

*"Learn which diet supplements work and which are no more than marketing hype..."*

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# DIET SUPPLEMENTS REVEALED



by  
**William D. Brink**

Will Brink solves the supplement puzzle.

*"It's the definitive guide to over twenty of the most popular diet supplements on the market today."*

**Third Edition**

An Internet Publications Book



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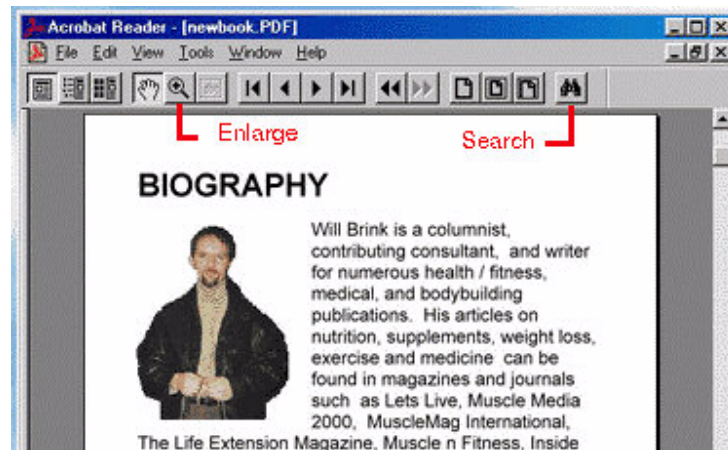
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## HOW TO USE THIS BOOK



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## DISCLAIMER

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## **BIOGRAPHY**



Will Brink is a columnist, contributing consultant, and writer for numerous health / fitness, medical, and bodybuilding publications. His articles on nutrition, supplements, weight loss, exercise and medicine can be found in magazines and journals such as Lets Live, Muscle Media 2000, MuscleMag International, The Life Extension Magazine, Muscle n Fitness, Inside Karate, Exercise for Men Only, Oxygen, and the Townsend Letter For Doctors.

Will Brink is the author of the book "Priming The Anabolic Environment: A practical and Scientific Guide to the Art and Science of Building Muscle", and a consulting Sports Nutrition Editor for Physical magazine.

Will graduated from Harvard University with a concentration in the natural sciences, and is a consultant to major supplement companies.

He has served as an NPC judge and as a Ms. Fitness USA judge. A well-known trainer, Will has helped many top level bodybuilders through all facets of pre-contest and off-season training. He has also worked with athletes ranging from professional golfers, fitness contestants, and police and military personnel.

His articles and interviews can be found on many Internet web sites (including [www.LEF.org](http://www.LEF.org), [QFAC.com](http://QFAC.com), [MotherNature.com](http://MotherNature.com), [Medlean.com](http://Medlean.com), [Testosterone.net](http://Testosterone.net), [Hairloss-Research.org](http://Hairloss-Research.org), [ThinkMuscle.com](http://ThinkMuscle.com), [MuscleMonthly.com](http://MuscleMonthly.com), as well as many others including his own site [BrinkZone.com](http://BrinkZone.com)).

Brink has co-authored several studies relating to sports nutrition and health found in peer reviewed academic journals.

His monthly column on supplements, "The Intake Update" is one of the most popular sections in MuscleMag International.

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## **DIET SUPPLEMENTS / WEIGHT LOSS NUTRIENTS REVEALED**

*By Will Brink © 2000, 2001, 2002*

### **Introduction**

This ebook provides concise, accurate, and unbiased information on the most popular weight loss nutrients currently on the market. More important perhaps, this booklet also looks at the “real world” results of using these products. What does “real world” actually mean? As a well known writer, trainer, and speaker, I have a unique position to see what actually works or doesn't work in peoples every day lives. That is, I look for what works in the real world in real people.

We all know piles of studies come out every year that make some new product seem like the best thing for weight loss ever invented, yet turns out to be a big disappointment to the average person using the product. This can be due to many factors, some of which are known and some of which are unknown. So, I have separated what the research has to say about a certain product and what the real world users say about each product listed.

I get literally thousands of emails, letters, or first hand accounts, from people who use various weight loss products, and I'll let you know what works in the lab and what works in the field. The average scientist would cringe and object to putting feedback from users in the same league with clinical research, but in the end, the average person does not care about the science. They just want to know “does this stuff really work?” when they plunk down their hard earned cash at the local health food store.

There is no lack of information on weight loss products, either on the internet, in magazines, or books, but the amount of accurate and unbiased information can be counted on one hand, maybe just a few fingers! I have built my reputation (and fair share of enemies) by telling it like it is.

I have broken each nutrient into easy to read sections and have made all attempts not to put you to sleep with overly technical jargon. The sections are:

- What is it?
- What is it supposed to do?
- What does the research have to say?
- What does the real world have to say?
- Recommendations.

**"What is it?"** will explain briefly what the compound is made of, where it comes from, and other pertinent information.

**"What is it supposed to do?"** will cover what a nutrient supposedly does and how it achieves the effect, assuming it has an effect. Far too many people pop things in their mouth without having a clue what it is or how it works. People should always have at least a rudimentary understanding of how a nutrient works and what contraindications may exist.

**"What does the research have to say?"** will briefly look at the studies, if there are any, and sum up the research on a particular nutrient or formula where applicable. My feeling was that the vast majority of people reading this e-book would be curious to know what studies have been done on a particular nutrient,



but probably don't want to read all the details of each study. That's what you have paid me to do!

**“What does the real world have to say?”** will sum up what people have said about their experience with each product. This section is a combination of the feedback I have received over the years and my own first hand experience with the many people I have worked with. Of course, there's no particular formula or hard science behind this section but many readers may find it the most useful part of the e-book.

**“Recommendations”** will of course summarize the potential pros and cons of all the sections and give no B.S. advice on whether a product is worth using. This will all be done in an easy to read, reference style that does not require a Ph.D. in biochemistry to understand. The intent of this e-book is not about volume per se, but about quality of information.

In fact, I have had a few readers comment that a few chapters could be longer. It's funny, but people all too often judge the worth of the information by sheer weight or size, not quality.

This assumption, that volume is what dictates quality, is of course sheer folly. Assuming your goal here is to lose fat – that has to be a fairly reasonable assumption in this case, right? And assuming that I could wrap up the exact strategy you need to follow to achieve the precise body fat level you desire and jot them down on a scrap of paper and mailed it to you, would you care that I didn't send you something the size of War and Peace?

As long as what I sent helped you achieve what you wanted, then the answer has to be "of course not!".

In this ebook you will find exactly what you have been promised... Concise, unbiased, and accurate information on achieving your goals of fat loss.

My goal with this ebook was not to pad this product and make it as long as possible. In fact, it's the reverse. I want to give you the maximum amount of information possible in the least amount of words. Why?

Because you need to be working on your body, or even better relaxing with your family or friends, or whatever, but certainly not reading some product that is bloated with filler information.

Take a good look at some of the most popular weight loss books on the market. You will find the vast majority of them contain very little actual information and literally hundreds of pages of recipes and other information you could figure out yourself. I took a close look at one of the most popular weight loss books that was all the rage a few years ago, and by my count it had exactly 81 pages of actual text relating to its promise of "new" information on helping people lose weight. The rest of the book—another 168 pages—was dedicated to recipes, worthless charts, and trying to sell the reader on buying the authors line of supplements.

That's EXACTLY what I wanted to avoid with this ebook!

What you are about to read is all substance and no fluff. If you want fluff then you should go and buy a novel or another fad diet book sitting on the store shelves.

The tool you have in your possession now is strictly designed for action. It tells you what you need to know and gives you a plan to do it.

It's information about weight loss supplements, what they do, what they don't do, whether they are worth buying or not. Pure and simple. Some of the information is simple, some of it is not, and some of it is deceptively simple, but in fact is based on some very complex ideas that were kept simple for the reader and are based on years of research and experience and will yield significant results for the reader if followed to the letter.

You should also note that while a supplement may or may not be effective for weight loss, it may well have other uses. For example, a product that may not be all that great for weight loss could in fact be a very good anti-oxidant, or treatment for a particular condition, and those effects will be mentioned where ever possible.

Conversely, just because a supplement is in fact effective for weight loss, does not automatically mean it's good for you. It's a mistake to always think that losing weight by any means is by default improving a person's health. Such is not always the case. Both of these concepts should be kept in mind and will be mentioned in the discussion of each product. It's important to note that there are very few black and white answers to many of these topics. Research is an ongoing endeavor and opinions can vary. People who try to put black or white hats on certain nutrients are often wrong and a gray hat might be more appropriate.

So, without further delay, here is the "Supplement Guide"....

## **L-CARNITINE**

### **What is it?**

L-Carnitine is an amino acid like substance the body synthesizes from the amino acid Lysine. The vitamins B-6, niacin, C, with iron and the amino acid methionine are required for production of carnitine in the body. The major dietary source of carnitine comes from animal meats, especially red meats (i.e. steak from cows, lamb and sheep). Carnitine has many functions in the human body, but is best known for its ability to shuttle long chain fatty acids across the membrane of cells so they can be burned (oxidized) for energy by the mitochondria.

Mitochondria are often referred to as the “power house” of cells where energy is produced. The actual process of how carnitine shuttles fatty acids to the mitochondria is fairly complex and detailed. Suffice to say, it involves several enzymes and steps before the fats you want to burn end up being utilized by the mitochondria. So, the carnitine shuttle system is essential for the body to be able to burn fats as energy, and this information can be found in any decent biochemistry text book.

### **What is it supposed to do?**

As the above section mentions, carnitine is sold in hopes that it will help the body shuttle more fatty acids into cells to be used as energy rather than stored as abdominal blurring blubber. The idea is that taking in additional carnitine will supposedly help the body burn more fat for energy and make dieting more

effective. Carnitine is also sold as a sports supplement for increasing energy and may have several medical uses. The concept is pretty straight forward, but does it actually work?

### **What does the research have to say?**

Studies that have focused on weight loss in people using carnitine as a supplement are few and conflicting. There are far more studies that look at carnitine as a sport and energy enhancing supplement, but the majority of them are not very impressive, but some studies suggest carnitine may help endurance athletes. The general consensus is that healthy people have plenty of carnitine within the cell (from the body's own production and dietary intake) for the carnitine shuttle system to work, though it has been shown that very low calories diets do alter carnitine metabolism.

The few studies that have looked at weight loss with carnitine have been unimpressive.

For example, a study that looked at 36 moderately overweight women given 4 grams of carnitine per day for 60 days—using a double blind placebo protocol—found no significant changes in any of the end points examined (i.e., body weight, LBM, and fat oxidation).

### **What does the real world have to say?**

In the real world, feedback on carnitine for weight loss has been generally disappointing. In all my years as a trainer, writer and speaker, I have yet to find anyone who has lost weight due to the simple addition of carnitine to their diet.

## **Recommendations**

Carnitine is a perfect example of a supplement, as mentioned in the intro to this booklet, that is useful for some applications but not for others.

In people with serious metabolic problems where fatty acid metabolism has been altered, carnitine has been shown to be of clinical use. Carnitine is even listed in the Physicians Desk Reference (AKA the PDR) for certain pathologies involving the heart, and many alternative doctors swear by it for that use. Carnitine may also help reduce cholesterol and increase HDL cholesterol. Carnitine is a very safe supplement with no known toxic effects.

Although it may very well have potential health benefits in certain people, the bottom line is that as a weight loss nutrient it does not appear to be all that effective for weight loss.

It is also quite an expensive supplement and companies will add very small amounts for label decoration.

If you want to use carnitine, you will need to use at least 500 milligrams (mg) or more several times daily (some studies have used 5000mg-6000mg or more daily).

If you see 20, 50, or 100mg of carnitine in some weight loss formula, it's nothing but label decoration and will have little effect.

Considering the cost, the amount needed for an effect, and the lack of solid research regarding weight loss, carnitine would get a poor rating in my book for

weight loss, though it may have its health uses. For what ever reason, carnitine is one of those ingredients that seems to continue fooling people into thinking its an effective weight loss agent for reasons that are unclear.

## **ACETYL- L- CARNITINE**



### **What is it?**

Acetyl-L-Carnitine (ALC), as the name implies, is related to carnitine. ALC has many functions in the human body that differ from carnitine, but they are in essence the same compound from a practical point of view to you of this pamphlet.

### **What is it supposed to do?**

See above description of carnitine

### **What does the research have to say?**

The research on ALC relating to weight loss is even more lacking than with carnitine. Research with ALC has generally focused on its potential health benefits, of which there are many. ALC does have some unique differences from that of carnitine, but those differences don't appear to have any added effects on weight loss per se.

### **What does the real world have to say?**

Pretty much the same thing as for carnitine. For weight loss it's a bust as far as feedback is concerned.



## **Recommendations.**

You do not have to be a mind reader to know what I am going to say about ALC and weight loss.

It's even more expensive than carnitine, has even less research behind it (as it relates to weight loss), and the feedback has generally been negative. However, like carnitine, ALC has many health uses and is very safe, which is why researchers and the medical community have taken a real interest in ALC.

ALC has been shown to have protective effects on the brain and heart tissue during low oxygen states from lack of blood flow (known as ischemia) and is of particular interest for mental functions associated with aging. It may also lower cholesterol and raise HDL.

It's often sold as a sports supplement because some animal research suggests it may raise testosterone, but the research on that is very much lacking and inconclusive.

So, for various health uses, ALC is very promising stuff. For weight loss, there are far better ways to spend your money.

## **CHROMIUM**

### **What is it?**

Chromium is a mineral essential to blood sugar metabolism, as well as having other important functions related to insulin and fat metabolism.

### **What is it supposed to do?**

As insulin is a primary fat storage hormone in the human body it is presumed anything that improves the actions of insulin will help prevent weight gain and food cravings.

It has been well established that chromium, along with other nutrients, is essential for proper insulin functioning.

Chromium supplements usually come as Chromium Picolinate, but can also be found as Chromium Polynicotinate, a form some studies suggest is superior to the Picolinate form.

Some studies suggest chromium can help reduce cholesterol levels and triglyceride levels and improve HDL levels, which would make perfect sense considering this mineral's role in blood sugar and lipid metabolism. Some feel it's also useful for people with blood sugar management problems, such as hypoglycemia.

### **What does the research have to say?**

Traditionally, companies marketing chromium tend to heavily emphasize the research that demonstrated chromium could help with fat loss and increases in lean body mass (LBM).

Early studies gave glowing reports of chromium and showed significant reductions in bodyfat and increases in muscle when given to college age athletes. However, this research was criticized for having extensive flaws.

As recently as 1997 no less than six studies showed chromium supplementation using various populations ranging from old to young subjects, found no effects on muscle mass or bodyfat.

In fact, one study found that older women (age range 54-71) given high doses of chromium and put on a strength training regimen gained less muscle than the group who did not receive the supplement!

On the flip side, a more recent study looks very promising for chromium as a weight loss aid. A double blind placebo controlled study of 122 over weight people were given 400mcg of chromium picolinate for 90 days and lost over six pounds of bodyfat. This was almost twice what the placebo group lost in bodyfat. So, what we have is conflicting research regarding the effects of chromium and weight loss.

### **So what does the real world have to say about chromium?**

Similar to the feedback on carnitine, chromium looks good on paper and in theory. In the real world, feedback has been unimpressive. I have not seen anyone

lose weight at an increased rate due to the simple addition of chromium to their diet, nor has anyone at any of my seminars or radio shows, ever really raved about chromium for fat loss.

### **Recommendations.**

After reading the information presented above, how do we come to grips with all the conflicting research on chromium as a product used for weight loss?

The bottom line is this: It is well known that exercise, diets high in sugar, and other factors drain the body's stores of chromium. It is also fairly well established that a large proportion of Americans do not take in sufficient amounts of chromium in their diets as much of the food people eat has been stripped of its chromium due to modern processing techniques.

Some research shows that a large proportion of people are chromium deficient.

Finally, it is well established that chromium is an essential nutrient to human health and is critical for the regulation of proper blood sugar metabolism.

Clearly, chromium is a nutrient that we should strive to get from a good supplement and/or from our food. There is no doubt that people deficient in chromium will get positive effects from ingesting chromium whether or not they lose weight. Whether people not deficient in chromium will get any effect from additional chromium is questionable.

You can make sure you get sufficient chromium in your diet from a variety of sources (i.e., multi vitamins, whole grains, various weight loss formulas, etc.) but

to view chromium as a miracle fat loss supplement or ergogenic sports aid would be premature.

Chromium is perfectly safe at normal recommended intakes found in most supplements. However, in extremely high doses, above 1000mcg or more per day for long periods of time, chromium can be toxic.

General advice for people who want to use chromium supplements is to use 300-600 micrograms (mcg) per day.

Chromium, and other nutrients, may be useful in a common health problem known as Syndrome X. Some studies suggest Syndrome X:

- Afflicts 70 - 80 million people, almost one third of Americans
- Is linked to obesity and weight gain
- Is associated with diabetes
- Is associated with high blood pressure
- Is a common factor in cardiovascular disease and stroke
- Is a primary cause of a lowered metabolism and fatigue

The term Syndrome X is actually a description for insulin resistance and all the potential pathologies that can come with it (i.e. obesity, reduced metabolism, cardiovascular disease, etc.).

The term "Syndrome X" was dubbed in 1988 because insulin resistance is found along with so many different medical conditions.

In other parts of the world there are various terms for insulin resistance. One such term is C.H.A.O.S, which is short for Coronary heart disease, Hypertension/hyperlipidemia, Adult onset diabetes, Obesity, and Stroke. Ouch!

Another term for the same syndrome is Insulin Resistance Metabolic Syndrome or IRMS for short.

All over the world the scientific and medical community is starting to see that many seemingly unrelated diseases are in fact linked to a malfunction in insulin and/or blood sugar metabolism.

Insulin resistance can underlie these various illnesses because the hormone insulin plays such an important and pivotal role in the body.

Among its hundreds of different functions, the body uses the hormone insulin to control the amount of sugar (glucose) in the blood, help pull amino acids into the cells and turn on protein synthesis in lean tissues, and is directly linked to regulating bodyfat storage.

Problems with the body's ability to regulate blood glucose appear if insulin does not properly bind to its receptors on the membranes of the cells or if, for other reasons, blood sugar is not readily accepted by the cells.

As already indicated, the general name for the failure of normal amounts of insulin to maintain blood sugar (i.e., glucose) within acceptable levels is insulin resistance. When insulin does not bring blood sugar down after meals, the body secretes higher amounts of insulin until serum glucose levels eventually fall.

Insulin resistance has several possible causes, including the over consumption of simple and refined carbohydrates and/or a lack of adequate nutrients combined with genetic factors. Of course the heavy over consumption of processed simple carbohydrates coupled with inadequate nutrient intake is a mainstay of the American diet.

Conversely, and not surprisingly, diets and nutrients which reduce the amount of insulin required by the body also appear to reduce the tendency toward excessive weight gain.

In as much as the hormone insulin is well known for its ability to store glucose in muscle, increase protein synthesis, and possibly increase muscle mass, it has predictably gotten the attention of bodybuilders and other athletes. In fact, it is sometimes said that insulin is the primary anabolic hormone produced by the body.

Some researchers feel that insulin is in fact more important to lean muscle tissue than the better known anabolic hormones testosterone and growth hormone (GH).

Unfortunately, insulin certainly has its down sides. Of course most people know that insulin metabolism out of control will make a person rather fat since insulin is a primary hormonal mediator of fat storage.

Insulin resistance increases the number of calories stored as fat and increases the amount of fat produced by the liver from carbohydrates. It gets worse. It turns out that insulin plays a big role in whether we produce our own fat from carbohydrates. And if we are making even a little fat, we turn off our ability to

burn fat because the body does not make new fat and burn already stored fat at the same time.

Of course the concept of "insulin management" for adding new muscle to the hard training athletes frame is all the rage with various bodybuilding magazines, supplement companies, and nutritional guru types. If you can manage insulin correctly, you can add new muscle without adding a great deal of bodyfat, and this has been the goal of proper insulin management.

It's obvious that athletes and bodybuilders are far more aware than the general public of the importance of insulin, hence the popularity of insulin potentiating compounds such as chromium and vanadyl sulfate.

Of course, some bodybuilders have chosen to go the Kamikaze route by injecting insulin directly, but it does not take a rocket scientist to realize how dangerous this practice is.

Can you say "coma?"

Also, many bodybuilders who play with insulin injections end up looking more like the Michelin Man than a bodybuilder.

One thing should be clear by now: proper insulin management is of paramount importance whether for athletes looking to add new muscle without adding bodyfat as well as non athletes trying to avoid a host of medical ills.

Athletes want to improve their insulin/blood sugar metabolism because they know it can lead to increases in lean mass, glycogen storage in muscle, and



decreases in bodyfat. Avoiding future medical problems is certainly not a bad motivator either.

On the plus side for bodybuilders and exercise buffs in general, regular exercise improves insulin sensitivity. On the nutritional side, fiber and nutrients such as vitamin C, E, magnesium, omega-3 fatty acids (see section on flax oil), and chromium have been shown to improve glucose metabolism. Diabetics, people with Syndrome X, and athletes who want to improve insulin metabolism/insulin sensitivity would be wise to include these nutrients in their diets.

Another nutrient that may improve insulin sensitivity and glucose disposal is *alpha* -Lipoic acid. Although known as a powerful anti oxidant, *alpha* -Lipoic acid's abilities as a potential "insulin mimicking" compound have only recently been discovered.

This compound has been used extensively in Germany and other countries to treat certain complications associated with diabetes. To date, the majority of research with *alpha* -Lipoic acid has been done on true diabetics. Regardless, *alpha*-Lipoic acid has been shown to stimulate insulin activity and to reduce insulin resistance in many clinical trials with diabetes sufferers.

In fact, in one study of adult diabetic patients, Lipoic acid increased the cellular uptake and oxidation (burning) of glucose by about 50%. The optimal dosage of *alpha*-lipoic acid for increasing glucose uptake into muscle appears to be approximately 600mg per day spread out over two to three meals. Whether or not *alpha*-lipoic acid turns out to be the greatest thing since sliced bread for athletes, it is certainly a nutrient that diabetics and the 70-80 million insulin resistant

Americans should consider using on a regular basis along with the other nutrients previously mentioned in this section.

Whether you're a bodybuilder, runner, general fitness buff, or average Joe/Jane, understanding insulin metabolism and what happens when it goes hay wire is essential for gaining muscle, losing bodyfat, and avoiding the spiral into disease that is Syndrome X.

Avoiding Syndrome X, and the many diseases associated with it, is a matter of regular exercise, adequate and correct nutrient intake, avoiding health degrading substances, and using some common sense. Too bad we don't have a common sense pill yet!

## **CONJUGATED LINOLEIC ACID (CLA)**



### **What is it?**

Conjugated Linoleic Acid (CLA) is a fatty acid derived from the essential fatty acid Linoleic Acid. CLA is found predominantly in dairy products and some meats and appears to be a fat with some unique effects on the metabolism of animals and (hopefully) people.

### **What is it supposed to do?**

CLA has been sold as both a fat loss supplement and as a sports nutrition product for adding muscle. The sellers of CLA focus on the fact that in animals such as rats and mice, CLA causes rats and mice to lose bodyfat while adding lean tissue (i.e. muscle).

Like so many products, CLA may have legitimate health uses. CLA can be found as different isomers (i.e., cis-9/trans-11 and trans-10/cis-12 isomers) and recent research suggests different isomers are responsible for different effects, such as anti cancer, anti obesity, etc.

### **What does the research have to say?**

CLA has been found to be the best thing for rats and mice muscle and fat loss since they slipped anabolic steroids in their mouse food! A substantial number of

studies has confirmed that animals (the aforementioned squeaky things with red eyes) add lean body mass (muscle) and lose bodyfat when fed CLA, making CLA a true anabolic agent in rodents.

"Ok," you're thinking "lots of things work on mice and rats but don't seem to do a thing for us higher animals who want to lose fat." That is true, and like many supplements sold as weight loss agents, the human data is lacking.

The few human studies that have been done are limited and produced mixed results. There was one interesting human study recently completed with bodybuilders. This research was presented by a Dr. Lowery at a large conference in Lahti, Finland.

The study fed 24 novice athletes 12 grams of a product containing 7.2 grams of CLA or a placebo (vegetable oil) while completing a 6 week program of bodybuilding exercises. The study found the group getting CLA had an increase in strength and arm girth (their arms got larger) but did not add bodyfat.

The researchers concluded "... apparently, CLA acts as a mild anabolic agent in novice male bodybuilders." No doubt, this finding needs to be confirmed in a larger study.

The good news about CLA is there have been several new studies in humans. The bad news is they continue to be conflicting in their findings. For example, one recent study found that CLA supplementation at 3-4 grams per day caused an almost one inch reduction in waste size and a loss of body fat of 2-4 lbs in overweight subjects over a 12 week period.

However, a pilot study using weight lifters found no differences in body weight, fat, or muscle mass over a 30 day period. Another small study with ten subjects receiving 3-4 grams of CLA versus 10 subjects getting a placebo for three months, found similar results. Yet another study of 17 healthy women getting 3 grams of CLA versus placebo (sunflower oil) for 64 days, found no statistically significant differences between the two groups.

### **What does the real world have to say?**

The general feedback on CLA has been mixed in regards to fat loss. There are some people who have reported that taken in high enough amounts, CLA seemed to help with fat loss. However, the majority of people I have spoken with, and all the people I have worked with on a one on one basis, reported no effects from using CLA.

### **Recommendations**

The vast majority of research with CLA has been performed with animals (rats and mice), and we are not rats and mice, though new human studies have just recently popped up. The metabolism of rats and mice vs people is often quite different regarding fats and carbohydrates, though this does not mean animal research should be ignored.

Some researchers feel there is a specific threshold intake of CLA needed to get an effect. For example, the human study cited above used 7 grams of CLA a day. Although a small study, 7 grams of CLA per day is an expensive proposition as the stuff is not cheap.

However, we now have a handful of studies using 3-4 grams that have come to conflicting conclusions, so you will have to make up their own mind on the importance of that finding. Lesser amounts (such as a few hundred milligrams) of CLA often found in a weight loss supplement are nothing but label decoration.

As for the health uses of CLA, several in vitro (test tube) and animal studies have shown it has powerful anti oxidant properties as well as impressive anti cancer properties. It has been shown to modulate insulin-like growth factor binding proteins (IGFBPs) in mice and may also improve insulin sensitivity.

It has been shown to suppress the growth of certain lines of human breast cancer as well as several other cancers. Animals subjected to various cancer causing chemicals and fed CLA appear to fare much better than those not getting CLA. Some studies with CLA also point to this lipid as a possible immune enhancer.

CLA is also a very safe product.

Bottom line is, though CLA may turn out to be a worthwhile supplement for losing fat, far more human research is needed for definitive conclusions. I consider CLA a supplement to keep an eye on, but there are better and more cost effective options, especially considering the cost of CLA and the lack of—or conflicting—human data.

People interested in using CLA probably need at least 3 grams or more per day of CLA, as the human studies would suggest as the minimum effective dose, though 4-6 grams would probably be better.

## **CHITOSAN**

### **What is it?**

Chitosan is technically a fiber, which is derived from the tough outer layer of shellfish. It was originally manufactured for water treatment applications as it binds to heavy metals, oils, and other pollutants.

### **What is it supposed to do?**

Chitosan works primarily through positive and negative charge interactions. Translated, chitosan has a positive charge which attracts negatively charged materials such as lipids (fats). If a person takes chitosan in conjunction with a high fat meal, the fat will (hopefully) bind to the chitosan during digestion and will be excreted from the body before it is ever absorbed, and thus should not be stored as bodyfat.

Manufacturers of chitosan claim it can bind up to eight times its weight in fat, but it's probably more like five to six times. Chitosan may also have health uses for people with high cholesterol levels.

### **What does the research have to say?**

As might be expected from a product of this nature, research has mainly focused on the possible effects of chitosan on cholesterol and triglyceride levels. Animal and human studies suggest chitosan is an effective reducer of cholesterol and

triglycerides, with some studies showing a rise in HDL (good) cholesterol and a reduction in LDL (bad) cholesterol.

One study found men using up to 6 grams daily of chitosan had an 11 point drop in total cholesterol and an increase in HDL (the "good" cholesterol) in just two weeks. Higher amounts in animals, up to 5% of the animal's diet, showed even more impressive drops in cholesterol levels with increases in HDL levels.

As its industrial use would imply, chitosan is binding to the fat, cholesterol, and bile, and not being available for absorption, is simply excreted. As for weight loss, several small studies appeared to show a statistically significant improvement on weight loss with chitosan, while another larger and more recent study found no effect. The difference may have been in the dosage between the different studies. As with carnitine and CLA, the effective dose is probably much higher than what is found on the bottle of most products.

### **What does the real world have to say?**

Strangely, though chitosan has been sold for several years, I have gotten very little feedback about this product. What little feedback I have gotten has been mixed, so I can't give a clear and useful picture regarding the real world opinion or "buzz" on chitosan at this time. Later additions of this e-book will hopefully contain greater feedback on chitosan.

### **Recommendations.**

Personally I have many qualms with products such as chitosan that work by blocking the uptake of dietary fats. Why? Many essential nutrients important to



our health are found in fats, including the fat soluble vitamins E, A, D, F, and K, and blocking the absorption of fats with chitosan could potentially lead to deficiencies in these and other nutrients.

