutamine and alanine. From a teleological standpoint, this seems logical. Glutamine, for instance, is perhaps the most common amino acid in the food proteins (plant and animal) you consume.

The amino acids lysine and leucine can be converted into ketones (Jungas et al., 1992), another alternative fuel source. Ketones can also be produced from fat. In fact, for our purposes, you can think of a ketone as a water-soluble fat.

Gluconeogenesis and the Burning of Fat: Hand-In-Hand

The increased use of fat and ketones by tissues that can use them effectively spares the glucose yielded by gluconeogenesis for those tissues that really need it. In fact, the oxidation of fat and ketones provides the energy required to drive gluconeogenesis (Jungas et al., 1992; Morand et al., 1993). Thus, the burning of fat and gluconeogenesis go hand-in-hand; you can't have one without the other. You can take advantage of this metabolic fact to turn your next meal into a fat burning "torch"!

Amino acids and glycerol are the two most important gluconeogenic substrates (Owen et al., 1998). To harness gluconeogenesis for its fat-burning benefits without melting away your hard-earned muscle, you must be certain to consume a higher protein diet (discussed later). This will spare your muscle from being torn down to provide glucogenic amino acids and other fuels.

Glycerol

The value of glycerol as a component of body fat becomes especially apparent when you ponder the dietary challenges faced by our species during the bulk of its evolutionary journey.

"Why Do We Have Body Fat?"

Perhaps the single most important metabolic function of your body fat (as unsightly as it may seem to you) is to serve and protect your Glucose Economy™. Thus, the more successful you are at threatening this Glucose Economy™ (within reason), the more successful you will be at threatening your body fat stores. They'll begin to wither away!

Most readers, including many medical researchers, will find this proposed purpose of body fat to be a revolutionary, eye-opening concept. Its implications are very far reaching, providing explanations for everything from diabetes to obesity and reproductive dysfunction.

Body fat provides both substrate (glycerol) for gluconeogenesis and a source of energy (fatty acids) with which to fuel it. Here's how it works. Fat is stored inside the cells of your body (especially fat cells or adipocytes) as "oil droplets" composed of triacylglycerols (a.k.a. "triglycerides"). Each triacylglycerol molecule consists of three fatty acid molecules attached to one molecule of glycerol.

When body fat is broken down, fatty acids and glycerol are released into your blood stream. This process is termed lipolysis, roughly translated as the "splitting" (lysis) of fat (lipid). The fatty acids can be oxidized to provide energy, whereas the glycerol can be converted into glucose (Chen et al., 1993). In fact, and as noted above, the energy provided by the former oxidation of fatty acids supplies the energy required to drive the latter-conversion of glycerol into glucose. It's an ingenious set-up, something only possible after millions of years of biological evolution.

A Prehistoric Predicament

Try to imagine yourself 100,000 or so years ago. There you are, wandering about under the midday sun searching for something to eat. You're physically active and short on food—the two most powerful ways to increase your fat-burning rate. Though you carry only a small amount of body fat on your lean, sinewy frame, it can supply ample energy to keep you going for many days. More specifically, your bodies fatty acids can be oxidized and the glycerol, via conversion to glucose, can be used to preserve your suffering Glucose Economy™. Nifty, huh?

Now back to the present. Same metabolic equipment, but a different, completely opposite set of dietary challenges. As a consequence of our modern day conveniences, we suffer not from under-nutrition, but from over-nutrition. We perform not too much exercise, but too little.

Yes, the reality is that compared to prehistoric times, you spend each day (overly) well fed and, despite your daily visits to the gym, mostly inactive. This renders your fat-burning metabolism (e.g., your gluconeogenic turbocharger) quite sluggish for the greater portion of each day. No wonder we get fat so easily! The solution? In order to build your best body as quickly as absolutely possible (without starving yourself), you must eat in a way that "revs" your fat-burning metabolism well above normal—which is the purpose of the eating plan discussed next.

Chapter 4

"Stop Thinking About Dieting Forever with Evolutionary Eating™: Teaching Old Biochemistry 'New' Tricks."

The quote provided below exemplifies a stance taken by many conventional nutritional scientists. However, Evolutionary Eating™ is anything but conventional. It is a radical, "anti-conventional" approach that occupies a place we refer to as the "bleeding edge" of bodybuilding nutrition. As a reference, read the quote below from a Conventional Nutritional Scientist.

"When its diet is such that an adult human is in a state of metabolic equilibrium, dietary protein is required to replace the essential amino acids and amino acid nitrogen lost during metabolic turnover. In the resistance-training adult (i.e., those stimulating muscle protein accretion through exercise), additional protein is required to subserve muscle growth requirements and possibly also the increased use of protein-derived amino acids as fuel (during exercise). The energy derived from carbohydrate and fat affects protein requirements, because it spares the use of protein as an energy source. To use dietary protein efficiently and to reduce requirements for its use to a minimum, it is necessary to ensure adequate provision of energy from nonprotein sources, some of which should be carbohydrate in order to spare protein from gluconeogenesis."

Modern Day Evolutionary Eating™

Pumping iron in the gym, that's what sets the muscle-building process in motion. How successful you are at seeing that process come to fruition in the form of bigger, stronger and leaner muscles is largely determined by the food you choose to put in your mouth.

The eating approach we describe below can allow you to achieve three things: (1) lose body fat faster, (2) build muscle faster and (3) eat more food. You won't feel restricted, nor will you feel like your muscles look "flat" or feel like the wind has come out of your sails. Let's work through it step by step.

STEP ONE:

Start by Eating 15 Calories Per Pound of Body Weight

It's a starting point or baseline and nothing more. To get you started on the Evolutionary Eating™ plan, begin by consuming 15 calories (a.k.a. "kcalories") per pound of body weight.

Granted, the "per pound of body weight" descriptor implies you are feeding metabolically "inactive" tissue such as adipose (fat) tissue. However, determining your lean, or "non-fat" body mass as well as a calorie level for it, is far more difficult and frankly not worth the trouble.

Get a calorie-counting guide (e.g., the Nutrition Almanac) that tells you how much energy (calories), protein, fat and carbohydrate are in a serving of as broad a variety of foods as possible. Don't make it rocket science, as it doesn't have to be. Simply watch your mirror closely for the next two weeks and adjust your 15 calories/lb value up or down accordingly. If you are relatively inactive, this may be too much food; for the highly active, it may be too little.

STEP TWO:

Spread Your Calories Over 5-6 Smaller Meals

Bodybuilders and similarly focused fitness enthusiasts are advised to consume smaller meals (e.g., 5-6) spaced evenly over the course of day. The purpose here is not to prevent a fall in your metabolic rate, as is sometimes suggested, but simply to provide a stable influx of muscle-building materials like water, amino acids, glucose, minerals, vitamins and so on.

The muscle-building process your workouts set in motion takes place over many hours and days. Reducing the number of nutritional "gaps" your muscles encounter during this process can have a big impact on the way you look in the mirror with each passing day. A great way to do this is with 5-6 smaller meals.

> Here's another metabolic secret. Physical activity such as working out in the gym, turns your muscles into caloric "sponges" of sorts. They "suck" up the food calories you consume effectively "stealing" them away from your fat cells.

Furthermore, the "small and more frequent" approach to eating increases the likelihood that the calories you eat will be shunted toward lean tissue compartments (muscle, connective tissue and bone) and away from fat stores—which, of course, is exactly what you want.

Here's another metabolic secret. Physical activity such as working out in the gym, turns your muscles into caloric "sponges," of sorts. They "suck" up the food calories you consume effectively "stealing" them away from your fat cells. Take advantage of this fact by having slightly larger meals after your workouts and other periods of physical activity. Eat smaller meals during your less active portions of the day. Again, this encourages your food to be tucked away as lean muscle rather than as extra body fat.

STEP THREE:

Eat More Protein Than You "Need"- 40% of Your Calories

Bodybuilders and similarly focused fitness enthusiasts can benefit from 1.6-1.7 grams of protein per kg body weight per day (Lemon et al., 1997). One kilogram, by the way, roughly equals 2.2 pounds. However, eating a diet providing even more protein than this (i.e., 2.5 g/kg bodyweight/day) yet lower in carbohydrate can allow you to burn more fat, both during exercise and at rest (Forslund et al., 1999)! Such a diet is superior to one lower (though still adequate) in protein and higher in carbohydrate for establishing a positive protein balance (Forslund et al., 1999) -an essential requirement for adding pounds and inches of lean muscle to your body!

We have been conducting our own personal nutritional experiments and observing some of the world's best physiques, both female and male, for decades. As such, we recommend consuming even more than the aforementioned 2.5 g protein/kg body weight/day. Importantly, this is to be accompanied by a reduction in carbohydrate intake (discussed later).

An "Anti-Conventional" Dietary Protein Recommendation

In opposition to the previous quotation ("To use dietary protein efficiently and reduce requirements for its use to a minimum..."), our goal is to use dietary protein inefficiently and to increase requirements for its use. This is achieved by providing inadequate "provision of energy from non protein sources", in particular, carbohydrate. Thus, rather than "spare protein from gluconeogenesis", we will encourage such use. This increases the need for fat oxidation (to provide energy with which to drive gluconeogenesis), thereby increasing your overall fat-burning rate.

Remember that at the end of the day, it's your fat balance that matters to your mirror and your measuring tape. For instance, if you consistently achieve a negative fat balance, you burn more fat than your body stores each day and body fat will melt away. Do the opposite (i.e., a positive fat balance), as most people do, and you'll positively get fatter. By taking advantage of your body's gluconeogenic capacities, you can peel off body fat in a way Mother Nature never intended!

> Remember that at the end of the day, it's your fat balance that matters to your mirror and your measuring tape.

Take Advantage of Mother Nature to Melt Away Your Body Fat

The typical registered dietician will tell you that the higher-protein diets favored by bodybuilders and serious fitness enthusiasts are too high in protein. Nutritional scientists, including some of the most respected minds in the arena of dietary protein metabolism, will say much the same thing. In a sense, all are correct. Certainly, many bodybuilders, the two of us included, consume more protein than is required to build muscle. But . . .

A Higher Protein Intake Does More Than Just Build Muscle!

Indeed, building more muscle isn't the only intention for our higher-protein eating approaches. That extra protein, coupled with a reasonable reduction in dietary carbohydrate, is also intended to boost our metabolism—in particular, our fat-burning metabolism. And boost it does! This simple and painless dietary adjustment can make your body fat appear to fall off and your muscles achieve a hardness that the human eye cannot deny. The Evolutionary Eating™ plan will have you eating more than enough protein to cover your muscle-building needs. Much of this "excess" will be turned into glucose in the energy-consuming process—gluconeogenesis—fueled by the oxidation of fat.

You Can Eat the "Evolutionary Way" All the Time!

Even though you will be making "deposits" into your Glucose Economy™ with all of the protein you'll be eating, this indirect pathway of glucose production (i.e., gluconeogenesis) will keep your muscles bursting with size and shape just as efficiently as carbohydrate (sugars and starches) can. But we'll discuss dietary carbohydrate (and dietary fat) later. Suffice to say, we've found that an eating plan deriving 40% of its calories from protein, 40% from carbohydrate and 20% from fat can yield phenomenal results. Plus, you can eat this way all the time! No need for periodic re-introduction of carbohydrate to preserve your muscles or your energy levels. No need to take a break to preserve your sanity!

Fat oxidation with the described Evolutionary Eating™ approach is in the range necessary for you to achieve a negative fat balance and thereby, a leaner, more muscular physique. On the other hand, the moderate intake of carbohydrate keeps your muscles bursting with size, shape and energy.

We've found that an eating plan deriving 40% of its calories from protein, 40% from carbohydrate and 20% from fat can yield phenomenal results. Plus, you can eat this way all the time!

"Do I Really Need a Protein Supplement?"

When you start eating 40% of your calories from protein and the same from carbohydrate, your fat-burning metabolism gets a tremendous boost. Your appearance will change correspondingly.

Now, protein isn't the only source of essential muscle building blocks, though it is arguably the most important one. Actin and myosin are the major contractile proteins of muscle. Their interaction (via the "cross-bridge cycle" of muscular contraction) is what makes lifting weights and moving, in general, possible. Building bigger, stronger muscles is to a large extent about building more muscle proteins like actin, myosin and many others.

Consuming 40% of your calories from protein without consuming too many total calories, particularly from fat or sugar, can be tough. Protein supplements (such as meal-replacement products (MRP's), protein powders and bars) can therefore provide a life-simplifying solution for anyone who is serious about building lean muscle tissue rapidly.

