

Performance/Endurance/Sports Products

Sports performance/Power—whey protein, electrolytes, magnesium, long-chain glucose-polymers, HGH/IGF, Creatine, chromium, CoQ10, Vit . C, Selenium, Zinc, Boron, HMB, L-Arginine, L – Lysine, Ornithine, DHEA, L - Glutamine, L-Leucine, L-Isoleucine, L-Valine

Sports Endurance – Panax Ginseng, Siberian Ginseng, L- Carnitine, Co Q10, Pyruvate, PAK, whey protein, electrolytes, magnesium, long-chain glucose-polymers

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ATHLETIC PERFORMANCE AND SPORTS SUPPLEMENTS

Many factors go into your abilities as an athlete — including your diet, how much sleep you get, genetics and heredity, and your training program. But the fact is that using sports supplements may give you the edge and increase your performance, but we need to realize it is only one part of the big picture for getting great results. So instead of turning only to supplements to improve your performance, concentrate on fundamental nutrition and follow a detailed well thought out specific weight-training and aerobic-conditioning program. Athletes often look for alternative nutrition to perform at their best. Supplements are a multi-million dollar business that offers some good and some unnecessary products. Here are some tips and information about the more common over the counter supplements.

What are Ergogenic Aids and Performance Enhancing Substances?

Erogenic aids consist of substance, supplements, drugs, procedures and even devices that are intended to improve athletic performance. Some of these substances are naturally occurring, easily available and completely legal while others are manufactured, some are illegal, or banned by many sporting organizations. A supplement is something added to the diet, typically to make up for a nutritional deficiency. Sports supplements include vitamins, minerals, amino acids, herbs, or botanicals (plants) — or any concentration, extract, or combination of these. These products are generally available over the counter without a prescription.

FUNDAMENTAL NUTRITION

Vitamins and minerals are necessary for normal metabolism and good health. Vitamins and minerals have no calories and are not an energy source, but assist and regulate metabolizing nutrients in food, help convert fat and carbohydrates into energy and are invaluable in keeping your body running smoothly. There are plenty of **Multivitamins Benefits** when you are building your body through weight training or cardiovascular exercise. When you are on a low calorie diet or lifting weights for gaining muscle mass, it is hard to get the right amount of vitamins and minerals from the food you eat. Not only do you need vitamins and minerals to keep your body running good, they are also important for growth and maintenance of your muscles. Plus, vitamins and minerals aid in the loss of stubborn body fat by boosting your metabolism. The multivitamins benefits will take your bodybuilding routine to the next level.

Of course there are many more vitamins and minerals that play a role in the success of your weight management – for a complete detailed explanation of the role and function of all our essential vitamins and minerals **read the *FUNDAMENTAL NUTRITION pdf* from our website: goodyearhealth.com.**

Vitamin A

Vitamin A plays an important role in vision, immune function, and maintenance of mucus forming cells, bone growth, reproduction, cell division and differentiation. Vitamin A helps keep your anabolic hormones at optimal levels, allowing for greater increases in lean muscle weight and strength. While ensuring a good supply of all of the fat soluble vitamins is crucial to good health, Vitamin A is particularly important in raising testosterone levels in the body. As well as being able to increase testosterone level naturally, Vitamin A is crucial in optimizing protein utilization, and can therefore help you to build and repair muscle more quickly

When building lean muscle mass, the purpose is for the protein from the food you eat to go to your muscles. Without vitamin A, 60 percent of the protein you digest will go to waste. When you want to gain muscle mass fast, vitamin A will help. When you workout, the cells in your muscles needs to be broken down and split. This vitamin will help in that process. Once the muscle cells are broken down, they are ready for the protein to be shuttle into the damaged muscle for repair. The transformation of protein turning into actually muscle will be aided greatly by a sufficient amount of vitamin A.

Vitamin A coupled with iron supplementation will increase lean body mass by improving their anabolic hormone status i.e. increased 'available' testosterone, igf-1 and growth hormone levels. Vitamin A status is not only essential to increase testosterone level naturally, but it will also lower estrogen levels! ***Controlling your estrogen levels*** is one of the most effective ways to lose fat, so as well as helping you to build muscle Vitamin A could help you to lean down as well. Besides Vitamin A, other components that increase testosterone level naturally such as zinc, saturated fat, cholesterol and high quality protein.

Low fat, high protein diets damage testosterone levels!

Diets that are high protein quickly deplete Vitamin A stores. Eating the ludicrously high levels of protein that many bodybuilders do will deplete Vitamin A levels and will depress your testosterone levels. The requirement for Vitamin A goes up with strenuous exercise and, particularly, heavy exercises such as squats and deadlifts that require great levels of testosterone to be performed. By choosing to eat low fat, low Vitamin A foods, many bodybuilders are probably creating a sub clinical Vitamin A deficiency that is causing low testosterone levels and undermining their attempts to build muscle and to get ripped!

Improved protein utilization!

What a lot of bodybuilders and strength athletes don't understand is it's not how much protein you eat but how much you utilize that is important in gaining lean muscle mass. As we've just seen, Vitamin A levels become depleted on a high protein diet and this means testosterone levels may fall below optimal. As well as this, some studies suggest that low Vitamin A levels may also mean protein is used less efficiently than it is when adequate vitamin a is consumed.

When looking for foods to eat with Vitamin A, try cod liver oil, orange vegetables, carrot, squash and oranges. The conversion of carotenes from orange vegetable and fruits to true Vitamin A only happens when fat is included in your meals. This is because the conversion is carried out by bile salts and fat splitting enzymes in the upper intestinal tract – low fat meals don't require bile or fat splitting enzymes so none become available to turn the carotenes into true Vitamin A.

The recommended daily allowance for vitamin A is 5000 international units (IU) (1,000 µg retinol equivalent- RE) for adults although 10,000 IU per day is normally used in supplementation and 8000 IU for pregnant or lactating women. Be aware that this dosage is the minimum that you require per day, to ward off serious deficiency of this particular nutrient. In the therapeutic use of this nutrient, the dosage is usually increased considerably, but the toxicity level must be kept in mind. Being fat-soluble, vitamin A is stored to a variable degree in the body, making it more likely to cause toxicity when taken in excess amounts. Dosages exceeding 15,000 IU per day must be taken under medical supervision. Toxicity can appear in some individuals at relatively low dosages and the symptoms may include nausea, dizziness, menstrual problems, skin changes and dryness, itchiness, irritability, vomiting, headaches and long term use can cause hair loss, bone and muscle pain, headache, liver damage, and an increase in blood lipid concentrations.

Pregnant women must be careful as a high intake of this vitamin can cause birth defects. Pro-vitamin A - beta-carotene does not cause toxicity.

Vitamin B complex

Vitamin B plays a vital role in energy production and muscle ATP utilization during exercise

The breakdown of carbohydrates into glucose (this provides energy for the body). The breakdown of fats and proteins; converts your stored fat cells into energy. Instead of using other means of energy, vitamin B complex makes use of your stored energy and uses it for energy. This in turn, helps you lose that stubborn belly fat faster when working out. Vitamin B complex also manages your body metabolism for the digestion of protein.

Vitamin B complex reduces muscle spasms, leg cramps, hand numbness and helps regulate blood pressure. Finally, this vitamin helps in the transformation of certain substances from your body and turns that into insulin and growth hormones that is essential for energy and faster muscle growth.

Supplement with a high quality *Vitamin B (100)* complex that includes all the B vitamins at the appropriate ratios; these ratios are compared to the B6 at 100 mg per day. This is recommended for promoting optimal health and immune function, weight loss and increase ATP production (energy). You will get a lot of multivitamins benefits from the Vitamin B complex.

Vitamin C

Vitamin C is essential to prevent free radical damage, which is accelerated after injuries, sickness and the trauma of weight training, thus enhancing recovery and growth. It is also essential in helping to repair the connective tissue. Ascorbic Acid is involved with amino acid metabolism, especially the formation of Collagen. Collagen is the primary constituent of connective tissue, the stuff that holds your bones and muscles together. This may not seem important, but if you are active, get injured easily or physically train often or lift heavier weights, the stress you put on your structure becomes tremendous. If your connective tissue is not as healthy and strong as it should be, risk of injury dramatically increases.

Vitamin C takes the cholesterol that you digest from your body and transformation it into a natural steroidal hormone that the body uses for gaining muscle mass – very important with increasing your basal metabolic rate. Ascorbic acid also assists in the formation and release of steroid hormones, including the anabolic hormone testosterone. It is a natural process in your body that helps build muscles and helps in the recovery of your muscles.

Third, vitamin C helps in the absorption of Iron. Iron is necessary to help Oxygen bind to hemoglobin in blood. Without adequate oxygen transportation in blood, muscles are robbed of precious oxygen and energy and performance is greatly reduced.

Finally, vitamin C is perhaps the most water soluble vitamin there is. In other words, it diffuses very rapidly in water. Since a muscle cell is mostly water, the more muscular an athlete becomes, the more vitamin C disperses and the lower the concentration of this critical substance becomes in body tissues. So vitamin C requirements are greatly increased for those that weight train and exercise on a structured diet. The RDA is a mere 60mg's which in my opinion is way too low for a normal person let alone a physically active individual or bodybuilder or someone trying to lose weight. Many Doctors and nutritionists also think that 60mg's is too low and tend to lean towards suggestion *1000-3000 mg's* is a range to experimenting with Vitamin C amounts. You could try a little more and see if you notice and difference in recovery. Remember, Vitamin C is water soluble, so any extra will just wash out of your system with your fluids.

