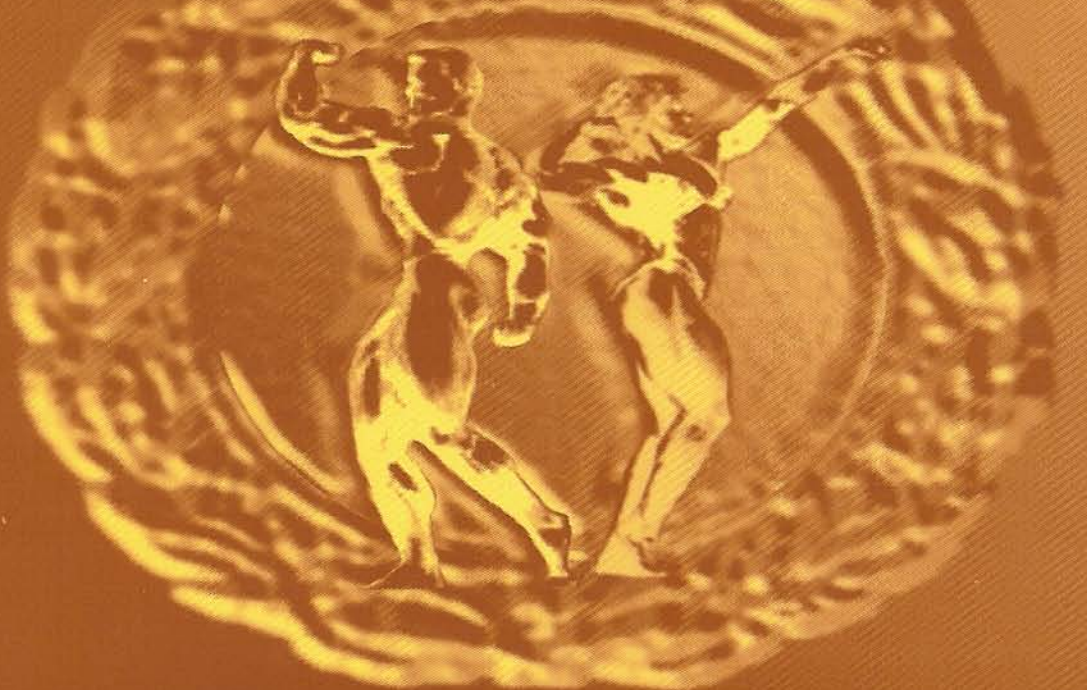
Chris Aceto's
Instruction Book for Bodybuilding

Championship Bodybuilding



- Training
- Aerobics
- Nutrition Programs
- Pre-Contest Dieting
- Carb Depleting and Loading
- Body Fat Control
- Supplements

Introduction

When I started training with weights when I was only 14 or 15 years old, I asked every big guy I knew in the gym the same question, "What are you doing to get so massive?" Each one offered a very different answer. Some told me I had to lift heavy to get big. Others said to use high reps and to really burn the muscle for growth and development. If I asked ten massive guys, I received nearly ten unique answers. Right there and then, I realized that there is no science and standardization to bodybuilding and getting big. How could there be? All these great physiques were using individual and unique techniques. However, I was able to utilize and retain some techniques that I thought were good and omit some that I thought were bad. At that point in my life, the good techniques were those that simply made sense to me, the bad ideas did not jive, so I omitted them from my program.

The same is true with diet and nutrition. Everyone told me something different. Talk about being confused! Of course, you probably can guess what I did. I used the dietary techniques of the most ripped and lean guy I met. Too bad though, in retrospect his dietary program was as detrimental for growing as it was beneficial for staying lean.

From 15 to 17, I simply trained as hard as I could every day until I was too tired to continue. Most sessions lasted 2 hours. If I was really tired on one particular day, I would simply skip training altogether and return the next day to train even harder. At 17, I also met a friend named Bob Gruskin. His thinking and training ideas were revolutionary to me. He taught me the real basics that I still use today. He brought me to the gym and was my first trainer. He showed me how to cook and to eat for gaining muscle and losing fat, and most important he taught me two invaluable lessons. They are; the winner of a contest is usually the most dedicated and hardest trainer, and the winner

must be smart and continually monitor his training and nutrition.

While I always looked through bodybuilding magazines for great photos for inspiration, I rarely read a training article by any champion bodybuilder. I refrained from doing so because I was told that most of the articles are ghost written and therefore, many of the training routines were inaccurate. Early on, I also knew how intangible bodybuilding could be. I'll give you an example. At 17, I thought I trained as hard as anyone. After all, my workouts lasted from 3 to 5 pm, sometimes even going later, to 6 pm. If I were a champion bodybuilder and was interviewing with a magazine, I would relay and even brag to the writer how incredibly tough and demanding my workouts are. I would also touch on a few techniques that I use.

Well, when I visited Bob Gruskin In New York, he trained me for less than 40 minutes and I was sore beyond belief. We used heavier weights than normal, really emphasized the negative, and also concentrated really hard with the positive. He showed me how to explode with the weights in my hands, not simply to push. In comparison, my old workouts were a breeze. The point is this; it is difficult to articulate onto paper what comprises a good workout. Magazines are not good at capturing the training that makes a champion bodybuilder. Bodybuilding is not an exact science. Many good bodybuilders are equally successful using very different training techniques. The magazines cover all the different training methods of several bodybuilders which can leave the reader more confused. Experiencing bodybuilding in the gym is the best way to learn. That is why Laura and I have our bodybuilding camp where people can come and stay here in Maine and learn the hands on way, by doing it, not reading about it.

However, this book will hopefully help you to understand more about bodybuilding, so you can build more muscle than you ever thought possible. I have compiled everything I have learned and picked up over the years and put it together in this easy to understand manual.

Special Thanks
to illustrator
Eric Blais
who created
the drawings
in this book.

THE TRAINING

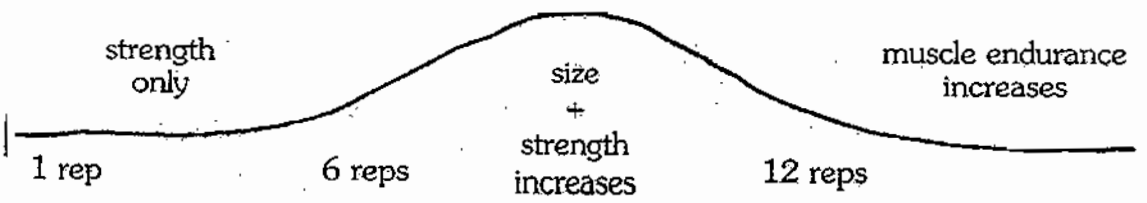
The goal of any bodybuilder is to gain as much muscle as possible. However, you must understand that building muscle is a (slow) process. If a beginner started training with a Pro bodybuilder, he would *not* make super gains. The body is like a new baseball glove. It must be broken in slowly; and that takes time. Trying to accelerate the entire muscle building process will not work. A beginner has to start basic and slow and go from there.

✔ The beginner should grasp two important ideas. ***Proper form is a must.*** Correct form allows you to place and maintain the majority of the stress from the weights on the particular muscle you are trying to build. A beginner should take as long as requires to perfect his form on each exercise. Many times a beginner doesn't quite grasp the correct form of an exercise. When he progresses and adds more weight, the form suddenly falls apart and stress is taken off a targeted muscle group. When stress is diverted from the muscle group, injuries begin to crop up and the targeted muscle fails to grow. Many times in the gym, I see guys using really heavy weights but they do not get great results even though they are taking sets to failure in the correct rep range. They do not add muscle even with heavy weights because, ***due to poor form,*** the stress is not completely placed on the targeted muscle. Instead, bad form places much of the stress on joints and other assisting muscle groups.

✔ The second important idea is ***weight training must be progressive.*** You must constantly change and alter the stress placed on the muscle. The best way; adding more weight - or striving to do so. This a really simple and basic idea, yet many people training to add muscle never emphasize this principle even though I believe it to be the most important and fundamental principle in bodybuilding. Always strive to add one more rep to a set or add more weight. Here is an example. If I can use 375

pounds on the bench press with proper form for 8 reps, I must perform 9 reps with that same weight in the following workout, or I must use more weight, 380 pounds for an equal number of reps. (8) Even if I can only do 6 or 7 reps with the additional weight, I have successfully utilized the ***progression principle.***

✔ The third important idea is that ***muscle grows best in the 6 to 12 repetition range.*** Less than 6 reps will increase strength with lesser increase in muscle size. This is why many strong powerlifters do not have super big muscles like bodybuilders. Powerlifters train for strength, not size, using a rep range of 1 to 6 reps. Performing more than 12 reps will build muscle endurance. This means, the muscles become better at (doing) the rep range. However, there is no *appreciable* increase in *either* size or strength from doing 20 reps. I will illustrate it this way. I can bench press 400 pounds for 6 reps, but my friend's 16 year old son can perform 100 push ups. Although he can not (even) bench press 225 pounds once, he has a high degree of muscle ***endurance*** while I lack muscle endurance because I train for strength and size in the 6 to 12 rep range. Needless to say, he can not out bench press me, but he can perform twice the amount of push ups that I can. ***Distinct rep ranges yield unique physiological changes.*** In general, a rep range of 5 or less will cause increases in strength with small increases in muscle size. A range of 6 to 12 reps will cause an increase in both strength and size, with size being the prevailing adaptation. And more than 12 reps will improve muscle endurance with little improvements in muscle size and no real improvements in muscle strength.



Which Is It? 6 Reps Or 12 Reps?

The *range* is 6 to 12 reps. As long as your reps on each set fall between 6 and 12, you should be stimulating muscle growth. If you can perform more than 12 reps on a set, the weight you are using is too light, so you will have to increase the weight. On the other hand, if you pick a weight and fail to complete 6 reps, the weight is too heavy requiring the removal of some weight so you can achieve at least 6 reps. Pick a weight where you can perform at least 6 reps but not more than 12.

Strive to continually push harder so that you add more weight in the future, and muscle mass will come. Many of the best bodybuilders in the world are the strongest people on earth. Dorian Yates can do reps with 450 pounds on bent over rowing for the back. Kevin Levrone can bench press 500 pounds for reps to develop his chest. Michael Francois can squat 700 pounds for reps for super thick legs, and yes, it is no coincidence that the pioneer of real female bodybuilding, Bev Francis, just happens to be the strongest woman on earth.

Stress and Growth

Stress (the weight used) is the stimulus for muscle growth. It is what sets muscle growth into play. Any beginner to bodybuilding will typically see very quick progress using very light weights because even light weights are a stress to a untrained body. Once the body becomes use to the stress, it adapts, and muscle growth grinds to a halt. In order to reintroduce that stress, a slightly heavier weight must be used to act as a successful stimulus.

Beginners often make the mistake of adding more reps or more exercises without first attempting to increase the weight on the exercises they are already doing. Adding more exercises only zaps energy and recovery levels so adding more weight as a means of increasing the stress on the original exercise becomes

nearly impossible. After mastering the right form, beginners should strive to use heavier weights on the exercises they are already using *before* adding additional exercises.

In the 1940's, a swedish scientist named Hans Selye formulated a theory on stress and how the body adapts to it. Much of his work can easily and effectively be applied to bodybuilding training. His theory is termed the General Adaptation Syndrome. The theory states that any stress (called a stressor) can have a profound effect on the body. A stressor is something that can upset the body's homeostasis; its day to day balance. It could be a cold, a virus, a super long day at work, a fight with a girlfriend or boyfriend, or in our case, training (stress). Three reactions occur with any severe stress. They are the alarm stage, resistance development stage, and exhaustion stage.

The ***Alarm Stage*** is the initial response to the stressor. Physiologically, the body reacts to the stress with physical symptoms that occur due to the demand of the stressor. A person experiencing a tremendous amount of stress at work and domestically at home may develop acne, his hair may thin, or he may sweat more frequently. The novice bodybuilder's stressor is the weights he uses. This stress will manifest in symptoms of being tired, extreme muscle soreness, and initially a little increase in strength.

In the ***Resistance Stage*** (also known as the rebuilding stage) the body adapts to the stressor. The signs such as extreme muscle soreness, or lethargy become dramatically less severe as the body attempts to recover and adapt to the stressor. It is during this time that muscles adapt to the work placed upon them and your body begins to grow. Here is where you must be smart and progress at your *own pace* in order to be successful in bodybuilding especially in the long run. Recall I wrote previously that bodybuilding is a slow process, *a building process*. If your training is not progressive, slowly over time, then surely you will not build any muscle at all! The stressor must be continually

changing and increasing over time to keep the body off guard, out of balance and not in a homeostatic situation. In order to build muscle the stressor must be *gradual* enough to allow the body's resistance stage to take place. Doing the same old workout over and over with the same weights and the same repetitions will, over the long haul, fail as a workout protocol because the body will adapt *completely* to the stressor. While complete adaptation is good - it means your recovering -, the stress ***must change*** to cause ***continual*** resistance and growth. The resistance stage allows the body to recuperate and rebuild from the stressor.

The ***Exhaustion Stage*** is the stage all bodybuilders want to avoid. It is the body's inability to cope with the stressor. It is where the resistance stage is omitted and muscle growth becomes an impossibility. Too much stress causes the body to fail in the resistance stage. Instead of having the energy and ability to recover, the body fails and becomes sickly. This sickliness is not the one we commonly think of, such as being laid up in bed. It is where the body becomes exhausted, unable to gather the strength to recover and rebuild from the stress of too much training; be it too many workouts each week or too many total sets for each body part. Instead of growing, the body, too tired and unable to recover, fails to grow and may even begin to lose muscle. The stress to bypass the resistance stage and initiate the exhaustion stage can be either acute or chronic. Acute training stress occurs when a beginner bodybuilder trains with a professional. The professional's work load is too overwhelming in one *single* workout. Although the beginner finishes the workout, most likely, he has pushed himself to totally new intensity levels overwhelming his body. While that is great, his body will be overwhelmed. Either injuries will occur or more common, he will become too sore or too tired. This extreme soreness will drain energy and recovery from every other body part, leaving his ability to recover for workouts in the immediate future severely compromised.

Chronic training stress occurs in beginner athletes and especially professional athletes. Professional bodybuilders train more often and harder than beginners. Professionals have conditioned themselves to pushing as humanly possible in every workout. Their resistance and ability to adapt to the stress of training has improved over time. To continue to grow, the stress must be higher and higher. While these workouts stimulate the body to grow, chronically over time, their resistance slowly begins to become overwhelmed by the stress (alarm) of training until the exhaustion stage is reached. Once the exhaustion stage is reached, the best way to overcome it is to suspend training for 2 to 3 days to allow the body to rest. Imagine the exhaustion stage of the flu. Nobody can be in bed one day and working at peak levels a couple of days later. In fact, it takes a week to 10 days after getting back on your feet and back to work for the body to recover fully from something as severe as the flu. Trying to get back to work too fast will only cause the body to fall back into exhaustion stage as the body's resistance is low. The same is true with training. If you are chronically tired, after taking a few days off to recover, try coming back to your training at a slower pace or you will end up exhausted all over again.

Women and Training

Men typically have no fear of adding weight to their exercises. After all, most want to add more muscle. It's the primary reason we weight train in the first place. On the other hand, women tend to fear using heavier weights. Their preference is to tighten and tone. However, the reason women choose weight training is to control body fat levels which is accomplished by adding muscle. In a nutshell, the more lean muscle a woman can add, the higher her daily resting metabolic rate, the body's internal calorie burning "engine". Many women are incorrectly under the impression that they should train different than men. They believe that high reps and light weight will quickly revamp the

physique making them leaner and harder. Light weights and high reps will not build any significant muscle and is, more or less, ineffective in building lean body mass or ridding the body of fat. The fastest and most effective way for a woman to change her body, to add lean body mass *and* to shed unwanted body fat, is to train with heavier weights in the 6 to 12 rep range. This type of training builds muscle. It is muscle that creates a lean appearance.

In years past, women often starved to lose fat. That did not work because, again, muscle is what visually creates the appearance of being in shape and lean. One could say a ***limiting factor*** to controlling body fat and appearing in great shape is the total amount of muscle (lean body mass) one carries. Simply put, if you build some muscle, you boost your metabolic rate.

Many people are now realizing that weight training is the superior way to lose fat and to keep fat off forever. Muscle is metabolically active. The more muscle you have the faster the metabolic rate. The faster the metabolic rate, the more calories are burned and the easier it becomes to stay lean.

In terms of measuring body fat levels, numbers have the potential to be somewhat misleading. A percent body fat measurement tells you how much fat to muscle you have. Most who try to alter the ratio emphasize losing fat. Most females try to alter the muscle to fat ratio with ***strict*** dieting. A female who weighs 130 pounds and carries 100 pounds of muscle and 30 pounds of fat has a body fat reading of 23%.

Body Weight: 130 pounds

Muscle	Fat	
100	30	23% body fat

She can try to alter that reading by dieting to lose fat. If she loses 5 pounds of fat she now has 100 pounds of muscle and 25 pounds of fat. She weighs 5 pounds less or 125 pounds. Now her percentage of fat becomes 20%.

Body Weight: 125 pounds

Muscle	Fat	
100	25	20% body fat

However, this is being a bit optimistic. Dieting alone, cutting calories with no exercise, *always* causes the body to lose a combination of body fat *and* muscle. Usually a dieter, with no exercise, will lose *equal* parts of muscle and fat. For arguments sake, let's be generous and assume this dieter lost twice as much fat as muscle. The five pounds lost will likely be 3-1/2 pounds of fat and 1-1/2 pounds of muscle.

Now she weighs 125 pounds with 98.5 pounds of muscle and 26.5 pounds of fat. That leaves her body fat at 21%. However, a loss of muscle mass causes a downshift in metabolism causing the body to burn fewer total calories in a given 24 hour period. When the metabolism slows, it becomes difficult to burn off body fat.

The ideal way to control fat is to weight train to build muscle. Adding muscle can change the muscle to fat ratio and the percentage of body fat faster than dieting alone. If a woman trains for a year under a good trainer, she could realistically add 5 pounds of muscle.

START			**FINISH** (end of year)		
Body Weight: 130 lbs.			Body Weight: 135 lbs.		
Muscle	Fat		Muscle	Fat	
100	30	23% body fat	105	30	22% body fat

Now, with no reduction in calories, she has changed her body composition by adding 5 pounds of muscle which ***lowers*** her muscle to fat ratio to 22% from 23%. However, the ***real permanent benefit*** is that the additional 5 pounds of muscle can increase her metabolic rate by as much as 60 to 88 calories a day, the equivalent to a 20 minute leisurely walk. Over time, carrying more muscle can promote fat loss with no additional

change in diet. Also, to build 5 pounds of muscle requires lots of physical work that burns plenty of calories. In the above example, we can safely assume that she would have lost some *additional* fat by virtue of the hard physical work required to do the training. Also, building muscle requires calories. The recovery process, or *rebuilding phase,* entails using energy (calories) to build muscle. Some of the calories required to rebuild muscle tissue to complete the recovery process actually come from stored body fat. It's safe to assume, another 2-3 pounds would be lost with the increase in metabolic rate resulting from additional lean muscle mass. *Another* 2-3 pounds would likely be shed due to:

1) the caloric expenditure required to *do* the training and
2) the metabolic demands required to *repair* the muscles to build those 5 new pounds of muscle.

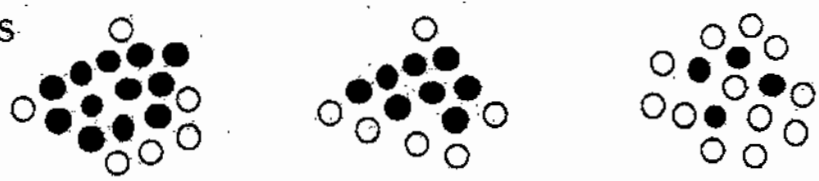
The point for women is that adding muscle is the best way to control fat. Dieting alone promotes the loss of both fat and muscle. Usually at the rate of 1 to 1. For every pound of fat lost, one pound of muscle is lost as well. Adding cardio exercise to dieting will accelerate fat breakdown. However, cardio will do nothing to cause the body to *hold* muscle mass. ***Weight training with dieting*** will cause the body to lose almost exclusively fat. Weights will give the body a reason to hold (or build) muscle during dieting. ***With dieting alone,*** the body will lose muscle mass along with body fat. A loss of muscle mass creates a compromised metabolic rate which can "cancel out" the potential fat loss one expects from a ***reduction*** in caloric intake. In other words, you cut back on calories but fail to look leaner. The loss of muscle is, ultimately, short-circuiting your ability to get lean.

Adding muscle is not the only way to speed the metabolic rate. Losing fat will speed the metabolism as well. Fat is stored calories. The more stored calories you have, the slower the metabolic rate. Therefore having too much body fat will only make you fatter in the long run due to a slow metabolism.

Losing fat while adding muscle drastically increases the metabolism so weight control becomes a lot easier.

● = Muscle Cells

○ = Fat Cells



Fast Metabolism Moderate Metabolism Slow Metabolism

Neuro Muscular Physiology

In order to be a really good bodybuilder and to add lots of muscle while controlling body fat, it is essential to learn as much as you can about training, exercise physiology, and nutrition. Only ultra genetically gifted bodybuilders can get by on desire alone. In fact, most of the top professional bodybuilders know a ton about muscle physiology. Some may not know the technical terms, but they sure know how to train and fully work each muscle group.

Every muscle a bodybuilder tries to develop is controlled by nerve fibers. Nerves cause muscles to contract. If a bodybuilder were to sever some nerves due to an accident of some sort, muscle contraction and growth would be impossible. ***All muscular contraction originates from nerve firings. The stronger the nerve signal, the better and more forceful the muscular contraction.***

Mind Over Matter

The nervous system, which governs muscular contraction, is made of the brain, the spinal chord, and the periphery nerves. Initiation of all nerve impulses for muscle contraction occurs in the brain. In order for a muscle to contract, the brain first sends a message through the spinal chord and towards the muscle. The brain must "tell" the muscles (via the spinal chord) how hard

to contract. This is where the adage, "mind over matter" originates, and is the reason why, in an emergency situation, a person of average weight and strength can hoist a car off an unfortunate victim who is pinned beneath. The nervous system, in a highly excitable state, sends overwhelmingly strong impulses to the muscles giving a person of "average strength" near super human power.

Slow Twitch and Fast Twitch

The ***Motor Unit*** is a network of nerve and muscle fiber where the final signal for muscle contraction occurs. It is where motoneurons (the final part of the nervous system) and muscle meet. Not all motoneurons are the same. Some are small, others are large. The smaller motoneurons control intricate movements like moving an eyeball or pointing with a finger. Large movements like bench presses and squats require ***large motoneurons to innervate large muscle fibers.***

Therefore, there are different fibers in the body controlled by small and large bundles of nerves. This is important to know and understand so that you can train accordingly. As bodybuilders, our goal is to add muscle. That is accomplished by knowing what fibers to train and how to train them, and their characteristics.

Slow twitch Muscle Fibers are suited for sports that require ***endurance*** such as long distance running. ***Slow twitch fibers are resistant to fatigue*** and they prefer to use fat as a fuel source when they are working. With training, the mitocondria may increase. The mitocondria is the part of a muscle cell where fat is ultimately used for fuel. The mitocondria will expand to meet the energy demand of the training. This allows the cell to make better use of fat for fuel. Aerobic training will not cause any increase in muscle size.

CHARACTERISTICS OF SLOW TWITCH MUSCLE FIBERS

1) innervated by smaller motoneurons
2) low force is generated due to smaller motoneurons
3) larger mitocondria
4) good blood supply
5) better able to use fat during (aerobic) exercise and can use glucose during weight training or anaerobic exercise.
6) small fiber size (due to 1 and 2), will not grow in response to aerobic training.

Fast twitch muscle fibers are classified as either type 2a or type 2b. These are the fibers that are involved during weight training. Type 2a fibers are always used in a higher rep range, greater than 12, and also are the **first** to come into play in the 6 to 12 rep range. They can use both fat and glycogen (stored carbohydrates in the muscle) as a fuel source. In response to training, they can grow up to 25% of their original size. A beginner with a 12 inch arm can, in theory, expect it to from by 25% or 3 inches.

CHARACTERISTICS OF FAST TWITCH TYPE 2a MUSCLE FIBERS

1) innervated by larger motoneurons (compared to slow twitch)
2) moderate force is generated when contracted (compared to slow twitch)
3) good blood supply
4) use fat and glycogen during exercise
5) moderate fiber size
6) can grow by 25%

These fibers can take on and adapt to *both* training stimuli: aerobic work or anaerobic work, as in bodybuilding.

The Growth Fibers

Type 2b fast twitch *fibers* are those best suited for bodybuilding. They respond somewhere between 4 to 12 reps. They can increase in size with training by as much as 100%. Therefore, a novice with a 12 inch arm can, in theory, build it to 24 inches! The best rep range for muscle growth is generally 4 reps at the lowest and 12 at the highest. During a set of 6 to 12 reps, ***the type 2a fibers are recruited first.*** If the set is completed in "fitness fashion" – you put the weight down before approaching failure–then primarily the 2a fibers are worked. If the same set is taken to ***failure*** *(you can't accomplish any more reps on your own)*, then the 2b fibers come into play. Stimulating the 2b fibers is the fastest and most effective way to make a muscle grow. The 2b fibers have the best potential for growth. While bodybuilders will grow from regular sets employing moderate intensity (weight), ***significant*** growth will occur only when a set is taken to failure. That means using a heavy enough weight to make the set most difficult. Remember, type 2a fibers do all the work unless the set is taken to failure. Type 2b fibers come into play at the end of a set. The last few reps are the growth reps!

Genetically, people are a hodge-podge of slow twitch and fast twitch muscle fibers. Some, including champion marathoners, have more slow twitch than fast twitch fibers. This would explain the ability to excel in exclusively aerobic sports. Endurance training requires slow twitch fibers and the person genetically blessed with a disproportionate amount of slow twitch/aerobic fibers will shine in activities requiring endurance.

In regards to fast twitch, champion bodybuilders are likely gifted with more 2b/growth fibers than 2a or slow twitch fibers. This allows for the building of eye popping amounts of lean muscle mass. Most of us are a mix. To generalize, our muscles are a blend of slow twitch and fast twitch. We have slow twitch and fast twitch; 2a and 2b muscle fibers. Unfortunately, we

don't have an overwhelming number of the easy-to-grow 2b fibers, but we can ***target*** our training to maximize the recruitment of the 2b fibers.

Tips To 2b Recruitment

"Belief, Maximal Weight, Explode, Accelerate, Fail"

The key to muscle growth is the recruitment of the 2b fibers and the key to ***recruitment*** is the load (weight) used. Obviously it is important to train heavy, so you fail and cause the 2b fibers to be worked. Recall, mind over matter. Muscle contraction is first determined by the brain. First, you must *believe* that you can push a certain weight. Then you must must generate enough large motoneurons to recruit the 2b fibers.

Here is an example of how important it is to believe in yourself. When I began training in Maine, I was markedly stronger than everyone else. I frequently benched pressed 400 for reps, squatted 600 for 10 and dead lifted 600 for 8 to 10 reps. After a year or two, I noticed several people approaching the lifts that previously, only I could do. Mentally, these people broke the barrier in their minds that such lifts would be un attainable. That's great cause that is the same way I got stronger. I saw others who I knew lift more than me and soon I convinced myself if they could max 600 pounds on the bench press then surely I could do 400 for a couple of reps.

One very effective technique to garner the recruitment of 2b muscle fibers is called ***explosion.*** Exploding during the concentric part (the "lifting" or "pushing part") of the exercise generates enormous power which in turn causes the recruitment of large motorunits. Remember, it is the large motorunits that recruit the large muscles and the 2b muscle fibers.

Another technique I use and teach is the act of ***acceleration.*** After exploding, I accelerate the weight. I push "faster and faster". This is the best way to generate force and to

recruit the fibers that grow best, the 2b fibers. I use the analogy of the great sprinter Carl Lewis, when he set the world record in the 100 meter dash. Not only did he explode with tremendous power out of the starting blocks, but he accelerated with speed as he whipped down the track. He was faster at the midway 10 meters than he was in the first 10 meters. This is what made him a terror for his competition.

The last tip to recruiting type 2b fibers is to take the sets to **positive failure.** Positive failure is where the lifter finds it extremely difficult to finish the final rep in the 6 to 12 rep range. It's a good idea to have a spotter help accomplish the final rep. The spotter will give you the confidence to try to finish the last rep. If a person tries to take a set to positive failure but has no spotter, then he will inevitably re-rack the weight before going to failure and the type 2b fibers will not be maximally recruited.

The Energy Systems

ATP-CP SYSTEM

The human body must be continually supplied with chemical energy to perform muscular work. The raw materials for this muscular work and muscle growth is generated from food. The ***Ultimate Energy Source*** in the body is not carbs, protein, and fat. The body gets all of its energy from ATP which is made in the body from chemical reactions that occur from the conversion of food into usable energy. (ATP)

ATP (adenosine triphosphate) is used for digestion, muscle contraction, nerve transmission, circulation, growth, and glandular functions. As the name implies, ATP is made of adenosine bonded to ***three*** (tri) molecules of phosphate. When one of the phosphate molecules is broken off the chain, a great amount of energy is produced.

ATP = Adenosine + phosphate + phosphate + phosphate

Adenosine + phosphate + phosphate + phosphate

Broken off to make energy

This energy producing process leaves us with ADP
ADP = Adenosine + phosphate + phosphate

Every cell in the body taps this energy to sustain life. The remaining molecule is ADP which is adenosine bonded to only 2 molecules of phosphate.

CP SYSTEM

Although ATP serves as the energy for all cells, its quantity is limited to 3 ounces at any one time. This is a small amount and allows for only a few seconds of exercise. Therefore ATP must be continually re-made.

Creatine phosphate (CP) is found in muscle. A muscle contains three times as much CP than ATP. Plus, when CP is destroyed in order to make energy, much more energy is derived than when ATP is broken apart for energy. Since the breaking of CP makes more energy than ATP breakdown, it can easily ***replenish*** the ATP. In effect, CP is a *reservoir* the body calls on to continually resynthesize ATP. The entire ATP-CP system allows for only maximal work of up to approximately 15 seconds.

After a grueling set, it takes 60 to 90 seconds for complete ATP resynthesis to occur so it is best to wait at least this time in between hard sets to maintain energy levels.

CP = creatine phosphate
CP — broken apart to produce energy
CP energy released..... donates energy to ADP to make ATP
CP + ADP = NEW ATP

Most sets will take about 15 seconds to complete. Therefore the energy system that is totally tapped is the ATP-CP system. ATP stores are limited. Therefore, workouts should not last too long. Also the resynthesis of ATP takes time, so there is no need to fly through a training session between sets. Give yourself enough time between sets for ATP to be reformed.

Training too fast and taking too little rest time in between sets elevates the heart rate to such a high level; the entire body as a unit fatigues before you can bring a set to ***muscle*** failure. Fast-action-training compromises your ability to get the best muscle building workout possible. I recommend 1 to 2 minutes between sets and up to 3 minutes on exercises like dead lifts, squats, and some back exercises. You should rest long enough for your heart rate to come down low enough so when you do a set the muscle fails with no concern your elevated heart rate will compromise your effort. (see supplement section on creatine)

Carbs Are The Reserve

In a nutshell, when you perform a hard set of leg presses, the energy allowing you to do the work comes from ATP while phosphocreatine helps to maintain elevated levels of ATP. Since ATP-creatine can only maintain energy needs for up to 15 seconds, the muscles rely on a back-up fuel reserve; glucose derived from carbohydrate foods.

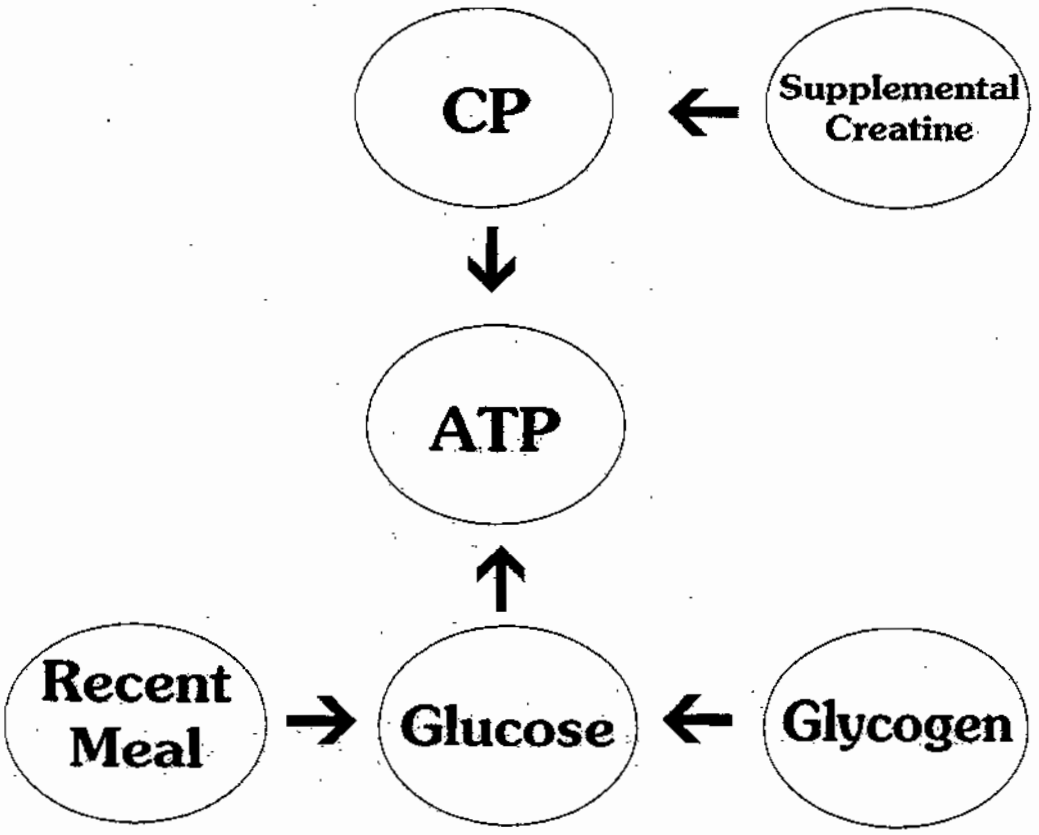
THE GLYCOLYTIC SYSTEM

Another way the muscles can obtain ATP is by breaking glucose (sugar) into ATP. Technically, this liberation of ATP from glucose is called the ***glycolytic*** system as it involves ***glycolysis*** or the "breakdown" of glucose by special enzymes called ***glycolytic enzymes.***

As your work out continues and the body struggles to supply ATP from the ATP-CP system, it begins to rely on the glycolytic system so that glucose can be used to make additional ATP.

There are two sources of glucose that can be used to make more ATP. The two sources include glucose or "blood sugar" that floats about in your blood stream from a recent carbohydrate meal or from liver or muscle ***glycogen***. Glycogen is made from glucose. It's a collection of a stored glucose derived from previously eaten carbohydrate foods bundled together and physically packed away into the muscles and liver where it can be called on to fuel your workouts when sugar levels in the blood fall.