A good protein supplement can also provide something "regular food" cannot. Read on, this is going to shock you.

The "Secret" to Building Muscle with Protein

For the bodybuilder eating the Evolutionary way, dietary protein can be considered as fulfilling at least 3 functions: (a) maintenance, (b) growth (e.g., of skeletal muscle, connective tissue and bone) and (c) support of the fat-burning metabolism (via gluconeogenesis).

Concerning growth, there's a muscle-building equation that you've got to satisfy in order to get bigger. Unfourtunately all diets and most protein supplements are addressing only half of it. At best, they're only giving you 50% of the muscle gains you're capable of achieving. Many fare even worse or do nothing at all!

STEP FOUR:
Use a Protein Supplement That Fulfills Both Sides of the Muscle-Building Equation

You see, in order to get your muscles bigger, as quickly as possible, you've got to do a couple of things: (1) reduce the breakdown (termed catabolism) of the muscle protein you already have and (2) increase the building (termed anabolism) of new muscle protein. When protein anabolism exceeds catabolism, the result is a net gain in muscle mass that you can see in the mirror and have envied by your friends.

Your protein supplement should address both sides of the muscle-building equation. It should help your body slam the brakes on muscle protein catabolism as it hits the gas pedal on muscle protein anabolism. Like "regular" food, most protein supplements do only one.

Regular Food Satisfies Only Half of the Muscle-Building Equation!

Until now, the best way to reduce the catabolism of your hard-earned muscle (in particular, muscle protein) was to eat. The protein in the food you eat signals your body to reduce the catabolism of its own muscle proteins. In fact, suppression of protein catabolism is the central means by which your body maintains protein balance in the face of fluctuations in dietary protein intake over the course of a day. But you're not interested in maintaining—you want to grow!!

As we said earlier, slowing down muscle protein catabolism is only one half of the muscle-building equation. To increase the size of your muscles, you've got to stimulate muscle protein synthesis, as well. The reality is that stimulating the synthesis of new muscle protein is by far the more important half of the muscle building equation. You can stimulate muscle protein synthesis by performing the

right kind of exercise (e.g., pumping iron) and by supplying your body with certain anabolic agents like testosterone, including its synthetic derivatives (anabolic-androgenic steroids) and growth hormone. These being the most commonly cited examples.

If you're like most people, no matter how intelligently you exercise and eat, your muscles grow only very slowly, if at all. There's a reason for this. As you emerge from childhood your muscles lose much of their ability to respond to the food you eat with an increase in protein synthesis. The growth signals that normally allow this to occur when you're a youngster severely weaken in intensity as you enter adulthood. It's as if Mother Nature has locked away much of your muscles' protein-synthesizing machinery, allowing you to build muscle only to a very limited extent as an adult. Kind of crummy, huh?

You can finally address both sides of the muscle-building equation and build 100% of the muscle you're capable of!

"Dual-Action" Protein

A "dual-action" protein supplement can change all of this. One example is Prolab's Lean Mass Matrix™ meal-supplement. This supplement provides a combination of proteins designed to help you "unlock" your protein-synthesizing machinery. At the same time, it helps you slam the brakes hard on muscle protein catabolism (hence "dual-action"). You can finally address both sides of the muscle building equation and build 100% of the muscle you're capable of! You'll start to see the muscle gains you've always expected from protein supplements...but never received!

"Details" (optional reading): Protein Balance

Whether proteins come from your own tissues (e.g., muscle) or from food, they consist of amino acids linked together in chains. Amino acids are the principle means by which we humans get nitrogen—an essential element to your survival.

Building muscle is about balance—protein balance. If your body makes more muscle protein than it breaks down (termed a positive protein balance) your muscles will increase in size and strength with time. Conversely, if you make less muscle protein than you break down (termed a negative protein balance) your muscles will tend to get weaker and smaller. Scientists refer to "building" processes as "anabolism" or "anabolic"; "catabolism", in contrast, describes processes of breakdown or degradation. Thus, a positive protein balance indicates an anabolic state.

Since protein contains nitrogen, we can estimate your protein balance by measuring your nitrogen balance. Technically speaking, however, the two should not be considered equal. In any case, a positive nitrogen balance is generally taken as a sign of an anabolic state with an overall gain (retention) of nitrogen for the day, whereas a negative nitrogen balance indicates a catabolic state.

Another, possibly more accurate, way to estimate your protein balance is by measuring your body's balance of a particular amino acid, such as leucine. A positive leucine balance indicates protein anabolism. Or, at least, a positive leucine balance reflects a state (i.e., increased availability of leucine inside your muscle cells) that promotes protein anabolism. Conversely, a negative leucine balance indicates protein catabolism. Simply said, a positive leucine balance is "good"; a negative leucine balance is "bad", if your interest lies in building bigger muscles.

Your Protein Economy

If you don't eat all the time, there are fluctuations in your protein intake such as in between meals and while you sleep. So how does your body preserve its protein balance? How does it keep the total amount of protein in your body—your "Protein Economy"— from shrinking in the face of fluctuating intakes of dietary protein (e.g., meal-to-meal variations and overnight fasting)?

The answer is that your body increases or decreases the rate of protein tissue breakdown according to how much protein you feed it (for review see Garlick et al., 1999). Generally speaking, in between meals you lose protein tissue (or muscle), but after a protein-containing meal, you recoup that which was lost through a decrease in protein breakdown. The production or synthesis of protein tissue typically doesn't change too much after a protein-containing meal (Melville et al., 1989; Price et al., 1994; Garlick et al., 1999); nevertheless, because protein breakdown is reduced, the result is a net increase (gain) in protein such that balance is achieved. You don't get bigger, granted, but you don't shrink either.

Of course, bodybuilders aren't interested in maintaining the status quo. We want to build bigger muscles. The bottom line is that in order to actually gain enough muscle protein to make your muscles bigger and stronger, you've got to address both sides of the protein balance equation. Again, stimulating muscle protein synthesis is by far the more important half of the muscle-building equation. This cannot be emphasized enough. Stimulation of muscle protein synthesis is the means by which resistance training (lifting weights) makes muscles grow (Barr and Esser, 1999). It's also how some of the most powerful muscle-building agents found in the human body (and used by athletes) operate (e.g., testosterone, growth hormone and insulin-like growth factor-1).

"Dual-Action" Protein: Lean Mass Matrix™

Lean Mass Matrix™ contains a unique mixture of proteins specifically chosen to slow down muscle protein catabolism and speed up muscle protein synthesis. Casein, for instance, which is a component of milk protein, "trickles" into your bloodstream feeding your muscles amino acids over many hours. This seems to be the better approach for slowing protein breakdown (Boirie et al., 1997). Lean Mass Matrix™ also contains proteins like whey (also a component of milk protein) that enter your bloodstream rapidly following consumption. This seems to be better for promoting protein synthesis (Boirie et al., 1997). Combined, Lean Mass Matrix™ gives you "Dual-Action" protein nutrition.

Leucine: Protein Synthesis Accelerator

Leucine is an essential amino acid. More accurately, humans have always been able to get enough leucine from the diet to avoid the necessity of making it completely on their own (i.e., de novo synthesis).

In any case, your muscles need leucine if they are to become bigger and stronger. Whey (again, found in Lean Mass Matrix™) has been found to raise blood leucine levels nearly as quickly as an intravenous amino acid injection (Boirie et al., 1997))! This is important to bodybuilders as leucine has been reported to be the most potent amino acid in terms of its ability to stimulate protein synthesis (Shigemitsu et al., 1999). Indeed, whey's speedy delivery of leucine may explain its ability to stimulate protein synthesis so powerfully when eaten by humans (Boirie et al., 1997).

"Fast" Proteins: A Double-Edge Sword?

You may have heard that faster isn't necessarily better when it comes to protein absorption. This is true. As research on proteins like casein have shown, a slow digestion/absorption profile can be better for reducing protein catabolism and promoting protein gain. The faster a protein supplement is digested and absorbed into your body, the more likely its constituent amino acids are to be wasted. That is, the more rapidly your blood amino acid level rises, the greater will be the oxidation of those amino acids as fuel.

It's a double-edge sword. Apparently, when it comes to protein supplements, you can't get the "good" (a strong stimulation of protein synthesis) without the "bad" (amino acid wastage). So, while the fast-absorbing proteins in a dual-action protein supplement may promote some amino acid wastage, they will also enhance protein synthesis—that other half of the muscle-building equation so important to building bigger muscles quickly.

One thing is certain, the "Dual-Action" concept of protein nutrition is not just our opinion. In fact, it has been talked about by some of the best minds in sports nutrition including Dr. Scott Connelly (M.D.) and Jeff Feliciano, to name a few. Interestingly, it would appear that Mother Nature had both sides of the muscle building equation covered with the invention of milk (a mixture of slow-absorbing casein plus fast-absorbing whey)!

Details (optional reading): More Protein = Less Catabolism

Increasing protein synthesis. Reducing protein breakdown. You've got to do both to build bigger muscles as quickly as possible.

In regards to suppressing protein breakdown, the quality, as well as quantity of the protein you eat can play a big role in determining how successful you are. Animal and human studies indicate that the higher the protein content of the diet, the greater the suppression of muscle myofibrillar protein breakdown (Nagasawa et al., 1998). This is a very important observation as the myofibrillar proteins of skeletal muscle include contractile proteins like actin and myosin. They must increase in abundance if your muscles are to become bigger and stronger over time.

STEP FIVE:

Eat 40% of Your Calories as "Intact", Slow-Digesting Carbohydrate

Okay, so you've calculated your baseline calorie intake using the 15 calories/lb of body weight rule. Forty percent of those calories will come from protein, at least some of that in the form of a "dual-action" protein supplement like Prolab's Lean Mass Matrix™. Another 40% of your calories will come from carbohydrate. This will allow you to keep your muscles bursting with size, shape and energy while harnessing your fat-burning drive train, gluconeogenesis. Not only the amount, but also the type of carbohydrate you eat matters. But before we get into that, let's answer that burning question...

"Why Not Eat a "Zero-Carb" Diet?"

Indeed, why not? A "zero-carbohydrate" diet can certainly work, but it will not give you the bodybuilding progress you dream of. That's why we refer to it as a diet.

Vince has written about this topic and has exposed many of the pitfalls from both a scientific and a practical point of view. Robert has had intimate experience with zero-carbohydrate diets, using them many, many times in the past. His muscles get lean and hard very quickly, yet they become flat and small in appearance nearly as fast. Importantly, additional gains of muscle are for the most part non-existent.

On a humorous note, Robert's girlfriend, Joy, has agreed that he lost weight from being on zero-carbohydrate diets. However, when she encourages him to briefly load up with carbohydrate (e.g., as by treating himself to a tray of her fat-free Rice Crispy squares or rice pudding) his muscles swell with size, shape and energy literally overnight.

What these and other observations tell us is that the zero-carbohydrate diet is a short-term approach, at best, that requires periodic re-introduction of carbohydrate. Gluconeogenesis, the sole source of glucose on such a diet, just can't satisfy your muscles' metabolic needs enough to keep them full, shapely and energetic. Yet even periodic consumption of carbohydrate won't manage to resolve these problems, nor restore your muscle-building progress. So what's the point? The Evolutionary Eating™ plan, in stark contrast, can be used indefinitely while bringing about the daily changes to your physical appearance you dream of.

Besides the negative impact on your physical appearance, performance and muscle-building progress; zero-carbohydrate diets also require excessive rigidity. This dietary monotony may be too much for those culinary inclined. At the least, such an extreme restriction of carbohydrate intake will prevent you from achieving the full, growing muscles possible with a diet higher in carbohydrate. In addition the effect on your perceived energy level may be problematic depending on your lifestyle (e.g., workout schedule, career and family demands). This is why many bodybuilders and workout enthusiasts find superior results by bumping up their carbohydrate intake slightly, while taking in less fat and more protein. The reward is lean muscles bursting with energy and shape as well as an eating plan you can stick to for the rest of your life. So picking up where we left off we, arrive at ...

"What Type of Carbohydrate Should I Eat?"

Not only the amount, but also the type of carbohydrate you eat can affect your bodybuilding progress. For the best results, we recommend your carbohydrate come from "intact", slow-absorbing sources. A relatively foolproof way to do this is by consuming only natural, "whole" (unrefined or unprocessed) foods—the way food looked for most of our evolutionary history as a species.

Not only the amount, but also the type of carbohydrate you eat can affect your bodybuilding progress.

Human beings have been around for hundreds upon hundreds of thousands of years. For essentially all of that time, our species obtained nutrients from natural, whole ("intact") foods. Many of these foods are no longer eaten or available. Even when they are, most of us choose to find something more convenient and economical to eat.