Calcium

Calcium is especially important for growth, maintenance and repair of bone tissue, maintenance of blood calcium levels, nerve conduction, and normal blood clotting. Inadequate dietary calcium and vitamin D increase the risk of low bone mineral density and stress fractures. Female athletes are at greatest risk for low bone mineral density if energy intakes are low, dairy products and other calcium-rich foods are inadequate or eliminated from the diet, and menstrual dysfunction is present. Calcium is necessary for *muscular contraction and relaxation*. If adequate stores of Calcium are not available in the muscle, full, hard muscular contractions cannot be sustained.

Calcium is also stored in fat cells and plays a crucial role in regulating how fat is stored and broken down by the body. A recent study theorized that the more calcium there is in a fat cell, the more fat will burn. Calcium is no magic bullet. What the study says is that... higher-calcium diets favor burning rather than storing fat. Calcium changes the efficiency of weight loss.

Supplementation with calcium and vitamin D should be determined after a thorough nutrition assessment. The FNB established RDAs for the amounts of calcium required for bone health and to maintain adequate rates of calcium retention in healthy people. They established 1.0 -1.2 g per day. The

two main forms of calcium in supplements are calcium from M.C.H.C. and calcium citrate which are readily absorbed and utilized by the body. While other forms of calcium may halt bone loss, only M.C.H.C. has been shown to restore bone density. M.C.H.C. or microcrystalline calcium hydroxyapatite complex, prepared from raw bone, is in an extremely bioavailable form of calcium which has been used with great success in prevention and treatment of osteoporosis, to prevent and halt bone loss, and to restore bone density. Additional minerals are present in the natural ratios occurring in normal bone. Calcium carbonate is more commonly available and is both inexpensive and convenient. Both the carbonate and citrate forms are similarly well absorbed, but individuals with reduced levels of stomach acid can absorb calcium citrate more easily. The body absorbs calcium carbonate most efficiently when the supplement is consumed with food, whereas the body can absorb calcium citrate equally effectively when the supplement is taken with or without food. Current supplementation recommendations for athletes, individuals with disordered eating, amenorrhea, and risk for early osteoporosis are *1500 mg* of elemental calcium.

Magnesium

Every organ in the body -- especially the heart, muscles, bones, and kidneys -- needs the mineral magnesium. Most important, it activates enzymes, contributes to energy production, and helps regulate calcium levels as well as copper, zinc, potassium, vitamin D, and other important nutrients in the body. Magnesium plays a variety of roles in cellular metabolism (glycolysis, fat, and protein metabolism) and regulates membrane stability and neuromuscular, cardiovascular, immune, and hormonal functions.

You can get magnesium from many foods. However, most people in the United States probably do not get as much magnesium as they should from their diet. Foods rich in magnesium include whole grains, nuts, and green vegetables. Green leafy vegetables are particularly good sources of magnesium. Too much coffee, soda, salt, or alcohol as well as heavy menstrual periods, excessive sweating, and prolonged stress can also lower magnesium levels.

Magnesium deficiency impairs endurance performance by increasing oxygen requirements to complete exercise. Athletes in weight-class and body-conscious sports, such as wrestling, ballet, gymnastics, and tennis or those on calorie restricted diets have been reported to consume inadequate dietary magnesium. In athletes with low magnesium status, supplementation is beneficial. Without magnesium, your muscles will not be able to contract to the best of their ability. It helps produce a compound called Adenosine Triphosphate (ATP) which is the prime source of energy in the muscles. Magnesium also increases your growth hormone for the recovery of physical activity.

Recommended supplemental types include magnesium citrate, magnesium gluconate, and magnesium lactate, all of which are more easily absorbed into the body than other forms. It is a good idea to take a B vitamin complex, or a multivitamin containing B vitamins, because the level of vitamin B6 in the body determines how much magnesium will be absorbed into the cells.

Healthy Adult

- Adolescent and adult males: 270 - 400 mg daily
- Adolescent and adult females: 280 - 300 mg daily
- Pregnant females: 320 mg daily
- Breastfeeding females: 340 - 335 mg daily

A person's need for magnesium increases during pregnancy, recovery from surgery and illnesses, and athletic training.

Iron

Iron is an essential mineral that is required for human life, found in red blood cells used in the formation of oxygen-carrying proteins, hemoglobin and myoglobin, and for enzymes involved in energy production. Extra iron is stored in the liver, bone marrow, spleen, and muscles. Oxygen-carrying capacity is essential for endurance exercise as well as normal function of the nervous, behavioral, and immune systems. *Iron depletion is one of the most prevalent nutrient deficiencies observed among athletes, especially females.* Iron deficiency, with or without anemia, can impair muscle function and limit work capacity. The most common symptoms of anemia are weakness and fatigue -- one reason people who are iron-deficient get tired easily is because their cells don't get enough oxygen. Iron requirements for endurance athletes, especially distance runners, are increased by approximately 70%.

The high incidence of iron depletion among athletes is usually attributed to inadequate energy intake. Other factors that can impact iron status include vegetarian diets that have poor iron availability, periods of rapid growth, training at high altitudes, increased iron losses in sweat, feces, urine, menstrual blood, bleeding ulcer, foot-strike hemolysis, regular blood donation, or injury. Athletes, especially women, long-distance runners, adolescents, and vegetarians should be screened periodically to assess and monitor iron status. Vitamin A helps mobilize iron from its storage sites, so a deficiency of vitamin A limits the body's ability to use stored iron.

Because reversing iron deficiency anemia can require 3-6 months, it is advantageous to begin nutrition intervention before iron deficiency anemia develops. The amount of iron absorbed decreases with increasing doses. For this reason, it is recommended that most people take their prescribed daily iron supplement in two or three equally spaced doses. For adults who are not pregnant, the CDC recommends taking *50 mg to 60 mg* of oral elemental iron *twice daily* for three months for the therapeutic treatment of iron deficiency anemia. Although depleted iron stores are more prevalent in female athletes, *the incidence of iron deficiency anemia in athletes is similar to that of the nonathlete female population.* Chronic iron deficiency, with or without anemia, that results from consistently poor iron intake can negatively impact health, physical, and mental performance and warrants prompt medical intervention and monitoring.

Best sources of iron are found in animal foods that originally contained hemoglobin, such as red meats, fish, and poultry. Iron in plant foods such as lentils and beans is arranged in a chemical structure called nonheme iron. In athletes who are iron-deficient, iron supplementation not only improves blood biochemical measures and iron status but also increases work capacity as evidenced by increasing oxygen uptake, reducing heart rate, and decreasing lactate concentration during exercise. There is some evidence that athletes who are iron-deficient but do not have anemia may benefit from iron supplementation. Recent findings provide additional support for improved performance (i.e., less skeletal muscle fatigue) when iron supplementation was prescribed as 100-mg ferrous sulfate for 4-6 wk.

Zinc

Zinc is an essential trace mineral, so you get it through the foods you eat. Next to iron, zinc is the most common trace mineral in the body and is found in every cell. It has been used since ancient times to help heal wounds. It plays an important role in the immune system, reproduction, growth, building and

repair of muscle tissue, break down of carbohydrates into energy production, taste, vision, smell, blood clotting, and proper insulin and thyroid function. Zinc helps transport Vitamin A from your liver to the other parts of your body that is in need. In addition, it keeps your testosterone levels high. Zinc also has antioxidant properties. Therefore it helps protect cells in the body from damage caused by free radicals.

Survey data indicate that a large number of North Americans have zinc intakes below recommended levels. A mild zinc deficiency isn't uncommon but taking a zinc supplement, plus eating a healthy diet, should give you all the zinc you need. Athletes, particularly females, are also at risk for zinc deficiency. Decreases in cardiorespiratory function, muscle strength, and endurance have been noted with poor zinc status. Zinc deficiency has been shown to directly affect thyroid hormone levels, BMR, and protein use, and decreases growth hormone and insulin like growth factor-1 which in turn can negatively affect health and physical performance.

The best sources of zinc are oysters (richest source), red meats, poultry, cheese (ricotta, Swiss, gouda), shrimp, crab, and other shellfish. Other good, though less easily absorbed, sources of zinc include legumes (especially lima beans, black-eyed peas, pinto beans, soybeans, peanuts), whole grains, miso, tofu, brewer's yeast, cooked greens, mushrooms, green beans, and pumpkin, and sunflower seeds. Fruits and vegetables are not good sources. Diets low in animal protein, high in fiber and vegetarian diets, in particular, are associated with decreased zinc intake. Our body absorbs 20 - 40% of the zinc present in food.

More easily absorbed forms of zinc supplements are zinc picolinate, zinc citrate, zinc acetate, zinc glycerate, and zinc monomethionine. The amount of elemental zinc is listed on the product label usually 30 - 50 mg. To determine the amount to take in supplement form, remember that you get about 10 - 15 mg from food. Individuals should be cautioned against very high single-dose zinc supplements because if taken for several weeks may lead to low HDL cholesterol and nutrient imbalances by interfering with absorption of other nutrients such as iron and copper. Zinc lessens the amount of copper your body absorbs, and high doses of zinc can cause a copper deficiency. For that reason, many doctors recommend that you take 2 mg of copper along with a 25 mg zinc supplement.