PRIMARY SOURCES OF FUEL FOR WEIGHT TRAINING



CP = Creatine Phosphate: increased by supplemental creatine

A Beginner's Overview

Enough of the physiology and technical stuff. Let's start applying some of this towards training. Ideally, the beginner should start off training 3 times a week working all the body parts in one session. Beginners do not need a tremendous variety of exercises to work each body part. With training being so new and foreign to the body, 1-2 sets of 1-2 exercises for each body part will be enough to completely work the area. Remember, form is most important to the beginner. I can't emphasize how important proper form is *and* becomes in developing plenty of muscle. ***The goal of the beginner must be to master the techniques on all the exercises.*** And don't fret and worry about using heavy weights! In fact, keep the weights ***light,*** comfortable and easy.

The best exercises are called basic exercises. Basic exercises are the ones for each muscle group that you are strongest on. For example, the bench press is a more basic exercise than flies for the chest and squats are a more basic exercise than leg extensions when working the legs.

Surprisingly beginners can work each body part more often than an advanced bodybuilder. I did and I grew when I first started and every bodybuilder I know did the same. They trained more when they first got started. How could this be? Why should a beginner train a body part more often than a pro bodybuilder? Because beginners are trying to master the right form and should be using really ***light*** weights. At first they should be concerned with, "Am I doing this exercise correctly? Is the muscle I am trying to work receiving the majority of the stress from the weights?" Practice makes perfect! Also, a beginner is less prone to injuries and overtraining since a beginner will never have the know how, experience, and strength to push himself to his physical limit each workout.

Bodybuilding is filled with intangibles. One is being able to "feel" the muscle work as you perform an exercise. For the

beginner, it is simply not enough to have correct form. You must have the right form ***and*** feel the muscle you are working. Watch the muscle contract as you do bicep curls or leg extensions and watch and feel it lengthen as you let the weight down. What you should be doing is attempting to feel the muscle being worked. Do this for every rep in every set, even before adding weights, even if the weight is light. My reasoning for emphasizing the "feel" is this; to fulfill your potential and to add large amounts of lean muscle, you will eventually have to lift some really big weights in the future. When lifting heavy, I am very aware of how much weight I am using. Being overly aware of the weight can take the mind off the "feel". However, if you have trained and conditioned your muscle to "feel" the weights from day one as a beginner, the big weights required to build thick and dense muscle will work wonders because the mind has been ***conditioned*** from the beginner's stage to subconsciously feel the work placed on the muscle all the way through each rep and each set.

A terrible mistake I see with most beginners is their ego interferes with the quality of the workout. Instead of using proper form and feeling the weights, they try to impress their friends by using poundages that are just too heavy. Their form is terrible. Worse, they never grow.

One way to learn proper form is to watch a person with a great body part train that muscle. When I was at the Muscle and Fitness bodybuilding camp in California, I watched all the champs train. I followed the bodybuilders around the gym who I thought had the best individual body parts. Then, I watched and tried to copy their form when I trained that same body part.

Training Splits

The number of days to train per week depends on a number of things; training experience, level of fitness, goals, and lifestyle influences. Here is a look at certain splits and who they will work best for.

If you are a beginner, I suggest to follow the splits gradually. Start with the first split below and, in time, move on to the successive splits. Do not try to skip steps even if you are eager for results. Skipping steps will only leave your body tired because you failed to let it slowly adapt to each successive split, as each split is more demanding than the previous one.

3 DAYS A WEEK

This is the practical and best approach for beginners. It allows ***all*** the body parts to be trained in one workout session ***on three*** occasions. Train Monday, Wednesday, and Friday. This split is good for those very unfamiliar with both training and athletics. The emphasis is placed on familiarizing yourself with training and form, form, form!

MONDAY, TUESDAY, THURSDAY, FRIDAY

This is also known as the four day split. It has the trainee separate the upper body from the lower body. Both the upper body and lower body are trained twice each week. This is good for building a foundation and working hard with heavier weights in more basic exercises. It's a great way to add mass for the person who has graduated from the 3 day a week split. Football players and many athletes find this split most successful since they are not in the gym every day and are trying to build strength primarily, with a bit less emphasis on size. Train the upper body on Monday and Thursday and the lower body on Tuesday and Friday.

4 DAYS ON, 1 DAY OFF

This is the next logical step for the person who is trying to

build a solid foundation on the 4 day split.

This is a great split for the bodybuilder. This allows him to pay more attention to each body part. All the body parts are worked once over a four day period with one day off to rest before starting the program all over again. The body parts can be grouped as follows.

Day 1	chest and biceps		chest and shoulders
Day 2	back and abs		legs and calves
Day 3	legs and calves	OR	arms
Day 4	shoulders and triceps		back and abs
Day 5	rest, then repeat cycle		

2 DAYS ON 1 DAY OFF

This is my favorite split to add mass. It allows for full recovery especially in those who may find it difficult to recover from the 4 days on-one day rest split. This split is guaranteed to make you bigger and stronger. Each body part is worked just once every 6 days. The split is great for advanced bodybuilders who find themselves pushing themselves to the limit but lack the energy, or recovery ability, to come back and train hard day after day. The body parts can be split as follows.

Day 1	back and biceps
Day 2	chest and abs
Day 3	rest
Day 4	legs and calves
Day 5	shoulders and triceps
Day 6	rest, then repeat cycle

3 DAYS ON 1 OFF - 1 ON 1 OFF

This is one of the splits that is gaining in popularity because, like the 4 days on, 1 day off split, it gives the bodybuilder more rest than training 6 days a week or 4 or 5 days in a row. Training splits calling for more than 4 consecutive days of training usually short circuit the body's ability to recover which impairs growth, leaving the bodybuilder frustrated with little gains. The benefit of this particular split is the upper body is never worked two days in a row allowing for better upper body recovery. Those who struggle with building up the torso and arms may benefit most by using this plan. The split looks like this:

Day 1	chest and triceps
Day 2	legs and calves
Day 3	back and abs
Day 4	rest
Day 5	shoulders and biceps
Day 6	rest, then repeat cycle

MODIFIED 6 DAYS A WEEK

Very few people, even professional bodybuilders with awesome recovery ability and the lifestyle that allows them to pay utmost attention to nutrition and training, work out 6 days a week. Traditional 6 day a week routines dictate you train each body part ***twice*** a week. Training a body part more than once every 5 to 7 days usually produces a 'wearing down' effect where the bodybuilder ends up overtraining, not having taken sufficient rest. The end result is little gains in strength and size. However, you ***can*** train every day if you only work one specific muscle at a time - and no more than one muscle group per week. This split allows you to pay more attention to a body part

and, since you are training only one muscle, you never spend a long time in the gym. ***Long*** training sessions burn up an abundance of glycogen and set in motion a cascade of hormones that ***oppose*** the building process. The split looks like this:

Day 1	Chest and abs
Day 2	Back
Day 3	Arms
Day 4	Quads
Day 5	Hamstrings and calves
Day 6	Shoulders
Day 7	Rest, then repeat cycle

Training for Beginners

Most beginners, myself included, jumped into a workout split found in bodybuilding magazines. Unfortunately, the routines were much too advanced for the beginner. When I started, I read a professional's workout routine from a small, now defunct magazine. I figured since I really wanted to make great gains and fast, I would simply do the pro's routine and more! I actually grew for a while, then I improved very little, thereafter.

Beginners should never mimic the workouts of professionals. Instead they should start slowly, working the entire body three times weekly using weights that are relatively light with the rep range being around ten. The goal should be to master the correct form, to learn what exercise works each muscle, ***to master muscle coordination,*** and to try to feel the muscle group that is responsible for lifting the weights, do the work. The beginner should stay with the 3 day split for as long as it takes to master the form of the exercises. Coordination is also important. Sometimes a trainee can perform an exercise in good form, except he can not properly execute (coordinate) the exercise when more weight is used. The more time spent mastering form and coordination, and muscle feel, the better the trainee will grow in the future when heavier weight, in good form, is required for continual growth.

The last part of beginner training is feeling which muscle or group of muscles is working. This is often referred to as the "mind to muscle connection." The mind to muscle connection is one of the many intangibles in bodybuilding. It is a difficult concept to teach. It is best learned through repetition and practice, still another reason to spend plenty of time on the three day split. Basically, use weights light enough so that you can literally feel the muscle working as the muscle shortens to contract and lengthens to relax. Too many bodybuilders skip the beginner level altogether in a rush to get big, or they do not spend enough time in the beginner stage. Down the road as an

advanced bodybuilder, you will have to be pushing more weight to keep adding more muscle mass. Using heavy weights usually takes the bodybuilder's attention off feeling the muscle and puts it onto "pushing" the weight. However, if you have learned early to concentrate on feeling the muscles work during each exercise, you will be able to both "feel" and "push" the weights at the same time.

Once the beginner has mastered form, coordination, and feeling the weights, he can begin to add more weight, still using a 10 rep scheme. Progressively add weight from week to week, but do not jump up in weight too drastically. That will lead to overtraining and injuries.

A mistake is to go from leg pressing 180 pounds one workout to 225 pounds the next workout. Even if the weights seem light, stick to small jumps that will ***allow for complete recovery and adaptation.*** If you jump from 180 to 225, your legs may become too sore to train them again the following workout. Allowing for a smaller increase in weight, even when you could do more, say from 180 pounds to 190 pounds or 195 pounds, is wiser. This (still) makes use of progressive overload, it need not be over "kill." Small increases in weight will allow for full recovery, it will not shock the muscle, and it will allow for proper progression, where you can continually add more weight in future workouts.

Increasing poundages too fast may actually hinder strength gains. After increasing to 225 pounds for 10 reps, you may be able to only get 210 pounds for 10 reps in the next workout. That's not ***progressive*** overload. What would you try for the next workout? More than 225 or somewhere between 210 and 225 pounds? Slowly adding weight will give you a better chance of increasing poundages from workout to workout. It will allow the body to adapt, without the risk of overtraining or injury.

The beginner's workout may look like this:

1 exercise for biceps, triceps and hamstrings 2 exercises for all other body parts
1 warm up set per each exercise
1 "working" set of 10 reps

* Form, feeling, and coordination are the goals
Maintain a 3 day a week training split
Working set: a set with *added* weight that allows for 10 reps, yet light enough where you *could* perform 12-15 reps.

Before moving to the intermediate stage, the beginner can add 1 to 2 sets so he is now performing 2 to 3 working sets of 10 reps **after** warming up. Perform all sets by yourself, with no help in completing each set other than the safety of a spotter.

Most beginners will need 4 to 6 and up to 12 months to master form, coordination and to get the right "feel" for each exercise.

SAMPLE BEGINNERS TRAINING SCHEDULE

(3 days a week: Monday, Wednesday, Friday ref. pages 99 & 105)

Bodypart	Exercise	Sets	Reps
Chest	Bench Presses	1 warm up	10
		1 working set	10
	Pec Dec	1 warm up	10
		1 working set	10
Back	Pulldowns	1 warm up	10
		1 working set	10
	Low Cable Rows	1 warm up	10
		1 working set	10
Shoulders	Front Presses	1 warm up	10
		1 working set	10
	Side Laterals	1 warm up	10
		1 working set	10
Biceps	Standing Curls	1 warm up	10
		1 working set	10
Triceps	Pushdowns	1 warm up	10
		1 working set	10
Legs: Quads	Leg Press	1 warm up	10
		1 working set	10
	Leg Extensions	1 warm up	10
		1 working set	10
Hamstrings	Leg Curls	1 warm up	10
		1 working set	10
Calves	Seated Raises	1 warm up	10
		1 working set	10
	Standing Raises	1 warm up	10
		1 working set	10
Abdominals	Crunches	2-3	10, 20

Intermediate Training

Intermediate training involves training each body part less frequently. The beginner can train more often because he is practicing form, coordination and feel. He is not using any advanced techniques for maximal muscle recruitment nor is he using really heavy weights. The beginner will respond to even the smallest stimulus since the training is so fresh and new for his body. The intermediate should train each body part less but with more intensity. ***As the intensity or poundages used increase, the frequency or number of times you train a body part each week should correspondingly decrease.*** **Simply put,** the more stress you add to a muscle by increasing the weight, the more time it needs to repair itself allowing for muscle growth.

A good program for the intermediate is the four day split. The intermediate should concentrate on using progressively heavier weights. The first ***working set*** should include the use of heavier weights where the trainee can complete 10 reps, yet may have been able to "nudge out" one more rep, completely alone, without spotter. Each additional 1-2 sets should be comprised of 10 reps and the reps should be performed in an ***exploding and accelerating fashion*** *(see page 20).*

The next step for the intermediate is to start taking sets to failure. This will definitely require a spotter to ensure that the final two reps of each set are extremely difficult to accomplish. The intermediate should also start to lower the reps on the basic compound movements. For most, the 4 day split is still best and the 4 day on, 1 day off is also appropriate.

The intermediate workout should look like this:

1 exercise for hamstrings
2 exercises for biceps, triceps, and calves
2-3 exercises for chest, shoulders, back, and quads
1 warm up set
1 working set (added weight)
1-2 sets (added weight) exploding and accelerating

"working set": a set with added weight that allows for 10 reps where the trainee can barely squeeze out the 10th rep on his own.

The intermediate should also use a spotter and take sets ***closer*** to failure. At least one exercise for chest, shoulders, back, and quads must emphasize lower reps, somewhere around 6 and no more than 10.

SAMPLE INTERMEDIATE TRAINING SCHEDULE A
Monday, Thursday

Bodypart	Exercise	Sets	Reps
Chest	Bench Press	1 warm up	10
		1 working set (add weight)	10
		1-2 exploding & accelerating	10
	Incline	1 warm up	10
	Bench Press	1 working set (add weight)	6 to 10
		1-2 exploding & accelerating	6 to 10
Back	Bent Rows	1 warm up	10
		1 working set (add weight)	10
		1-2 exploding & accelerating	10
	Pull Downs	1 warm up	10
		1 working set (add weight)	6 to 10
		1-2 exploding & accelerating	6 to 10
Shoulders	Front Presses	1 warm up	10
		1 working set (add weight)	10
		1-2 exploding & accelerating	10
	Side Laterals	1 warm up	10
		1 working set (add weight)	6 to 10
		1-2 exploding & accelerating	6 to 10
Biceps	Standing Curls	1 warm up	10
		1 working set (add weight)	10
		1-2 exploding & accelerating	10
	Preacher Curls	1 warm up	10
		1 working set (add weight)	10
		1-2 exploding & accelerating	10
Triceps	Pushdown	1 warm up	10
		1 working set (add weight)	10
		1-2 exploding & accelerating	10
	Close Grip	1 warm up	
	Bench Press	1 working set (add weight)	10
		1-2 exploding & accelerating	10

SAMPLE INTERMEDIATE TRAINING SCHEDULE
Tuesday, Friday

Bodypart	Exercise	Sets	Reps
Quads	Presses	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Smith machine	1 warm up	10
	Squats	1 working set	6 to 10
		1-2 exploding & accelerating	6 to 10
	Extensions	1 warm up	10
	(optional)	1 working set	10
		1-2 exploding & accelerating	10
Hamstrings	Leg Curls	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
Calves	Seated Raises	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Standing Raises	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
Abs	Crunches	3 sets	15
	Hanging Leg Raises	3 sets	10

SAMPLE INTERMEDIATE TRAINING *SCHEDULE B*
(4 day on, 1 day off Split pg. 99)

Bodypart	Exercise	Sets	Reps
Day 1: Chest and Biceps			
Chest	Bench Press	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Incline Bench	1 warm up	10
	Press	1 working set	6 to 10
		1-2 exploding & accelerating	6 to 10
Biceps	Standing Curls	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Preacher Curls	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
Day 2: Back and Abs			
Back	Bent Rows	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Pull Downs	1 warm up	10
		1 working set	6 to 10
		1-2 exploding & accelerating	6 to 10
Abdominals	Crunches	3 sets	15-20
	Hanging Leg Raises	3 sets	15-20
Day 3: Legs and Calves			
Quads	Presses	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Extensions	1 warm up	10
		1 working set	6 to 10
		1-2 exploding & accelerating	6 to 10
Hamstrings	Leg Curls	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
Calves	Seated Raises	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Standing Raises	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
Day 4: Shoulders and Triceps			
Shoulders	Front Presses	1 warm up	10
		1 working set	6 to 10
		1-2 exploding & accelerating	6 to 10
	Side Laterals	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
Triceps	Pushdowns	1 warm up	10
		1 working set	10
		1-2 exploding & accelerating	10
	Close Grip	1 warm up	
	Bench Press	1 working set	10
		1-2 exploding & accelerating	10

The Importance of Using Heavy Weights

People usually want something "nifty" or "hi tech" when it comes to training plans. Yet, truth is, after establishing good form, the core foundation in stimulating growth is old fashion heavy weights. Heavy weights is the most basic stimulus causing ***maximal muscle fiber recruitment.*** When you take a set to failure in the in the 6 to 12 rep range, rest assure *all* the 2b fibers - the one's that have the greatest potential for muscular growth - are recruited. For example, if a bodybuilder can use 200 pounds on the bench press and fails at the eighth repetition, it is likely that 100% of the muscle fibers of the chest came into play. However, the same bodybuilder who uses half the weight or 100 pounds and completes eight reps will ***not*** recruit ***all*** the fibers of the chest ***even if he does multiple sets.*** To ensure maximal muscle recruitment, choose a weight heavy enough that ***prevents*** you from exceeding 12 reps yet is not so overwhelmingly heavy that you can not accomplish 6 reps. When you work in the 6 to 12 rep range with maximal poundages, and fail on the final rep, be it, 6, 7, 8, 9, 10, 11 or 12, you are guaranteeing optimal muscle stimulation.

A common training mistake is to use lighter weights that do not cause muscle failure. Light weights fail to recruit 100% of the muscle fibers within a muscle during a given set. Furthermore, those who avoid heavy training usually try to compensate by performing an ***abundance*** of sets, feeling more sets will make up for not working heavy. In this case, it's possible to exhaust the body, to tire it out with "set after set" mentality ***without*** stimulating maximal fiber recruitment. Volume work, believing "lots of sets" is the key to growth is a fallacy. While doing multiple sets is important, performing ***too many sets*** at the expense of working with heavy weights to failure will prevent you from making any serious gains in lean muscle mass.

Advanced Training

Another bodybuilding intangible. When does an intermediate receive his diploma to ascend to the advanced bodybuilding level? It is hard to pin point. It is up to you. If you have mastered form, coordination, and feel the muscle, and the weights are going up, then move on. The best training schedule is the modified 6 day a week plan or the 2 day on one day rest approach. Most should train for a minimum of one year before considering an advanced training plan.

A good set and repetition scheme looks like this:

2 exercises for hamstrings
2 to 3 exercises for biceps, triceps, calves
3 to 4 exercises for chest, shoulders, back, and quads
1 warm up set
2 sets (progressively adding weight) for each exercise
1-2 exploding and accelerating sets to *failure**

*Use advanced training tips found on pages 116-121.

The above information is not written in stone. Advanced trainees may want to do more sets on days they feel full of energy and less sets on the days they feel tired.

Advanced training will require more variety of exercises to create a different recruitment pattern. Changing the exercises by making slight angle changes in the basic exercises is one way to change the stress on the muscle. An example is to alternate squats with front squats to smith machine squats. Another variation in angles is simply alternating standing bicep curls with preacher curls and alternate dumbbell curls. Previously there was no great need to change the stress on the muscle if the muscle or muscle group was progressively becoming stronger. Only after you feel you can not get significantly stronger on the basic

exercises should angles begin to change. If you are still getting stronger, do not change the workout.

SAMPLE ADVANCED TRAINING SCHEDULE
(2 days on 1 Day off Split, pg. 100)

Bodypart	Exercise	Sets	Reps
Day 1			
Back	Pulldowns	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Bent Rows	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Low Cable Rows	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Dumbbell Shrugs (optional)	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
Biceps	Standing Curls	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Preacher Curls	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Cable Curls (optional)	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
Day 2			
Chest	Bench Presses	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Incline Bench Press	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Pec Dec	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
Abs	Crunches	2	20
		2 (add weight)	12 to 15
	Hanging Leg Raises	4	12 to 15

SAMPLE ADVANCED TRAINING SCHEDULE
(2 days on 1 Day off Split, pg. 100)

Bodypart	Exercise	Sets	Reps
Day 4			
Quads	Leg Extensions	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Smith Machine	1 warm up	12
	Squats	2 working sets	8 to 10
		1-2 advanced	6 to 8
	Leg Extensions	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Dumbbell Lunges	1 warm up	12
	(optional)	2 working sets	8 to 10
		1-2 advanced	6 to 8
Hamstrings	Leg Curls	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Stiff Leg	1 warm up	12
	Dead Lifts	2 working sets	8 to 10
		1-2 advanced	6 to 8
Calves	Seated Raises	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Standing Raises	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
Day 5			
Shoulders	Front Presses	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Side Laterals	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Rear Laterals	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
Triceps	Pushdowns	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Skull Crushers	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8
	Dips	1 warm up	12
		2 working sets	8 to 10
		1-2 advanced	6 to 8

— Tips to Advanced Training —

Acceleration

The definition of force is equal to mass (the weight) multiplied by acceleration. Force=mass x acceleration. The great track star, Carl Lewis is faster from 50 to 60 meters than from 30 to 40 meters. Lewis keeps getting faster as the sprint progresses. Therefore he is known as the most "powerful" sprinter in history.

The training goal of the mass seeking bodybuilder or the trainee trying to increase lean body mass is ***muscle recruitment.*** That is, the more muscle fibers you can involve in an exercise, the greater the overall muscle stimulation and muscle growth. Overwhelming factors that stimulate muscle recruitment include ***total poundage used,*** which is the "weight" you decide to use. In good form, more weight is always better than less weight as the greater the poundage, the greater the stress on the muscle. The second factor is the ***speed at which you move the weight.*** Contrary to the common practice of super slow motion training, the faster you move the weight, the greater the muscle fiber recruitment. When doing a repetition, you should ***not*** move the weight in a lazy cadence, but "blast" the weight and try to move the weight as fast as possible. This ***accelerative*** training coupled with a heavy weight is the ideal method to maximize the recruitment of as many muscle fibers within a muscle as possible.

Take home lesson: ***drive*** that weight up to place more force on the muscle.

REST PAUSE

While 6 to 12 reps is the range you want to be in (to failure) you do not have to do all your reps at once. Let's say you are shooting for 8 reps on the bench press but struggle to finish only 6. Rack the weight, rest for no longer than 20 seconds, and push up to 2 more, for a total of 8 reps.

STRIP SETS TO 10

A good way to add stress to the muscle is to use a heavy weight and aim for 10 reps to failure. However, in 70 pound dumbbell presses, you can only get 5 reps. Drop the dumbbells, immediately pick up a lighter weight that allows you to squeeze out 3 more. After failing again, immediately choose yet another lighter set of dumbbells and get the last 2 reps, for a total of 10 reps.

Strip sets are effective when you *start* with a weight that forces you to fail in a 4 to 5 rep range and you proceed to extend the set by choosing ***another heavy poundage*** that may allow you to perform 1 to 3 more reps. Again, after failing choose *another* heavy weight allowing for only 1 to 3 more reps so the total reps performed tally up to roughly 10. The goal is to ***use heavy weights.*** A mistake is to *start* the strip set with a weight that is not heavy enough to cause you to fail in the first place. For example a lifter initially performing 5 reps, may mistakenly pick a weight that is so light he could have achieved 7 or 8 reps. Next, he proceeds to lower the weight and perform another 2 to 3 reps with a weight that is still too light.

Take home lesson: Light strip sets do not cause maximal muscle fiber recruitment.

FORCED REPS

Aim for a set number of reps, 8 for example. Use a weight that allows for only 6 clean reps. Have a spotter help you to get the last 2 reps. This places additional stress on already failed muscle fibers.

PEAK CONTRACTION/NEGATIVES

This technique is good for exercises that allow you to squeeze a muscle at the top of an exercise. You can use this with leg extensions, leg curls, bicep and tricep exercises and others. Here is how it works. For example, on leg extensions you may set a goal of 10 reps but can accomplish 6 reps on your own. Have a partner ***help*** you get an additional 4 reps to

bring the total to 10.

For the final 4 reps, have your partner manually help you extend the weight up so your legs are fully extended. At the top, contract your quads in a static (holding) position for 1 to 2 seconds maximum. Instead of lowering the weight with little resistance during the negative or down side of the exercise, fight and resist the weight as much as you can lowering the weight as slowly as possible. You can even take the technique a degree further and have a partner push on the weight stack during the negative portion of the exercise to "add weight". During the lowering of the weight, the muscles are typically 50% stronger during the resistance or lowering part of an exercise compared to the positive or "doing" part of an exercise.

REVERSE STRIP SETS

This is the opposite of strip sets. Instead of taking weight off the bar when a muscle fails, you add weight. Here is an example. Choose a weight that allows you to perform 8 reps. The eighth rep should be moderately heavy. Next add more weight so you can fail with half the reps (4). When you can no longer do another rep, rack the weight. Immediately add more weight, and try to get 2 more reps. If you can get just 1, have your partner assist you for 1 more rep.

MODIFIED SUPER SETS

Super sets entail doing one exercise right after another with as little rest as possible. I like super sets that allow no more than ***12 total reps.*** For example, do 6 reps to failure on the leg extension followed by 6 reps to failure on smith machine squats. This is a good way to induce muscle failure. Traditional super sets usually call for a trainee to perform a high number of reps on one exercise followed by a high number of reps on another exercise with no rest in between the two exercises. The problem is a rep range greater than 12 usually causes less muscle growth than a rep range of 6 to 12 as high reps bring about changes in ***muscle endurance*** rather than increases in muscle size.

Don't forget, specific rep ranges cause unique adaptations within the muscle and the range that is most conducive for muscle growth is somewhere between 6 and 12.

PARTIALS

Partials, also referred to as "half reps" is a technique used to overload the muscle ***after failing with good form in full range movements.*** The best way to include partial reps in your training is to work a body part through its natural full range of motion. *After* having failed or unable to perform any additional reps in the 6 to 12 rep range, "shorten" or abbreviate the range of motion. Using leg presses as an example: place enough weight on the machine so you can complete 6 to 10 reps using a full range of motion. Bring your legs as far as they can come back and press the weight back to the starting position so the quads are fully extended. When you can no longer perform ***complete reps,*** perform 1 to 3 "half reps" or even "quarter reps". Allow the legs to come back half as far as previous and return the weight to the starting position. Partials can be used on nearly every exercise and they are a proven technique to put as much stress as possible on a body part.

CHANGE THE ANGLES

Altering a basic exercise will change the stress put on the muscle and stimulate new growth. Instead of using the same incline bench for incline bench presses, use the smith machine and use a much smaller incline. Change your foot positioning on leg presses or use a different leg extension. A variety of angles causes unique "patterns of contraction" within each muscle you work. Changing your grip on the bench press from moderately wide to very wide creates a slightly different stimulus which will promote muscle growth. ***However*** as simple as it sounds, the foundation for growth, the main stimuli causing the body to lay down more muscle mass is the poundage, the rep range, training to recruit the 2b muscle fibers (by using the advanced techniques recently covered) ***followed by*** alternate training

angles. Many fall prey to the misconception that changes in angles take precedent over all other training techniques. As a result, it's common to find trainees falling prey to performing all kinds of different exercises for the chest or lower body hoping to see changes in muscle mass, yet fail to see any real results as they ***trade*** volume work (total sets) for the basics; the poundage, the rep range, and the 2b training methods previously covered. Keep things simple and you'll discover remarkable results!

Here is the best advice to advanced trainees; look for ways to make the workout more difficult! Hard work builds big muscles.

Look back over the section titled stress and growth. The body will try its best to adapt to the training stimulus under which it is subjected. Small changes in the workout can keep the stimulus fresh to keep the body slightly off guard so growth continues.

3 REP MAXES

While the 6 to 12 rep range is the primary repetition range best suited for gains in both muscle size, there is a place for lower rep training.

A rep range under 6 promotes increases in muscle strength. In fact, the lower the rep range, the less changes in muscle size and the more radical the changes in the muscles strength. It's fully possible to continue to build muscle strength year after year *without* adding any significant lean muscle mass at all! This explains how powerlifters, those athletes who foremost goal is to increase muscle strength, can increase their one repetition maximum on lifts such as the bench press, the dead lift and the squat without adding body weight or muscle size. ***Training in the 1 to 3 rep range*** will induce increases in strength with ***little*** increases in muscle mass.

That said, there is a place for lower rep training. Once every 6 to 8 weeks, it's a good idea to dedicate a 2 week period of your training towards lowering your rep range to sets of 3's, 2's

and even one rep maxes. This 2 week mini strength building phase will not only build up your strength, but will increase your tolerance for heavier weight when you return to the 6 to 12 rep range. In essence, upon returning to a size building range (6 to 12 reps) you'll not only have more strength to push greater weights, but you'll have more confidence and experience in working with really heavy poundages which can be parlayed into greater size. This is especially beneficial for the basic exercises for chest, back and legs. Or, you can follow the strength system outlined below.

Strength Training Made Easy

Building mass is a little different from building strength. While training like a bodybuilder, emphasizing a rep range of 6 to 12 reps and training each bodypart once every 5 to 8 days causes ***both*** increases in mass and strength, there are a few adjustments the bodybuilder can employ to focus on increasing his strength while holding his mass. Focusing on ***lower reps*** and greater ***rest periods*** both in between sets and between workouts, can increase muscle strength far greater than could be achieved than through strict bodybuilding style training. The benefit of strength training for the bodybuilder is obvious. The more strength one can acquire, the greater tension he can place on the muscles and the more tension placed on the muscles, the greater the increases in muscle mass. While it is true, strength training by performing less than 6 reps does not cause significant increases in muscle mass, it is a fact a person who becomes stronger in lower rep ranges can *carry that strength* over into a higher reps range. In other words, when you increase your strength in the bench press in a 3-5 rep range, you will ***definitely*** be able to either lift ***more weight*** in a 6 to 12 rep range and/or perform ***more reps*** with what was previously a very heavy weight. The bodybuilder who takes 3-4 weeks, twice a year, to focus on adding strength will likely

become stronger and therefore see greater gains in mass than the individual who trains like a "pure" bodybuilder all year long.

Strength increases are associated with the total number of reps performed within each set. In general, the lower the rep range, the greater the increase in strength. Performing less than 6 reps per set will cause adaptations in strength, so the bodybuilder hoping to add more pure strength should concentrate on including rep ranges of 3-5 on very basic exercises such as squats, leg presses, shoulder presses, bench presses, bent rows, chins, and dead lifts. Also, the rest time in between sets greatly influences how much weight you can use. It's clear, a person performing 6 reps with 500 pounds on the leg press would, with a long enough rest period, be able to repeat another set using the same weight. However, if the same individual performed 6 reps with 500 pounds and waited as little as a minute between sets, he'd likely fail to complete 6 reps on the successive set. The longer you rest between sets in strength training, the more weight you will be able to handle. Pretty simple. It's not un common for powerlifters to wait up to 5 minutes or more between super heavy sets on major lifts like bench presses, squats and dead lifts. In fact, a friend of mine, Marty Joyce, a former world record holder in the dead lift - 735 pounds at 168 pound bodyweight! - use to wait up to 10 minutes between sets of 600 for 3 reps on squats. While that may be excessive for the bodybuilder trying to gain some strength, it clearly illustrates there's a pretty strong advantage in waiting long enough between sets to allow for maximal muscle and nervous system recovery for maximum strength.

To ***blend*** strength training and bodybuilding training, you can perform more exercises than a strict powerlifting routine would normally dictate and include both lower rep sets, below 6, along with normal bodybuilding rep sets - closer to 10. However, as strength is the main concern, you will abbreviate the number of times you train each week to 4 sessions, on a Monday, Tuesday, Thursday, Friday scedule. This gives you 3 days out of the week,

Wednesday, Saturday and Sunday, completely off to facilitate recovery. And just in case your confused, I'll warn you, ***cardio work is forbidden!*** It's not only detrimental to increases in strength, but equally hampering to increases in muscle size. Cardio work has no place in off season mass or strength building!

Below are 3 ways to group your body parts in a strength training phase. The fourth example could also be used successfully to increase strength and it gives you an extra day off. I have also included a sample training plan with exercises, reps and rest time between sets (in seconds). Stick to a strength plan for 3 and even 5 weeks - two times a year. And you'll notice an increase in size when you return to a traditional bodybuilding training system.

———SAMPLE STRENGTH TRAINING SPLITS———

MONDAY	chest and abs
TUESDAY	back and shoulders
THURSDAY	legs (quads and hamstrings) and calves
FRIDAY	biceps and triceps

MONDAY	back and abs
TUESDAY	legs (quads and hamstrings) and calves
THURSDAY	chest and shoulders
FRIDAY	biceps and triceps

MONDAY	chest and tricep
TUESDAY	back and bicep
THURSDAY	legs (quads and hamstrings) and calves
FRIDAY	shoulders and abs

MONDAY	legs (quads and hamstrings)
TUESDAY	chest, shoulders and bicep and tricep
FRIDAY	back, abs, calves

MENU OF EXERCISES

CHEST
bench press
dumbell bench press
incline bench press
incline dumbell bench press
dips

BACK
chins
front pull downs
bent rows
t-bar rows
low cable rows
dead lift
rack pulls

QUADS
leg presses
squats
three quarter cage squats
leg extensions
hack squats

HAMSTRING
lying leg curls
seated leg curls
stiff legged dead lift

SHOULDERS
dumbell presses
front presses
side dumbell laterals
front dumbell raises
upright rows

TRICEP
dips
extensions
french presses

BICEP
machine curls
alternate dumbell curls
standing curls
cheat curls

ABS
crunches
machine crunches
hanging leg raises

CALVES
standing calve raises
seated calve raises

BODYPART	EXERCISE	SETS	REPS	rest between sets
CHEST	+ bench press	4	12/8/4-6/2-4	110-150 seconds
	= incline bench press	3	9-10/5-7/3-5	90-120
	dips	3	9-10/5-7/3-5	90-120
	+ dumbell bench press	4	12/10/4-6/2-4	110-150
	= incline dumbell bench press	3	9-10/5-7/3-5	90-120
BACK	+ chins	4	12/8/5-7/3-5	90-120
	+ front pull downs	4	12/8/5-7/3-5	90-120
	= t-bar rows	3	9-10/5-7/3-5	90-180
	= low cable rows	3	9-10/5-7/3-5	90-180
	= bent rows	3	9-10/5-7/3-5	90-180
	¥ dead lift	5	7-8/4-6/4-6/ 3-5/2-3	120/150-180/150-180 180-240
	¥ rack pulls	5	7-8/4-6/4-6/ 3-5/2-3	120/150-180/150-180 180-240
QUADS	+ leg presses	5	7-8/4-6/4-6/ 3-5/2-3	120/150-180/150-180 180-240
	+ squats	5	7-8/4-6/4-6/ 3-5/2-3	120/150-180/150-180 180-240
	+ three quarter cage squats	5	7-8/4-6/4-6 3-5/2-3	120/150-180/150-180 180-240
	= extensions	3	9-10/7-8/4-6	90-120
	= hack squats	3	9-10/7-8/4-6	90-150
HAMSTRING	+ lying leg curls	4	9-10/7-8/4-6 4-6	90-120
	+ seated curls	4	9-10/7-8/4-6 4-6	90-120
	+ standing leg curl	4	9-10/7-8/4-6 4-6	90-120
	= stiff legged dead lift	4	9-10/9-10/7-8 7-8	90-120
SHOULDERS	+ dumbell presses	4	9-10/7-8/4-6 3-5	120-150
	+ front presses	4	9-10/7-8/4-6 3-5	120-150
	= side dumbell laterals	3	9-10/7-8/4-6	90-120
	= front dumbell raises	3	9-10/7-8/4-6	90-120
	upright rows	3	7-8/6-8/4-6	90-120
TRICEP	dips	2	7-8/4-6	90
	+ extensions	3	9-10/7-8/4-6	90
	+ french presses	3	9-10/7-8/4-6	90

BICEPS	=standing curls	3	9-10/7-8/4-6	90
	=cheat curls	3	9-10/7-8/4-6	90
	+alternate dumbell curl	3	9-10/7-8/4-6	90
	+machine curls	3	9-10/7-8/4-6	90
ABS	=crunches	3	12-20/12-20 12-20	60-90
	=machine crunches	3	12-20/12-20 12-20	60-90
	hanging leg raises	3	12-20/12-20 12-20	
CALVES	standing calves raise	3	12/10/8	60-90
	seated calves raises	3	12/10/8	60-90

NOTE: + denotes similar exercise
= denotes similar exercise
¥ denotes similar exercise

Perform one of the exercises marked +,= or ¥. For example, under chest, you would perform either bench press or dumbell bench presses, but never both in the same workout. Each set should be taken to failure, using a spotter, with maximal weight. If no special marking appears next to an exercise, you should always do that exercise. Example: hanging leg raises.