But convenience foods lack something the whole foods from our evolutionary past provided: intact, biologically potent nutrients delivered in a complex matrix built of fiber and other structural elements. In the carbohydrate realm, these are otherwise known as whole grains, fruits and vegetables. For our discussion, we will focus on whole grains, since in today's world they are only remotely similar to their origins (fruits and vegetables are much easier to find in a natural state). Simply put, the mass market commercialization of food products effectively turned us into a nation that primarily eats refined grains that have been depleted of their structural integrity. These "empty" carbohydrates are then marketed in the form of baked goods that are easily sold to people on the go.

The Birth of the Health Food Store

Package foods manufacturers call it "refinement" or the removal of vitamins, minerals, fiber, antioxidants, bioflavonoids, phytosterols and lecithin (as well as many more growth factors that support your bodybuilding efforts) from natural, whole foods. Then, they put just a few of the vitamins and minerals, in synthetic forms that have little or no resemblance the original, biologically intact, forms of these nutrients back into the food. The final product is dubiously referred to as "enriched" or "refined". What the manufacturers remove in this process is what you attempt to buy back at the health food store.

Take a shopping cart and browse through your neighborhood food store and you'll see the aisles bursting with refined or processed foods. Yet, on an evolutionary time scale, such foods have been in the human diet for only a blink of an eye. In the early 1900s, big cereal companies began mass processing grains. It should therefore come as no surprise that processed foods are quite new and foreign to your body. We are firmly convinced that, metabolically speaking, your body cannot use them as effectively as the natural, biologically intact foods from which they are derived.

Breakfast cereals are just one, of many refined carbohydrate foods. Many of which effectively dump glucose into your blood stream more quickly than it can be turned into lean tissue (e.g., muscle glycogen). In fact, as we've learned, it may be more likely to end up being wastefully oxidized and promoting the storage of co-ingested fat (e.g., as through suppression of fatty acid oxidation).

Carbohydrates and the Glycemic Index (GI)

We use the Glycemic Index (GI) to rate the propensity of carbohydrate-containing foods to raise your blood glucose (and thereby, insulin) levels following their consumption.

Your body likely has the capacity to harness low-GI, biologically "intact" (unprocessed) carbohydrate-containing foods to their full anabolic potential. Studies performed in the 1930s (Cuthbertson and Munro, 1939), for instance, showed that sustained nutrient delivery such as would be expected to occur with ingestion of smaller, more frequent meals consisting of unprocessed nutrients is superior for enhancing lean tissue and minimizing body fat.

Higher-GI Foods Give a New Meaning to the "Chinese Food Syndrome"

We also know that this type of nutrient delivery is best for satisfying your appetite (i.e., curbing your desire to overeat)! Higher-GI foods, because of their effects on insulin secretion, can cause your blood glucose to fall to a lower level than that which existed prior to their consumption. Your brain interprets this as a threat to your Glucose Economy™ and reacts by stimulating appetite. You become ravenous even though your tissues are actually very well fed. You can see what kind of trouble this can get you into! We call it "rebound eating". It gives the "Chinese Food Syndrome" a whole new meaning!

NOTE: For an up-to-date table of GI food values, please consult Adad et al. 2002. Am J Clin Nutr.

How the Glycemic Index Works

In 1981, Jenkins and his colleagues reported differences in absorption rates for foods we typically place under the heading dietary carbohydrate. The researchers published a paper on the Glycemic Index (GI), which they introduced as an index by which to rank carbohydrate foods according to their ability to raise blood glucose levels following ingestion.

Basically, the GI of a food is measured as follows. A standard or reference food is chosen. The choice is usually white bread (crusts removed), but occasionally pure glucose [a.k.a. "dextrose" or D-glucose] is used. Following an overnight fast, the subjects eat a serving of the standard food chosen to deliver 50 grams (g) of available glucose. This serving is consumed within a set period of time, say, 15 minutes. Over the next two hours, the subjects finger is pricked at 15-minute intervals so as to provide capillary blood samples.

By analyzing the blood samples, the subject's blood glucose (i.e., "glycemic") responses to the standard food meal can be followed over time. Tracing an individual subject's 2-hour blood glucose pattern on a graph yields, appropriately enough, a "blood glucose curve". The area underneath this curve can be compared to other foods tested in the same fashion on a separate occasion. Typically, the standard food is tested three times in each subject and an average is taken.

The GI values of different foods may be determined in a given subject on different occasions. As with the standard, a serving of the food of interest is chosen to provide 50 g of available glucose. The area under the blood glucose curve for this food is determined as above and compared with that obtained with the standard food. This gives us that food's GI value. When many subjects are tested, the resulting GI values are averaged to give the food GI.

The area under the blood glucose curve for glucose is about 138% higher than that for white bread. What this means is that white bread produces food GI values that are 1.38 times greater than if glucose is used as the standard. This is why white bread is the standard of choice for most GI studies.

STEP SIX:

Eat 20% of Your Calories as Fat — Mostly Unsaturated Fat

With 20% of your calories coming from fat, you'll be able to enjoy a wide variety of foods. Nevertheless, the type of fat you eat matters, much as it does for dietary carbohydrate. To appreciate this, we need to briefly delve into the chemical structure of fat. Recall that fat is stored as triacylglycerols. A triacylglycerol is composed of 3 fatty acids attached to 1 glycerol molecule. The fatty acids are of variable length and degree of saturation (discussed below).

A fatty acid is essentially a chain of carbon atoms. When each carbon atom in the chain is carrying as many hydrogen (H) atoms as it can, we say that the fatty acid is "saturated" in this regard.

Monounsaturated fatty acids, such as oleic acid (found in olive oil), contain one point of unsaturation. Polyunsaturated fatty acids, like those found in fish oils (omega-3 fatty acids), contain more than one site of unsaturation along their chain lengths. At a point of unsaturation, two adjacent carbon atoms are each holding one less H atom than is possible. This allows the carbon atoms to hold on to one another via a double (=) bond rather than the usual single (-) bond that you find under saturated conditions.

Saturated Fats are More Likely to Be Stored as Body Fat

Importantly, a double bond is highly reactive, chemically speaking. Thus, mono and polyunsaturated fatty acids possess more chemical reactivity than saturated fatty acids. Therefore, they are more likely to participate in other metabolic pathways (such as oxidation) before they have a chance to be stored as body fat. In contrast, saturated fats, being relatively "inert," (chemically stable) are favorites for storage.

You really have no need for saturated fats in a diet and you should try to avoid them whenever practically possible.

Generally speaking, animal fats are richer in saturated fats. The harder a fat is at room temperature (e.g., cooled bacon drippings vs. vegetable oil) the more saturated it tends to be. Plant fats tend to be richer in unsaturated fats, though cold-water fish are also good sources.

Staying In Fat Balance

Of course, you can afford to eat slightly more fat by reducing your carbohydrate intake from the 40% reccommended level. However, the downside will be seen in the form of flat, lethargic muscles. In addition, as you cut carbohydrate from your diet, your food choices narrow. Thus, we recommend eating 20% of your calories as fat because it is a happy medium of sorts. Incidentally, some researchers have estimated that the dietary fat intake of ancient humans hovered around 22%.

The amount of fat the typical human burns each day is not that great. Ezell et al. (1999) demonstrated this in a study, which examined fuel oxidation in obese, post-obese and never-obese females (all were pre-menopausal, sedentary, non-smokers and between 20 and 45 years of age). They found that resting fat oxidation was not different between groups; averaging 1.63, 2.38 and 1.99 g/60 min for obese, post-obese and never-obese. Even during exercise, the amount of fat oxidized isn't that great. In the same study, the women performed 60 minutes of stationary cycling at 60-65% VO2 peak. Fat oxidation was greater in the post-exercise period, but again, was not different between groups: O = 4.19 g/60 min; PO = 3.72 g/60 min; NO = 2.85 g/60 min.

For resting conditions, using an average of 2.0 g of fat oxidized per hour, this amounts to 48 grams of fat burned in a 24-hour period. If your goal is to achieve fat balance for the day, (i.e., no gain of body fat) this leaves little room for cheating. Note that the women in the Ezell et al. study were consuming maintenance diets broken down as 55% carbohydrate, 30% fat and 15% protein. Coupled with your daily workouts at the gym, reducing your carbohydrate intake to 40% will allow you to burn much more fat each day than these relatively sedentary people.

Essential Fatty Acids (EFA's)

Fatty acids that are not synthesized by the body (or at least, to a significant degree) are referred to as essential fatty acids (EFA's). There is still some debate over whether or not certain fatty acids are actually made by the human body and if so, to what degree.

Like essential amino acids, essential fatty acids are in no way more important to your health than "non-essential" fatty acids. In fact, from an evolutionary standpoint, it would seem that the human body was able to get sufficient amounts of EFA's from the diet to avoid the necessity of making them on its own. Again, this same concept applies to essential amino acids. Glutamine, for instance, is so important, one could argue, that even though it is among the most common amino acids in the diet, it has always been necessary for the body to synthesize it on its own, in order to satisfy day-to-day physiological needs.

The omega-6 (n-6) and omega-3 (n-3) families of polyunsaturated fatty acids (PUFA) are the most commonly discussed EFA's. Omega-6 fatty acids are derived from linoleic acid (LA, C18:2n-6). Omaga-3 fatty acids are derived from alpha-linolenic acid (LNA, C18:3n-3). The omega-3 fatty acid alpha-linolenic acid occurs most abundantly in leaves. It may be converted into eicosapentanoic acid (EPA, C20:5n-3), which, in turn, may be used to synthesize docosahexanoic acid (DHA, c22:6n-3). Your body's ability to carry out these conversions (particularly EPA -> DHA) seems somewhat limited, although dietary factors may be to blame here. EPA and DHA are especially abundant in marine organisms, such as cold-water fish (e.g., halibut, mackerel, herring and salmon).

Vegetable seed oils are a rich source of the omega-6 fatty acid linoleic acid. It can be converted into arachidonic acid (C20:4n-6). Arachidonic acid, EPA and DHA form important components of cell membranes (e.g., in the brain) and play key roles in mediating signaling cascades critical to cell function.

Most diets seem to have an overabundance of omega-6 fatty acids relative to omega-3 fatty acids. This is because many foods typically consumed in the American diet contain such an overabundance of the former. Choosing foods that minimize this scenario can have benefits for your physical appearance and performance. The simplest way to do this is by choosing foods that resemble those foods we encountered for the bulk of our evolutionary history as a species: whole, unprocessed plant and animal foods.

One very important role of EFA's is to serve as precursors to prostaglandins: fast acting, short-lived hormone-like substances made by virtually every cell in your body. Prostaglandins seem to be involved in regulating just about every physiological function known. Before linoleic acid can be used to make prostaglandins, it must first be converted to gamma-linoleic acid (GLA), which is then converted to dihomo-gamma-linoleic acid (DHLA). DHLA, in turn, is then used to make either "good" prostaglandins or it may be converted to arachidonic acid (AA). AA is especially abundant in meats and eggs and can be used to make "bad" prostaglandins. Prostaglandins made from EPA tend to be either neutral or slightly beneficial.

"How Can EFA's Make My Muscles Bigger and Stronger?"

Some interesting research studies have provided evidence that skeletal muscle protein synthesis is influenced by prostaglandins. Recent investigations have demonstrated that by inhibiting prostaglandin production [e.g., as with anti-inflammatory agents (e.g., indomethacin or aspirin)], the exercise-induced increase in muscle protein synthesis is blocked. Conversely, when prostaglandin synthesis is restored, so too is the protein anabolic response to muscular work. Inhibiting prostaglandin synthesis was also found to prevent insulin's stimulatory effect on muscle protein synthesis.

Another way in which prostaglandins may influence muscular development is by increasing muscle glutamine levels. Recent evidence has shown that EFA supplementation increases muscle glutamine levels, which, in turn, can influence muscle protein synthesis. Animal studies, for example, have found that the higher the glutamine content in muscle, the higher the rate of protein synthesis. Dr. Steven Max of the University of Maryland School of Medicine, found that anabolic-androgenic steroids might protect against muscle protein catabolism by enhancing muscle glutamine content. Whether proper EFA supplementation can mimic this effect in healthy, bodybuilding humans awaits further investigation. Of course, serious bodybuilders don't like to wait for science; many are already supplementing their diets with EFA's in an effort to see more rapid changes to their physical appearance.