As chitosan blocks the absorption of fats, it would also block the uptake of the essential fatty acids (EFA's) we all need for optimal health and weight loss (see section on EFA's for more info).

Chitosan may also reduce the absorption of minerals, and one study showed mineral absorption and bone density was reduced in animals fed chitosan.

Relating to the fat soluble vitamin issue, the same study also found a “marked and rapid decrease in the serum vitamin E level...” Other animal studies have shown a blunting of growth with high amounts of chitosan. When a deficiency in any of the above nutrients could negatively affect long term health, I have to question the wisdom of long term use of chitosan.

Chitosan *might* be a moderately useful part of a total plan to lose fat, but it would be a mistake for a person to rely on it as their sole method of weight loss.

So what's the take home on chitosan?

It might be an effective aid in reducing cholesterol and triglycerides. It might also be an aid to weight loss, if used as a small part of the weight loss arsenal available to people. In this writer's opinion there are better ways to safely lose weight.

Of course, some people are bound to be attracted to the idea of blocking fat absorption and will use it regardless of these warnings as they have been brain washed into believing fat is bad.

Best advice at this time for people interested in using chitosan would be to use it for specific periods of dieting (e.g. 8-12 weeks), and take additional fat soluble vitamins , minerals , and essential fatty acids at least 3 - 4 hours away from the chitosan to address any potential deficiencies that might occur.

Oh, here is a tip when using chitosan. Chitosan forms a gel with the fats, bile and cholesterol, which is then excreted. It has been found that adding vitamin C to chitosan appears to further enhance the formation of the gel. So, adding say 100mg - 200mg of vitamin C to the chitosan (both of which should be taken 30-40 minutes prior to a meal with a large glass of water) may improve the effects of chitosan.

## **Co-ENZYME Q10**

### **What is it?**

Co-enzyme Q10, or Q10 for short, is involved in energy production at the cellular level. Q10 is part of the electron transfer chain involved in the production of ATP. If that sounds confusing, it's not important to remember if you don't want to. The body produces Q10 from the foods we eat, and the amino acid methionine is known to be important for its production. Foods such as organ meats and fish contain small amounts of Q10. Like L-Carnitine, Q10 works in the mitochondria to produce energy and is part of the electron transfer system. It may have health benefits and is an anti oxidant.

### **What is it supposed to do?**

Q10 has been recommended to overweight people as a means of burning more calories by increasing energy production from food, rather than storing it as bodyfat, because it may improve energy production at the cellular level.

### **What does the research have to say?**

The research looking at Q10 as a weight loss agent is non existent for all practical purposes. Interestingly however, some research found obese people to be deficient in Q10. What that means to weight loss is unknown, and companies who have recommended the use of Q10 based on that knowledge are taking a stab in the dark.

Q10 is used extensively in Japan, and other countries, as a treatment for certain heart conditions, especially congestive heart failure. Some studies suggest it can improve endurance. It may also improve immunity, but research on Q10 as a rule has been contradictory.

### **What does the real world have to say?**

If there is a human being in the world who has lost weight with Q10, I have yet to meet him or her.

### **Recommendations**

Though Q10 seems to have various potential health benefits, proof that it has any use as a fat loss agent is very much lacking and less than impressive. It is also exceedingly expensive and the amounts found in most weight loss formulas would not affect a mouse much less a person.

Q10 has been found to be totally safe and has no known toxic effects. People interested in Q10 for health reasons, or who just want to take an expensive shot in the dark at weight loss, should take 25-100mg or more daily. Relating to its possible role in heart disease, alternative medical researchers "in the know" suggest Q10 be combined with carnitine, magnesium, and vitamin E for optimal effect.

## **DHEA**

### **What is it?**



Dehydroepiandrosterone (DHEA) is a hormone produced primarily in the adrenal glands with minor amounts produced by the testes. It is found in both men and women. DHEA is the most abundant steroid hormone in the human body, and like all steroid hormones, ultimately comes from cholesterol. Most DHEA in the body is found as DHEA-sulphate (DHEA-S). DHEA is a major precursor to other steroid hormones, which is why some companies market it as a “muscle builder.”

### **What is it supposed to do?**

DHEA is marketed as being helpful for just about every human ailment from memory loss to heart disease to immune enhancement to weight loss, and more.

### **What does the research have to say?**

DHEA is very consistent for making rodents such as mice and rats lose weight. In people, the research has been far less impressive. Several studies using over 1500mg per day of DHEA showed either no effects or short lived effects on weight loss in humans.

Some studies in people using DHEA have shown slight increases in testosterone and insulin like growth factor one (IGF-1) levels, but most studies have found minimal effect in people.

In red eyed rodents (i.e. mice and rats), DHEA causes many biochemical changes that just don't seem to happen in people, showing just how different rats and people can be.

The research showing health improvements, such as cognitive benefits, immune enhancement, stress reduction, and anti cancer benefits, is much more compelling.

One early study found 1600mg per day of DHEA (a very high dose of DHEA) reduced bodyfat and increased muscle mass in men, with later studies done by the same group and others failing to find that effect. However, one recent study on DHEA found only 150mg per day increased lean body mass in young men and increase IGF-1.

### **What does the real world have to say?**

I have known many people who genuinely felt DHEA helped them in many ways, including an improved feeling of well being, but none of them claimed to have lost any weight using DHEA. In my personal experiences with people over the years, no one has lost measurable amounts of bodyfat from the use of DHEA.

### **Recommendations**

It's well known that DHEA levels fall off as we age, and the research on health uses of DHEA justifies using small amounts to counter this age related drop off or deficiencies from other causes.

However, as a weight loss supplement, it has generally been a bust. Also, though quite safe, DHEA is a steroid hormone and weak androgen. Some women have noticed increases in facial hair growth from using large amounts of DHEA.

It is not an innocuous substance. For general DHEA replacement, very small amounts are needed, like 25mg-50mg a day for men and even less for women.

Positive effects of DHEA in older individuals is much clearer, with only 25-100mg per day being needed to positively effect bone mineral density, lean mass, and bodyfat levels in older men and women.

Why the difference between old and young people?

DHEA and DHEA-s levels are one of the best biological markers of aging known. DHEA levels rise slowly till they peak at around 30 years of age, and decline steadily after age 35, with levels reduced by 70-80% by age 75. This effect is one of the most consistent and predictable changes in aging people known so far.

Though the utility of DHEA in younger people with normal physiological levels of DHEA is still debatable, the benefits clearly outweigh any small risks in people over 40 who have reduced DHA levels. Only blood tests will tell a person what their DHEA/DHEA-s levels are and where they are compared to others in their age group.

As a muscle building supplement in young healthy athletes, DHEA is probably worthless, and high intakes may in fact be counter-productive to gaining muscle. People interested in using DHEA as a general health benefiting supplement,

should have blood tests done to determine their levels of DHEA and DHEA-S before using this supplement.



## **7- KETO- DHEA**

### **What is it?**

3-Acetyl-7-oxo-dehydroepiandrosterone (7-keto-DHEA), as the name implies, is a metabolite of DHEA.

### **What is it supposed to do?**

The claims on 7-keto DHEA are that it possesses the benefits of DHEA without any of the potential down sides, such as possible effects on sex hormone levels. It's supposed to be more biologically active but lacks the ability to cause changes in hormone levels. Some research suggests 7-keto-DHEA may be the active metabolite responsible for many of the health benefits of DHEA.

### **What does the research have to say?**

In vitro (test tube) studies with 7-keto-DHEA appear to show it has no effect on steroid hormones and does not convert to sex hormones such as testosterone, estrogens, etc. One study that fed 200mg of 7-keto-DHEA to men ages 18-49 years old for four weeks found no effects on sex hormone levels. Interestingly, 7-keto-DHEA may have a more pronounced thermogenic effect (the process the body uses to convert stored calories into energy) than DHEA.

A few animal studies and in vitro studies have shown this. However, no studies in people to date have looked specifically at the thermogenic effect of 7-keto-DHEA vs DHEA.

Some animal research has also shown improvements in memory and other cognitive functions. 7-keto -DHEA may have positive effects on thyroid function. There has been one recent study that looked at weight loss in people. The study fed 30 overweight women (15 acted as a control group and received a placebo) 200mg a day of 7-keto-DHEA for 8 weeks. The study found that the group getting the 7-Keto-DHEA lost 1.8% of their bodyweight (a little over 6lbs on average) vs the placebo group who only lost 0.57% of their bodyweight.

The study also found that the group getting the 7-keto-DHEA had increases in the specific thyroid hormone T3 without significant changes in blood sugar, testosterone, estradiol (estrogen), liver, renal function tests, vital signs, or overall caloric intake over the eight week study. There were there no subjective adverse effects reported throughout the study.

The study conclusion was that "... 200 mg of 7-Keto-DHEA per day yields a significant reduction in both body weight and body fat." Further studies are needed to confirm this fat loss effect in people, but this study does make 7-Keto-DHEA look like potentially promising weight loss agent.

### **What does the real world have to say?**

7-Keto-DHEA has not been around long enough for me to get any useful feedback regarding its effects on weight loss.

### **Recommendations**

On paper, 7-keto-DHEA looks promising. We do have some human research regarding weight loss, albeit only one study. The study is however a compelling one and appears to show 7-keto-DHEA has metabolic effects different from that of simple DHEA on weight loss.

It should also be a very safe supplement. I consider 7-keto-DHEA one of those "might be worth a try" supplements at this time. It's not terribly expensive, appears safe, and may turn out to be something worthwhile as a weight loss nutrient. Unfortunately, I have no real world feedback to go on at this time. Hopefully that will change as time goes on and any feedback will be noted in future additions of this e-book. Like DHEA, this product will probably have little use to athletes as far as strength and performance is concerned. People interested in trying this supplement, can use 100-200mg a day in divided doses.

## **DIGESTIVE ENZYMES**

### **What is it?**

Enzymes are catalysts to chemical reactions. As we all know, the digestion of our foods involves many enzymes. There are various enzymes used in various supplement formulas, some which are of animal origin and some of plant origin.

### **What is it supposed to do?**

The breakdown of food starts in the mouth with chewing and the exposure to enzymes. In the stomach, food mixes with enzymes and other factors such as lipase, pepsin, intrinsic factor, and of course, HCL (stomach acid).

The food moves on to the small intestine and then the large intestine. The small intestine is considered the major anatomical site of food digestion and nutrient absorption. It is made up of sections such as the duodenum, jejunum, and the ileum. Pancreatic enzymes (chymotrypsin, trypsin, etc.), bile salts, gastrin, cholecystokinin, peptidases, are among the substances released here.

The large intestine is composed of the ascending colon, transverse colon, descending colon, and the sigmoid colon, which all play a part in absorbing the nutrients we eat.

Sounds complicated? It is.

Enzymes play an essential role in every step of the digestive process. The basic idea is that by adding specific enzymes in supplement form, it will help the body efficiently digest food and this will help with weight loss.

Companies market supplemental enzymes such as papian, amylase, lactase, lipase, bromelian, pancreatin, as well as others.

Enzyme therapy may have health benefits, especially for those with poor digestion or other issues relating to the digestive tract. Exactly how the enzymes are supposed to assist in weight loss is unclear.

### **What does the research have to say?**

There are a few odd studies with animals that have found adding certain enzymes, such as pancreatin, reduced food intake and weight gain. One recent study fed broiler chickens large amounts of pancreatic and noted reductions in food intake and subsequent weight loss.

High amounts of pancreatin may have a mild anorectic (appetite suppressing) effect, but I doubt it would work in people or be particularly healthy either. However, there is very little modern research to go on regarding healthy people and weight loss with enzymes.

### **What does the real world have to say?**

Never met a person who lost weight from taking enzymes as their only supplement.

## **Recommendations.**

Digestive enzymes have many potential health uses and are often prescribed for specific treatments in a variety of health problems, from simple digestion issues to pancreatitis and other pathologies. Some studies show the intake of certain enzymes, such as bromelain, may reduce inflammation. Other research suggests enzymes can positively effect immunity.

For weight loss specifically, enzymes don't appear to be of any help. It's a wonder why so many diet books still recommend them.

It's impossible for me to give recommendations on how to take enzymes due to the fact there are so many types and formulas and each enzyme serves a different function. Enzyme formulas should pose no risk to healthy people however.

## **EPHEDRINE / CAFFEINE MIXTURES (EC)**



### **What is it?**

I am going to cover ephedrine and caffeine (EC) as one section as they are often found together in any “fat burner” type weight loss products. Ephedrine and caffeine are both mild to strong stimulants with many interesting properties.

Ephedrine can be derived from plants such as Ma Huang, Sida Cordifolia, and others.

Caffeine can be derived from Cola nut, tea, gurana, and many other plant sources have caffeine and contain other compounds from the xanthine family.

### **What is it supposed to do?**

EC products are called “Thermogenic compounds” because they can increase thermogenesis (the production of heat) and effect metabolic rate.

Explaining everything ephedrine and caffeine do would take an entire book onto itself. It is my feeling most people purchased this booklet because they want short, concise, and easy to understand information regarding the many products on the market, not a long drawn out and boring explanation of the science ( or lack there of) relating to each product.

So, in a nut shell, ephedrine is referred to as a Beta-adrenergic agonist that works by mimicking the effects of the "fight or flight" hormones epinephrine and noropenephrine (i.e. adrenaline).

The topic of beta agonism can get complicated real fast, so we will leave it at that. The point is, beta agonists such as ephedrine can have many positive effects relating to fat loss, such as increasing lipolysis ( an increase in free fatty acids to be used as energy), increased energy levels, preserving lean tissue (muscle) while dieting, and many other effects that greatly help with fat loss.

Ephedrine also has anorectic (appetite suppressing) effects and helps increase energy levels before a workout.

Caffeine is of course a chemical people are very familiar with and needs less of an explanation as that of ephedrine. Caffeine has many similar effects as that of ephedrine but works through different mechanisms. Rather than mimic the effects of the stimulatory hormones such as epinephrine and noropenephrine (i.e. adrenaline), caffeine stimulates the adrenal glands to release these hormones while blocking their breakdown, which has similar, though different, effects on fat loss than that of ephedrine (i.e. increased lipolysis, energy levels, etc.).

In summary, ephedrine increases the release of norepinephrine, which modulates food intake and acts as a sympathomimetic agent to stimulate heart rate and blood pressure, and enhance thermogenesis. Caffeine, an adenosine antagonist, reduces the breakdown of norepinephrine within the synaptic junction. Got all that?

**What does the research have to say?**



The research on ephedrine and caffeine (EC) is clear and extensive regarding the effects on fat loss. Both caffeine and ephedrine alone have been found to be mildly helpful for weight loss, but together, there is clear synergism.

That is, the effects of EC together are far more powerful than either compound alone.

Research published in the American Journal of Clinical Nutrition (55:246S-282, 1992), International Journal of Obesity (17[6]:343-347, 1993; S:73-78, 1993; 3:S73-77, 1993; 18:99-103, 1994), and the journal Metabolism (41[11]: 1233-1241, 1992; 41[7]:686-688, 1992; 40:323, 1990) as well as many others, have shown conclusively that the combination of E and C in the correct ratios and amounts is very effective for weight loss. This research has been done on animals and confirmed repeatedly in human studies many times over the past decade.

The bottom line here is EC products work, and they work well for fat loss. A handful of clinical trials have shown that a C to E ratio of 10:1, that is ten times more caffeine than ephedrine, is an optimal ratio for this fat loss combination with minimal side effects.

The vast majority of studies have used 20mg of ephedrine and 200mg of caffeine three times a day for a total of 60mg of E and 600mg of C daily. Though a few studies suggest that lower doses may also be effective for weight loss, the vast majority have used the above doses.

Anecdotally, many report using half the standard recommended dose works well for fat loss with fewer side effects.

Those of you who are familiar with these products have usually known the above as the "ECA" combination which stands for ephedrine, caffeine, and aspirin. I have not covered this combination for a reason. Though some studies suggest that the addition of aspirin may help with the fat loss effects of E and C, there has never been a head to head study done that showed the ECA combo was superior to the EC combo.

The vast majority of studies were in fact done of the EC combo. There are also some theories that the addition of aspirin to the EC combination may, in fact, hinder the fat loss effects of EC products. Not to mention taking aspirin on a daily basis has its potential side effects and health problems, such as burning a hole in your stomach.

Interestingly, EC research also shows lean tissue (muscle) is protected while on reduced calorie diets, which is another considerable plus for people using such products, especially athletes.

Another distinction of the EC products is that they appear to work on non-exercising people. There are very few supplements in the world that work on couch potatoes. I am not condoning sitting on your behind and using the ECA stack to lose weight, but it appears the ECA stack is effective for non-exercising (read lazy) people.

In one recent study that examined the use of ECA with non-exercising people, subjects lost almost ten pounds of fat in six weeks from taking 20mg of ephedrine, 200mg of caffeine, and 325mg of aspirin three times a day.

So what does this all tell us?

If the ECA combination works this well on couch po.....err sedentary people, imagine what it can do for people who get up off the couch and kick some butt in the gym!

### **What does the real world have to say?**

This is one of the few places where the research and the real world agree: EC products work for weight loss in the majority of people who use them.

### **Recommendations**

Because EC, more specifically ephedrine, has been under such scrutiny regarding potential side effects, I am going to take extra time to address this issue.

It's amazing to me that if a single study pops up on some new diet drug, no matter how obscure, the media leaps on it as if it were the cure for all weight problems. When study after study have been done on animals and people showing that a mixture of ephedrine and caffeine is a very effective and inexpensive method of fat loss, the media seems to ignore it.

Why?

Beats me. They have been far more interested in attempting to show EC based fat burners as being inherently dangerous rather than showing it to be the safe and effective fat loss product it really is... and I base my conclusion on science and research rather than the anecdotal evidence favored by the "don't confuse us with the facts" media and FDA.

Do the people who want us to believe that ephedrine based fat burners are inherently toxic ever bother to read the research on these products, or do they just ignore the studies? -- Hard to tell.

Why doesn't the media ever give us both sides of the story and mention that studies to date using EC have come to the conclusion that these are safe products when used correctly?

Wish I knew.

Not only have there been multiple human studies showing weight loss with minimal side effects in healthy people, several studies have been done that specifically examined side effects.

One study called "Ephedrine, Caffeine, and Aspirin: Safety and Efficacy for Treatment of Human Obesity" concluded "In all studies, no significant changes in heart rate, blood pressure, blood glucose, insulin, and cholesterol levels, and differences in the frequency of side effects were found." And where was this study conducted that the media never bothers to mention? A little out of way place called the Department of Medicine at the Harvard Medical School.

Another large randomized, placebo-controlled, double blind study with 180 subjects that ran for twenty four weeks called "Safety and Efficacy of Long-Term Treatment with Ephedrine, Caffeine and Ephedrine/Caffeine Mixture" concluded: "The side effects are minor and transient and no withdrawal symptoms have been found." This study, like the others came to basically the same conclusion about the side effects of the EC based products, which is they are minor (insomnia and

tremors), transient, and short lived. Not exactly what the media and the FDA would like us to believe regarding these products no?

Being I am a bottom line kind of person, let's get to the bottom line.

In healthy people who want to lose some weight, EC based fat loss supplements have been found to be both safe and effective proven repeatedly by human research. Are they harmless? Of course not, and I would never infer they were.

However, EC based products are far from the killers the media and the FDA would have us believe. People who don't tolerate stimulants well, people with preexisting medical conditions such as heart disease or any heart irregularities, high blood pressure, or prostate disease, pregnant women, and people taking MAO inhibitors are advised not to use such products.

Another bad idea is taking far more of the product than the directions on the bottle recommends. Stick to the recommended doses. Start with a lower dose of both (EC) and raise slowly over a few weeks until you reach those doses.

These particular warnings can be found on the side of many over the counter products used by millions of people every day, and they should not be ignored. A little common sense goes a long way here.

I generally advise people to use EC products for defined periods of time, with a specific off cycle. 8-14 weeks on and 2-6 weeks off, is a good plan of using the EC products for maximum effects while minimizing the potential for side effects.

If used as a pre workout energy booster, I recommend using no more than 3-4 days per week.

Finally, there are other compounds companies add to formulas that might enhance the fat loss/thermic effects of the EC combo, such as Cayenne pepper, tyrosine, and ginger, but there is no solid research to prove this.

There are also other stimulants being sold that claim to be more thermogenic than EC with less side effects, such as nor-ephedrine, theophylline, synephrine, and yohimbine (see section on yohimbine for more information), but none of them have been studied head to head in people to show they are superior to ephedrine for weight loss with less side effects.

In addition, mixing different stimulants (e.g., ephedrine and theophylline, etc.) could increase the potential for side effects above what is acceptable. If using any of the above stimulants in conjunction with EC products, I would recommend cutting back on the dose of EC to account for the additional effects of these other stimulants.

## **FLAX OIL**



### **What is it?**

To understand flax oil you have to understand what essential fatty acids (EFA's) are and what they do. The definition of an essential nutrient is anything the body cannot synthesize itself and therefore must be obtained from the diet. We need to eat an assortment of vitamins, minerals, approximately nine to eleven amino acids, and two fatty acids to stay alive and healthy (There is no such thing as an essential carbohydrate, but we'll have to discuss that at another time and place).

The two essential fatty acids we need in our diets are Linoleic acid (LA) which is an Omega-6 fatty acid and Alpha -Linolenic acid (LNA) which is an Omega-3 fatty acid. The highest known source of the Omega-3 fatty acid LNA is flax oil which also contains a small amount of LA (flax oil has 4:1 ratio of LNA to LA). Minimum requirements for essential fatty acids are 3-6% of daily calories for LA and 0.5-1% of daily calories for LNA.

### **What is it supposed to do?**

As with most vitamins and minerals, it is virtually impossible to get optimal amounts of unprocessed essential fatty acids (especially the Omega-3 fatty acids) from our heavily processed food supply.

The term “Omega-3 fatty acid” should ring a bell for you.

Fish oils are well publicized Omega-3 fatty acids that have been shown to have many benefits. Although early research told us we need a bit more LA than LNA, in practice we find that a diet higher in LNA gets the best results for a reduction in bodyfat levels.

Americans tend to get their fats from saturated fats, rancid fats, and highly processed fats (which contain byproducts such as trans fatty acids), thus giving fats a bad name.

EFA's are not to be avoided as a "bad fat" because all fats are not created equal. From a general health standpoint, EFA's are involved in literally thousands of bodily processes essential to our health and general well being. Immunity, aging, hormone production and hormone signaling... well, you get the point.

As one would expect, EFA's have been found to have many health uses including cholesterol reduction, cancer treatment and prevention and treating inflammatory conditions.

In particular, the Omega-3 fatty acids are anti-lipogenic (they block fat storage), anti-catabolic, anti-inflammatory, and they increase beta oxidation (fat burning!), improve insulin sensitivity, increase thermogenesis, and a whole lot more positive effects on fat loss we don't have the space, time, or need, to cover in this little booklet.

Recent research has found that EFA's, in particular the Omega-3 lipids, control gene transcription. For the more technically adept: Omega-3 lipids play essential roles in the maintenance of energy balance and function as fuel partitioners in that



they direct glucose toward glycogen storage, and direct fatty acids away from triglyceride synthesis and assimilation and toward fatty acid oxidation.

Omega-3 lipids appear to have a unique ability to enhance thermogenesis and thereby reduce the efficiency of body fat deposition. EFA's exert their effects on lipid metabolism and thermogenesis by up-regulating the transcription of the mitochondrial uncoupling protein-3, and inducing genes encoding proteins involved in fatty acid oxidation (e.g. carnitine palmitoyltransferase and acyl-CoA oxidase) while simultaneously down-regulating the transcription of genes encoding proteins involved in lipid synthesis (e.g. fatty acid synthase).

A lack of EFA's, in particular the Omega-3 EFA's, appears to be one of the dietary factors leading to the development of obesity and insulin resistance seen in Syndrome X (see section on Chromium for more information of Syndrome X).

Of particular interest, the body makes something called prostaglandins (as well as other highly unsaturated compounds) from both of the essential fatty acids. Prostaglandins are high active short-lived hormone-like substances that regulate cellular activity on a moment to moment basis. Prostaglandins are directly involved with regulating blood pressure, inflammatory responses, insulin sensitivity, immune responses, anabolic/catabolic processes, and hundreds of other functions known and yet unknown.

The long and the short of all this, without going into a long and boring biochemical explanation: Omega-3 fatty acids are responsible for forming the anti-inflammatory prostaglandins, and Omega-6 derived prostaglandins are responsible for making many of the pro-inflammatory prostaglandins (in addition other products derived from EFA's of which there are many).

Obviously, it's a lot more complicated than that, but hey, I only have so much space to write. It is probably easy to see from just reading this section that the metabolism of EFA's is quite complicated. If you are interested in a solid easy to read primer on the many functions of EFA's and uses of flax oil, read my book Priming the Anabolic Environment which has a chapter on the topic. For even more details on the many benefits of flax oil, as well as many other oils, read Fats that Heal Fats that Kill by my good friend Dr. Udo Erasmus.

### **What does the research have to say?**

The research that directly examines fat loss using flax oil is varied, compelling, and interesting, but not nearly as conclusive or extensive in humans as one would expect.

Research has shown Omega-3 fatty acids added to the diets of animals such as rats, mice, and pigs, results in fat loss. Many in vitro (test tube) studies also have been very clear as to the effects of flax oil (and other oils high in Omega-3 fatty acids) on fat loss and other health related issues. There have been human studies, that suggest flax oil can help with weight loss but there are no “smoking gun” type studies to convince the hard core skeptic.

I wish I could show people the huge pile of research I have gathered over the years that demonstrate just how interesting and effective flax oil—and other oils high in Omega-3 fatty acids—can be for weight loss, health, and over all well being. Not all the research agrees (and it never does) but the vast majority of studies strongly suggest the Omega-3 fatty acids from Flax seed oil, fish oil, etc., are very effective for weight loss.

We need more human research to confirm this weight loss effect to the satisfaction of most scientists.

Most of the research over the years has in fact been done on the fish oils, and many people are already aware of such research. Flax oil and other high LNA oils have been more recently studied. The human body can, in fact, make the fish oils DHA and EPA from the LNA found in flax oil (via desaturase enzymes), but some controversy still exists as to how efficiently it's converted which is why some still recommend fish oils over flax.

Some studies suggest the conversion of LNA (found in flax) to EPA and DHA (the “fish oils”) is more efficient than commonly believed. One study called “Dietary substitution with an alpha-linolenic acid rich vegetable oil increases eicosapentaenoic acid (EPA) concentrations in tissues (*Am. J. Clin. Nutri* (59 [6]: 1304-9, 1994) examined this issue.

This study took thirty healthy volunteers and separated them into two groups. Group one ate a high LNA and low LA diet. The other group ate a high LA and low LNA diet, which is more typical of the average Americans diet. The study ran for eight weeks, which is a relatively short time. At the end of four weeks the group receiving a high LNA and low LA diet had significantly higher levels of EPA in their plasma lipid fractions than the group receiving a high LA/low LNA diet.

For another four weeks both groups were given fish oils supplements. The group that got the flax oil and fish oil supplements had far higher levels of EPA than the group getting fish oil without the flax oil leading researchers to conclude “the

*results indicate that alpha-linolenic acid rich vegetable oils can be used in a domestic setting (in conjunction with a background diet low in LA) to elevate EPA in tissues to concentrations comparable with those associated with fish oil supplementation."*

This is only one of six studies that found ingesting flax oil does raise EPA in tissues reliably and predictably. This does not however mean pre formed EPA and DHA don't have their uses, and one study that fed people 6grams of fish oil per day found significant weight loss.

In my experience flax oil is quite effective for fat loss and providing other health benefits. In my view, there may be reasons not to use the fish oils as the sole source of Omega-3 fats. They are far more susceptible to oxidation and rancidity. The production of fish oils for use as a supplement is not as well controlled as for flax seed oil and fish oils can contain toxins such as PCBs and other compounds. Fish oils do have their therapeutic uses however.

For a full explanation on the differences between the various lipids (fats) discussed in this e-book, as well as lipids not covered here, I am afraid I must again direct you to the books previously mentioned.

### **What does the real world have to say?**

In the vast majority of people who have added flax oil to their diet (or other oils high in Omega-3 fatty acids), improved fat loss has been the result. How much fat loss seems to be fairly individual and depends on many factors and physiological variables such as diet, exercise, initial fatty acid status, and bodyfat levels. Fish oil supplements also get high marks for fat loss with most people.

## **Recommendations**

Flax oil has been a particular interest of mine for years. As some people may already know, I was the first person to popularize the use of flax oil with bodybuilders and other athletes for fat loss.

As I hope you can appreciate, I have attempted to distill a great deal of complicated information regarding the essential fatty acids and their effects on fat loss in this section, and I have of course left out a considerable amount of information in order to get to the point and offer a simple recommendation. However, you should certainly get the jist of it.

I generally tell people to take 1-3 tablespoons of flax oil per day mixed in a protein drink, put over a salad with some vinegar, or taken straight from the bottle. Don't bother with the capsules as it takes 12-14 capsules to equal one tablespoon, which becomes expensive and inconvenient.

However, most people don't like vague advice and request a specific figure. So, I recommend one tablespoon of flax oil for every 75lbs of bodyweight, though more can be used if desired.