Training Logs

I am willing to bet that of all the great professional bodybuilders, few if any use a training log to record poundages, sets, reps, and other pertinent workout information. The reason is that the pros *are* the pros. They know exactly what has to be done in the gym to get the best results possible.

However, I sternly believe that you should use a training log. In it record the exercises performed, the number of sets performed for each exercise, and the weight used as well as the number of reps for each set. The log can serve as your map and guide. By reviewing previous workouts, it provides a reference point so you can strive to better your last workout. You can add another rep or add more weight than before, or vary the workout to change the stimulus.

People who do not keep records tend to aimlessly wonder

through the gym. Furthermore, they are often unaware of exactly what exercise and set and rep scheme they used in previous workouts. Over time, the log can provide you with valuable information. If you are not seeing results in a certain body part, then you can reference the log book and find out why. Likewise, if you are seeing some good results, you can continue to perform the workouts that are effective.

Recovery

By now you understand, for the intermediate to advanced bodybuilder, simply training with weights does not build large amounts of muscle. Hard, to failure training with progressively heavier weights builds muscle. However, once you have worked out, you have to rest to grow.

All-out-effort training is the real way to increase muscle mass. Continual progressive overload is the key. Using the same weights for an extended period of time will not yield constant increases in muscle. It can't. The stimulus to the muscle must be constantly changing, preferably with more weight, to keep the muscles from adapting. Once the muscles adapt with no variation or change in training stimulus, the body will stop growing.

Muscles grow through absolute overload, not relative overload.

ABSOLUTE OVERLOAD means recruiting the important type 2b muscle fibers. Once they are recruited and stimulated, that's it. There is no need to ***over*** stimulate them. Doing too much will lead to tired and overtrained muscle. Overtrained muscles fail to grow no matter what the stimulus, or nutritional state.

RELATIVE OVERLOAD is where the bodybuilder does multiple sets of multiple exercises using weights that are not heavy enough to consistently recruit the type 2b fibers. Recall, 2b

fibers have the greatest potential for growth. Since the sets are not heavy and are performed to muscular failure, the 2a fibers are the main recipient of the stress and compared to the 2b muscle fibers, the 2a's potential for growth is limited. Those who apply relative overload use long workouts sessions doing lots of sets, reps, and exercises, but fail to make significant gains. This is understandable since success in other aspects of life is often associated with the total amount of ***time*** spent in each endeavor. If you study more, you tend to learn more and get good grades. If you put lots of hours into a small business venture, you are apt to get a great return. However, with bodybuilding training, total time in the gym, sometimes referred to as ***volume,*** can be a training trap as muscles respond best to shorter workouts that stress ***absolute muscle overload.***

Many bodybuilders who attend my bodybuilding camp do not train correctly. Training with too many sets can lead to overtraining, meaning "your body has failed to refuel, rebuild,and return to a comfortable state." Overtraining translates into zero muscular growth, regardless of nutritional intake. The only way to break an overtrained state is to suspend training for a couple of days. Training with a maximum effort usually prevents overtraining as it becomes fairly self evident that ***all-out*** training and ***long*** training sessions are a clear paradox. If you choose to perform 25 sets for a body part, how much effort can you possibly be making? That is, it's impossible to train heavy and to muscle failure using the technique to recruit the all important 2b muscle fibers *and* perform 25 sets. You simply "save" yourself and "pace" your effort in order to complete all those sets. And when you hold back and lower the weight in order to complete all those sets, you likely miss recruiting the 2b fibers, the one's with greatest growth potential. Training too ***long*** in any one training session or training too ***frequently*** with not enough rest days are the two prevailing training factors that rob your body of energy reserves and send you into an overtraining free fall where progress becomes impossible.

The overtraining we want to avoid is chronic overtraining from working too often and too long. The body actually has quite remarkable acute recovery ability. Have you ever stayed awake nearly a full night with two to four hours of rest and still felt fine the following day? However, constantly missing a couple of hours a night from your typical eight hours of rest will catch up with you in time leaving you exhausted. When a stressful situation like training is prolonged or repetitious, the homeostatic or comfortable resting state of the body deteriorates. The defense system of recovery eventually wears down and the body is no longer able to repair itself or adjust to the stress of training.

The worst scenario possible is to overtrain without stimulating growth in the first place. This occurs for those who use relative overload. The lengthy and frequent workouts leave the body tired and flat and the deep type 2b fibers never get any significant work. It is harder to overtrain utilizing absolute overload because the workouts are short and intense. The intense workouts cause muscle breakdown. Causing muscle ***breakdown, without*** overly exhausting the entire body via excessive sets, is a good thing: with proper nutrition and some rest, you'll recover and grow.

Signs of Overtraining

Overtraining is the top component that slows and actually retards the muscle building process. Avoiding overtraining can be the best way to increase strength levels and to add lean muscle mass.

Bodybuilding is a sport where overtraining is most prevelant. We use resistance, unlike boxers, track athletes, football players, and swimmers. True these athletes can also overtrain by engaging in too frequent energy draining workouts, but bodybuilders can overtrain more often because we add resistance to already volumous and frequent workouts. Together the volume, frequency (how often we train) and resistance lead

to one tired body.

Under a good training program, a bodybuilder will balance training intensity with rest. When a bodybuilder balances his training with rest, the anabolic (muscle building) environment is created. When training intensity is too high or too advanced, or when workouts are too frequent, or too long in duration, the stress of training becomes too abundant for the body to handle. This promotes a catabolic (muscle wasting) state where the body taps muscle mass and breaks it apart to use it as energy. Overtraining promotes the release of two catabolic hormones; glucagon and cortisol. Cortisol works to destroy and over ride the four anabolic (muscle friendly) hormones; testosterone, insulin, thyroid, and growth hormone. This results in a loss of muscle! When training intensity is correct for the bodybuilder and adequate rest is supplied, then these anabolic hormones function at optimal levels, over-riding the catabolic hormones, allowing the body to repair itself and build muscle.

Here are the easy signs to look for to avoid overtraining. If you experience 2 or more of these signs, then you should take at least two and up to three days off from training.

A LOSS IN STRENGTH

To get bigger muscles, progressive overload must be used. If your strength has not increased in some time in the basic mass building exercises like bench press, bent over rows, squats, and shoulder presses, then you are probably overtrained to some degree. For the majority of lifters, simply pumping the muscle with lighter or sub maximal poundages will not lead to serious muscle gains. In an attempt to rectify no gains, most lifters will add more sets and more reps. This will accelerate a borderline overtrained bodybuilder into a severely overtrained bodybuilder.

FLAT LOOKING MUSCLE WITH NO PUMP

If you are training correctly and getting the right amount of rest and eat like a bodybuilder then your muscles should stay filled with at least some blood for up to one hour after training. They should

also appear round and fuller after training. If you do not feel a pump, a temporary expansion in the muscle that makes the muscle feel tighter, you may have already entered a *catabolic* (state). Training out of guilt, as when you are afraid to skip a day even when tired is the one of the worse things to do. It accelerates the overtraining process.

"catabolic"
- Muscle wasting
- Using protein or muscle as fuel
- Releasing hormones that over ride muscle growth
- Opposing muscle growth and repair

THE NEED FOR STIMULANTS

While caffeine and herbs like Ma Huang on occasion are a pre-workout aid to enhance muscle contraction and the ability to concentrate, stay away from these products when you feel overly tired. Using stimulants when you are just too tired will only mask and temporarily disguise the signs of overtraining. Furthermore, stimulants such as ma huang promote the release of adrenaline a hormone released by the adrenal glands that, in an overtrained state, accelerates and keeps the body from battling back out of a state of overtraining. Stimulants added to a well rested body will really add some fire to your workouts. Using them when tired may speed overtraining and keep you from realizing that you are overtrained.

A LACK OF AGGRESSION

Exploding and accelerating a weight to recruit the maximum number of muscle fibers requires a great deal of aggression. It is impossible to be supremely aggressive when too many catabolic hormones are flowing through the body.

THE FEELING THAT GOING TO THE GYM IS A CHORE

Every competitive bodybuilder I know loves to train. When

training feels more like a job than fun, catabolism is dominating and it is an absolute waste of time to train as stressing muscles that are already in a catabolic state will only facilitate the loss of muscle and accentuate an overtraining state. Never be afraid to take one or two days off from training when your body feels tired, weak, listless or run down. ***Complete* rest** is the primary solution to reverse the muscle stripping, no-gain effects of overtraining allowing your body to fully recover and re-direct itself back to an anabolic or muscle building state. Some bodybuilders fall for the misconception that additional calories from carbs of fat along with extra protein can put a stop to an over training state. Fact is, a truly overtrained athlete who packs in extra fuel will likely gain fat from the added calories because the ***bottom* line** in reversing an overtraining state is ***not*** better nutrition, but complete rest! When you've taken a few days off from training and are feeling more energetic, review your nutrition as proper diet is a ***component*** in recovery, yet in a true overtraining state where gains are little, if any, rest is the limiting factor your body needs to re-set itself towards an anabolic (muscle building) state.

THE NEED FOR SLEEP

Eight hours is the absolute minimum amount of sleep you can get and still make good gains in muscle size. Most bodybuilders who are training with all out effort will need nine to ten hours of sleep each night. If you can only fit 8 hours of sleep into your schedule, try taking a nap in the afternoon. Even 20 minutes can really enhance your recovery.

The best time to take a nap is after finishing your big meal after training. This will allow you to easily digest the food you ate and jump start recuperation after an energy draining training sessions by temporarily increasing growth hormone levels.

MUSCLE SORENESS

Moderate muscle soreness is a good thing. It is an indicator that the muscle has been thoroughly worked and a workout was productive. Almost immediately, the bodybuilder associates

soreness with results.

Extreme soreness is not a good thing. Deep aching soreness that lingers more than two days after a workout is an indicator that the muscle has been "too" damaged, or your diet and rest are inadequate. While some soreness, lasting no more than 2 consecutive days is beneficial indicating muscle stimulation, excessive soreness lasting more than 2 consecutive days is overkill with inhibitory effects on muscle recovery and muscle growth. There's a fine line in building muscle between sufficient training and recovery. Too much training, usually too many total sets, will overwhelm the body's ability to recover and when recovery is ***incomplete,*** it becomes impossible to add lean body mass.

The exact cause of soreness is not entirely understood. There are several theories that are popular. Most agree that the ***intensity*** (poundage used) of the exercise as well as the ***volume*** (total number of sets) are contributing factors that effect muscle soreness. Short workouts with heavy weights can cause muscle soreness as can really long workouts with lighter weights. The negative portion of the exercise, also known as the eccentric part, has been shown to cause the most amount of soreness. Free radicals, a by product of exercise, may also cause soreness and hamper recovery.

The beginner will typically experience almost immediate soreness. The day of working out or the day following the workout is the time when he will feel aches, tight muscles, and discomfort. This is normal and will also occur in a bodybuilder who has returned to training after a break.

An intermediate or advanced bodybuilder usually will not feel weak and stiff a few hours after a workout. Instead, he feels the pain from training the day after and more often, two days after working a body part. This is referred to as ***delayed onset muscle soreness.*** Most consider it to be a marker to evaluate whether a workout was a success. It is different than the pain that is felt in joints or extreme pain in muscles. That type of soreness is an indicator of sprains, strains, or a muscle pull.

The ***Muscle Tear Theory*** proposes that minute tears or ruptures within the muscle fibers causes delayed onset muscle soreness. Eccentric training, the lowering of the weight, also referred to as the lengthening of the muscle, causes more damage and soreness than the concentric (positive or shortening of a muscle) part of training. Using the bench press as an example, pushing the weight ***from*** the chest upwards so the arms are extended is a concentric contraction and will cause less muscle damage than lowering the weight from the point of full extension of the arms back to where the bar touches the chest.

Ironically, the negative portion or eccentric part of an exercise is the portion most likely to ***induce*** damage, it's also the part that seems to set in motion a cascade of events that promote the remodeling or ***rebuilding*** of the very muscle fibers that have been damaged during the training. One way to make benefit from this rebuilding effect is to ***always resist and fight*** and slowly lower the weight ***after having failed*** on the final rep in the positive portion of an exercise. Using standing curls as an example, unable to complete any additional reps on your own, have a partner assist you so you can complete one more rep and ***slowly*** lower the weight in hopes of maximizing the remodeling effect that's stimulated with eccentric training.

Another theory of muscle soreness holds that lactic acid, a by product in the metabolism of glucose to fuel weight training, or a collection of other metabolites produced with weight lifting, may irritate the nerves endings that encroach upon muscle fibers. This theory also holds some credence though much of the lactic acid produced in weight training is resynthesized by the muscles and used as fuel. Interestingly, high repetition training, such as performing ***endurance*** type weight training in a rep range greater than 12, super sets, and drop sets that require a bodybuilder to perform up to 20 or more reps produce huge amounts of lactic acid; more so than produced with heavy training in a lower rep range. High rep style training floods muscle tissue with lactic acid causing intense pain and burning which trainees

believe to be the ***primary*** indicator of muscle growth. Fact is, lactic acid plays a mild role in muscle growth by stimulating the release of growth hormone. Once again, the real stimulus for growth is the stress you put on the muscle; the poundage used, the correct rep range to stimulate growth and avoiding excessive sets which can compromise the poundage you can use while short circuiting the body's ability to fully recover.

Other theories blame lack of blood flow to the muscles while others call miniscule muscle spasms the culprit leading to muscle soreness.

Contest Training

Contest training brings up one of the true catch-22's in the sport of bodybuilding. That is, "How can I lose all my fat to let my definition show without losing any muscle mass in the process?"

The answer is a combination of training, diet and cardiovascular exercise. I'll cover the training here first. Most bodybuilders make the mistake of trying to drastically alter their training in hopes that it will make them appear more cut. That is probably a mistake. The training that ***built*** the muscle in the first place will suffice pre-contest. The goal pre-contest is to ***hold*** muscle mass. Give the body a reason to do so! Use the workout schedule, the split, the set, the reps, etc. that packed on the muscle. If you do too many sets, reps, or workouts, you will be overtaxing the body and probably using lighter weights than normal. If you consistently use lighter weights over the contest period, then you will more than likely lose muscle mass. Remember how the muscles contract. If you have been using 60 pound dumbbells for shoulder presses to gain mass and drop the weight pre-contest to 40 pounds, you are reducing the weight and therefore the stimulus by a third. Reducing the stimulus will prevent the body from holding muscle mass because less muscle fibers are called into play to push a 40 pound weight compared

to a 60 pound weight. When you lose mass, muscles appear flat and less dense. Any drop in lean body mass will cause a downdraft in the metabolic rate which makes getting lean and ripped up very difficult.

One technique that may be helpful is to train at a faster pace resting for shorter intervals in between sets. Shorter rest periods make the workout more productive as long as you can push the same, or near-same poundages with shorter rest intervals between sets. If you rest 2 minutes between sets to gain muscle, you may want to rest for a minute to a minute and a half pre-contest. Reducing rest intervals while keeping the poundage high will put a greater stress on the ***glycolytic*** energy system. Simply put, you will burn more carbs and lower glycogen stores more so than training with greater rest periods. ***Lowering*** glycogen reserves can induce a metabolic shift where the body will attempt to use fatty acids from stored body fat as fuel which will lead to a leaner physique. ***Lower*** glycogen stores, though ***not depleted stores,*** also favor fat burning. However, do not rest less than one minute and make sure that the weights you are using do not drop suddenly or too dramatically. If they do, it is an indication that the muscles are not recovered between sets. The idea of working fast is to burn more calories. This is *bodybuilding*. The goal is always to build and at the very least ***retain*** muscle mass. Trying to train too fast, with too short of rest intervals between sets in an attempt to burn additional calories can be detrimental because a ***super fast*** pace causes training ***poundages to drop.*** Never try to burn more calories in pre-contest training by training ***too fast*** or by doing extra sets at the ***expense*** of the poundage. When your poundages begin to crumble, your on your way to looking washed out, neither big, hard nor cut. Bottom line; decrease the rest periods but not at the expense of decreasing the weight you use.

Some bodybuilders who have a tough time getting ripped may find training twice a day can enhance the loss of fat without the loss of any muscle mass. The most common pre-contest split

that utilizes twice a day training is the three days on one day rest split. All the body parts are trained in 3 days with one day of rest after all the body parts have been worked. Typically a large body part is trained in the morning and a smaller body part is worked in the evening. Here are two examples:

SAMPLE CONTEST SPLITS

Day 1	chest	biceps, triceps and abs
Day 2	back	shoulders
Day 3	quads	hamstring and calves
Day 4	rest, then repeat	
	OR	
Day 1	biceps and hamstring	shoulders
Day 2	chest	back and abs
Day 3	quads and calves	triceps
Day 4	rest, then repeat	

AM PM

Every time you train, the metabolic rate is stimulated. Constantly stimulating the metabolism through twice a day training will burn off more body fat and calories. Also weight training depletes the muscle of glycogen. When muscle glycogen stores are low and carbohydrates are consumed, the carbohydrates will refill the glycogen stores before encouraging fat storage. Training also lowers insulin. Low insulin levels favor the release of fat so it can be used as fuel. Training *twice* will lower insulin *twice* thereby making fat loss easier. In essence, training twice a day is superior to once a day training in shedding body fat as two-a-days stimulate the metabolic rate, encourage carbohydrate uptake by muscles making carbs less

likely to be stored as body fat and lower insulin levels which allow body fat to be drawn upon as fuel.

One drawback to the above pre-contest split is that it can leave you too tired so training hard (heavy) becomes difficult. It may seem as if you are constantly in the gym or constantly returning from or getting ready to go off to the gym. Such a split is up to the individual. I think that most bodybuilders can sustain such a routine for no more than 6 weeks maximum without getting burned out. It may be better to avoid becoming over tired, but still harness the calorie burning effects of twice a day training sessions using the 4 day on-one day rest split or the 2 days on-one day rest split. However, train twice daily, one body part in the morning and one at night.

ADDITIONAL CONTEST SPLITS

	AM	PM
Day 1	chest	biceps
Day 2	shoulders	abs, calves
Day 3	OFF	
Day 4	back	triceps
Day 5	quads	hamstrings
Day 6	OFF	

	AM	PM
Day 1	chest	biceps
Day 2	back	triceps
Day 3	quads	hamstrings
Day 4	shoulders	calves, abs
Day 5	OFF	

Many bodybuilders make the mistake of using light weights before competition with higher reps to "shape" a muscle or to "bring out definition." That is a mistake. First, there is no real way to shape a muscle. You are born with the shapes that your muscles have. Adding more thickness to the thighs and upper body while keeping the waist small may make it *appear* as if the shape has changed. Fact is, some of the most symmetrical bodybuilders train very similar to those with bodies that are considered non-symmetrical or even "ugly physiques". All the mythical shaping exercises in the world can't re-shape an ugly body into the physical perfection of a Flex Wheeler or Shawn Ray.

There is no way to bring out "striations/definition" in a muscle. All skeletal muscle is striated in appearance by the way the tiny filaments called actin and myosin fall one atop the other. Diet, and to a smaller degree cardio work, will reduce fat stores and enable muscle definition to be seen. Never use weight training as a spot reducer or severe calorie burner. Increasing muscle mass and refining the diet is the best way to bring about definition.

Most contest prep periods will last 12 to 16 weeks. This allows plenty of time for the fat to be shed while holding muscle mass. The idea of competing makes most bodybuilders train with an all time high level of intensity. Though beneficial, it can back fire as the contest approaches. It is best to refrain from pushing too hard the final two weeks. All those weeks of more consistent and hard training, coupled with a reduction in calories, have the tendency to leave the muscles looking flat. ***The last 14 days, no sets should be taken to failure, no advanced techniques to add intensity should be used, and rest periods between sets should return to off season intervals.*** This will allow the body to fully recover and repair from the gruelling pre-contest training and diet and permit the muscle to fill out to look round and hard. Flat muscles never can look hard and dense.

Train to stimulate the muscle! The diet and cardio work are the true fat fighters.

Recommended periods of time to prepare for a contest.

8 weeks – if you are "sharp" or less than 8% body fat, less than 13% females

13 weeks – if you are "hard" or 8-11% body fat, 13-16% females

16 weeks – if you are "soft" or 12-17% body fat, 17-20% females

20 weeks – if you are "fat" or 17% body fat and up 21% and up for females

Recommendations for preparing for your first contest.

1) Start early - You should set aside 16 weeks to prepare. This will give you sufficient time to slowly lose fat while retaining your muscle mass. There will be weeks where your body does not change or you screw up on the diet, so the more time you have to make adjustments for mistakes, the better. Furthermore, a longer period of time will allow you to lose weight at a more moderate or slower pace. Many times, losing weight at a rate greater than 1-1/2 pounds a week leaves the dieter physically tired which compromises his ability to maintain heavy poundages in the gym. Once again, a drop in poundages is the equivalent to reducing the stimulation placed upon the muscle which in turn ***makes it difficult*** to retain muscle mass - the backbone and key element to an elevated metabolism.

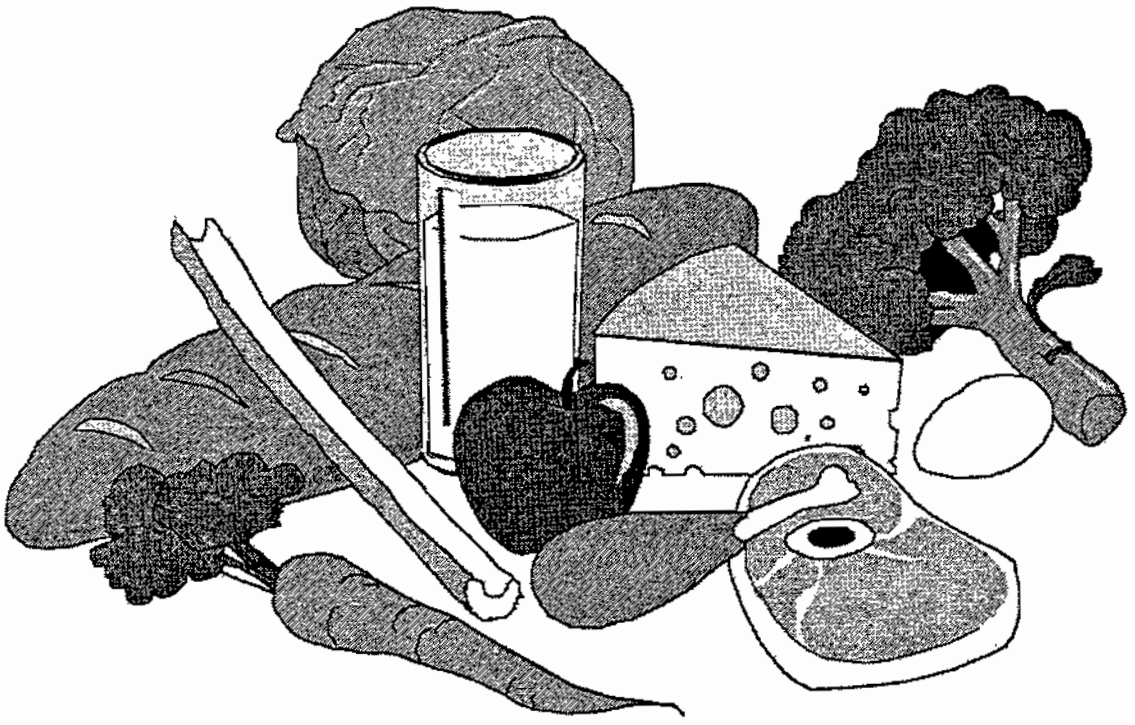
2) Don't over diet - Novices tend to believe that losing a lot of weight is the key to becoming ripped. The real key to a cut physique is losing fat while holding **all** your muscle. An extreme or radical reduction in caloric intake will cause the body to enter a starvation state where a ***blend* of body fat and *muscle tissue*** is burned as fuel. When muscle is tapped as fuel, the metabolic rate drops which ***negates*** any reduction in calories. In males, large reduction in calories also promotes a drop in

testosterone levels, the muscle friendly hormone that support strength and muscle growth. ***Mild*** reduction in calories are more likely to promote the near exclusive use of body fat as fuel.

3) Don't over do cardio work - Even the novice bodybuilder seems to understand the concept that severe dieting, large reductions in ***caloric intake,*** causes the loss of muscle mass. The same concept is true with aerobics! ***Large expenditures*** in energy via 2 hours a day of cardio work will cause an adaptation where a ***blend*** of both fat and muscle tissue is tapped as fuel leading to a slow down in metabolic rate *and* a drop in strength which translates into compromised muscle stimulation so ***holding*** muscle mass in a dieting state becomes difficult. For some reason, many are under the impression that fat is *always and exclusively* the fuel source with aerobic exercise. Truth is, heavy aerobics coupled with a reduction in calories will cause muscle tissue to be burned as fuel making a ripped or shredded appearance nearly impossible! The most amount of cardio any bodybuilder should do for a contest is 45 minutes 4 to 5 times a week. Any more will deplete your energy levels which makes it difficult to train hard. Start with 20 minutes, three times a week, and add from there. Build slowly, and do not add more if you are already seeing results.

4) Look for small changes - Most beginners to competition start the diet and expect to see dramatic changes overnight. If they don't see such changes, they cut calories further or add more cardio. Doing so, leads to a loss of muscle. Look for subtle changes. If the abs look tighter, or ***any*** body part seems to look sharper, then the diet is working and there is no need to accelerate the fat losing process. In time, these small changes add up and you will look sharper and sharper.

NUTRITION



Cardio and Fat Loss

In a way, aerobic exercise and what you eat are inseparable as, for the most part, bodybuilders who try to alter their eating habits to control body fat also tend to include some type of aerobic exercise to limit the accumulation of fat stores. Thus, when trying to get lean, it's difficult to discuss nutrition strategies without including aerobic exercise.

Aerobic work is a must for pre-contest bodybuilders. Aerobics use fat as a fuel source which allows a bodybuilder get really ripped. To be a great bodybuilder, you have to maximize your training sessions by making them as demanding as possible. Likewise, you should maximize your aerobic work by reaching and maintaining your individual target heart rate. Target heart rate (THR) is the number of beats the heart should beat in one minute in order to insure the body is tapping as much fat and burning as many calories as possible. Numerically, THR can be found by subtracting your age from 220, and multiplying the number by .65 to .75

65 and 75 represent the heart will be working at 65% to 75% of its maximum.

Here is an example for a 20 year old.	
220 - 20 = 200	220 - 20 = 200
200 (.65) = 130	200 (.75) = 150

This 20 year old should work hard enough so that his heart beats anywhere from 130 to 150 beats in one minute. Lower intensity aerobics, in my opinion, are not effective in really leaning down the physique. Lower intensity work burns fewer calories and exerts a far lesser effect on the enzymes that promote the use of free fatty acids from fat stores as energy. As a rule of thumb, keep your heart rate higher. You will burn more calories and be successful in shedding unwanted body fat.

Have a trainer at the gym show you how to manually

measure the beats by taking a pulse at the carotid artery located on the neck. Or, use a heart rate monitoring devise to measure your heart rate. Some bikes and treadmills have their own built in devices making it easy to record the heart rate.

Bodybuilding Nutrition

Clearly nutrition plays a major role in not only building lean body mass but shedding body fat. The foods we eat provide the fuel muscles require to do the work to ***stimulate*** growth in the first place via hard training and food is the raw ingredients that allow the muscles to adapt and lay down new muscle tissue. Like training, bodybuilders often make nutrition far more complicated than it really has to be. In an attempt to devise some super hi-tech training or nutrition plan, many skip the basics, the real "secrets" to successful bodybuilding.

I strongly suggest that you weigh all the food you eat. This will allow you to take control of your diet and master it like a professional.

Most people do not know the total amount of calories, carbs, protein, and fat they consume in any given day. Weighing allows you to make accurate minor adjustments to initiate the fat burning process or to inhibit fat storage.

Bodybuilders who often claim to eat 6000 calories a day don't; they mis-calculate their caloric intake. Likewise those who find losing fat difficult often eat more than they believe. Weighing food and logs gives you accurate numbers, feedback and direction allowing you to build the ideal nutrition plan.

The Baseline/Reference Diet

As with the training, nutrition is somewhat individual. For example, 30 pound dumbell shoulder presses may be tremendously heavy for a novice female bodybuilder yet too light to stimulate growth in the novice male bodybuilder. Point being,

while the poundages or ***numbers*** may be different to stimulate growth from bodybuilder to bodybuilder, the exercises, rep range, mode or advanced techniques are effective and work well for ***different*** bodybuilders. When it comes to nutrition, the same is true. The numbers will vary from individual to individual, yet the ***way*** we find the numbers (total calories, carbs, protein and fat) are the same.

The first and foremost step in putting together a nutrition plan, be it a strategy to add muscle and body weight or one to hold muscle mass while shedding body fat, is to establish what's called a baseline or reference diet. The baseline diet establishes the ***amount of calories you need each day to maintain your current body weight*** and muscle mass. The baseline approach is superior to any other method in establishing caloric needs as it takes into consideration ***your current caloric status.*** Your current caloric status or ***how many calories*** *you eat a day "on average"* is the most overwhelming factor one must take into consideration in setting down sound nutrition principles. Charts, metabolic testing, graphs, etc. all take a second seat to the baseline approach as ***how you eat now determines what you will change*** (nutritionally) to get your body to grow or shed body fat. For example, two people with very similar body types, the same height and weight, both desiring to lose 20 pounds of body fat may experience radically different results if both reduce their caloric intake to 2500. Why? One may be ***currently*** eating 4000 calories a day while another may be eating 3000. The individual eating 3000 will likely lose body fat on 2500 a day while the person eating 4000 will likely lose muscle mass and fat on 2500. The person eating 3000 calories and moving down to 2500 will likely burn, for the majority, body fat and have sufficient energy intake to train hard. On the other hand, the person eating 4000 calories and moving downward to 2500 calories will experience a slow down in the metabolic rate which accompanies large decreases in caloric intake. And, he'll find it

difficult to train with peak levels of intensity as his total energy (caloric) intake has been significantly slashed. The end result; a slower metabolism, less energy and a loss in lean muscle mass! To be precise, determine your current caloric status before starting a reduction plan.

To establish your reference diet, you'll need a calorie counts book to add up all the calories you eat each day. Many foods like pasta, rice, potatoes, yams and protein foods such as meat, turkey, fish and fowl will have to be weighed so you can determine ***precisely*** how many calories your eating each day.

To start, add up all the calories you eat in a day. Then repeat this step for 2 more days.
For example:

Day 1	2500 calories consumed
Day 2	3000 calories consumed
Day 3	3500 calories consumed

The grand total is 9000 calories. Divided by three (days), the average intake comes out to be 3000 calories. Three thousand calories a day is the starting point or the reference diet.

Most people do not eat the same things and especially the same calories each day. My goal in the reference diet is to get you to eat the same foods or more importantly the same number of total calories each day.

One reason diets do not work is because the person starting the diet never had a reference (point) diet. When he reduces calories, his body is stubborn to give up fat as fuel. The reason is because some days he had been eating a lot more, some days a lot less and on other days he ate a middle of the road amount of calories. The body refuses to ***respond*** to a deficit.

Here is an example. John eats about 3000 calories a day. Maybe he eats less or 2300 for one day then 2800 for one day. Then for a few days he eats more, like 3800 for a day followed

by 3500 for a day. Well, eating 2000 or 2300 he expects to lose weight but he does not. Why? Because his body knows that he never consistently eats that low number, soon he should go up to as high as 3800 calories so there is no real reason to begin the fat burning process.

However, if John begins and stays with a baseline diet for at least 4 weeks and up to 6 weeks, he would be establishing stability in his body and metabolism. By reducing from 3000 calories (the baseline) to 2300, his body would quickly recognize the deficit and begin to give up fat for fuel. The baseline ***conditions*** the body and metabolism. When calories are reduced from a baseline, the body ***responds,*** and body fat is called upon as fuel.

PROTEIN NEEDS

A custom nutrition plan is based on your reference calories found using a baseline diet along with protein needs.

Protein along with total energy (carbs and to a lesser degree dietary fat) exist in a dynamic relationship. That is, the more total calories (energy) you eat, the less the body relies on protein as fuel. When calories are kept high and eaten in abundance, protein needs tend to go down and when calories fall while trying to get ripped, protein needs will increase.

Protein is the most important nutrient in building muscle mass as ***only*** protein becomes part of new muscle tissue. When protein foods are eaten, the protein is eventually broken down into tiny little building blocks called amino acids. It is these amino acids the body uses to incorporate into ***tissue*** (muscle) protein. The best sources of protein for bodybuilding are ***animal source*** proteins such as:

- meat
- turkey breast
- chicken breast
- fish
- shell fish
- eggs and egg whites
- low fat and nonfat milk
- low fat and nonfat yogurt
- low fat and fat free cheese

Soy products, like soy protein are also a good source of protein for the bodybuilder though its considered a non animal source of protein. Animal source proteins contain all eight of the ***essential amino acids.*** These are the special amino acids the body can ***not*** make and are common to all of the foods listed above.

Protein needs will vary from individual depending on:

- body weight
- training intensity
- total caloric intake

The more you weigh, the more protein you need. A 300 pound professional needs more total grams of protein each day than the 130 pound beginner. And a hard training professional bodybuilder overloading his musculature 4 or 5 days out of every 7 with maximum tonnage will surely induce more muscle damage, trauma and structural tears than the beginner doing his best to stimulate growth 3 times a week. As you will see, the protein I recommend exceeds many of the protein recommendations set or prescribed by reputable PhD's. Fact is, most studies fail to consider ***training intensity.*** The harder you train, the more protein you'll need - to a point. Surely, you can't load up on 600 grams a day and expect to out grow every person in your gym. Growth is a process, a slow one at that. Just keep in mind, many protein studies that actually prescribe much higher protein than only ten years ago, often use non training college athletes who may not be putting a whole lot of training stress on their muscles compared to an intermediate and advanced bodybuilder. Finally, caloric status influences protein needs. If you simply fail to eat enough total calories every day in a mass building phase, the protein you eat will be ***wasted.*** It will be sent to the liver and converted into fuel leaving you with ***less net*** protein to ***build*** muscle! The more you eat, the less likely you will "burn up" your protein. When you eat a lot of total calories, from carbs and to a lesser degree dietary fat, you allow

the protein you eat to do its intended job; to build and repair muscle tissue.