A fourth way in which EFA's can influence muscular growth is by influencing growth hormone levels, which as you know can increase lean body mass and decrease body fat. Numerous studies have shown that the release of growth hormone is dependent on certain prostaglandins. Just as with muscle protein synthesis, inhibiting prostaglandin synthesis also inhibited growth hormone release from the pituitary gland.

In conclusion, EFA's are important not only to a person's musculature, but also to his or her overall health. Just how important, is the question that cannot be answered at the present time. The potential benefits exerted by these EFA's are enormous. Supplementation with these substances has already been shown to significantly decrease chronic fatigue syndrome symptoms, rheumatoid arthritis, hypercholesterolemia and hypertension. In addition, preliminary work in athletes has shown to be quite promising.

Chapter 5

"Simple and Easy Muscle Building Meal Preparation for Evolutionary Eating™"

Using true meal replacement powders like Prolab's Lean Mass Matrix™, the preparation of "clean" meals can be greatly simplified and economized. Of course, it's important to learn how to plan meals using regular food as well.

We believe that a great many attempts at Cosmetic Bodybuilding™ fail due to the lack of effective meal planning. Caught unprepared at mealtime, you're likely to grasp at whatever food becomes available. It doesn't take long for this to soften your physique and slow down your workouts.

Therefore, our purpose in this section is to teach you how to put together muscle building, fat-burning meals quickly and easily. Remember, if this guide fails to positively impact your physique we will end up being the "fall guys"—and we're not going to let that happen!

Making enough meals for an entire week is likely to result in your food spoiling and losing much of its flavor.

Eating for the Real-World Bodybuilder

First let's, assume you are home long enough to prepare breakfast and dinner each day and that your job allows you enough break time to eat three meals at work.

The plan that seems to work best for many successful real-world bodybuilders is one in which 2-3 days worth of meals are produced 2-3 days each week. Though this may seem more cumbersome than a once-weekly approach, it's guaranteed to give you superior flavor and nutrition...and it's safer. Making enough meals for an entire week is likely to result in your food spoiling and losing much of its flavor. You certainly want to enjoy the results you get from your eating plan, but you also want to enjoy the process of eating itself. You earn that food with each set and rep you perform in the gym.

Lean Protein Sources

Consuming adequate lean protein at each of your meals is key to successful bodybuilding nutrition. Protein foods also require careful planning. If they are not prepared and stored correctly they can spoil so that you will not only be wasting hard earned money, you may even get yourself some type of nasty food sickness along the way.

High-quality, portable lean protein sources include chicken or turkey breasts, lean cuts of beef, non-fat cottage cheese, hard-boiled eggs (remove the yolk after cooking) and water-packed tuna.

If you will be cooking your protein foods, make sure to quickly transfer them into Tupperware® or a similar container (standard equipment for the bodybuilding road warrior) and refrigerate. Another good investment is a small Igloo®-style beach cooler, which can serve as a traveling refrigerator for your meals. Your co-workers may think you're a freak at first, but that's okay because freaks that look great are cool.

Complex Carbohydrates

Depending on your diet goal, each meal should contain at least some carbohydrate. Selected into your diet properly, carbohydrate will keep your muscles bursting with size, shape and striations.

You can find Glycemic Index tables all over the Internet. Focus on eating low-to moderate-glycemic index carbohydrate. Evolutionary Eating™ means eating good nutrients from whole, unprocessed foods.

Starches are easy to prepare. "Cosmetically-friendly" starchy carbs include, though are not limited to: brown rice (one of Robert's personal favorites), yams, steel-cut rolled oats and baked potatoes. Later, we'll discuss adding fibrous carbs or using a fiber supplement. In any case, don't drive yourself crazy trying to make each meal glycemically "perfect". Just think whole and unprocessed—this is as close to nature as you can get.

Once again, you'll need to calculate how many grams of carbohydrate you want to consume in each meal. You will basically be prepping 15 carbohydrate portions; so just get a handle on how much per serving and start steaming, baking or microwaving your glycogen-building treats of choice.

For example, one medium-sized baked potato (a large fist) yields about 30 grams of carbs. A good resource for determining the carbohydrate content of basic foods is the Nutrition Almanac®, which can be found in your local health food store or bookstore. You should store your carbs the same way as proteins, using Tupperware® followed by refrigeration.

Fibrous Carbs

These are the low-GI, biologically very intact carbs. To ensure good health and to alleviate any wild blood sugar swings, ample amounts of fibrous carbs should be eaten at each meal. The only exceptions are that if the starchy carb (like steel cut oats) contains ample fiber or if you are in a hurry use a fiber supplement such as Metamucil®.

Vince's favorite approach has always been to purchase blends of frozen vegetables from his local supermarket and microwave several 1-2 pound bags. Once again, these would be stored the same way as proteins. There are several good varieties that can be found virtually in any good grocery store. Many of them have ethnic styles such as fiesta blend (Mexican), Italian, Japanese and Oriental. It sure beats the heck out of shopping, dicing and slicing produce. You may want to eat your fibrous veggies on

top of a mixed green salad, which can easily be thrown together with some romaine or head lettuce with a healthy dressing for flavor.

Putting It All Together

Now the hard work is done. All that's left is to throw each set of meals together in the evenings to prepare for the next day. This is also the time you can choose any condiments, special fats or spices that provide the finishing touches to each meal. Don't worry you can still enjoy eating fresh food for dinner and the smell of oats in the morning but now you'll never worry about what you'll have for those three meals you always need on the road.

Summary:

A "Compressed" Look at Cosmetic Bodybuilding™ Nutrition

You could be losing body fat a heck of a lot faster! Mother Nature or in more scientific terms, biological evolution, has provided the human body with a fat-burning "turbocharger" and yours is barely on. This is really quite a staggering fact. You see, if you were to actually harness this metabolic device, you could peel fat off of your body several hundreds percent faster than you are now while building bigger, stronger muscles at the same time.

You're not alone. Most of the inhabitants on this planet are unaware of the vast, untapped potential for fat loss that lies dormant in the human body. As you've learned, that potential lies in the form of gluconeogenesis, a fat-burning turbocharger of sorts.

By using the Evolutionary Eating™ approach to satisfy the 40/40/20 formula, you can switch your gluconeogenic turbocharger into "high gear" while building bigger, leaner muscles quickly.

STEP ONE:

Eat 15 Calories Per Pound of Body Weight

Remember that this is just a baseline to get you started. Monitor your body in the mirror over the next 2 weeks and adjust your food intake up or down accordingly. If you're not all that active, this baseline caloric value may be a little on the high side.

STEP TWO:

Eat 5-6 Smaller Meals Throughout the Day

Of these 5-6 meals, try to have slightly bigger ones after periods of physical activity (e.g., after working out). That is when your body is in a metabolic state in which calories are more likely to be shunted toward lean tissue (e.g., muscle) as opposed to fat.

Don't worry about eating a slightly larger meal after an evening workout. You want your muscles to recover, don't you? As long as you don't consume more calories than you burn, eating later in the evening won't hurt you a bit. Not eating after an evening workout will hurt you, however.

Oh, one more thing. Don't go out of your way to avoid eating before going to the gym in the morning, if that is when you train. Granted, you may breakdown and perhaps burn a little more fat while performing cardio in this fasted state. However, you will also feel a lot crummier (reflected in your performance). Why not eat a little bit first and then feel great during your workout so you can do even more work (burn more calories) than if you'd gone without food?

Let's say you eat before doing cardio, but perform more work during the training session. This will cause your body to burn less fat and more carbohydrates. However, this won't matter because you will just be making a greater "withdrawal" from your glucose "banks" (and your Glucose Economy™ will suffer more). The reward is that after your workout, you'll experience a greater boost in your fat-burning metabolism.

STEP THREE:

Eat More Protein Than You "Need"

We know 40% of calories is a lot of protein. But remember, some of it will be converted into glucose via gluconeogenesis; thereby prompting an increase in your fat-burning metabolism (and overall metabolic rate).

STEP FOUR:

Choose Protein Supplements That Can Fulfill Both Sides of the Muscle-Building Equation

If you have difficulty getting enough protein each day from whole foods, then try replacing one or two meals a day with a higher-protein 40/40/20 meal-replacement like Prolab's Lean Mass Matrix™ product. Besides providing a convenient 40/40/20 macronutrient profile, the Lean Mass Matrix™ MRP offers dual-action (anti-catabolic and anabolic) proteins.

STEP FIVE:

Eat 40% of Your Calories as Intact, Slow-Digesting Carbohydrate

In GI terms, that means low-to-moderate-GI carbohydrate. Again, think whole and unprocessed and you'll always pick the appropriate foods. That's Evolutionary Eating™. Slower is actually better when it comes to digestion and absorption of the carbohydrates you eat—especially for us cosmetic bodybuilders.

STEP SIX:

Eat 20% of Your Calories as Mostly Unsaturated Fat

Remember, because of their relatively chemically "inert" structure, saturated fats are more likely to be stored as body fat. Therefore, intake of dietary fats should consist mostly of the mono and polyunsaturated varieties.

Following these recomendations may be easier than you think. This is because whole, unprocessed meats like chicken, turkey and beef have less saturated fat than many people have been led to believe. Further, because these fats are tucked away in the complex structural matrix of muscle (meat is muscle, after all), it makes it harder for your digestive system to pull them out and absorb them into your body. The most fattening thing about a meal of steak and potatoes is not the steak—it's the potatoes and butter (or sour cream). If you manage your Glucose Economy™ wisely, you'll be able to eat plenty of great-tasting beef while building striated, rock-hard muscle. In short, get fat the way our ancestors did—as part of whole, unprocessed foods.

Don't go out of your way
to find fat.

NO MISTAKES IN THE REAL WORLD

Here's what NPC competitor Chris Cianciulli has to say about training and nutrition:

The key to obtaining goals through nutrition is structure! You must have a well-planned diet. I am a firm believer in planning your meals ahead of time. There are no excuses. If you want results, you have to work for them. You cannot be lazy and depend on someone else to prepare your food the way you desire. If a child doesn't study for a test, they can plan to fail. The same holds true when structuring a diet. Convenience is a factor. I am a realist and understand that time can be an issue for many of us. This is why I am a firm believer in meal replacement shakes. When I started lifting weights all the MRP's were loaded with sugar and tasted lousy. But now many meal supplement shakes taste great!

What you should look for in a protein shake is balance. You want the majority of calories to come from protein and carbohydrates. The amino acids in protein are broken down in your body to help your muscles recover. The carbohydrates will help store and restore glycogen in your muscles. Without this glycogen, there will be a lack of strength and energy in the gym. The absence of glycogen will also lead to that "flat" muscle feeling and appearance. Fat is also very important. When I say fat, I mean essential fats like nuts, fish, and mono unsaturated oils. Without fat, it is next to impossible to have hormones transported. This is crucial because testosterone is the key factor in muscle building. Without a transport system, there will not be an increase in lean muscle.

People may train for many different reasons. There is the competitive bodybuilder/athlete who trains five times a week, there is a fitness enthusiast who works out 2-3 times a week and there is an average athlete who is looking to improve their overall health and they find exercising is therapeutic. Whatever their reasons are, certain factors that go hand-in-hand cannot be ignored. These are rest, nutrition and supplementation.

Rest is a major factor after doing aerobic and resistance training. Without recuperation time, you'll over stress your body, which can lead to over-training or burnout. Secondly, think of nutrition as fuel. You wouldn't expect a car to run without gasoline. So how do you expect to make gains when training without an adequate consumption of calories? Thirdly, I am a firm believer in supplementation. Since my first day in the gym I had people telling me what worked and what didn't. Who were those guys? They were your typical gym "rat" that started using supplements because someone told them to! DON'T BE A GULLABLE CONSUMER! If there's a ridiculous claim associated with an ad like "Gain 20 lbs. on your bench overnight" or "Lose 10 lbs in a week", you should question it!

Here's my favorite saying pertaining to supplements; "If the perfect body came in a bottle, everyone would have it!" I believe that supplements should be taken in addition to one's training program and structured diet. This is when they work. For those who don't have time to eat throughout the day, consider taking a meal supplement. They're great for a meal on the go. To me, Prolab's Lean Mass Matrix™ is the most innovative shake. The combination of multiple protein blends offers a time-released effect; therefore, your muscles can absorb the amino acids in the

protein as needed. The low glycemic carbohydrates are from food sources, which I've stated is the best way to obtain nutrients. With the combination of an oat fiber complex, brown rice, oatmeal and barley, you can expect your muscles to have a "full" and "pumped" feeling. By blending these low glycemic carbohydrates from their natural sources you have a high fiber shake. Let's face it, most individuals do not monitor their fiber intake. Colon cancer in one of the leading causes of death in this country. With the Lean Mass Matrix™ you can help with the prevention of this illness. There is no other meal supplement on the market that has the 40-40-20 (40g of carbs, 40g of protein and 8g of fat) combination of ingredients that mixes with a spoon. This meal supplement takes the MRP to a new level. Lean Mass Matrix™ is the shake for the serious athlete. Good luck and train hard!