Selenium

Selenium is an essential mineral found in trace amounts in the body. It works as an antioxidant, especially when combined with vitamin E, by scavenging damaging particles in the body known as free radicals. Free radicals can damage cell membranes and DNA, and may contribute to aging and a number of conditions. The majority of selenium research has addressed the possible role selenium may have in preventing heart disease and some cancers. A body of evidence has been established in regards to exercise and selenium. Multiple studies agree that the glutathione peroxidase (GSH-Px) system increases with chronic exercise training. Glutathione peroxidase, a key enzyme in the body's antioxidant defence systems, which helps to neutralize highly reactive and damaging free radicals. The enzyme (GSH-Px) is dependent upon selenium. Without selenium GSH-Px surrenders the ability to degrade H₂O₂, a potential free radical. Endurance and high intensity training have both correlated to an increase in GSH-Px activities. Adaptation of the enzyme is limited to only Type I and Type IIa muscles. A known adaptation to endurance training is an increase in oxidative enzyme activity, which increases to a greater percent than the reduced glutathione antioxidant defense system can sustain. It is theorized that selenium aids and replenishes this system for quicker recovery with endurance exercise. Many athletes may not be consuming even the basic amounts of selenium for their needs, let alone the optimum

amounts required to protect cells from the higher throughputs of oxygen and consequent potentially damaging free radical production associated with sport activity

Selenium is found in some meats and seafood. Animals that eat grains or plants that were grown in selenium-rich soil have higher levels of selenium in their muscle. In the U.S., meats and bread are common sources of dietary selenium. Some nuts are also sources of selenium. Selenium therapeutic supplementation is often recommended at *100-200 mcg*.

Protein

Protein is not just an essential nutrient, but the largest component in the body after water, typically representing about 15% of body weight. Most of this protein mass is found in skeletal muscle, which explains the importance of protein to athletes. However, proteins also play an important role in the following:

- Transport and storage of other nutrients;
- Catalyzing biochemical reactions;
- Control of growth and differentiation;
- Immune protection;
- Providing our bodies with structural integrity.

Although the basic biochemistry and functional roles of protein in the body have long been understood, there's still a huge amount of mythology and confusion surrounding protein nutrition, especially where athletes are concerned. This is partly because new research continues to throw up surprises about exactly what constitutes optimum protein nutrition!

The protein we eat is made up of around 20 amino acid 'building blocks'. The process of digestion breaks down dietary protein into its constituent amino acid building blocks, which can then be absorbed into the body and reassembled to make various kinds of human protein, such as muscle, connective tissue, immune proteins, and so on.

However, it is important to understand that protein metabolism is in a constant state of flux; although muscle and other tissues contain a large amount of stored protein, this protein is not 'locked away'. When dietary amino acids are insufficient, tissue protein can rapidly be broken down back to amino acid building blocks, which are then used to replenish the 'amino acid pool', a reservoir of amino acids that can be drawn upon to support such vital functions as energy production or immune function. This explains why muscle mass is often lost during times of stress, disease and heavy training loads, or poor nutrition.

Conversely, when dietary amino acids are in plentiful supply and other demands for protein are low, tissue protein synthesis can become the dominant process. The overall control of protein turnover – whether the body is in a state of anabolism (building up) or catabolism (breaking down), also known as positive or negative nitrogen balance – is governed by hormonal factors, caloric intake and availability of amino acids, particularly of the eight 'essential' amino acids that cannot be synthesised in the human body and therefore have to be obtained from the diet.

Maintaining optimum protein status

An athlete has to move his or her body to perform, and this requires the muscles to generate force to accelerate body mass. As a rule of thumb, the greater an athlete's power-to-weight ratio, the faster he or she can move, and (to a lesser extent) the longer he or she will be able to maintain any given speed of movement. Since all force and movement is generated by muscles, most power athlete's benefit from maximizing muscle mass and strength, while minimizing the amount of unnecessary body mass – ie fat.

And while outright muscle strength is less important for endurance athletes, maintaining sufficient muscle mass is critically important, because high training volumes are known to increase the rate of protein usage from the amino acid pool, potentially leading to delayed recovery, a loss of muscle mass and consequent loss of power, and increased injury risk.

Given that athletic training is known to increase the demands on the amino acid pool, many athletes, particularly bodybuilders and strength athletes, adopt high-protein diets to maintain a positive nitrogen balance, or at least prevent catabolism and loss of muscle tissue.

Protein vs carbohydrate

There are other questions too. For example, should any extra protein be ingested at the expense of carbohydrate, the body's preferred fuel for high-intensity training?

Until recently the protein requirements of athletes were thought to be similar to those of sedentary people, and athletes were advised that they need only consume the recommended daily amount (RDA) of protein – (.35 - .45 grams of protein per 1 pound of body weight). However, research over the past decade has indicated that active individuals to athletes engaged in intense training actually need to ingest about 2 – 3 times the RDA (1- 1.5 grams of protein per 1 pound of body weight) in order to maintain a positive protein balance. This equates to 135-225g of protein per day for a 150lb athlete, which is equivalent to 3 - 5 medium-sized chicken breasts or 4 to 7 drained 6oz canned water tuna per day! There is also evidence that training at altitude imposes an even higher demand for protein – perhaps greater than 1.5 grams per 1 lb of body weight per day.

Although foods like breads, cereals and legumes contain significant amounts of protein, which can add to that contributed by high-protein foods, such as meat, fish, milk and eggs, larger athletes, or those engaged in high volumes of training, may struggle to include the increased amounts of protein now recommended in a 'normal' diet; indeed, a number of nutritional surveys have indicated that protein insufficiency may be a problem for certain groups of athletes, including runners, cyclists, swimmers, triathletes, gymnasts, skaters and wrestler.

Forty years ago, it was protein that dominated the thoughts of power athletes and bodybuilders. Employing the simple logic that muscles are made of protein, and that to build muscle you need lots of protein, steak-and-egg diets were the order of the day! But as the importance of carbohydrates in supplying energy and driving the insulin system (the most anabolic hormone in the body) became clearer, the emphasis gradually shifted.

This shift in emphasis was encouraged by an appreciation of the health benefits of dietary fiber present in unrefined carbohydrates, and also by research **suggesting** that very high protein intakes simply resulted in increased protein oxidation, imposing an additional load on the liver and kidneys. However, the recent meteoric rise in popularity of high-protein diets, such as Zone and Atkins has exploded an

intense debate about the safety and efficacy of high-protein diets, which is also relevant for athletes who routinely consume high-protein diets. If you examine the scientific literature, it is hard to see how this consensus, linking high protein intakes to increased health risks, has become so widespread. In a recent meta-review of the literature, Finnish scientists searched for any evidence supporting the hypothesis that high protein diets, containing two to three times the current RDA for protein, increase the risk of a number of health conditions – and drew a big fat blank.

They concluded that:

- There is ***no evidence to suggest*** that renal function is impaired by high protein diets;
- ***Far from reducing*** bone mineral density, high-protein diets may actually increase it;
- Such diets are associated with ***lower not higher*** blood pressures.

These conclusions have also been confirmed by other researchers; healthy athletes should not, therefore, be discouraged from increasing their protein intake to up to three times the RDA level if they need to accomplish wellness and GOALS.

SEE our [PROTEIN pdf](#) and [Nutrition Math Made Easy pdf](#) for more specifics on protein type, quantity, quality and timing of ingesting protein supplements and the ratios and goals of the proper nutrition pyramid for optimal health and wellness.

Healthy Balance of Protein, Carb and Fat Ranges

Your intake of protein may be higher due to higher demands from your body to recover and to obtain optimal performance; but don't lose sight of eating a health balanced fundamental nutritious diet. Your Protein, carbohydrates and fat may be somewhat higher or lower than the our recommendations, due to your taste preferences, cooking style, culture, fitness routine, health conditions and performance goals. Regardless of the obstacles, we recommend a *minimum level of 25%* protein. This requirement will help prevent muscle loss and promote feelings of fullness among dieters. Our *specific* breakdown is **30% Protein, 50% Carbohydrates and 20% fat**, all of which fall into the healthy ranges. Hydrate daily with 1/3 to 1/2 your ideal body weight in fluid ounces of water per day. Eat a wide variety of healthy foods to keep from becoming bored. Do your best to meet at least the minimum recommendations for calories, carbohydrates, fat and protein.

Role of Carbohydrates in Supplying Energy for Fuel and Recovery

Carbohydrates take more energy to digest and have more nutrition value than fat and do not raise the set point as high fat intake does. Carbohydrate intake – “carbs” are essential in our diet since they supply vitamins and minerals and are the body's preferred source of energy which allows protein to be spared for building muscle. Guides suggest ingesting 80% complex carbs such as fiber, vegetables and starch such as whole grains and pasta; and less than 20% simple sugars. Stay away from empty calorie simple sugars from candy, honey, refined grains, drinks with high fructose corn syrup and white sugar and eat more nutritious simple sugars from lactose – milk and fructose – fruits. However, while theoretically sound, this just doesn't pan out that all "complex" foods are better. Maltodextrin, for example, is a complex carbohydrate that digests more quickly than straight glucose (a simple carbohydrate) which causes a more dramatic increase in blood sugar and blood insulin. Therefore it appears that classifying carbohydrates according to how they're processed in the body presents a better

way to look at carbs than classifying them according to their structural characteristics (i.e. simple vs. complex). Enter the glycemic and insulin indices....

The glycemic index, put simply, is a scale of how rapidly an ingested carbs will enter the bloodstream as glucose. It's one of the factors determining insulin response and metabolism of the food. But not the only factor that determines insulin response, as demonstrated by the insulin index. The insulin index measures the direct insulin response to an ingested food, whereas the glycemic index measures the glucose response to the ingested food. All foods have been classified according to their glycemic and insulin response in the body, using a reference can be helpful. Research states that eating a meal with combining different types of foods has an effect on the total GI and II response. Knowing this, we suggest keeping it simple. Choose better complex foods in each category to get the most nutrition value per calorie of food with the least glycemic and insulin response to the body.