In fact, many "large and in charge" high level bodybuilders take up to seven tablespoons of flax oil a day before a contest and were still losing bodyfat on that much oil! People do not get fat on flax oil, period.

Ill informed nutritionists who might tell you “all fats will make you fat and should be avoided” as they are simply incorrect and have not done their homework.

There are however a few points to consider regarding flax oil. For one thing, flax oil, like all poly unsaturated oils, is very sensitive to heat, light, and oxygen. It should never be heated or cooked with and should be kept in the fridge after opening the bottle.

Secondly, when a person increases their intake of such oils, they should also increase their intake of anti-oxidants such as vitamin C, E, selenium, and others. A good anti oxidant complex is recommended.

Finally, there is a draw back to taking large amounts of flax for long periods of time, and that is the possibility that one could end up with a deficiency in the Omega-6 EFA's.

What to do?

Several companies have developed oil products to address the issue of potential imbalances from long term flax oil intake. For example, Dr. Erasmus (the fat guru) has a product aptly named “Udo's Choice Ultimate Oil Blend.” (Note: long before the bodybuilding community became aware of the importance of the essential fatty acids for fat loss—thanks in large part to yours truly—Dr. Erasmus was extolling the virtues of the essential fatty acids for health, fat loss, and performance.)

As previously mentioned flax oil is particularly rich in Omega-3 essential fatty acids (LNA) but is actually a poor source of the Omega-6 fatty acid, LA. This makes flax oil "Omega-3 rich" and "Omega-6 poor" for long term use.

Many writers on nutrition have made the mistake of telling people that flax oil is a good source of the essential fatty acids, which is not true. It is a good source of the Omega-3 essential fatty acids but lacks adequate Omega-6 EFA's for long term use.

There are two schools of thought on how to look at this problem as it relates to the essential fatty acids. One school of thought says that most people already eat far too much Omega-6 oils (which they do) and far too little Omega-3 oils (also correct), and taking flax oil will bring you into balance. The other camp believes flax oil is too rich in Omega-3 essential fatty acids and taking it exclusively will lead to an Omega-6 deficiency.

I know this is getting complicated, but it will all come together in a minute.

Where do I stand on this issue? I think both assumptions are correct depending on the population (or individual) you are looking at. What various companies have done is alter the ratio of Omega-3 to Omega-6 by mixing different oils together to get something closer to a 2:1 ratio of Omega-3 to Omega-6, as opposed to the 4:1 ratio of flax oil. What this does is bring the ratio closer to what is optimal (and avoids any imbalances) while keeping it an Omega-3 rich product that we find gets the best results. In addition, several companies have added other important and useful ingredients for health and fatty acid metabolism such as: lecithin, vitamin E, GLA, etc..

As you can see from the above discussion, not only do we need to get adequate amounts of both the essential fatty acids (LNA and LA), but we need to take them in the proper ratios with respect to one another. I have recently seen some of the companies that make these types of products, producing oils in a 1:1 ratio of LNA to LA, but I definitely prefer a product with more emphasis on the Omega-3 essential fatty acids. I have seen much better results in health, fat loss, and muscle gains, from an Omega-3 rich product.

Perhaps the best way of getting maximum fat loss benefits from such products is to use them most of the time, throwing in a bottle of flax once in a while. The person can then switch over to flax oil exclusively during specific times when losing fat is the immediate goal.

I have found using this strategy with bodybuilders before contests is an optimal solution, and I consider this strategy the best of all possible worlds. I have gotten some pretty impressive results with it. A person can, of course, make their own oil blend with various LNA and LA ratios by mixing LA rich oils with the flax oil, but products such as Udo's Choice just makes life easier, and many such products contain other useful ingredients.

As far as bang for the buck, flax oil and other oil blends are about the best weight loss health/improving product around in my humble opinion. As for fish oils, my advice is to eat at least two - three servings per week of fish known to be high in healthy fish oils, such as salmon and others.



## **GH RELEASING SUPPLEMENTS**

### **What is it?**

There is a long list of supplements being sold claiming to either be Human Growth Hormone (HGH or GH) or cause the release of GH. The number of nutrients claiming to be able to increase HGH levels is long. The major products in this category currently being marketed can be broken down into three major categories however. There is:

- Homeopathic GH claiming to contain actual HGH
- Growth hormone promoting nutrients (e.g., certain amino acids, vitamins, etc.)
- Secretagogues which are short peptides that supposedly cause a release of GH.

### **What is it supposed to do?**

The role of GH in the human body is extensive and rather complicated with many effects still being elucidated. GH is known to play an essential role in the regulation of bodyfat levels, immunity, muscle mass, wound healing, bone mass, and literally thousands of other functions both known and yet unknown. GH is a peptide 191 amino acids long with a molecular weight of approx. 20,000.

It is produced by the anterior pituitary gland, located at the base the brain. The bulk of the effect accomplished by GH is performed by a related hormone (Insulin-like Growth Factor-1 or IGF-1), which is released predominantly by the

liver and, to some extent, by other tissues in response to GH levels. However, some recent data suggests GH has effects separate from that of its relation to IGF-1.

It is well established that GH levels steadily decline as we age and is partially responsible for the steady loss of muscle mass, loss of skin elasticity, immune disfunction, and many other physical changes that take place in the aging human body. Explaining in detail the many roles GH plays in the human body is beyond the scope of this ebook.

GH releasing nutrients claim to release GH and thus have the positive effects associated with GH.

### **What does the research have to say?**

Research with GH has been both interesting and conflicting. However, the bulk of research with actual injections of GH is compelling. In populations who have reduced GH levels – such as the elderly – injections of GH have been shown to: increase skin thickness and elasticity, improve healing time and reduce infection rates after surgery, decrease body fat, increase muscle mass, increase bone density, improve cholesterol levels (by decreasing LDL cholesterol and increasing HDL cholesterol), and improve exercise capacity.

We will examine the three sections separately.

- **GH releasing nutrients:** The number of nutrients found to possibly cause a release of GH are many, and include the amino acids arginine, leucine, ornithine, and glutamine; vitamins such as niacin, choline and pantothenic

acid, and non vitamin nutrients such as melatonin as well as many others. Although there is a good deal of data showing many of these nutrients can cause a release of GH to some degree, not one study has demonstrated the same effects in humans or animals as is seen with actual injections of GH as outlined above.

- **Homeopathic GH.** These products claim to contain actual GH in extremely minute quantities, which is the nature of homeopathic products, which is they dilute a compound (in this case GH) down to virtually undetectable levels and claim it still has biological effects. Regarding GH, this idea is full of problems. For one, the amounts found in these products are of no biological significance, and even if directly injected at those levels, would have no effects on muscle mass or bodyfat levels. Another major issue is the fact that GH is a very delicate molecule and will not survive the digestive process as the 191 amino acid length of GH will be chopped up by digestive enzymes. There is no solid data showing any of these products effects muscle mass or bodyfat.
- **Secretagogues.** A secretagogue is a generally made up of short amino acid peptides, 6-11 amino acids long, that may survive the digestive process and are orally absorbable. This has been an intensive area of research for pharmaceutical companies looking for a better way to increase GH levels instead of injections. Some studies have shown these pharmaceutical compounds can stimulate the production of significant amounts of GH. For example, one secretagogue made by the huge pharmaceutical company Merck, is called NK677. Research looking at NK677 found it increased the GH pulse during GH production and increased the frequency of the GH pulse. Did this natural “pulse” of GH have an improved anabolic response

over big single injections as studied in the previous research mentioned above? The answer appeared to be no, as there were no changes in muscle mass, strength or bodyfat in young weight lifters or older people who where given NK677. To date, there is no data showing any of the “natural” secretagogues being sold on the supplement market alter bodyfat, muscle mass, or performance, much less the real pharmaceutical versions that are still being researched.

### **What does the real world have to say?**

The feedback on such products for increasing muscle mass or decreasing bodyfat has been almost universally negative.

### **Recommendations**

The problems with this category of supplements are many.

For example, the age and GH status of the person appears to have a great deal to do with any GH being released, and many factors will dictate how much if any GH is does get released.

I have not listed doses for the above nutrients because they vary so greatly nutrient to nutrient. Some data also suggests that other counter regulatory hormones such as the catabolic (muscle wasting) hormone cortisol may go up in response to such products.

None of the GH releasing products listed above have ever been shown to keep GH levels sustained and/or reach high enough levers– as injections of real GH

have achieved – which appears necessary to see any real effects in bodyfat levels or muscle mass.

Also, in younger individuals with Normal GH levels, even GH injections seem to be of little to no benefit.

The benefits of GH injections may be of real use in older populations who suffer from low GH levels. The truth is, GH levels go up and down all the time and can be altered by all sorts of things, from exercise, to standing in the cold, to hitting yourself on the head with a hammer...

Bottom line?

Even if the current "GH releasing" products on the market do have some effects on GH (and I am not convinced they do), there is no reason to believe at this time they will effect muscle mass or bodyfat.

Sellers of such products make them look like the best thing since sliced bread by listing all the known effects of GH in the human body, then pretending their products have been proven to mimic those effects. Problem is they have not been shown to do this and probably never will. Even much of the research using injections of real GH is often conflicting.

For example, one study looked at both young and old people given fairly large doses of GH and put on a weight lifting program. Both groups were given 40mcg per KG of GH daily, which is a good sized dose.

As eluded to above about supplements that claim to raise GH, it's one thing to raise the level of some hormone but a totally different thing to show that a raise in that hormone is leading to more muscle mass or less bodyfat. That is, who cares if the product raises some hormone if in the end it has no effect on muscle mass or bodyfat?!

This research found that GH didn't increase protein synthesis or decrease protein breakdown (anti catabolism) in the young guys lifting weights, even though their IGF-1 levels tripled. Also, there were no changes in strength between the GH group and the placebo group.

In the older group, the guys getting the GH did gain more fat free mass (FFM) than the placebo group. However, the additional FFM turned out to be almost all water and not actual protein accumulation in the group getting the GH. Both groups showed similar strength increases.

So, in total, the amount of actual muscle gained by the older group getting GH was "nada" and it didn't do anything for their strength either.

Their conclusion was that large doses of GH combined with weight training has no additive effects over that of just weight training and IGF-1 levels went up without anabolic effect.

They did however feel that small multiple doses of GH would work better than one large whopping dose as this study used.

So much for GH being the holy grail of fat loss hormones.

This is not to say that GH does not play an important role in the body as a regulator of muscle growth and fat loss, but it is very clear that it is far more complicated than simply raising this hormone by injection or supplements.

Another important thing to know: chronically high GH levels are not by default a good thing and can come with side effects over time, such as insulin resistance, various neuropathies, and other problems.

In case you have not figured it out by now, I consider GH releasing supplements to be perhaps the most over hyped supplements on the market for losing bodyfat and or increasing muscle mass, especially in younger (under 40) people who eat well and workout.

For older individuals who have confirmed low GH levels, GH therapy by injections given by a medical doctor might be worth pursuing. As for safety, the GH releasing supplements appear safe enough.

## **GREEN TEA EXTRACT**

### **What is it?**

Green tea has been used in China, India, and other eastern countries—both as a beverage and medicinally—for centuries. In the west, black tea is by far the more common tea, but green tea is making great strides as a beverage in the west. Green tea is prepared by steaming the leaves then allowing the leaves to dry, while black tea has an added step in that it is allowed to ferment. Because green tea is not allowed to ferment, green tea contains many compounds that would otherwise be lost during the fermentation process. Both forms of tea contain caffeine. In recent years, companies have now been offering green tea extracts, which highly concentrate the active compounds in green tea.

### **What is it supposed to do?**

Green tea contains a long list of compounds that appear to have all sorts of biological effects, from increasing metabolic rate, to being powerful anti oxidants and immune modulators. The major active compounds in green tea extracts are: polyphenols (catechins) and flavonols. These two major categories are broken down into many sub groups of active compounds such as flavanoids, epigallocatechin gallate, epicatechin gallate, epicatechin, epigallocatechin and tannins, as well as other active constituents, including varying amounts of caffeine.

Studies suggest epigallocatechin gallate or EGCG appears to be the most powerful of the catechins. Some research shows it has up to 100 times greater



antioxidant activity than vitamins C and E! As most readers of this ebook should know by now, oxidative stress is associated with a long list of diseases, such as cancer, heart disease, immune suppression, and many other pathologies.

From a weight loss point of view, green tea extracts may offer some real benefits to the dieter. Green tea and green tea extracts do contain small amount of caffeine. Caffeine is known to increase energy levels, help the body to liberate stored body fat for energy, and other functions well known to most people (readers should review the ephedrine/caffeine chapter for more info on caffeine).

Although caffeine alone has the above properties, recent studies have shown green tea may be superior to simple caffeine for liberating stored body fat as a fuel and may be superior to simple caffeine for energy levels and enhanced metabolic rate. Studies have found that the catechins in green tea inhibit the enzyme that breaks down norepinephrine (catechol O-methyltransferase), while caffeine inhibits the cyclic AMP degrading enzymes (phosphodiesterases); also green tea extract may have a greater effect on thermogenesis. It should also be highly synergistic when combined with other thermogenic compounds.

Green tea has a wide range of potential health benefits. As mentioned above, various compounds in green tea extracts act as anti-oxidants, it may also reduce blood pressure, prevents LDL cholesterol from oxidation, may prevent certain forms of cancer, improve immunity, help prevent heart disease, and control blood sugar.

Epidemiological studies suggest that people who drink green tea have significantly lower risks of many diseases, including cancer, heart disease and stroke. Laboratory studies show that green tea extract protects against, and may

be an effective treatment for, many common degenerative diseases as listed above. Green tea catechins are potent anti-oxidants that provide health benefits beyond their ability to neutralize free radicals. Heart disease and stroke are associated with a number of risk factors, yet the surprising news is that green tea appears to mitigate many of these risk factors.

Green tea has been shown to lower LDL cholesterol and serum triglyceride levels. The potent anti-oxidant effects of green tea appear to inhibit the oxidation of LDL cholesterol in the arteries. The oxidation of LDL cholesterol plays a major contributory role in the formation of atherosclerosis. The formation of abnormal blood clots (thrombosis) is the leading cause of heart attack and stroke, and green tea has been shown to inhibit abnormal blood clot formation as effectively as aspirin. When looking at coagulation risk factors in the blood, green tea specifically inhibits platelet aggregation and adhesion via effects that differ from those of aspirin.

Green tea reduces the risk of arterial blood clotting by two known mechanisms. First, green tea inhibits thromboxane A<sub>2</sub> formation, as does aspirin. Second, green tea inhibits another clotting agent called "platelet activating factor" (PAF). Reducing thromboxane A<sub>2</sub> levels is highly desirable. High thromboxane levels not only cause arterial blood clots, but also cause arterial constriction. The inhibition of thromboxane can prevent a heart attack or a thrombotic stroke. Green tea also has been shown to elevate levels of HDL, the good cholesterol that helps remove atherosclerotic plaque from arterial walls. Note that aspirin has some anti-thrombotic effects that differ from green tea, such as inhibition of cyclooxygenase.

Green tea polyphenols are potent anti-oxidants, especially in the brain. Some studies show that the polyphenols most prevalent in green tea (the catechins) are far more potent in suppressing free radicals than vitamins C or E.

Green tea can kill bacteria and appears to promote the growth of friendly bifidobacteria in the intestine and prevents the growth of dangerous intestinal bacterial strains such as clostridia and E. coli. Green tea also appears to be protective to the immune system in cancer patients undergoing radiation or chemotherapy and white blood cell count appears to be maintained more effectively in cancer patients consuming green tea.

Interestingly, some research suggests green tea lowers leptin levels, a major hormone involved in metabolic rate and other important metabolic effects relating to weight gain or loss. One potential down side to green tea is a few animal studies found it reduced anabolic hormones such as testosterone and many other hormones in rats. The list of what green tea has been shown to do in the research is extensive and compelling.

### **What does the research have to say?**

Because green tea has such a great deal of varied research behind it, this section will stick to research looking directly at weight loss or weight loss related effects.

Several compelling studies involving humans and animals exist for green tea extracts and its potential effects on metabolism. For example, a Dr. Abdul G. Dulloo, of the University of Geneva in Switzerland, and colleagues (*Am J Clin Nutr* 1999;70:1040-045 and *Int J Obes Relat Metab Disord* 2000 Feb;24(2):252-8) measured the 24-hour energy expenditure, respiratory quotient, and urinary

excretion of nitrogen and catecholamines in 10 healthy men who received either placebo, caffeine alone, or green tea extract.

Compared with placebo, the green tea group had significantly increased 24-hour energy expenditure, significantly decreased the 24-hour respiratory quotient, and increased 24-hour urinary norepinephrine excretion. The effects did not appear to be due to the caffeine, since subjects receiving amounts of caffeine similar to that found in green tea (approx 50mg) had no changes in any of the same measurements. No changes in urinary nitrogen were observed either.

What this translates into is this; the subjects getting the green tea extract had a higher metabolic rate and were using significantly more body fat (beta oxidation) for fuel which translated into an additional 800 calories burned over the 24 hour period without any change in urinary nitrogen. The group getting the caffeine alone did not experience these effects relative to the green tea group, which leads one to believe green tea has its own unique effects beyond that of its caffeine content. It also suggested that the green tea group burned fat without sacrificing lean body tissue (muscle), which is essential to the dieter, (see ten tip guide for the importance of muscle mass to the metabolism).

In one animal study using mice, green tea was fed to the mice at between 1 and 4% of their diet for 4 months. The study found that the mice receiving the green tea at all levels ate far less food and gained less overall body weight and accumulated less body fat.

On what might be one of the few negative finding of green tea, is a study that found green tea modulated hormone levels in rats. Green tea catechins into rats and studied for their acute effects on the rats' endocrine systems. Interestingly,

the researchers found that EGCG, (considered to be the most powerful catechin in green tea), significantly reduced testosterone levels, estradiol, leptin, insulin, insulin like growth factor 1 (IGF-1), LH, glucose, cholesterol, and triglycerides! They also found that the EGCG, but not other catechins, reduced the growth of the prostate, uterus, and ovary in the rats.

### **What does the real word have to say?**

Most people report a definite added fat loss benefit to adding a green tea extract to their fat loss supplement regimen, but not everyone reports this effect. The reason may be the wide variation in green tea quality seen on the market.

### **Recommendations**

As alluded to above, there is a wide range of quality in green tea extracts on the market. Also, manufacturers will often be extracting different compounds and or may concentrate different compounds in the green tea, which may not specifically be what a person wants for weight loss per se.

Truth is, high quality green tea extracts containing high levels of active compounds are expensive and rarely used in the cost conscious supplement industry. The few human studies done used a green tea extract containing approximately 90mg of EGCG. People should look for a green tea extract standardized to at least 60% polyphenols with EGCG as a marker compound. If people want to drink green tea, they will have to down about to 4-10 cups of strong brewed green tea to get those amounts of polyphenols.

As for the study that found green tea lowered hormone levels, I don't put great stock in that as it was injected into the rats at high doses, rats are not people, and no studies to date have found any problems with green tea in humans.

However, bodybuilders and other athletes interested in maximum muscle mass may need to at least keep that possible issue in mind, though I have never had a single person tell me they lost muscle from using green tea extracts.

As for any safety issues, studies have shown people drinking up to 20 cups per day failed to find any significant side effects. Of course, 20 cups of tea is a high dose of caffeine, and typical side effects of high caffeine intakes such as insomnia may occur.

People that combine green tea with other stimulants such as ephedrine and caffeine products need to also adjust for that. Also, because green tea can "thin" the blood, individuals taking aspirin or other anticoagulant medications should be aware blood clotting times (bleeding time) could be increased which has both positive or negative ramifications.

## **GUGGUL LIPIDS**

### **What is it?**

Guggul lipids are derived from the guggul plant, also known as Commiphora Mukul. Guggul lipids contain active compounds called guggulsterones. Guggul has been used in Indian Ayurvedic medicine for hundreds, perhaps thousands, of years.

### **What is it supposed to do?**

Guggul is best known for its effects on cholesterol and triglyceride levels. It has been used to reduce total cholesterol levels while increasing HDL (the “good” cholesterol) levels. Guggul is also prescribed for weight loss in some Ayurvedic texts. Regarding for weight loss, guggul is supposed to stimulate the thyroid gland to increase production of thyroid hormones. Thyroid hormone levels are often suppressed in people from certain nutrient deficiencies, long term low calorie intakes, certain diseases, among other factors.

A “slow” thyroid is often a key area of concern for people trying to lose weight. A slow thyroid (often referred to as sub-clinical hypothyroidism) will make it very difficult for a person to lose weight or keep it off long term. There are many health risks associated with an underactive thyroid and guggul may be able to help with that issue. Companies are selling guggul as a way of possibly increasing thyroid activity and thus making it easier to maintain a higher metabolic rate and improve weight loss.

## **What does the research have to say?**

The majority of research with guggul has focused mainly on its effects on cholesterol levels. Studies on both animals and people suggest guggul is as good, or better, than many of the current lipid reducing drugs currently prescribed to people for reducing cholesterol levels.

The exact mechanism of how guggul achieves its cholesterol lowering effects has not been fully elucidated. It may be related to guggul's supposed effects on the thyroid gland as increased thyroid activity is associated with a reduction in cholesterol levels.

One recent study in mice suggests guggul lowers cholesterol levels by being an antagonist of the FXR receptor, a nuclear hormone receptor that is activated by bile acids. Guggul decreased hepatic cholesterol in mice fed a high-cholesterol diet but was not effective in mice lacking an FXR receptor. This fact leads researchers to conclude it's the inhibition of the FXR receptor which is responsible for this herb's cholesterol-lowering activity. It's clear however that guggul has additional effects.

For example, research has shown guggul's lipid lowering activity is related to an increase in LDL breakdown (catabolism), as well as other possible mechanisms have been examined. For example, studies with guggul have seemed to show it inhibits certain enzymes involved with cholesterol storage and clearance while increasing the fecal excretion of sterols and bile acids. Other interesting research suggests guggul may be protective to heart tissue; may have strong anti-inflammatory properties, and for some odd reason, helps cure acne.



As far as weight loss is concerned, little has been done to examine this assertion, although studies from older Indian research mentions weight loss as an effect from the use of guggul lipids. Animal research looking at its effects on the thyroid appears to show thyroid activity increases but human studies are limited or inconclusive. The one recent study that examined weight loss and guggul combined with other compounds is covered in the next section.

### **What does the real world have to say?**

General feedback has been limited and mixed. Most people report no weight loss from taking guggul as the only weight loss nutrient, but very few people have tried it for that use in my experience.

### **Recommendations**

There is no doubt that guggul lipids are an interesting topic with potentially useful applications, such as reducing total cholesterol and triglyceride levels. The lack of modern research examining the effects of guggul on weight loss, combined with lack luster feedback, is a problem but certainly does not mean it is worthless.

The mixed feedback may be due to several of the following issues:-

(a) Thyroid is clearly essential for the regulation of metabolic rate/weight loss, there are many factors that have to be considered, such as GH, UCP's, insulin levels, neurotransmitters, androgens, leptin levels, estrogen levels, and about a hundred other variables, so people are not going to find thyroid output and

function as the be all and end all of fat loss. It is definitely however one important and worthwhile angle to pursue.

(b) While there is still some debate, guggul does appear to positively affect thyroid output, but the effect may not be great enough to cause weight loss. The thyroid is not the only regulator of the body's metabolism or our ability to lose fat. It's very possible that guggul is useful as part of a formula that combines other nutrients (See next section on guggul and phosphates mixtures for further info).

For people interested in trying this product, research on guggul for reducing cholesterol generally used 50-75mg of guggulsterones per day in divided doses. There does not seem to be any major known side effects at this time. However, anything that has the potential to greatly alter thyroid metabolism has the potential for problems in certain people. In particular, if a person has clinical hypothyroidism and is being treated with synthetic thyroid medications, the addition of guggul could have some negative and unknown interactions.

Best advice is for people who are using thyroid meds to avoid guggul products, or be willing to work closely with a doctor to fine tune the dosage of their medications (assuming the guggul has any effects). For people not using thyroid meds, there should not be any issues. However, I would still recommend cycling this product 6-8 weeks on and 2-4 weeks off as a good though unproven schedule.

How do you know if you have a slow thyroid? What should you do if you are already taking thyroid meds?

There has been an ongoing controversy for decades as to whether or not people with sub clinical hypothyroidism should be treated. Recent studies suggest such people should be treated. People given thyroid medication with "normal" but low thyroid hormones have shown reductions in cholesterol, improvements in energy and general feelings of well being with no side effects. One recent study (Sept. 1999 Ann. Intern. Med.) also found that people with hypothyroidism had higher levels of homocysteine which were brought down by thyroid medication. This may also be the case for people with sub clinical hypothyroidism as well. If you suspect you have a slow thyroid, you need to find a doctor who treats people with sub clinical hypothyroidism rather than a doctor who tells you you don't need it.

If you suspect you have a slow thyroid, have a doctor run a full thyroid panel including: T4, T3, TSH, free T3 and reverse T3. Secondly, make sure you are taking in all the nutrients needed for proper thyroid function, such as kelp (which contains iodine), L-tyrosine (see tyrosine section for more info), zinc, B vitamins, vitamin C, minerals, essential fatty acids, and adequate calories. Consider using a guggul/phosphate mixture (see next section). Try this strategy for a month or so and get retested.

If that does not work, that is raise your T4 and T3 levels while lowering TSH, you will probably need to have a doctor prescribe a small dose of thyroid medication if they can pin point the cause.

What about thyroid medication if you have to go that route?

Again, this has been something of an ongoing controversy in the medical community. There are two main thyroid hormones. Thyroxine (T4) and tri-iodothyronine (T3). T3 possesses about 5 times more activity than T4. The body

converts T4 into the more active T3 as needed via an enzyme. The general logic by most medical professionals in the US has been to give people synthetic T4 (brand name Synthroid) and let the body convert it to T3 as needed. Most docs in the US don't use T3, while it's more commonly prescribed in other countries. In the old days, doctors prescribed natural desiccated thyroid (brand name Armour Thyroid) which is a mixture of T4 and T3 with other naturally occurring constituents found in thyroid, including the rarely talked about thyroid hormones T2 and T4.

Although many modern traditional doctors have all but dismissed the natural thyroid products, alternative practitioners have found the synthetic thyroid meds did not work as well as the natural Armour thyroid. Many alternative MDs continue to prescribe Armour rather than the synthetic T4 or T3. Thus a controversy arised as the majority of medical professionals feel simple T4 is fine. Armour thyroid is probably superior, and some studies suggest that a mixture of T4 and T3 is superior to either alone.

For example, a recent study published in the New England Journal of Medicine (NEJM, 340: 424-429, 1999.) found that a combination of T4 and T3 was more effective than T4 alone for improving mood and neuropsychological functions of people with hypothyroidism. I can also tell you that people who have taken T4 and switched over to Armour often report they feel better and have more energy.

If you need thyroid medication, I suggest the use of the Armour product. If you already take thyroid meds for some condition, you might want to consider talking to your doctor regarding the use of Armour thyroid . With sub-clinical hypothyroidism, most docs will start a person off on a half to a whole grain of Armour thyroid. This dose may be higher or lower depending on what the doctor

feels is needed however. Each half grain or Armour has approximately 19mcg of T4 and 4.5mcg of T3.

## GUGGUL/PHOSPHATE MIXTURES



### **What is it?**

I am going to cover guggul/phosphate mixtures as one section as I did with ephedrine/caffeine products. The reason will become apparent shortly. For a full explanation of guggul, see the previous section on guggul lipids. Phosphates are the “P” in ATP. As most people know, adenosine triphosphate (ATP) is the often called the “universal energy storage molecule” in the human body.

### **What is it supposed to do?**

Guggul lipids were covered in the previous section, and therefore only a short explanation is needed here. Guggul lipids (containing various guggulsterones) have been shown to reduce cholesterol and triglycerides. They may possibly improve thyroid function, and have other potential health uses. The role of ATP would take an entire biochemistry text book to cover, so we will narrow our discussion to the topic of weight loss and its possible synergism to guggul and thyroid function.

Even narrowing our discussion of ATP to weight loss and thyroid function is going to get a tad complicated and will need some set up. Bear with me. We all know you have to reduce calories to get the body to lose weight. As most people already know from their own diet experience, the body responds to a decrease in calories by slowing down the metabolism. As mentioned in the previous section

on guggul lipids, the thyroid gland is a major player in the regulation of metabolic rate.

There are two primary thyroid hormones, which are thyroxine (T4) and tri-iodothyronine (T3). T3 is about 5 times more active than T4, and this interplay is one of many ways the body regulates metabolism. That is, the body will convert T4 to T3 as needed or block the conversion as needed to speed up or slow down the metabolism in response to caloric intake and other factors.

When the body senses a reduction in calories, there is a reduction in the conversion of the thyroid hormone T4, to the more active T3, thus slowing down the metabolism and potentially reducing the effectiveness of the diet. This is one of several reasons diets fail to be effective after a short period of time, thus forcing the person to restrict calories even further and beginning a vicious cycle. Therefore, anything that can reduce or delay this reduction in thyroid hormones should have positive effects on fat loss.

Another important point to know about metabolic rate and thyroid hormones: Most of the conversion of T4 to T3 takes place in the liver. When a person is well fed they have a high ATP storage.