No Mistakes Meal Plans

By Tracey Greenwood, IFBB Professional Fitness Competitor, Ph.D. Candidate, Exercise Physiology

A 115-pound person should consume:

1700 calories per day (40%-40%-20%)

680 calories of carbs, 680 calories of protein and 340 calories of fat

Meal One - 1 Lean Mass Matrix™ shake

Meal Two - 4 ounces of chicken breast with 1 cup of green beans

Meal Three - 4 ounces of water-packed tuna with 1 baked potato

Meal Four - 1 Prolab Pure Whey Protein shake

Meal Five - 4 ounces of flank steak with 1 cup broccoli

Meal Six - 1 Lean Mass Matrix™ shake

A145-pound person should consume:

2200 calories per day (40%-40%-20%)

880 calories of carbs, 880 calories of protein and 440 calories of fat

Meal One - 6 scrambled egg whites with 1 cup of oatmeal

Meal Two - 1 Lean Mass Matrix™ shake

Meal Three - 6 ounces of chicken breast with 6 ounces of yam

Meal Four - 1 Prolab Pure Whey Protein shake

Meal Five - 4 ounces of water-packed tuna, 1 cup steamed broccoli and 1 cup of brown rice

Meal Six - 1 Lean Mass Matrix™ shake

A 175-pound person should consume:

2600 calories per day (40%-40%-20%)

1040 calories of carbs, 1040 calories of protein and 520 calories of fat

Meal One - 10 scrambled egg whites with 1 cup of grits

Meal Two - 8 ounces of chicken breast, 1 cup of green beans and 1 medium baked potato

Meal Three - 1 Lean Mass Matrix™ shake

Meal Four - 4 ounces of lean ground sirloin, 1 cup of broccoli and 1 cup of brown rice

Meal Five - 8 ounces chicken breast, 1 cup broccoli and 1 small green salad with balsamic vinegar dressing

Meal Six - 1 Prolab Pure Whey Protein shake (frozen if desired)

A 200-pound person should consume:

3000 calories per day (40-40-20)

1200 calories of carbs, 1200 calories of protein and 600 calories of fat

Meal One - 10 scrambled egg whites with 1cup of oatmeal

Meal Two - 1 Lean Mass Matrix™ shake

Meal Three - 10 ounces chicken breast with 1 cup of brown rice

Meal Four - 1 Prolab Pure Whey Protein shake mixed with 6 fresh strawberries

Meal Five - 5 ounces of water-packed tuna with 8 ounces of yam

Meal Six - 8 ounces of flank steak, 1 baked potato, 1 small green salad with fat free dressing and 1 Lean Mass Matrix™ shake one hour before bed if hungry.

A 225-pound person should consume:

3400 calories per day (40-40-20)

1360 calories of carbs, 1,360 calories of protein and 680 calories of fat

Meal One - 1 Lean Mass Matrix™ shake

Meal Two - 15 scrambled egg whites with 1 cup of oatmeal

Meal Three - 1 Lean Mass Matrix™ shake

Meal Four - 10 ounces of lean ground sirloin with 1 cup of brown rice

Meal Five - 10 ounces of water-packed tuna with 10 ounces of yam

Meal Six - 8 ounces of chicken breast, 1 baked potato and 1 salad (2 cups lettuce with balsamic vinegar)

Note: All foods should be baked, steamed, broiled, microwaved or boiled when applicable. All meats should be skinless and drained of fat when applicable.

The *No Mistakes* Guide to Real Foods You Should Eat

Lean Proteins	*Complex(intact) Carbohydrates*	*Fibrous Vegetables*
Chicken Breast	Whole Grain Breads	Asparagus
Lean Ground Turkey	Sweet Potato/Yam	Broccoli
Cod or Sole	Baked Potato w/skin	Brussel Sprouts
Egg Whites or Substitutes	Whole Wheat or Buck Wheat Pancakes	Cabbage
Halibut	Lard Free Pinto Beans	Carrots
Lean Ground Beef	Corn	Cauliflower
Turkey Breast	Oatmeal	Celery
Beef Tenderloin	Lima Beans	Cucumber
Orange Roughy	Cream of Wheat/Rice	Green Beans
Non or Low-Fat Cottage Cheese	Pasta or Wheat Pasta	Lettuce
Salmon	Squash	Onion
Shrimp, Red Snapper or Crab	Brown Rice	Zucchini
Swordfish	Wild Rice	Spinach
Flank Steak, Buffalo or Ostrich Meat	Strawberries, Apples and Pears	Squash
Top Sirloin Steak, Ground Round or Round Steak	Peas	Sweet Peppers
Tuna	Lentils	Tomato
Non or Low Fat Plain Yogurt	Whole Grain Hot Cereal	Unsweetened Frozen Vegetable Blends

The *No Mistakes* Guide to Fats You Should Avoid

As we mentioned earlier in this book, fats are just as necessary to the normal functioning of our bodies as protein, carbohydrates and fiber. We also stressed getting your fats from natural food sources focusing on the mono and unsaturated varieties. You really have no need for saturated fats in the diet and you should try to avoid them whenever practically possible. To help you reduce the saturated fats in your diet, refer to the chart below:

Saturated Fat in Common Foods

	Grams
Hamburger, 3.5 ounces	*8*
Fries, small, 20 pieces	*5*
Hot dog, one	*6*
Fried chicken, 3.5 ounces	*5*
Beef taco, small, one	*5*
Milk shake, 10 ounces	*6*
Ice cream, 1/2 cup	*5*
Cheese cake, 1 small piece	*9*
Whole milk, 1 cup	*8*
Cheese, 1 ounce	*5*
Fried egg, two	*6*
Butter, 1 tbl	*12*
Shortening, 1 tbl	*3*
Nonfat milk	*0*
Fruits, vegetables, beans, bread and rice	*0*

Source: USDA, released on CD, 2001

Use unhydrogenated vegetable oils and foods rich in monounsaturated fat.

No Mistakes "Good" Fat Cheat Sheet:

* Use unhydrogenated vegetable oils and foods rich in monounsaturated fat. Remember to use all isolated fats moderately as they are high in calories and not found in nature in large bottles! In most cases the Evolutionary Eating™ plan, in this guide, eliminates the need to hunt down additional fats.
* Good vegetable oils for cooking include Olive, Canola and most other seed oils. When possible use these in place of all animal fats and solid fats such as shortening.
* Nuts, olives, seeds and avocado are good sources of monounsaturated fat.
* Choose salad dressings made with pure vegetable oils (virgin pressed is best).
* In place of butter, use olive oil and garlic (like the Italians and Greeks) spreads such as humus and nut butters.
* Limit commercially baked goods (cookies, pastry and crackers), which are made with hydrogenated fats.
* Limit snack foods and chips. Choose healthier snacks such as apples, oranges, nuts, seeds or fresh veggies.
* Avoid deep fat fried foods and fried foods at restaurants.
* Limit packaged, convenient foods.

GLOSSARY

The *No Mistakes Nutritional Guide* makes reference to many scientific terms and concepts throughout the entire text. This section allows you to both remind and expand your understanding of many of these not-so-common terms and issues.

Use this section as a reference tool to maximize your vocabulary and derive even more benefits from the contents of this book. We realize that some of you more advanced bodybuilding enthusiasts have already grasped the meaning of these terms but for others, an explanation of what they mean will take your knowledge base to a higher level.

- **Additive Effect:** This simply means that the combined effect of two or more factors equals the sum of their individual effects in isolation. For example, let's say creatine monohydrate supplementation, by itself, enhances lean body mass by six pounds over a four-week period and HMB supplementation, by itself, increases lean body mass by two pounds over a four-week period. If their effects are additive we would expect subjects to gain eight pounds in a four-week period of time when the two products are "stacked" (as they sometimes are).
- **ADP (Adenosine Diphosphate):** ADP is formed during the biochemical reaction in which adenosine triphosphate (ATP) is broken down to release energy. The most available source of energy in the ATP molecule lies in its outermost phosphate bond. When this bond is broken (by the enzyme ATPase), the outmost phosphate group is released (as inorganic phosphate or Pi) leaving ADP behind.

  Phosphocreatine (PC) is used to re-synthesize ATP from ADP and Pi. The energy carried in the bond between phosphate and creatine is sufficient to drive the formation of a new bond between ADP and Pi. Thus, as PC is broken down to form creatine and phosphate, ATP is resynthesized.
- **Aerobic:** This means "requiring oxygen." Aerobic metabolism occurs all the time and is the predominant source of energy (ATP) during low-intensity, long-duration exercises like jogging.
- **"All Natural":** This is gym jargon for athletes who have not used anabolic steroids for a particular period of time (You'd think it would be for their entire life...whatever).

  Usually, "natural" athletic competitions are open to athletes who have not used steroids or other banned ergogenic aids for a period of no less than 12 months.
- **Amino Acids:** Amino Acids, at least for our purposes, refer to the alpha-amino acids that are the building blocks of tissue (e.g., muscle) and dietary proteins. Some of these amino acids must be included in the diet (they are "essential"), whereas others can make from "scratch," provided enough nitrogen is available.

  Amino acids consist of a nitrogen (N) group, a hydrogen (H) atom, a "side chain" and a carboxylic acid (-COOH) group. The "side chain" for glycine (the simplest amino acid) is H. The branched-chain amino acids (leucine, isoleucine and valine) and aromatic amino acids (e.g., tyrosine) have more complex side chains.

A protein consists of a chain (or chains) of assorted amino acids linked together. These chains can bend, twist and fold up to form the 3-dimensional structures that give protein, their biological activity or functionality.

Besides serving as building blocks for proteins, amino acids also serve many regulatory roles in metabolism.

- **Anabolic:** An anabolic process is one involving the "building up" of biological structures such as muscle proteins. Anabolic processes also include those involved in the formation of glycogen, cell membranes, etc.

  Anabolic steroids are used to enhance the building of protein (protein synthesis) and other structures in skeletal muscle cells so as to increase muscle mass and physical performance.
- **Anabolic Steroids:** These are synthetic versions of the natural male steroid hormone, testosterone. Testosterone and its more potent metabolite, dihydrotestosterone (DHT), regulate a vast many physiologic functions. Of particular interest to bodybuilders and serious fitness enthusiasts are those functions controlling tissue (e.g., muscle) anabolism ("building up" processes).

  Steroids mimic the anabolic and androgen properties of testosterone. Depending on the molecular structure of the steroid, anabolism (e.g., muscle growth) may be accelerated beyond what could be expected from testosterone.

  Through drastic metabolic changes in the body, anabolic steroids speed up protein synthesis, reduce protein catabolism and increase muscle mass and strength in athletes who train with weights (and even those who do not, though to a much smaller degree).

  Steroids not only exert their effects on muscles, but unfortunately affect many other parts of the body as well (they go hand in hand). This is why dramatic gains in muscularity are often accompanied by the risk of serious side effects.
- **Anaerobic:** Anaerobic, loosely translated, means "without oxygen". Anaerobic metabolism occurs all the time, though it becomes especially important during high intensity exercise when the demand for force (and thus energy to fuel its production) is greatest. Weight-lifting is regarded as a predominantly anaerobic event.
- **Anti-Catabolism:** Refers to the halting of degradation (breakdown) of cellular structures, most especially protein.

  Bodybuilders are continually on the search for new dietary supplements that slow muscle protein catabolism and thereby increase muscle mass. Supplements used for this purpose in the recent past include: L-glutamine, alpha-ketoglutarate (e.g., as the arginine or ornithine salt), beta-hydroxyl-beta-methylbutyrate (HMB), methoxyisoflavone, N-acetyl-cysteine and carnitine.
- **Antioxidants:** Free radicals (particularly those derived from oxygen) are molecular "fire starters" implicated in a host of chronic diseases and the root of aging itself. Antioxidants include drugs and compounds provided by the diet and/or manufactured by the body that can "quench" free radicals. Examples include: glutathione (GSH), vitamin C, vitamin E, alpha-lipoic acid (thioctic acid), bioflavonoids (e.g., quercetin and proanthocyanidins), carotenoids (e.g., lycopene) and pyruvate.