Bodybuilders need:

1 to 1.5 grams of *complete* protein for every pound of lean body mass each day

"complete": protein coming from animal derived protein sources including protein powders.

Note: There is no need to count the protein found ***outside*** of complete sources. ***Don't*** count the protein found in carbs; rice, pasta, potatoes, yams, oats, etc.

Lean body mass is the amount of muscle you carry or "what you weigh minus all your body fat stores." To establish lean body mass, you must find your percentage of body fat. This can be done by having a skin caliper measurement taken or an under water weighing measurement. Both find how many pounds of fat you have. If John weighs 175 pounds and a health professional tells him he has 12% body fat, he has 20 pounds of fat and 154 pounds of muscle mass. His lean body mass is 154.

The math looks like this

175	pounds	175	pounds
.12 %	fat	- 21	pounds of fat
21	pounds are fat	154	pounds of muscle left

This bodybuilder needs to eat 1 to 1.5 grams of complete protein for every pound of lean body mass. Our bodybuilder needs 154 to 230 grams of protein daily.

Both carbohydrates and fat can be stored by the body. Carbs are mainly stored in the liver and muscles as ***glycogen*** while dietary fat is packed away into body fat stores as ***adipose tissue*** - body fat! Protein can not be stored to any significant degree. Therefore, to maximize protein absorption and to flood the blood with a continual influx of muscle building amino acids, divide your protein intake into 5 to 6 smaller meals each day.

For example, John should eat his 154 to 230 grams of protein split into six equal servings yielding 25 to 38 grams of protein.

Protein is the most important nutrient in bodybuilding. It is the only nutrient that directly builds muscle. If the person falls miserably short in the protein department and tears down muscle tissue by engaging in a hard training session, he will end up getting *fatter* as an insufficient protein intake will fail to maintain (or build additional) muscle mass so body protein (muscle!) is literally shed.

In a protein deprived body, muscles, which are made up of amino acids are torn down to give the body the aminos it needs to maintain or building muscle. This is the equivalent of the saying "Rob Peter to pay Paul." The body, short on protein, tears down muscle tissue through out the body - a catabolic event - to either provide protein as a back-up fuel source or to supply amino acids to repair damaged tissue as a result of training. Any time you lose muscle, no matter how little the amount, you induce a slow down in the metabolic rate and a slow metabolic rate leads to an ***increase*** in body fat.

If you do not eat enough protein, it becomes impossible to recover and build muscle. Protein is a secondary fuel source used during training. When you train the fuel sources are carbohydrates, then fats & protein. The carbohydrates come from those found in the blood from foods recently eaten or from stored sources in muscle. Fats come from what is found in the blood and from fat stores, and protein as a fuel is derived from amino acids found in the blood from recently consumed foods. If there are no amino acids found in the blood, the body will look elsewhere for them. These aminos can be found in muscle. Muscle is made of protein. If the bodybuilder needs amino acids for fuel and they are not present in the bloodstream because he did not eat enough protein or he missed a meal, then his body will tap muscle, break it down, and obtain the amino acids from the destroyed muscle! You must eat enough protein to satisfy the amount of muscle you carry and to ensure that your muscle mass is not burned as fuel.

Many people bodybuild just to look lean, not to build overly

huge muscle mass. They want to look good in clothes and on the beach. Looking good is a combination of a low level of fat and having some decent muscle. If the person doesn't eat enough protein, then trains, he will be losing muscle and getting fatter!

Here's how. A 135 pound female has 24 pounds of fat and a lean body mass of 111 pounds. She trains hard but eats too little protein. The body's response is to lose muscle. First it searches for amino acids as a back up fuel source. There are none. Therefore, the body breaks down her muscle to provide fuel. After doing this for a few weeks, she has lost muscle. Now she weighs 132 pounds with only 108 pounds of muscle. She has the same amount of fat covering less muscle, so her body fat is higher!

Start	**Finish**
135 pounds	132 pounds
111 pounds of muscle	108 pounds of muscle
24 pounds of fat	24 pounds of fat
18 % body fat	19% body fat!

COMMON PROTEIN FOODS AND THEIR NUTRIENT BREAKDOWN

CAL = Calories CHO = Carbs P = Protein F = Fat
Carbs, protein, and fat are measured in grams

	CAL	CHO	P	F
4 oz chicken breast	100	0	18	4
4 oz turkey breast	200	0	27	4
4 oz lobster meat	103	0	19	2
4 oz cod	88	0	20	1
4 oz flounder	90	0	19	1
4 oz haddock	90	0	19	1
4 oz oysters	75	4	10	2
4 oz salmon	246	0	25	15
4 oz scallops	91	4	18	0
4 oz swordfish	34	0	22	5
4 oz peeled shrimp	100	0	20	1
6 oz can tuna	200	0	40	5
4 oz flank steak	164	0	25	6
4 oz round steak	166	0	27	5
4 oz beef liver	190	15	14	6
cup skim milk	80	12	8	0
1 large egg	75	0	6	6
1 large egg white	15	0	4	0

The above listings were derived from a book called the Nutrition Almanac. If you want more listing for other protein foods, you should pick up a copy of that book.

CARBOHYDRATES

Carbohydrates are the primary fuel source during weight training. They provide you with the energy to train hard. If you do not eat a sufficient amount of carbs, you'll lack the class A fuel required to train hard enough to stimulate the body to lay down new muscle tissue. And, a mass building diet that is too low in carbs will cause protein to be used as fuel, leaving your muscles "protein starved" without the raw building blocks (amino acids) they need to repair and grow.

Carbohydrates are similar to proteins in that the more muscle you carry, the more carbs you require. Furthermore, the more active you are the more carbs you'll need.

When carbohydrates are consumed they enter the blood stream as sugar. There, they release a hormone called insulin. Insulin is important to the growing bodybuilder. First, insulin drives any excess carbohydrates floating around in the bloodstream into the muscle where it is stored as muscle glycogen. It is stored as muscle glycogen until the body needs it. Within the first few minutes of weight training, the body quickly burns up the sugar found in the blood and subsequently *shifts* and calls upon the stored collection of sugar (glycogen) found in the muscle in order to complete the training session. The other muscle building role of insulin is to drive amino acids, the building blocks of muscle, into the muscle so more muscle can be made. If you eat the right amount of protein, but are much too low in carbohydrates, then amino acids from protein are burned as fuel in preference to being used to repair or build muscle tissue. To ensure that amino acids are used to build muscle and to have enough energy to train, eat enough carbohydrates every day. ***Moderate amounts*** of insulin promote the storage of glycogen and amino acids into muscle and inhibit fat storage.

The unfortunate side of insulin is that, in excessively ***high amounts,*** it can store carbohydrates as fat and prevent body fat from being disassembled to be used as fuel.

Insulin and carbs are a catch-22 in bodybuilding nutrition.

While carbs are an absolute "must" for growth; they provide the fuel to train hard enough to stimulate the body to grow, they initiate an insulin spike which not only enhances the formation of glycogen, improves amino acid uptake by muscle tissue and ***prevents*** muscles from being broken down to provide the body with fuel, they also can promote the accumulation of body fat.

Once muscles are fully loaded with glycogen, all extra or excessive carbs will be stored as body fat. Furthermore, a super high carbohydrate intake can result in insulin spikes which

1) increase the uptake of dietary fatty acids by fat cells leading to an increase in body fat.
2) And, elevated insulin retards or inhibits fat cells from "giving up" fatty acids so they can be used as fuel.

In a nutshell, there's a good side and a bad side to carbs. Controlling your carb intake is important if you hope to gain mass without adding globs of body fat.

Since carbs influence both growth of muscle tissue and the accumulation of body fat, you'll need a strategy to support muscle growth without causing an increase in body fat. Here are 6 tips to inhibiting body fat while adding muscle mass.

EAT 5 to 6 TIMES A DAY

Smaller meals spread over the day, usually every 2-1/2 to 3 hours, allows you to eat a "lesser" amount of carbs at any one meal. Carbs are the chief releaser of insulin. Too many carbs eaten at one sitting will cause an elevated spike in insulin which can contribute to fat storage ***especially*** in those who struggle to maintain lower levels of body fat. Five to six meals a day not only provides the body with a constant supply of protein for growth, but smaller meals ***modify*** insulin output which can potentially lead to a leaner, yet more muscular, physique.

MAKE BREAKFAST THE BIGGEST MEAL IN CARBS

When there are few carbs in the blood stream (you have not eaten for 8 to 10 hours) and muscle glycogen is not saturated, carbohydrates have a tendency to ***first*** satisfy and replenish

muscle glycogen reserves and elevate low blood sugar levels before having the potential to effect body fat storage. In other words, a large amount of carbohydrates consumed under a near-fasting state will be stored as muscle glycogen, the carbohydrate fuel reserve located within muscles, before having the ability to be packed away as body fat.

MAKE THE POST TRAINING MEAL THE SECOND BIGGEST CARB MEAL

Training uses a lot of glycogen and lowers the amount of sugar in the blood. More carbs eaten following a workout will release a lot of insulin, but the replenishment of glycogen and blood levels for carbs must be met ***before*** any can be stored as body fat. An insulin surge induced from a high carb intake in the meal following training is anabolic, muscle building, in that high insulin levels after training drive amino acids from protein foods into the muscles where they are assembled into new muscle tissue. The post training insulin burst also is ideal in resynthesizing muscle glycogen allowing you to quickly recover for the following day's workout. During this time, (post training) the receptors for the hormone (insulin) located on muscle tissue are highly sensitive and excitable. When a high carb intake is introduced to the body producing an insulin surge, the receptors on muscle tissue "lock up" the circulating insulin enhancing the carb up process. Interestingly, high insulin, which potentially encourages fat storage, is ineffective in stimulating the accumulation of body fat in the post training meal because excitable receptors for insulin on muscle tissue seem to "draw" the insulin towards the muscle producing growth, repair and energy replenishment, preventing insulin from effecting fat storage. Another way of looking at it is to say carbs are ***required*** to support anabolism after training and are ineffective in increasing body fat.

The post training meal that's abundant in carbs is ***anti-catabolic***, or prevents muscle loss, by completely reversing

protein breakdown. During a training session, there is always the potential for muscle breakdown. A pre-training meal that is low in carbs *or* low muscle glycogen levels may initiate protein breakdown where muscle tissue is disassembled and burned as fuel. The high carb intake in the post training meal shuts down protein breakdown *and* suppresses levels of cortisol, a stress hormone that's released with hardcore training. Left unchecked, cortisol can attach itself to muscle tissue and facilitate the breakdown of muscle mass. Insulin, the result of pounding the carbs after training, can keep cortisol levels in a more normal range thereby saving muscle mass.

Lastly, the ***types* of carbs** you eat after training effect how fast your body will enter an anabolic state. Fast acting, refined, or easy to digest carbs are superior to slower acting more natural carbs in rapidly replenishing muscle glycogen stores in the post training meal. Common fast acting carbs include:

cream of rice cereal	ripe bananas	white potatoes
cream of wheat cereal	baby food	white bread
fruit juice	white rice	bagels
raisins	mashed potatoes	
low fat or fat free muffins	low fat or fat free cookies	

Natural, slower digesting carbs would include yams, red potatoes, whole wheat pasta, beans and dairy products. Simple (or fast acting) carbs are a complete must in the post training meal!

ALTER THE TYPES OF CARBS AND AMOUNTS

Thus in the morning and after you train are the two times you need more carbs. At other times, you'll need fewer as you'll be less active and pounding the carbs while sitting at a desk will likely contribute to unwanted body fat.

I'm a believer that the carbs eaten at night have an easier chance to stimulate fat storage than those eaten at any other time of the day ***unless*** you are training at night and the final meal of the day happens to be the post training meal. In that case, skimping on the carbs after training, even if it's 10 pm at

night and you plan to head off to bed, will only impair recovery. Otherwise, cutting back on your carb intake at night and at meals other than breakfast and post training is a good way to manipulate caloric intake and insulin. Those who are always ***struggling to control body fat*** levels probably should avoid carbs in the final meal before going to bed. Theoretically, a high carb intake (in a person battling body fat) may suppress the natural growth hormone surge that occurs within the first 90 minutes of sleeping. Growth hormone helps mobilize fatty acids from fat stores thereby decreasing body fat. On the other hand, low blood sugar levels, which occur by avoiding carbs in the final meal, encourage growth hormone output. This compromised growth hormone output *might* occur in heavier set individuals but not in leaner individuals.

While at rest, with no training immediately planned, it's best to modify your carbo intake by eating ***less carbs*** and eating ***natural,*** less refined carbs, in an effort to control body fat. Getting huge is easy. Simply eat carbs all day long and in unlimited quantities. You'll get really big but ***really fat.*** If you want to get bigger and avoid getting fatter, you'll have to control carbs.

Less carbs and more natural carbs translate into less total insulin. Outside the post training and breakfast meals, smaller amounts of insulin are required to keep the body in an anabolic, tissue building, state so long as sufficient protein is present. And less carbs and less insulin while ***inactive*** can only contribute to a leaner physique.

EAT THE RIGHT AMOUNTS OF PROTEIN

Protein releases a hormone that opposes insulin, called glucagon. Glucagon lowers the net effect of insulin. Lowering the net effect is another way to control insulin so calories consumed have a greater tendency to be stored or diverted to muscle stores rather than fat stores.

Protein also exerts a "slow down" effect on carb breakdown.

When carbs are eaten alone they rapidly breakdown into blood sugar which sends insulin levels ***surging.*** Surging insulin levels retard fat cells from being used up as fuel, indirectly adding to body fat levels. Combining protein with carbs at every meal prevents the rapid breakdown of carbohydrate foods into sugar which not only favors a leaner body by controlling insulin but promotes more even levels of energy. Insulin spikes, with no protein present, promote an intense feeling of lethargy by two mechanisms. First, insulin is a clearing or storage hormone. It's job is to remove excess sugar from the blood and deposit it into glycogen stores. When insulin surges from a high carb-low protein or high carb-no protein meal, as opposed to more controlled and moderate output as seen with smaller meals that include protein, a disproportionate amount of sugar in the blood is wisked away and stored as glycogen. The down side is blood sugar levels can severely fall, which stimulate the appetite for the consumption of more sugar (carbs) to elevate or restore blood sugar levels back to normal. Low blood sugar levels also leave the bodybuilder feeling weak. The second down fall to a high-carb-only meal is the release in brain messengers that cause fatigue. A high carb meal lacking protein encourages the release of a chemical messenger in the brain called serotonin. Serotonin makes you feel mentally tired. Thus the drawback to missing out on protein results in low blood sugar levels making you feel ***physically tired*** and an increase in serotonin uptake in the brain leaving you ***mentally tired.*** Eating the right amount of protein not only modifies sugar breakdown in the blood but prevents a serotonin surge in the brain. And, protein combined with carbs "keeps" the carbs in the stomach for a longer period, making you feel less hungry.

CHOOSE FIBROUS CARBS

Adding fibrous carbohydrates like broccoli, cauliflower, carrots, green beans, and lettuce to meals ***excluding breakfast and post training*** will slow the entry of carbohydrates into the

bloodstream, as sugar. This will, in turn, control insulin output to favor muscle building and fat burning.

Fibrous carbs are the super low calorie vegetables which are an insignificant source of carbohydrates yet dense in fiber. Fiber is a non digestible food substance that modifies insulin output by acting as a "buffer" slowing the digestion of carbs. When carb digestion slows, the breakdown of the carbohydrate food into blood sugar also slows which causes a modified or smaller insulin release. Some fibers also have the potential to make the receptors for insulin located on muscle tissue ***more reactive*** and sensitive to circulating insulin. The benefit is greater insulin sensitivity on muscle which ***encourages glycogen formation*** and ***discourages the build up of body fat.*** Fibrous carbs also fill the dieter up, making it easier to control calories and body fat.

FINISHING THE BASELINE DIET

✔ Step one in developing a nutrition strategy is to establish "on average" your daily caloric intake, termed a baseline diet. The goal with the baseline diet is to establish or estimate your current caloric status which is the definitive factor in building mass or losing fat. The baseline approach establishes a ***starting point*** upon which you can manipulate to build mass or shed body fat.

✔ Step two requires you to establish accurate ***protein requirements*** based on your lean body mass and to count complete sources of protein in meeting your daily protein needs.

✔ The third step in the baseline diet is to alter your carbohydrate timing. This includes a greater portion of your daily carbohydrate consumption at times where the body needs them - at breakfast and after training. Simple carbs should be included in the post training meal to stimulate recovery and growth. Slower burning carbs should be consumed during periods of inactivity to control insulin levels and fibrous carbs can be added at meals outside of breakfast and post training to alter insulin spikes. Lastly, avoiding carbs at night, before going to bed, is a practical step if controlling body fat continues to be an issue while trying to gain mass.

Meal frequency, multiple smaller meals each day, coupled with carbohydrate timing and an adequate protein intake are the trio which encourages the body to lay down more muscle tissue without adding body fat. In essence, any nutritional trick employed to ***encourage*** muscle growth ***discourages*** the body from laying down body fat.

Eating the right amount of protein will help prevent muscle loss during training, it will help build muscle, and it will aid in maintaining moderate insulin levels to control fat storage. Altering carb intake to modify and control insulin will inhibit fat storage and promote glycogen storage. All this without changing the total caloric intake.

Here is what the protein requirements look like at each meal for 175 pounder with 12% body fat (see page 149). I chose the higher number of 38, because I prefer more protein.

When adding up protein in your nutrition plan only count ***complete protein,*** the protein found in ***animal derived*** foods. This includes meat, turkey, chicken, fish, eggs, egg whites, yogurt, non fat cheese and protein powders. Complete proteins contain all 8 essential amino acids while ***incomplete proteins*** are missing one or more of the essential 8 the body needs to grow. Incomplete protein is found in all ***non animal foods*** such as oats, rice, potatoes, pasta, fruit, cereal, etc.

Protein is 38 grams per meal.

Meal 1	38 grams of protein
Meal 2	38 grams of protein
Meal 3	38 grams of protein
Meal 4	38 grams of protein
Meal 5	38 grams of protein
Meal 6	38 grams of protein

228 grams of protein at 4 calories a gram = 912 calories

The person is eating a diet of 3000 calories. 912 of those are protein.

3000 (ref page 146)
- 912
2088 calories remaining from fat and carbohydrates.

One gram of protein is equal to 4 calories.

Bodybuilders should follow a low fat diet as dietary fat, more so than carbohydrates or protein, is the easier nutrient to be stored as body fat. Carbs ***fuel*** the bodybuilder's workout, they prevent the body from using up protein or muscle tissue for energy and they are the main inducer of insulin, the hormone that is highly anabolic; it supports muscle recovery by causing the body to store muscle glycogen and it supports muscle repair by increasing protein synthesis whereby amino acids stimulate the building of new muscle tissue. When carbs are overconsumed they have the potential to be stored as body fat. With hard weight training, carbs are used up in large amounts and are easily depleted making them an important day to day commodity in the bodybuilder's diet. For the most part, carbs are used in such great amounts that few are ***left over*** to be stored by the body as fat ***unless*** your simply eating way to many each day or are eating too little protein or 3 or 4 very large meals which can spike insulin levels and create a hormonal environment that encourages the storage and retention of body fat.

Furthermore, when carbs are eaten beyond what is needed to fill up muscle glycogen reserves, 12-15% of the excess calories are burned away as "metabolic heat" before the body can store the excess as body fat. Let's say a bodybuilder needs 400 grams of carbs a day and he eats 600 grams. Of those ***excess*** 200 grams of carbs (or 800 calories, 200x4=800) 15% will be burned off leaving 680 calories. This "burning off effect" is even greater with protein and dramatically less with dietary fat. When you over eat dietary fat, roughly 3%-4% of the excess is burned away leaving 96% of the extra fat calories to be stored as body fat.

Since bodybuilding training relies on carbs as fuel and not dietary fat, there is not great demand for dietary fat. Thus, much of the fat you eat is simply packed away as body fat. The last reason to maintain a lower fat intake? Once again insulin. Insulin is the spark plug that increases fat storage. While insulin increases both glucose uptake and amino acids uptake by ***muscle tissue*** to make glycogen and new lean body mass, it is also a ***strong*** stimulus for increasing fatty acid uptake by fat cells. That is, fatty acids from fatty foods ***rely on*** insulin to drive them into fat cells! The bodybuilder eating a high carb diet loaded with fat will see an increase in body fat due to the increased calories from additional dietary fat and from the increased fat storage storing dynamics produced with high insulin coupled with an abundance of fatty acids. ***Insulin is a potent stimulus for fat storage in the presence of large amounts of dietary fat.***

Therefore, for gains in mass, stress carbs and protein and de-emphasize dietary fat. The only fat you should eat is that which is normally found in protein foods. When you follow the protein guidelines prescribed and eat 1-1.5 grams of protein per pound of lean body weight from complete sources like chicken, lean meat, and low fat dairy products, your dietary fat consumption will automatically fall in line with what I recommend - about 20% of your total calories from fat. Eating the right amount of protein each day will set your total calories form fat at 15% - 20% of your total calories.

Most low fat diets supply about 20% of the total calories from fats. These fats are found in "Fat Free" salad dressing. Yes, they do contain fat! The rest and majority is found in the protein foods chicken, fish, lean red meat, turkey, etc. Those who try to eat a no fat diet still get about 7% of their total calories from fat. So, I am going to estimate that of the low fat foods we eat 20% of the total calories come from fat. For the 3000 calorie intake, it looks like this

3000	calories (baseline)
x .20%	fat
600	calories of fat calories
2088	calories (see page 161)
- 600	calories of fat
1488	calories are remaining.
	This caloric intake will be made up of carbohydrates

Our bodybuilder should be eating 1488 calories worth of carbohydrate foods.

1488/4 = 372 grams of carbohydrates.

One gram of carbohydrate = 4 calories.

Now, I have to plug the 372 carbs (I rounded down for easier math) into the 6 meals. Let's say the bodybuilder trains after meal 4, later in the day.

I want to make breakfast highest in carbs and the meal after training second highest and taper the rest.

Using the principles of less carbs when inactive and more carbs at breakfast and post training, a sample carb/protein breakdown may look like this:

Meal 1	38 grams of protein and 94 grams of carbs
Meal 2	38 grams of protein and 46 grams of carbs
Meal 3	38 grams of protein and 46 grams of carbs
Meal 4	38 grams of protein and 46 grams of carbs
TRAIN	
Meal 5	38 grams of protein and 94 grams of carbs
Meal 6	38 grams of protein and 46* grams of carbs

*(optional. You can omit the carbs here and spread the 46 into meals 2, 3 and 4 or two of those 3 meals.)

Note: About 45 to 50% of the total carb intake is derived from breakfast and the meal after training.

SAMPLE MENU PLAN FOR OUTLINE ON PAGE 163

MEAL 1	CARBS (in grams)	PROTEIN (in grams)
2 rice cakes	14	
8 ounces orange juice	30	
1 bagel	50	
10 large egg whites		38
TOTALS	94	38
MEAL 2		
7 ounce potato	47	
1/2 cup broccoli	4	
8 ounce chicken breast		38
TOTALS	51	38
MEAL 3		
2 slices bread	24	
1 large apple	25	
8 large egg whites		32
1 whole egg		6
TOTALS	49	38
MEAL 4		
3 ounces cream of rice cereal	73	
1 banana	23	
2 scoops whey protein powder		38
TOTALS	96	38
MEAL 5		
6 ounces yam	46	
8.5 ounces white fish (haddock, roughy)		38
TOTALS	46	38
MEAL 6		
1 cup rice	40	
1/2 cup zucchini	6	
6 ounces turkey breast		38
TOTALS	46	38

COMMON CARBOHYDRATE FOODS THAT YIELD APPROXIMATELY 100 CALORIES OR 23 TO 25 GRAMS OF CARBOHYDRATES

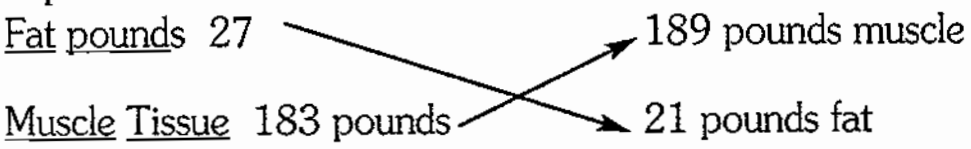
4 oz potato, pre cooked	2 Mrs. T's brand perogies
3 oz yam, pre cooked	1/3 cup, plus 2 tablespoons (dry measure) oatmeal
1/2 cup mashed potatoes	
3/4 cup corn	1 small pear
1 cup peas	1 small banana
3/4 cup cooked rice	1 large orange
3 rice cakes	6 oz orange juice
1 oz pasta, dry weight	1 small apple
1 oz hot cereal, dry weight	8 oz apple juice
1/2 english muffin	2 tablespoons raisins
2 slices whole grain bread	1/2 small cantaloupe
1/2 fat free bran muffin	1/4 cup apple butter
2 slices calorie reduced bread	1 cup applesauce, unsweetened
1/2 bagel	

LOSING FAT "WITHOUT TRYING" ON A BASELINE DIET

1) Establish an average daily caloric intake (page 146)
2) Eat the right amount of protein (page 149)
3) Modify carbohydrate intake (page 153-158)

TRAIN HARD!

Example



More Muscle is added due to the right diet approach = Increased Metabolic Rate

⇩

Increased Metabolic Rate = faster fat loss

⇩

Small fat loss (with no cut in calories) is due to:

1) Modified carbohydrate intake
2) More muscle which burns more calories
3) Dropping body fat increases the metabolism. Fat acts as an insulator inhibiting thermogenesis. Lower fat stores also will alter the body's release of insulin. The leaner one becomes, the less insulin output.

Remember, high insulin channels food into fat stores!

Getting Lean

Recall from a previous chapter, I said that I do not recommend drastically altering training for contest preparations. Whatever gave you that muscle in the first place will be the same thing to enable you to hold it while dieting. Instead, allow your fat loss to come from dieting and cardio work.

First a couple of notes on dieting. Dieting alone is not selective at fuel burning. For those who diet (without exercise) half the fat loss comes from fat and the other half comes from a loss of muscle. Therefore, the dieter who loses 20 pounds has failed to alter his body fat level. Instead he loses 10 pounds of fat and 10 pounds of muscle mass.

The person who adds cardio work has similar problems. Cardio work accelerates fat loss but does ***nothing*** to cause a retention of muscle mass. The dieter who performs cardio work

may accelerate the burning of fatty acids from body fat stores but aerobics will not cause the retention of muscle mass.

Keeping your poundage heavy, as close as possible to your off season poundages, will give the body a ***reason*** to retain and hold your metabolic boosting muscle while reducing caloric intake. The person who trains and diets will lose fat without losing muscle unless his calories or protein intake are just too low.

Thus, the perfect combination; training plus diet, plus cardio. You can lose fat and keep all your muscle.

How many calories should I cut and how much cardio should I do to get lean?

Whether your getting ready for a competition or wish to systematically reduce your body fat to as low as possible, give yourself 16 weeks preparation. It takes that long to lose the fat while retaining all your hard earned muscle. Plus, you will hit plateaus and possibly screw up along the way, so you will need the extra time to make adjustments.

Hopefully the baseline diet will have altered your fat levels somewhat by inhibiting fat storage while promoting at least a mild increase in lean body mass. Since you have been following a set diet, one that is standardized and the same each day, any deficit will be fully recognized by the body and the body will give up fat as fuel.

Most people make the mistake of both cardio work *and* dieting at the same time. They see results but do not have complete control over what caused the decrease in body fat. Was it the diet or was it more the cardio work? It is difficult to be sure. That is why I suggest to change ***one variable at a time.***

DECREASE CALORIES FIRST. Reduce the calories by cutting back on your carbs by 25%. Trying to create too large a deficit will backfire. Greater cuts in calories, by cutting carbs, will leave the bodybuilder feeling weak, often unable to train hard enough to initiate muscle retention. Recall, it's the hard-heavy

training that gives the body a reason to hold onto muscle tissue in a calorie deprived state and holding onto your mass is a vital factor in keeping the metabolic rate elevated making fat loss easy. Furthermore, cuts in calories greater than 15% can decrease testosterone levels, the muscle friendly hormone, in male bodybuilders. Large caloric deficits also promote a down regulation in metabolism. The job of a fat cell is two fold;

1) to store fat when excess calories are consumed

2) to hoard fat when ***drastically*** too few are consumed.

The reduction should come from carbohydrate calories, not protein as you should still be eating 1 to 1.5 *complete* grams per pound of lean body mass. And, since fat calories are already low, only found in protein foods, there's no real "room" to cut calories further. To make your cut, simply chop 25% off each meal's carb. For example, in the baseline diet, the bodybuilder trying to rip up would reduce carbs accordingly: (refer to page 163)

	Baseline Carb Intake	25% less	Dieting Carb Intake
Meal 1	94 grams	→	70 grams
Meal 2	46 grams	→	34 grams
Meal 3	46 grams	→	34 grams
Meal 4	46 grams	→	34 grams
Meal 5	94 grams	→	70 grams
Meal 6	46 grams	→	34 grams

To find 25% less: Multiply Baseline carb intake by .75 Example: 94 x .75 = 70
46 x .75 = 34

Look for a loss of 1/2 to 1 pound of fat a week. If you lose more, you have a good metabolism and will have to increase your carbs a little.

SECOND, ADD CARDIO WORK. Do so only when you see that the reduction in calories/carbs is no longer working. That is, either you are not losing 1/2 to 1 pound of fat (2

pounds max) a week or you do not visually ***appear*** leaner. Just as there is no reason to severely cut calories to stimulate fat breakdown, there is no reason to go overboard with a drastic output in calories in an attempt to get leaner. When 3 - thirty minute sessions no longer seem suffice, add more, slowly and gradually, to build to no more than 45 minutes 5 to 6 times a week. The problem with too much cardio (more than my recommendation) is it can devour energy levels so you can not train hard, and hamper recovery ability so you can not recover from the workouts. Too much endurance work (aerobics) also exerts an internal tug-o-war between 2b fibers, the ones with greatest growth potential and 2a fibers those with less potential for muscle growth. To simplify, excessive aerobic work, such as 2 hours a day of cardio, can cause shrinkage in the 2b muscle fibers. And, the 2a's can begin to shift and take on characteristics of slow twitch muscle fibers. That means the 2a's which ***can become*** 2b like in nature actually become slow switch in nature with excessive aerobic work. And slow twitch fibers have zero potential for muscle growth! Too much cardio will reduce muscle mass leading to flat looking muscles. And, too much cardio can decrease testosterone levels.

The best time to do cardio work is in the morning after rising on an empty stomach. The total amount of glucose from carbohydrate (foods) in the blood influences "how quickly" the body will tap body fat as fuel. Even a small carb snack before cardio work can elevate insulin levels and circulating insulin tends to ***oppose*** the use of fat as fuel. However, refraining from eating allows blood sugar levels to stay low. When sugar levels are low, the next fuel sources are stored muscle glycogen and body fat. After 5 minutes of constant aerobic work, your body will attempt to do its best and stop burning glycogen. Instead, it shifts its utilization of fuel so mostly body fat is used. I always suggest bodybuilders do their cardio in the morning then return to the gym later in the day or at night for the weight training session. Or, the bodybuilder could do his cardio in the

morning upon rising, then eat his first meal, then train a body part within 90 minutes and return to the gym for a smaller body part at night.

Intensity of cardio work is an important factor determining how lean you will become. There has been dispute over lower intensity work and higher intensity work. The low intensity proponents label lower intensity work as the "fat burning zone". The spin is in a 55%-60% training heart rate zone promotes a greater burning of fat over glycogen or amino acids. That is, walking on the treadmill for 45 minutes at 55%-60% of your maximum heart rate is most effective in getting lean because you burn *a* ***greater percentage of fatty acids*** than glycogen. At higher intensity levels, such as 75% of your maximum heart rate, the ***percentage*** of fuel burned shifts. At high levels of intensity, the body burns a bit less fatty acids and more glycogen. However, working at a higher intensity can nearly ***double the total calories burned*** in the same time period. Therefore, higher intensity aerobics is *better* than lower intensity aerobics because more calories are burned and truly, more fat is burned. When intensity increases, the *percentage* of fat used *slightly* decreases *but* the total fat burned with higher intensity *is* significantly higher due to the ***greater calorie burn.***

High vs Lower Intensity Aerobic Work
500 calories burned at 75% - 80% target heart rate (using intervals)
72% of the calories burned come from fatty acids
Net fat burn: 360 calories of fat (500 x .72)
Versus
340 calories burned at 55% to 60% target heart rate
85% of the calories burned come from fatty acids
Net fat burn: 289 calories of fat (340 x .85)

At higher intensity, 32% more ***total calories*** are utilized (340/500) and 20% more fat (289/360). In general, carbohydrates from stored muscle glycogen is the other source of fuel.

The best way to keep aerobic intensity high for long periods of time - up to 45 minutes at a clip - is to employ interval training. Interval training requires you work as hard as possible, be it stationary cycling, stair climbing or whatever your favorite mode of aerobic activity, for 3 minutes followed by 2 minutes of low intensity work. The net effect of increasing your heart rate up to 80% of its maximum for 3 minutes followed by 2 minutes of *much* easier peddling or stair climbing is a "net" elevation in heart rate and far greater total caloric burn than could be achieved through constant work. Psychologically, it may be easier as it allows for a break of 1 to 2 minutes after 3 minutes of all-out work leaving you to perform 9 intervals of continuous 3 to 4 minute spikes in energy output followed by 2 minute "break" periods.

SAMPLE 45 MINUTE FAT BURNING INTERVAL		
Time Interval	Heart Rate	Heart beats in 10 seconds For 20/30/40 year old
2 minutes 3 minutes	55% 80%	18/17/16 27/25/24
2 minutes 3 minutes	"Break" 80%	Let HR fall to 55%, easy exertion 27/25/24 Kick into gear
2 minutes 3 minutes	"Break" 80%	Attempt to bring heart rate to 55% 27/25/24 Hard work!
2 minutes 3 minutes	"Break" 80%	Slow things down to 55-60% 27/25/24 HR becomes ez to maintain
2 minutes 3 minutes	"Break" 80%	HR will likely stay very elevated with nominal effort 27/25/24
2 minutes 3 minutes	"Break" 80%	Slow things down 27/25/24 Turning the corner!
2 minutes 3 minutes	"Break" 80%	Easy does it 27/25/24
2 minutes 3 minutes	"Break" 80%	8th of 9 intervals complete 27/25/24
2 minutes 3 minutes	"Break" 80%	EZ work still maintains a high HR 27/25/24
DONE!!!!!!		

The next step you can take after adding in the maximum amount of aerobic work, is to further reduce the carbohydrate intake. The maximum you should reduce is another 25%.

	Starting Carb Intake		Reduced to		Reduced further to
Meal 1	94	→	70	→	53
Meal 2	46	→	34	→	26
Meal 3	46	→	34	→	26
Meal 4	46	→	34	→	26
Meal 5	94	→	70	→	53
Meal 6	46	→	34	→	26

To find 25% less carbs: Multiply the carbohydrate intake in a left hand column by .75.
For example: 70 x .75 = 53

However, you do not have to reduce the calories 7 days a week. Instead follow a rotational diet where the calories are low for 3 days and higher for one day. Rotational dieting when calories are already reduced allows you to shed more fat and to hold more muscle compared to a non rotational diet.