Another strategy to modulate the response is to take a food that may rank higher in terms of causing an insulin release and add in some sort of soluble fiber to slows down the rate of digestion which slows the absorption of glucose in the intestine and thus allowing for a smaller release of insulin. This will allow a higher GI carb to be eaten without the large burst in blood glucose. Consuming a fair amount of fiber with each meal should accomplish this.

Avoid refined starches and sugars at all costs except for during and after exercise... Human beings aren't genetically programmed to handle large amounts of simple sugars! Besides, all nutrition guidelines already suggest foods that are low-GI (whole grains, legumes, most fruits, milk products).

Simple and complex molecules are digested to form free glucose which causes a very high insulin response. As we know, insulin is a strong lipogenic hormone (fat building or generating) and if insulin levels are raised for a prolonged period of time, it inhibits lipolysis (fat breakdown) to occur. Thus a person will gain fat. Now, fructose (fruit) on the other hand doesn't require insulin in order to be stored as glycogen in the liver and thus it causes a very small increase in insulin secretion, making it better than starch in terms of the insulin response. In other words, an apple is better for you than a bowl of rice unless you are about to work out or just finished. During and after training your body's requirements to refuel is at its highest and is driven by glucose. It is during this time that you are also training your body on insulin responses to glucose, which offers a window of opportunity to train this system to be efficient pro glycogen storage instead of allowing glucose to be allowed in the lipogenic system of fat storage.

However, the role of carbohydrates in supplying energy for fuel and recovery remain as important as ever, which means the diet must contain high-quality, low-fat sources of protein in order to enable adequate carbohydrate intake without an overall excess of calories.

As for the actual intake of carbs,

- Those trying to "**gain weight**" use a simple formula of three or four times the person's bodyweight in carbs. In other words, a 150 pound man ingests at least 450 to 600 grams of carbs every day.
- Those trying to **reduce body fat**, minimizing carb intake for the most part, except for a few key times. With these people, consume foods that are high in fiber and don't cause much of an insulin release. Foods like old-fashioned oatmeal, yams, certain fruits, etc.

- For these trying to **reduce body fat**, consume no more than their body weight in grams, so a 210 pound guy at 12 to 15% body fat shouldn't be consuming more than 210 grams of carbs per day. Now, this does leave some room for variation depending on the person's body fat levels and daily calorie restrictions. For instance, when it comes to a guy 350 lbs at 25% body fat, don't consume 350 grams per day, instead around 250 grams or less.

As far as carb timing, I feel the most important times are in the morning upon waking, in the middle of the day, and post workout. You also need some form of carb before your workout to ensure that glycogen stores are at least partially full by the time you train. Finally, after workout, consume a post-workout drink with carbs.

Typically carb selections should be unprocessed, grainy, whole foods like beans, nuts, whole grains, oats. Therefore your carb choices should be low GI, low IL, and unprocessed. If you want to gain weight and have a fast metabolic rate, carb it all day. If you want to lose weight then the most important times to eat your carbs are probably the first meal of the day and then after training.

Since energy is a core principal for training, an athlete's must regularly consume the requirement of 50% carbohydrates of total diet while also consuming enough calories (25%) from fat to meet essential fat requirements. Athletes also need to remember, given the importance of carbohydrate for energy requirements that during higher-volume training and competition phases one must follow a regime that contains more carbohydrates!

Fat intake – good in certain forms

Fats are used for hormone formation and absorption and transport of certain vitamins. It is recommended that 80% of your total fat intake as monounsaturated fats (oils in olive oil, canola oils) and as polyunsaturated (liquid vegetable, flax and fish oils) and Consume less than 20% of total dietary daily fat saturated fats – animal fat, butter, cream. Polyunsaturated oils are the healthiest and are further described as Omega 3s are mainly found in fish oil, flaxseed oil, canola oil, walnut oil, and green leafy vegetables. Omega 6s are mainly found in vegetable oil, corn oil, safflower oil, sunflower oil, peanut oil, and sesame oil.

Over the past 100 years there has been an enormous imbalanced increase in the consumption of omega-6 fatty acids due to the increased intake of vegetable oils from corn, sunflower seeds, safflower seeds, and soybeans. Today, in Western diets, the ratio of ω 6 to ω 3 fatty acids ranges from 20–30:1 *instead of* the optimal range of 1–2:1. Studies indicate that a shift to a higher intake of ω -3 fatty acids shifts the bodies physiologic state to one that is antiinflammatory, antithrombotic, antiarrhythmic, hypolipidemic, and vasodilatory properties.

Dietary fats have been lumped together as a single entity and rejected for too long. When people start talking about completely getting rid of fat in their diets it frightens me. It's a classic example of the nutritional misinformation that's so out of control in our society. There's nothing magically thermogenic about the absence of fat! Seriously, though, the general recommendations to cut down on fat in the diet were well intended. At the time, the average sedentary individual was eating about 40% fat (most of this coming from saturated fats) in the diet. That's a nice recipe for heart disease, obesity, etc.

Now, of course, it's not that simple in terms of assigning importance to each macronutrient in the diet. But it isn't all that difficult either. Basically, the body is either mostly anabolic or catabolic. It's both building up and breaking down at all times. However, if anabolism outweighs catabolism, we grow. This has roots on the hormonal, neuromuscular, and/or organ level. If you eat to be anabolic, you'll grow muscle, fat... depends on the quality and quantity of the calories of your diet and the ratios of each. If you eat to be catabolic, you'll lose muscle, fat... It's that simple. Too many athletes and bodybuilders just don't understand that losing weight and maximizing training are two conflicting ideas as far as your body is concerned. If you're dieting/starving yourself or even eating below maintenance to try and lose weight, then you aren't going to have the maximum energy to gain muscle or get great results from your training! It's just that simple.

If you aren't eating intelligently, it'll take much longer for your body to fully recover from a hard workout. Even more devastating is the fact that you won't have the ability to train as hard. All athletes need to train hard to maximize their gains. I don't care if you're sitting on a bike for four hours per day or pushing up iron.

It takes a lot of energy to train hard day-in and day-out and your body knows this. It won't take too many days of hard training on a catabolic diet before your body decides that it doesn't want to play anymore. Mentally and physically you just won't be able to keep up the same intensity during your workouts. Unfortunately, too many athletes ignore the warning signals from their bodies and they continue to push on. This can lead to overtraining, which may take weeks or even months to correct.

We are not saying that you should never try to work out and diet. Lifting along with dieting is an extremely effective means of shedding fat, but it isn't an effective means of increasing muscle mass. The bottom line is if your objective is to put on as much muscle as possible, you have to give your body what it needs.

Hypothetically, if we took a 200-lb male that has about 15% body fat, that individual would have about 30 lbs of fat on their body and less than 15 lbs of contractile muscle protein. That's a 2 to 1 ratio of fat to muscle contractile protein.

Due to the importance of energy, proper macronutrients for building blocks and hormone control it is very important to eat balanced meals that include right amounts of vitamins, mineral, 50% Carbohydrates, 30% Protein and **20% fat**. I think that only *10 to 15%* of your *total fat* intake should come from saturates. But when trying to increase mass, you need to take saturates up to about 30 to 35% of total fats. I say this because there's data to suggest that saturated fat intake can increase Testosterone production. With all of the fears of saturated fats out there, I can understand why some would be cautious. But the bottom line is that if you train, you can get away with higher levels of saturated fats from a health perspective and you'll probably grow.

Eating moderate to high fat is ideal for both hormonal reasons and metabolic ones, too. With low fat diets, Testosterone levels crash. In addition, when there's inadequate fat in the diet, the essential fatty acids are deficient. The body can't function optimally from the genetic level up to the cellular level and even all the way up to integrative metabolism. In addition, cellular metabolism favors carbohydrate oxidation (burning) during low fat diets and therefore fats are more likely to be stored anyway.

- During all training phases, make a conscious attempt to reduce the omega 6 polyunsaturates from your diet while simultaneously increasing your omega 3s mostly in the form of fish/salmon oils (DHA, EPA) and some flax seeds or flax oils. This increase in 3s, as well as the more favorable ratio of 3s to 6s, can potentially increase insulin sensitivity in muscle, decrease it in fat, reduce body fat, decrease muscle damage and soreness, and decrease disease or injury-induced inflammation.
- Replacing the saturates with monounsaturates in the form of olive oils is a smart move. This will favorably impact blood lipid profiles and cell integrity (by preventing free radical induced oxidation.)
- If you want to “bulk up” and stray from the dieticians and "health fanatics," eat saturated fats (about 30%, but not much more of your total fat intake) during *mass phases*. During *diet phases*, decrease this ratio to about 10% of total fat intake and attack the salmon and olives for the rest of your fats.
- Finally, don't reduce fat intake to such low levels (lower than 15%) that your energy levels are that of a 80-year-old bridge player.

SEE our *Nutrition Math Made Easy pdf* for more specifics on macronutrient type, quantity, quality and the ratios and goals of the proper nutrition pyramid for optimal health and wellness.

SPECIALTY PERFORMANCE AND ENDURANCE SUPPLEMENTS

Growth Hormone

GH is a powerful anabolic hormone in humans. HGH has been used by competitors in sports since the 1970s, and it has been banned by the IOC and NCAA. HGH is synthesized and secreted from the anterior pituitary gland in a pulsatile manner throughout the day; surges of secretion occur at 3- to 5-hour intervals. The plasma concentration of GH during these peaks may range from 5 to even 45 ng/mL. The largest and most predictable of these GH peaks occurs about an hour after onset of sleep. A number of factors are known to affect HGH secretion, such as age, gender, diet, exercise, stress, and other hormones. Young adolescents secrete HGH at the rate of about 700 µg/day, while healthy adults secrete HGH at the rate of about 400 µg/day. Many tissues are targets for GH including skeletal muscles. Its benefits have variably included reduced fat mass, increased lean mass, increased bone density, improved lipid profile, reduced cardiovascular risk factors, and improved psychosocial well-being. The use of Growth hormone is controversial and recently has been used experimental as an anti-aging agent. Growth hormone is used as prescription drug in medicine to treat children's growth disorders and adult growth hormone deficiency. In the United States, it is only available legally from pharmacies, by prescription from a doctor. In recent years in the United States, some doctors have started to prescribe growth hormone in GH-deficient older patients to increase vitality.