- **Anti-Proteolysis:** A form of anti-catabolism referring to the amelioration of protein breakdown (as in muscle tissue).
- **ATP (Adenosine Triphosphate):** ATP is a so-called "high-energy" molecule found in small amounts inside each cell. It is the principle form of energy used by the cell to perform work—e.g., muscle contraction, nutrient transport, glycogen formation, etc.

  The most available source of energy in ATP is carried in its outermost phosphate bond. When broken down by enzymes known as ATPases, this phosphate bond is broken: liberating energy, Adenosine Diphosphate (ADP) and phosphate.
- **Attenuate:** This verb means to weaken, diminish or reduce. This term is often used to describe the diminishing effect of a drug or supplement over time. For example, if you take the herb ephedra every day, its positive effects "attenuate"—they diminish.
- **Bioavailability:** This is the ease at which nutrients can be absorbed. (This differs from potency)
- **Biochemical Reaction:** This term refers to the broad range of chemical reactions which take place in all living organisms. Examples of biochemical reactions, which occur within the human body include the conversion of blood sugar into energy, the effects of testosterone on muscle cell growth and nerve impulse reaction to name only a few of thousand.
- **Biological Value (BV):** This is a measure of protein quality assessed by how well a given food or food mixture supports nitrogen retention in humans.
- **Blood Sugar:** Also known as glucose (D-glucose or dextrose), this is your body's most important fuel. Only a few grams of glucose circulate in the blood; the majority is stored as glycogen in the liver and skeletal muscle.

  The most direct sources of glucose, in the diet, are sugars and starches. When we say "carbohydrate" we are usually referring to these compounds.
- **Body Composition:** This is the percentage of your body composed of fat versus fat-free mass. Very sensitive methods of body composition measurements, including DEXA, can actually subdivide body composition into more specific categories such as percentage of bone mineral, body water, hair, etc.
- **Buffer:** This is a substance that minimizes changes in hydrogen-ion concentration (pH). Buffers such as sodium phosphate are used by athletes to help reduce lactic acid buildup during strenuous exercise.
- **"Bulked Up":** "Bulking up" is the bodybuilding practice of consuming a high-calorie diet, in the non-competitive season, in an effort to increase body mass and strength. Though much of the weight gained may be fat, many bodybuilders still ascribe to this practice.
- **Caloric Intake Exceeds Your Caloric Expenditure:** The food you eat consists of molecules (e.g., as of protein, carbohydrate and fat) whose chemical bonds are a source of potential energy. In the process of metabolism, that energy is converted into forms that your body's cells can make use of (e.g., ATP to fuel muscle contraction and phosphocreatine to re-synthesize ATP).

The energy in food is measured in units called "Calories" ("Joules", in the Metric System). When you consistently consume more calories than you burn up (as through exercise), you gain weight, mostly fat.

- **Carbohydrates:** These are organic compounds containing carbon, hydrogen and oxygen. They're a very effective fuel source for the body. The different types of carbohydrates include starches, sugars and fibers that are classified into three group's—monosaccharides, disaccharides and polysaccharides. Carbohydrates contain four calories per gram. Glucose—blood sugar—is a carbohydrate used by every cell in the body as fuel.
- **Carbophobic:** This refers to the modern-day "fear" of dietary carbohydrates (sugars and starches) invoked by the health and fitness lay press. Under the misguided belief that carbohydrates "make you fat", many people have chosen to avoid eating them almost entirely.
- **Catabolic:** This is the opposite of anabolic. It means the breakdown of tissue. Catabolic states occur with disease, infection, injury, intense training, strict dieting and immobilization. Catabolic conditions are not conducive to lean muscle mass gains; in fact, they typically cause a loss of lean muscle mass.
- **Catabolism:** This refers to the breakdown or loss of muscle and other bodily tissues.
- **Chelating Agents:** These are soluble, organic compounds that can fit certain metallic ions into their molecular structure. They are often used to increase the absorption of minerals within the body. For example, amino acids are very commonly used as chelating agents for iron and other poorly absorbed minerals.
- **Cholesterol:** This is a type of lipid that, although most widely known as a "badfat" implicated in promoting heart disease and stroke, is a vital component in the production of many steroid hormones in the body. It also plays a vital role in proper cell-membrane structure and functioning. It's a substrate for bile-acid synthesis as well as sex hormone and Vitamin D synthesis. There are many different types of cholesterol, two of which are , HDL and LDL (HDL being the "good" form and LDL being the "bad" form).
- **Coenzyme:** This is a substance that works with an enzyme to promote a chemical reaction or to produce a compound in the body.
- **Complete Proteins:** These are proteins that contain all the essential amino acids in the right balance.
- **Cortisol:** This is one of the primary catabolic hormones in the body. However, catabolism, or the breakdown of body tissue, is not the only function of cortisol. It is typically secreted in response to physical trauma or prolonged stress. Its functions include: controlling inflammation, increasing muscular catabolism and glycolysis (the energy-yielding conversion of glucose to lactic acid), suppressing immune response, and maintaining normal vascular circulation and renal function. Suppressing cortisol production, at key times during the day, may help bodybuilders avoid excess muscle breakdown. However, you doneed some cortisol to survive.

- **Cosmetic Bodybuilding:™** A term coined by Vince Andrich that takes the broad definition of weight training and bodybuilding toward a more modern classification, which is "to make cosmetic changes to your physique". The Cosmetic Bodybuilder does not focus on improving strength, power and/or aerobic capacity; however, by focusing on cosmetic changes, improvements in these performance criteria are markedly increased. (Also see Performance-Oriented Athlete).
- **Creatine Phosphate (CP):** This is an inorganic phosphate molecule that binds with ADP to form ATP. Supplementing with creatine monohydrate helps increase your muscle's CP reserves, which is good!
- **Cytokine:** This term is used to describe a broad range of molecular protein messenger cells. The cytokine family of proteins includes interleukins (powerful anti-carcinogenic agents), interferons (which can be very effective against viral infection), IGF-1 (insulin-like growth factor-1, e.c.t.) Cytokines act directly on cells and are very potent agents which can elicit massive changes in cellular function.
- **Deficiency:** This is a sub-optimal level of one or more nutrients that are essential for good health. Deficiency is most often seen with vitamins. Many natural supplements that are marketed to athletes as ergogenic aids, are effective at enhancing performance if an individual is defficient in that nutrient. A deficiency can be caused by poor nutrition, increased bodily demands (especially from intense training) or both.
- **DEXA:** This term stands for "dual-energy x-ray absorptiometry." DEXA is a form of total-body x-ray, which is used to determine body composition. This is probably the most accurate method available for measuring bodyfat, lean body mass, bone mineralization and body water content. This is a very expensive procedure; however, it's an important part of quality clinical trials.
- **Dextrose:** This is simply another name for glucose—the terms are interchangeable (see glucose).
- **Dipeptides:** These are protein fragments made up of only two amino acids.
- **Disaccharide:** This is a carbohydrate compound made up of two sugars. Examples are sucrose (table sugar), lactose (milk sugar) and maltose.
- **Diuretic:** This term can describe any product that increases the amount of urine excreted by the body. Natural diuretics include black tea, coffee, guarana and dandelion.
- **Drug:** This is the generic name for any substance (except food) used for the prevention, diagnosis and/or treatment of a disease; as well as, the relief of symptoms. The word medicine is usually preferred to describe therapeutic drugs to distinguish them from the addictive drugs that are used illegally.
- **DSHEA:** This is a term which stands for the "Dietary Supplement Health and Education Act of 1994." This law was established by Congress and states that "dietary supplements" are defined as: vitamins, minerals, herbs or other botanicals (except tobacco), amino acids, any "dietary substance for use by man to supplement the diet by increasing the total dietary intake" and "a concentration, metabolite, constituent, extract or combination of any of the above-listed ingredients."

- **Efficacious:** This means producing the desired effect—that "it works."
- **Electrolytes:** These are substances that, when in solution, are capable of conducting electricity. These charged particles are present throughout the body and are involved in many activities such as regulating the distribution of water inside and outside cells. Examples include the bulk minerals: potassium, sodium and chloride.
- **Empirical Data:** This is information based on observation and experience, not scientific reasoning. Empirical data is often very accurate, although it is not accepted as scientifically sound; however, no area of science is devoid of a real world/empirical component.
- **Endogenous:** This term refers to things that occur naturally in the body. For example, the testosterone your body produces naturally is "endogenous."
- **Energy:** This is the capacity to do work. The energy in food is chemical energy; it can be converted to mechanical, electrical or heat energy. Energy is sometimes measured in "calories."
- **Enzyme:** This is a protein molecule that acts as a "helper" in thousands of chemical reactions, in the body, including: digestion of food, hormone production, muscle-cell repair and thousands and thousands of more.
- **Ergogenic:** This word refers to something that can increase muscular work capacity. Natural supplements that can increase some aspect of athletic performance are said to be ergogenic or performance-enhancing aids.
- **Essential Fatty Acids (EFA's):** These are fats that our bodies can't make, so we must obtain them through our diets. These fats (which include linoleic and linolenic acid) are very important to hormone production, as well as cellular synthesis and integrity. Good sources of these fats are flaxseed oil and safflower oil.
- **Evolutionary Eating™:** This refers to how you choose your foods. You should pick foods that are as whole ("natural") and unprocessed as possible. The closer the foods you eat are to the foods found in the human diet, for the bulk of its evolutionary history, the better off your physique will be. These types of foods deliver nutrients to your body in a way that best suits building muscle and burning fat.
- **Exogenous:** This term refers to things originating outside of the body. For example, if you took a DHEA pill, it would be an "exogenous" source of that hormone.
- **Fat:** This is one of the macronutrients. Fat contains nine calories per gram; it has the most calories of all the macronutrients. Dietary fats may also be referred to as lipids or triglycerides. Fats serve a variety of functions in the body; they act as structural components for all cell membranes, as well as supply necessary chemical substrates for hormone production. There are two types of fat—saturated "bad" fat and unsaturated "good" fat.
- **Fat-Free Mass (FFM):** This refers to all portions of body tissue not containing fat. These tissues include all skeletal bones and muscles, skin, organs and body water, as well as hair, blood and lymph. Fat-free mass is a term used frequently in the texts of clinical studies. Often, an increase in fat-free mass equals an increase in skeletal muscle.

- **Flat, Smooth And Soft Appearance :** Cut your carbohydrate intake too much and this is what happens to your physique. The lower you cut your carbs, the greater the reduction in muscle glycogen. This causes your muscles to lose cell volume (glycogen binds water), contributing a flat appearance (and a loss of muscular performance).

  Even though you may be quite lean, when your muscles lose cell volume they can appear smoother and softer. As the muscle "deflates", it loses the "bumps and valleys"—the "topography"—unique to that particularly muscle's anatomy.
- **Free-Form Amino Acids:** These are structurally unlinked, individual amino acids.
- **Free Radicals:** These are troublemakers. They're highly reactive molecules possessing unpaired electrons that are produced during metabolism of food and energy production. They are believed to contribute to the molecular damage and death of vital body cells. Free radicals may be a factor in aging or disease and may ultimately contribute to death. Antioxidants help neutralize free radicals.
- **Fructose:** This is the main type of sugar found in fruit. It's sweeter than sucrose (table sugar) and has a low glycemic index (GI). In other words, eating fructose won't cause nearly as dramatic a release of insulin as glucose (dextrose). Eating a high-fructose diet may increase blood fats. Due to its low glycemic index and because it's metabolized mostly in the liver, fructose is often used as a sugar substitute for diabetics.
- **"Fuel-Burning See Saw":** Robert Thoburn uses this phrase to refer to the effect your Glucose Economy™ (total supply of glucose) has on the burning (oxidation) of carbohydrate and fat. As your Glucose Economy™ diminishes, your body burns more fat and less carbohydrate (glucose). As you replenish your Glucose Economy™, the fuel mixture shifts back toward glucose and away from fat. Managing this "see saw" of fuel-burning metabolism is essential to achieving "ShrinkWrap" skin and granite hard muscles.
- **Full-Spectrum Amino Acids:** These are supplements that contain a combination of all of the essential amino acids.
- **Glucagon:** This is a hormone that is responsible for helping maintain proper blood sugar levels. When blood sugar levels go too low, glucagon activates glucose production in the liver as well as regulates the release of glycogen from muscle cells. Eventually it may cause the catabolism of muscle cell proteins for glucose. This is considered a catabolic hormone.
- **Glucose:** This is a simple sugar molecule. It's also the main sugar found in blood and is used as a basic fuel for the body. When you eat complex carbs, they're broken down by the body into glucose. Glucose is also found in various fruits, but not in as high concentrations as fructose, another sugar. However, when you eat too much glucose, it's converted to fatty acids and triglycerides by the liver and deposited in adipose (fatty) tissue. Due to its quick absorption by the body, glucose is often used as an invigorating and strengthening agent in many medicinal formulations. It will cause your body to release a rapid and large amount of insulin to counteract the large influx of sugar.