It appears that, after having reached a plateau by reducing your carbs by 25% and including aerobic work, rotating lower carbohydrate days followed by higher carbohydrate days works wonders for burning fat and maintaining muscle. Basically, on low carb days, muscle glycogen levels decrease which initiates a metabolic shift where fatty acids are called upon for fuel. Lower carbs also decrease insulin levels and the combination of less insulin, 2 a day training sessions, interval training aerobic work and a reduced caloric intake is the ideal situation causing fat loss. However, the body is always ***fighting to adapt*** to either ***decreases*** in caloric intake or ***increases*** in energy output (lots of cardio work) by slowing its metabolic rate. A higher carbohydrate day every 4th day, after 3 days of a lower carbohydrate intake, will off set the metabolic downshift that can occur with reducing carbs.

On the 3 consecutive lower carbohydrate days, additional body fat will be burned, and lower glycogen stores may also cause the body to burn up more protein. If there is no increase in protein intake, the body may burn muscle as fuel as muscle is

comprised of protein. Additional protein *spares* muscle loss during low carb dieting. ***However,*** increasing protein too high can negate the decrease in calories and fat burning potential brought on by three consecutive days of lower carbs as protein can be sent to the liver and converted into glucose. Bodybuilders going overboard on protein will find it tough to get super lean.

The bodybuilder eating 1 gram of complete protein per pound of lean body mass will need to bump up his protein to 1.5 complete grams per pound of lean body mass on lower carb days and then back off to 1 gram on the single higher carb day. The bodybuilder who has been eating 1.5 *complete* grams of protein per pound of lean body weight should increase his daily protein intake to 1.8 grams of *complete* protein per pound of weight. Thus, the male carrying 154 pounds of lean body weight and eating 228 grams of protein a day will benefit by eating 277 grams a day on the lower carb days and 1.5 grams on the single higher carb day.

SAMPLE 3 LOW 1 HIGH ROTATIONAL DIET

Repeat cycle: 3 days lower carbs, 1 day higher carbs.

Days 1, 2 and 3		Day 4
Meal 1	53 grams of carbs	70 grams of carbs
Meal 2	26 grams of carbs	34 grams of carbs
Meal 3	26 grams of carbs	34 grams of carbs
Meal 4	26 grams of carbs	34 grams of carbs
Meal 5	53 grams of carbs	70 grams of carbs
Meal 6	26 grams of carbs	34 grams of carbs

SAMPLE 3 LOW 1 HIGH ROTATIONAL DIET
Repeat cycle: 3 days lower carbs, 1 day higher carbs

Days 1, 2, 3		Day 4
Meal 1	53 grams of carbs 46 grams of protein	70 grams of carbs 38 grams of protein
Meal 2	26 grams of carbs 46 grams of protein	34 grams of carbs 38 grams of protein
Meal 3	26 grams of carbs 46 grams of protein	34 grams of carbs 38 grams of protein
Meal 4	26 grams of carbs 46 grams of protein	34 grams of carbs 38 grams of protein
Meal 5	53 grams of carbs 46 grams of protein	70 grams of carbs 38 grams of protein
Meal 6	26 grams of carbs 46 grams of protein	34 grams of carbs 38 grams of protein
Total Carbs	210 grams	276 grams
Total Protein	276 grams	228 grams

POSSIBLE DIET BREAK

The need to substantially increase calories.

While dieting and getting ripped ***is*** a product of reducing calories from carbs and fat while simultaneously increasing energy expenditure by performing aerobic work, we know many bodybuilders fail to achieve a desired level of extreme muscularity though most are tremendously dedicated to the day-in-day-out process of contest preparation. The fact is, chronic dieting and caloric expenditure, even a rotational approach, often causes a metabolic slowdown which makes getting super cut up nearly impossible. The knee jerk reaction to putting in a few weeks of dedicated dieting which eventually results in only

tiny visual drops in body fat, is:

- to radically reduce calories
- to eliminate the higher carb day in a rotational approach diet
- to significantly increase aerobic activity

Any of the three changes, or a combination of them ***could*** rob the body of energy, throw fat cells into an extreme defensive state where they "fight back" and ***resist*** being burned as fuel and, worse, cause a disproportionate amount of protein (including muscle mass) to be burned as energy. Even 3 to 5 days of low calorie dieting can cause a drop in thyroid hormone, the calorie burning hormone that hugely impacts fat loss. Sustained low calorie dieting also lowers growth hormone levels and IGF levels. The final result? A loss in muscle mass, a slower metabolic rate and dismal changes in body composition.

If you are engaged in rotational dieting and have failed to see noticeable decreases in body fat or you seem to be getting leaner ***but smaller in size,*** increase your carbs for 1 day to something closer to an off season approach, following what was day 4, a higher carb day. For example, the dieter eating 210 grams of carbs for 3 days and 1 day of 276 carbs (see page 175) should follow the 1 higher carb day with a carbohydrate intake indicative of an off season day - no matter what that number be. In terms of total carbs, ***eat what you normally eat in an 'off season' day.*** So, the rotational dieter who may have been eating 372 grams of carbs a day in the off season (refer to page 163) would eat that amount for a single day following the higher carb day. ***At the same time,*** the first lower carb day (of three), will require you cut the carbs in ***half*** - from where they were in the original 3 days of lower carb intake. Thus the *total carbs* would look like so:

Day 1 (day 2 and 3 cut in half)	Day 2 and 3	Day 4	Day 5 (off season intake)
105 grams	210 grams	276 grams	372 grams

Then ***return back*** to the original 3 low 1 high rotational diet. The added calories from dramatically increasing carbs coupled with lowering your carbs on the first day of the cycle exaggerates the "zig-zag" lower carb-higher carb strategy which is nearly always effective in overcoming or preventing metabolic slowdowns.

As a rule of thumb, you can interrupt a 3 day low carb, 1 day high carb rotational diet after running through 4 cycles with the modified approach outlined above to increase fat burning and preserve muscle mass.

Special Note: Dieting for fat loss is another intangible. I will draw an analogy. Lighting a bunch of wood on fire can be difficult. The wood may be resistant to igniting. I may need more matches or an igniter, like lighter fluid, to get the wood to ignite. However, once the fire catches, it will burn continuously with no additional matches or fluid. In fact, it could go wild, and burn everything in sight.

The body is similar. A reduction in calories or the addition of cardio should tap fat for fuel. However, some bodies are stubborn. A stubborn body does not need more cardio or a further reduction, it simply needs *time* to recognize the reduction or the addition of cardio before in begins to respond. The fire above could be started with just one match, but it may take time. Once a fire or metabolism gets roaring, it could roar so fast that it could burn too much. A dieter for competition may start to lose too much weight without reducing more calories or adding more cardio. His metabolism can simply speed so much that it (the metabolism) burns everything, including muscle, like a fire out of control. To offset this, he should add more carbs back to the diet or drop back on cardio so muscle mass can be protected.

If you still struggle in getting ripped, cut out your dietary fat on the lower carb days. This means eating exclusively fat free protein sources to eliminate any extra calories that may be

preventing you from getting as lean as possible. The best fat free sources of protein include: egg whites, protein powder, fish, and turkey breasts versus higher fat sources like lean red meat and chicken. Furthermore, you can include ***some*** fibrous carbs on your three lower carb days like vegetables; broccoli, cauliflower, asparagus, cucumbers, onions and peppers. Due to their high fiber content, these carbs actually yield less total calories than complex carbs like rice, pasta, bread, yams and potatoes. However, *always* stick with complex carbs (no veggies!) on your higher carbohydrate day as you'll need the fuel and glucose to re-store glycogen levels and to prevent a metabolic slowdown associated with eating less carbs for three days.

Summary:

1) Cut carbs by 25% off the baseline diet
2) Add appropriate cardio: build to six 45 minute intervals
3) Further reduce carbs by 25% . Use a rotational diet
4) On lower carb days, increase protein to 1.5 grams per pound of lean body mass from 1 gram. If you were eating 1.5 grams per pound of lean body mass, increase protein to 1.8 grams.
5) Drop fat intake on lower carb days: Eat lowest fat proteins
6) Substitute some fibrous carbs for complex on lower carb days
7) Eat no veggies on single high carb day and include *any* type of carbohydrate including refined carbs.

The Glycemic Index

In bodybuilding, as in most sports, training and dietary fads come and go. The hottest thing in the gym one day could be as repulsive as yesterday's workout towel the next — not even worth a second glance. Yet many people who hope to build serious size have fallen prey to the latest nutritional faux pas: eating low carbs or completely avoiding high-glycemic carbohydrates.

They want to gain mass without adding a single ounce of fat, and may rely on ratio diets that frequently reduce their carb intake to less than 50% of their total daily calories. If they only knew that avoiding carbohydrates, particularly high-glycemic carbs, won't help them gain mass at all! In fact, this is a surefire way to short-circuit your ability to get really huge. Carbs are vital in building maximum muscle mass, and if you skimp, cut way back or fail to eat the right amount, you'll never gain the size and mass you want.

If you want to pack on serious *size,* choose the role models who have proven, over and over, that adding body weight is the best way to increase both strength and mass. Serious bodybuilders rarely worry about staying lean and ripped all year long; many load up on calories in the off-season and train with heavy weights using basic exercises to gain as much muscle weight as possible. Sure, they'll add some body fat and may even sacrifice some cuts and definition, but if you have size in mind, lots of calories and plenty of carbs is the name of the game.

FUELS FOR THE FIGHT

Weight training with high levels of intensity requires glucose, the technical term for sugar. This basic energy source enables each muscle to contract and push the big weights you need to lift to stimulate growth. The immediate advantage in devouring potatoes, rice, pasta, bread, grains, fruit and other

carbohydrates is a saturation of muscle-glycogen stores — a fancy name for the reservoir of stored sugar found in muscle tissue. Put simply, topping off your muscle glycogen by eating plenty of carbs allows you to train harder and longer.

The second advantage to an abundant carb intake is the hormonal change that facilitates muscle growth. Carbs boost the output of an anabolic hormone called insulin, which turns on the system responsible for collecting glucose from what you eat an bundling it into muscle glycogen. Insulin also increases your muscles' ability to absorb the amino acids found in protein foods you consume

Yes, muscles *are* made of protein, but you could still fail to grow on a high-protein diet if your carb intake is insufficient. When you consume too few carbs and calories, some of the protein you eat is burned up as fuel and completely wasted. Yet when you eat adequate carbs, protein breakdown comes to a halt, allowing your muscles to recover and grow.

You can reap the rewards of eating carbs even if you don't quite follow the science. Although he says he knew nothing about nutrition when he first began training, '99 Arnold Classic Champion Nasser El Sonbaty found a high carb diet critical for quick gains in size. "When I started working out in Germany, the bulk of my diet included bread; I ate a couple of loaves a day and made very good progress," he remembers.

GLYCEMIC CONFUSION

Originally intended and created for diabetics to help them manage and adjust insulin shots, the glycemic index (GI) is a scale that measures the speed at which 100 grams of a carbohydrate enter the blood as sugar. The index assigns numbers to all sorts of carbohydrate foods, comparing the variable speeds at which they're ultimately absorbed. The GI has been usurped by bodybuilders and others who hope to limit body fat, and they've gone way overboard on its application.

Total calories, total carbohydrate intake and the insulin spike

you get from carb foods are muscle friendly helping to create a tissue building environment in the body. *In terms of building mass,* your aim should be to increase your calories, especially those coming from carbohydrates. Yet the majority of those who regularly hit the weight room fail to see considerable size gains because they eat too few calories and carbs, which leads to suppressed insulin levels and the burning of protein as fuel. Instead of the ideal, anabolic state, the opposite is created — the dreaded catabolic or "muscle losing" state.

Believing that higher-GI carbs that rapidly digest into glucose aren't helpful in building muscle, those who enslave themselves to the glycemic index often avoid simple or fast-acting carbs. Scientific research and anecdotal reports from champion bodybuilders, however, offer a completely different view. Nasser explains: "People get so detailed about what they eat that they forget massive bodies can't be built by eating small amounts of food. I don't limit my carbs when I'm trying to get big, and I eat quite a bit of fast-digesting carbs like bagels to get what I need."

Potatoes, white rice, breakfast cereals, fat-free sweets, jams, preserves and honey score high on the index, meaning they quickly break down in sugar. They're usually shunned by those following a low-GI diet in favor of slower-to-digest carbs such as beans, yams, oats, brown rice and whole-wheat pasta. Yet consuming high-glycemic carbs in the meal immediately following training is better for quickly replenishing muscle glycogen stores than eating low-glycemic carbs.

HIGHS & LOWS

Still gun-shy about eating high-glycemic carbs? Well, according to research, they aren't always high-glycemic. Those high-GI numbers ascribed to rice cakes and fat-free ice cream can be radically skewed and significantly lowered when the food is combined with protein, fat or fiber. Slapping together a turkey sandwich using high-GI white bread drags the bread's index rating down; the protein and small amounts of fat in the turkey

transform a seemingly high-glycemic meal into a lower-glycemic one.

Another way to manipulate the speed at which high-glycemic carbs reach the blood is to include fiber, nature's very own "time-releasing" agent. Adding even a small amount of fibrous vegetables blunts the rate at which high-glycemic carbs are absorbed. Complementing a serving of mashed potatoes with a cup of mixed steamed vegetables, for example, will offset the GI rating of the potatoes. Throw in a small grilled chicken breast and the GI drops even lower.

So what's the big deal? Why do so many people stick to low-glycemic carbs? It could be that they don't understand that the glycemic index rates carbs alone; most are eaten with protein, fat and fiber, affecting their glycemic index rating. Others fear that high-glycemic carbs influence fat storage more than total calorie intake. In this regard, hard-training bodybuilders who want to build mass needn't worry: the way you train changes your body's response to carbohydrate foods.

Weight training depletes muscles of their glycogen stores and stimulates the receptors for insulin, which are located on the surface of muscle cells, to become more sensitive to insulin's effects. Combined, these two actions tend to negate potentially fat-storing effects of high-glycemic carbs. Why? Muscles depleted of glycogen have highly sensitive insulin receptors and demand that carbohydrates be stored as glycogen first, before stimulating fat storage!

Yes, high-glycemic carbs do have fat-storing potential, but in a very select population: Obese individuals who don't exercise have very little demand for resynthesizing large amounts of muscle glycogen. Others who may want to keep an eye on the ratings of carbs and stick to lower glycemic carbs include the bodybuilder trying to rip up who is experiencing difficulty in getting lean and females who may be "carb sensitive"; their carb intake might have to be closely monitored in order to build lean body mass without adding unwanted body fat.

The final group who may need to watch the carb ratings is the pre-contest bodybuilder who finds it difficult to get through a training session. Lower glycemic carbs before training; yams, oats, rye cereal, plums, cherries or *red* potatoes break down slower and may help spare glycogen. Faster acting carbs in the pre-training meal (while dieting) may leave some bodybuilders tired. The reason? The fast digesting carbs break down so quickly they don't "last" during a training session leaving a hard dieting bodybuilder feeling weak with low blood sugar levels. However, when mass is the goal, you must eat plenty of carbs over 5 or 6 meals. Combining protein at each meal and some vitamin dense vegetables at 2 or 3 of your off season mass building meals will skew index ratings making them obsolete. This group may be better off sticking with a calorie-controlled diet emphasizing lower glycemic carbs.

Hi-Lo Dieting for Endomorphs

An endomorph is a term used to describe a body type that tends to be higher in body fat. Many endomorphs who try to lose weight find it difficult. Those who attempt to compete in bodybuilding can find it very frustrating.

Endomorphs tend to store carbohydrates very easily as body fat. A theory holds the endomorph's receptor cites for insulin on the muscle are dull and/or their metabolism is somehow more efficient at obtaining energy from food which makes them better fat storers. When an endomorph eats carbs, the body releases insulin except the insulin can not efficiently do its job. The dull receptor does not completely accept the insulin. As a result, the muscles do not receive all the amino acids and carbs that it needs. Recall, insulin is a "driver." It drives nutrients (carbs and aminos) into the muscle. However, if it can't do its job, the pancreas (over) compensates, by releasing **more** insulin. High insulin levels are bad. High insulin levels are body fat friendly. Elevated insulin levels ***in the endomorph stimulate fat accumulation*** making fat

loss difficult even when calories are reduced. Therefore, fat cells do the growing, not the muscle cells.

Endomorphs, or anyone who has a higher amount of body fat releases more insulin than normal. This further adds to fat storage. For example, an individual with 30 pounds of fat will release more insulin in response to eating a meal than another individual who carries only 10 pounds of fat.

The diet that works well for the endomorph trying to shed as much fat as possible or hoping to compete is the ***variable low carbohydrate diet.*** Lowering carbs controls the release of insulin enabling the fat burning system to take over and do its job. By avoiding carbohydrates, the body releases a hormone sensitive enzyme called "lipase" which encourages the fat cell to release fatty acids into the blood stream so they can be used as fuel. Carbohydrate usage and fat burning exist in a dynamic relationship especially in those who carry a high amount of body fat. When carb intake skyrockets with a high carbohydrate diet, the mobilization of fatty acids from fat cells virtually comes to a dead stop. On the other hand, when carbohydrates are drastically reduced, the body shifts and attempts to dig into fat stores and rely on fatty acids as fuel.

Insulin also stimulates the hunger center in the brain. Rats injected with insulin will eat until their stomachs explode. Avoiding carbohydrates to control and ***suppress*** insulin allows the endomorph to control hunger. Avoiding carbs also causes the production of ketones. Ketones are by products of fat oxidation. Ketones, like freed up fatty acids, can be used for energy thereby ***sparing*** muscle mass from being used as fuel. Ketones help save muscle mass! Ketones are also the opposite of insulin; they are anorectic in nature-they suppress the appetite.

When carbohydrates are severely reduced from the diet, the body calls on a blend of fatty acids and protein as fuel so the need for protein increases dramatically. Increasing the ratio of calories from protein will provide the body with amino acids that can be used as fuel, (along with ketones), and the extra protein will spare

muscle from being broken apart to be used as fuel.

Protein can be used to provide energy and therefore spare muscle mass from being used in two ways. Some amino acids can be used as an energy source ***directly*** in the muscle (branched chain amino acids). Other amino acids can be ***converted into*** carbohydrates ***(glucose)*** through a process called ***gluconeogenesis.***

A high protein, low carb diet can stimulate fat loss in other ways. Food has a stimulating effect on the metabolism. After consuming a meal, the body must expend energy to digest, absorb, and assimilate the nutrients in the food. This is called dietary induced thermogenesis. Carbohydrates cause a thermic effect of up up to 12%, while an all protein meal may stimulate a thermic response of 25%. This means a 200 calorie chicken breast may end up being only 150 calories due to its high thermic response. Some of the calories are simply "wasted" as metabolic heat in the body's extrapolation and removal of energy from food.

Another way this diet stimulates fat loss is by stimulating the ***sympathetic nervous system (SNS).*** A high carb diet stimulates the *para*sympathetic nervous system which slows the metabolism. Protein stimulates the SNS which in turn stimulates ***brown fat metabolism.*** Brown fat is located surrounding the organs and is highly concentrated between the shoulder blades. Brown fat is like muscle in that it is metabolically active and exerts a calorie burning effect.

I suggest that carbs be limited to 60 grams a day for moderate size bodybuilders and 100 for large bodybuilders. Generally, a large bodybuilder would be considered 185 pounds and over while smaller would be considered under 185. Protein should be up to 2 complete grams *per pound* of body weight. A 200 pound bodybuilder would eat no more than 100 grams of carb a day with up to 400 grams of complete sources of protein. He should follow this for 3 to 5 days before lowering his protein to 1 gram per pound of body weight and upping his carbs to 2 grams per pound of body weight for 1 day only. Then, repeat the process. Three to

five days of low carbs with one day of high carbs. Why up the carbs? Reducing carbs for too long can cause the body to conserve the amount of the calorie burning hormone, thyroid. Reintroducing carbs will trick the body so it is not conservative in this manner. Adding carbs also causes the muscles to swell temporarily with glycogen. This swelling acts as a not-fully-understood "anabolic switch" to signal muscles to grow or at least hold muscle mass while dieting. Finally, this low carb to high carb switch is similar to rotational dieting that was discussed previously.

Those who choose this diet do not need much cardio work as cardio combined with low carbs seems to throw the body into an over training or muscle losing state, that in turn, stagnates the metabolism. I suggest no more than 3 sessions a week or 40 to 45 minutes. If you are experiencing problems or reaching roadblocks using this diet, reduce your carbs even further to 30 to 50 grams per day. Or, you can switch the majority of your carbs from common bodybuilding favorites like potatoes, rice, some fruit and oatmeal to ***non insulin*** producing super low calorie carbs including:

asparagus (4)	green beans (4)	spinach (1)
broccoli (4)	squash, spaghetti (5)	squash, summer (4)
cabbage (3)	lettuce (1)	water chestnuts (7)
cauliflower (3)	mushrooms (2)	wax beans (4)
celery (3)	okra (4)	zucchini (4)
eggplant (2.5)	radish (2)	

NOTE: Number in parenthesis represents total carbs per half cup serving.

Endo dieters, who have to reduce carb intake severely, can benefit from eating lean beef (daily) while dieting. Beef is high in creatine. Low calorie pre-contest diets that stress fish, egg whites, and chicken are low in creatine. Adding beef (and supplemental creatine) can increase muscle creatine and ATP levels. This can contribute to more energy even while dieting.

Beef is also high in alanine, the nonessential amino acid that is required to make glucose. Alanine makes glucose when carbs are low. The body ***can*** make alanine, but it does so at a terrible price.

The body ***breaks down*** its muscle to derive alanine. This is a catabolic process. Tuna, chicken, and egg whites are all low in alanine.

Endomorphs are notorious water retainers. They always look best the final week before the contest if the high carb day is Thursday before a show. The one day on carbs may fill them out a bit, but low carbs on Friday allows the ***natural diuretic effect*** of low carbs to occur so the competitor can look his best. The endo who uses this diet does not need to reduce water intake as the low carb diet naturally acts as a diuretic by ***suppressing*** the hormone, aldosterone. Aldosterone governs water retention. High aldosterone levels associated with stress or from a high salt diet will cause the body to retain water. When carbs are low, aldosterone levels fall, so water retention is not a problem. Lastly, the endo dieter can benefit from using 1 to 2 tablespoons of MCT's a day, short for medium chain triglycerides, on low carb days - especially if switching to 30 grams of carbs and mostly non insulin producing ones. MCT's, while following a very low carb diet, are converted directly into ketones and spare muscle loss. The low carb dieting endo dieter will usually find it ***very difficult*** to train as blood glucose levels coupled with low glycogen levels make it extremely tough to get through the training sessions. Taking 1 to 2 tablespoons of MCT's provides and immediate source of fuel which spares protein loss and gives you the needed ***immediate*** fuel to make it through the training. MCT's in a low insulin carb free environment ***cannot*** be stored as body fat so taking 1 to 2 tablespoons which yields about 80 to 160 calories is only beneficial. Larger bodybuilders, over 200 pounds can work up to 3 tablespoons before training. The final benefit of MCT's is that they are thermic in nature - they bump up the metabolic rate in low carb diets. For carb free or near carb free dieting, they're a truly must have supplement and are readily available at most health food stores.

TIPS TO THE VARIABLE LOW CARB DIET

1) Start with 100 grams of carbs a day. Eat 50 grams in the morning at breakfast and another 50 after any training session.
2) Start with 3 consecutive low days, 100 grams of carbs per day. Upon reaching a road block, extend the low carb days to 5 straight days.
3) If you reach another road block, reduce your carbs to 30 grams for days 1-3 and return to 100 on days 4 and 5.
4) Include 1 to 2 tablespoons of muscle sparing MCT's on low carb days before training session.
5) Always include any type of carb on your 1 high carb day. Fruit, fast acting carbs, bread and even frozen yogurt are perfectly fine. The carbs consumed on this day will only boost the metabolic rate, retard potential muscle breakdown, and replenish severely depleted muscle glycogen. They will not cause you to get fatter!

SAMPLE VARIABLE LOW CARB DIET

Sample: 200 pound bodybuilder

Day 1	100 grams of carbs	400 grams of protein
Day 2	100 grams of carbs	400 grams of protein
Day 3	100 grams of carbs	400 grams of protein
Day 4	400 grams of carbs repeat, go back to day 1	100 grams of protein

↘

Roadblock or Plateau?

↘

Day 1	100 grams of carbs	400 grams of protein
Day 2	100 grams of carbs	400 grams of protein
Day 3	100 grams of carbs	400 grams of protein
Day 4	100 grams of carbs	400 grams of protein
Day 5	100 grams of carbs	400 grams of protein
Day 6	400 grams of carbs repeat, go back to day 1	100 grams of protein

↘

Roadblocks and Plateaus?

↘

Proceed to *extended lower* carb plan

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Day 1	30 grams of carbs*	400 grams of protein
Day 2	30 grams of carbs*	400 grams of protein
Day 3	30 grams of carbs*	400 grams of protein
Day 4	100 grams of carbs*	400 grams of protein
Day 5	100 grams of carbs*	400 grams of protein
Day 6	400 grams of carbs (See page 180)	100 grams of protein

*Can substitute non insulin releasing carbs or use mostly non insulin releasing carbs (see page 186). Also use MCT's.

SAMPLE MENU FOR 200 POUNDER

Menu Provides 100 grams of Carbs and 400 grams of Protein

MEAL 1	CARBS (in grams)	PROTEIN (in grams)
1/2 cantaloupe	29	
3 rice cakes	21	
14 ounces chicken breast		66
TOTALS	50	66
MEAL 2		
1 cup lettuce	4	
9 ounces tuna		66
TOTALS	4	66
MEAL 3		
1/2 cup asparagus	4	
10 ounces round steak		66
TOTALS	4	66
MEAL 4		
3 heaping scoops whey protein powder mixed in water		66
TOTALS	0	66
MEAL 5		
8 ounce yam	50	
10 ounces turkey		66
TOTALS	50	66
MEAL 6		
2 cups jugar free jello	4	
3 heaping scoops whey protein powder		66
TOTALS	4	66

Fats

Dietary fats are the most concentrated source of energy. One gram of fat is equal to 9 calories where one gram of carbohydrates or protein is only four calories. From a body fat control standpoint, it makes sense to eat less fat.

Fats are also more likely to be stored as body fat. When protein is consumed in excess, it takes energy to eventually store it as body fat. For every 100 calories of protein eaten about 23 are burned off breaking down the protein to amino acids. When 100 calories of carbohydrates are eaten, about 9 to 12 calories are used up in the processing of the carbohydrate so that it can be stored as either glycogen of body fat. However fats are efficient. For every 100 calories consumed of fat, only 3 are burned off before the fat is either used for fuel, or more accurately stored as body fat.

There are two types of fat; saturated and unsaturated. Saturated fats are solid at room temperature and are derived from animal sources. Saturated fat is associated with several health ailments. Men who eat a highly saturated fat tend to store a disproportionate amount around the mid section and lower back areas. Women tend to store it on the hips and thighs. A high saturated fat diet, especially one that is also dense in refined carbohydrates and lacking adequate dietary fiber can damage the muscle's ability to uptake sugar making it more difficult to manufacture muscle glycogen. In essence, the receptor cites for insulin located on muscle tissue become ***less sensitive*** to the glycogen storing effects of insulin so the body adapts by increasing insulin levels and we've seen chronically elevated insulin levels promote the accumulation of body fat. Damaging this receptor can make muscle building more difficult and therefore encourage fat deposition.

Unsaturated fats are liquids at room temperature. They are derived from nuts and vegetables. Linoleic acid, an essential fat required for hormone regulation and growth is found

predominantly in unsaturated fats although it is found to a lesser but still significant degree in saturated fats. Even your low fat chicken breast contains about 18% fat with some being linoleic acid.

Special Fats

Cold water ocean fish, especially salmon, mackerel, and blue fish contain omega 3 fatty acids. These fats have been shown to fight inflammation of all kinds from joint pain to the inflammation associated with sore muscles after a hard workout. They also may speed the repair of damaged tissue and create an anabolic environment by causing the retention of glutamine in muscle. Some European countries supplement post surgery heart patients with fish oils to enhance recovery of the heart. Adding supplemental fish oil capsules, enough to yield 7 to 9 grams of "fish fat" a day (off season and 4 grams pre-contest) or eating higher fat fish like mackerel, sardines or salmon three times a week may help your muscles recover faster. Lastly, fish oils can increase the sensitivity of the muscle receptor cite for insulin. If the receptor is more sensitive, then the body is not forced to out put an over abundance of insulin. Recall, high insulin is associated with high body fat levels and improved insulin sensitivity on muscle tissue encourages muscle recovery, growth, and repair. Don't be fat phobic and worry an extra 7 to 9 grams of fat from fish is going to increase your body fat. Omega-s 3 fats are less likely to be stored as body fat compared to saturated fats, the grissly fat common to fattier cuts of red meat, pork or brown meat fowl. Omega 3's have a few physiological jobs to perform; fighting inflammation, supporting growth hormone production and interacting with insulin *before* having the ability to stimulate body fat production.

One oil that may be helpful to bodybuilders is borage oil. Borage oil is a precursor to gamma linoleic acid (GLA). GLA aids in the production of prostaglandins in the body.

Prostaglandins are strong messengers that are constantly being released in the body as a result of stress, training, and the foods we eat. There are good prostaglandins and there are bad prostaglandins just as many consider there to be good cholesterol (HDL), and bad cholesterol (LDL).

GLA promotes the release of a recognized good prostaglandin called P-1 or PGE-1. PGE-1 enhances blood flow to training muscles, it supports the immune system for optimal workout recovery, and it fights inflammation associated with hard workouts. PGE-1 also helps make important anabolic hormones like growth hormone and thyroid. Both are necessary for muscle growth and normal fat metabolism. At first glance, it appears GLA can be readily made by the body from linoleic acid, the omega-6 essential fatty acid common in every day vegetable oils. That is, you should be able to add a tablespoon of canola oil to your nutrition strategy giving your body plenty of linoleic acid which the body should convert into GLA. Problem is, the oils in your grocery store are, for the most part, ***spoiled*** much akin to a loaf of bread turned "bad" or a chicken breast decayed filled with bacteria. Commercial oils are made to have a long shelf life. Manufacturers use a heating and bleaching process to prolong the shelf life of the oil but this process ***destroys*** nearly all of the essential fatty acid (linoleic acid) that ultimately gives way to GLA in the body. Furthermore, the oils are displayed in clear see-thru bottles to make them more attractive and "sellable" yet sunlight and store lighting actually contribute further to the destruction of linoleic acid. The result: ***Bad Fats,*** a poor grade oil lacking the essential linoleic acid the body needs. *"Bad fats"* also called "rancid fats" produce free radicals, the highly unstable, highly reactive compounds that bind with healthy cells in the body leading to the death of cells and, ironically, muscle inflammation! When trying to get real linoleic acid, look for ***cold processed*** oils sold in light resistant dark bottles to ensure you are getting "active" linoleic acid. Cold processing is a unique cooling process extending the shelf life

without killing the essential fatty acid in the oil. Unlike commercial oils that use heat, the cold process keeps linoleic acid intact. Off season, use 1 to 2 tablespoons a day to supply essential fats and extra calories. Pre-contest, *all* dieters will benefit by taking 2 teaspoons which equals approximately 9 grams of fat or 81 calories. Dieting bodybuilders shouldn't make the now common mythical mistake of pounding tablespoon upon tablespoon of oils in hopes of getting cut. Getting lean requires ***reducing calories*** and those who suggest a high fat diet chock full of essential fats will *speed* fat burning forget calories, total energy intake, is of primary importance in getting lean and 10 tablespoons of added fat makes it all that more difficult to get lean; essential fat or not.

Stay Lean

Without a doubt, muscle will grow best in a lean body. In fact, fat people will have a tough time adding any muscle at all.

Men should try to keep body fat levels at 12% or less and women should try to keep theirs at 17% or less.

Muscle builds the metabolism. Muscle is metabolically active; the muscle in the body requires calories even at rest. The more muscle the more calories required.

Fat is dormant. It is inactive metabolically. It does not require calories. In fact, the more fat you carry, the more difficult it becomes to lose fat and the harder it is to build muscle. Muscle and fat act as a see-saw. Both have receptors for the hormone insulin. Insulin is a double edged sword. It can store and divert the calories eaten towards both muscle or fat. If a person has a lot of muscle and little fat, that means the ratio of receptor cites for insulin are more favorable towards muscle. When calories are consumed and insulin is released, the calories will have a higher affinity for muscle. Therefore, the greater muscle mass you begin to carry, the greater the likelihood that what you eat will be funneled towards building more muscle as long as body

fat levels fall within the 12% range for men and 17% range for women. This is sometimes referred to as "repartioning". Once body fat levels get out of control, the repartioning effect to favor muscle building wanes, leaving the foods you eat more likely to begin to favor fat storage.

A person who is fat and eats a 700 calorie meal will release more insulin than the person who is lean and muscular and eats the same size meal. The fat person will more easily store fat. Lean people release less insulin to the same calorie meal.

Depleting and Loading

Carbohydrate depleting and loading is a technique used to lose fluid from beneath the skin and to a lesser degree, to add to the appearance of muscle fullness. All competitors, beginners to advanced try to lose water to appear harder.

Depletion involves ridding the body of carbohydrates. There are two ways to deplete your carbs: one is to restrict them for one to three days, and the other is to train with high repetitions, 15 to 20 reps per set for three to five days. High rep, light training will tap the glycolytic energy system and empty muscles of their glycogen. Depleting the body of carbs coupled with high rep training will magnify the depletion process. When this happens, the muscles appear flat and are sponge like in nature. Carbs attract water in the body. Reducing them will help you to lose water from under the skin. Now its your job to keep it (water) out while adding back carbs to fill the muscles out.

When carbohydrates are re-introduced to the body, the depleted muscles act as dry sponges and "suck up" the carbohydrates along with water from under the skin. This causes the muscles to appear harder for two reasons

1) less water is stored under the skin and

2) the muscles store more glycogen and literally feel harder.

While this is a great process and leads to better conditioning, beware. First, make sure that you have done all your homework

and shed your fat stores. Depleting and loading an already cut body typically leads to a shredded physique. However, depleting and loading a slightly smooth body seems to make the physique look worse.

Large bodybuilders need more time to deplete and therefore more time to add back those lost carbs in the loading phase. Three days of depleting with three days of loading is usually best. Smaller bodybuilders, and most women, can deplete for a shorter time, more like 1 to 2 days with 1 to 2 days of loading.

Depleting is not destructing! Many bodybuilders reduce their carb intake to zero. This actually can cause muscle loss during the depletion phase. Severely depleting does not allow the body to "re-fill" with carbs. Most bodybuilders who "destruct" instead of deplete end up panicking. In an attempt to fill the muscles back with glycogen, they end up overeating which leads to water retention-the exact thing you are trying to avoid by depleting and loading in the first place!