When we diet, ATP stores decline and the liver appears to be the main sensing organ of this system. If liver ATP declines, the body senses this and adjusts the thyroid output and conversion of T4 to T3 downward, that is to say, the conversion of T4 to T3 is partially dependent on the ATP status of the liver. Therefore, anything that can maintain liver ATP should fool the system into thinking it is well fed, thus hopefully maintaining adequate thyroid output. This is where the use of phosphates may come in.

Phosphates may allow a person to maintain a higher liver ATP content without eating extra food. Translated, by ingesting phosphates (a non-caloric ATP substrate), it may be possible to maintain liver ATP levels without adding any calories to the diet and the person can maintain a higher metabolism.

Further translated, you take in stuff that can be made into ATP, tricking your system into thinking you are eating plenty of food, even though it has no caloric value. Got all that? Go ahead, and read it again, I can wait.

### **What does the research have to say?**

The research on guggul was covered in the previous section on guggul lipids. Several studies using a combination of mixed phosphates (the “P” in ATP) fed to people appeared to show an increase in metabolism and a maintenance of T3 levels in people who were put on a diet. One study found that when thirty overweight women who participated in 8 week “slimming program” were given supplemental mixed phosphate/mineral tablets, they maintained higher T3 levels and resting metabolic rate over a group not getting the supplement.

However, the actual rate of weight loss was similar in both groups. The study found during the periods of phosphate supplementation, the resting metabolic rate (RMR) increased in addition to the effects on thyroid hormone levels. The study concluded “This effect seems to be, at least partly, due to an influence of phosphates on peripheral metabolism of thyroid hormones.”

Another study with the long name of *Effect of Phosphate Supplementation on Metabolic and Neuroendocrine Responses to Exercise and Oral Glucose Load in Obese Women During Weight Reduction* found essentially the same thing. The



study had thirty six chunky women (BMI 29.5 to 44.0 kg m<sup>-2</sup>, aged 27 to 45 yrs) participate in the 4- week weight-reducing program. They were put on a low calorie diet and given phosphate supplements and were found to have a higher RMR and maintained higher levels of T3 which normally would have dropped with reduced calorie intake.

However, there was little or no difference in weight loss between groups getting the phosphates and those not getting them, and that's an important point. The authors of the study stated "In conclusion, the present study confirmed a potential usefulness of phosphate supplementation during energy restriction in obese patients due to its effect on resting metabolic rate. The results did not, however, reveal any major alterations in the metabolic and hormonal responses to exercise or to glucose ingestion in comparison with placebo treatment."

So far, research with phosphates, though interesting and promising, does not seem to show it has effects on weight loss when used as the only supplement. Hence the reason for this section of combining guggul and phosphates as one section. A recent study that looked at the combination of guggul and phosphates did in fact seem to find real effects on weight loss.

The study was a prospective, double blind, placebo controlled study involving 18 people. Each person was put on an 1800 calorie diet and workout, done three days per week doing 45 minutes of circuit training and aerobics, which is not very strenuous by most standards. After six weeks, the study found that the group receiving the guggul/phosphate mixture lost three times more fat than the placebo group or control group (9.4lbs of fat lost for the guggul/phosphate group vs 3lbs and 2.9lbs for placebo and control group respectively) while neither group experienced changes in muscle mass.

These results would suggest that there is a possible synergism between guggul and phosphates, similar in effect to that of ephedrine and caffeine. Of course, EC products work through very different mechanisms than that of the guggul/phosphate product used in this study. The product used in the study (Metabolic Thyrolean) also contained the ingredients choline, garcinia cambogia, and tyrosine, but the main effect was believed to come from the guggul/phosphate mixture.

The study also found no side effects. An interesting side note is that, the study also looked at something called a Profile of Mood States (POMS), a common psychological test used to test the mood of subjects. The POMS test found that the people getting the guggul/phosphate formulation were less prone to fatigue and had better mood scores. They just felt better than the other groups not getting the product. Some research suggests phosphates may improve athletic performance by altering the lactic acid buffering system of the body, but that has been a mixed bag and inconclusive.

### **What does the real world have to say?**

The feed back for guggul lipids as covered in the previous section has been mixed or disappointing. Feedback for phosphates has been disappointing regarding weight loss, although some people feel they have more energy and strength when using phosphate supplements. Feedback for the product that combines the two, on the other hand has been generally positive for the most part.

This leads me to believe that neither ingredient alone has enough effect on metabolism to help with weight loss, but together, there may be synergism (The

US patent office was also convinced enough regarding the idea of a synergistic effect of these two ingredients to award the manufacturer and sponsor of the study, Prolab Nutrition, a composition patent on the formulation.

Of course, patents are not a guarantee that something works, but if a company goes through the time and expense to protect their findings and product, it may be inferred the information has perceived value.)

### **Recommendations.**

I have made it a rule not to mention brand names in this weight loss booklet with the exception of Udo's Choice Oil in the Flax oil section. I have made a special consideration in this section by mentioning the company that first marketed the guggul/phosphate mixture because they have the patent and sponsored the study.

I felt both Udo's Choice Oil and Prolab Nutrition's product were unique enough to warrant it, and I just like to give credit where credit is due.

Those who wish to read up on the specific guggul/phosphate product used in the study can read the full article on the topic at my web site at BrinkZone.com or directly at <http://www.brinkzone.com/thyrolean.html>.

Many bodybuilders and other athletes, as well as "normal" people, have been generally positive about the mixture of guggul and phosphates for weight loss. My advice at this time is it's a "worth a try" supplement. There is decent research behind it. There has been generally good feedback, it's safe and not terribly expensive.

However, I don't think guggul/phosphate mixtures will prove superior to EC products for fat loss but they (a) may be a particularly good combination with EC based products and (b) may be a good alternative for those who can't tolerate the EC based products.

## **GLYCO MACRO PEPTIDES (GMP)**

### **What is it?**

Glycomacropeptide (GMP) is a protein sub fraction found in some whey protein supplements. Whey proteins are derived from cow's milk and contain many sub fraction proteins and peptides, including GMP. When we talk about whey we are actually referring to a complex protein made up of many smaller protein subfractions (peptides) such as: Beta-lactoglobulin, alpha-lactalbumin, immunoglobulins (IgGs), glycomacropeptides, bovine serum albumin (BSA), and minor peptides such as lactoperoxidases, lysozyme, and lactoferrin. Each of the sub fractions found in whey has its own unique biological properties.

Whey protein appears to be a powerful natural food with a host of positive effects on human health, such as improved immunity.

### **What is it supposed to do?**

GMP may be able to help people trying to lose weight by stimulating the release of a hormone called Cholecystokinin (CCK). CCK has many functions in the human body. CCK plays an essential role relating to gastrointestinal function, including the regulation of food intake in animals and (hopefully) humans. In addition to being a regulator of food intake, CCK stimulates gallbladder contraction, stimulates bowel motility, regulates gastric emptying, and stimulates the release of enzymes from the pancreas. CCK also has effects on the central nervous system.

In particular, CCK is often referred to as a "satiety hormone," meaning it is a hormone that tells the brain when a person has eaten enough food. This means that CCK is considered to function as an important regulator of satiety and food intake.

### **What does the research have to say?**

In animals, CCK is directly related to food intake. Increases in CCK will cause reductions in food intake and consequently weight loss in many animals studied, such as mice, rats, and dogs. Interestingly, new born infants who are breast-fed have much higher levels of CCK and take in less food than formula fed infants. Another interesting tid bit is that one of the ways nicotine may exert its anorectic (appetite suppressing) effects is by raising CCK.

In rats exposed to nicotine, CCK levels are much higher and food intake much lower, resulting in weight loss. In humans, the exact relationship of CCK to food intake and weight loss is not as clear (so what else is new?) though CCK is clearly related on some level to food consumption. In the past few decades, the mechanisms of what signal tells people to stop eating (i.e., the satiating effect of food that terminates a meal) have been clinically investigated in animals and humans.

The research has revealed that peptides such as cholecystokinin (CCK), pancreatic glucagon, and bombesin are released by ingested food in the gastrointestinal tract and are related to food intake. The release of these gut based peptides appears to decrease meal size in a dose-related manner without toxicity. Perhaps more importantly to people, the stimulation of these peptides appears to

decrease meal size without decreasing the reported pleasure or satisfaction of the meal.

Research into the use of these peptides may find them to be a new class of appetite suppressing agents, though more human research is needed but progressing rapidly. There is limited, though interesting, research showing GMP from whey increases CCK. A clinical study done by a Dr. Maubois from France found that the ingestion of whey by healthy volunteers resulted in a substantial elevation in CCK being released. What he did not check, however, was if this large increase in CCK resulted in less food being consumed or if any weight loss occurred.

There is no conclusive human research using GMP or whey containing GMP, that has looked directly at the issue of weight loss in response to CCK release.

### **What does the real world have to say?**

This is not one of those things where people can say "my CCK went up, and I ate less and lost weight from using whey supplements containing GMP." However, it has been observed that the use of whey protein supplements during a diet seems to make dieting easier for most people.

Many athletes, especially bodybuilders, rely heavily on whey based supplements when dieting. Whether or not this is related in some small part to a release of CCK by GMP is of course unknown, and many other factors could be related to this positive feedback regarding whey.

### **Recommendations.**

Whey is one of my personal interests and I have written as much, or more, on this topic than anyone. It's a shame we don't have a clear cut study showing that GMP raises CCK in people who then eat less food and lose weight. However, whey is known to have so many potential health benefits not only to athletes and dieters, but everyone else, that the addition of a few scoops of whey to any weight loss plan is a no-brainer in my book.

People interested in knowing more about the many health benefits of whey can read my special article that will be given you as a free gift for purchasing this ebook. You should receive an email about this, but here's the link for easy reference:- <http://aboutsupsupplements.com/bonus/bonus1.htm>

If GMP in whey is ultimately found to be great for weight loss, then the people using whey will be ahead of the game.

A few important points however: GMP in whey can range from 0-25%, depending on how the whey is produced. For example, ion exchange whey proteins (a popular type of whey used by athletes) contain virtually no GMP. Whey proteins are very persnickety about how they are processed, and many of the subfractions are easily lost due to certain processing methods employed.

I recommend well made whey using processes that preserve the sub fraction ratios naturally found in the whey. Cross flow micro filtration (CFM™) is one process that does a great job of this. Again, people interested in knowing more about the issue of whey processing and the preservation of peptides found in whey (i.e. GMP, etc.) are directed to the web site above for more information.



The topic is too complicated and detailed to cover here. People wishing to use whey as a possible adjunct to weight loss can try one scoop 30-40 minutes prior to meals one to three times per day. Athletes often use more, up to six or more scoops per day (Most scoops are a 20g serving). There are no known side effects of using whey proteins, though individuals with severe milk allergies should try a small amount first and consult their doctor.

Although CCK is linked to the control of human food intake, people have to understand it's a very complicated system in human beings. Much more so than mice and rats.

There is a great deal of research going on looking at drugs that will reduce appetite that should be hitting the market in the not too distant future. One such drug is called C75. The hypothalamus appears to be the part of the brain (known as the limbic system) that is involved in the regulation of hunger and eating. By mapping blood flow in the brain, scientists have found it takes approximately 10 minutes for the human brain to signal it is full after a meal. Amazingly, one recent study found this system works differently in thin people vs overweight people. That is, the brain's response to food is significantly different in thin people vs fat people.

Scientists have found C75 is a compound that turns off appetite and causes weight loss in mice, and may work through the pathway mentioned above. Originally, C75 was being tested as a cancer drug when it was found to have a remarkable effect on weight loss and food intake. C75 appears to be using a major pathway in the brain the body uses to signal when it has eaten enough food. In one day, C75 reduced food intake by more than 90% in mice!

Although humans and mice are quite different, us humans are known to have a similar mechanism in the brain controlling hunger and C75 seems to work in the appetite center of the brain.

C75 may work by lowering levels of a hormones such as Leptin or neuropeptide Y, both of which are known to control appetite and hunger in man and animals. This is only the tip of the iceberg regarding new research and drugs that get to the heart of the obesity problem, especially in affluent countries such as the US.

Controlling the signals of hunger and appetite (no they are not the same thing) is the key to weight loss, and future drugs will work by manipulating CCK, Leptin, neuropeptide Y, to name the major players. The use of GMP may be a major step in that direction.

## **HYDROXYCITRIC ACID (HCA).**

### **What is it?**

Hydroxycitric Acid (HCA) is derived from the fruit of the *Garcinia cambogia* plant, a plant found in South Asia.

### **What is it supposed to do?**

HCA is marketed as being able to block the conversion of excess carbohydrate calories into stored bodyfat. HCA blocks an enzyme called ATP-Citrate Lyase. This enzyme is involved in the early production of fat synthesis. By blocking this enzyme, it's believe more carbohydrate calories will be stored as glycogen in muscle tissue and the liver while less excess calories from carbohydrates will be stored as body fat.

The basic metabolic rule is, when the body tops off its stores of glycogen (stored muscle sugars) any excess carbohydrates will be burned off as heat (i.e. thermic effects) and stored as bodyfat. ATP-Citrate lyase is a key enzyme in that system. HCA is marketed to a lesser degree as an appetite suppressant. It may also enhance thermogenesis, which is the production of heat from food and may be beneficial in reducing total cholesterol and LDL ("bad" cholesterol) levels.

### **What does the research have to say?**

In vitro (test tube) research has shown HCA to block ATP-citrate lyase. In animals, HCA appears to be a legitimate weight loss agent. Several decades of

animal research has shown HCA to be a good appetite suppressant, presumably by sending the fullness (satiety) signal to the brain after changes in glycogen status in the liver. Rats and mice given HCA eat less food and gain less bodyfat from the food they ingest.

The real issue here is that there has been little contemporary human research or data regarding the effects of HCA on weight loss with several studies finding no effects in people. As we all know, the metabolism of rats and humans are quite different so the positive animal studies may not be duplicated or possible in humans.

### **What does the real world have to say?**

HCA is a product that has been around for quite a while. The vast majority of feedback regarding weight loss with people using HCA has been negative in my experience. At higher doses, some people do feel HCA has a mild anorectic (appetite suppressing) effect.

### **Recommendations.**

The use of HCA for weight/fat loss may seem bleak from the above discussion, but I actually hold out some hope for this product. HCA may have had poor feedback and results because of several factors. One factor may be simple dose. Most weight loss formulas containing HCA don't have enough for a measurable response. HCA probably needs to be taken in the multi gram range (1000 to 5000mg) in divided doses per day to have any effects, if it is to have any effects at all. I would consider 1000mg per day of the more absorbable forms (see below) to be a minimum daily intake.

Another factor may be the form of the HCA. Up until recently, HCA products were in calcium-HCA form and this form may not be very absorbable. Newer HCA types can be found as potassium and potassium/magnesium forms of HCA salts. These may well have better effects in people at lower doses. Finally, these HCA products are approximately 50% actual HCA. Therefore, people have to look at the label to see what actual dose of HCA is being taken (Note: Some products may contain far less than 50% actual HCA). For example, a 1000mg dose may contain 500mg of actual HCA, and this has to be figured into the total daily intake. Unfortunately, the dose needed to have an effect (if there is any effect) is expensive.

HCA appears to be a very safe supplement with no known side effects. People who wish to try HCA should start with 250mg of HCA 30-40 minutes prior to a meal three times a day and increase the dose until an effect is observed. HCA may turn out to be a worthwhile weight loss supplement after all, but the limited and/or negative human research combined with lack luster feedback, does not bode well , I still believe it holds some promise.

## **LIPOTROPIC**

### **What is it?**

The number of nutrients that can be considered a “lipotropic” are many. Probably the best known nutrients people associate with the term lipotropic are inositol and choline. However, nutrients such as methionine, betaine, niacin, lipase, and various herbs such as Milk Thistle, are also referred to as lipotropic nutrients. Some of the lipotropic products are naturally occurring in the human body (e.g. lipase) while some are amino acids (e.g. methionine) and others may be derived from herbs (e.g. Milk Thistle) or vitamins such as Niacin.

### **What is it supposed to do?**

As a general rule, the term lipotropic is a catch all term to include any nutrient(s) that can help the body both prevent the storage of fat while assisting the body to detoxify wastes and excrete toxins. Lipotropics generally work with in the liver and digestive system and assist these organs in the detoxification of wastes and excretion of toxins. Lipotropics may help to emulsify fats, some may help to increase bile release, while still others may prevent fat absorption, to name a few possible mechanisms of the lipotropic nutrients. It is a large group of nutrients with diverse and different mechanisms of action with a similar goal.

### **What does the research have to say?**

As you can plainly see, the number of nutrients considered lipotropic makes it difficult to look at specific studies. Many of the lipotropic nutrients have been

found to have potentially medicinal uses, such as niacin being recommend for lowering cholesterol, but the lipotropic concept for weight loss is pretty much uncharted territory as far as real research is concerned.

### **What does the real world have to say?**

Do you have to ask ☺ ?

### **Recommendations.**

Lipotropics, such as inositol and choline, have been around for ever as weight loss supplements and they don't do a bloody thing for weight loss. Some may, in fact, be a helpful ingredient in a weight loss formula for various reasons, but used alone are not effective weight loss products.

However, it's a broad category of products. For example, choline is a precursor to certain neurotransmitters and may have an additive effect to some formulas, but it's a tough thing to prove. Betaine may help improve digestion, and that can be beneficial to certain individuals who are deficient in stomach acids and have associated digestive problems often improved by the use of betaine and digestive enzymes. Many studies have shown the cholesterol lowering abilities of niacin, but whether it affects weight loss is debatable and unproven by medical science.

My general recommendation at this time: If a lipotropic nutrient is found in some weight loss formula that has other effective ingredients, no harm is done and it may or may not help. Probably not. Products sold exclusively as lipotropic formulas (i.e. inositol and choline supplements) are unlikely to have any appreciable effects on weight loss. It's also impossible to give a run down of the

possible side effects of the lipotropic nutrients as there are so many of them, often working through totally different mechanisms. For example, the side effects of too much betaine could cause a stomach ache and heart burn. The side effects of high dose niacin are totally different and range from flushing to burning skin sensations. As a rule however, none of the general lipotropic nutrients currently sold as such would be considered toxic.



## L-TYROSINE

### What is it?



Tyrosine is an amino acid which is an essential precursor or “building block” to the neurotransmitters responsible for maintaining metabolic rate. L-Tyrosine is the direct precursor to stimulatory neurotransmitters such as epinephrine and noropenephrine (i.e. adrenaline) as well as certain thyroid hormones and dopamine. In other words, L-Tyrosine is a precursor to important stimulants to the metabolism. It is also considered a non carbohydrate ATP substrate.

Tyrosine is a precursor to CCK (see section on glycomacropeptide for a discussion on the effects of CCK). High amounts of tyrosine are found in foods high in protein. The body can make tyrosine from the amino acid phenylalanine.

### What is it supposed to do?

As the above would imply, tyrosine is an important amino acid for maintaining a higher metabolic rate. As people reduce their calories during a diet, less tyrosine is available to make the natural stimulants to metabolism. Therefore, the metabolism slows down making it harder to lose weight.

Less building blocks for stimulants means a slower metabolism. This is an overly simple explanation, but you get the idea.

This may be one more way the body has built its own safety net to respond to less calories being eaten. By taking L-tyrosine as a supplement you supply the building blocks to these important neurotransmitters responsible for maintaining metabolic rate. This may allow the dieter to bypass some of the metabolic down regulation from a reduced calories diet, thus maintaining a higher metabolic rate making weight loss easier and avoiding plateaus.

Tyrosine may also act as an anorectic (appetite suppressing) supplement via its effects on CCK and other mechanisms. Tyrosine is also sold as a mild stimulant and some feel it may be useful for depression. Under stressful conditions, food sources and phenylalanine to tyrosine conversion may be inadequate to maintain the essential neurotransmitters needed for optimal performance.

### **What does the research have to say?**

The research with tyrosine as a weight loss agent is limited. However, there are studies showing tyrosine can potentiate the anorectic effects of other weight loss compounds, such as phenylpropanolamine and ephedrine making their effects more prolonged and effective. Several animals studies demonstrated that tyrosine is a powerful potentiator of the appetite suppressing qualities of the ephedrine based supplements.

Although human studies using tyrosine mixed with ephedrine are limited, one would expect similar results as found in animals. Because of the extreme complexity of human metabolism and appetite control, effects in people may not be as dramatic as those seen with animals.

Tyrosine does not appear to increase the thermogenic effects of the ephedrine caffeine products, but work at the level of the brain to reduce food intake and maintain the availability of stimulatory neurotransmitters. There is research suggesting that the positive effects of ephedrine and other compounds are actually limited by the availability of L-tyrosine.

One area tyrosine shines in the research relates to its effects on mental acuity and stress. The military has been particularly interested in tyrosine for use with troops. Tyrosine may also have direct applications to athletes in rigorous training susceptible to Over Training Syndrome (OTS).

Several studies done by the US Army found animals given supplemental L-tyrosine were more resistant to cold temperatures than those not getting the amino acid. Studies with humans given supplemental L-tyrosine have found improved cognitive function when subjected to cold temperatures. One recent study found that 21 cadets fed 2 grams of tyrosine a day then subjected to a demanding military combat training course, reduced the effects of stress and fatigue on cognitive task performance.

Several studies have found tyrosine to be a stress fighting nutrient that may counter some of the negative effects of prolonged sleeplessness. As a further test of tyrosine's efficacy, 36 Navy SEALs ingested L-tyrosine during Winter Warfare training. Either tyrosine or a placebo was consumed by the men, who were then exposed to temperatures as low as -10° F. The study found SEALs getting the L-tyrosine prevented the decline in mental acuity common to extreme cold conditions.

At least one study found L-tyrosine reduced levels of the catabolic (muscle wasting) hormone cortisol, and this effect is a major plus to both soldiers and athletes alike.

Studies done by the Naval Aerospace Medical Research Laboratory, Massachusetts Institute of Technology (MIT), and The US Army suggest L-tyrosine may be useful in counteracting stress-related performance decrement and mood deterioration:

- By preventing various forms of stress induced brain depletion of catecholamines (adrenaline), especially norepinephrine.
- By helping to sustain brain norepinephrine levels which are closely related to stress-induced performance decrements.
- The administration of tyrosine may minimize or reverse stress-induced performance decrement by increasing depleted brain norepinephrine levels.

Showing just how complex human metabolism is, one study found tyrosine increased appetite in women with anorexia. What this shows however is that tyrosine's general anti stress effects are probably causing the effect. Several recent studies suggest tyrosine may improve exercise tolerance, treat mild depression, and a host of other positive effects, but this comes as no surprise considering tyrosine's role in metabolism as explained above.

### **What does the real world have to say?**

Because few if any people take tyrosine for weight loss alone, feedback is limited. However, many people feel the addition of tyrosine to various weight

loss "stacks" is helpful. Many athletes also feel taking tyrosine prior to exercise has a mild stimulating effect. People often report a general improvement in mood when taking L-tyrosine.

### **Recommendations.**

Tyrosine is probably a classic example of a supplement that alone has little effect on weight loss, but when combined with other nutrients, may have synergistic properties.

The evidence that tyrosine potentiates the effects of the EC based products is certainly compelling enough to warrant using it.

Some weight loss formulas already contain tyrosine but often not enough to have the desired results. In general, a minimum dose is 1000mg per day although higher amounts are not uncommon. Studies that have found positive effects with tyrosine have used considerably more, ranging from 2000mg (2g) to 15000mg (15g) daily.

Tyrosine is not a particularly expensive supplement so adding tyrosine to other weight loss formulas is not difficult. Tyrosine is not known to have any serious side effects.

However, because it's a mild stimulant and works at the level of the central nervous system, people using MAO inhibitors, pregnant women, people with high blood pressure, and people sensitive to stimulants, should avoid high doses of tyrosine. People who wish to try tyrosine should try 500mg-1000mg two to three times a day on an empty stomach 30-40 minutes prior to meals for best results.

It can also be taken prior to a workout for added energy. The combination of a black cup of strong coffee and a few grams of tyrosine is a great pre workout mixture used by many athletes "in the know."

## **MEDIUM CHAIN TRIGLYCERIDES (MCT's).**

### **What is it?**

Medium Chain triglycerides (MCT's) are a type of lipid (fat). MCT's are different from other lipids because their length and structure differ from long chain fatty acids that are found in the normal diet. MCT's are technically a saturated fat with 8-10 carbon lengths, as opposed to long chain fatty acids which have 16, 18, or more, carbon lengths. MCT's are derived from the fractioning of other oils, usually coconut oil.

### **What is it supposed to do?**

MCT's are fats with some unique biological properties from that of other lipids. They were originally designed for use with people with digestive disorders that caused malabsorption of long chain fatty acids.

MCT's are absorbed and utilized more efficiently than other fats. Long chain fatty acids we all know and love to eat must be transported in small fat-containing globs known as chylomicrons and then passed through the lymph system. MCT's, on the other hand, are transported through the small intestine into the portal blood and go directly to the liver to be burned as energy, thus bypassing the normal route for fats. MCT's can also bypass the carnitine shuttle system (see section on carnitine for more info) and can enter the mitochondria directly to be oxidized, or "burned," as energy. This is one of several reasons MCT's are less likely to be stored as bodyfat than long chain fatty acids.

MCT's may also increase thermogenesis (heat production) and preserve muscle mass during certain catabolic (muscle wasting) states such as cancer, burns, post surgical, HIV, and other ailments where trauma or disease contributes to a loss of muscle mass. MCT oil is often marketed to athletes as a sports nutrition supplement as it is a calorie dense energy source less likely to end up as bodyfat. MCT's are also sold as a weight loss supplement by some companies.

### **What does the research have to say?**

MCT's have demonstrated a wide variety of effects in animals leading to less bodyfat storage and additional energy being lost as heat (i.e. thermogenesis). In both human and animal research MCT's seem to increase the thermic effect of food and increase daily energy expenditure (EE); which means the energy is lost as heat rather than stored as bodyfat. The substantial number of studies with animals would lead one to believe that MCT's may be a great dieting and fat loss aid for people.

There are also studies showing in severe catabolic states, such as burns, certain types of cancer, etc., that MCT's are helpful for maintaining nitrogen balance and muscle mass. A handful of human studies have shown the energy expenditure after eating MCT's is higher than for other types of fat, which would suggest that over time the use of MCT's should help with weight loss. Again, the few studies that have looked directly at the use of MCT's for weight loss are generally disappointing, finding no effects on weight loss.

Why?



Some research suggests MCT's have a more pronounced effect on the release of the fat storing hormone insulin than other fats as well as having other effects that might counter its positive influence on fat loss. MCT's may have a sort of biphasic dual effect that cancel each other out.

One review paper on the topic theorized the reasons for this lack of effect. "Findings in support of the opinion (lower energy density, control of satiety, rapid intrahepatic delivery and oxidation rates, poor adipose tissue incorporation) may be invalidated by counteracting data (stimulation of insulin secretion and of anabolic-related processes, increased de novo fatty acid synthesis, induced hypertriglyceridemia). The balance between these two opposing influences depends on the composition (energy intake, nature of ingredients, MCT/LCT ratio, octanoate/decanoate ratio) and duration of the regimen."

Translated, the positive effects of MCT's (increased burning of fats, decreases in hunger, the reduced likelihood of MCT's being made into bodyfat, etc.) may be offset by some potential negatives. Those negative may be an increased release of the fat storage hormone insulin, an increase in the production of triglycerides, and other factors.

The net effect may be no fat is lost, at least in humans, though more research is needed for definitive answers. MCT's have genuine medical uses where digestion of fats and various liver problems exist, as well as having possible anti catabolic (muscle sparing) effects in hospitalized patients.

**What does the real world have to say?**

MCT's are a supplement that just never took off with people. Athletes have used the products to one extent or another for many years, but MCT's have never been very popular in the sports nutrition arena either. The general feedback is neither very exciting nor very compelling for athletes or people trying lose weight.

### **Recommendations.**

MCT's are a classic example of what looks good on paper not panning out in the real world. It's not that MCT's are of no potential use to the dieter, but in healthy people, they just don't seem to have dramatic effects. There are drawbacks to using MCT's. In many people, they cause stomach upset. Also, they can cause an odd, scratchy sensation in the back of the throat. As they contain no essential fatty acids (EFA's) a person still needs to take in additional fat to avoid any EFA deficiencies. Nor do MCT's contain fat soluble vitamins such Vitamin E, D, and K essential to human health.

In theory, MCT's should be a helpful addition to a weight loss diet, but in practice they are neither needed nor all that effective in healthy people.

There are no serious side effects of using MCT's, but as they are not a normal part of the human diet in any appreciable amounts, long term effects in healthy people is questionable in my view.

One product that might have real promise however, is something called a structured lipid, which is a hybrid combination of MCT's and Omega-3 fatty acids joined together. In the research, this looks like a great supplement with some interesting properties. To my knowledge, structured lipids have never been marketed as a commercial product for use by athletes or dieters. People interested

in using MCT's should add a few teaspoons a day to their diet and work their way up to several tablespoons per day over a few weeks.

## **PEPTIDE FM**

### **What is it?**

Peptide FM, also known as Globin digest, is made from the protease (enzyme) treatment of certain proteins to create peptides (oligopeptides) of a specific length and sequence. Peptide FM is derived from various proteins, including cows blood (yuk).