The goal of supplementation would be to use safe supplements that stimulate a natural increase in your own GH production for the greatest results. For example: orally administered arginine is a potent GH releaser. More specific amounts of these substances reported a stronger effect on GH. Combining arginine and ornithine statistically increased GH. While oral dose of 1200 mg of L- arginine plus 1200mg of L- lysine on an empty stomach significantly increased plasma GH levels.

Branched –Chained Amino Acids (BCAA's)

The BCAA's include leucine, isoleucine and valine. They make up 35% of your muscle mass and must be present for molecular growth and development to take place. The BCAA's are indispensable. Clinical

benefits are increased nitrogen retention, post surgical trauma, injury and the primary amino acids metabolized by muscles for energy during exercise. Athletes show decreased levels of leucine and isoleucine. The benefits for athlete supplementation include, as an energy source and anabolic (N2 sparing) agent. This has a sparing effect on muscle glycogen degradation during exercise. The use of BCAA's suppress the muscle protein breakdown during intense exercise.

With BCAA's 4-8 grams before a workout and 4-8 grams after is optimal. BCAA's should be consumed closely to a 2:1:1 Ratio with Leucine, Iso-Leucine & Valine, this is similar to the body's muscle tissues ratio. Lesser amounts are effective but if increased performance and recovery are needed a higher dosage is more effective. Taking BCAA's immediately before or during a strenuous workout or cardio session will increase performance.

Taking them after with a post work out meal or recovery drink will help speed the replacement of BCAA's in the muscles, speeding muscle recovery and preventing overtraining. For optimum results in supplement form, it is desirable to take your BCAA's separately from the other amino acid groupings for the fact that they totally dominate the race for entry into the bodies' systems.

HMB

HMB is a leucine metabolite (a BCAA) used for nitrogen retention. Its function is to decrease muscle – protein turnover and minimize protein degradation. A dose of 3 grams per day of oral HMB decreases body fat, increases lean mass and strength and reduces muscle damage. It is suggested to take protein supplementation along with HMB.

L-Arginine

A conditionally-essential amino acid necessary for protein synthesis, precursor to nitric oxide, a compound responsible for multiple functions within the body including supporting the immune system and increasing blood flow (vasodilation). It stimulates growth hormone secretion and insulin-like growth factor-1 and improves the nitrogen balance. Arginine is required for Creatine synthesis. Ornithine has similar actions. When Arginine and Ornithine are consumed in combination together they both increase the strength and enhancement of GH secretion and production of lean body mass. The body can produce this amino acid. However, in the young, highly stress and injured, production may not meet requirements. Recommended dose of 2 grams per day of each arginine and Ornithine.

L- Glutamine

L-glutamine is the most abundant amino acid found in human muscle and plasma. It is released from the muscle during times of stress (such as hard weight training workouts) and dieting. This amino acid not only has been shown to be a great anti-catabolic agent (protects the muscle from “breakdown” - the catabolic activities of the hormone cortisol), to be a contributor to muscle cell volume, and to have immune system enhancing properties. It is an important fuel source for muscle and rapidly dividing cells such as the cells of the immune and the gastrointestinal (GI) systems. It is also the very important fuel source of the enterocyte of the GI. It plays a role in brain function as a neuroactive precursor needed for optimal mental functioning. Additionally L-Glutamine has important roles of:

- Regulation/stimulation of protein synthesis.
- Has an anabolic effect on skeletal muscle (this is one of the ways in which steroids exert their muscle building effects).
- Increases the release of Growth Hormone.

- Accelerating glycogen synthesis after a workout.
- Sparing the use of the glycogen stored in the muscle cell (recall that the glycogen is the energy source for muscle cells to contract).
- Faster recuperation from weight training workouts.
- Primary nitrogen donor, meaning that it moves the nitrogen around in the body to where it is needed. Maintaining a positive nitrogen balance is absolutely necessary for muscle building.

Recently, glutamine has become known as a conditionally essential amino acid because in times of physical stress, such as intense exhaustive exercise, critically ill and surgery, the body requires more of it to maintain its glutamine stores in blood and muscle. When glutamine stores are depleted, you may experience decreases in strength, stamina, and recovery.

Due to its anti-catabolic properties and the fact that it accelerates glycogen synthesis after a workout, glutamine is best taken 20-30 minutes after a workout with a protein shake. One of the best products to use to prevent overtraining!

On days that you don't work out, just take it with your last protein shake of the day. Initial Dosage could start with 2-5 grams which is sufficient and will allow your stomach to get used to it; you can slowly increase to as much as 10-15 grams. However, this supplement will be most effective when taking about *10-15 grams total each day dividing the does over 2-3 times*, with the most effective times first thing in the morning, before you go to bed, and directly after your workout. Research has shown that Glutamine can help increase growth hormone levels. A study showed 2 g of L- Glutamine increased growth hormone levels by over 400%.

L-Lysine

L-Lysine is a necessary building block for all protein in the body. L-Lysine is required for the absorption of calcium so it is an important element in building strong bones. L-Lysine helps with tissue repair, collagen formation, and aids in the repair of surgical wounds and muscle injury since lysine is used in the extracellular matrix and is essential in the crosslink formation that stabilizes collagen and elastin. It also plays an important role in the body's production of hormones, enzymes, and antibodies. Lysine is a base, as are arginine and histidine. As an essential amino acid, lysine is not synthesized in animals; hence it must be ingested as lysine or lysine-containing proteins. Lysine is the limiting amino acid - meaning the essential amino acid found in the smallest quantity in the particular food. It has been used as a powerful enhancer of the anabolic hormone GH. Results showed statistically significant increases in GH in men and women alike with an oral dose of 1200 mg of both L-lysine hydrochloride and 1200mg L arginine on an empty stomach. When administered alone results were less than significant.

L-Ornithine Alpha keto Glutarate (OKG)

Ornithine is used in burn, traumatized and surgical patients and chronically malnourished patients. IT promotes wound healing and increases protein synthesis and reduced protein degradation. It increases appetite and used for better disposition to exercise and physically train. OKG is used to increase the secretion of insulin like growth factor-1 and Growth hormone. When Arginine and Ornithine are consumed in combination together they both potentiate the secretion of Growth hormone. It also increases the synthesis of other metabolites important in anabolic effects such as Glutamine, Polyamines, Arginine, and Ketoacids.

It is recommended for strength training to consume 2 grams per day of each arginine and Ornithine to increase of strength and enhancement of Growth hormone secretion and production of lean body mass. Individual Ornithine doses of up to 10 grams per day.

L- Carnitine

L-Carnitine is located in the mitochondrial membrane, and is a co-factor needed for transformation and transport of long-chain fatty acids (FAT), such as triglycerides into mitochondria (a cell's energy powerhouse), where they are broken down to produce energy. It is necessary to improve the body's ability to use stored fat as fuel by enhancing lipid oxidation. L-carnitine is a very popular supplement that promotes growth and development. It is also used for fat-burning and increasing energy. L-carnitine has been suggested as a muscle disease, liver disease, and kidney disease fighter, and has also been shown to help build muscle and treat some forms of cardiovascular disease. It is also great in dieting, as it reduces feelings of hunger and weakness. It was found with experiments that doses of 2 grams just prior to an event increased running speeds and decreased O₂ consumption and reduced heart rate with athletes. There was also a decrease in Lactate post exercise. This has led to its properties of increasing VO₂ Max. L-Carnitine requires many Co-factors to function such as: Magnesium, Iron, Vitamin C, Folic Acid, Vitamin B12, B6, B5 and B3.

Doses of 2-6 g/day over 6 months have been studied with no observed adverse side effects. Doses of 500mg -6 g/day are typically recommended for cardiovascular, sports performance, and weight loss benefits, although the effectiveness of any lower dose of carnitine for sports or weight loss effects are not impressive. As a "heart health" nutrient, approximately 2 g/day of carnitine provide some benefits in terms of promoting general heart function.

Pyruvate

Pyruvate is a substance that occurs naturally in the body, as a by-product of the metabolism of carbohydrates. Pyruvate is a key intersection in several metabolic pathways. It is found naturally in fruits and vegetables, as red apples as the best source. During glycolysis (breakdown of glucose into energy), glucose is converted into Pyruvate and then either converted into 1.- acetyl Co A, for the entry into the citric acid cycle (Krebs Cycle) under aerobic conditions or 2. – Lactic acid under anaerobic conditions. There is some evidence that it may help reduce body fat, possibly by increasing the body's metabolic rate. It is becoming popular with athletes due to reports of its endurance and weight loss enhancing effects. Studies have demonstrated that Pyruvate is most effective when given in combination with dihydroxyacetone (DYAP). Dose recommendation is 3 grams per day.