To facilitate the depletion process, continue to train while depleting your carbs. Train each body part, *everyday* using very light weights. Pick any 3 exercises for smaller body parts such as calves, abs, biceps, triceps and shoulders and perform 2 sets of 15 to 20 repetitions for each set you perform. For larger body parts like quads, hamstrings, chest and back choose any 3 exercises and perform 3 sets of 15 to 20 repetitions. A combination of a reduced carb intake and high rep training will drain the muscles of stored glycogen, reduce aldosterone levels - the definition blurring hormone that causes water retention, rid the body of subcutaneous (under the skin) water and severely stimulate the enzymes responsible for forming muscle glycogen. In essence, the lower your glycogen reserves, the greater the output in glycogen storing enzymes. When carbs are ***re-introduced*** into a carb deprived body, all the carbs are packed away as muscle glycogen, dragging water along with it as glucose from carbohydrate foods and water are the ***two*** components comprising (new) muscle glycogen. Where's the great majority of

the water come from? From beneath the skin, allowing you to temporarily appear more defined!

The best approach to reducing carbs over 3 days is to consecutively reduce them in half the Sunday, Monday and Tuesday preceding the competition. For example, the bodybuilder eating 200 grams of carbs while dieting will reduce them in half, to 100 grams on Sunday. On Monday he will reduce that number in half to 50 grams and on Tuesday he should again reduce them to 25 grams over the entire day. Some suggest to replace those calories with fat or protein. I disagree as you want to make sure you are depleted. By eating another source of calories, you could derive some energy that will prevent you from depleting your muscles. However, you may wish to include whey protein powder(s) as a protein source during the Sunday, Monday, Tuesday depletion stage. About half of your protein intake on those three days should come from whey. Whey protein is higher in branched amino acids which are used as fuel when glycogen levels drop. The benefit; using whey protein can off set the burning of muscle tissue during the depletion stage, protecting your body from muscle loss.

The poundage to encourage the depletion process is generally ***50% less*** than your normal training poundage. The purpose with the light training is simply to burn away some of the carbs in the muscles which, in turn, will help temporarily create a hyper-loading state where the muscles are prepped to store the maximum amount of carbohydrates possible. When the maximum amount of carbs are stored, a disproportionate amount of water is pulled from under the skin to help form glycogen leaving a tighter or "dry" look. Thus, the individual who usually uses 200 pounds for bench presses would use only 100 pounds. Don't make the mistake of trying to continue to train with heavy weights. The combo of severely low carbs and training heavy each day during the Sunday thru Tuesday depletion phase can strip the body of muscle and send it into a catabolic state.

"Filling Up." Once Wednesday arrives, it's time to reverse

gears and carb up. Filling up your stores of glycogen generally takes about 3 days. For every day you deplete, you will need a day to load. The amount of carbs you will need to re-load your now depleted muscles with glycogen depend upon how many you were eating previous to your depletion. In general, multiply the amount of carbs you were eating on Saturday (the amount of carbs you were eating while dieting or the amount of carbs on your high day. See page 173), previous to depleting, by 2.5 - 3. The bodybuilder dieting on 200 carbs will need 500 to 600 grams of carbs ***each day*** on Wednesday, Thursday and Friday to re-fill and saturate his muscles with glycogen.

While low glycemic carbs are best on Thursday and Friday, a 50-50 mix of high glycemic carbs and low glycemic carbs should be used on Wednesday as high glycemic carbs are better kicking off the carb storing process than low glycemic ones.

If you feel especially flat, you could eat a few more carbs the first day of loading. This is when your glycogen stores are lowest, and the enzymes that store carbs as glycogen are super active. Like wise, if you feel like you could start to hold water on the final day of loading, reduce your carb intake a bit.

The carbohydrate source can also make a difference the final week. I have always had good luck with yams as a carb source, on Thursday and Friday. Yams have a low glycemic index. High glycemic carbs release a greater amount of insulin than an equal amount of carbs from low glycemic sources and higher glycemic carbs (by virtue of their greater insulin release) can increase aldosterone levels in the body. Aldosterone is a potent water retaining hormone that can ruin your clear muscle definition no matter how mean you are.

Don't think you can "fill out" more by eating more carbs. Eating too many carbs will absolutely blur definition even if your body fat is low. When it comes to carb loading, it is better to have your glycogen stores 99% re-loaded rather than than 101% full. That little bit of extra carbs may just be the thing that keeps you from taking home the first place award.

Water intake should be kept higher than normal *during* depletion. Doubling up on water intake is not uncommon. A high water intake will flush sodium out of the body.

Sodium is an important mineral that actually helps enhance the formation of muscle glycogen and, to a smaller degree, it is involved in protein synthesis. During the off season, when your trying to grow, it is a complete mistake to follow a zero sodium diet. *Including* sodium in your diet will enhance muscle contraction, recovery and lead to a better *pump* within the muscles. Sodium also helps protein synthesis. Sources of sodium for the off season, mass seeking bodybuilding include fat free cheese, fat free cottage cheese, spices, ketchup, tomato sauce, mustard, fat free mayonnaise, soy sauce and bread. When it comes to the *final 3 to 4 days* before a competition, sodium can ruin your chances of appearing cut up as sodium traps water under the skin, clouding muscle detail and definition. Sodium causes water retention and blurs definition.

Sodium should be cut out completely ***on Tuesday,*** before a Saturday competition. This will allow you to shed some excess water, as sodium, along with ***over carbing*** the final 3 days, are the main culprits affecting definition. While dieting, and even as close as the Monday proceeding the show, sodium is totally OK. I use spices, tomato sauce, salsa, fat-free bread, and other items that have a moderate amount of salt in them. In fact, starting 10 days from the depletion process (10 days previous to *starting* the depletion phase beginning on Sunday before the show), it is a good idea to deliberately ***increase*** your sodium intake. When sodium intake rises, the body increases it's ability to ***rid*** the body of this extra sodium. ***Increasing sodium results in a hormonal adaptation*** where the body tries to "pump" more sodium out of the body. On Tuesday before the show, when sodium is restricted the body ***continues its now hyped up ability to pump sodium.*** The net effect; reducing sodium by cutting it out on Tuesday before the show causes the shedding of excess water from beneath the skin and ***more sodium than***

normal is pumped out of the body as the body remains in a "hyper sodium pumping state" for 3 days following a reduction in sodium." Adding 6000-12000 mgs of sodium from plain table salt during the 10 to 14 days preceding the depletion will suffice - about the amount of salt found in 1 to 2 rounded tablespoons of table salt. Using sodium during the off season and close to the show will allow ample room to "cut" it from the diet, which will actually aid definition.

While loading, you should reduce water intake to half of normal, on Thursday and Friday, and try to drink sparingly the day of the show. Reducing water intake on the loading days allows the body to become slightly dehydrated which enhances definition. When you decrease your fluid intake, the body, in an urgent state to remake muscle glycogen, drags the glucose from the carbohydrates along with water from ***beneath the skin*** and even from ***within*** the skin, making the body appear more cut and "dry".

Another way to lose more water on the final day or two is to drink coffee as part of your total fluid intake. Coffee acts as a diuretic, ridding the body of still more water. Wine can also suppress aldosterone levels. I know a few bodybuilders who have a glass or two the night before competing.

Saunas are helpful. Taking saunas twice a day on Thursday and Friday can help to lose water from under the skin. Only stay in each time until you ***begin*** to sweat and no longer. If you sweat ***too much at one time,*** the body will release ***anti-diuretic hormone*** and you will rebound and hold any water you just sweated out in the sauna.

OTHER TIPS TO CARBO DEPLETION AND LOADING

1) No training on Wednesday and Thursday

The goal on Wednesday and Thursday is to allow the body to rest so the muscles can "suck up" as many carbohydrates as possible. Training on these days would simply burn away some of the carbs leaving you flat, glycogen deprived, and depleted.

2) Do Train on Friday

On Wednesday and Thursday the enzymes that make glycogen will be extremely elevated which promotes glycogen ***over***compensation where all the extra carbs you eat are quickly stored as glycogen. However, on Friday, the glycogen forming enzymes may begin to fade. Performing 1 set of 12 to 15 reps for each body part with ***very light*** weights is effective in re-stimulating the glycogen forming enzymes. Reduce your weights by 70% compared to normal training poundages. For example, if you use 100 pounds on standing curls, try using 30 pounds on Friday. Pick one exercise for each body part any perform ***only*** 1 set of 12-15 reps.

3) Use glucose disposing supplements on Thursday and Friday

400 mcgs of chromium, 400 mgs of alpha-lipoic acid, 8 grams of omega-3 fatty acids should be taken daily along with 100 mgs of hydroxy citric acid (HCA) before each meal. These supplements all encourage the formation of muscle glycogen.

4) Avoid Cardio the final 10 days before a contest

Cardio performed too close to a contest tends to promote a flat, stringy physique. Plus, cardio stimulates enzymes that oppose the glycolytic, carb forming machinery. This interferes with the body's ***maximal*** ability to re-store muscle glycogen.

5) Use potassium supplements

1000-2000 mgs of supplemental potassium daily during the final week before a show, or 300-400 mgs with each of your 5 daily meals can encourage sodium excretion and primes the muscles to form maximum amounts of glycogen during the 3-day load phase.

SUMMARY OF CARBO DEPLETION AND LOAD

SUNDAY:

Deplete carbs: half normal (Saturday's) intake Example: 200 grams becomes 100 grams

High Water intake: up to twice normal intake

Example: 1 gallon should become 2 gallons (for *best* results double up on water 2 weeks prior to the competition)

Maintain Elevated Sodium Intake (up to 12,000 mgs daily), best results, start 2 weeks prior to competition

Light Training: calves, abs, biceps, triceps, shoulders - any 3 exercises, 2 sets per exercise 15 to 20 reps; chest, back, quads, hamstrings - any 3 exercises, 3 sets per exercise 15 to 20 reps

Weight: 50% less than training poundages

Protein: Switch half of your protein intake to whey protein to increase branched chain amino acid intake

MONDAY:

Deplete carbs: half of previous day's intake Example: 100 grams becomes 50 grams

All else the same

TUESDAY:

Deplete carbs further: half of previous day's intake Example: 50 gms becomes 25 gms

Cut out added sodium

All else the same

WEDNESDAY:

Carbo Load: 2.5 to 3 times more carbs than typical dieting intake or Saturday's intake Example: 200 x 2.5 = 625 grams

200 x 3 = 750 grams

A 50/50 mix of high glycemic carbs and low glycemic carbs

Water: normal, previous intake as on Sunday Example: 1 gallon

No training

No sodium

THURSDAY

Carbo Load: repeat Wednesday, switch to low glycemic carbs; yams, oats, red potatoes

Water: cut water in half Example: 1 gallon becomes 1/2 gallon

No training

No sodium

Use chromium, alpha-lipoic acid, omega 3's and HCA

FRIDAY

Carbo Load: repeat Thursday, low glycemic carbs

Water: repeat Thursday. May wish to go a little lower for better results.

Light training: 1 set for each body part, 12 to 15 reps; reduce weight by 70%

No sodium

Photos and Coaching

No bodybuilder can get ready for a contest and reach absolute peak conditioning without the help of a coach. When a competitor gets ready for a show, his view of his own physique can become vastly skewed. Frequently, the competitor wrongly believes he is losing muscle or he thinks he is cut when he still has fat to lose. For some reason, a bodybuilder can rarely see of himself what someone else really sees. Therefore, anyone who gets ready for a show should have an objective friend help him in his contest preparations.

When starting a diet, have a friend take a close look at your physique. Do all the quarter turns and perform all the mandatory poses. Do this each week. Your friend should be able to see if you are leaning down, better than you can. If anything looks leaner, stay the course and do not change a thing with your diet or cardio work. I can not emphasize enough how important it is to stay with a program that is working. Too many times, bodybuilders try to speed things up by cutting more calories or by adding in more aerobic work. Fat loss is like muscle building. Both are slow processes. Trying to accelerate fat loss will only cause you to lose muscle, not fat!

If the triceps, or any other body part, appear harder but nothing else does, that is ok. Stay with your current pre-contest program. The fat loss will "spread" to other areas eventually. Once fat loss is set in motion, contest dieting becomes a time game. In time, you will continue to lose fat from all over and eventually get more cut. If you have to accelerate things too much and radically cut carbs and calories, then you probably got too fat in the off season or you just need a longer time to diet to shed all the body fat.

Another great tool to monitor your progress before a contest is to take photos with a good quality camera. Take the photos in the *same* location each week. Different color backgrounds can make the physique look harder or softer and using the *same*

location will make sure the lighting is consistent each week. Look to see if any area on the body appears leaner. If you do not look leaner, then either cut calories by cutting back on your carb intake *or* add more aerobics. Don't do both because you will lose track of what is most responsible for making you leaner; the cardio or the reduction in calories.

Bodybuilding is a visual sport. No judge asks how big is your chest, or what is your body fat, so why rely on body fat measurements? Those who rely on body fat measurements to peak for a show typically end up slightly smooth in appearance. Instead, rely on the mirror, a coach, or photos. If you *look* smooth then you probably *are* smooth. You could have a low body fat reading and still not be ready as numbers can be deceiving.

Get Ready Sooner Than Later

It is important to look like the winner early. It can be the difference between winning and getting 5th place.

If you take twins, completely identical with the same diet, training, rest, and supplement schedule and had one diet for 9 weeks and the other for 12 weeks and both end up weighing 185 pounds with 6% body fat, I can guarantee the twin who took the longer time will look sharper! The longer you are lean and in true contest shape, the harder looking you become. There is something about being lean for a few weeks and training at contest condition that makes you look harder. I can't explain why, but it works for everyone every single time.

Fat slows down the metabolic rate. The more fat you carry, the slower the metabolism. As you lose fat, the metabolism becomes somewhat faster. Training a few weeks at your lowest level of body fat before a show definitely will make you tighter appearing but you must be careful. Training when fat stores are very low can quickly and unexpectedly increase the metabolism and burn off muscle. After all, there is no more fat to use.

Therefore, you may have to eat more carbs to keep from losing muscle mass. It's tough, because most are afraid to eat at this point, fearing they will smooth out. I prefer to drop out or at least drop back on cardio work instead of adding calories.

And it's important to ease back on your training to the final two weeks, not taking sets to failure as "failure training" and other advanced training techniques coupled with low levels of body fat and low energy reserves can cause your body to quickly plummet into an overtraining state making you look flat and washed out.

Diet Logs

I have found that most bodybuilders make better progress when they record the foods they eat, the calories, carbs, protein and fat. I suggest you do the same. A log helps you stay consistent. If you have to write down and record all the food you eat each day, then you will be less likely to skip meals and less likely to over eat.

It also gives you the feedback you need to understand why you are or are not making progress.

Adding Mass

Nutritionally, adding muscle mass first requires you set in motion a cascade of events that stimulates the body to lay down more muscle tissue. Which means, you have to train with progressive overload to cause moderate amounts of trauma to the muscles. Once stimulated the muscles will need ample amounts of both dietary protein and plenty of calories from carbohydrates and to a lesser degree, dietary fat, to support a building process.

Thus, the primary need for the mass seeking bodybuilder is total calories and since glucose from carbohydrates in the main source of fuel for weight training, it makes sense to increase

calories by first focusing on increasing carbs. Recall, carbs, in addition to simply being a source of energy which allows you to work hard enough in the gym to stimulate the muscles in the first place, also induce the release of insulin which is highly "anabolic" in that it "turns on" the glycogen forming machinery within the body and it strongly increases amino acid uptake by muscle cells. That means, a high carb intake which kicks out insulin released by the pancreas is directly responsible for increasing protein synthesis. The more insulin released by virtue of a high carb intake, the greater the protein uptake by muscles. Of course, eating a sky high carbo intake has its drawback. Excess carbs, way beyond what your body needs each day, are also responsible for a build up in body fat stores. Thus, the mass seeking individual absolutely must follow a high carb diet but he has to be careful not eat too many. Carb intake will vary greatly from individual to individual. Referring back to a baseline diet (see pg 144). The mass seeker should increase his carbs by ***25%-50% above his current carbo intake*** as established on page 163. A moderate increase in carbs should provide

* ample fuel to train hard enough using progression to ***stimulate*** growth
* increase insulin output to support protein synthesis
* support the calorie/energy demands of training

Start with an increase of 25% and follow that carb intake for 2 weeks. If you gain 1/2 to 3 pounds, stay the course. If you fail and do not gain any weight in the 2 week period, increase the carbs to 35% above the baseline level for another 2 week period. In the great majority of bodybuilders, this will surely suffice to add 1/2 to 3 pounds. The last step would be to increase the carbs to 50% above baseline levels.

Examples of increased carbohydrate intake in relation to a baseline number are as follows:

If baseline Carb Intake was	Increase by 25%	Increase by 35%	Increase by 50%
200 grams	250 grams	270 grams	300 grams
250 grams	312 grams	337 grams	375 grams
300 grams	375 grams	405 grams	450 grams
350 grams	437 grams	473 grams	525 grams
400 grams	500 grams	540 grams	600 grams
450 grams	562 grams	607 grams	675 grams
500 grams	625 grams	675 grams	750 grams
550 grams	687 grams	742 grams	825 grams

Building mass requires an adequate protein intake. Unfortunately, protein needs, or 'implied needs' have become somewhat skewed over the last few years as much of the anectodal reports for protein intake have come from bodybuilders using anabolic steroids and steroids increase the need for protein while, paradoxically, seem to decrease the need for carbs. In other words, the steroid using bodybuilder can eat more protein than the non steroid using bodybuilder and much of that protein will be incorporated into making new muscle. Furthermore, the steroid using bodybuilder can get by on a lot less carbs than the non steroid user. The most likely reason; steroids modify the chemistry in the body which allows for greater protein turnover and retention-without the usual carbohydrate/insulin push needed with non steroid users. Recall, insulin is a "driver." It pushes aminos and carbs into muscle tissue creating growth. With steroids, the athlete benefits from greater protein uptake. Thus, he has less a need for an insulin "push/drive" created from pounding lots of carbs. The result or advantage the steroid user has is greater protein uptake and less body fat accumulation as he can eat less carbs than one would normally expect.

The other way we establish protein needs is with studies. Most nutritionists seem to recommend roughly .7 grams of

protein per pound of bodyweight. Thus, the 175 pounder would need 122 grams a day. For real bodybuilding, I think those numbers are too low. First, the majority of studies make use of college age athletes. The problem is many "athletes" are not bodybuilders. Assuming the bodybuilder trains harder or more often than the non bodybuilder, you could see where protein requirements would be higher than the college athlete. Simply, the harder you train or the more frequently you train, the more protein you'll need to repair damaged tissue. I also disagree with the common recommendation that the bodybuilder count or "tally up" the protein found in incomplete sources like potatoes, bread, pasta, rice, and vegetables. First, incomplete protein found in non animal sources of protein lack 1 or more of the eight essential amino acids needed for growth. The eight essentials can not be made by the body. Therefore, you have to eat them every day. That's what makes them essential. In other words, it is an absolute must, a requirement, or essential you supply the body with them every day - even if you never touched a weight in your life. Essential aminos are required for life! Therefore, the recommendation of .7 grams of protein per pound of bodyweight seems very low as it takes into consideration the protein found in non essential proteins; in veggies, grains and the small amounts of incomplete protein common to many carbohydrate foods. The hope is that one source of protein, lacking 1 or more of the essential aminos will "lock up" with another source which contains that missing amino acid making a complete protein. Nutritionists call this "complimentary proteins." Complimentary proteins, or counting the protein found in non animal or non essential sources raises an important question. Are complimentary proteins as good as complete proteins? Bodybuilders will likely say "no." In practical terms, is 20 grams of (incomplete) protein found in oatmeal added to 8 grams of (complete) protein found in 1 cup of skim milk the same as 28 grams of (complete) protein found in 6 ounces of chicken? For that matter, is 28 grams of whey or

casein proteins, both complete sources of protein, the same as 28 grams of protein found in 4 ounces of pasta yielding 14 grams of (incomplete) protein mixed with 3 ounces of chicken yielding another 14 grams of (complete) protein. The answer seems clear when we look at it in real world scenarios. Bodybuilders stick with complete protein and should count only complete proteins because they are the raw ingredients the muscles need to build and repair themselves as efficiently as possible. Complete proteins are always superior to incomplete proteins in building muscle mass and supporting muscle repair and growth. And, .7 grams is likely on the lower side-unable to support growth-for the person seeking to add serious amounts of muscle mass and who is engaged in serious training.

For adding mass, you'll need to eat 1 gram of protein per pound of lean body mass as found on page 149. Since super precise and exact numbers may not be of such great concern compared to the dieting bodybuilder, you can simplify things and estimate your protein needs to be:

*1 gram of complete protein per pound of bodyweight

OR

* 1.3 grams of protein per pound of bodyweight

The variable protein intake is typically dependent on your carbo intake. Some who increase their carb intake may get too fat with an increase in carbs and may have to moderate their carb intake to the lower intake, 25% higher than that found in the baseline diet (see pages 163 and 207). If mass building is difficult, you find yourself always struggling to stay lean as you increase your carb intake, you may have to keep the higher protein intake of 1.3 grams per pound of bodyweight. It seems keeping the carbs in check, to a lower amount for a mass seeking bodybuilder, with added protein, is a technique that keeps some individuals leaner.

In terms of protein, the mass seeker, like the dieter, should evenly divide his protein intake into 5 or 6 even servings. He can also benefit greatly by including a protein powders at 2 and

even 3 of his meals, so up to half of his protein intake will come from powders. Powders are easier to absorb than meats which allows better retention leading to potentially better growth - as long as your training is on track. If your not training hard enough to stimulate growth, the body will simply convert the protein into glucose and it will, in turn, be stored away as body fat. Another reason to include powders is to some degree, yet by different mechanisms, whey and casein seem to support the immune system. And, a strong immune system is essential to total muscle recovery.

With carbohydrate timing, those ***struggling to control body*** fat should incorporate the same ***carbo-modifying techniques*** found on pages 153-158. Those who are leaner and who do not readily pack on body fat should simply eat a high carb intake, 25% to 50% higher than that established in the baseline plan and evenly spread the carbs through the day over all 6 meals. Thus, a large bodybuilder eating 600 grams of carbohydrates daily can eat 100 grams at each of his 6 meals. Furthermore, if ***he is a really lean individual, he can choose any type of carb*** he wishes; simple, complex, slow burning or fast burning.

When it comes to mass gaining, the person who struggles to put on nearly fat free mass, or plenty of muscle without blowing up and getting really fat, also has to control dietary fat intake. This individual will have to eat leaner sources of dietary protein such as fat free cheese, egg whites with moderate amounts of eggs-usually 3 or 4 whites for every whole egg, chicken breast, turkey breast and only the leanest cuts of red meat like eye of round steak and flank steak.

The mass seeker who struggles to put on any kind of bodyweight can choose protein sources that are much higher in fat. Sirloin steak, ground beef, ground turkey meat and all parts of the chicken are calorie dense choices as are low fat cheese and low fat dairy products. The person who may fall somewhere in between can eat a mix of lean and not so lean protein

sources. The reason? Dietary fat spares carbs and carbs spare protein. That is, at rest, the body generally calls upon fat from fatty acids as fuel. Next comes carbs and then, to a very small degree, comes dietary protein. Some dietary fat adds to the calorie surplus needed to grow and ***in really lean bodybuilders, additional fat can off set or prevent the body from burning up carbs at rest.*** The benefit is obvious; more carbs are available to be used during training leaving you with lots of muscle glycogen, provided you also maintain a high carbohydrate intake. This, in turn, impacts protein synthesis as the ***greater amount of carbs stored in the muscle as glycogen, the less the body relies on protein as fuel*** which allows protein to perform its intended anabolic job requirement; to build new muscle.

The type of fat you eat also impacts muscle growth. Eating only saturated fat, fats like those found in red meat and eggs, with total disregard for the fats found in fish (omega-3 fatty acids) or flax seed oil or cold processed vegetable oils, can cause a downgraded insulin response. In essence, the more saturated fat you eat, the less sensitive the insulin receptors become located on muscle cells. A high saturated fat diet can "close off" the muscle's ability to lock up with insulin, the anabolic hormone supporting glycogen formation and amino acid uptake by muscles. However, including omega-3's, flax seed oil and cold processed vegetable oils not only supply the body with essential fats that support anabolic hormones such as testosterone, growth hormone and thyroid, they also upgrade or "open up" the receptors for insulin located on muscle tissue which can enhance glycogen formation and amino acid uptake. The benefit of including these fats; repartitioning. Nutrients and energy are encouraged to be stored as muscle fuel or support muscle growth at the expense of supporting body fat storage.

Gaining Weight

There are two catch-22's in bodybuilding. One is how to lose fat without losing muscle. The other is how to add muscle without gaining (too much) fat.

When I first started training, I was under the impression that gains in muscle mass should be accompanied by little or no increases in fat levels. I read the magazines and all the guys claimed to stay in great shape all the time. I would see a photo from one year, and the following year a particular bodybuilder would show great progress. I assumed he stayed in competition shape all the time. Nothing could be farther from the truth. It is ok to gain fat in the off season while trying to add muscle as long as you are gaining more muscle than fat and fat levels do not surpass 12% for men and women 17%. Some bodybuilders train a full year and make little progress while others make big gains. Those who are making the big gains gain more fat than you think. They do not stayed ripped! A rule of thumb is to eat enough calories to feel good and strong so you can generate enough power in the gym to really push each set to failure.

If you are not gaining muscle, first evaluate your training. Look back in your log. Are you slowly using more weight? Maybe you are training too often. Are the sets taken to failure. Are you doing too many sets? Are your workouts the same all the time with no changes in exercise choices or angles. These are some of the important questions to ask yourself.

Next evaluate your diet. Are you consistent? Do you eat 5 to 6 meal a day every single day? Do you eat sufficient protein. Are you using supplements like creatine, BCAA and powders? Maybe you need more calories from carbs or even fat. The point is this. Actively look for reasons why you are not making the progress you want. Don't simply sit around and hope that suddenly things will change and you will make great gains.

Don't haphazardly add a bunch of calories to your diet without first evaluating your log. Doing so may simply

encourage fat storage, not muscle building. Weight gain powders - they are a gimmick, too many calories!

NO CARDIO!

I don't like cardio exercise for bodybuilding. When I tell people that at seminars, I usually irritate someone in the audience who gets angry at me. They say bodybuilders need to do cardio work for the heart. I disagree. First, a low level of body fat that can be achieved with a good diet and hard weight training is the best preventor of heart disease. Anyone who has heart problems or borderline diabetes knows the first bit of advice the doctor gives is to lose some weight! Body fat plays havoc with your body.

In my opinion, no bodybuilder who wishes to gain muscle mass should ever do aerobics in the off season. Weight training is an activity that creates an anabolic state. Aerobic training creates a catabolic state. Weight training will improve and increase the release of anabolic hormones in the body to support growth while aerobic training can counteract this by decreasing the output of these hormones.

A myth in bodybuilding is off season cardio will stimulate the metabolism. Bodybuilders often do aerobic work in the off season in hopes of staying leaner. Dead wrong! First, aerobic activity does not burn as many calories as most believe. However, weight training that adds muscle to the body, causes the body to burn more calories even at rest. Both weight training and cardio work will stimulate the metabolism for a few hours following a workout. However, weight training stimulates muscle breakdown and remodeling. The act of recovery and muscle anabolism, stimulated from hard training, increases the need for calories.

Aerobics taps the recovery process. Recovery entails supplying sufficient calories and nutrients coupled with adequate rest. Anything that throws the body out of its attempt to regain a comfortable resting state will interfere with recovery and growth.

Finally, the bodybuilder will promote strength and growth by tapping the energy system he uses during hard training sessions. The longer (years-not duration of a workout) a bodybuilder trains, the more efficient the body becomes at storing glycogen, resynthesizing ATP, buffering and clearing lactic acid, and firing stronger nerve impulses to promote a more forceful muscle contraction.

Aerobic work stimulates a totally different system; the aerobic pathway. The best way to train for results in any sport is to train the energy system that you will need in your sport. This is called the law of specificity. You wouldn't expect a world class sprinter to practice 10 mile runs to improve his 100 meter dash! Why would a bodybuilder do any activity but lift weights to become a better bodybuilder?

Aerobic training also taps different muscle fibers. Aerobic work uses slow twitch muscle fibers while bodybuilding uses fast twitch fibers. Working the slow twitch fibers will cause an improvement in them at the expense of the fast twitch fibers.

Each muscle is made of both slow twitch and fast twitch muscle fiber. The fast twitch fibers are composed of two types. They are the 2a type and the 2b type. The 2b fibers respond to weight training by becoming thicker. The 2a fibers can respond to either aerobic work or weight training. If you are doing cardio work and weight training, then those 2a fibers, that can respond to either type of training, surely will not favor weight training. Combining cardio and weight training in the off season will cause the volatile 2a fibers to adapt to aerobic training at the expense of becoming thicker, by taking on characteristics of the slow twitch fibers. Weight training by itself will allow the 2a fibers to thicken and be more like the 2b fibers.

Not as Effective As You Think

Aerobics burns calories and it stimulates the body to use more calories immediately following the exercise. Those are two pluses. Let me set the scenario for the negative.

I live along a very flat and sandy beach beach popular to many walkers and runners. If I took a sedentary or mildly overweight female and had her walk/jog the beach for 1 hour, she would burn relatively close to 500 calories in that hour. Now, she continues with the hour every day for eight straight months. With no change in diet how much weight would she lose?

My exercise science books provided me with the information that 3500 calories equals one pound of fat. In order to lose one pound, a person must either consume 3500 calories less food in seven days or expend that amount.

The female working each day on the beach should lose 32 pounds of fat in 32 weeks; one pound a week for 8 months (32 weeks). However, she loses only 20. How could this be?

The way the body adapts to aerobic exercise is to become better at performing the work and more efficient. The female walking/jogging the beach will not consistently expend 500 calories in her daily one hour walk. Over time, the exercise becomes easier and she will expend less calories per hour. This a reason why untrained people can run a marathon with only one year of training. Could you imagine someone looking phenomenal with one year of bodybuilding?

The body adapts quickly to cardio work. You burn less and less calories. Plus, if you are doing cardio work year round, then what are you going to do pre-contest. That's right, you'll be on the bike more than you are in the gym and will probably end up exhausted with little energy to train hard and to keep muscle as a result.

Supplemental Science

A serious athlete will always look for an edge that will provide that little "extra" allowing him to lift more, work harder or recover quicker. It's human nature. Unfortunately, a marketer, one whose very business is nothing more than finding a want or need and filling it, is more than ready to give that athlete what he wants in the form of a pill, drink, powder or mixture and combo of the two.

The desire to meet that need has, at times, lead the sports nutrition industry to weaken its credibility in that there are many companies producing products that are simply a waste of money; their products either don't work or they don't put *into* the product what the label claims! Yet, there are numerous companies making products that are effective and helpful for the athlete and knowing how to incorporate these dietary supplements into your eating and training plan may make a difference in recovery and performance leading to faster gains.

Before diving into which supplements may be helpful, consider that the basic core of a successful athlete's ***total nutrition*** plan is found in the *foods* he eats. Supplements are just as the name implies, ***supplemental*** or something you add to your food intake. They are not intended to ***substitute*** for sound nutritional practices and principles.

Creatine is the wonder supplement of the past 10 years. Creatine is a derivative of amino acids and its used by the body to ***power*** the human machine during high intensity exercise. Bodybuilders like Arnold Schwarzenegger used to chow down up to 5 pounds of red meat a day in the early seventies as he understood red meat made him feel stronger. He was right. Two pounds of red meat yields about 3-4 grams of creatine and three amino acids (arginine, glycine and methionine) common to animal source protein foods can be used to make additional creatine.

The drawback to eating all that meat is the excess dietary fat

and calories which can cause an accumulation of unwanted body fat, so athletes use *supplemental creatine* the calorie-free source of creatine.

Creatine is sort of sucked up by muscle tissue where it is stored and where it can also make another compound called ***phosphocreatine*** (PC), a super energy producing molecule that helps make ATP (adenosine triphosphate).

Creatine is a ***power booster*** in that it is used in explosive skills, like the first 3 reps of a set in weight training or suddenly, with great force, exploding out of the downside of a bench press or squat. The more intensity you generate, the more creatine is called on as a fuel source to supply that sudden and explosive source of energy. The scoop on creatine? It works! Creatine can increase power output [1] delay fatigue[2] and improve recovery.[3]

PC is used to make ATP and it is ATP that is the very end or "last point" in the utilization of carbohydrates and dietary fat. For example, while we say carbs are the main fuel source for weight training, the reality is that carbs provide glucose which in turn, makes ATP, the final energy molecule in anaerobic activity like sprinting and lifting. By keeping higher levels of PC in the muscle, the body can ***more*** readily ***make*** ATP, to continue to fuel a bodybuilder during a workout. When PC levels fall, the body, a marvelous adaptable machine, can still make ATP, but there are a few metabolic steps that must occur which may ***compromise*** the athletes ability to generate energy, leading to fatigue.

Elevated muscle creatine stores, by using supplemental creatine, can increase protein synthesis [4] which encourages muscle recovery and, in turn, by supporting muscle growth, has the possibility to increase the metabolic rate, which would be beneficial to the bodybuilder struggling with creeping levels of body fat.

The amount of creatine required to gain a competitive edge is surprisingly small. Former studies seemed to indicate a 20 gram per day dose for two consecutive days was the way to go

followed by a "maintenance dose" of 5 to 7 grams a day. The collective agreement of both nutritionists and athletes has whittled the dose down, closer to 2 to 4 grams a day for athletes weighting 150 pounds or less and 4-7 grams a day for athletes weighing 151 pounds and up. An ideal time to use your creatine is after your workout session, where creatine and PC has been used to help power your training session. Furthermore, the post training meal is the ideal time to increase your carbohydrate intake as the insulin spike created from eating more carbs not only prevents muscle wasting induced with training but will also enhance the uptake of creatine by muscle tissue.[5] It's probably ***not*** a good idea for most athletes to gulp down a creatine cocktail that may contain upwards to 150 grams of carbohydrates because, for the most part, an athlete can readily obtain a high carb intake simply by eating a high carbo meal (along with protein) in the meal following a training session. Some athletes gulp down the sugar packed creatine cocktail, *then* proceed to eat a large post training meal which boosts their carbo intake so high that some of the carbs are destined for fat storage. If your ***extremely lean,*** give the creatine cocktails that are packed with added sugar a try. If body fat is a concern, simply include creatine with the high carb post training meal. And remember; simple carbs, the refined fiber less carbs like white bread, white rice, mashed potatoes and juice, should comprise at least half of all the carbs you eat after training as simple carbs jack up insulin levels which *immediately* increase protein synthesis and completely retard protein breakdown.

While caffeine is a great aid in helping athletes perform better, it's not a good idea to combine your creatine with your favorite cup of Java as caffeine counteracts the positive effects of creatine.[6]

Glutamine is a "conditionally essential" amino acid. While the layman, the average person, may not require glutamine in supplemental amounts, the athlete is discovering that this amino acid nearly rivals creatine in its benefits. Thus, the word

conditional. Glutamine needs depend on your level of stress and activity

Glutamine comprises more than 50% of all the amino acids floating about in ***amino acid pools,*** reservoir of amino acids that are sort of storage locations that release amino acids into the blood when there is the need for tissue repair or hormone production. Originally, bodybuilders and sprinters began using glutamine before and after training to squelch or neutralize the build up of ammonia, a by product of high intensity exercise. Ammonia is detrimental to muscle recovery and growth so taking supplemental glutamine can help lower the amount of ammonia in the body, indirectly speeding recovery.