### **What is it suppose to do?**

Peptide FM is supposed to be able to reduce fat deposition from both the intake of fat and carbohydrates in the diet at both the digestive and cellular level. In theory, Peptide FM inhibits lipogenesis (fat storage) in both liver and adipose (fat) tissue as well as inhibiting certain enzymes involved with the production and subsequent storage of fat in fat cells. Other effects may be an increase in beta-oxidation (fat burning) and a reduction of triglycerides, as well as other benefits is claimed.

### **What does the research have to say?**

Peptide FM appears to have some interesting properties that may be of use to people trying to lose weight. Invitro (test tube) and animal research suggests Peptide FM works on a variety of mechanisms to prevent the absorption of dietary fats and synthesis of bodyfat.

Its effects can be found at both the digestive and cellular levels. On the digestive level, Peptide FM was shown to reduce the uptake of fats and carbohydrates by mechanisms yet to be fully explained. On the cellular level, it was found to increase beta-oxidation (fat burning) and inhibit certain enzymes involved with the storage of fat (FAS and GPDH) and the production of triglycerides.

In mice, rats, pigs, and dogs, Peptide FM was shown to reduce bodyfat and reduce serum triglycerides from eating both fats and carbohydrates.

In a double blind clinical trial using real live human beings, Peptide FM reduced bodyfat by approximately 3% in one month in people taking about 1.6g a day. In this study, doses ranged from about 0.6 g/day (600mg a day) to 2 g/day (2000mg per day). They concluded that the higher dose was more effective than the lower dose.

So what's the downside of Peptide FM research? For one thing, exactly how it does what it does is not well understood, but it does not appear to pose any dangers to the user. It may work by mimicking some of the satiety hormones such as CCK (see section on glycomacropeptide for more info on CCK) or by causing a release of those hormones. There may be direct effects from Peptide FM on preventing fat synthesis as mentioned above. The real problem with the studies mentioned is they have never seen the light of day in a peer reviewed medical or scientific journal.

Most of the information we have on peptide FM, including the information above, comes from "in house" research published by the Japanese pharmaceutical company that manufactures it. There are however a few studies that were

published in 1996 and 1998 on Peptide FM regarding its effects on blood lipid levels (i.e. cholesterol and triglycerides.).

A 1998 study called “Suppressive Effect of Globin Digest on Postprandial Hyperlipidemia in Male Volunteers” came to some interesting conclusions. The study was a parallel crossover trial conducted with men who consumed a high fat diet (25 g fat, 7.6 g carbohydrate, 1.9 g protein and 0.7 g sodium chloride) or the same diet supplemented with Peptide FM. The amounts used in the study ranged from 1 to 4 grams of Peptide FM per day. In the men receiving the higher doses of Peptide FM, blood levels of triglycerides were greatly reduced.

The researchers concluded “In these trials, globin digest (Peptide FM) reduced the increase in serum chylomicron triglyceride concentrations as a result of the ingestion of a high fat diet. This hypotriglyceridemic effect of globin digest may be valuable for preventing obesity and in lowering the incidence of cardiovascular diseases.”

Another study found essentially the same thing after feeding people olive oil. This study also looked at some of the possible mechanisms through which Peptide FM achieved these impressive results. The study found Peptide FM did not suppress peristaltic movement nor delay gastric emptying, that is, Peptide FM did not change the rate at which food was moved through the digestive tract, but did find that the excretion of the olive oil was greater than that of the control group.

More importantly to weight loss perhaps, the study found Peptide FM caused an activation of certain enzymes involved in fat metabolism and clearance (hepatic triglyceride lipase, or HTGL).

The study concluded that Peptide FM inhibited fat absorption in the digestive tract and enhanced activity of certain enzymes involved in clearance of dietary dietary fats. These results could have an effect on weight loss.

### **What does the real world have to say?**

Very few people have used Peptide FM in the U.S., so feedback in this country has been limited so far. I can not offer you a clear picture of its real world effectiveness at this time. Two years after the first version of this book, and feedback is pretty much non existent.

### **Recommendations.**

It is my understanding that Peptide FM has been sold in Japan for some time as a weight loss product. If this product proves to be as good as its claim and research suggests, it may be a useful addition to the dieters arsenal of fat loss nutrients.

The studies I have read make it seem almost too good to be true, and things that appear too good to be true, usually means the catch hasn't been discovered. For example, studies indicate that although Peptide FM can block the absorption of dietary fats and carbohydrates, it does not interfere with the absorption of fat soluble vitamins and essential fatty acids.

Sorry, but the human body rarely, if ever, works on the "having your cake and eating it too" principal.

There are a few companies in the U.S. that sell Peptide FM as a dietary supplement, but it is not a popular item in the U.S. yet. Peptide FM is also quite

expensive and using the 1- 4grams per day needed is a costly proposition. No side effects have been reported in any of the studies. Peptide FM comes under the "might be a worth a try" category if the person does not mind parting with the money.



## **PYRUVATE**

### **What is it?**

Pyruvate is technically a byproduct of glucose (blood sugar) metabolism. When the body breaks down glucose for energy it enters what is called the glycolytic pathway. Glucose enters the glycolytic pathway and is broken down through successive enzymatic steps arriving at pyruvate. Think of pyruvate as half a glucose molecule, or glucose divided into two. That’s basically what it is. Once pyruvate is formed it can enter the all important TCA cycle, which is the ultimate producer of ATP and other high energy compounds in the body.

### **What is it supposed to do?**

The various companies selling pyruvate claim it will increase energy, improve athletic performance, and help people trying to lose weight get more “bang for the buck” from their diets.

### **What does the research have to say?**

The human studies done with pyruvate have looked promising but not miraculous for weight loss. The majority of research on pyruvate and weight loss has been carried out at the University of Pittsburgh by a Dr. Stanko and colleagues. One study took two groups of obese woman who were put on very low calorie diets (VLCD) for 21 days. One group had approximately 20% of their low calorie diets replaced with pyruvate and they lost more weight overall (5.9kg

vs 4.3kg) and fat in particular (4.0kg vs 2.7kg) than the group that did not receive the pyruvate.

An earlier study done by the same group of researchers had similar results with basically the same setup (i.e. very low calorie/low fat diets and pyruvate replacing roughly 20% of the study participants' calories). In one of the most recent studies done by Dr. Stanko and colleagues, 17 women were put on extremely low calorie diets for three weeks followed by diets consisting of 150% of maintenance calories to see if pyruvate and dihydroxyacetone (another three carbon metabolite of glucose) could partially block the rebound weight gained from such low calorie diets.

The group that received the pyruvate and dihydroxyacetone while eating the high calorie part of the study gained less weight (+1.8kg vs +2.9kg ) than the women who did not receive these glucose metabolites.

In one of these studies, the women getting the pyruvate sustained a slightly higher metabolic rate, which is also important for long term weight loss.

Finally, for preventing weight gain, one study found that on a 46% fat diet (that's a high fat diet) pyruvate failed to prevent weight gain but it did slightly reduce total cholesterol and diastolic blood pressure, therefore appearing to have some health benefits for the people eating a high fat diet. Recent research appeared to show that a dose as low as 6 grams per day caused statistically significant weight loss, with an increase in lean body mass (muscle). It was however a small study and other research generally indicates a need for much higher intakes to get a response from pyruvate.

Pyruvate may have some potential use in the treatment and control of type II diabetes and other ailments. Diabetes is characterized as a disease relating to abnormalities in blood sugar regulation. Research was conducted to see what effect pyruvate might have on blood sugar levels and utilization. The main job of the hormone insulin is to pull blood sugar out of the blood stream and deposit it into other compartments such as muscle tissue ( to be stored as glycogen for future energy needs).

When food intake exceeds glycogen storage capacity, the body can convert glucose into bodyfat. In type II diabetes the main problem is "insulin resistance." That is, tissues have become unable to accept blood sugar from insulin with the result of the blood sugar building up in the blood stream causing a host of physical problems common to type II diabetics (see discussion on Syndrome X in the section on chromium for more information on blood sugar related health issues).

Being skeletal muscles are the main repository for glucose following a meal, it is easy to see that anything that improves the muscles ability to react to insulin (i.e. improve insulin sensitivity) will help the type II diabetic control this disease.

One study using pyruvate with type II diabetics showed reductions in blood glucose and possible improvements in insulin sensitivity. If future research shows similar results with pyruvate and diabetics, it could have legitimate uses in diseases involving blood sugar regulation, though further research is clearly indicated.

Some research points to possible performance applications of pyruvate. As mentioned previously, pyruvate can be thought of as half a glucose molecule,

which is to say that glucose is a six carbon molecule and pyruvate is a three carbon compound derived from glucose. The body stores glucose in the muscles for future energy needs in the form of glycogen: when we exercise, the body breaks down this stored energy or "muscle sugar" to fuel the production of ATP for energy.

It should come as no real surprise that the intake of pyruvate can spare muscle glycogen during exercise and increase the rate of glycogen storage in the muscles after exercise.

For runners and other endurance athletes, this could result in greater endurance. There has been research demonstrating pyruvate improved leg exercise endurance and improved endurance on a group of people tested on an arm crank machine. An increase in stored muscle glycogen causes the muscles cells to swell thus making the muscles appear larger. Pyruvate may have uses for bodybuilders as well as endurance athletes.

The practice of "carb loading" to increase glycogen stores and make the muscles appear larger is a common practice of bodybuilders pre-contest and pyruvate might also have uses during a carb loading phase, although I see no advantages over eating good old carbohydrates for the same purpose.

### **What does the real world have to say?**

The bulk of feedback I have gotten regarding pyruvate has been negative regarding weight loss. This may be due to the fact that no one can afford to take the dose needed for an effect on weight loss. Or it could be the possibility that

pyruvate simply does not effect weight loss. The form pyruvate comes in could also be an issue.

## **Recommendations.**

So what are the potential downsides of pyruvate? With only exception, all the research to date has been based on very high doses of pyruvate. For example, in the study that showed pyruvate reduced weight gain with VLCDs, 15 grams of pyruvate plus 75 grams of dihydroxyacetone were used.

In the various studies that showed pyruvate assisted in weight loss on very low to moderate calorie intakes, doses ranged from 30 to 53 grams, with pyruvate making up 20% of total calories. That's a heck of a lot of pyruvate. A person would have to take 60, 500 milligram capsules a day to get the 30 grams of pyruvate that was used in the research!

The improvements demonstrated in exercise performance and endurance used at least 20 grams which would equal 40, 500 milligram capsules daily. Besides the obvious inconvenience of taking this many capsules, the costs would be prohibitive. Finally, the amount of weight lost by the group getting pyruvate was not so significantly different from the people not getting the supplement to warrant the investment.

Another important issue is the form pyruvate comes in. Currently, pyruvate offered in either a sodium (sodium pyruvate) or a calcium (calcium pyruvate) form. Both types are considered pyruvate salts. The intake of 15 grams of sodium pyruvate will add 3 grams (3000 milligrams) of sodium to a person's diet.

Thus, the intake of these forms of pyruvate may be limited by the amount of sodium and/or calcium a person wants in their diet or is safe to add to the diet. High intakes of either could potentially cause mineral imbalances over the long term.

There are other variations of pyruvate that would prevent this problem, such as pyruvate connected to the amino acid glycine to make pyruvylglycine. This form would eliminate the dangers of mineral imbalances but has not been well tested in people and is even more expensive than the two types currently being marketed!

Several companies marketing pyruvate and a few magazine articles have claimed that 5 grams might be as effective as the much higher amounts used in the research. This information is based on extrapolations from animal research but there is little human data that shows this to be true.

Therefore, I would not get all that excited regarding those claims that 5 grams will work as well as the higher doses or will "prime the energy pump" to quote one marketing document. It is possible that pyruvate could end up being a useful part of the dieter's arsenal, but the jury is still out as to exactly how useful it will be, exactly how it works, what are the exact doses needed, and for how long it needs to be taken.

So far, I have met very few people who felt they lost weight using pyruvate. There have been no serious side effects reported, nor would I expect any.

People interested in using pyruvate should take at least 6 grams (6000 milligrams) per day as a minimum amount, assuming the one study that found that 6 grams a day to be effective, is correct. I assume I don't have to repeat that weight loss

formulas containing a few hundred milligrams of pyruvate are 100% worthless, right? Hope not...

## **SYNEPHRINE / CITRUS AURANTIUM**

### **What is it?**

Synephrine is derived from Citrus Aurantium, a.k.a, bitter orange or zhi shi. Synephrine is quite similar in chemical structure to compounds such as ephedrine (see ephedrine/caffeine section for a description of ephedrine) and pseudo-ephedrine, which makes it a stimulant and beta agonist.

### **What is it supposed to do?**

Companies selling synephrine generally make the claim it has the same metabolic effects as ephedrine and other beta agonists (i.e. increased metabolic rate, weight loss, etc.) but without the side effects of ephedrine. Although citrus aurantium extracts contain synephrine, they also contain other potentially active compounds such as N-methyltyramine, hordenine, octopamine, and tyramine.

The major claim by companies regarding synephrine is because the active compounds in citrus aurantium stimulate Beta-3 receptors, (but not the Beta 1, or Beta 2 receptors), the negative effects of ephedrine and other stimulants are avoided while an increased metabolic rate takes place.

Beta-3 receptors are concentrated in what is called “Brown Adipose Tissue” or BAT, which is more metabolically active than “regular” white fat and is involved in metabolic rate and other functions, though Beta-3 receptors are expressed in much smaller amounts in both muscle and white fat.



BAT differs from white fat not just in color. BAT has a large number of mitochondria (the part of the cell where energy is produced) that contain something called "uncoupling protein," which can stimulate oxidative phosphorylation and thereby increase metabolic rate. BAT is present to oxidize lipids (i.e. burn fat) in order to produce heat and rid the body of excess adipose tissue (i.e. blubber, fat, lard, or what ever you want to call it).

Let's get a little more technical: agonizing (stimulating) the beta-3 receptor found in BAT, activates adenylate cyclase, which increases intracellular concentrations of cyclic AMP and results in increase lipolysis and thermogenesis. Got all that? If not, don't worry... As one might expect, many big name pharmaceutical companies have also pursued Beta-3 agonists as possible weight loss drugs. For example, Ciba-Geigy has at least one drug, code name - GCP 12177, Sanofi-Midy has another code named - SR 58611A, ICI Labs has at least two, code named ICI D7114 and ICI 215001, and Smith-Kline Beecham has at least four, code named BRL 26830A, BRL 37344, BRL 49653, and BRL 35135 respectively. Other companies have also looked into developing specific Beta-3 agonist compounds for the multi billion dollar weight loss market.

### **What does the research have to say?**

Because Beta agonists were found to simultaneously increase lipolysis, fat oxidation, energy expenditure and insulin action in animals leading to the belief that this receptor might serve as an attractive target for the treatment of diabetes and obesity, research has been intense.

One journal article, ('Potentiations of the anti-obesity effect of the selective beta-3 adrenoreceptor agonist BRL 35135 in obese Zucker rats by exercise' British

Journal of Pharmacology. 1994 Dec; 113(4): 1231-6), said that BRL 35135 (a beta-3 agonist) was given at a dose of 0.5mg/kg orally to half the rats in the study while the other half got a placebo (I don't know why they would give animals a placebo...)

Bodyweight, food intake, brown adipose tissue thermogenesis and plasma insulin/glucose levels were measured in both groups after 3 weeks of treatment. The rats that received the beta-3 agonist showed a 45-fold increase in brown fat thermogenic activity, and a decrease in plasma insulin levels of 50%. The effect of the drug was significantly potentiated by exercise; the reduction in weight gain was 56% in comparison to 19% in sedentary animals.

Another journal article ('Clinical studies with the beta-adrenoreceptor agonist BRL 26830A' American Journal of Clinical Nutrition. 1992 Jan; 55(1): 258S-261S) discusses a double-blind study with 40 obese patients who received either BRL 26830A or a placebo for 18 weeks. Both groups were put on a calorie restrictive diet.

After 18 weeks, the BRL 26830A group had a weight loss of 33.88 lbs. (median) while the control group had a median weight loss of only 22 lbs. Urinary nitrogen excretion was similar in both groups and suggested that the weight loss was mainly from adipose tissue, not muscle.

Psychological assessments showed that BRL 26830A had no adverse effects on mood and no effect on hunger or satiety, which seems odd as most beta-agonists usually suppress hunger. Most people who take drugs such as Clenbuterol or OTC beta agonists such as ephedrine notice a reduction in hunger. Of course it should be noted that this effect was found with a synthetic drug.

Even more important to note is that although there have been some impressive studies; there have also been some spectacular failures in this area of drug development. Major obstacles have included the pharmacological differences between the rodent and human beta-3 receptors, poor oral bioavailability of the drugs as well as other problems. So far, this area of drug development has had a very rocky start.

Specific to synephrine/Citrus Aurantium, studies in animals have suggested an increased metabolic rate and a decrease in food intake in animals given the extracts from Citrus Aurantium. There have been a limited number of studies that were done in humans using extracts of Citrus Aurantium, but they have suffered either serious methodological flaws and or were done as a combination formula containing other herbs, making it impossible to tell exactly what caused the weight loss.

Also, some studies indicate the effects/mechanism of Synephrine may be that it acts as a vaso dilator rather than a true thermogenic compound. The result of which would be, you feel hot to the touch (because of the increased blood flow to the skin) but you are not burning more calories via thermogenesis.

### **What does the real world have to say?**

Feedback to date has been moderate to negative with most people reporting little effect or no effect. Some do report a reduced appetite. Also, as mentioned above, Citrus Aurantium generally comes mixed with other herbs and other compounds in a formula rather than sold as single ingredient, so it's near impossible to separate the effects of the Citrus Aurantium over the other ingredients.

## **Recommendations**

So far, I have not been impressed with this herb for weight loss. The studies done to date that found any effects on weight loss always had it combined with other herbs, so no real conclusion can be made. Studies done alone are mixed and or not very impressive. It may be a mild appetite suppressant however.

It bothers me that companies selling the products claim they "stimulate beta-3 cell receptors with minimal effect on other alpha and beta receptors. This could indicate that Citrus Aurantium increases metabolic rate without affecting heart rate or blood pressure" to quote one company.

There is one very major flaw to this statement. Rats and mice have large areas of fat that are exclusively made of BAT to help them regulate body temperature, body fat levels, and other important metabolic functions, and newborn human babies also have distinct areas of brown fat, but adult humans don't have a lot of distinct brown adipose tissue. At this point, I consider synephrine/Citrus Aurantium as far more hype than backed by solid credible studies showing effects in humans.

As for dose, 4-20 mg of synephrine per day is a typical dose found in products providing 200-600 mg of a standardized Citrus Aurantium extract (3-6% synephrine). As for safety, I think companies pushing it as totally without side effects are misleading the public. Studies have shown both the herb and the synthetic versions can raise blood pressure at high enough doses, but no studies have found any acute toxicity at normal doses.

The warnings for Synephrine / Citrus Aurantium would be more or less the same for ephedrine and other stimulants: people who don't tolerate stimulants well, people with pre-existing medical conditions such as heart disease or any heart irregularities, high blood pressure, or prostate disease, pregnant women, are advised to avoid such products.

Mixing different stimulants (e.g., ephedrine and theophylline, etc.) could increase the potential for side effects above what is acceptable. If using any of the above stimulants in conjunction with EC products, I would recommend cutting back on the dose of EC to account for the additional effects of these other stimulants.

## **YOHIMBINE**

### **What is it?**

Yohimbine is an extract of yohimbe bark, which is derived from the *Corynanthe Johimbe* tree found in Africa.

### **What is it supposed to do?**

Yohimbine is a metabolic stimulant like ephedrine and caffeine. As you may recall, I had mentioned that ephedrine is a Beta-adrenergic agonist, which basically means it can stimulate something called a Beta receptor found on various tissues in the body.

There are different sub classes of beta receptors found on different tissues. It is these beta receptors that are effected by ephedrine, and that's how ephedrine ultimately causes fat loss, although it does have other systemic effects. Another class of receptors is called alpha receptors. Similar to beta receptors, there are several sub types of alpha receptor found in different tissues.

Both the beta and the alpha receptors have a distinctive pattern of response to the catecholamines (i.e. adrenaline). Depending on which of these receptors you stimulate or block, different effects will be seen. Yohimbine is an alpha-2 adrenergic antagonist, which basically means it blocks the sub type 2 alpha receptors. As alluded to in the ephedrine and caffeine section (EC), the topic of beta (and now alpha) adrenergic agonists and antagonists gets complicated rapidly.

Lipolysis (the mobilization of stored bodyfat) can be initiated through stimulation of certain beta adrenergic receptors or by inhibition of certain alpha adrenergic receptors.

Got all that?

Yohimbine is sold as a compound that can improve the effects of the EC based products and is often found combined with those ingredients. It's best known as a possible enhancer of libido in men and may have other medical uses. Some companies sell it as a testosterone booster and sports supplement.

Perhaps most interesting, the stubborn fat on women's thighs is more difficult to mobilize due to a high number and activity of these alpha-2 adrenergic receptors. Yohimbine may help to specifically reduce bodyfat in the more stubborn areas on women, which is most often the thighs and sides of the thighs known fondly as "saddle bags."

### **What does the research have to say?**

Studies in humans that have looked at yohimbine as a weight loss agent have been mixed, with the majority finding no effects. One study with consisted of twenty obese female outpatients who were put on a 3-week, low-energy diet (1,000 kcal/day) Using a double-blind study protocol, ten subjects received 5 mg yohimbine 4 times a day while the other group received a placebo for three weeks, in addition to a low calorie diet.

The study found the yohimbine “significantly increased weight loss” in the group getting the supplement. However, several other studies utilizing larger groups of both men and women, found no effects on weight loss with yohimbine supplements. Several animal studies have found yohimbine has an anorectic (appetite suppressive) quality and dogs fed yohimbine ate less food and lost weight.

One study that tried to use yohimbine as a topical “thigh cream” but found no effects on fat loss in the thighs or systemically (Interestingly, other ingredients did appear to work for spot reduction, but this is not an e-book about fat loss creams, so I will end the discussion of topical creams here).

Of particular importance and concern to the dieter using EC based products, is that it was found that yohimbine added to EC impaired cardiac performance and reduced the ejection fraction of the heart. A similar group in the study getting only EC found no such effects on the vascular system and heart.

Theoretically, yohimbine should assist in weight loss when combined with EC, but there is little proof or research to show it. Studies on yohimbine alone for weight loss have been mixed or unimpressive. Some in vitro (test tube) studies suggest yohimbine can reduce fat synthesis and have other effects that should increase fat oxidation (fat “burning”).

Studies using yohimbine to boost male libido have been promising, and there is a prescription strength product doctors can prescribe for that use. Yohimbine appears to increase blood flow to the penis while decreasing blood flow out, thus making an erection easier and “better.” Some cultures consider yohimbe bark to be a real aphrodisiac.



As indicated above, yohimbine works through non sex hormone pathways and studies have found it does not increase testosterone.

Other studies have shown yohimbine can reduce platelet aggregation, thus potentially lowering the risk of heart attacks and strokes (similar to aspirin's effects on the blood but by another mechanism). Other studies have found yohimbine to be useful in the treatment of congestive heart failure.

### **What does the real world have to say?**

People who have mixed yohimbine with EC based products generally feel it has an additive effect for weight loss. Very few people take yohimbine alone for weight loss, so there is little feedback on that score.

### **Recommendations**

On paper and in theory, yohimbine should be helpful for weight loss, especially when mixed with EC products. However, one plus one rarely makes two in the human body. It often makes three, and sometimes one and a half, but rarely two.

Also, as mentioned in the section on ephedrine and caffeine, there are only so many stimulants you can put in the system, and the above study would seem to suggest that EC and yohimbine combined may be potentially problematic to the heart and vascular system of some people. It makes sense that certain stimulants just don't combine well while others work fine without serious side effects.

My advice to people who want to mix yohimbine and other natural stimulants (i.e. ephedrine, caffeine, etc.) would be to reduce the dose of the other products to

half their normal recommended dose and add in the yohimbine cautiously. Though the positive effects on weight loss of the EC based products may be enhanced by the use of yohimbine, one of the possible side effects could be additive.

My advice for yohimbine is going to be similar for that of ephedrine, or any stimulant for that matter. People who don't tolerate stimulants well, people with pre-existing medical conditions such as heart disease or heart irregularities, high blood pressure, or prostate disease and pregnant women, or people taking MAO inhibitors are advised to avoid such products or to use caution and a little common sense.

One important issue to remember is that studies looking at weight loss have used pure yohimbine, not the yohimbe bark that is found in health food stores. Yohimbe supplements are notorious for containing little if any actual yohimbine. Even good quality yohimbe supplements are approximately 3-4% actual yohimbine. This means, if the product actually contains 4% active yohimbine, it will take 300mg of ground bark to get just 12mg of yohimbine.

Most studies have used doses ranging from 10mg per day in two doses (i.e. 2X5mg) up to 40mg per day in divided doses. I would consider 40mg far too high a dose for long term safety. If combined with EC based products, 10mg-20mg per day of yohimbine in divided doses would be the upper limit.

However, the response to such products is very individual. Lower doses of yohimbine should be attempted to see if any undesirable side effects occur. Translated, some people can drink a pot of coffee at night and go to sleep while others can't tolerate a single cup of coffee at any time.

At reasonable doses in healthy people, yohimbine appears quite safe. However, mixed with other products or taken by people with pre-existing medical issues, the margin of safety is likely to drop. Something to keep in mind if considering mixing various products together.

## **WEIGHT LOSS SUPPLEMENT SCORE BOARD**

(Note: this score board only takes into account the supplements potential effects on *weight loss*, not its possible effects on health, side effects, or contraindications. People using this score board should not overlook the supplements uses for other things, or its potential problems which are outlined in the full description of each supplement in the e-book)

### **Supplements/nutrients worth using:**

- EC based formulas
- Flax oil, Udo's Oil, fish oils.
- Green Tea extracts
- Guggule/Phosphatidylcholine (Tyrolean)
- Tyrosine

### **Could be worth a try but needs more research and or feedback has been unimpressive:**

- CLA
- 7-Keto DHEA
- GMP
- Peptide FM
- Synephrine
- Yohimbine

### **Probably not worth spending money on (for weight loss):**

- Carnitine
- Acetyl-L-Carnitine
- Chromium
- Chitosan
- Co-enzyme Q10
- DHEA
- Digestive enzymes
- GH releasing nutrients
- HCA
- Lipotropics
- MCT's
- Pyruvate

## **Part 3 – Bonus Reports**

### **10 TIPS FOR SUCCESSFUL, HEALTHY, LONG TERM FAT LOSS.**

**By William D. Brink**

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#### **Tip 1 - Weight Training (Resistance Training)**

Although your aim may be to lose fat rather than build muscle, everybody likes a lean and “toned” body, and that’s what weight training (resistance training) will accomplish.

It’s a little known and under appreciated fact that the more muscle you have the more calories you burn, and a higher resting metabolic rate (RMR) is the result. As you can plainly see, resistance training is essential to fat loss and maintaining lean body mass (muscle).

In fact, it’s as important as aerobics if not more so.

The truth is, if a person has limited time for either weight training or aerobics, I would recommend the weight training over the aerobics.

Several recent studies have found that resistance training maintains resting metabolic rate (RMR) better than aerobics and studies have shown resistance training is far superior to aerobics for maintaining the metabolically active tissue we need (muscle!) for a superior fat burning metabolism while on a diet. Lean muscle mass is the active tissue that burns calories and maintains our metabolic rate.

Your metabolism is the rate at which your body oxidizes (burns) calories to live.

About 10 percent of your total daily energy expenditure is used to convert the food you eat into fuel or blubber (fat). Another 20 percent or so is accounted for by exercise and the everyday physical activities of life. I don't believe these figures are written in stone, but you can get an idea of where the calories you eat are going at least.

However, the biggest block of energy is consumed by your resting metabolic rate (RMR), which accounts for 70 percent of your daily expenditure. Your RMR is basically the amount of energy used to fuel essential functions such as temperature regulation, breathing, blood circulation and so on.

With the RMR accounting for this big a chunk of your daily calories, it behooves you to focus on the RMR as a key spot to manipulate.

Can the RMR be altered? Of course!

Your RMR is ultimately controlled by your genetic makeup, but age, gender, and body composition also play an important role. Altering your body composition by increasing your muscle mass and decreasing bodyfat will increase RMR.

For example, people who are naturally blessed with a higher RMR will burn up to 200 calories more each day, even when they perform identical activities.

Weight lifting is the only exercise that has been proven to keep a persons metabolism elevated over long periods of time. Resistance training will burn

approximately the same number of calories as if you went for a run or hopped around in an aerobics class, but the calorie burning and metabolism raising effects of weight training continue far after the activity has ended.

Aerobic exercise can never offer that benefit.

After aerobic exercise, RMR returns to normal within an hour or so, resulting in the consumption of a few additional calories. Big deal.

After weight lifting, RMR remains elevated for up to 15 hours! Bottom line, weight training builds muscle and muscle is approximately four times more metabolically active than body fat. The goal of any successful diet should be to gain muscle and lose fat, and that rule applies to everyone regardless of background, sex, or age.

Weight train three to four days per week using rest periods of 30-60 seconds between sets. Workout no longer than an hour to keep anabolic (muscle building) hormones high and catabolic (muscle wasting) hormones low.