Panax Ginseng

Panax Ginseng also known as Chinese or Korean Ginseng is called an adaptogen because it promotes adaption to stress. Panax is a root found to grow in the Northern Hemisphere in eastern Asia (mostly northern China, Korea, and eastern Siberia), typically in cooler climates; it is most often available in a root and in dried form, either whole or sliced. Ginseng leaf, although not as highly prized, is sometimes also used; as with the root, it is most often available in dried form. Panax Ginseng promotes yin energy and cleans excess yang in the body, and calms the body. Panax is among the most popular supplements used by athletes. Primarily it decreases fatigue and helps rebuild strength. IT works by enhancing or increasing free testosterone, ACTH, FSH and LH (sex hormones). Also increasing maximal oxygen consumption and utilization of oxygen by muscles. Using Panax has shown to reduce plasma lactate levels and associated soreness. Dose recommended is 250-500 mg per day; while some recommend discontinuing the supplement for a few days every couple months.

Eleutherooccus Senticosus

This adaptogen is referred to as *Siberian Ginseng*. It promotes recovery and improves endurance. It is known to enhance general health, longevity, appetite and memory. Increases ability to accommodate to mental stress. It has been routinely used by the Soviet cosmonauts, athletes and military. Siberian Ginseng has been used to prolong the time to exhaustion in swimmers and track athletes. Used by endurance athletes alike for decreased muscle fatigue, delayed lactic acid buildup, reducing heart rate during exercise and optimally reducing recovery time with training. Siberian Ginseng has weight loss characteristics and has been used due to its ability to spare carbohydrate action and shift the utilization of fats for energy. Dose recommendations are 300 mg per day.

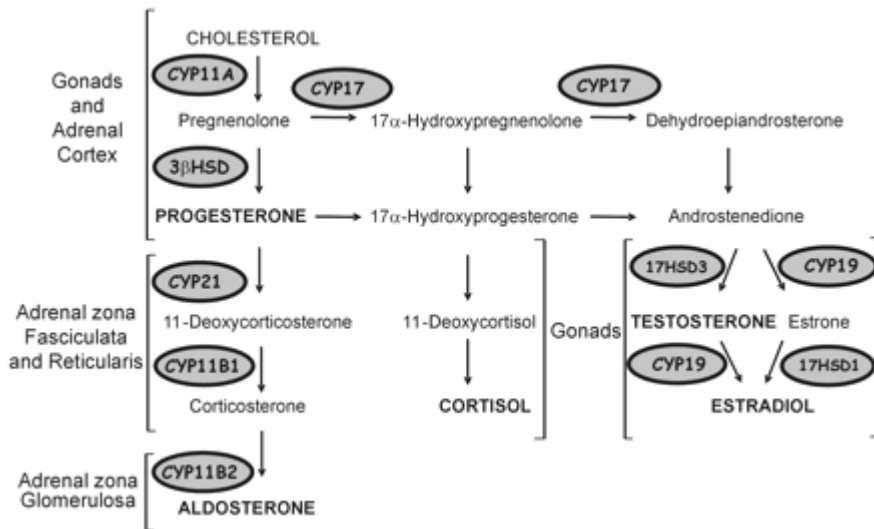
Co Q-10

Co-Enzyme Q10 is an important vitamin-like nutrient found virtually in all body cell membranes and organs and energy compartments in the mitochondria. CoQ10 plays a critical role in the production of an important molecule known as adenosine triphosphate (ATP), the basic energy molecule of all cells. It is used in the conversion of energy from carbohydrates and fats to ATP. Although CoQ-10 can be synthesized by the body, the body's capacity to do so may be insufficient, to meet CoQ-10 requirements. Primary dietary sources of CoQ10 include oily fish (such as salmon and tuna), organ meats (such as liver), and whole grains. Most individuals lack sufficient amounts of CoQ10 with a "Western" diet, it may be useful for individuals with particular health conditions or those taking certain medications to supplement. Susceptibility to CoQ-10 deficiency appears to be greatest in cells that are metabolically active, such as those in the heart, lungs, immune system, and gingivae. CoQ-10 also functions as an antioxidant. By functioning as an antioxidant, CoQ10 protects tissue components by scavenging and neutralizing damaging free radicals and reactive oxygen species produced during the oxidation of fats and carbohydrates. Scientists believe free radicals contribute to the aging process, as well as the development of a number of health problems, including heart disease and cancer.

In animal studies, CoQ10 supplementation has increased mean lifespan by as much as 50%. The beneficial effects of CoQ10 appear to be dose dependent. Recent clinical trials show faster and greater regression of disease with doses (300-600 mg) of CoQ10 daily. Supplementing 50-200mg CoQ10 per day has also demonstrated an increase in ATP production (energy) by enhancing CoQ10's critical role in breaking down of carbohydrates and fats. Soft gels tend to be better absorbed by the body than capsules or other preparations. CoQ10 is fat-soluble so should be taken with a meal containing fat for optimal absorption. Also, taking CoQ10 at night may help with the body's ability to use it.

7-Keto DHEA

DHEA (dehydroepiandrosterone) is a steroid prohormone known produced mainly by adrenal glands, gonads and the brain and is the most dominant hormone in the body involved in the physiology of virtually every cell. The body converts cholesterol into pregnenolone which is further transformed into DHEA to a hormone called androstenedione. Androstenedione is then changed into the major male and female sex hormones testosterone and estrogen.



In both sexes, blood levels of DHEA peak at 25. After 30 years of age, the levels steadily decline. By 80 years old, the body only has 5% of the DHEA levels it had at 20. Because levels of DHEA decline with age, DHEA has been hyped as an "antidote for aging" and a "superhormone". Proclaiming its function to help burn fat, build muscle mass, boost libido, strengthen the immune system, prevent heart disease, cancer, osteoporosis and non-insulin dependent diabetes, ease the effects of menopause, memory loss, help in the treatment of lupus, limit burn damage, combat stress and prevent or slow the progression of Alzheimer, Parkinson diseases, Multiple sclerosis (MS), low levels of steroid hormones (Addison's disease), depression, schizophrenia and chronic fatigue syndrome (CFS).

The sex steroid hormones have pronounced effects in areas of the brain that are not involved in sexual behavior or reproduction. The actions of the sex hormones have been a topic of recent research. (DHEA), the adrenal hormone, also alters spine formation, and the effect may be due to its metabolism to estrogen in the brain. One area of interest is their effects on hippocampal neuron spine formation. DHEA is used in the growth of dendritic spines in the hippocampus. The hippocampus is a brain region involved in learning, memory, and cognitive function, and it also shows pronounced changes during aging and in pathological disease states, such as Alzheimer's disease, related to aging and cognition. Estrogen and DHEA have been shown to enhance memory and learning functions and prevent damage due to anoxia and glutamate-induced toxicity. DHEA levels and estrogen levels decrease during aging and have also been implicated in etiology and treatment of the damage induced by Alzheimer's disease.

Several studies suggest that taking DHEA may help improve mood, fatigue, and well-being. In one study, women with this condition who took DHEA supplements reported improved sexuality and sense of well-being (including decreased feelings of depression and anxiety). In a few clinical studies of people with major depression, DHEA significantly improved symptoms compared to placebo.

DHEA promotes an increase in sex hormones testosterone production and associated sex drive. DHEA is also used by men for erectile dysfunction (ED), and by healthy women and women who have low levels of certain hormones to improve well-being and sexuality. A Study in France used the supplement to relieve symptoms of menopause. It suggested that the hormone may slow bone loss, improve skin health, and improve sexual drive and vaginal dryness. DHEA can be converted into either estrogen or testosterone in the body, women or men with a history of hormone-sensitive cancers such

as breast or prostate cancer should consult a healthcare provider and be monitored during nutritional therapies.

DHEA is used to increase metabolism and thermogenesis to promote weight loss, to increase lean body mass and build muscle, to increase activity of the thyroid gland and immune system. It will stimulate an increase in insulin receptors for better glucose levels and ultimately usage for ATP. It also has effects on inhibiting an increase in fat cell size, the number and ability to split. Due to its effects it is used for preventing diabetes and metabolic syndrome. Athletes use DHEA to increase muscle mass, strength, and energy. But DHEA use is banned by the National Collegiate Athletic Association (NCAA).

Additionally it will have compounding effects by reducing Adrenal stress and cortisol levels which are known to inhibit adipose breakdown. A study funded by the National Institutes of Health looked at the effect of DHEA (50 mg a day) compared to a placebo for weight loss in 56 overweight adults between the ages of 65 and 78. At the end of the six month study, people taking DHEA lost an average of two pounds compared to the people taking the placebo, who gained just over one pound. Although overall weight loss was minimal, results were more promising when fat loss around the abdomen was assessed. After six months, women taking DHEA lost 10% of their abdominal fat and men lost 7%.

There are two types of DHEA available: pharmaceutical grade DHEA supplements and DHEA extracts.

Only a doctor can prescribe pharmaceutical grade DHEA. Synthetic or pharmaceutical grade DHEA is produced from pharmaceutical grade ingredients. This form is molecularly identical to the DHEA that we produce. DHEA extracts are available over-the-counter and are made from the Mexican yam called Dioscorea that contains a sterol called diosgenin which contains about 5 to 10 percent of true DHEA.

7-KETO DHEA is a potent, natural metabolite, also called conversion product, of DHEA. This means that 7-Keto is a substance that is produced when DHEA is metabolized by the human body. 7-Keto may then seem to be the answer to people's prayers who want the benefits of DHEA but not the side effects that were worrisome. It gives the same effects that DHEA has as far as boosting the immune system, improving the memory, and increasing the metabolism of the body however 7-Keto is not metabolized by the body into either an androgenic or estrogenic hormone or steroid to make the sex hormones that present cancer risks.