- **Glucose Disposal Agent:** A nutrient or complex of nutrients that has the ability to increase insulin sensitivity, thus allowing circulating blood glucose to be readily deposited in to target tissues.
- **Glycemic Index (GI):** This is a measure of the extent to which a food raises the blood sugar (glucose) level as compared to white bread, which has a GI of 100. Glucose (dextrose) scores a 138, brown rice an 81 and fructose (fruit sugar) is all the way down at 31.
- **Glycemic Response Modifier:** A nutrient or complex of nutrients that has the ability to slow down the absorption rate of ingested carbohydrates, thus lowering the glycemic index.
- **Glycogen:** This is the principal storage form of carbohydrate energy (glucose), which is reserved in muscles and in the liver. When your muscles are full of glycogen, they look and feel full/pumped.
- **Growth Hormone (GH):** This is a hormone that is naturally released by the pituitary gland; it is an anabolic hormone. GH promotes muscle growth and the breakdown of bodyfat for energy. GH levels are high in children and in teens but diminish greatly after age 20. Some sports supplements are supposed to increase the amount of GH that is naturally released in the body, therefore creating an anabolic state and increasing fat burning in the athlete. Unfortunately, most have little effect.
- **Hard Gainers:** Generally refers to those individuals with a low propensity for building muscle. Also referred to as "ectomorphs" (slight frame).

  In truth, all of us are capable of increasing the size of our muscles substantially; however, certain factors act to limit this ability. Perhaps, most important, is the quantity of muscle fibers one is born with and their individual size (and therefore, capacity for further growth). Testosterone levels and tissue (e.g., muscle) sensitivity to this hormone also play a role in determining one's propensity for bodybuilding.
- **HDL:** This stands for "high-density lipoprotein." It's one of the subcategories of cholesterol—typically thought of as the "good" cholesterol. HDL cholesterol is the form that is typically used to clear fats from the system, therefore not lending itself to the formation of "crud" in your arteries that can cause heart attacks. You may be able to raise your HDL cholesterol levels by ingesting quality unsaturated fats like flaxseed oil. Exercise has also been shown to increase HDL levels.
- **High-Carbohydrate Diet:** Generally, a "high-carbohydrate" diet refers to one providing 60% or more of its calories as carbohydrate (i.e., sugars and starches). No matter how much carbohydrate is consumed, ideally, it should be in the form of whole, unprocessed food—just as Mother Nature provided us for most of our evolutionary history.

  In accordance with the Glucose Economy™ concept, a high-carbohydrate diet should also be low in fat.

- **High-Intensity, High-Volume Nature Of Training:** Bodybuilders tend to perform multiple sets of resistance movements (e.g., barbell squat, barbell bench press, dumbbell curl, e.c.t.) in which the involved muscles are required to generate a high percentage of their maximum force-generating capacity. This kind of high-intensity, high-volume training is effective for stimulating muscle hypertrophy (growth). These type of workouts are also an effective means of reducing muscle glycogen stores (threatening the Glucose Economy™) and thereby, increasing the overall fat-burning rate.
- **Hormones:** These are substances in the body that are very important to bodybuilders. Two important hormone-producing organs are the pituitary gland and the testes. Hormones regulate various biological processes through their ability to activate or deactivate enzymes. An example of this regulation is the effect of the testosterone hormone on the enzymatic activity relating to protein production of muscle cells. Other hormones, such as insulin and glucagon, control blood sugar levels and energy storage in the body. Hormones can be made of proteins.
- **Hydrolysis:** This is a chemical reaction where water reacts with a substance to change it into another substance or substances. For instance, if you add sodium acetate to water, it hydrolyses into sodium ions and acetate ions.
- **Hypertrophy:** This means to increase in size. Muscular hypertrophy is the increase in size of the muscle cells.
- **Hypoglycemia:** This is low blood sugar/glucose levels resulting in anxiety, fatigue, perspiration, delirium and in severe cases, coma. Hypoglycemia occurs most commonly in diabetics where it is due to either insulin overdose or inadequate intake of carbohydrates. Temporary hypoglycemia is common in athletes and can be overcome with the ingestion of carbohydrates.
- **Incomplete Proteins:** These are proteins that lack or are low in one or more of the essential amino acids.
- **Insulin:** This is an anabolic hormone secreted by the pancreas that aids the body in maintaining proper blood sugar levels and promoting glycogen storage.
- **Insulin Amplifier:** A nutrient or complex of nutrients that has the ability to increase the secretion of insulin.
- **Insulin-Spiking Carbohydrate:** The term "insulin spike" is a pseudo-technical term referring to a rapid surge in blood insulin levels. This occurs most commonly following the ingestion of high-GI carbohydrate alone.

  Consider a glass of Kool-Aid®. Kool-Aid® provides a readily available source of glucose in the form of heavily processed sugar particles (i.e., sucrose and glucose). Upon drinking Kool-Aid®, the dissolved sugar molecules are rapidly digested and absorbed into your bloodstream as glucose. This rapid rise in blood glucose levels prompts insulin secretion from the pancreas, resulting in a surge in blood insulin levels.

High-GI foods (e.g., Kool-Aid®, mashed potatoes and Rice Krispies®) raise blood glucose levels rapidly, thereby causing a more rapid release of insulin into the bloodstream. Though the issue is more complicated than this, in general, the more processed the carbohydrate ingested, the more likely it will produce an insulin "spike". Thus, mashed potatoes would be expected to produce a greater surge in insulin levels than would, say, fresh grapefruit.

- **Ketones:** These are organic chemical compounds resulting from the breakdown of triglycerides. They are used as an energy source in the body during very-low-carbohydrate diets.
- **Lactic Acid:** This is a molecule produced from glucose during anaerobic metabolism. When oxygen becomes available, lactic acid can be completely broken down to carbon dioxide and water. Lactic-acid buildup is a primary cause of muscle fatigue. Supplements that limit lactic-acid buildup may enhance athletic performance.
- **LDL:** This stands for "low-density lipoprotein" and is a subcategory of cholesterol, typically thought of as the "bad" cholesterol. LDL is the type of cholesterol that circulates throughout the bloodstream and may cause heart disease. Levels of LDL cholesterol can be elevated by ingestion of saturated fats and a lack of exercise.
- **Lean Body Mass (LBM):** This is another term that describes fat-free mass (see fat-free mass).
- **Limiting Factor:** This is an element that prevents a process or reaction from taking place. For example, a lack of protein in the diet can be a "limiting factor" for muscle growth.
- **Linoleic Acid:** This is an essential fatty acid. More specifically, an omega-6 polyunsaturated fatty acid. Good sources of this fatty acid are safflower oil and soybean oil.
- **Linolenic Acid:** This is an essential fatty acid. More precisely, an omega-3 polyunsaturated fatty acid. It is found in high concentrations in flaxseed oil.
- **Lipid:** This is simply another name for dietary fats or triglycerides.
- **Lipogenic:** This means making bodyfat (literally translated "fat producing"). This is bad.
- **Lipolysis:** This term refers to the chemical breakdown of bodyfat, by enzymes, which results in stored bodyfat being used as fuel by the body. This is good.
- **Lipolytic:** This term is usually used to describe something with fat-burning effects. It literally means "to disintegrate fat."
- **Low-Carbohydrate Diet:** Within bodybuilding circles, this term is generally applied to a diet that limits total daily carbohydrate intake to roughly 100 grams or less. The remainder of your daily calories must come from protein and fat with an emphasis on protein being the preferred macronutrient, particularly for those interested in maintaining or increasing muscle mass.

Very-low carbohydrate diets are sometimes referred to as "ketogenic". Technically, however, this term applies only to diets providing a rather specific ratio of protein to fat established as being necessary to produce maximal ketogenesis. Low-carbohydrate and "ketogenic" diets discussed in the lay press include Atkins, Protein Power, The Carbohydrate Addicts Diet and the Anabolic Diet.

- **Low-Glycemic Carbohydrate:** The Glycemic Index (GI) assigns a number to carbohydrate-containing foods according to how quickly they raise blood sugar (glucose) levels relative to a standard (e.g., white bread or dextrose).

  The lower the GI, the more slowly the absorbed carbohydrate enters the bloodstream as glucose. This produces a correspondingly weaker insulin response from the pancreas. Thus, low-GI carbohydrates tend to be associated with lower blood insulin levels.

  In general, the less processed the carbohydrate source in question, the lower its GI. The whole foods eaten by humans, for the bulk of their evolutionary history as a species, for instance, contained nutrients bound within a complex structural matrix (e.g., plant fiber or animal flesh). Such matrix-bound nutrients were more slowly released into the bloodstream when compared to today's processed (e.g., convenience) foods.

- **Luteinizing Hormone (LH):** This is a powerful hormone that, in men, stimulates the testes to make testosterone. (Yeah!) In gals, LH induces ovulation.

- **Macronutrient:** Carbohydrate, protein and fat are the 3 major macronutrients of the human diet. "Macro," because they are required in large (a few to hundreds of gram) amounts.

  "Micronutrient" refers to vitamins, minerals and related substances which are required in substantially smaller ("micro") amounts (e.g., milligrams or micrograms).

- **Malabsorption:** This big word means bad absorption of nutrients from the digestive tract. This can result in vitamin deficiencies, loss of weight and poor health. Malabsorption can be caused by intestinal diseases or lack of digestive enzymes.

- **Meal-Replacement Powders (MRP's):** These are a category of supplements which contain protein, carbohydrates, vitamins, minerals and other key nutrients, which are used to replace a regular-food meal for purposes of weight loss, weight gain or increasing dietary nutrient intake. These supplements may also be referred to as "total-nutrition products," "engineered foods" or "superfoods." (The new generation MRPS support many concepts in this book)

- **Metabolic Rate:** This refers to the rate you convert energy stores into working energy in the body. In other words, it's how fast your "whole system" runs. The metabolic rate is controlled by a number of factors including: muscle mass (the greater your muscle mass the greater your metabolic rate), caloric intake, exercise and use of stimulant or depressant chemicals.

- **Metabolism:** Metabolism refers to those biochemical processes by which the food you eat is converted into energy, how that energy is stored, distributed and budgeted within the cells and tissues of your body.

- **Micronutrients:** These are dietary nutrients, which we ingest in relatively small (micro means "small") amounts compared to macronutrients. Examples of micronutrients include vitamins and minerals. Many micronutrients are essential dietary nutrients that perform vital functions in the body. Micronutrients are typically ingested in gram quantities or less.

- **Minerals:** These are naturally occurring, inorganic substances that are essential for human life and play a role in many vital metabolic processes.

- **Monosaccharide:** This is a simple carbohydrate made up of one sugar molecule. Examples are glucose and fructose.

- **Muscle Fatigue:** This is the failure of a muscle to continue to perform work caused by muscle ATP depletion. Lactic-acid buildup also plays a role in muscle fatigue. Some natural supplements marketed to athletes have the ability to post-pone muscle fatigue, thus increasing the work potential of the muscle—one of the most potent is creatine, which increases the availability of ATP, which is used for energy.

- **Muscle Fullness:** Muscle fullness refers to the volume of a muscle. The greater the glycogen (and associated water) content of a muscle the greater will tend to be its apparent "fullness." Carbohydrate-restricted diets tend to reduce muscle glycogen stores.

- **Muscularity:** Refers to the appearance of one's muscle mass, particularly in regards to the degree of leanness, the development and fullness of the individual muscles.

- **Myocyte:** This means "muscle cell."

- **Natural:** This term is often used to refer to foods or supplements that are not highly refined and which do not contain chemical fertilizers or artificial flavors and colors. The word natural has no legal definition in food supplementation though.

- **Net Protein Utilization (NPU):** This is a method of evaluating protein quality by comparing the amount animals retained to the amount they ingested. Evaluation parameters are digestibility and essential amino acid content. (Don't worry, I don't understand it either.)

- **Neurotransmitter:** This is a substance that is released at the end of one nerve cell when a nerve impulse arrives there. Neurotransmitters diffuse across the gap to the next nerve cell and alter the membrane of that cell in such a way that it becomes less or more likely to fire. Examples include adrenaline and serotonin. Adrenaline is responsible for the "fight-or-flight" response and is an excitatory neurotransmitter; serotonin is the opposite—it makes you sleepy.

- **Nitrogen:** This is an element that distinguishes proteins from other substances and allows them to form various structural units in our bodies including enzymes and muscle cells.