Glutamine is used by the body to "feed" the immune system, the body's extensive and intricate defense organization that not only fights off viruses, bacteria and disease but is vitally important in helping an athlete recover from training. A weak immune system, usually a result of an on coming cold, sickness or simply a result of over training, can throw an athlete's body deeper into an overtraining state, impairing performance and destroying muscle recovery. In immune support, the role of glutamine is replenishment and nourishment. Glutamine, which is stored in both the amino acid pools and in muscle tissue itself acts as a "sacrificial lamb." Under stressful conditions, glutamine leaves the muscles, and is sent to the small intestines to support the immune system. This action leaves muscle tissues "under-glutamized," lacking sufficient glutamine. When muscles lack glutamine, muscle growth and repair come to a halt regardless of calorie or carbohydrate intake.[7]

While the body can replenish these depleted levels by obtaining glutamine from protein foods and from a longer process which includes "the making of new glutamine" from branched chain amino acids (also common in all protein foods), the bottom line is the body's ability to ***replenish*** muscle glutamine falls short leaving muscles "empty" which in turn sends the body into a catabolic or muscle wasting state.

Glutamine also enhances the formation of glycogen from glucose. One study showed combining glutamine with a carbo drink after training was better at saturating the muscles with glycogen than using a carbo drink by itself.[8] That study indicated an 8 gram dose should do the trick while previous research had shown a 2 gram dose after training increased levels of growth hormone (GH), the master hormone that spares muscle glycogen while causing a shift in fuel sources so more fat is burned instead of glucose. GH also enhances amino acid uptake by muscle tissue which can facilitate muscle recovery. Yet another benefit of glutamine, and to a lesser extent, creatine, is its ability to keep muscles hydrated or full with water. When muscles become dehydrated, they suddenly fall into a muscle wasting state and glutamine can inhibit this detrimental environment by keeping water ***in*** the muscle.[9] Furthermore, glumamine plays a role in ***suppressing*** *or* lowering the total amount of circulating cortisol in the body.[10] Cortisol is the stress hormone that is released with training, a natural response to heavy exercise. However, ***extreme elevation*** of cortisol levels sets in motion a cascade of events that also sends the body into a catabolic state which inhibits recovery and leads to muscle inflammation.

Branched chain amino acids (BCAA) are three of the essential amino acids, the one's the body requires daily as it lacks the ability to manufacture them. Complete proteins such as eggs, chicken, turkey, meat, dairy and fish contain BCAA.

BCAA are important to the athlete as they serve as a back up fuel reserve when glycogen levels drop. That is, as a work out progresses and an athlete's reserves of glycogen begin to diminish, the BCAA begin to be used as fuel. Clearly, the first goal in an athlete's nutrition program is to maintain glycogen levels with a high carbohydrate diet. However, the reality is athletes, especially those trying to control body fat, are not always training on "topped off" levels of muscle glycogen and day to day training, with emphasis on two-a day workouts often

rapidly deplete reserves of muscle glycogen leaving an athlete at risk of burning BCAA to compensate for inadequate levels of glycogen.

Therefore, low glycogen levels initiate a metabolic flux where BCAA are used as fuel and an athlete who does not eat sufficient protein, will enter a catabolic or muscle wasting state where ***muscle tissue,*** which is literally comprised of a variety of amino acids, is torn apart so the body can obtain BCAA. In a nutshell: when glycogen drops and BCAA are unavailable, the body will get them (BCAA) from tearing apart muscle tissue. A loss of muscle tissue not only decreases power and strength but causes a decrease in metabolic rate which, in turn, can cause an increase in the storage of body fat. Lastly, a loss in muscle typically causes a downshift in the strength of the immune system and when immunity drops, ***glutamine*** is severely tapped as fuel which further accelerates the catabolic process. ***For insurance,*** athletes must not only keep carbohydrates levels adequate, but must maintain a sufficient protein intake as a viable source of BCAA.

-BCAA support Testosterone in distance work

Chronic exercise and long distance work has been shown to shut off menstruation in females and male marathoners often have tetsoterone levels that are lower than the average male. Turns out, BCAA taken an hour and a half before a long distance event may support testosterone levels in men.[11] Fourteen male long distance runners were given a mix of BCAA with 12 grams of casein protein found in milk along with 29 grams of carbs and a gram of fat. All totalled, the drink was 216 calories. Another group was given a drink with 10 grams of milk protein, the same 216 calories and same number of carbs. The sole difference was the BCAA content. The group ***with*** added BCAA showed stable testosterone levels while the group without the BCAA showed a drop in testosterone levels. The importance is that decreased testosterone levels are likely associated with a decrease in recovery and protein synthesis - nutrition jargon for

"muscle building." Leucine, one of the three BCAA has been shown in several studies to slow down protein breakdown in the body. Protein breakdown, or the "usage of protein" as fuel is a hallmark of a catabolic state, the muscle wasting environment that sends an athlete into an overtraining state.

Many bodybuilders will balk when it comes to BCAA because they are more familiar with creatine and vaguely familiar with glutamine. Yet studies supporting the benefit of using BCAA's have been around far longer than both creatine and glutamine. BCAA's are time tested, There are literally hundreds upon hundreds of reputable studies showing their effectiveness.

BCAA's also help mental stamina, an important factor in dieting and training intensity. BCAA can ***displace*** or compete with the uptake of another ***calming and tiring*** amino acid called tryptophan. One phenomena with overtraining is the body can fatigue due to a lack in glycogen or from the increase uptake of tryptophan by the brain during a workout-especially one that is aerobic in nature, like the pre-contest dieting bodybuilder who sits on the stationary bike for 45 minutes, 6 days a week. Tryptophan is a precursor to a chemical messenger in the brain called serotonin and serotonin induces a strong sedative effect on the body. It's postulated that a common cause of fatigue in aerobic work is the shift in tryptophan uptake by the brain which can make the athlete exhausted even if he has adequate levels of glycogen stored to perform physical work. In effect, the athlete attempting to perform interval work, or to train at high levels of aerobic intensity, begins to fade not due to a lack in actual fuel but from the result of a downtrodden tired nervous system resulting from this tryptophan induced state. BCAA's compete with or "block out" the same system that allows tryptophan to make it to the brain so adding BCAA to a pre-workout meal or drink may be a good way for bodybuilders to gain a mental edge during training. Or, taking 5 to 7 grams of BCAA's before your morning cardio work may prevent the energy draining feeling of fatigue. And the harder you can

pedal, free from fatigue, the more calories you can burn.

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For building size or getting ripped up, nothing can replace hard training and proper nutrition. Together, they are the foundation. The most advanced supplement or even anabolic steroids can not replace hard work and consistency.

Supplements are just that. They are supplemental, meaning "added to," or "in addition to" the right training and nutrition program. You can not expect to make any gains with supplements if there is something wrong with your diet or training program. You can't take amino acids and expect to build muscle if you do not eat sufficient protein in 5 to 6 meals a day. You also can't add muscle with amino acids if your training is so wrong that you are not stimulating the muscle correctly in

the first place! If you overtrain, no amount of fancy "anti-catabolic" nutrients will prevent or slow muscle loss.

So, what supplements work? There are a few. I'll review the ones I think have some credence. If I left one out I feel it doesn't work, or it works but is cost prohibitive for most.

PROTEIN POWDERS

To eat 5 or 6 meals a day with protein at each meal can become downright time consuming. The chicken, meat, fish and eggs have to be prepared, or you can include sliced turkey breast, fat free cheese and lean roast beef as a quick alternative. In addition to the prep time, eating all the protein can become boring and even nauseating. Therefore, protein powders are a good alternative saving you time and, for the most part, they taste very good.

Of the many powders today, the two main sources of protein come from casein, the protein common to milk. The other popular powder is whey which is derived from the cheese making process.

While there are some differences among proteins, the most important factor in terms of protein, especially when trying to build mass, is the total quantity of protein consummed each day, as well as the meal frequency. No matter what type of protein powder you choose, if you underconsume protein, you will not build any appreciable muscle mass. Thus, "how much" total grams of protein you eat each day is more important than using powders. And, smaller meals with protein divided evenly through the day helps you maximize protein absorption, limiting gastro-intestinal distress which can aid the muscle building process. That said, there is some debate in regards to which protein is best; casein or whey. A recent study involving overweight police officers had the officers follow a calorie reduced diet over 12 weeks and exercise with weights. Ten officers did not exercise and ate no extra protein, but reduced their caloric intake by about 20%. Another group of 28 officers

ate .68 grams of protein per pound of bodyweight (that's about 136 grams for a 200 pounder) and also followed a calorie reduced diet-again about 20% less total calories than normal. Of these 28, 14 took casein protein hydrolysate and another 14 took whey protein hydrolysate. The results? The diet only group lost 5.5 pounds of fat, gaining no muscle. The whey group lost, on average, 9.2 lbs of fat and gained 4.4 lbs of muscle. The casein group came out on top averaging 15 lbs of fat loss and gaining 8.8 pounds of muscle. Big difference! [1]

Yet another study from McGill University in Montreal, Canada showed whey to reign supreme over casein. This study of 10 men and 10 women each taking either 10 grams of whey twice daily or 10 grams of casein twice daily showed the whey group lost more fat than the casein group and showed an increase in lymphocyte glutathione levels. Glutathione is an antioxidant derived from the amino acids cysteine, glutamic acid and glycine. It's found in the inner part of cells. The theory goes; more glutathione suppresses the activity of free radicals and less free radical activity translates in less sore muscles or better recovery and possibly less muscular fatigue.

Whey protein is a fast acting protein while casein is a slower acting protein. That is, whey is rapidly digested into amino acids while casein is much slower in eventually breaking down into aminos. Some bodybuilders prefer to use whey in the pre-training meal hoping the whey will rapidly enter the blood, immediately sparing the body from using up body protein as fuel. An ideal pre-training combo might be whey protein combined with oatmeal or cream of rye cereal. Slow burning carbs like oats and rye are slowly digested into glucose. Slowing the glucose release into the blood allows a bodybuilder to train a bit longer as slower burner carbs before training are probably better than fast acting carbs (like bread, cream of rice, juice and potatoes) since slow burners, gram for gram, may spare muscle glycogen better than fast burners. Slow burners "stay with you" longer and often make the bodybuilder "feel" better during

training offsetting fatigue. On the other hand, the casein proponents argue the slower acting protein is superior as slow burning proteins allow the body to evenly and consistently obtain the important muscle building aminos from the protein. The slow digesting caseins are commonly referred to as "time release" proteins. The aminos don't all flood the blood stream at once. The argument holds some water as whey, the fast acting protein, does seem to immediately flood the body with protein. The result: some of the aminos in the whey protein end up "unusable" to build muscle because so much protein enters the blood at one time, some of the amino acids are simply burned as fuel, leaving fewer aminos than you think remaining to build and repair tissue. While fast acting aminos are another reason to use whey in the post training meal, when amino acid pools are low and the body needs an *immediate* source of protein to build itself back up, the best solution is probably a middle way, to combine whey and casein together. Thus, you'll get both fast and slow acting proteins.

Whey may be best before training and a mix of mostly whey to casein after training. A 70% whey to 30% casein mix should do. At other times, when your inactive, caseins, the long acting protein, will likely be better or you can use a combo that's 80% casein and 20% whey.

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BRANCHED CHAIN AMINO ACIDS

They are isoleucine, leucine, and valine. As discussed earlier, they serve as the secondary fuel source during training. First carbohydrates are used and when they run low, BCAA come into play.

BCAA are found in your normal every day protein foods. Many bodybuilders use them in capsule form before and after training to ensure that muscle mass is not used for fuel. When BCAA are present in the blood from eating protein or from

capsules, and you train soon after, the body will tap the supplemental or food source of BCAA. If the BCAA are not there, then the body will tap muscle, and break it apart, to obtain BCAA.

When dieting and carbs are reduced by more than 25% and muscle glycogen becomes lowered, the need for BCAA increases dramatically. BCAA also displace serotonin levels in the brain. Serotonin is released from a high carb intake. Serotonin is a messenger in the brain that induces a sedated effect. Dieting bodybuilders can pop a few BCAA in hopes of eliminating this tiring effect before training or when they feel the need for energy.

Low heat whey protein is an excellent source of BCAA. All animal protein contains sufficient BCAA, though milk and eggs are higher in BCAA than chicken, meat, turkey and fish.

When calories are reduced or activity is high, the need for BCAA skyrockets. Even aerobic work can quickly deplete BCAA stores. Studies from Tufts University physiologist William Evans, show 2 hours of moderate aerobic work can deplete up to 90% of stored leucine. Leucine can be used directly as fuel for working muscle. Leucine releases two important hormones; insulin and growth hormone. Insulin drives amino acids from protein and glucose from carbohydrates into the muscle for growth and repair. Growth hormone works to release fat from fat stores so it can be readily tapped for fuel, thereby sparing muscle glycogen and BCAA. Growth hormone also contributes to protein synthesis. A lack of BCAA especially leucine, could prevent the bodybuilder from maintaining the necessary hormones for muscular growth. High BCAA intake also replenished muscle glutamine levels.

A recent study shows the benefits of BCAA. 25 very active wrestlers restricted their caloric intake to approximately 2500 a day (28 calories per kg of bodyweight). Each wrestler kept his calories low for 19 days.

Of the wrestlers, all ate 2500 calories a day. Some consumed a higher protein intake, others a lower protein intake. A third

group followed a moderate protein intake, higher carb diet supplemented heavily with BCAA. Of the three groups all lost weight but the third group, the ones using BCAA held more muscle and therefore lost more body fat then the other two groups. The benefit: this study shows BCAA can save muscle while dieting. As a bodybuilder, if you can save more muscle mass, then you will look more ripped. And, the more muscle you save or hold onto while dieting, the easier it is to burn body fat as the total amount of muscle you carry is the number one influence on keeping the metabolism elevated while calories are reduced. The down side of the study is that the BCAA group used huge amounts of BCAA. About the equivalent of a 80 kg bodybuilder using 30 grams a day - about double of what most bodybuilders would ever use. Off season, try 4 grams before training. Dieting, use 6 to 8 grams before training and 6 to 8 grams after training if you train once a day and 4 grams before aerobics when doing cardio on an empty stomach. If you train twice a day pre-contest, then use 3 to 4 grams before and after ***each*** training session. Smaller bodybuilders, including women, may be able to use a little less.

GLUTAMINE

As discussed earlier, glutamine is a non essential amino acid that comprises 50 to 60% of the total amino acids found in muscle. Bodybuilders use up glutamine in huge amounts during and immediately after hard or long workout sessions in order to squelch the build up of toxic ammonia. When the muscle is worked, it releases ammonia which is detrimental to muscle growth. Glutamine is released into the blood from the muscle to counteract and fight the ammonia. Once glutamine levels in the muscle fall, growth becomes nearly impossible. High muscle glutamine levels are associated with muscle growth.

When glutamine is released from muscle, the body trys to keep the muscle levels high by making more glutamine from other amino acids, especially the BCAA. However, when the

BCAA are resynthesizing muscle glutamine, it takes away from the BCAA job of supplying fuel directly to muscle during training. Thus, another reason to add BCAA to the diet.

When the body is stressed as in training or sickness, glutamine is released from muscle to replenish and support the immune system. The immune system takes precedent over muscle growth. The glutamine must support immunity before it can be stored fully in muscle to aid growth.

Good ways to increase glutamine is to supplement with BCAA, to use a high quality protein powder, to avoid overtraining, and never train while sick or exhausted.

The amino acid glutamine can only increase muscle glutamine levels to a small degree since it is not well absorbed by the body. About 70% of oral glutamine is absorbed. Try using 2 to 3 grams after training to replenish muscle glutamine levels. Pre-contest, when calories drop and activity increases, you'll need a lot more. Those weighing less than 170 pounds will need 6 to 8 grams a day. If your weight falls between 171 and 215, you'll need 9 to 15 grams a day and large bodybuilders carrying more than 215 pounds will need 16 to 20 grams a day, preferably split over 3 servings throughout the day.

KETOISOCAPROATE

BCAA work. However, they also produce small amounts of ammonia. Ammonia is a toxic by product produced when the bodybuilder consumes too much protein or with hard training. Ammonia inhibits performance by interfering with ATP production and glycogen formation. Even though BCAA produce some ammonia, a detrimental compound for the bodybuilder, they (BCAA) save muscle and the net amount of ammonia produced from BCAA is dramatically lower than the total amount of ammonia produced with catabolism. Remember catabolism (muscle loss) occurs when there are insufficient BCAA available and muscle is tapped for fuel or when calories are too low for extended periods of time.

Ketoisocaproate (KIC) is the keto-acid of the most important BCAA, leucine. KIC acts as a strong ammonia scavenger. It accepts ammonia and reduces it to a much weaker acid and prevents muscle breakdown by eventually contributing fuel in the form of glucose. Cattle fed a normal diet with added KIC show a 20% decrease in fat weight with a 15% increase in muscle weight. The popular supplement HMB is actually a derivative of KIC and should render similar results. Of the three, BCAA, KIC and HMB, there are better studies affirming the benefit of BCAA than the other two.

CHROMIUM PICOLINATE

Chromium is a trace mineral that works to increase the efficiency of insulin.

Recall insulin is a double edge sword. It is released from eating carbohydrates and it does two things with those carbs. In moderate amounts, insulin will have a stronger tendency to funnel and drive the carbohydrates consumed towards muscles. If insulin levels are high, the fat storing machinery is turned on and the carbohydrate intake has a greater ability to stimulate fat storage.

You have receptor cites for insulin on both muscle and fat. Chromium increases the muscle cell sensitivity for insulin. When muscle become more sensitive, then the body outputs less insulin, so carbs can be directed towards the muscle, and fat storage becomes lessened.

Many studies have shown that 200 mcg of chromium can aid in a training program by inhibiting some fat storage and encouraging muscle deposition by increasing your muscle's affinity for insulin. Muscle is built at the expense of fat.

This is a mineral that is difficult to obtain even from a "healthy" bodybuilding diet. Sweating, stress, a high sugar diet, and a low fiber diet all deplete chromium levels in the body. Recommended dose: 200 mcg daily.

VANADYL SULFATE

Vanadyl is kind of similar to chromium. Like chromium, it is used to attain more muscle and inhibit fat storing by controlling insulin. Vanadyl works inside the muscle cell. It acts to "draw" circulating carbohydrates into the muscle without the assistance of insulin. If the muscle need less insulin, then there is a lesser chance of carbohydrates to be stored as fat. Dose: 7-15 mgs twice a day. Once at breakfast and with the post training meal.

CREATINE MONOHYDRATE

Creatine monohydrate can increase muscle stores of creatine in the body. Recall from the section on the energy systems, creatine can resynthesize ATP in the body. Both creatine and ATP are an integral part of energy. The energy I speak of is the "bursting' and "power" energy produced and needed for high intensity workouts. Low creatine levels will inhibit optimal ATP production leaving you with less overall energy to have the stellar workouts that really make a difference in adding muscle.

Creatine also seems to drive more fluid into the muscle. This fluid is an advantage. It serves as leverage to push heavier weights and it triggers a still not fully understood "anabolic switch" in the muscle to encourage muscle growth. This trigger is probably nothing more than fluid and blood retained in the muscle from storing more creatine, ATP and blood from good workouts which encourages growth.

A good dose for men is 4 to 7 grams a day taken in the post training meal or 2 to 3 grams for females. Higher doses may cause unwanted water retention and bloating making you look smoother rather than harder. Women are especially sensitive to water retention so a smaller 2 to 3 gram dose is advisable.

BORAGE OIL (see special fats and Ma Huang)

GARCINIA CAMBOGIA is derived from tamarind, a fruit found in Africa and the Middle East. When carbohydrates are

over eaten, the body releases too much insulin which in turn sends a message to certain enzymes to make fat from the excess carbohydrates. Garcinia temporarily interrupts the enzyme ATP citrate lyase. Citrate lyase can form acetyl coenzyme A which will take the extra carbs and store them as body fat.

Another benefit of Garcinia is that it shunts the excess carbs somewhere else; mainly towards both the liver and muscle so glycogen stores stay high. High glycogen stores are helpful in recovery. Try 250 mg of (-) hydroxycitric acid 3 to 4 times a day 20 minutes before a meal. Breakfast and the meal after training have the least tendency to be stored as fat, so take your garcinia before the other 3 to 4 meals where carbs could stimulate some fat storage. If you don't see results, increase the 250 mg dose to 500 mg or even 750 mgs per meal. According to Milos Sarcev, one of the most knowledgeable bodybuilders around, high doses, even greater than 750 mgs per meal are required to see a difference. He recommends 1000-1500 mgs before each of the 3 meals outside of the post training and breakfast meals.

PHOSPHATIDYLSERINE (PS) is a supplement that can potentially off set muscle soreness and improve muscle recovery. It isn't one of the glamour supplements touted by many supplement companies, but it has some science behind it. PS is a phospholipid. It's part of cell membranes, the outer "coating" of all cells in the body including muscle fibers. In the early 1990's scientists in Italy reported athletes taking 800 mgs of PS a day for ten days decreased the release of cortisol after exercise.[1] That's important because less cortisol means less stress to the body which could boost recovery and growth. Other studies not only showed decreased cortisol release, but an improvement in "well- being." Simply stated, those taking PS reported feeling better.[2] Dieting bodybuilders, engaged in daily aerobic sessions and 1 or even 2 training sessions in the gym will likely experience increases in cortisol which could not only affect recovery and even lower testosterone levels, but simply

make an athlete feel like crap. Keeping corisol levels in check by using 800 mgs of PS after training, and as high as 600 mgs twice a day, once after cardio in the morning and another 600 mgs after training later in the day, may help the dieting bodybuilder hold muscle mass.

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L-CARNITINE

Before ephedrine and caffeine became popular fat burning supplements, carnitine was the bodybuilding favorite. Carnitine is found naturally in organ meats and beef and has been used in supplemental form in Europe for over 50 years to treat heart patients with high levels of fat in the blood, the exact scenario leading to heart disease. Introduced in the US in 1986, aerobic athletes start using it to promote greater endurance. Later, bodybuilders began using it as an aid to increase fat burning during pre-competition aerobic work. Carnitine is a catalyst. When the bodybuilder does aerobic work, fat cells are broken down and the fatty acids from the fat cell is transported into the muscle where it fuels the aerobic exercise. Carnitine is the transporter that carries these fatty acids into a special part of the muscle cell (the mitocondria) where they can be burned. Interestingly, when glucose is absent from the diet, insulin levels drop and enzymes responsible for allowing fat out from their (body) fat stores become more activated as do those that participate in the manufacture of carnitine. A popular way to take carnitine has been to use 3 grams 20 minutes before aerobic work. The 3 gram dose has been reported by athletes to increase performance. Athletes in recent studies at University of Tennessee showed greater exercise endurance by using a 3 gram dose. Other athletes report the feeling of greater heat production within the body, perhaps similar to the increased

metabolic effect that comes from using ephedra.

Another recent study showed chicken feed blended with carnitine yielded chickens with more meat and less fat. While researchers could not pin point the reason for the change in muscle and drop in fat in the chickens, we do know carnitine helps the body metabolize branch chain amino acids (BCAA) and helps manufacture ketone bodys. When calories drop in dieting states, the body calls upon fat as fuel and protein to a smaller degree. Specifically, the type of amino acids (protein) that is burning during lower calorie states if BCAA. Thus, it is postulated that taking 3 or 6 grams of carnitine while on a diet, especially one that is low in carbs, will help the body make better use of BCAA, thereby sparing or preventing the body from burning off muscle mass. When muscle is spared, the metabolic rate stays elevated making fat loss easier. Carnitine also helps make ketone bodys. Ketones are by products of fat breakdown and they exert very *strong* muscle preserving qualities. The theory holds that carnitine, by stimulating ketone production - again especially with a lower carb diet - can spare muscle loss. The more ketones the body produces, the less likely muscle will be burned as fuel. While the dieting bodybuilder seems to be using less carnitine than was popular in the early 1990's, I think carnitine is a very important pre-contest supplement that can make you leaner and retain lean body mass.

MA HUANG is an herb that's been used for generations in Indian and Chinese medicine as a tonic and for asthma. "Tonic" simply means it makes you feel good. And it does. Ma Huang is also the herb used to manufacture its drug cousin called ephedrine. Chemically, ephedrine is ephedra, more or less, and it has been slightly altered to "get into" the blood stream faster than Ma Huang. In either case, both are used as fat loss supplements and as a pre-workout "energy booster"

These products increase the metabolism by roughly 10% a

day. That means, the completely inactive person who weighs 175 pounds and may burn about 1900 calories a day can expect to burn off another 190 calories a day simply by using these supplements. That's a pretty good metabolic boost, about the same amount of calories burned in 15 minutes of weight training or during a leisurely 40 minute walk. On the other hand, a small to medium size bagel yields about 190 calories so its equally easy to "put back" another 190 calories by over eating as little as a small bagel each day. That said, ephedra and ephedrine products may work their calorie burning magic by increasing thermogenesis in the body, a fancy hi tech word for heat. The metabolism is akin to a warm engine. The warmer it burns, the greater use of fat for fuel, and the less calories are likely to be stored as fat. Training and eating both boost the metabolic rate by boosting the internal core temperature ever so slightly. Turns out, even small increases in body temperature have a pretty big effect on the metabolism. To get a bigger picture, imagine a person running a fever of 103 degrees over a 24 hour period due to some type of illness or infection. A bed ridden 190 pounder, sick and running a dangerous fever, could expect to see a metabolic increase of 100%, or burn 3800 calories in 24 hours rather than 1900 calories.

So, every time you eat, the metabolic furnace increases which means 5, 6 or even 7 smaller meals totalling 3000 calories will increase the metabolic rate greater than 3 or 4 meals also totally the same 3000 calories. No wonder bodybuilders eat multiple smaller meals through the day as opposed to a few larger ones. More frequent meals increase thermogenesis which, in turn, keeps you lean. Since training increases thermogenesis, it makes sense for the pre-contest bodybuilder in search of a shredded physique to train twice a day, two shorter workouts each day, rather than one longer training session.

Ma Huang also increases neurotransmitters in the brain making you feel alert. Really alert. It's this increase in alertness

that makes it easy for the dieting bodybuilder to blast away on the treadmill first thing in the morning on an empty stomach. Though he's had little to eat, his glycogen levels flat, a small dose of ephedrine can boost those stimulatory neurotransmitters through the roof making 45 minutes of run-and-gun cardio seem effortless.

There's more. Dieting, any kind of caloric restriction, be it a reduction in carbs coupled with an effective cardio training program or the very low carb diet used by endo dieters puts the body at risk of burning off body protein (muscle). Ephedrine products cause a shifting effect, where fatty acids are used as fuel in preference to branched chain amino acids (BCAA). Basically, when calories go down and caloric expenditure goes up, the body will burn fat along with protein. Ephedrine pushes the body to burn more fat or less BCAA/protein. The net effect over time is a leaner body with more muscle. And if you can get the body to hold more muscle, then the metabolic rate stays elevated which burns off even more fat. How effective is ephedrine? I think it is the #1 fat burning supplement, better than synthetic growth hormone in burning fat, certainly less expensive. So, from a cost point of view, it's superior to growth hormone. While not as effective as thyroid hormones in increasing the metabolism, its safer, and arguably somewhat better. The reason; though thyroid hormones increase the metabolic rate, they can, in higher amounts, burn off a lot of muscle. When this occurs, the metabolic rate drops which cancels out the reason bodybuilders may have chosen to take thyroid in the first place. Furthermore, thyroid hormones definitely suppress your own thyroid. Upon cessation, there's a lag time where your own thyroid hasn't kicked back on leaving the post contest bodybuilder with a slower metabolism leading to a rapid, and sometimes alarming, increase in body fat.

Caffeine strengthens the effects of ephedrine and seems to radically increase ephedrine's fat burning effectiveness. Aspirin blocks off prostaglandins, hormone messengers, whose job is to

interrupt the thermogenic effects of ephedrine + caffeine. While some bodybuilders take up to 325 mgs of aspirin a day, the smarter and safer dose would likely be around 200 mgs a day.

The final component to ephedrine, caffeine and aspirin is borage oil, or GLA found within it. Adding 500 mgs of borage oil to a ephedra, caffeine and aspirin mix has been shown to prolong the thermogenic effect by making receptors for norepinephrine more sensitive. Norepinepherine (NE) is termed a "catecholamine" and is increased with ephedrine use. NE stimulates fat cell breakdown and glycogen breakdown and is thought of as the polar opposite to insulin in that it ***liberates*** energy from fat stores and glycogen stores rather than increasing glycogen and fat storage. In fact, obese individuals taking these thermic combos will not see a metabolic boost unless they include borage oil which supplies gamma linolenic acid, an important regulator of heat production within the body.

Okay, the dose. First, know that ephedrine is a stimulant, a strong one that can effect heart rate. Anyone who wants to use these products should do so under doctor supervision and pregnant women, those with high blood pressure, gout, thyroid conditions and diabetes should never use them. That behind us, studies have shown 75 mg along with 200 mgs of caffeine, (about 2 cups of coffee or one caffeine tablet) taken 2 times a day caused pretty serious results in dieting, non active individuals. Dieting groups not using the thermic combo also lost weight - in some cases a lot of weight - but compared to the ephedrine/caffeine group, not nearly as much. I also know quite a few natural bodybuilders who took 150 mgs and 2 cups of coffee along with 100 mgs of aspirin (about a baby aspirin or 1/3 of a regular strength aspirin) and 2000 mgs of borage oil twice a day and got pretty darn ripped. The awful down side is the "crash." Most bodybuilders who resort to using these products to cut up find it really hard to get out of bed without them. Call it dependency. After all, ephedrine is speed like in nature. By the way, I don't recommend those higher doses of

ephedrine.

334 mgs of Ma Huang generally is accepted as being, more or less, the equivalent to 20 mgs of ephedrine. For most bodybuilder, 334 mgs or 20 mgs of ephedrine along with a cup of coffee in the morning should suffice.

CAFFEINE

Caffeine is the drug of choice for the American public at large. And its everywhere. Found in coffee, tea, Diet Coke, Coke, Mountain Dew, Pepsi, over the counter diet pills like Dexatrim and in "wake-me-up" products like Vivarin and NoDoz, caffeine stimulates the central nervous system and makes a person feel less fatigued. Not only can caffeine increase one's ability to focus and concentrate, but it is a proven ergogenic aid- it increases athletic performance, period. And when combined with ephedra or ephedrine, there is a marked increase in one's ability to physically "push" himself, be it finishing off a truly grueling set of heavy-to-failure leg presses or blasting away on a stair master performing all out intervals for maximum caloric expenditure.

Caffeine has been shown to increase endurance in competitive cyclists allowing them to decrease time and exercise for longer periods of time. [1]

How does caffeine work?

There are several mechanisms by which caffeine helps an athlete perform better. Among the first, and often most overlooked, is caffeine's ability to increase mental alertness and therefore influence mood. When an athlete feels more alert, he's likely to express greater self confidence which often allows him to work harder, feel more confident in achieving greater tasks, including physical workloads, which translates into better athletic performance. So great is the mood building effect of caffeine that one sports researcher once told me he thought it to be the key phenomena to caffeine's wide spread use by athletes and non athletes. His example: the banker, the lawyer, the writer

and manager all choose caffeinated beverages, usually a strong cup of coffee, before engaging in mental tasks that often require mental calisthenics and clear thought. His take is that caffeine is a ***motivational drug*** that we all use to help us feel better or at least feel different which changes our mental state providing a 'jump start' to "do more work."

Like ephedrine, physiological dynamics of caffeine use include an increase in catecholamines, also referred to as the "fight of flight" hormones. Catecholamines is a collective name for the hormones epinepherine and norepinepherine released from the brain in times of heavy exercise, during a state of fear- be it real or imagined - and with caffeine consumption. Together the two produce the following internal changes:

- an increase in heart rate
- an increased metabolic rate (total calories burned each hour)
- increased glycogenolysis - the breakdown and use of stored muscle glycogen allowing it to be used as fuel
- Increased lipolysis- the breakdown of fat stores into glycerol and fatty acids - providing fuel for the body.

The benefit for the athlete entails glycogenolysis and lipolysis, depending on his event. The bodybuilder in the gym will benefit from caffeine as it stimulates a breakdown in glycogen making more glucose immediately available. In addition, anecdotal evidence overwhelmingly supports caffeine's ability to increase power output. The bodybuilder can push more aggressively and drive a weight with more ferocity leading to improved performance - you can lift more and do more reps. While much of this benefit is derived from the mood changing effects of caffeine, it's "get up and go!" effect, some research shows caffeine may allow muscles to contract "harder" leading directly to increased power. It's postulated that caffeine can increase the release of calcium from the sarcoplasmic reticulum of skeletal muscle.[2] The sarcoplasmic reticulum is a network of tube-like reservoirs that store calcium within each muscle fiber

and influences the "degree" to how hard a muscle fiber can contract, especially the specialized fast twitch muscle fibers that are involved in anaerobic or high intensity training. Whatever the case, caffeine works and helps magnify the stimulatory effects of ephedra.

The dieting bodybuilder, or the individual who is doing cardio work in the morning on an empty stomach to shed body fat, can benefit from caffeine or a caffeine and ephedra mix. The use of caffeine liberates fatty acids from body fat stores which not only supplies ample fuel for the dieter engaged in aerobics, but spares muscle glycogen. Cardio work relies on a mix of fatty acids and glucose as fuel where glucose is the limiting fuel source. When the body runs low on glucose found in stored muscle glycogen, it becomes very hard to continue to exercise. Thus, caffeine and especially ephedrine and caffeine, kicks up catecholamine release which causes fat cells to release fatty acids which can be used as fuel. This alleviates the burden on glycogen stores; the more fatty acids the dieting bodybuilder can liberate while doing his cardio in preference to glucose from glycogen, the better his performance, the leaner he will become retaining greater amounts of muscle mass. In effect, caffeine and especially a caffeine and ephedra mix saves glycogen stores in the bodybuilder, preferring fatty acids from fat stores as fuel during aerobic work.

The effects of caffeine typically peak within 1-2 hours of ingesting. Thus, the bodybuilder would benefit by consuming his caffeine roughly 1 hour before a workout. The fatty acid mobilizing effects take a bit longer, about 3-4 hours to peak, so the dieter engaging in cardio may see more results by drinking caffeinated beverages 3 hours previous to his cardio. However, due to the need to perform cardio on an empty stomach to maximize fat loss, reality dictates most bodybuilders will have to grab their coffee and be on the bike within an hour. No problem. While the fat liberating effects of caffeine peak in 3 hours, the effects, while in a state of an empty stomach, are

nearly immediate. Another good tip to encourage fat burning while dieting is to include only low glycemic carbs in the meal following cardio. The reason? High glycemic carbs can kick up insulin levels higher than low glycemic carbs. The idea is lower glycemic carbs after your cardio will keep insulin levels in check, allowing the caffeine to continually liberate fatty acids from body fat stores for the 3-4 hour period after consuming the caffeine. The opposite? Higher glycemic carbs are thought to suppress and over ride the fat liberating effects of caffeine. So include low glycemic carbs such as oats, cream of rye cereal, rye bread or yams with your lean protein.

Many studies affirming an ergogenic benefit use doses of approximately 2.5 to 3 mgs of caffeine per pound of body weight. (see chart for caffeine content) The caveat is two fold. First, though millions use caffeine every day, there are potential side effects including wakefulness, appetite suppression, vomiting and dehydration. Second, the body is efficient in its ability to adapt to the stimulating and beneficial effects of caffeine so intermittent use, perhaps once every 3 to 5 days, may be best for improving athletic performance. The same holds true with ephedra. For better results, use these products sparingly.