Overtraining is a quick way to lose muscle along with bodyfat, which ultimately sabotages long term fat loss.

Maintaining muscle mass is always the goal and a key factor to maintaining a high metabolic rate so fat loss continues at a slow and steady pace.

I highly recommend being a member of a decent health club/gym that has an adequate weight room, though a small investment in a decent set of dumbbells and a bench will give you a perfectly reasonable home gym.



Basic dumbbell and free weight exercise guides are available in every fitness magazine, online, or book store. Consult the weight training report in this e-book for more indepth information regarding weight training and the different exercises and routines to follow.

Bodybuilders and other people already serious about their weight training may want to consult my book [Priming the Anabolic Environment](#) for more advanced routines and tips.

Attempt to lose no more than 1-1.5 pounds of fat per week. Quick weight loss schemes are a sure fired way of losing muscle mass and which only leads to metabolic problems in the long run.

When ever I hear of some person who lost a large amount of weight in a very short amount of time, I know they gave up a large amount of muscle mass, water, and even bone tissue along with the fat. I know they will be unsuccessful in the long run.

## **Tip 2 - Aerobics**

Do aerobics 3-4 days per week for 40-60 minutes on alternating days, or after weight training to burn (oxidize) fat and calories. Aerobics are best done on alternating days from weight training.

Aerobics on an empty stomach also tends to optimize the use of fat for energy which is why many people choose to do their aerobics first thing in the morning when blood sugar is low and free fatty acids are being used as fuel for the body.

You need not kill yourself with aerobics. A steady manageable pace is adequate and will also pay dividends in improving your health in general.

### **Tip 3 - Carbohydrates**

Reduce carbohydrate intake to between 0.8 -1.2 grams per pound of lean bodyweight depending on how active you are.

Below is a simple table you can use to estimate your carbohydrate requirements. These numbers are not set in stone but do provide a good guideline to calculate your diet.

<b>Days per week of exercise</b>	<b>45 – 60 Minutes Weights</b>	<b>40 + Minutes aerobics</b>
<b>One day</b>	<b>0.8 grams</b>	<b>0.8 grams</b>
<b>Two days</b>	<b>0.8 grams</b>	<b>0.8 grams</b>
<b>Three Days</b>	<b>0.8 grams</b>	<b>0.8 grams</b>
<b>Four Days</b>	<b>0.8 – 1.0 grams</b>	<b>1.0 grams</b>
<b>Five Days</b>	<b>1 gram</b>	<b>1.0 – 1.2 grams</b>
<b>Six days</b>	<b>1.2 grams</b>	<b>1.2 –1.5 grams</b>

In the middle column you can see your gram amounts based on performing weight training alone and in the far right column the gram amounts if you participate in weight training and aerobics combined.

For example if you trained three days per week with weights and aerobics as is suggested in the ‘Ten Golden Laws of Fat Loss’ then you should consume approximately 0.8 grams of carbohydrates per pound of lean body weight.

I suggest you workout with weights three times per week and participate in aerobics three times per week. You can find other options for weight training schedules in the Beginner and Intermediate Weight Training Report

If however you choose to train with weights four days per week and do aerobics four days week then you should eat 1 gram of carbohydrates per pound of lean body weight.

Lean bodyweight is your total bodyweight less the weight you carry from fat. The weight left over is the amount of total lean body mass (from muscle, bone, connective tissue, etc.) you carry.

For example, if a person weighs 200lbs pounds and has 20% bodyfat, they would have approximately 160 pounds of lean body mass (200lbs total bodyweight less 20%body fat =160lbs of lean bodyweight, or  $200 - 20\% = 160$ ).

It is the lean bodyweight we want to feed not the additional fat. Therefore, a person who weighs 200 pounds with 20% bodyfat would be eating between 128 and 192 grams of carbohydrates per day -- 200lbs total bodyweight less 20% bodyfat which in this case equates to 40lbs of fat and 160lbs of lean body mass.  $160\text{lbs} \times 0.8\text{grams} = 128\text{grams}$  of carbohydrates.

Avoid simple sugars and eat complex/low glycemic carbohydrates in moderation to reduce insulin output and prevent blood sugar fluctuations. Insulin is the main hormone responsible for the storage of bodyfat and high insulin levels prevent the burning of stored bodyfat for energy.

High carbohydrate diets are not the optimal way to lose fat while preserving lean body mass (muscle). Rely on complex, high fiber carbohydrates such as: oatmeal, lentils, brown rice, and sweet potatoes. Avoid breads, pasta, white rice, and other highly processed low fiber carbohydrate sources, as well as sweets. Keep fruit intake to no more than three pieces of fruit per day.

## **Understanding the Glycemic Index**

The ability of a carbohydrate food to raise blood sugar quickly or slowly is called the glycemic index (GI). The GI was developed to track what foods effect blood sugar at different rates.

Interestingly, many carbohydrates that are considered “complex” have been found to raise blood sugar rapidly while a few “simple” carbohydrates don't have a dramatic effect on blood sugar.

GI rating of a food is based on how much blood glucose rises after consuming a carbohydrate food over a 2-hour period. This is compared to a reference, which is glucose, a simple sugar. Some GI scales now use white bread as the reference, but we will use the glucose scale in this chapter.

For instance, if you consume 50 grams of glucose (yuk), you will get dramatic elevation in blood sugar. If you eat say 50 grams of carbs found in the form of oranges, your blood glucose would probably rise only 44% as high as compared to glucose.

So the GI rating for oranges would be 44 on the glucose scale. Using white bread as the reference carbohydrate, it would be a different number. Capich?

Look at the GI table for a partial list. There is no hard science to what is considered a low or high GI food per se, but a good guide is low is below 50, intermediate is between 50 and 75, and high GI foods are 75 and above on the scale.

### **What is the significance of Glycemic Index and what are it's drawbacks?**

The GI's importance relates to blood sugars affects on the hormone insulin which is the primary hormonal mediator of fat storage, among the hundreds of functions of insulin.

Among its hundreds of different functions, the body uses the hormone insulin to control the amount of sugar (glucose) in the blood, help pull amino acids into the cells and turn on protein synthesis in lean tissues, and is directly linked to regulating bodyfat storage.

Understanding the GI allows a person to keep a steady and predictable blood sugar level which can lead to possible improvements in bodyfat levels, energy levels, etc.

For the diabetic (the original reason the GI was invented) it can mean the difference between life and death.

If you can manage insulin via the GI correctly, you can add new muscle without adding a great deal of bodyfat, and this has been the goal of proper insulin management. It's obvious that athletes and bodybuilders are far more aware than

the general public of the importance of insulin, hence the popularity of insulin potentiating compounds such as chromium and vanadyl sulfate.

Of course, some bodybuilders have chosen to go the Kamikaze route by injecting insulin directly, but it does not take a rocket scientist to realize how dangerous this practice is.

Can you say "coma?"

Also, many bodybuilders who play with insulin injections end up looking more like the Michelin Man than a bodybuilder.

### **What are the drawbacks of the GI?**

For one thing, many people hold it up as the holy grail of dieting, the be-all-end-all of nutrition. It's not. It is however another useful tool in the fight against bodyfat.

Many things can alter the GI of foods. For example, the GI is figured out in isolation, that is each food is tested alone to figure out its GI number. Makes perfect sense from the research point of view, but rarely reflects how people really eat.

Mixing different foods together, the way most people actually eat, can have dramatic effects on the GI of the food in question. Fat, fiber, protein, cooking times, etc. can all affect the GI of a food or a meal for that matter.

Want to lower the GI of a rice cake for example? Smear a table spoon of peanut butter on it. So, understanding the overall importance of the GI can be a useful tool in getting the most out of a diet plan for gaining muscle with minimum bodyfat, but it is far from the last word in nutrition.

### **Research looking at the effects of GI on performance and bodyfat.**

Researchers compared the effects of four different meals using different GI rated carbs. The diets contained 1 gram of carbohydrates per kg body weight fed 1-hour before cycling to exhaustion. For a 200 pound person, that would be 90g of carbohydrates (200 divided by 2.2 = approx 90). The meals were made up of lentils (a low GI food), baked potato (a high GI food), glucose (the reference GI food) and water, which of course has no GI rating as it does not effect blood sugar.

One interesting find of the study was the lentil group burned more fat during exercise than the glucose or potato groups and lasted longer on the bike test than the other groups (Thomas DE et al, 1991).

Several studies have found low GI foods eaten prior to endurance exercise results in more fat burned and improvements in performance (Burke LM et al. 1998). One study found women who consumed a moderate glycemic food 45 minutes before an exercise test lasted 16% longer when fed low GI foods (Kirwan JP et al, 1998), though It should be noted however that not all studies have found this effect of GI on performance.

### **Body fat and the GI.**

As most people are probably aware, Americans are eating less fat but are fatter than ever! One likely culprit is the fact that most people have replaced fat with high GI foods such as "low fat" cookies, cakes, rice cakes, and other high GI foods.

Some research has even found the GI of food can actually alter the eating behavior all day long. One recent study examined how the GI affected eating behavior in obese teenage boys (Ludwig DS et al., 1999). The boys consumed either a high, medium or low GI meal at breakfast and lunch. They then measured how much the boys ate for a 5-hour period after lunch. Each of the meals contained the same number of calories.

Amazingly, the study found food intake was 53% greater after the medium GI meal and a whopping 81% greater after the high GI meal when compared to the low GI meal.

As one would expect, insulin levels were dramatically higher after the high GI meal. The study showed that a single high GI meal can effect how many calories a person will eat many hours later. The reason for this is most likely the effect of the high GI meal on blood sugar (Roberts SB. 2000).

As mentioned, the study found the insulin levels of the high GI meal were much higher than the other meals.

When insulin rushes in to lower blood sugar after a high GI meal, the effect can be low blood sugar shortly after, and thus the body senses the low blood sugar and sends out the hunger signal.



Eating low to moderate GI carbs throughout the day keeps steadier blood sugar levels and thus the body senses that adequate food and carbohydrates are coming in.

The feedback pathways by how the human body controls hunger and appetite (no they are not the same thing) is incredibly complex and beyond the scope of this chapter. Suffice it to say, blood sugar levels, and blood sugar levels effects on insulin, is one key feedback mechanism the body uses to sense incoming nutrients and diverts those nutrients where needed.

There are numerous studies that find eating high GI foods is associated with greater bodyfat levels (Morris KL.1999) and some animal studies have found feeding high GI foods to animals causes them to gain bodyfat.

When you understand the role of insulin in human metabolism, it does not take a PhD in biochem to see why this would happen. One thing is clear, the GI of the carbs you eat will be a factor in how much bodyfat is ultimately produced from the meal and the spike in insulin you will produce (Pawlak DB et al. 2001, Marques-Lopes I et al. 2000, Ludwig, DS et al. 1999).

You know those low fat cakes you were so happy about? Throw em out!

One important caveat. Calories also matter, and although it may be possible to eat greater amounts of low GI carbs vs high GI carbs without problems, it's far from a free for all excuse to stuff yourself with carbohydrates. The body can only 'burn' and store so much carbohydrates as glycogen. After that, increased body fat will be the result. The trick is to eat the correct amount – and types – of carbs

to fill glycogen levels and fuel workouts and daily activities, and make up the other calories in healthy fats and proteins.

## **The GI and Health**

As expected, the GI has also been found to be directly involved with the risk of heart disease and other diseases, such as type 2 diabetes. Eating high glycemic foods can by itself increase your risk of coronary heart disease. In fact, carbohydrates classified by their glycemic index rather than as either simple or complex, were a better predictor of coronary heart disease (Liu S et al.,2000).

To sum up the effects of low GI carbohydrates:

- Eating low GI foods prior to exercise may increase the amount of free fatty acids in the blood therefore increasing fat burning (beta oxidation for you propeller heads).
- Eating low GI foods may result in less food eaten later in the day via improved appetite suppression.
- Eating low GI foods is healthier for you metabolically due to stable insulin levels and a possible decreased risk of heart disease.
- Eating low GI foods may, in the long run, promote lower body fat levels and a more lean, muscular physique.
- Low GI means a smaller rise in blood sugar and can help control established diabetes and may improve blood sugar metabolism of people

with Syndrome X. (most likely due to in an improvement in the body's sensitivity to insulin)

### **Is there a role for high GI carbs for bodybuilders and other athletes?**

After all the high GI carb bashing I just did, you might think there is no place for them in the bodybuilders diet. This assumption would be wrong.

As the expression goes "there is a time and place for everything" and there is one key time and place for high GI carbs; immediately following workouts.

Following workouts the body preferentially shuttles glucose into the liver and muscles replacing lost glycogen via both insulin dependent and non insulin dependent glucose transport mechanisms (Gautier JF. 2001). This is the key time to take advantage of the one thing high GI carbs do well: raise blood sugar and insulin quickly.

Post workout, the catabolic (muscle wasting) hormone cortisol rises. Drinking a post workout drink consisting of high GI carbs and fast acting proteins is perhaps the best way to prevent the post workout effects of cortisol due to the sharp rise in insulin which is known to counter act the effects of cortisol (Kraemer WJ et al 1998) .

Some bodybuilders will eat a high GI meal such as a bowl of white rice or corn flakes in skim milk, and drink a protein shake consisting of whey with it, or mix a carb drink with a few scoops of protein powder.

Interestingly, studies have found a better insulin response when carbs and protein is mixed together post workout over carbs alone (Ivy JL. 1998).

There are specific grams of carbs per kg of bodyweight formulas for post workout carbohydrate and proteins recommendations (Burke LM 1997), but 75-100g of high GI carbs and 30-50 grams of protein is the norm with most athletes and will suffice. These numbers would of course be subtracted from the days total for carbs, proteins, and calories (see below).

In a nut shell -- High GI foods can help refill liver and muscle glycogen stores immediately following exercise and may reduce the catabolic effects of cortisol post workout.

### **GI List:**

<b>Pasta</b>	<b>GI Score</b>
brown rice pasta	92
linguine, durum	50
macaroni	46
macaroni & cheese	64
spaghetti	40
spag. protein. enriched.	28
vermicelli	35
vermicelli, rice	58
<b>Fruits</b>	
apple	38
apricot, canned	64
apricot, dried	30
apricot jam	55
banana	62
banana, unripe	30
cantaloupe	65
cherries	22
dates, dried	103
fruit cocktail	55
grapefruit	25
grapes	43

kiwi	52
mango	55
orange	43
papaya	58
peach	42
pear	36
pineapple	66
plum	24
raisins	64
strawberries	32
strawberry jam	51
watermelon	72
<b>Legumes</b>	
Lentils	28
Soybeans	18
Baked beans (canned)	48
baby lima	32
chickpeas	33
kidney	27
lentil	30
navy	38
pinto	42
split peas	32
soy	18
<b>Grains</b>	
barley	22
brown rice	59
buckwheat	54
bulger	47
cornmeal	68
couscous	65
millet	75
rice, instant	91
rice, parboiled	47
rye	34
sweet corn	55
white rice	88
<b>Dairy foods</b>	
Milk, full fat	27
Milk, skim	32
Icecream, full fat	61
Yogurt, low fat, fruit	33

<b>Breads</b>	
White bread	70
Wholemeal bread	69
Pumpernickel	41
Dark rye	76
Sourdough	57
Heavy mixed grain	30-45
<b>Breakfast cereals</b>	
All Bran Soy' n Fibre	33
Raisin Bran	61
Froot Loops	69
Special K	69
Grape nuts	75
Corn Pops	80
Cornflakes	84
Rice Crispies	82
Cheerios	83
Puffed Wheat	80
All Bran	42
Porridge	46
<b>Snack foods</b>	
Mars Bar	65
Jelly beans	80
Chocolate bar	49

## **Tip 4 - Protein**

Increase intake of lean proteins to 1-1.5 grams per pound of lean bodyweight to increase your metabolic rate, increase anabolic hormones, and prevent lean tissue (muscle) losses during dieting.

Below is a simple table designed to determine your protein requirements.

<b>Days per week of exercise</b>	<b>45 Minutes weights</b>	<b>40+ Minutes aerobics</b>
<b>One day</b>	<b>1 gram</b>	<b>1 gram</b>
<b>Two days</b>	<b>1 gram</b>	<b>1 gram</b>
<b>Three Days</b>	<b>1 gram</b>	<b>1-1.2 gram</b>
<b>Four Days</b>	<b>1-1.2 grams</b>	<b>1.2 –1.5 grams</b>
<b>Five Days</b>	<b>1.5 grams</b>	<b>1.5 grams</b>
<b>Six days</b>	<b>1.5 grams</b>	<b>1.8 grams</b>

The goal is to preserve the active tissue we want (muscle) while coaxing the body to reduce the tissue (i.e. bodyfat) we don't want, or at least want to reduce.

This would mean that for our 200lb example at 20% body fat, this person would be eating between 160 and 240 grams of protein a day. 200lbs total bodyweight less 20% of that weight in bodyfat means our fictional man or woman will have 160lbs of lean bodyweight.

Therefore, at 1gram (bottom end of the protein recommendation) they should be eating 160 grams of protein. The 160 grams is for healthy active people following tips one and two above but it can be as high as 240 grams (160 lbs x 1.5 grams) of protein daily for highly active people. This figure would be for those engaged in competitive level weight training, extreme endurance runners, and other high level athletes. Of course those figures would be much lower for a person weighing less and/or having less lean body mass.

Research has shown conclusively that intense exercise increases the need for protein to maintain muscle mass and performance. From a biochemical, thermic, and hormonal point of view, protein is the least likely nutrient to be converted to bodyfat as well as having many other effects conducive to preserving muscle mass and increasing the metabolism.

High quality low fat protein sources such as skinless chicken, lean red meat, sea food, eggs, and high quality protein supplements should be emphasized during a fat loss diet.

You might be concerned about a "high" protein diet.

First, one must define a high protein diet. In fact, there is no official definition of a high protein diet. For the sake of argument, we will define a high protein diet as anything above the Required Daily Allowances (RDAs).

A pervasive myth about the foods we eat is the notion that protein intakes above the (RDA) are a health risk. This dire warning about higher than recommended protein intakes has been around for decades, and is total nonsense.

Earlier studies suggested high protein diets may be a risk factor for increased rates of bone loss and "stressed" the kidneys. These studies have been shown to be incorrect.

Nutritional myths based on outdated and/or incorrect studies, like old habits, die hard.

More recent and accurate research has shown potential health uses for higher protein intakes, as well as debunking earlier fears based on incomplete and outdated studies.

One recent review study that examined the above issues called "Optimal Intakes of Protein in the Human Diet (Millward DJ. Proc Nutr Soc 1999 May;58(2):403-



13)” came to some interesting conclusions regarding protein and its potential health uses and safety.

The study outlined an extensive body of recent data showing that high protein diets may in fact be beneficial for reducing blood pressure and stroke mortality. Though some early studies appeared to show higher protein intakes caused an excretion of calcium, which would ultimately lead to bone loss, recent studies have debunked that assertion.

On the matter of bone loss, the review paper concludes, “for bone health the established views of risk of high protein intakes are not supported by newly-emerging data, with benefit indicated in the elderly.”

Regarding the potential for protein to stress the kidneys, though research suggests that people with pre existing kidney disease avoid high protein diets, no data has ever shown kidney function to be compromised in healthy adults. A recent study called “Do Regular High Protein Diets Have Potential Health Risks on Kidney Function in Athletes?” examined the renal (kidney) function of athletes who follow a high protein diet. The study failed to find any negative effects of a higher protein intake on the kidney function of these athletes (Jacques R. Poortmans and Olivier Dellalieux. *International Journal of Sport Nutrition*, 2000,10).

So what’s the take home? Higher protein intakes do not appear to pose health hazards to healthy active people, and higher protein intakes may in fact have health uses of their own as has been found in a plethora of emerging research.

## **Tip 5 - Reduce saturated fats but not all fat**

Reduce saturated fats where possible and replace with polyunsaturated fats (PUFS) such as Flax oil, deep water fish, Walnut oil, and mono unsaturated fats from olive oil and avocados. The fats from these sources are considered the "good fats" and need not be avoided but added to the diet.

Research has shown that Omega-3 oils from flax and other sources improve health and assist fat loss. One to three table spoons a day of flax oil mixed in a protein drink, used as salad oil with viniger, or taken straight, will dramatically improve fat loss and long term health.

The Omega-3 oil found in flax oil known as alpha- linolenic acid is an essential fatty acids (EFA's) and is required for optimal health and fatty acid metabolism.

All fats are not created equal and trying to avoid all fats in the diet, as is commonly recommended, is a sure fired way to sabotage a fat loss diet. It will also degrade ones health and performance. You can read all you need to know about flax seed oil, and other fats, in the "Diet Supplements Revealed" section of this guide.

### **Tip 6 - Drink water, don't forget it**

Drink at least 8-10 glasses or more of water per day to prevent dehydration and help liberate fat stores to be burned as energy. Water intake is often cited as the most underrated and overlooked part of fat loss. Increased protein intakes also require increased water intakes.

### **Tip 7 - Multivitamins**

Take a full spectrum multi vitamin and multi mineral supplement to prevent any possible deficiencies that can sabotage the fat loss process, or degrade your health.

There are countless nutrients responsible for our metabolism, health, performance, and over all well being. Deficiencies in one or more nutrients are not uncommon, and has been scientifically validated many times. Regardless of whether or not a person is deficient in some important nutrient, a good multi vitamin and multi mineral supplement is always good insurance for optimizing fat loss and health. Recommended multi-vitamins can be found at the [BrinkZone.com](http://BrinkZone.com) site, but there are many other brands to choose from.

### **Tip 8 - Use only the best fat loss supplements**

Use the highest quality fat loss supplements available to raise metabolic rate, increase energy, prevent muscle loss, and suppress appetite, as discussed in Diet Supplements Revealed.

The information found in Diet Supplements Revealed should allow anyone to make educated and specific choices about the fat loss nutrients they use. Make no mistake about it, supplements can have a substantial effect on fat loss if used properly.

### **Tip 9 - Increase your fiber intake**

Increase fiber intake from fibrous vegetables to increase transit time of food, improve digestion, and improve weight loss.

Increasing fiber intake from vegetables such as broccoli, cauliflower, peppers, carrots, and other raw vegetables adds fiber, minerals, and vitamins, also means adding very few calories.

Raw fibrous vegetables will add bulk to the diet which will reduce appetite. As a rule, foods higher in fiber are lower on the GI scale.

### **Tip 10 - Eat 5 or 6 small meals a day**

Spread food intake over 5-6 meals during the day to improve nutrient absorption, prevent blood sugar fluctuations, and decrease fat storing hormones and fat storing enzymes.

Simply spreading the same number of calories over 5-6 small meals per day, rather than the standard 3 meals per day will improve fat loss.

This is due to the above effects on blood sugar, various hormones, and fat storing enzymes. Adding in the additional 1-9 tips in the Ten Tip guide will insure success in losing fat and preserving muscle

## **HOW DO I WORK OUT MY BODY FAT PERCENTAGE?**

The amount of bodyfat a person carries can easily be figured out by using such methods as skin calipers, hydra static weighing, infra red machines, as well as other methods.

Most health clubs can check a person's bodyfat levels for them using one of these methods.

One inexpensive device for checking bodyfat levels is called the AccuMeasure. This plastic skin caliper is surprisingly accurate and can be done in the privacy of your home. I have personally compared the AccuMeasure to reference medical calipers and found the AccuMeasure to do a great job of giving an accurate approximation of a person's bodyfat.

The AccuMeasure is easy and simple to use. It can be purchased by following the link on this page <http://www.aboutsupplements.com/resources/>

People trying to lose weight often make the mistake of relying solely on the scale to tell them if they are successful with their fat loss plan. This of course tells the person nothing about what they are losing. Is it fat, muscle, bone, or water?

The scale can never give you an answer to that important question. This reliance on the scale has lead to a nation of overweight confused people. Muscle weighs roughly three times more than fat for a given volume. A person could be losing fat and gaining muscle without great changes in actual bodyweight.

However, the person will now find their clothing fits much looser than it used to, which means they are getting smaller. So, a total reliance on the scale is a fast way to sabotage fat loss in the long wrong.

Athletes such as bodybuilders have known this for many years. In fact, many of them never get on the scale and rely totally on bodyfat levels, the mirror, and how their clothes fit. You might not want to get to the extremely low levels of bodyfat of a competitive bodybuilder, but you have to admit they look pretty darn lean considering they don't get on a scale.

## **PUTTING IT ALL TOGETHER**

Many popular diets recommended today are often based on specific ratios. These diets recommend a fixed macro nutrient ratio, such as 40-30-30. Others are more extreme.

Although a ratio might be useful for some people and is easy to figure out, I find it's more effective to figure out diets based on the tissues (i.e. muscle vs fat, etc) we want to effect, rather than a one size fits all ratio.

People come in very different sizes and shapes, different activity levels, ages, and so on.

By following a simple ratio given in many diets currently recommended, I find it allows people greater potential for mistakes in comparison to giving people specific numbers to follow based on the amount of actual muscle they carry and their activity level. This might seem a bit more complicated at first, but becomes much easier to figure out over time, and will yield far better results with a more individual and targeted approach.

In the long run, it's a better way to address the vexing problem of excess bodyfat.

If we continue the example of our 200 pound friend with 20% bodyfat, we end up with 160 lbs of lean bodyweight ( $200 - 20\% = 160\text{lbs}$ ). We are going to assume this is an active person following exercise tips one and two above, but not necessarily a bodybuilder or long distance runner.

Using our lean bodyweight calculations, our friend will be getting 160 grams of protein daily ( $160 \times 1 = 160$ ) which is approximately 640 calories from protein per day. This person will be getting approximately 128 grams of carbohydrates ( $160 \times 0.8 = 128$ ) which is approximately 512 calories from carbohydrates.

Figuring out fat calories is a tad more complicated, and this is due to the flax oil calculations of one 1 table spoon for every 75 pounds of bodyweight (as explained in the Flax oil section of Weight Loss Nutrients Revealed).

Using those calculations for our 200 lb example, we get roughly 3 table spoons of flax oil per day ( $200 \text{ divided by } 75 = 3$ ). This will end up being approximately 42 grams of fat (from flax oil) and 378 calories.

Adding up all the numbers, we find our 200lb person with 20% bodyfat is eating approximately 1530 calories per day (640 calories from protein + 512 calories from carbohydrates + 380 calories from fat = 1530 calories total).

This is just about right for an active person trying to reduce bodyfat while maintaining hard earned muscle mass.

People tend to make far too big a deal out of calories. If you feed the body the nutrients it needs specific to the effect you want to achieve (in this case fat loss while maintaining muscle mass) the calories issue will usually take care of itself.

The body needs nutrients, not calories per se.



In addition to an over reliance on the scale as a measure of success, I would rate counting calories as the second major offense in sabotaging a fat loss muscle preserving eating plan.

No doubt, total calories is a factor, but permanent fat loss will never come from trying to starve yourself, avoiding all fat in your diet, or doing aerobics till your legs fall off.

Permanent fat loss will only happen when there is a long term shift in your metabolism to one that favors fat burning over fat storage. This can only happen when your hormonal profiles and metabolism shift to that mode, because fat loss is ultimately a biochemical and hormonal event.

The food you eat is only as relevant as the hormones and enzymatic pathways that are manipulated.

I have found repeatedly that people can eat a higher calorie intake without gaining bodyfat when the diet is based on high quality proteins, the right type of fats in the correct ratios, and a carbohydrate intake that reflects the hormonal shift to one of fat burning as opposed to fat storage.

Yes, calories matter, but they are far from the only factor relating to losing fat. Don't forget, protein and carbohydrates have approximately 4 calories per gram and fat contains approximately 9 calories per gram, hence the figures listed above.

Those figures can be very deceiving and fail to take into account the unique effects the different macro nutrients (proteins, carbohydrates, and fats) have on

the metabolism. The calorie differences of fats versus carbohydrates and protein often leads people to avoid fats altogether in their diet. Big mistake.

Remember, the carb, protein, and fat recommendations above are not written in stone and have a decent amount of potential variability within the ranges given. Staying within the ranges given in the ten tip guide, a person could come to some different calculations for the different macro nutrients (protein, carbohydrates, and fats).

It's also important to remember that the total calorie intake and fat intake will be slightly higher. Why?

Fats that are naturally found in even the leanest meats and other foods are going to end up in the diet, but that should not be a problem to either the weight loss achieved or the total calorie intake required.

It's healthy and important to have other types of fat in the diet such as mono unsaturated fats from olive oil and small amount of saturated fats from lean beef, egg yolks, and other foods. It's also perfectly OK to eat fish with higher fat levels as fish oil is particularly healthy and useful to fat loss as mentioned in Diet Supplements Revealed

**So how do I figure out how many calories are found in different foods if I follow the advice in this e-book?**

Any decent book store will sell a calorie counting book that lists the protein, carbohydrate, and fat contents of different foods. Sitting down with a pad, pencil,

and calculator, it's easy to figure out exactly what the break down of different foods are.

Also, the label of most foods also has that information on the back panel.

At first it's a little confusing to a person who has never had to deal with such things, but it becomes easy rapidly, and within a few days it's done in a matter of minutes. I have worked with countless people at all levels of knowledge and experience from house wives to professional bodybuilders, and none of them failed to get the swing of it given a little focus and determination.