In preliminary studies on animals, 7-Keto DHEA stimulates the immune system, prevents muscle loss (anti-catabolic), reduces stress, increases the calorie-burning rate by activating thermogenic liver enzymes and improves memory more than DHEA or a placebo. 7-Keto DHEA may be less likely to cause problems than its counterpart DHEA however when any hormonal supplement comes into play there can be side effects. It is recommended that if you have any type of medical condition please consult with your physician or medical professional prior to starting any type of supplement such as this.

Doses of *50mg -2 g/day*, never take under age of 18 years old, are typically recommended for cardiovascular, sports performance and weight loss benefits, although the effectiveness of any lower dose for sports or weight loss effects are not impressive.

Androstenedione

Androstenedione a steroid hormone produced in the adrenal glands and the gonads as an intermediate step in the biochemical pathway that produces the androgen testosterone and the estrogens estrone and estradiol. Androstenedione is the common precursor of male and female sex hormones. Some

androstenedione is also secreted into the plasma, and may be converted in peripheral tissues to testosterone and estrogens. Known popularly as “andro”. It has been used as a supplement to increase muscle strength. Taking “andro” raises testosterone levels above normal. Side effects include acne, male baldness, and a decrease in "good" cholesterol, which may predispose to cardiovascular disease.

Androstenedione has been shown to increase serum testosterone levels over an eight-hour period in men when taken as a single oral dose of 300 mg per day, but a 100 mg dose had no significant effect on serum testosterone. However, serum levels of estradiol increased following both the 100 mg and 300 mg doses. At dosages of 50 mg or 100 mg per day, “andro” had no effect on muscle strength or size, or on body fat levels. One study utilized a daily dosage of 300 mg of androstenedione combined with several other supplements, and also found no increase in strength when compared to a control group that did not take the supplements.

Though it is natural, androstenedione has been used in a dietary supplement form in the past by numerous athletes to enhance athletic performance, increase energy, and encourage red blood cell health, until it was banned in 2004. The drug is now illegal in supplement form in the U.S. because it is believed to have caused numerous side effects in both males and females that can be irreversible. The Food and Drug Administration (FDA) banned the sale of androstenedione on April 11, 2004, citing that the drug poses significant health risks. As of October 2004, it has been classified as a controlled substance and can no longer be sold without a prescription. The primary reason for this decision was a finding filed by the FDA stating that there was no safe way for androstenedione to be used in a supplement form. The risk of side effects and damage to the body are too high and too numerous for the drug to be administered without the recommendation of a doctor.

Creatine Monohydrate

Creatine has become one of the most popular supplements in the history of body building. A nitrogenous organic acid synthesized from the amino acids glycine, L-arginine, and L-methionine that is found in the muscle tissue of vertebrates mainly in the form of phosphocreatine and which supplies energy for muscle contraction. Research in adults found that creatine is most effective for athletes doing intermittent high-intensity exercise with short recovery intervals, such as sprinting and power lifting. It is used primarily to increase strength and lean body mass. Over time muscles will become saturated with creatine, fatigue is delayed, refueling is quicker during high intensity, short duration exercise and muscle is capable of greater work. When muscles absorb Creatine, it also brings in water intracellularly, resulting in a larger, fuller muscle. This then helps to accelerate the synthesis of new protein as well as decrease the protein degradation.

Load for 5-7 days, maintenance after that. Loading dose 2-5 grams divided over two times, then maintain with a dose of 1-2 grams per day. Cofactors B12, B6 and folic acid are required to recycle homocysteine back to methionine for the reuse of SAMe, therefore are important for the full benefit of creatine supplementation.

Phosphate loading

Creatine Phosphate is a source of quick, immediate energy in muscle. The effects of phosphate loading allows more efficient delivery of oxygen to tissue. Phosphate loading decreases serum lactate levels during exercise and increases VO₂ Max and decreases exercise fatigue.

Recommendations (speculative): 1 to 3 grams sodium phosphate 1 hour before exercise.

Bicarbonate Loading

The normal pH of blood is between 7.35 to 7.45 and is tightly controlled even during exercise. During high intense exercise blood pH can drop to 7.0 and muscle pH to 6.4. This causes a buildup of hydrogen ions, donated from the build-up of lactic acid resulting in acidosis which leads to fatigue. Alkaline loading doesn't affect VO₂max, heart rate, or strength. It has been shown to consistently improve performance by reducing the acidosis. Large doses 0.2 to 0.3 grams of Sodium Bicarbonate per each Kg of body weight are given 1 to 3 hours before strenuous exercise.

Glycogen Loading

Following strenuous exercise or a competitive endurance event muscle glycogen levels are depleted. Most effective period for carbohydrate super compensation due to sensitivity of muscles to insulin (2 to 4 hours post exercise, most likely 4 hours). The sooner muscle glycogen stores are replaced, the sooner performance returns to an optimal level. It takes 24 to 48 hours to completely replenish muscle glycogen. Intense exercise tends to suppress appetite, whereas mild, prolonged exercise may enhance appetite.

- Hyperhydrate
- Refuel as soon as possible (up to 4 Hours)
- Refuel enough 50gm CHO/hr during the first 4 hr period, then 500gm to 700gm total CHO /24 hr
- Refuel with complex carbohydrate (75% total diet)

Hydration and Sports Drinks

Adequate fluid intake for athletes is essential to comfort, performance and safety. The longer and more intensely you exercise, the more important it is to drink the right kind of fluids. Performance drinks are designed to maintain normal hydration, electrolyte balance and blood glucose levels during endurance exercise. The proper balance of all three of these is critical for allowing the highest performance capacity and is used during exercise to regulate temperature and direct the pathway of the energy systems. Dehydration does occur with exercise and replenishing your fluids, electrolytes and blood glucose is the simplest yet most important maintenance as an athlete or any individual that is physically active. Performance drinks are abundantly available in many forms and usually contain to some degree ingredients such as: glucose, fructose, sucrose, maltodextrins, sodium, potassium, and chloride. The efficacy of a drink is limited by the rate of absorption of fluid from the intestines, which is limited by gastric emptying. Gastric emptying (stomach) is progressively slowed by as caloric content increases, such as high carbohydrate content. Intense exercise additionally will slow gastric emptying. Timing is important; water prior to performance events is optimal while sugar electrolyte drinks during and especially right after will result in positive results of increased performance. Avoid a sugar drink immediately (1hour) prior to an event since the insulin response can impair performance.

Product Recommendations

At Goodyear Chiropractic Health Center, we offer only the highest quality nutritional supplements. The brands we offer are formulated with the highest regard for safety and efficacy with the highest quality ingredients and standardized extracts for best absorption and consistent results. Some of the brand names we offer are ***Advocare, Metagenics, Nutrition Dynamics, Optimum Nutrition, Standard Process, and Nutrina.***

N-Ornithine-alpha-Ketoglutaric

N-Ornithine-A-Ketoglutaric

Ornithine-a-Ketoglutarate, a powerful compound & precursor, has beneficial effect on hormones, the immune system, promotes healing in surgical and trauma cases and has anabolic properties.

One capsule supplies:

N-Ornithine-alpha-Ketoglutaric 500 mg

7-Keto DHEA

Weight Loss Formula

Keto DHEA is used to increase metabolism and thermogenesis to promote weight loss, to improve lean body mass and build muscle, to increase activity of the thyroid gland and immune system, to boost memory, and to reduce aging.

Each capsule supplies:

Keto metabolite of DHEA† 100 mg

Pregnenolone

Bio-identical Pregnenolone

Pregnenolone is synthesized in the body from cholesterol and is the precursor for all the steroid hormones, including progesterone, aldosterone, cortisol, dehydroepiandrosterone (DHEA), testosterone, and estrogens.

One capsule supplies:

- Pregnenolone 30 mg

Acetyl-L-Carnitine

Neuroprotection Formula

Acetyl-L-Carnitine, the acetyl ester and biologically active form of L-Carnitine, is an effective delivery form for both L-Carnitine and acetyl groups. Essential for normal mitochondrial function in all cells, L-Carnitine's primary function is to transport long chain fatty acids into the mitochondria where they are oxidized to produce energy.

Acetyl-L-Carnitine is unique in that it can cross the blood-brain barrier where it facilitates energy production in brain cells. The acetyl group it carries contribute to production of the important neurotransmitter, acetylcholine. Research shows Acetyl-L-Carnitine is critical to youthful cellular function in the brain, heart, liver, peripheral nerves and immune system, which makes it extremely important for anti-aging.

One capsule supplies:

- Acetyl-L-Carnitine 500 mg

L-Carnitine 500

Cardiovascular Health and Energy Production Formula

L-Carnitine transfers long-chain fatty acids, such as triglycerides into mitochondria (a cell's energy powerhouse), where they may be oxidized to produce energy. L-carnitine is a very popular supplement that promotes growth and development. It is also used for fat-burning and increasing energy.

L-carnitine has been suggested as a muscle disease, liver disease, and kidney disease fighter, and has also been shown to help build muscle and treat some forms of cardiovascular disease. It is also great in dieting, as it reduces feelings of hunger and weakness.

Studies have been conducted on L-carnitine since as early as 1937 which show that the body's cardiovascular system can greatly benefit from its intake. Also, there are a variety of published studies that show L-carnitine is useful in increasing the heart's output and improving its functioning, as well as stimulating the heart's energy supply and improving cardiac performance. Some experts have shown it increases endurance and helps regulating heart arrhythmia.

One capsule supplies:

- L-Carnitine (as L-carnitine fumarate)500 mg

CoQ10 200 mg

Stabilized, Highly Absorbable Coenzyme Q10 with Natural Vitamin E and Beta-Carotene

Coenzyme Q-10 is essential for the health of virtually all human tissues and organs. CoQ-10 also functions as an antioxidant.