Approximate Caffeine Content

8 ounces diet cola	22-44 mgs
8 ounces diet Mountain Dew	36 mgs
8 ounces ice tea	80-100 mgs
8 ounces hot tea	80-110 mgs depends on brewing time
8 ounces coffee	130-175 mgs depends on strength
No-Doz or Vivarin	200 mgs per pill

(1) Ivy, J.l., Costill, et al. Influence of caffeine and carbohydrate feedings on endurance performance. Med and Sci in Sports and Exerc. 11, 6-11. (1979)
(2) Williams, JH et al. (1993) Fatigue-induced alterations in Ca2+ and caffeine

sensitivities of skinned muscle fibers. J Appl Physiol 75(2): 586-593.

PYRUVATE

Pyruvate is a natural by product of sugar metabolism (derived from carbohydrate foods). Sugar, or 'glucose', produces pyruvic acid in the body. Supplement manufacturers combine this pyruvic acid with sodium, calcium or potassium to form pyruvate. Pyruvate offers dieters an advantage. Studies show 6 grams a day, combined with 250 mcg of chromium produced markedly better results (more fat loss and more muscle gain) than another group who did not use the supplement, but ate the same amount of calories. Both groups performed the same amount and kind (weight training) of exercise. Pyruvate works in 2 ways. First, it makes it "easier" for muscles to derive sugar from the blood to put it to work. This seems to decrease fatigue and allow you to "work harder." Second, pyruvate produces lactate and alanine, two compounds that can spare the body from burning up its muscle mass during any calorie reduced state. The last thing you want to lose while dieting is muscle as muscle tissue is the most important component in keeping your metabolic rate high!

VITAMINS AND MINERALS

A good encapsulated multi vitamin/mineral should be taken each day. It should supply at least 200% of the RDA for all the vitamins and minerals. The RDA is set for the 121 pound reference inactive female and the 154 pound reference inactive male. If you weigh more, you need more vitamins and minerals. If you are training, you need more, and surely if you are dieting and not eating a wide variety of food, you need more.

Bodybuilders should be getting plenty of antioxidants; 1 to 3 grams a day of vitamin C, 400 iu of vitamin E, and up to 20,000 iu of beta carotene. The antioxidants glutathione, selenium, and N-acytl cysteine, are also helpful in fighting free radical damage. An over production of free radicals from training can damage muscle cells, hamper glucose tolerance, promote muscle inflammation,

and increase cortisol levels. Cortisol is a hormone that acts the opposite of testosterone. It can destroy muscle mass. Taking a good supplement that includes the above antioxidants can reduce the net damaging effects of radicals, and boost the immune system.

'*Pro*-Hormones'

There are 3 supplements that are available at health food stores that are considered hormone pre-cursors. All 3 can increase testosterone levels which, in turn, may increase muscle strength and muscle size. The following *are not* recommended for women.

DHEA This testosterone precursor is produced by the adrenal cortex which sits atop your kidneys. Although it can be converted into testosterone and add to the total amount of testosterone in the body, no one really knows if or how well it works in building muscle. The testosterone boost produced is probably too small to see any real results. Most bodybuilders report ***feeling more energetic*** while using 50 to 100 mgs a day split into 2 doses. 25 to 50 mgs upon rising in morning and another 25 to 50 mgs 2 hours before training.

ANDROSTENEDIONE are closer precursors to testosterone than DHEA and, therefore, can increase testosterone levels higher than DHEA. In fact, a single 100 mg dose taken 1 to 2 hours before training has been shown to boost testosterone levels by up to 300% for a short time (about 2 hours). My opinion is that over a 4 to 5 week period use, men can build more muscle and strength than without having used it. However, there is a caveat. The increased testosterone levels produced by this product may subsequently cause the testes, which make the vast majority of testosterone, to ***decrease*** their production of testosterone. The net effect: the androstenedione continues to increase testosterone levels, but the testes ***compensate*** and

produce less! What happens if you use androstenedione over a long period (more than 8 weeks) and stop? My best guess is your testes will now compensate and produce less testosterone, so it becomes hard to hold and maintain any gains you made using andreostenedione.

TRIBULUS may be the next answer to the off set any chance the testes may decrease their production in testosterone. Tribulus is an herb that increases the amount of lutenizing hormone (LH) in the body. LH is the hormone that governs testosterone production by the testes. When LH is high, testosterone production is high and when LH is low, testosterone production falls. Androstenedione may, in a long use period, cause a decrease in LH which, in turn, causes a drop in testosterone production by the testes. If you are going to use androstenedione to raise your testosterone levels, never use it for more than 4 continuous weeks. Then, follow it up with a 3 week dose of tribulus. Use 250 mg a day the first week, 500 mg the second week and go back to 250 mg the final week. Next, take a full 4 to 6 week break. Use no testosterone precursors before starting their use again.

OVERVIEW: VITAMINS AND MINERALS

Thus far, we have covered the ***macronutrients*** carbohydrates, protein and dietary fat. ***Macro,*** meaning ***large,*** indicates these nutrients are needed in large amounts. And since the body can not make or manufacture carbs, protein and fat from thin air, it's the bodybuilders responsibility to not only consume them each day but to strive to take in the right amounts and, for best performance, to structure a diet that allows for maximal absorption via smaller feeding with more carbs coming in the post training, pre- training and first meal of the day.

Carbs, protein and fat, vitamins and minerals are also found

in common, every day foods. However, the vitamins and minerals are classified as ***micronutrients.*** Although absolutely necessary for good health, they are not required in large amounts. Carbs, protein and fat are measured in *grams* where vitamins and minerals are measured, for the most part in ***milligrams.*** One milligram is only 1/1000 of a gram. While carbs, protein and fat are a source of ***calories,*** vitamins and minerals are not.

Vitamins serve as ***sparkplugs*** that help the body digest, metabolize and absorb the carbohydrates, protein and fat we eat. They work "hand in hand" to derive fuel from ***macronutrients.*** Therefore, ***micronutrients*** could be called "energy producing" nutrients.

The common way to classify vitamins is to group them by their solubility. Some vitamins dissolve or "mix" with water while others dissolve with fat. ***Fat soluble vitamins*** include A, D, E, K and require a special carrier in the blood made from protein in order to move along the watery-like blood stream. The good news is fat soluble vitamins are storable. They can hang around the body for a long time within fat cells or in the liver waiting to be used when the body needs them. The down side is the fat soluble vitamins can also build up in the same fat deposits and eventually be deemed dangerous. So, the uninformed pill popping athlete looking for energy, vitality and endurance in a bottle of vitamins could be making a big mistake in randomly swallowing pill after pill, uneducated to the fact that excessive fat soluble vitamins could be harmful to the body!

The ***water soluble*** vitamins include all those in the B family and vitamin C. They are readily transported in the blood. Some, like B-12, can be stored in tissues, but unlike fat soluble vitamins the water soluble can be easily removed from the body and readily excreted via the urine.

The *amount* of vitamins we need has been determined by the Food and Nutrition board of the ***National Academy of Science.*** Their findings are referred to as the RDA of

Recommended Dietary Allowances. Every five years the board sets new or updated recommendations concerning the amount of vitamins and minerals necessary to meet the "known nutritional needs of all healthy persons." These recommendations are set to cover the full population and are set by determining the ***lowest level*** at which a deficiency occurs and the highest level where harm can occur and a "happy medium" is set from there. The RDA for each micronutrient is high enough above the lower level to prevent deficiency even if the vitamin is not consummed (via foods) every day yet far enough from the highest level to prevent harm.

Before opting for a vitamin and mineral supplement, its imperative that you rely on food sources to obtain as much of the nutrition you need each day. Research scientists are discovering another family of nutrients called ***phytochemicals,*** compounds common to fruits and vegetables that exert healthy and immune boosting effects. The mind set of the pill popping athlete is that he can shun wholesome foods and obtain all the micronutrients he needs through supplemental pills. While, as we will see, supplements hold some promise, they are not *substitutes* for a balanced healthy diet. Eating a variety of grains, fruits, vegetables, and lean proteins such as non fat milk and cheese, fish, skinless chicken breast and even small amounts of lean cuts of red meat will provide the body with a wide spectrum of vitamins and minerals.

PROBLEMATIC GROUPS

There are some groups of athletes who ***should*** add a quality multi vitamin and mineral to their eating plan. ***Dieters,*** those athletes who must monitor total caloric intake in order to create a mild deficit, may fall short on certain vitamins and minerals simply due to a decrease in food consumption. In general , when a person eats less total calories, very often, he is also eating less vitamins and minerals. Furthermore, most dieters

stick to few foods, and eat these same few foods day after day which prevents them from achieving *food variety*. When ever a lack of variety in food choices becomes an issue, rest assure, the person is missing a few vitamins here and there.

Alcohol consumption is reality in this society and commonplace to find even the best athlete celebrating or simply socializing with the use of alcoholic beverages over any given weekend. Alcohol decreases the absorption or the ability to store vitamins A, C, D, B-1, B-2, B-6, B-12 and the minerals folic acid, calcium, magnesium, selenium and zinc.

Oral Contraceptives also decrease levels of vitamins B-1, B- 2, B-6, B-12, folacin, and vitamin C.

Vegetarians who follow a strict vegan diet, one that omits meat and other protein sources may fall radically short in obtaining adequate amounts of vitamin B-12 since this energy building nutrient is only found in animal foods. In some cases, vegans also miss out on iron, the blood building mineral that supports the formation of red blood cells, the energy carrying cells that deliver oxygen to the tissues. There is a never ending controversy regarding vegan diets and sports performance. While many nutritionists may argue that a proper vegan can obtain the nutrition he or she needs to perform, I am of the opposing school. Vegan diets are always low in protein; no matter how many soy beans or rice and beans combos you eat. Recall protein is the nutrient that support the immune system, the core backbone that enables a bodybuilder to *recover* allowing him to train with peak levels of intensity. Vegans also miss out on B-12 and vitamin D as both are found only in animal sources. From an emperical point, I have yet to find a world champion bodybuilder, tennis player, sprinter, basketball player or marathoner who shuns ***all*** meat based foods all the time. ***However,*** I have met athletes who tried, with guidance of professional nutritionists, to opt for a meat free lifestyle and fail miserably. Across the board, they report feeling weaker or less aggressive. Lastly, some studies are confirming lower

testosterone levels in vegan diets as compared with their meat eating counterparts. When testosterone drops, a bodybuilder would likely experience decreases in strength, size and energy.

THE MICROS, WHAT AND WHY

VITAMIN A

SOURCES: Low fat milk, yogurt and cheese, carrots, pumpkin, squash, sweet potatoes, broccoli, peas, kale, collard greens, peppers, spinach, cantaloupe, papaya, peaches, apricots, carrots, liver fish fat.

Vitamin A is a fat soluble vitamin found in animal foods. Vitamin A also has "family members" known as *pre-cursors* which are converted to Vitamin A in the body. While vitamin A from foods or supplements have the potential to build up in the body and become toxic, the precursors ***retinol, retinal*** and the ***carotenoids*** do not. The precursors, unlike A, are found in dark green vegetables, orange vegetables and fruit.

"Eat your carrots" is a common nutritional cliche parents use to coax their children to eat their fill of carotenoids, the pre-cursor that is helpful in supporting visual capacity. Besides supporting eye health, vitamin A supports the immune system by maintaining the lining of the mucous membranes, the gastointestinal tract of the entire digestive system and lungs.

VITAMIN D

SOURCES: Fattier cuts of fish including salmon, sardines, herring, orange roughy or brown tuna, egg yolks.

Vitamin D is required to make dense bones and that's why milk which is concentrated in calcium, is fortified with D. The milk industry adds extra D to most dairy products as D and calcium work together to build healthy bones. Interestingly, sunlight increases the body's ability to make D.

VITAMIN E

SOURCES: wheat germ, soybeans, most vegetable oils**(see page 193), eggs, nuts, sweet potatoes, spinach, molasses
RDA: 10 mgs a day for men 8 mg a day for women

Vitamin E refers to a family of compounds called ***tocopherols.*** Vitamin E is an ***antioxidant.*** It protects the body from potentially oxidative damage incurred with heavy exercise, smoking, stress or from consuming a high saturated fat (fat common to meat and animals) or polyunsaturated fat (oils) diet. One study [12] showed that a mega dose of 1200 mgs a day of vitamin E once per day for two weeks yielded a decrease in ***creatine kinase*** (CK) activity. CK is a marker for muscle fiber injury. Generally, the higher the CK activity, the greater the trauma to a muscle. Speculating, when an athlete has less trauma, then he can recover faster and train harder in following workouts.

Vitamin E, like vitamin C, is considered an antioxidant. While C is water soluble, E is fat soluble. E is required to "fight" the oxidative stress of exercise as well as the oxidation that occurs with a high intake of dietary fat. As far as an aid to the athlete, E has been shown to aid the aerobic trainer [20] by lowering blood lactate and a more recent study with body builders engaged in weight training, given 1200 iu a day of vitamin E, showed a decrease in malondialdehyde-a marker for free radical production.[21] The take home application is higher doses may fight inflammation and lead to better recovery. Another study at the Human Nutrition Research Center at Tufts University found 800 iu a day helped reduce inflammation of damaged tissue in subjects running downhill on a treadmill. I suppose the down hill running could be equated with the "negative" part of a rep. So vitamin E may speed recovery particularly in those advanced bodybuilders who do a lot of negative work.

Higher doses of E (900 mgs a day for 4 months) also have been found to help *non insulin dependent diabetics* uptake glucose out of the blood and into tissue.[22] While a bit of a stretch, vitamin E may also help, in an unknown way, to improve glucose uptake in athletes similar to glutamine.

THE B FAMILY

B vitamins function as enzymes in the body. More specifically termed ***co-enzymes,*** B vitamins aid in the production of ATP, the body's main unit of fuel. Essentially, foods yield fuel in the form of calories from carbs, protein and dietary fat and B vitamins act as "middle men" helping the body obtain ATP from carbs and fat and to make use of the building blocks of protein called *amino acids.*

VITAMIN B-1 (Thiamine)

SOURCES: whole grains, meat, legumes, fish, green vegetables, fruit, milk

RDA: .5 mg per 1000 calories with a minimum of 1 mg

• Bodybuilders need: 5 to 10 mgs daily •

B-1 helps the body make use of carbs and protein. B-1 is converted into its active form called *thiamine pyrophoshate* (TPP) where it helps metabolize carbs. Interestingly, the same TPP serves as a co-enzyme so the body can use branched chain amino acids for fuel. If an athlete is eating a carbo surplus, it's TPP that helps out in using those carbs and if the same athlete falls short in his carbo intake, BCAA come into play as a back up fuel source - with the help of TPP which makes it possible for the body to burn the protein (BCAA) as fuel.

One study with very high amounts of thiamine (900 mg/day) showed an improvement in anaerobic threshold, blood lactate and recovery heart rates after maximal stationary cycling[16].

Some smaller female athletes who consume less than 2000 calories a day may fail to obtain sufficient B-1 so a supplement providing 1 mg would be helpful. Most athletes eating a high calorie diet providing a variety of food will be able to obtain a an adequate amount of B-1. Some ***younger*** athletes who opt for refined and nutrient-less carbs such as soda, cakes and other junk foods may also fall short. They should be encouraged to change their eating habits before vying for a supplement.

VITAMIN B-2 (Riboflavin)

SOURCES: low fat and non fat milk, yogurt, cheese, meat,

vegetables and fortified cereals.
RDA: .6 mgs per 1000 calories with a *minimum* of 1.2 mgs.

• Bodybuilders need: 5 to 10 mgs daily •

Riboflavin is equally as important as B-1 with regards to turning your food into usable fuel. B-2 is changed or *converted* into not one but two co-enzymes, *flavin mononucleotide* (FMN) and *flavin adenine dinucleotide* (FAD). FMN and FAD are used to burn all three macronutrients; carbs, fats and amino acids from protein. In general, athletes can get all the B-2 they need from a well balanced diet. Yet again, of special concern are small athletes who eat less than 2000 calories a day, dieting bodybuilders who want to get "ripped" and restrict food intake in relation to their total energy output, or young athletes who eat an unbalanced diet.

VITAMIN B-3 (Niacin)

SOURCES: Fortified cereals, legumes, meat
RDA: 19 mg a day for men 15 mg a day for women

• Bodybuilders need: 50 to 100 mgs daily •

Like B-1 and B-2, niacin is converted into coenzymes *nicotinamide adenine dinucleotide* or more easily referred to as "NAD" and *nicotinamide adenine dinucleotide phospophate* or "NADP" . It helps transform food into energy and is needed for growth and for the production of hormones.

VITAMIN B-6 (Pyridoxine)

SOURCES: meat, fish, eggs, legumes, fowl
RDA: 2 mg per day for men 1.6 mg per day for women

• Bodybuilders need: 10 to 20 mgs daily •

Like all B vitamins, vitamin B-6 is converted by the body into the its coenzyme form called *pyridoxal-5'-phosphate,* or PLP. PLP is vital in amino acid and protein metabolism and also participates in the the breakdown of glycogen into glucose and is involved in over 60 metabolic reactions in the body. Problem is, some studies show athletes may not be getting their fair share of B-6. One study showed college male athletes consumed only 69% of the RDA [14]. Others show females also come up short in

regards to B-6 status.[15] Interestingly, one study showed B-6 could increase growth hormone output after maximal exercise.[17] Growth hormone (GH) is the master hormone in the body that regulates hundreds of other reactions. One benefit of increase GH output is a metabolic shift where fatty acids are used as fuel, sparing glycogen reserves. This shift allows an athlete to train harder and longer without depleting his limited reserves of glycogen. The other benefit of GH is that it speeds muscle recovery and causes a mild build up in body protein, making an athlete more muscular.

VITAMIN B-12 (Cobalamin)

SOURCES: The sole sources of B-12 are animal foods so vegetarians or those who follow a low protein diet will likely miss out on this essential B vitamin.

RDA: 3 mcg per day

• Bodybuilders need: 20 to 50 mcg daily •

B-12 is needed for growing cells and cells that have a rapid rate of turnover. Bone marrow, red blood cells and those in the gastrointestinal tract are in a continual flux where old cells die off and are replaced with new ones - that's where B-12 helps out. A deficiency could result in anemia causing a loss in energy and extreme fatigue. Because of B-12's crucial role in the manufacture of red blood cells, the cells that deliver oxygen to tissues, supplementation *may* enhance the body's ability to deliver oxygen and improve endurance levels.

FOLATE

SOURCES: uncooked green leafy vegetables, legumes, egg yolks

RDA: 400 mcg a day

• Bodybuilders need: 600 to 800 mcg daily •

Folate is yet another B vitamin that, as a coenzyme plays a role in regulating amino acid metabolism in the body. Deficiencies, which can lead to anemia, are common as many athletes fill up on lean proteins like fowl, meat and fish and eat copious amounts of energy producing carbs such as potatoes,

pasta or rice, yet fail to include sufficient fresh vegetables. Ironically, in a zeal to control body fat by reducing dietary fat, many athletes forego all egg yolks in an attempt to control fat calories yet egg yolks are one of the better sources of folate. Some studies show athletes may not be getting the required amount of folate.[23]

BIOTIN

SOURCES: liver, sardines, egg yolks, soy beans, meat
RDA: 100-200 mcg a day (no definitive RDA recommendation for this nutrient)

• Bodybuilders need: 200 mcg daily •

Helps metabolize carbohydrates, protein and dietary fat.

VITAMIN C

SOURCES: peppers, broccoli, oranges, tomatoes, cantaloupe, strawberries, cauliflower, cabbage, brussel sprouts.
RDA: 60-70 mgs daily

• Bodybuilders need: 1000 mgs daily •

Like B vitamins, Vitamin C is water soluble. It does not stick around for a long time as the body lacks the ability to hold onto it for longer than a day. C is required to make collagen, the connective mix that comprises skin, ligaments and connective tissue. As an antioxidant, it protects the athlete from "oxidation," the complicated process akin to internal "rusting" within the body. Essentially, all-out exercise produces free radicals inside the body that, left unchecked, damage the body. C binds with these "oxidants" rendering them harmless and C also feeds internal antioxidant enzymes that are the second line of defense which also neutralize the damaging effects of oxidants.

Vitamin C may also aid in recovery by reducing the amount of cortisol in the body, the stress hormone that, among other things, tears down body protein (muscle), and in extremely elevated amounts can decrease testosterone levels in men. Lowered testosterone levels is associated fatigue and can exert a negative effect on energy output and strength. A study with

weightlifters showed 1000 mgs of vitamin C a day during intense training lowered the total amount of circulating cortisol in the body.[18] Another study involving endurance athletes showed those who consummed 2000 mgs of vitamin C showed a 11% decrease in oxidative stress after exercise in the recovery period.[19] While the high dose of C did not cause the athletes to perform better, it did contribute into better recovery after the athletic event.

BETA CAROTENE

SOURCES: carrots, green leafy vegetables, apricots, cantaloupe, winter squash, tomatoes, grapefruit.

RDA: 800-1000 RE's

Beta Carotene, along with vitamins C and E are the "big 3" antioxidants. Beta carotene is the "non toxic" form and precursor to vitamin A. While A is essential for among other things; normal vision, healthy skin and mucous membranes, cell growth and supports the immune system, it's a fat soluble vitamin that gets lodged in fat cells and can potentially build up to toxic levels in the liver. Beta carotene can be readily converted into vitamin A with no known toxic effects.

While the research is not definitive and conclusive as to what degree *larger* amounts of C, E and beta carotene can effect performance, the consensus is that a *lack* in these nutrients *negatively* effects performance.

THE MINERALS

The macronutrients, your carbs, protein and dietary fat are pretty easy to obtain simply by eating plenty of food. However, the ***quality*** of the food you choose can determine whether you will get the ***micronutrients*** you need to be healthy; vitamins and minerals. While both vitamins and minerals are grouped as micronutrients, in that they are needed in far smaller quantities than carbs, protein and fat, they are essential and it's the athletes job to eat a wide enough variety of foods to provide the body with all the micronutrients he needs to perform and

recover from athletic activity.

Calcium, magnesium, phosphorous, potassium and chloride are the more abundant and important of the minerals and a diet that is very low on even a ***single*** mineral, sets in motion a cascade of events that disturbs the balance of other mineral in the body.

CALCIUM

RDA: 1000-1200 mgs a day to age 24; 800 mgs thereafter

Calcium is necessary in the formation of strong bones and teeth. No less than 99% of all the calcium in the body can be found in these two areas, with only 1% found in the blood. While the body is growing, in child hood years and in pregnancy, the body requires more and absorbs more calcium.

Bones are always under constant change where calcium continually moves in or out of them and healthy dense bones later in life are largely a component of total calcium intake and physical activity in the childhood and teenage years. Smoking, drinking alcohol, diet soda and coffee all rob the body of calcium by either preventing absorption or increasing the excretion of calcium out of the body.

MAGNESIUM

SOURCES whole grains, legumes, oats, soybeans, seafood.

RDA: 350 mgs daily

Magnesium is one versatile mineral forming part of over 300 vital enzymes as well as comprising part of your bones. Magnesium is required to utilize muscle glycogen, to activate protein synthesis, for muscle contraction and for ATP synthesis. And it is involved with all reactions that require vitamin B-1. The majority is stored in bones as a reservoir to be sent to the blood in times of bnimes of need.

How's this for versatility. Magnesium has been shown to prevent muscle cramping in amounts of 500 mgs a day [24]. Another study showed it to increase strength in amounts of 560 mg a day.[25] A third showed it could increase endurance. [26]

PHOSPHORUS

SOURCES: animal proteins; meat, fish, eggs, fowl dairy products.
RDA: 1200 mgs a day, 800 mgs 25 and older

In addition to supporting strong bones and teeth, phosphorus is important for growth, maintenance and repair of all the tissues in the body by contributing to protein synthesis and the burning of blood glucose as fuel. The B vitamins require phosphorus so they can be activated to help make use of carbs protein and fat. In this sense, phosphorus could be considered a limiting factor in obtaining the fuel the body needs from carbs and fat. There are no studies reporting well fed athletes are or often become deficient in this mineral.

POTASSIUM

SOURCES: lean cuts of meat, low fat dairy products, potatoes, bananas, orange juice, fruit.
RDA: None

Potassium, like magnesium is a pretty flexible mineral in that it aids in muscle contraction and it not only helps form muscle glycogen but assists in liberating glucose from glycogen stores during activity. To a lesser degree, it plays a role in protein metabolism. Since potassium is stored ***within*** cells, there has been some speculation that, like glutamine and creatine, potassium helps draw water ***into*** cells and a hydrated cell seems to set off or promote an ***anabolic*** environ ment that could potentially facilitate muscle recovery. Many bodybuilders take 500 to 1000 mgs a day as potassium is fairly easy to get from natural foods and many meal replacement powders are fortified with potassium.

CHLORIDE

SOURCES: Chloride is a component of table salt in sodium *chloride* and also found in animal source protein foods and vegetables.
RDA: None set

Not much glamour here. Chloride is a component of hydrochloric acid the stomach's digesting agent that breaks down food into smaller particles.

IRON

SOURCES: meats and vegetables

RDA: 10-15 mgs daily

Iron is required for energy production and is part of the proteins called ***hemoglobin*** and ***myoglobin.*** Hemoglobin carrys energy producing oxygen in red blood cells while myoglobin is the iron storage cite located in muscle tissue. One of the most common nutrient deficiencies in women is the lack of iron in the diet or low levels within the body. During menstruation, large quantities of blood are lost along with the iron found in the hemglobin. Iron deficiencies lead to weakness, fatigue and compromised athletic performance.[27]

Iron can be difficult to absorb and not all iron is the same. There are two types; ***heme iron*** and ***non heme iron.*** Heme iron is found in animal foods and is much easier to absorb than non heme iron, which is found in vegetables and fruits.

Further complicating iron balance is the consumption of caffeine found in tea, coffee and many diet drinks. And while it's always a sound nutrition practice to consume plenty of vegetables, eating *too many* may actually cause the excretion of iron. This scenario would be problematic for the dieting female bodybuilder who loads up on vegetables in an attempt to "feel full" and control calories and skips red meat, the best source of iron, due to its higher fat content. Interestingly, while spinach, the popular source of iron for comic book hero. Popeye, is a good source of non heme iron, it contains ***oxalic acid*** which actually decreases the absorption of iron! 3 tips for iron consumption:

1) Eat red meat, preferably daily. Red meat is the premier source of heme iron and there are many cuts, such as eye of round steak, flank steak, and round steak that are low in fat so the calorie conscious bodybuilder can feel comfortable in obtaining the energy producing iron required.

2) Combine heme and non heme sources. When red meat, even a very small quantity, is combined with vegetables, the heme

iron in the meat ***increase the absorption*** of the non heme source found in the vegetables.

3) Cook Iron foods with C. Vitamin C causes the stomach to secrete acid and iron is better absorbed in a more acidic environment. Tomatoes, lemons and oranges will help you get the most mileage out of your iron rich foods.

ZINC

SOURCES: red meat, seafood, oysters, chicken

RDA: 15 mg a day form men 12 mg a day for women

Although zinc is not needed in daily amounts of greater than 15 mgs, it's a key mineral as it plays a role in more than 100 vital body enzymes. Though its of great importance, athletes often fail to get enough [28] Worse, since may become depleted in athletes undergoing vigorous activity. [29]

Testosterone levels in men are regulated, in part, by zinc. So, low levels of zinc in the body may have an effect on a male athlete's ability to produce testosterone, the muscle building hormone that's intricately involved in promoting total body recovery from training. A recent development in sports nutrition heralded the combination of zinc and magnesium as a potential strength builder and hormone booster. The zinc-magnesium complex called ZMA (30 mgs zinc, 450 mgs of magnesium and 10.5 mgs of B- 6) was used by 27 football players over a 8 week period. Twelve used the ZMA, 15 did not. Strength increased by 12%-18% in the ZMA group and only 5%-9% in the group not using the ZMA complex.[30] Furthermore, increases of 32% to 34% in testosterone were seen in the ZMA group with IGF-1 levels increasing by a moderate 4%.[31] IGF-1 along with testosterone are critical hormones that support muscle building while inhibiting the accumulation of body fat. While the 4% jump in IGF-1 doesn't sound so impressive, those not taking the ZMA experiences an average drop of 22%.

COPPER

SOURCES: shell fish, organ meats, legumes

RDA: None. Safe recommended levels are 1.5 to 3 mg a day

Copper, though a "less glamorous" mineral, is required for energy production and helps in forming red blood cells. A deficiency can lead to red blood cells that have an abnormal or shortened life span. Copper is also part of *superoxide dismutase,* the body's most potent internal scavenger of free radicals. While most adults meet the daily need for copper, one study did show competitive swimmers lacked adequate copper after several months of training.[32] Perhaps due to excretion, or poor eating habits. One could assume bodybuilders in hard training miss out on this nutrient.

CHROMIUM

SOURCES: broccoli, oysters, liver, mushrooms, potatoes

RDA: None. Recommended dose is usually 50- 200 mcg a day.

Chromium participates in the utilization of glucose from carbohydrates. The theory holds that chromium makes muscles tissue more reactive to the anabolic hormone called insulin, the carbohydrate and amino acid storing hormone that is released in response to carbohydrates or a combination of carbohydrates and protein. This increase in "glucose tolerance" or an improvement by muscles to "make use" of insulin is supposed to translate into greater gains in muscle mass and less body fat.

Initial studies showed football players engaged in weight training, using 200 mcg of chromium for 40 days increased their body mass (muscle) greater than those who did not take chromium.[33] However, later studies by other researchers failed to confirm Evans work. Interestingly, one study similar to Evan's showed a significant increase in muscle mass by females but not by males. [34] To speculate, chromium is not a mineral that's all that easy to get via food intake,- at least in the amounts (200 mcg) used in the studies. And since profuse sweating, a common trait with athletes, causes the excretion of chromium, adding a supplement may be helpful.

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2 WEEK TRAINING AND NUTRITION JOURNAL

Weight Training Journal

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Short term goals equal long term results!

Nutrition Journal

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Weight Training Journal

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What Your Mind can conceive, your body can achieve

Nutrition Journal

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Today's goal is to duplicate yesterdays' workout

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There's always enough time to train

Nutrition Journal

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100% effort = 100% results

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1 set is 100% better than doing nothing

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A quitter never wins

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Winning is doing your best

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It doesn't take great genetics to grow. It takes determination.

Nutrition Journal

Week: _____ Day _____ Date: ___/___/___

MEAL	FOOD CHOICES	CALS.	CARBS	PROTEIN	FAT
1					
	MEAL TOTALS →				
2					
	MEAL TOTALS →				
3					
	MEAL TOTALS →				
4					
	MEAL TOTALS →				
5					
	MEAL TOTALS →				
6					
	MEAL TOTALS →				
	GRAND TOTALS				

Weight Training Journal

Date _____/_____/_____

BODY PART	EXERCISE	WARM-UP	SET #1	SET #2	SET #3
		( )	( )	( )	( )
		( )	( )	( )	( )
		( )	( )	( )	( )
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If you are doing the best you can, you can't fail.

Nutrition Journal

Week: _____ Day _____ Date: ____/____/____

MEAL	FOOD CHOICES	CALS.	CARBS	PROTEIN	FAT
1					
	MEAL TOTALS →				
2					
	MEAL TOTALS →				
3					
	MEAL TOTALS →				
4					
	MEAL TOTALS →				
5					
	MEAL TOTALS →				
6					
	MEAL TOTALS →				
	GRAND TOTALS				

Weight Training Journal

Date _____/_____/_____

BODY PART	EXERCISE	WARM-UP	SET #1	SET #2	SET #3
		( )	( )	( )	( )
		( )	( )	( )	( )
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The hardest exercises are the most productive

Nutrition Journal

Week: _____ Day _____ Date: ____/____/____

MEAL	FOOD CHOICES	CALS.	CARBS	PROTEIN	FAT
1					
	MEAL TOTALS ➞				
2					
	MEAL TOTALS ➞				
3					
	MEAL TOTALS ➞				
4					
	MEAL TOTALS ➞				
5					
	MEAL TOTALS ➞				
6					
	MEAL TOTALS ➞				
	GRAND TOTALS				

Weight Training Journal

Date _____/_____/_____

BODY PART	EXERCISE	WARM-UP	SET #1	SET #2	SET #3
		( )	( )	( )	( )
		( )	( )	( )	( )
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		( )	( )	( )	( )

Show me a bodybuilder who hates to squat and I'll show you a weak pair of legs

Nutrition Journal

Week: _____ Day _____ Date: ____/____/____

MEAL	FOOD CHOICES	CALS.	CARBS	PROTEIN	FAT
1					
	MEAL TOTALS →				
2					
	MEAL TOTALS →				
3					
	MEAL TOTALS →				
4					
	MEAL TOTALS →				
5					
	MEAL TOTALS →				
6					
	MEAL TOTALS →				
	GRAND TOTALS				

Weight Training Journal

Date _____/_____/_____

BODY PART	EXERCISE	WARM-UP	SET #1	SET #2	SET #3
		( )	( )	( )	( )
		( )	( )	( )	( )
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People fear car crashes and plane crashes but still succumb to crash diets.

Nutrition Journal

Week: _____ Day _____ Date: ___/___/___

MEAL	FOOD CHOICES	CALS.	CARBS	PROTEIN	FAT
1					
	MEAL TOTALS →				
2					
	MEAL TOTALS →				
3					
	MEAL TOTALS →				
4					
	MEAL TOTALS →				
5					
	MEAL TOTALS →				
6					
	MEAL TOTALS →				
	GRAND TOTALS				

Weight Training Journal

Date _____/_____/_____

BODY PART	EXERCISE	WARM-UP	SET #1	SET #2	SET #3
		( )	( )	( )	( )
		( )	( )	( )	( )
		( )	( )	( )	( )
		( )	( )	( )	( )
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Heavy weights always cause more growth than lighter weights

Nutrition Journal

Week: _____ Day _____ Date: ___/___/___

MEAL	FOOD CHOICES	CALS.	CARBS	PROTEIN	FAT
1					
	MEAL TOTALS ➡				
2					
	MEAL TOTALS ➡				
3					
	MEAL TOTALS ➡				
4					
	MEAL TOTALS ➡				
5					
	MEAL TOTALS ➡				
6					
	MEAL TOTALS ➡				
	GRAND TOTALS				

Nutrition Journal

Week: _____ Day _____ Date: ____/____/____

MEAL	FOOD CHOICES	CALS.	CARBS	PROTEIN	FAT
1					
	MEAL TOTALS ➡				
2					
	MEAL TOTALS ➡				
3					
	MEAL TOTALS ➡				
4					
	MEAL TOTALS ➡				
5					
	MEAL TOTALS ➡				
6					
	MEAL TOTALS ➡				
	GRAND TOTALS				

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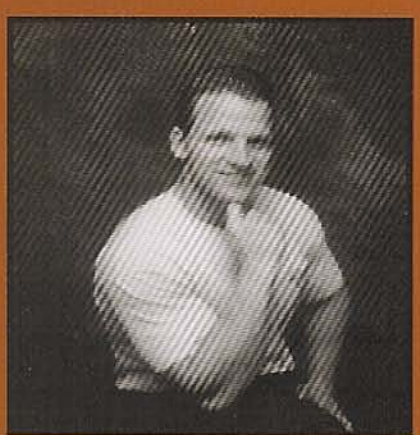
Night Of Champions Winner



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