The above diet advice might make the typical nutritionist flinch. It does not follow many of the dietary guidelines currently being recommended by various nutritional groups. It also does not follow the Food Pyramid very well.

My experience, many years of research, and work in the field, has led me to what I consider a far more effective way of designing diets for people of all levels. I believe the high carb low fat diets currently recommended are not optimal for fat loss or long term health.

An ever growing body of research is confirming that position. I have found a diet high to moderate in protein, low to moderate in carbohydrates, and employing the correct fats in the correct ratios, is the optimal way to loss bodyfat for the vast majority of people.

This advice assumes a normal healthy active individual.

It is a healthy long term way to maintaining a diet that will cause fat loss and the retention of lean mass. Although people like me have other tricks up their sleeves for certain athletes that need to get to extremely low bodyfat levels, anyone should be able to obtain an ideal and desired bodyfat level following the diet tips above and information found in Weight Loss Nutrients Revealed.

The advice in this section might seem too short and simple to be effective. Not true. It's not about the length of the book but the quality of the information. One man recently emailed me who lost 98lbs following the advice in this e-book.

People who have questions about changes in their diet, should consult their physicians.

There are other types of diets, ranging from very low carbohydrate/ketogenic diets (Atkins, and others), various ratio diets (40-30-30 Zone type diet) as well as others. Many of them have their potential advantages and disadvantages and people have had success following them. What I look for is long term success that is healthy and easy to maintain. That in my view is the key factors in successful fat loss.

## **PROTEIN, CARBOHYDRATE & FAT**

### **FATS**

Fats are deceptively simple molecules. Fats are just atoms of carbon linked together in a chain. Assuming nothing is attached to either end of the chain (a free fatty acid) you will find a carbon surrounded by hydrogens (CH<sub>3</sub>) on one end, and on the other end you will find a few oxygens (COOH or COO<sup>-</sup>). Surrounding all the carbons are hydrogen atoms

Now what gives various fats most of their biological character is the length of the chain and the number of double bonds. The more carbons the longer the chain. A double bond is what you get when you take away a few hydrogens and the bond "doubles up" on the carbons (see picture). These double bonds are very important and dictate (along with the length and shape) what type of fat it is and effect it will have on the body.

For example, a fatty acid chain with no double bonds is said to be "saturated" and is known as a saturated fat. These are fats that are hard at room temperature. Put a single double bond in the fat and it is a "mono" unsaturated, and so on to the "polyunsaturated" fats as you add more double bonds.

Olive oil is an example of a mono unsaturated fat and oils such flax, corn, soy bean oil, etc. are examples of polyunsaturated fats.

As with the essential amino acids, the body has two essential fatty acids it cannot make itself (due to a lack of the necessary enzymes) so they must be supplied by the diet and are aptly called "the essential fatty acids." These two fats are: Linoleic acid and Alpha-Linolenic acid.

Below is a table of recommendations for your fat sources.

Good Fat	Fats to Limit	Fats to Avoid
Flax oil	Butter	Processed Vegetable oils
Udo's choice oil. (Omega 3 & Omega 6)	Saturated Fats from red meats etc.	Foods with the words partially hydrogenated" on the label.
Cod	Mayonnaise	Fried foods of any kind
Non Processed Vegetable oil	Macadamia nuts	
Salmon	Peanut Butter	Margarines
Olive Oil	Sunflower seeds	
Hazelnuts		
Peanut Oil		
Hemp		
Avocado		
Olive Oil		
Non processed vegetable oils		

## **PROTEINS**

There are approximately 20 or so amino acids that can make up a protein. Eight of them are considered essential and the body cannot make them on its own (the definition of an essential nutrient) and are required from the diet.

Technically, the non-essential aminos can be made from the essential aminos. If you link several aminos together you get a peptide. Keep linking peptides together and you get a protein.

The shape of the individual amino acids is quite unique and highly specific, so I won't go into great detail here. Suffice it to say, amino acids are the structural unit of a protein molecule.

Proteins have many different roles in the body besides simple muscle. Protein, or more appropriately amino acids, is the only macronutrient that supplies nitrogen to drive lean tissue growth (anabolism). Although athletes usually focus on the effect that protein has on skeletal muscle, it is equally important for people to understand that there are other disposal sites of amino acid nitrogen in the human body.

In simple terms, these include structural proteins, DNA, RNA, phospholipids, enzymes, immune function, and bile acids to name just a few.

Bottom line? There are many uses for protein in the body unrelated to just building muscle.

We need protein to build or regenerate skeletal muscle. However, many people don't understand the other functions protein has within the body, as alluded to above.

Upon digestion, amino acids from ingested protein enters what is called the "free amino acid pool." The amino acids can then be diverted to different areas of the body for utilization depending on what the body needs. For example, some amino acids are used as an energy source through their conversion to glucose (using a process called gluconeogenesis).

Others are used as a substrate for protein synthesis of many different tissues. Protein can also be converted to fat, though this is a very inefficient process in humans and is not a major source of bodyfat.

Protein is also a very thermogenic fuel substrate in the body, meaning that its digestion, metabolism and storage require a great deal of energy which is released as heat. Have you ever wondered why you may feel hot after a large protein meal? This could be the reason.

In fact, it has been shown that ingesting large amounts of protein can account for upward of 20 percent of daily energy expenditure. This means that as much as 20 percent or more of the calories from protein you eat are in fact lost as heat and can't be stored on your glutes or hips!

Here you'll find a table with my suggestions of protein sources.



<b>Good Protein Sources</b>	<b>Proteins to avoid / limit</b>
<b>Lean cuts of beef</b>	<b>Luncheon Meats</b>
<b>Whey Protein powder</b>	<b>Whole Milk</b>
<b>Skinless Chicken</b>	<b>Ground Beef</b>
<b>Salmon/Tuna/Sardines</b>	<b>Ham</b>
<b>Low Fat Cottage Cheese</b>	<b>Cheese</b>
<b>Egg Whites</b>	<b>Bacon</b>
<b>Turkey Breast</b>	<b>Pork Chop</b>
<b>Plus all fish</b>	<b>Yogurt</b>

## **CARBOHYDRATES**

Carbohydrates or sugars are made primarily of carbon, hydrogen, and oxygen atoms that cyclize into a ring. Carbohydrates can be "simple" or "complex" by the number of rings you hook together and the way in which they hook together. Though the rings can be slightly different, their common theme is that of the ring structure as their final shape.

Similar to amino acids and fats, when you link the simple units (the sugars) together you get carbohydrates with different properties. You can link glucose units together to get a glucose polymer, and in fact the body stores units of glucose linked together in the liver and muscle called "glycogen," a term most people are familiar with.

You can also link different kinds of sugars to get different products. For instance, if you combine glucose with fructose you get sucrose (table sugar). If you combine glucose with galactose you get lactose (milk sugar) and so on. Link a bunch of sugars together and you get polysaccharides. Combine two sugars together like the previously mentioned lactose, and you get a disaccharide. Of course by themselves they are called monosaccharides. Are you starting to see a repeating theme here?

Link a simple unit together with other units and you get a product the body can do all sorts of things with. Linking units together gives you a product (fats, carbs, proteins) and breaking down the products into units (ultimately) gives you energy.

So simple yet so complex.

You will notice I have not mentioned the "essential carbohydrates" because there is no such thing! Though the body runs best on an intake of some carbs in the diet, the body can make its own carbohydrates from protein and other non-carbohydrate substrates.

Going in reverse from digestion, the body breaks down complex carbohydrates into simple carbohydrates and ultimately blood sugar (glucose) which can go onto be used for many different functions, such as the production of ATP (the body's universal energy molecule).

Depending on the carbohydrate and other factors, different carbohydrates will have different effects on blood sugar, in particular how fast blood sugar rises and falls. The carbohydrates recommended in the diet section of this e-book have less of an effect on blood sugar as well as the rate of blood sugar increases.

See this table for my recommendations on carbohydrates:

<b>Good Carbohydrate Sources</b>	<b>Carbohydrates to avoid / limit</b>
<b>Brown Rice</b>	<b>White Rice</b>
<b>Yams</b>	<b>Pasta</b>
<b>Lentils</b>	<b>White Bread</b>
<b>Oatmeal</b>	<b>Instant Oatmeal</b>
<b>Vegetables ALL Kinds</b>	<b>Fruit juices</b>
<b>Fruit (but only 2 pieces per day)</b>	<b>Processed Breakfast cereals</b>
<b>Whole Grain Breads</b>	<b>Bagels</b>
<b>Pitas</b>	<b>Sweets</b>
<b>Whole grain/fiber cereals</b>	<b>Raisins</b>
<b>Potatoes</b>	<b>Cream of Wheat</b>

Sources of fruit can include any of the following but no more than two pieces per day -- Oranges, Cantaloupe, Cherries, Grapefruit, Lemon, Nectarines, Strawberries, Apples, Pears, Peaches.

Sources of Vegetables can include any of the following and quantity is limited only to your prescribed carbohydrate intake as explained in the '*Ten Golden Laws of Fat Loss*' chapter.

Kidney Beans, Lentils, Artichokes, Brussel Sprouts, Spinach, Green Peppers  
Navy Beans, Chick Peas, Broccoli, Mushrooms, Onions, Zucchini, Lettuce.

## **Special Bonus Report:-**

### **"SAW PALMETTO"**

***"Wonder herb or wondrous scam?"***

***By Will Brink***



Saw Palmetto extract [1] is often recommended as a cure all for everything from MPB / hair loss [2] to benign prostate enlargement/BPH [3] to gynecomastia.

Saw Palmetto is commonly added to various supplement formulas or sold alone. It's particularly popular with companies selling "andro" products who claim the added Saw Palmetto (SP) will block any possible negative effects the androstenedione, androstenediol, etc., might cause.

Due to its potential effects on people's hormones, namely the "male hormone" testosterone, andro products often get a bad rap as potential aggravators of the aforementioned afflictions (i.e. MPB, BPH, and gyno).

For non athletes, Saw Palmetto-often combined with other herbs-has been a standard alternative treatment for BPH, an affliction that many men suffer from as they age. Some people are also under the impression that Saw Palmetto works as an anti estrogen and will block the conversion of testosterone into estrogen avoiding gynecomastia, also known fondly in bodybuilding circles as "bitch tits."

Will Saw Palmetto deliver this wonderful cure for all that bother men from their hair to their nether region? Stop hair loss, prevent bitch tits, and fix prostate problems? Sounds like damn fine stuff, but is it true?

Maybe... maybe not!

How does the stuff work? Who should really use it?

In this article we take a closer look at the facts vs fiction of this supposed wonder herb to see if the hard training bodybuilder should bother using it and/or believe the people and companies who hype the stuff. (Readers note. Don't overlook the footnotes as there are many useful tidbits of information to be found there.)

### **Does SP really block the conversion of testosterone to DHT?**

Perhaps Saw Palmetto's best known sales pitch to bodybuilders and other athletes is its supposed ability to prevent the conversion of testosterone to dihydrotestosterone (DHT).

The story goes like this: The "male hormone" testosterone converts to the more powerful androgen (DHT) via the enzyme 5-alpha-reductase (5ar) [4] . DHT is known to be a strong factor in the development of several problems many men face such as the aforementioned male pattern baldness and BPH.

So, finding something that blocks the 5ar enzyme should reduce the amount of DHT and said male problems should be improved or avoided (FYI, this is also how the drug Finasteride, name brand Proscar, works.). Of course it's a lot more complicated than that but (a) it's beyond the scope of this report, and (b) only science geeks like me need to know the information in the real world.

Anyway, Saw Palmetto has often been cited as an herb able to block the 5 $\alpha$  enzyme and is recommended to people losing their hair or suffering from BPH and/or is added to "andro" products to theoretically block any negative effects of such products.

Sounds great, but is it true?

A handful of in-vitro (test tube) studies have suggested in certain cells Saw Palmetto inhibits both types of the 5 $\alpha$  enzyme. This effect was noncompetitive and uncompetitive [5] vs. Finasteride which works as a competitive inhibitor on the 5 $\alpha$  enzyme. [6] However, in vivo studies, that is studies using either animals or people actually ingesting SP, have generally failed to show Saw Palmetto reduced DHT system wide as its major effect. This has tipped researchers, and wise guy writer like me, off to the possibility that SP works through a different mechanism than that of a simple inhibitor of 5 $\alpha$ .

### **My testosterone can't get into the cells!**

One of the best known effects of SP not related to blocking 5 $\alpha$ , was a study that showed SP actually blocked the uptake of both testosterone and DHT by approximately 40% in eleven different tissues that were tested.

This information scared off a lot of people from using SP as the thought of having their testosterone blocked at the cell surface along with DHT did not seem like a good idea to most bodybuilders.

The study did lead one to believe that part of the effect of SP is as an androgen receptor antagonist (i.e. blocking the receptor that testosterone binds to at the



surface of the cell) and this would not be what an athlete wants trying to gain muscle. Several studies appear to show SP acts at the level of the androgen receptor.

### **SP as an antiinflammatory?**

Perhaps more interesting is research that shows SP as a potential blocker of the inflammatory response. SP was found to block several key enzymes [7] involved in the production of inflammatory promoters/regulators such as leukotriene (LT) B4 as well as others produced from arachidonic acid via these enzymes.

What this tells us is that one of the mechanisms of SP may be in fact as a potent antiinflammatory rather than as a blocker of testosterone to DHT. Interestingly enough, it has been shown that infiltration of the prostate by inflammatory cells is a key etiologic factor involved in the development of BPH. Translated, the immune system is involved in benign prostate enlargement. Actually the immune system also appears to be involved in MPB and that's an interesting angle being pursued by researchers in the field. People interested in the topic can read my article "Hair today, gone tomorrow" at my web site: [Brinkzone.com](http://Brinkzone.com)

### **SP as an anti estrogen?**

Finally, we come to the reputation of SP as some kind of anti estrogen. This is perhaps the most interesting, yet potentially confusing, effect of SP.

Several studies have suggested SP may exert some type of anti-estrogenic effect on prostate tissues. However, and this is a huge however, it does not tell the entire story. Why? I'm getting to it, but first we have to do a little side track into how

you go about "blocking" estrogen. I mean, people throw that term around all the time, but what does it really mean?

Basically, there are two ways to effect estrogen.

You can block the receptor site, or you can inhibit the enzyme (known as an aromatase) that converts testosterone, androstenedione, etc., into estrogens. When a molecule fits into the receptor but does not send an estrogenic signal it is called an "antagonist" meaning it prevents or "blocks" estrogen from getting to the receptor but does not in itself act as an estrogen. Hence the term "estrogen blocker."

When something can lock into the receptor and does act as an estrogen, that is activates the receptor to one degree or another, it's called an "agonist." So, an antagonist fits into a receptor (thus blocking something else from occupying that receptor) but does not activate the receptor and an agonist fits into the receptor in question (in this case an estrogen receptor) and does activate the receptor to one degree or another.

[8] This is exactly how the drug Tamoxifen (brand name Nolvadex) works. It can fit into the estrogen receptor but does not activate it thus preventing estrogenic effects in the tissue in question. Thus, Tamoxifen is an "estrogen antagonist." So far so good right?

What most people do not realize is that many things will have what is known as "mixed" antagonist and agonist properties. Before you slap your head in confusion, let me explain.

Just because something has anti-estrogenic effects on one tissue does not mean it will have that effect on all tissues. In fact, and quite common, a compound can actually be an anti-estrogen in one tissue while actually acting as an estrogen (i.e., increasing estrogenic effects) in others!

Many things are known to have mixed antagonist and agonist properties.

Remember when I said Tamoxifen was an estrogen receptor antagonist? Well I sort of lied. [9] Tamoxifen is a drug shown to have just such "mixed" properties, that is it has agonist or antagonist effects depending on the tissue in question. [10] In women, Tamoxifen has been shown to act as an estrogen antagonist (i.e. blocks the estrogen receptor) in breast tissue but actually acts as an estrogen agonist in uterine tissues which is why it's used to treat breast cancer but may increase rates of uterine cancer.

You starting to catch my drift here?

"So where the hell is Brink going with this and what on God's earth does it mean to the hard training bodybuilder?!" you ask. Here is the rub: Just because SP might have some anti-estrogenic effects on the prostate does not mean it will prevent gyno, bodyfat increases, etc. known to occur from increased levels of estrogen (whether from andro products, steroid use, age, etc.) in all tissues.

Companies or people that say otherwise are misleading you. There is no research to date that shows SP can prevent gyno or any other estrogen related problems athletes are concerned about except possibly in prostate tissue. I realize it took me a while to get to that point but the reader can appreciate the fact that without the proper background you would be forced to just take my word for it.

Now you know better.

Finally, you might recall that I mentioned another way of reducing estrogen, and that is by inhibiting the aromatase enzyme that converts testosterone into estrogens. A compound that can have that effect is an "anti-aromatase." Many people make the mistake of thinking Tamoxifen is an anti-aromatase when it is not.

A true anti aromatase is the drug Arimidex (anastrozole). There are also several plant isoflavones that appear to have anti aromatase activity in vitro (test tube) research but have yet to show this effect in animals or people, especially in the doses most people take them.

All the research I have seen to date points to SP as working at the level of the receptor rather than inhibiting the aromatase enzyme, which is why I focused mostly on explaining the concept of receptor agonists, antagonists, and compounds with "mixed" effects. Capiche?

### **Back to the real world:**

### **The bottom line on SP for MPB, BPH, and gyno.**

OK, back to the real world. I love research and science but I never lose sight of the fact that the real world is where stuff actually happens. Remember when the research used to show steroids didn't increase muscle or strength?!

So, I am going to give you all what in the military is referred to as a "no shitter." There is no research that has directly looked at Saw Palmetto for hair loss in men

(i.e. MPB) nor is there any research that has directly shown Saw Palmetto can reduce any potential side effects of any of the andro products or steroids for that matter. So, it would seem premature to recommend Saw Palmetto for such problems until far more is known.

I have yet to meet one single person who has grown one single hair from using SP.

Prevent gyno? Ditto for the gyno as far as real world feedback is concerned. If you think you can pump steroids and/or androstenedione all day and use SP to save your ass...errr hair, you could be in for a big surprise. [11] Until someone shows me the large double blind study showing it prevents gyno and/or hair loss in healthy men, or I see with my own two eyes gyno disappear on some bodybuilders I know, I would not bother with it for those uses.

Regarding BPH, that's where Saw Palmetto looks far more promising. Studies using Saw Palmetto extract have shown positive effects on BPH symptoms. Though it is unclear exactly how Saw Palmetto improves the symptoms of BPH, there appears to be enough data and clinical evidence in favor of Saw Palmetto as a treatment for men who suffer from an enlargement of the prostate that is not cancerous. So, if you have BPH, SP does in fact look like worthwhile treatment and that has been confirmed by real world observations.

## **Conclusion**

Believe or not, there are several more proposed mechanisms for SP and a few more studies I could have mentioned, but the above covers the most common ideas behind how SP works. Whether Saw Palmetto inhibits 5ar, blocks the

uptake of testosterone and DHT into the prostate, blocks estrogen at the receptor, or actually inhibits certain pro inflammatory enzymes responsible for the etiology and formation of BPH, is not certain at this time. Perhaps it works by all those mechanisms. Regardless, if you have an enlarged prostate, SP could really help. As for gyno and hair loss, I leave it to the reader to decide. It's your money...

## Footnotes

(1) SP is An n-hexane lipidosterolic extract of the dwarf American palm plant, *Serenoa repens*.

(2) MPB= Male Pattern Baldness

(3) BPH = benign prostatic hyperplasia

(4) There are in fact two isozymes of 5ar known as type one and type two, which are found in different tissues. For the sake of brevity and brain cells, we will overlook this fact for the remainder of the article though it is important to note.

(5) Depending on the isozyme.

(6) If that does not make any sense to you, don't sweat it. If it does, can you explain it to me?! Just kidding...

(7) cyclooxygenase and 5-lipoxygenase

(8) There are in fact things that can be "weak" estrogens and the androgen/estrogen ratio is also involved in gyno formation, but again I am forced to keep this as simple as possible.

(9) So sue me!

(10) several plant derived isoflavones are also known to have this effect.

(11) I don't even have the heart to tell people that SP may cause gyno in high doses and several doctors I know have mentioned that as a side effect of high dose SP in some patients.

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## **Part 4: RESISTANCE TRAINING**

### **BEGINNERS -- INTERMEDIATE -- 3 PHASE TRAINING GUIDE**

This report is divided into roughly two parts. The first section is for people who have some basic to moderate knowledge about weight training, but could use specific advice about constructing a routine and choice of exercises. The second part is geared more toward advanced weight trainers and bodybuilders who have experience and knowledge about weight training routines, but haven't found or have overlooked a key ingredient to getting the most out of their routines.

As a writer for various bodybuilding/health magazines and a trainer of competitive athletes, I sometimes forget that the majority of people who train with weights are just looking for a simple routine they can count on to get results without being as complicated as the theory of relativity.

I am often surprised how much confusion there is when it comes to designing an efficient and effective weight training schedule for the average person who is not necessarily a bodybuilder or high level athlete, but is serious about their muscle mass! Actually, designing an effective weight training routine is nothing more than putting together your knowledge of basic human physiology, weight training theory, and realistic goals.

The most important concept to know about weight training, as it relates to physiology and theory, is this: weight training is a qualitative, not a quantitative, effort. It is not the amount of time spent doing it, but the intensity put into it, that

will yield the results you want. Translated, weight training should not be seen as an endurance exercise.

It is all too common to see people doing an endless number of sets without any of them being particularly difficult (i.e., is lacking intensity). It is far more effective to do three to five intense sets than fifteen easy ones. There is a stimulus threshold that must be reached each time you train a muscle for it to respond (i.e., get stronger, firmer, etc.) to a given stimulus. Of course that threshold is different for each person, and depends on such factors as the person's fitness level, genetics, age, etc. Doing a bunch of easy sets using light weights might burn a few calories, but for building and strengthening, or even "toning and firming," you must push the muscle (reach its stimulus threshold) each time you train it.

More is not necessarily better when it comes to weight training. The statement "if five intense sets per body part, two to three days per week is good, then fifteen intense sets six times per week must be better" is rarely true. Unless you are a competitive bodybuilder, training that much that often, can lead to overtraining and/or injury and a general lack of results. Actually, training that much often leads to overtraining, injury, not to mention a lack of results for many bodybuilders too!

Optimal results with a minimum of time spent in the gym can be achieved through the following workout phases are how a person can construct a weight training schedule for. I have used this training schedule with high level athletes and non-athletes alike with superb results. Of course the structure of the workout can be vastly different person to person, depending on their goals and fitness levels, but the format is essentially the same. If you are trying to figure out an

appropriate and efficient weight training routine with a busy schedule, following these phases should be very helpful.

## **Phase 1: Conditioning**

Phase one is designed for total beginners, people with very limited time, or people who are satisfied with their fitness level and just want to maintain it.

Phase one can be as easy or hard (!) as it needs to be for the beginner or intermediate weight trainer. It can also be a nice change of pace for advanced weight trainers. Phase one consists of training the whole body, two to three days per week, two to four sets per body part (usually two sets each of two exercises).

Reps are kept in the 8 to 12 range. You always start with the largest muscles, when energy is highest, and work your way down to the smaller muscles.

My favorite line-up goes in this order: thighs, hamstrings, back, chest, shoulders, biceps, triceps, calves and abdominals.

You can construct your own line up, but remember to use the larger to smaller muscle group rule when doing so. You should keep up a good pace, and shouldn't have any trouble completing it in under an hour. Using the body part line up outlined above, this is what a typical workout might look like:

**Warm up:** 10-15 minute warm up on treadmill or stationary bike followed by light stretching.

<b>LEGS</b>	
<b>Leg extensions:</b>	<b>2 sets of 8 12 reps</b>
<b>Barbell squats</b>	<b>2X 8-12 reps</b>
<b>Hamstring curls on machine</b>	<b>2X8-12 reps</b>
<b>OR</b>	
<b>Straight leg dead lifts</b>	<b>2X8-12 reps</b>

### **Leg Extensions**



### **Hamstring Curls**



### **Barbell Squats**



<b>BACK</b>	
<b>Chin ups</b> <b>OR</b>	<b>2X8-12 reps</b>
<b>Lat pull down on machine</b> <b>(depending on ability)</b>	<b>2X8-12 reps</b>
<b>Bent barbell rows</b> <b>OR</b>	<b>2X 8-12 reps</b>
<b>Cable rows</b>	<b>2X 8-12 reps</b>

<b>CHEST</b>	
<b>Incline dumbbell presses</b> <b>OR</b>	<b>2X8-12 reps</b>
<b>Incline bench presses</b> <b>Machine presses</b> <b>OR</b>	<b>2X8-12 reps</b>
<b>Flat barbell presses</b>	<b>2X8-12 reps</b>

### **Inclined Bench Press**



### **Dumbbell Press**



## **SHOULDERS**

**Seated dumbbell military  
press**

**2X8-12 reps**

**OR**

**Machine press**

**2X 8-12 reps**

**Dumbbell side laterals  
raises**

**2X8-12 reps**

### **Press**



### **Side Laterals**



<b>BICEPS</b>	
Seated alternating dumbbell curl	2-3X8-12 reps
OR	
Standing barbell curl	2-3X8-12 reps
<b>TRICEPS</b>	
Lying barbell triceps extensions	2-3x8 12 reps
OR	
Cable pushdowns	2-3x8 12 reps

### **Standing Barbell Curl**



### **Lying Barbell Triceps Extension**





## Cable Pushdowns



## TO FINISH

**Standing calf raises**

**2X 15-20 reps**

**AND**

**ab crunches**

**2x as many as you  
can do in good  
form**

## Seated Calf Raises



## Crunch



Other total body workouts based on phase 1 can be constructed using different exercises or body part line up. For example, some people might prefer to start with upper body (i.e. back, chest, etc.) and do legs afterward. It's always a good idea to mix up the routine at least every 4-6 weeks.

## **Phase 2: *Getting more serious.***

Phase two is designed for people who don't find phase one challenging enough or want more significant results than Phase One type training provides. If they are already at a high level of muscular fitness they may derive greater benefit from Phase Two.

Phase two consists of training three or four days a week, usually, Monday, Wednesday, and Friday; or Monday, Tuesday, Thursday, and Friday.

On the three day per week schedule, a good break down by body part might be chest and back on Monday, legs on Wednesday, and shoulders, biceps and triceps on Friday. If training on the four day per week routine, you could train upper body on Monday and Thursday, and lower body on Tuesday and Friday.

Another division of the four day split could be chest/biceps/triceps on Monday, thighs / hamstrings on Tuesday, back / abdominals on Thursday, and shoulders / calves on Friday. There are many body part configurations the more adventurous can try if conditioned for it and time is not at a premium.

The three and four day per week "split" routines are considered more of a true strength and power routine as they allow more rest for each muscle group over a 7 day period.

The four day "upper/lower" routine is more of a general fitness routine, but, in fact, many continue to prefer it. The upper/lower split will also have fewer sets per body part as the total number of body parts per day being worked is higher.

Regardless of which routine you choose, you will do six to eight sets for larger muscle groups (legs, back, and chest), while smaller body parts such as shoulders, biceps, triceps, etc., you will do four to six sets (all in the 8 to 12 rep range). Calves and abdominals are the exception, and for those, you can do as many reps as you can stand. Again, a good pace is essential and you should easily finish in approximately one hour.