Although CoQ-10 can be synthesized by the body, the body's capacity to do so may be insufficient, to meet CoQ-10 requirements, in some situations. Susceptibility to CoQ-10 deficiency appears to be greatest in cells that are metabolically active, such as those in the heart, immune system, and gingivae.

One softgel supplies:

- Vitamin A (Betatene© natural mixed carotenoids)2000 IU
- Vitamin E (d-alpha-tocopherol)200 IU
- Coenzyme Q10 (Ubiquinone)200 mg

Glutamine

Muscle Performance | Cell Volumizer

This Glutamine product was designed for Body building and sports nutrition. Glutamine, when paired with exercise, promotes lean muscle mass and cell growth.

One teaspoon supplies:

- L-Glutamine5 g
- Note: For critical illness or trauma, 10-40 grams daily has been used.

CATALYST™ by Advocare

Catalyst™ Amino Acid Supplement is a blend of essential branched-chain amino acids and L-glutamine that supplies your body with muscle-building components and sustains your muscles during exercise and reduced calorie intake. Whether you're trying to lose weight or gain muscle, Catalyst helps repair and protect muscles. And it works great in conjunction with other AdvoCare® products like Spark™ Energy Drink and one of the Metabolic Nutrition Systems (MNS®). Other amino acids in Catalyst like L-arginine, taurine and betaine help fuel and maintain your muscles to support endurance and strength. Combined with a healthy diet and exercise, Catalyst helps you retain muscle and reduce fat for a more toned and better defined look.

One Serving supplies: L-Glutamine-1,200mg, L-Leucine-450mg, L-Isoleucine-225mg, L-Valine-225mg, L-Arginine-100mg, Betaine-50mg, Taurine-50mg.

Purple Wraath by Controlled Labs Presents

Recovery and Increase Strength, Endurance, and Energy Support.

Purple Wraath was created to be the most complete EAA/BCAA product on the market; keeping your body in a constant anabolic state and keeping you training hard with its added super endurance complex. Research suggests that blood levels of these KEY amino acids and appropriate ratios are directly related to muscle protein synthesis, so we formulated a comprehensive and efficient matrix to enhance lean mass directly and indirectly, and under various conditions. Now, that ratio is important, but there are some other very exciting points about this formula. Unlike some of the amino acid supplements on the market, you aren't paying for cheap "filler" ingredients such as dextrose or maltodextrin when you purchase Purple Wraath. Also, we chose not to include the amino acid glutamine since it is not an essential amino acid, and our bodies can synthesize it on its own in sufficient quantities. Because the studies that we based this formula off of do not use tryptophan and since it has the potential for "sedative" like side effects, we designed Purple Wraath to be completely tryptophan-free. By combining intense exercise or weightlifting with the fast absorbing PurplEAA Complex you can rush nutrients into the active cells of your working muscles, creating an anabolic environment optimal for recovery and lean mass

Serving Size 1 Scoop (12g): Servings Per Container 45 Amount Per Serving % Daily Value Calories 0 Calories From Fat 0; Niacin (Niacinamide) 10mg 50%; Vitamin B6 (as Pyridoxine HCL) 10mg 500%; Potassium (Citrate) 67mg 2%; PurplEAA Complex™ 7000mg † L-Leucine, L-Valine, L-Isoleucine, L-Lysine, L-Arginine, L-Histidine, L-Threonine, L-Methionine, L-Phenylalanine PurplEndurance Complex™ 2700mg Beta Alanine, Citrulline Malate, Betaine Anhydrous, Ginger (From Root), L-Norvaline

Xtend by SciVation

Scientifically Advanced Endurance and Recovery Support.

Xtend is a precise, scientific blend of Energy Aminos consisting of the surmised 2:1:1 ratio of Branched Chain Amino Acids (L-Leucine, L-Isoleucine and L-Valine), Glutamine, Citrulline Malate, and Vitamin B6 that will give you the energy you need to maximize your training while promoting recovery at the same time. The advanced components in Xtend have been scientifically suggested to help speed recovery and enhance ATP production and promote cell volumization. Avoid fatigue by blocking entry of fatigue-inducing tryptophan into the brain. Support protein synthesis, immune function and digestive health.

Promote vasodilation which can lead to better assimilation and absorption of protein. Elevate growth hormone levels.

Amount Per Serving Value; Vitamin B6 (Pyridoxine HCL) 10mg, L-Leucine 3.5g, L-Glutamine 2.5g, L-Isoleucine 1.75g, L-Valine 1.75g, Citrulline Malate 1g

Arginine Extreme

Arginine Extreme combines a substantial amount of L-arginine with other amino acids, B-vitamins and related nutrients scientifically designed to contribute to the body's production of nitric oxide and muscle support. This unique combination of powerful nutrients nourishes the growth of lean muscle tissue in conjunction with an exercise program and provides targeted nutritional support for the vascular, cardiovascular, reproductive and immune systems. For athletes and exercisers, great-tasting Arginine Extreme is a premier pre-workout supplement that can help magnify the results of strength training by providing nutrient-delivery support directly to the muscles. With 2 1/2 grams of L-arginine per serving, plus L-leucine, another important amino acid, you can get better endurance in the weight room and improved stamina during cardio workouts. Use it with the rest of the Performance Elite product line, especially Muscle Fuel® to help further enhance your results by supporting longer, more vigorous workouts.

But Arginine Extreme isn't just for athletes. Because it feeds the vascular system with many of the nutrients it needs to perform at its best, Arginine Extreme provides cardiovascular nourishment and excellent immune support. As nitric oxide levels increase, healthy blood flow is easier to maintain. In fact, the ingredients in Arginine Extreme have been shown to help support healthy blood pressure levels and cholesterol levels already in the normal ranges.

One Serving supplies: Calories per serving-25, Total Carbohydrates-6g, Riboflavin-500mcg, Niacin-5mg, Vitamin B-6 (pyridoxine HCl)-500mcg, Folic Acid-100mcg, Vitamin B-12 (as cyanocobalamin)-1.5mcg, Biotin-250mcg, L-Arginine-2,500mg, L-Leucine-800mg, L-Glutamine-200mg, Glycine-200mg, Betaine (as HCl)-100mg, L-Lysine (as HCl)-100mg, Taurine-100mg.

Post-Workout Recovery

Post-Workout Recovery Sports Drink contains more than 30 vitamins, minerals and other nutrients that support the muscles' metabolic processes in recovery and helps minimize occasional soreness after workouts. Post-Workout Recovery combines the muscle-supporting nutrition used by hundreds of professional and world-class athletes across the United States. Post-Workout Recovery helps enhance physical performance and endurance while supplying essential components for muscle repair and gain during and after physical activity. The unique blend of high-quality protein combined with glucose polymers and other carbohydrates, gives the body energy and structural support.

Post-Workout Recovery also contains branched-chain amino acids to support muscle recovery, growth and endurance. Finally, the antioxidants present in this advanced sports drink help the body ward off free radicals that are commonly produced as a result of exercise.

One Serving supplies: Calories per serving 230, Total Carbohydrate-38g, Creatine-2g, Choline-50mcg, Inositol-50mg, Vanadium-200mcg, Boron-250mcg, Gamma-oryzanol-150mcg, L-Carnitine-25mg, Inosine-100mg, Silicon-1mg, DL-Methionine-250mg, L-Leucine-200mg, L-Valine-100mg, L-Isoleucine-100mg.

AdvoCare® Muscle Fuel Pre-Workout Drink

AdvoCare® Muscle Fuel is a unique, single-product solution that supports multiple muscle metabolic processes and helps maintain and restore energy during and after physical activity. Its 28 vitamins, minerals, botanicals and other energy-producing intermediates synergistically enhance physical performance and endurance. It also supplies essential muscle-gaining components during and after physical activity, helps reduce oxidative stress, facilitates workout recovery, maximizes training benefits, and helps you take your workout to the next level. And it contains essential nutrients to fight age-related muscle atrophy.

One Serving supplies: Calories per serving-25, Total Carbohydrate-6g, Vitamin A(as beta-carotene)-1,250 IU, Vitamin C (as ascorbic acid)-180mg, Folic acid-100mcg, Vitamin B-12 (as cyanocobalamin)-30mcg, Pantothenic acid (as calcium pantothenate)-20mg, Calcium (as calcium citrate and carbonate)-200mg, Magnesium (as magnesium citrate)-40mg, Zinc (as zinc gluconate)-3mg, Chromium (as chromium citrate)-60mcg, Sodium (as bicarbonate)-140mg, Potassium (as bicarbonate)-250mg, Creatine (as citrate and monohydrate)-3g, Citrate-2.5g, L-Arginine-2g, D-Ribose-1.5g, Malate (as malic acid)-850mg, Green tea extract (leaf-camellia sinensis)-500mg, Calcium pyruvate-500mg, Glycine-500mg, L-Carnitine-400mg, Aspartate (as L-aspartic acid)-250mg, Tartrate (as tartaric acid)-250mg, L-Citrulline-200mg, Succinate (as potassium succinate)-200mg, Betaine (as HCl)-100mg, Caffeine-100mg, Vanadium (as amino acid chelate)-2mg, Boron (as amino acid chelate)-100mcg.

Be sure to discuss nutritional supplementation with your health care provider, especially if you have a health condition or are currently taking medication.

Maintain a healthy Lifestyle

Make sure that you're eating a sensible diet, training regularly and intensely, staying well hydrated, and getting at least 7 hours of sleep every night. Protein provides the building blocks, but even the best sources won't build new muscle without the proper stimulus and **consistency!**

For more on why nutritional supplements are an important part of healthy eating, schedule your nutrition consult.