- **Nitrogen Balance:** This is when a person's daily intake of nitrogen, from proteins, equals the daily excretion of nitrogen. A negative nitrogen balance occurs when the excretion of nitrogen exceeds the daily intake and is often seen when muscle is being lost. A positive nitrogen balance is often associated with muscle growth.

- **Nutrient Partitioning:** This refers to the shunting of food calories (as under the influence of hormones) to one tissue (e.g., muscle) versus another (e.g., adipose). Ideally, the food calories we eat are partitioned toward lean tissue compartments, such as skeletal muscle, and away from fat-storing adipose tissue. Hormones such as insulin and growth hormone play key roles in nutrient partitioning.
- **Nutrients:** These are components of food that help nourish the body: that is, they provide energy or serve as "building materials." These nutrients include carbohydrates, fats, proteins, vitamins, minerals, water, etc. Omega-3 is the name of the first spacecraft that landed on the moon. (Nah, I'm just kidding—I was seeing if you were paying attention. This chapter is boring, huh?!) Omega-3 is actually a name for a certain fatty acid. The 3 designates where the first double-bond is located in the fatty acid carbon chain. Linolenic acid is an example of an omega-3 fatty acid. Omega-6, this is another name for a fatty acid. Omega-6 refers to the first double-bond on a fatty acid chain which is located at the sixth carbon acid. Linoleic acid is an example of an omega-6 fatty acid.
- **Optimal Nutrition:** This is a term you need to know. It means the best possible nutrition; distinct from merely adequate nutrition that is characterized by no overt deficiency. This term describes people free from marginal deficiencies, imbalances and toxicities and who are not at risk for such. All athletes making an effort to increase muscle growth naturally must try to achieve optimal nutrition. In many cases, this requires supplementation of protein, vitamins and minerals, and possibly other conditionally essential nutrients such as glutamine and creatine.
- **Over-The-Counter (OTC):** This refers to substances that do not require a prescription to be obtained legally.
- **Oxidation:** This is the process of cellular decomposition and breakdown. Oxidation produces free radicals.
- **Oxygen Debt:** What this means to me is "out of breath." It's a deficiency of oxygen in working muscles when performing exercise that is so demanding, the cardiovascular system cannot deliver oxygen fast enough to the muscles to support aerobic metabolism. The debt must be repaid by rapid breathing after the activity slows down or stops. Oxygen debt leads to anaerobic metabolism, which leads to lactic-acid buildup and muscle fatigue.
- **"Peak":** Refers to the point at which the maximum degree of muscularity is achieved through appropriate dietary manipulations (e.g., carbohydrate-loading). Ideally, the bodybuilder hopes to achieve his or her peak during competition—on stage. Sometimes, however, the peak is "missed;" for instance, he or she comes in "flat" (too little carbohydrate) or "smooth" (too much).
- **Performance-Oriented Athlete:** Term used to describe an athlete that has specialized goals in the realm of strength, power and aerobic capacity. The performance-oriented athlete may compete as a triathlete, power lifter, mountain biker, etc. These performance oriented athletic endeavors have different nutritional strategies that may be in stark contrast to those outlined in the book which are designed for Cosmetic Bodybuilders. (See Cosmetic Bodybuilding™ for details)

- **Peptide:** This is a compound made up of two or more amino acids. Protein molecules are broken own into peptides in the gut and absorbed in that form.
- **Phytochemical:** This term means "plant chemical." It's used to refer to a broad spectrum of bioactive plant compounds that are typically used in herbal preparations and a variety of other nutrition supplements.
- **Pineal Gland:** This is an endocrine gland that functions mainly in the secretion of melatonin and a few other peptide hormones.
- **Placebo:** This is a harmless, "inactive" substance which may be given in the place of an effective drug or substance, especially to "control groups" in clinical studies. In many cases, individuals using a placebo will react positively as though they were using an efficacious compound. Some of the positive effects performance athletes experience while using natural supplements are attributed to a "placebo effect." Basically, if you strongly believe a supplement will work, there is a chance that belief alone will produce positive results. It is even theorized that many of the positive effects athletes experience while using anabolic steroids can be attributed to a placebo effect. This is why it's important to do placebo-controlled scientific studies—to separate real effects from "placebo effects."
- **Polypeptides:** These are proteins formed by the union of three or more (usually many) amino acids.
- **Polysaccharides:** These are carbohydrates containing a large number of "sugar groups." Starch, glycogen, dextrin and cellulose are examples.
- **Precursors:** These are compounds from which another compound is formed. For example, the hormone androstenedione is a direct precursor to testosterone production in the body.
- **Prohormone:** This term refers to a class of chemicals typically found inside various glands, in the body, such as the pituitary and adrenal glands. These chemicals are the direct precursors to hormone production: e.g., pro-insulin is the direct precursor to insulin. DHEA and melatonin are also prohormones.
- **Prostaglandins:** These are "hormone-like" chemicals produced in the body. Their structure is much like that of a fatty acid and they exhibit a wide range of actions on things like blood pressure, water balance, immune system reactions, inflammation, e.c.t. Their synthesis, in almost all tissues in the body, is partially controlled by fatty acid intake.
- **Protein Efficiency Ratio (PER):** This is a measure of protein quality assessed by determining how well a given protein supports weight gain in laboratory animals: namely, rats. The PER is probably not the best rating system because it over estimates methionine needs due to the greater need for methionine in rats for hair production.

- **Proteins:** These are highly complex nitrogen-containing compounds found in all animal and vegetable tissues. They are made up of amino acids and are essential for growth and repair in the body. A gram of protein contains four calories. Those from animal sources are high in biological value since they contain the essential amino acids. Those from vegetable sources contain some but not all of the essential amino acids. Proteins are broken up by the body to produce amino acids that are used to build new proteins. Proteins are the building blocks of muscle, enzymes and some hormones.
- **Pure:** This term is often used to refer to supplements that are unadulterated—that have no other ingredient in them except that which is stated on the label.
- **Saturated Fats:** These are bad fats. They are called "saturated" because they contain no open spots on their "carbon skeletons." Saturated fats include myristic acid, palmitic acid, stearic acid, arachidic acid and lignoceric acid. These bad fats have been shown to raise cholesterol levels in the body. Sources of these fats include animal foods and hydrogenated vegetable oils such as margarine. These fats serve no biological function in the body other than to supply calories.
- **Sedentary Folks:** The typical sedentary person has two challenges facing them. They don't do much (or any) exercise, therefore their Glucose Economy™ is always thriving.

  Plus, because sedentary people don't do much exercise (particularly weight training), they don't carry much muscle on their body. Consequently, they can't store as much muscle glycogen as someone with more muscle mass. Coupled with their inactivity, this makes it easy for glycogen stores to remain chock-full all the time. With glucose so readily abundant, the fat-burning metabolism operates at a snail's pace. This makes it easy to get fat.
- **Self-Actualization:** A term coined by the famed psychologist Abraham Maslow who is best remembered for developing a theory of human motivation now known as Maslow's Hierarchy of Needs. Maslow noted that some human needs were more powerful than others. He divided those needs into five general categories from most urgent to most advanced: physiological, safety, belonging/love, esteem and self-actualization. The latter generally means "to realize, fully, one's potential, often through constant self-assessments and improvement". These self-assessments are usually guided by a personal inner voice.
- **Sports Supplement Review, 4th Issue:** A comprehensive guide to sports supplements and bodybuilding nutrition. Author: Vince Andrich. Sports Supplement Review is a registered trademark of EAS®.
- **Stacking:** This term refers to taking two or more compounds at once, in an attempt to maximize results.
- **Striation, Peak or Separation:** Terms used to describe the cosmetic attributes of a well conditioned bodybuilder;

  * Striation- Any of the alternate dark and light cross bands of a myofibril in striated muscles. Otherwise seen as deeply etched lines when a muscle is flexed.

  * Peak- The state of a muscle in the fully contracted "top" position. For example the biceps are usually more impressive when flexed in the "top" position as to create the illusion of a mountain peak.

  * Separation- Distinct delineation between different aspects of a particular muscle group. For example, the quadriceps (the large four-part extensor muscle at the front of the thigh) are usually more impressive when flexed in a fashion so that all four aspects of the muscle are clearly separated. This also shows when an athlete is in top shape and creates the illusion of four distinct muscles instead of one blocky thigh.
- **Sublingual:** This means "beneath the tongue." Several supplements available to athletes are made to be taken in this manner. This occasionally results in better absorption. Some suggest hormonal preparations be taken sublingually to avoid the harsh environment of the gut.
- **Sucrose:** This is most commonly known as table sugar. Industrially, sucrose is derived from sugar cane or sugar beets. When you eat it, the body breaks down sucrose into fructose and glucose. Consequently, it has some of the properties of fructose and some of the properties of glucose. Eating it will elicit a rapid insulin response but not as high as that caused by glucose.
- **Supplement:** This is a term used to describe a preparation such as a pill, powder or liquid that contains nutrients. A supplement is to be used as part of a person's daily food intake to either supply adequate or supraphysiological levels of a nutrient.
- **Supraphysiological:** This big word means amounts greater than normally found in the body. For example, a person consuming ten grams of creatine monohydrate per day will create supraphysiological levels of creatine in muscle cells.
- **Synergistic:** This term refers to an action that is created when things "cooperate" with one another; in other words, one supplement could enhance or multiply the effectiveness of another supplement. Many vitamins have been found to be synergistic. Creatine plus carbs is synergistic, as is caffeine plus ephedrine in the right amounts.
- **Testes:** This term refers to the male reproductive organs. The testes are where many of the hormones that regulate growth, such as testosterone, are produced.
- **Testosterone:** This is the anabolic hormone produced primarily by the testes, in men, which makes muscles grow. It literally separates the men from the boys.
- **"The Capacity To Perform Work":** Physicists define energy as "the capacity to perform work." The food we eat provides us with potential energy. Through the process of metabolism, our body can extract some of this energy in usable forms such as ATP (adenosine triphosphate). This energy can be used to perform work such as muscle contraction.
- **Thermogenic:** This term means heat producing or fat burning. Taking a thermogenic agent will speed up the metabolism, raise core body temperature and accelerate calorie expenditure.

- **Triacylglycerol (a.k.a. triglycerides):** This is the scientific name for the most common type of fat in the diet. A triacylglycerol is an electrically neutral molecule (i.e., it carries no net electrical charge) consisting of a glycerol molecule (the "backbone") to which is attached three fatty acid molecules via ester bonds. The term ester bond refers to the chemical bond between an acid (in this case, a fatty acid) and an alcohol (in this case, glycerol). The fatty acids in a triacylglycerol are of varying length and degree of saturation. Plant triacylglycerols (oils) tend to be less saturated than animal triacylglycerols (fats).
- **Tripeptides:** Amino acids (see Amino Acids) are the building blocks of proteins (although some amino acids display regulatory properties and do not occur in proteins). A protein consists of a chain or chains of amino acids chemically bonded together. When the chain consists of only a few amino acid residues, it is known as a "peptide". A "tripeptide" consists of three amino acids linked together.
- **Unified Theory Of Dieting:™** The Unified Theory of Dieting™ and the Glucose Economy™ are concepts created by Robert Thoburn. The status of your Glucose Economy™—your body's total supply of glucose—is ultimately what determines whether you are getting leaner or fatter with each passing moment. Thus, the Glucose Economy™ can be used to explain how any diet can work or fail. In this sense, it offers us a "Unified Theory" of Dieting™, a common thread linking together every diet that ever was or will be.
- **Unsaturated Fatty Acids:** Fatty acids consist of a chain of carbon atoms with a carboxylic acid (-COOH) group at one end. The carbon chain length varies, as does its degree of "saturation". When each carbon atom in the chain is holding as many hydrogen (H) atoms as it can, the fatty acid is said to be "saturated". Unsaturated fatty acids have one (monounsaturated) or more (polyunsaturated) points of unsaturation.

  The omega-3 and omega-6 families of polyunsaturated fatty acids include fatty acids that are considered to be essential in the human diet.
- **Up-regulate:** This term basically means "increase." For example, creatine monohydrate appears to have the ability to up-regulate the muscle's ability to replenish energy stores.
- **Vitamins:** These are organic compounds which are vital to life, indispensable to bodily function and needed in minute amounts. They are non-caloric essential nutrients. Many of them function as coenzymes, supporting a multitude of biological functions.
- **VO 2 max:** This is the maximum volume of oxygen an individual can consume per minute of work. It is often used to evaluate an athlete's cardiovascular efficiency and thus, performance capacity.

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