**A three day split might look like so:**

<b>CHEST</b>	<b>MONDAY</b>
<b>Incline dumbbell presses</b>	<b>3X8-12 reps</b>
<b>Machine presses (i.e. Nautilus, Hammer Strength, etc.)</b>	<b>2-3X 8-12 reps</b>
<b>Dips or flat dumbbell flyes</b>	<b>2-3 X 8-12 reps</b>

**Dips**



<b>BACK</b>	<b>MONDAY</b>
Chin ups or cable pull down	3x8-12 reps
Cable rows	2-3x8 12 reps
OR	
Barbell bent rows	
One arm dumbbell rows	2-3X8-12 reps.
OR	
Partial rep dead lifts in a power cage	2-3X8-12 reps

<b>QUADS/THIGHS</b>	<b>WEDNESDAY</b>
Barbell Squats	3x8-12 reps
OR	
Leg presses	
Lunges / Lunge Walks	2-3 X 8-12 reps
Seated leg extensions	2-3X8-12 reps
<b>HAMSTRINGS</b>	
Straight leg dead lifts	3X8-12 reps
OR	
Lying hamstring curl	3X8-12 reps

### Lunges



<b>SHOULDERS</b>	<b>FRIDAY</b>
<b>Seated machine press</b>	<b>3x8-12 reps</b>
<b>OR</b>	
<b>Dumbbell presses</b>	<b>3X8-12 reps</b>
<b>Dumbbell side laterals</b>	<b>2-3X 8-12 reps</b>

<b>BICEPS</b>	<b>FRIDAY</b>
<b>Dumbbell curls</b>	<b>2-3X 8-12 reps</b>
<b>OR</b>	
<b>Machine curls</b>	
<b>TRICEPS</b>	
<b>Barbell lying triceps extension</b>	<b>2-3X 8-12 reps</b>
<b>OR</b>	
<b>Close grip bench presses</b>	<b>2-3X 8-12 reps</b>
<b>CALVES</b>	
<b>Standing calve raises</b>	<b>3X 15-20 reps</b>
<b>OR</b>	
<b>Calf raises on a leg press</b>	<b>3X 15-2- reps</b>

## The four day "upper / lower" routine:

### UPPER BODY – Monday & Thursday

<b>CHEST</b>	<b>Mon &amp; Thurs</b>
Incline flyes	3X 8-12 reps
Machine press	3X 8-12 reps
Incline dumbbell presses	2-3X8-12 reps
<b>BACK</b>	
Chin ups	3X8-12
OR	
Lat pull down	3X8-12
Cable rows	2-3X8-12 reps
OR	2-3X8-12 reps
Bent over barbell rows	2-3X8-12 reps
<b>SHOULDERS</b>	<b>Mon &amp; Thurs</b>
Military machine press	2X8-12 reps
Dumbbell side laterals	2X8-12 reps
<b>BICEPS</b>	
Seated dumbbell curl	2X8-12 reps
OR	
Machine curl	2X8-12 reps
Standing barbell	2X8-12 reps
<b>TRICEPS</b>	
Close grip bench press	2X8-12 reps
OR	
Barbell lying barbell extension	2X8-12 reps
Triceps cable push downs	2X8-12 reps

## **LOWER BODY** – Tuesday and Friday

<b>QUADS</b>	<b>Tues &amp; Fri</b>
<b>Barbell Squats</b>	<b>3X8-12 reps</b>
<b>OR</b>	
<b>Leg presses</b>	<b>3X8-12 reps</b>
<b>Lunges or lunge walks</b>	<b>2-3X 8 reps</b>
<b>Seated leg extensions</b>	<b>2-3X8-12 reps</b>
<b>HAMSTRINGS</b>	
<b>Lying hamstring curl</b>	<b>3X8-12 reps</b>
<b>OR</b>	
<b>Straight leg dead lifts</b>	<b>3X12 reps</b>
<b>CALVES</b>	
<b>Standing calf raises</b>	<b>3X 15-20 reps</b>
<b>Seated calf raises</b>	<b>3X 15-20- reps</b>

### **Phase 3: *Prioritizing***

Phase three is essentially the same as Phase two, but there is an extra component added.

Phase three is for people who are satisfied with their total body strength and endurance but might have a weakness that needs to be "prioritized" until they match stronger body parts. A weak body part can be categorized as either aesthetically (visually) weak or structurally weak (i.e., needs to be stronger). Some muscles can be a little of both.

In phase three, the workout schedule remains the same as phase two, but the set scheme changes. Instead of using the larger to smaller muscle rule to figure out the number of sets needed, you will use the weaker to stronger rule. Muscles that you feel are visually and/ or structurally strong enough, are trained with four to six sets, and muscles that need the improving, are trained using six to eight sets. Training in this manner will allow you to maintain the areas you are happy with, and improve the areas you are not so happy with, and we all have plenty of those! This can be very helpful for athletes, and other people, who want to improve their strength in specific areas (visually or structurally).

If for example, a fitness or aerobics competitor is satisfied with their jumping ability, but unsatisfied with their ability to do upper body strength moves, such as one-arm push ups, he or she can design a program to improve the strength imbalance (i.e., de-emphasize lower body work and increase upper body work).

Aerobics and fitness competitors must also be visually symmetrical, so it could be a visual improvement that is needed. The only potential pitfall to this phase is forgetting the all important "more is not better" rule. Don't pick too many body parts to prioritize, or you will quickly burn yourself out. And yes, you still do it in under an hour.

You will notice I have not put a time frame on any of the phases. This is because they are not intended to be static. I have had clients who have been training in Phase One for over two years, and have never had the urge to change it.

Many aerobics and fitness competitors, runners, golfers, and other athletes will switch back and forth between phase two and three, when not competing, and will go back to phase one when time gets tight around competition time. So as you



can see, how much time spent in a particular phase is an individual matter, and depends on such variables as how much time is available and one's goals at that particular time.

## **Conclusion**

There are countless theories on the best routines related to weight training. The above will be very effective for probably 90% of the people reading this report.

Bodybuilders and other athletes in need of more advanced information should read my book "Priming the Anabolic Environment" for more advanced routines as well as the works of Charles Poliquin, Charles Staley, and Paul Chek. If the above list of exercises sounds foreign, then I would highly recommend a good book on weight training exercises or speaking with a qualified trainer to figure out the correct exercise choice to address individual needs.

People might also notice I have not mentioned home gyms. Why? Five years or so of running a successful private training business showed me that home gyms are not a practical way to go for most people. I would estimate roughly 80% or more of the people I trained had a home gym for sale along with various treadmills and stair steppers only used a few times.

It takes a highly motivated person to workout at home with the phone, fridge, and television close by to name only a few distractions. People need to get out of their houses and go to a specific place to exercise away from the distractions. Also, a decent home gym set up can cost at least as much or more than a year's membership at a gym.

Why not use the million dollars worth of equipment the gym owner purchased than the rinky dink equipment you will buy?

It never made much sense to me. I will say, all the fancy brand name home gym products are far more expensive and no more effective than a simple flat bench, a small rack of dumbbells, and a barbell with a good selection of weights. If you really want to go big time, a power rack will finish off the home gym nicely and is recommended for home gyms as it increases the safety and number of exercises you can perform.

Generally speaking, the majority of people's weight training routines is overly complicated and last far too long. A result oriented weight training routine (and I suspect results are what we are all looking for) is brief, intense, and simple. Follow the above advice to the letter, and results are what you will soon have. See you in the gym!

## **ADVANCED TRAINING -- THE PERFECT REP**

*By Will Brink*

I know what you're thinking, "I hope this is not going to be another redundant training article!" Having written articles on virtually every fact of bodybuilding at one time or another, I am the first to admit that training articles can get redundant. OK, maybe even flat out boring.

Nutrition is an endless subject, and most bodybuilders can read articles on nutrition endlessly, but training articles can bore the pants of people. Why? Because most are either full of jargon lacking any real life application, or fail to say anything new or even believable. I think people tend to glaze over certain training articles in a sort of semi stupor, like watching the 700 club on a Sunday morning. Well friends, I think you will find this training report low in jargon, high in utility, and not too painfully boring to read (I hope).

This training report is on a very simple topic: the rep itself and style of rep I have found to be productive to growth. Now before you go turning the page, consider just how important the simple rep is to your success.

If you think about it, the rep is not only the most basic concept in all of weight training, but also the most fundamental aspect for growth. There are stacks of theories on what is the best routine, volumes of research on how muscles grow and what is the most effective number of reps for muscle growth, and countless ways to increase intensity to stimulate the muscles.

In the end however, it comes down to the rep itself. If your reps are done incorrectly, what does it matter which routine you are using? An incorrectly executed rep undermines whatever exercise you choose; theory you adhere to, or guru you follow in your quest for new muscle.

If a person only gets a few "good" reps per set, and the rest are a waste of time, could this person dramatically improve the efficiency and effectiveness of their workouts by making every rep a "good" rep? I think you know the answer to that question, so I will not answer it. If you don't know the answer to that question, then brother you are in the wrong sport and a golf club might be better suited for your hands than a dumbbell.

Aspiring bodybuilders often get caught up in the latest theories on weight training yet fail to grasp the importance of the foundation of growth itself: the simple rep.

Talking about how to perform a rep is not sexy, high tech, or something that can be put in a bottle and sold as a supplement (RepRX?), yet in the final analysis, the rep is what stands between you and more muscle and is the very place so many bodybuilders fall short.

They slop through their reps, rush through their reps, or have no intensity during their reps, but rarely see what is under their nose: It is not the routine they are following, the supplements they are taking, or the diet they eat, that stops their muscle growth, but the very way they perform their reps that keep them from getting larger. Translated: Some times it is not what you do, but how you do it!

People tend to look for complex answers to simple problems. I get stacks of letters and email from people with all sorts of questions as to why they are not making any progress. Their theories range from "I think it was the descending set-negative feedback loop-burn sets that stop my muscle growth", to "Aliens have put growth retarding chemicals in my creatine."

With that introduction, let us get onto what is the ultimate growth rep, with a little scientific mumbo-jumbo in between.

### **What Actually Causes Muscle Growth?**

This is the point in the article where I could go into a long and unusually boring dissertation about muscle physiology: Muscle fiber types, controversies over whether the muscle gets larger or divides into new muscle cells, or both.

Number of reps, volume of training, concentric, eccentric, isometric, etc., etc. This is important information for the research scientist, but not all that relevant to the hard training bodybuilder.

I mean, what are we looking for here? In a nut shell, what we want is the correct level of stimulation to a muscle to make it larger, right? Too little stimulus and the muscle does not grow. Too much stimulus and the muscle does not grow, or worse yet, gets smaller due to injury or inability to recuperate. The proper stimulus within a given period of time is what we are looking for.

This brings me to another point. It is not the amount of actual weight that is the most important factor to muscle growth, but the actual amount of stress or tension

the muscle must endure during the rep that is the crucial stimulus for growth. But some might ask "Doesn't using more weight mean more stress on the muscle?"

The answer is no.

If you take 405lbs off the rack when bench pressing and bring it down quickly without control, bounce it off your chest and lock the elbows out hard at the top for one rep, are you creating more stimulus to the pec muscles than if you took 300lbs off the rack and brought it down with full control, pressed it up without any bounce or momentum, and did not lock the elbows out at the top for ten reps?

I think the answer to that question is obvious, and we will examine this particular topic in the coming sections.

The point I am trying to make here is that weight is only a factor within the variable of how the rep itself is performed. All things being equal (i.e. each rep is performed correctly for that exercise) weight does matter.

The more weight you can use in a given exercise, with correct form, in a given time period, for a specified number of reps, the more stimulus for growth the muscle will experience. However, using more weight for the sheer sake of using more weight, not taking into account how the rep is performed, does NOT equal more stress on the muscle.

When we talk about a stimulus for growth, we must look beyond the simple micro-environment of the muscle fiber in question. This is where bodybuilders and scientists often fall short when trying to examine the topic of muscle growth. An examination at the level of the muscle fiber, where the actual damage occurs,

is obviously important for any study of why and how muscles grow from weight training.

However, it is not the only factor involved leading to the increase in size and/or number of muscle fibers in response to weight training.

When we train with weights using sufficient loads and intensity, we cause micro trauma to the muscle fiber(s). That is, at the level of the fiber itself, we have caused a certain amount of controlled damage to the fibers involved.

However, muscle growth is far more involved than simple breakdown and repair. This is the point in the report where we need to look at the concept known as the "metabolic cost of exercise." This concept, though complex if you map it all out, can still be reduced to its most basic definition: Muscle growth is not a local event that happens exclusively at the level of the muscle fiber, but is ultimately a systemic response to exercise that leads to muscle growth.

So what exactly is meant by "systemic?"

It means that when we lift a weight several things happen. At the level of the muscle, there is controlled damage to the myofiber during muscular contraction. This damage (known as micro-trauma) leads to remodeling (growth) of the muscle predominantly takes place during the eccentric (negative) part of the rep.

Simply put, at the local level of the muscle fiber, it is the lowering (negative) part of the exercise that is responsible for most of the damage to the fiber that (hopefully) leads to muscle hypertrophy and increases in strength.

From this information we can conclude that a controlled rep, where the weight is lowered under full control, is a particularly important part of a properly executed rep.

Now this is what is happening at the local level of the muscle fiber, but as I said before, muscle growth is ultimately controlled by the effects exercise has on the entire system. For example, as any bodybuilder knows, growth hormone is one of several anabolic hormones important for increasing muscle mass and shedding bodyfat.

Growth hormone is a key anabolic and lipolytic (fat mobilizing) hormone that many bodybuilders are injecting pre-contest and off season to build additional mass and burn fat. However, growth hormone (GH), insulin, human growth factor one (IGF-1), and to a lesser degree testosterone, can be partially manipulated by diet and exercise, so don't think an elephant pituitary extract enema is the only way you will ever add new muscle!

The metabolic costs of exercise can be shown in this example: When we lift weights we cause a rise in lactic acid. Research suggests that the signal to release growth hormone in response to exercise is related to the level of lactic acid in the blood. It is a system wide response to the exercise (i.e. the increasing level of lactic acid in the blood) that causes growth hormone to be released.

In fact, the body produces many metabolites and metabolic byproducts in response to weight lifting that contribute to the growth of lean tissues being trained.

What does this tell us?



It tells us that weight training does not just cause controlled damage to muscle fibers to stimulate growth but has a systemic effect. It suggests weight training has a high metabolic cost that stimulates the entire body to respond to the exercise in a positive way.

Another example of a systemic response to weight training is not commonly appreciated.

When a person first starts to train with weights, their strength climbs rather quickly, yet they put on relatively little muscle. What is going on here? Scientists have postulated that this early rise in strength in response to weight lifting takes place from an improved efficiency of the nervous system, that it is a neural adaptive response.

Personally, I believe that the efficiency of the nervous system continues to play an important role in the process of building muscle even after many years of training, but that's another story.

You see, this is an example that demonstrates it is not only what happens to the muscles themselves when we train, but what happens to our entire system when we train. The nervous system becomes more efficient, the endocrine system responds, and various enzymatic pathways are affected. The body's response to weight training is clearly not a local event relegated simply to its direct effects on muscle fiber but is actively promoting a systemic response.

These are a few examples of how the systemic response to exercise leads to increases in size and strength. The metabolic cost of exercise probably plays as

crucial a role in muscle growth as does the local stimulation to the muscles (i.e. myofiber damage caused by intense muscle contraction).

## **So how do I Improve the Quality of My Reps?**

OK, I'll bite. How do I incorporate the above knowledge into workout, you ask? Before we get to that, let's quickly review what the previous section tells us.

Different types of training can still elicit growth. It tells us that manipulating certain variables in our training, such as intensity, volume, and other factors, is essential for growth. It is probably why some people can get stronger but not get much bigger and why power lifters and bodybuilders can look so much different from each other.

Finally, and most importantly in my view, it tells us that along with lower reps, moderate to higher reps have an important place in our training regimen as they have the highest metabolic demand which may have an important systemic effect on our long term ability to increase lean tissue.

So what style of rep causes adequate stimulus for growth (i.e. micro trauma) and has a high metabolic cost? Elementary my dear Watson, it would be the continuous -tension non-lockout rep. I told you it would not be all that sexy or high tech when I told you what it was, but how and why you should use it might be.

Our goal of using continuous-tension non-lock out style reps is to keep, as the name implies, the most amount of tension (stress) possible on the muscle(s) being trained. Continuous-tension non-lockout (CTNL) reps are probably the most

metabolically costly reps you can do; especially if they're done for moderate to high reps.

The systemic effect (i.e. the amount of exercise induced metabolites such as lactate) is generated more quickly and at higher levels than with any other style of training. The amount of actual time the muscle is under tension is greatest when the reps are done in a CTNL fashion.

As stated earlier, many people slop through, chop through, rush through their reps, totally lacking the intensity required during each set of an exercise.

Is the muscle and the entire system being stimulated to a greater degree when you slop through your reps in an attempt to use big weights? No.

It is the amount of tension, and the length of time the muscle is under that tension, that is the key. When CTNL reps are properly performed the muscle is under tension 100% of the time in every rep of every set. It is one of the most grueling and effective ways you can train.

## **Incorporating CTNL Reps Into a Workout**

So how do we use this seemingly simple rep style in a workout? A properly done CTNL rep has a cadence or rhythm to it. A person who can do CTNL reps well will make the first rep look almost identical to the last rep. The entire set has a cadence to it. When doing the CTNL rep you should take about 3-4 seconds for the eccentric (negative) part of the movement and 2 seconds for the concentric (positive) part of the movement.

If you look at the typical set of the typical aspiring bodybuilder, you will usually notice that they start the set out by doing the reps one way and as the set progresses the reps get faster and looser in form. This is the result of the brain going into self preservation mode wanting to finish the set as fast as possible.

The real challenge of doing an entire set in the CTNL rep fashion is to keep the same pace or rhythm on the last rep as you began the set with. This is a lot easier said than done.

As the lactic acid starts to build up, your mind starts to count the ways out of this revolting situation to speed the reps up or use some leverage to take the stress off the muscle.

As the PH of the blood drops (from the rise in lactic acid) it becomes more and more difficult for the nerves to fire. Being able to do the reps in the CTNL rep fashion dramatically improves nervous system efficiency among other adaptations that take place.

People who first begin using the CTNL rep style of training notice a big drop in the poundages they can use on an exercise. However, as time goes by, their nervous system, buffering systems, and enzymatic pathways come up to the challenge. In a short time they are able to use the same weight they could use before but are now being much more efficient in their workouts and are creating far more stress to the muscles than ever before.

People who train this way find they need to do fewer sets per body part and are amazingly sore a few days after their workouts.

Now let's take a look at an exercise like the squat and how a typical set done in the CTNL rep fashion would be performed. CTNL reps are best done for moderate to high reps because this causes the greatest metabolic demand and generation of exercise induced metabolites (along with the damage at the level of the muscle fiber). Also, CTNL reps are most effective when done in full range of motion for that muscle.

OK, back to the squat. After warming up you would pick a moderate weight, a weight you could normally get around ten reps with. Descend into the rep, concentrating on keeping full tension on the muscles of the legs, at the rate of 3-4 seconds. At the bottom of the squat come back up strong but controlled at 2-3 seconds (obviously you will not be able to look at a stop-watch while doing this, but you get the idea). This is where we get to the non-lock out portion of the rep.

When you approach the top of the rep, you do not come all the way up to an upright position and stand up with weight. Why? Because this takes the tension off the muscles. You are resting! Instead, as you approach the top of the rep, in a controlled fashion, you then reverse direction and again descend back into the bottom the rep. For a fleeting second, you get close to standing upright with the weight, but you never quite do it.

Now this might seem amazingly simple, but as the reps continue, 5, 8, 10, 12 reps, you will receive the inner directive to either speed up the tempo of the reps, stand up with the weight and rest, or just dump the weight on the floor!

This is where you have to dig down deep and force yourself to not only complete the reps but maintain the tempo you started with, never letting up the tension on

the muscle. This is where things get tough, and the CTNL rep excels at making larger people out of smaller people!

When you get good at it, you should be able to get 12-15 reps in this style.

At first try, most people fail miserably at training like this. Their nervous system just conks out on them. Their lactic acid buffering systems are not yet up to the task, and the mind won't tolerate it. However, as time goes by you will be amazed how strong you will get. Don't look for monster poundages when training like this, at least not in the beginning.

CTNL style reps are not best suited for increases in strength, though you can get quite strong at it, but they are highly effective for increasing muscle size.

CTNL reps are a very focused and mentally demanding way of training, but the results are worth it. Certain people reading this will give these ideas a try and will say to themselves "damn, how could something as simple as changing the way I do my reps be right under my nose all this time?" While others might say "I know all this stuff" and blow it off assuming what I have said here is too basic to be of any use to them. Take it or leave it, you can't avoid the importance of the simple rep.

## **Tips for Success Using CTNL Reps**

**1)** Always strive to use progressive resistance, that is, try to achieve a personal best when possible. Many people misinterpret the concept of progressive resistance to mean constantly using more weight.

Obviously, you will not be able to add more weight to every workout indefinitely. Sometimes it is doing two sets of ten with a weight you could only do one set of ten with before. Sometimes it is doing eleven reps with a weight you could only get ten reps with the week before, or it can even be doing two sets of 12 reps with a weight you did the week before, but knocking off a few minutes of rest between those two sets, thus causing more stress on the muscle.

Weight is important, but making it your one and only focus will ultimately lead you down the road to disappointment. There are many ways to increase the stress on the muscle. For instance, what do you do at the end of the set, when you absolutely positively cannot do one more rep in the CTNL fashion? At this point you can rest and do one of a few options.

- (1) You could just be done with the set
- (2) You could do a few forced reps
- (3) You could do a few negatives
- (4) You could do a few "cheat reps" depending on the exercise
- (5) Finally, you could reduce the weight and continue with the set in the CTNL rep style.

Most of the time you should really just be done with the set because they can be quite intense. Throwing in one of the above intensity enhancing strategies once in a while is fine, but overtraining is a guarantee if you do it too often.

**2)** For upper body, 8-12 reps in this fashion seems optimal for causing adequate micro trauma to the muscle and creating the required metabolic cost. For lower

body exercises, higher reps can be used. For example, after getting a few heavy sets of 8-10 reps on say squats, a set of 15-20 reps in CTNL fashion is essential on leg day. Believe me, you have not lived until you have done a set of squats for 20 reps in this fashion with a maximum weight.

**3)** CTNL reps works equally well with any exercise. Dead lifts, leg extensions, military presses, you name it. I would recommend no more than 8-10 sets per body part on larger muscle groups (legs, back, chest) and no more than 6-8 sets for biceps, triceps, and delts, because this style of training can be very intense when done correctly and overtraining is a distinct possibility.



## **Part 5: CONCLUSION**

Using the information found in this e-book, you should now be able to make an informed choice as to which of the popular products on the market to try, and can now construct an effective and safe weight loss supplement program for long term fat loss instead of throwing money away. After two years of selling this e-book, and thousands of people using it to lose fat, it's clear it will help you as much as it has them.

Of course, all products will fail to have much effect if the person does not initiate a change in diet and include an exercise regimen.

For diet tips and exercise routines, follow the Ten Tip Guide and weight training report in this e-book.

This e-book will be supplemented as new products claiming to help with weight loss pop up. If you wish to see specific nutrients covered in future reports, contact the [HealthandMuscle.com](http://HealthandMuscle.com) site and those requests will be forwarded to me for future updates to this e-book.

E-books allow people like me to get information out to readers at a rate no printed book could ever match, and that's one of the reasons I decided to go the "e" route rather than a traditional book or magazine.

I hope most readers realize at this late juncture in the book that this e-book is in no way sponsored or connected to a supplement company or manufacturer. No doubt, certain companies and individuals in the weight loss supplement business

will be unhappy to see the unbiased truth put down on paper, or as electrons on a computer screen.

Don't be surprised if you are greeted with something less than enthusiasm after presenting some of this information to people who want to believe whatever the weight loss industry marketing machine promises.

Knowledge is power. I say gain a little knowledge before you try to take off the weight!

The group of people who will be unhappy with this e-book thought I would finally reveal the magic pill for weight loss. Sorry I could not supply that information. There is no magic pill. I do know however that anyone at any level will lose fat and maintain muscle following this book. With a little luck and hard work, you should be able to gain some muscle.

## **Part 6: OF INTEREST...**

### **RECIPIES – SEE THESE HEALTHY RECIPIES FROM THE INNER RING**

With so much positive feedback from the several emails we sent out containing healthy recipes, we have decided to make a web page from the information.

Here's the link: <http://www.aboutsupplements.com/recipes>

You can check this page regularly as more recipes will be added over time.

These are taken from Will's Inner Ring which is available to customers of 'Diet Supplements Revealed'.

If you are a member of the Inner Ring and would like to add your own input here please do so in the “forum” and we’ll add it to the web page.

## **EARN MONEY RECOMMENDING "DIET SUPPLEMENTS REVEALED"**

If you have enjoyed this ebook and have a bodybuilding, fitness, health or weight loss related web site then you can make great money simply by linking to us and recommending "Diet Supplements Revealed".

If only 3 people you recommend buy the book then your commissions will have covered the cost of the ebook !!!

Here's the link to learn more:-

<http://www.aboutsupplements.com/affiliates/affiliateinfo.html>

And here's some feedback from a current affiliate :-

*"I have known Will for several years and have seen first hand the level of respect and influence he has in the industry. When I was approached to carry his new E-Book I accepted with some hesitation and caution.*

*The service and support I have received has been first rate and I didn't have to do anything but set up a simple link to start making money. Considering the fact that I have had to do virtually no work to promote it, combined with no additional overhead costs for me, I can say this has been a worthwhile and profitable addition to my site.*

*The fact that all the billing is automated and all I have to do is get checks each month, it has been a win win situation for me and my web site. "*

**- Shelley Hominuk [www.qfac.com](http://www.qfac.com)**

## **"NOT JOINED THE INNER RING YET?" – LEARN MORE HERE**

If you have not chosen to gain access to the Inner Ring then you will not be able to chat live with Will, join in the discussion with all the other readers of Diet Supplements Revealed on our forum discussing their real world feedback about all kinds of supplement brands and so forth.

You will also not gain access to all the other benefits like integrated calorie counters, live health and fitness news etc.

If you do decide to do this after you've started reading your book, you can still do so from:- <http://www.aboutsupplements.com/innercircle.html>

Remember that the above link will be shut down in the near future and you will then have to pay the full \$77.00 as opposed to the offer price of just \$4.77 for an entire year's access with no recurring charges.

## **"NEED PROFESSIONAL CONSULTATION?" – SEE WILL'S CONSULTATION SERVICE**

### **IF YOU NEED 'HANDS ON' COACHING...**

*'One-on-one telephone, Live Chat or E-Mail consultation with Industry  
Consultant, Author & Columnist Will Brink'*

Here's a quick note just to let you know that if you ever want to go one step further than the information available in the ebook then you can always have a personal consultation with Will himself.

Will is considered one of the top five experts in the US on training, dieting and supplementation. Yet his prices are surprisingly affordable (starting at only \$40).

To take a look here for more information...

<http://www.aboutsupplements.com/privatechat/consults.html>

### **CONSULTING FEEDBACK**

Here's some feedback about Will's consultation service...

*'Thanks for your e-mail Will and yes the consult was worth every cent and more.  
I'll never be a bodybuilder but 19% body fat to 9% in 10 weeks has totally  
changed my body – no more GUT! Just in time for my holiday in Turkey - thanks  
again' - Simon Garner, Atlanta - USA*

You can see Simon's photo here and also see exactly what other people think about Will's consulting services...

<http://www.aboutsupplements.com/privatechat/others.html>

Once again here's the link:-

<http://www.aboutsupplements.com/privatechat/consults.html>

(Also take note that these consulting services are not always available, they are subject to Will's availability)

## **THE "FITNESS AND FAT LOSS RESOURCES" PAGE**

Take note of this web page where we will be posting useful resources. You will also receive emails about each resource which will explain things a little more detail, but if you want to take a look right now then this is the link.

(I suggest you bookmark this page as I will be adding more little gems to it as I find them...)

Here's the link:-

<http://www.aboutsupplements.com/resources/>

If you know of any other \*outstanding\* fitness resources that you feel would also benefit others then send me an email to...

<mailto:info@aboutsupplements.com?subject=resources>

... and I will go and take a look.



## **ONE FINAL NOTE -- LET US KNOW HOW YOU GET ON...**

If you want to drop me a line use this link...

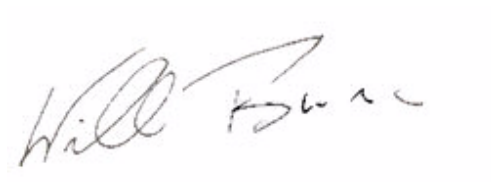
[mailto:info@aboutesupplements.com?subject=customer\\_feedback](mailto:info@aboutesupplements.com?subject=customer_feedback)

...and tell me all about your success.

There is NOTHING more rewarding to me than to hear about peoples success. It really is what drives me.

Finally I want to say a sincere thanks for your custom, and wish you all the very best in your health and physical goals.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Will Brink", is enclosed within a thin black rectangular border.

**Will Brink**

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## **William D. Brink**

Will Brink is a columnist, contributing consultant, and writer for numerous health/fitness, medical, and bodybuilding publications. His articles on nutrition, supplements, weight loss, exercise and medicine can be found in magazines and journals such as *Lets Live*, *Muscle Media 2000*, *MuscleMag International*, *The Life Extension Magazine*, *Muscle n Fitness*, *Inside Karate*, *Exercise for Men Only*, *Oxygen*, and the *Townsend Letter For Doctors*.

Brink is the author of the book Priming The Anabolic Environment: A practical and Scientific Guide to the Art and Science of Building Muscle, and a consulting Sports Nutrition Editor for *Physical* magazine. Will graduated from Harvard University with a concentration in the natural sciences, and is a consultant to major supplement companies.

He has served as an NPC judge and as a Ms. Fitness USA judge. A well-known trainer, Will has helped many top level bodybuilders through all facets of precontest and off-season training. William has also worked with athletes ranging from professional golfers, fitness contestants, and police and military personnel.

His articles and interviews can be found on many internet web sites (including WWW.LEF.Org, QFAC.com, MotherNature.com, Medlean.com, Testosterone.net, hairloss-research.org, thinkmuscle.com, MuscleMonthly.com, as well as many others including his own site BrinkZone.com).

Brink has co-authored several studies relating to sports nutrition and health found in peer reviewed academic journals. His monthly column on supplements, "The

Intake Update" is one of the most popular sections in *MuscleMag International*. William has been lectured at trade associations and universities around the United States and has appeared on numerous radio and television programs examining issues of health and fitness.

He can be contacted at: PO Box 480, Newton Centre, MA 02459.

[www.brinkzone.com](http://www.brinkzone.com).

**Disclaimer: Here's the usual stuff that the lawyer made me write....**

The information contained in this booklet is not intended as medical advice, nor should it be used as medical advice. The information found in this booklet is provided solely for informational purposes.

Further scientific, medical and training articles can be found at Will Brinks own site at <http://www.brinkzone.com>

*"If you think we get all the nutrients we need from our highly processed food supply and food choices we make, there is a bridge in Brooklyn you may be interested in..."*

**~Will Brink ~**