

What Is It?	Sources	Uses/Benefits	How Much
<b>Beta-hydroxy beta-methylbutyrate (HMB)</b> An anticatabolic compound that is a metabolite of the branched chain amino acid leucine.	Found in small quantities in catfish and citrus fruits; also found in breast milk. Available as a supplement in capsule form.	It appears that this amino acid metabolite supports the body's ability to minimize protein breakdown subsequent to stress such as intense exercise. By minimizing protein breakdown, HMB may cause an increase in muscle mass and strength.	3–5 grams/day during heavy training.
<b>Branch Chain Amino Acids (BCAAs)</b> The essential amino acids: isoleucine, leucine and valine.	<i>Leucine</i> : brown rice, beans, meats, nuts, soy & whole wheat. <i>Isoleucine</i> : almonds, cashews, chicken, eggs, meat, fish, seeds & soy. <i>Valine</i> : dairy, grains, meat, mushrooms, soy & peanuts. BCAA supplements are also available.	They are the building blocks of muscle protein. Together, they make up about 35 percent of the amino acid content of muscle tissue. In addition, they are important for energy production during exercise.	1,500–6,000 mg/day of leucine, and 800–3,000 mg/day each for isoleucine and valine.
<b>Choline</b> A vitamin-like substance, part of the structure of acetylcholine and phosphatidylcholine—key components used for nerve transmission.	Whole grains, egg yolks, lecithin, legumes, meat, milk and soybeans. Supplemental forms include capsules and tablets.	Choline is involved in the neurological processes responsible for muscular contraction. Researchers suggest that low levels of this chemical may contribute to muscle fatigue. When marathon runners were supplemented with 2 grams of choline before an event, 7 out of 10 improved their running times by over 5 minutes.	600–1,200 mg/day.
<b>CoQ10 (coenzyme Q10 or ubiquinone)</b> A naturally occurring metabolic enzyme responsible for converting food, oxygen and water into materials needed for cellular function.	Mackerel, salmon and sardines. Found in small amounts in beef, peanuts and spinach.	Research has shown that CoQ10 supplementation improves heart function, oxygen consumption and exercise performance in cardiac patients; it is used by athletes for increased energy production.	100 mg/day.
<b>Colostrum</b> After giving birth, all mammals produce a special milk called colostrum. Bovine colostrum is secreted by cows during the first few days after calving and is a rich source of protein, antibodies and growth factors, such as insulin growth factors (IGF and IGF-1).	Supplemental forms include capsules, powder, lozenges and tablets.	Growth factors (e.g., IGF-1) found in colostrum are proposed to help increase muscle size, strength and power output. IGF-1 helps in the regulation of muscular development, cartilage generation and bone mending. Immune components (such as IgG) restore immunity to immune-challenged athletes.	Much of the research on the use of colostrum for improved sports performance recommends up to 20 grams 3 times a day with meals. Although colostrum can be used year-round, it is also effective if it is just taken during competition season.
<b>Creatine</b> An intermediate compound used in the production of creatine phosphate. This molecule can help provide energy during high power or speed events.	Creatine is manufactured in the body during protein metabolism. It is available as a supplement and is present in foods, mostly meat and fish. Supplemental forms include caplets and tablets.	Used as an energy source for increased strength and power during highly anaerobic work. Athletes such as weight lifters, sprinters, jumpers and body builders gain the most from creatine supplementation. It also allows for an increase in muscle mass because it increases ability for high-intensity training.	A loading dose of 20 grams/day for 3–5 days and then 5–10 grams/day as a maintenance dose. Usually taken with carbohydrates to aid with its uptake by the muscle.
<b>Glutamine</b> An amino acid that is known as a “conditionally” essential amino acid for athletes and people under stress.	Found in raw spinach and parsley. As a supplement, it is commonly added to protein and recovery carbohydrate drinks.	Largest free-amino acid in the muscles and important for muscle growth and homeostasis. Glutamine is also important to immune functioning. New studies show that glutamine is required for cellular replication in the immune system.	1–20 grams/day during periods of high muscular stress.
<b>L-Carnitine (Carnitine)</b> L-Carnitine is a co-factor for several enzymes in the muscle cells.	Found in greater amounts in foods of animal origin and in lesser amounts in foods of plant origin. Supplemental forms include capsules, tablets and liquid.	L-Carnitine influences the metabolism of fatty acids, facilitating the transfer of long-chain fatty acids into the mitochondria for energy production. Increased metabolism of fatty acids can decrease the use of carbohydrates as an energy source.	Normal use: 250–500 mg/day; in rigorous athletic regimens, 2–4 grams/day. Make sure to use L-Carnitine, not DL-Carnitine, because the DL form can interfere with the normal function of L-Carnitine in the body.
<b>Methyl-sulfonyl-methane (MSM)</b> A natural sulfur compound.	Found in oral supplement form or in an ointment for topical application to muscles and joints. Also available as a powder.	Many athletes and fitness enthusiasts rely on MSM to reduce pain, soreness and inflammation associated with injuries, strained or cramped muscles and over-extended joints. A study conducted at UCLA showed that athletes using MSM had improved recovery after hard training and had fewer medical office visits.	Many athletes find that taking 3–5 grams/day helps relieve soreness and aids in recovery during hard or extensive training.
<b>NADH (reduced B-nicotinamide adenine dinucleotide)</b> A coenzyme that enables the body's enzymes, or its cellular monitors, to function optimally.	Every living cell contains NADH, which is present in meat, poultry and fish, but is destroyed during the cooking process. It is also found in yeast, and smaller amounts are present in plants. Supplements come in tablet form.	Through a series of reactions in the muscle cells, NADH is able to produce energy in the form of ATP. Therefore, a good supply of NADH optimizes energy production in the body. It also helps transform the amino acid tyrosine into the important brain chemical dopamine.	2.5–5 mg/day or every other day. Should be taken in the morning on an empty stomach.
<b>Phosphatidylserine (PS)</b> A phospholipid essential for healthy cell membranes throughout the body, especially in the brain.	Available in only small amounts in the diet. Supplemental forms of PS, derived from soybeans, are available as capsules and softgels.	A 7-week study with strength-trained athletes showed that PS can help reduce muscle soreness, cortisol levels and muscle damage. PS-induced cortisol reductions could potentially improve muscle building and hasten one's recovery.	400–800 mg/day during hard training.
<b>Pyruvate</b> A three-carbon carbohydrate that is used in energy production and fuel storage.	Red apples, vegetables, most cheeses, and alcoholic beverages such as beer and red wine. Also available as a supplement.	Improves athletic endurance by enhancing glucose extraction, which is the removal of glucose from the blood circulating into the muscle cells. The muscles can then burn the glucose for energy if exercising or store it as glycogen for later use.	5–10 grams/day.
<b>Ribose</b> A simple sugar that is used in the production of nucleotides. Nucleotides are compounds such as ATP, DNA and RNA.	Best taken as a supplement. While all living cells contain ribose, there is not enough in food to get the effects needed to sustain high energy levels during strenuous exercise or ischemia (insufficient blood flow).	Produces energy required by muscle cells for strength and endurance performance, and fuels all of the metabolic reactions for life itself. University studies show that it helps improve sprint performance and aids in ATP recovery after sprint exercise. Helps manufacture protein, glycogen and nucleic acids (RNA and DNA). In addition, ribose helps transfer energy from one compound to another, which is necessary for muscle cells.	A loading dose of 10 grams/day for 3–5 days and then a maintenance dose of 3–5 grams/day.
<b>Vitamin C</b> Ascorbic acid; a water-soluble vitamin.	Berries, citrus fruits and green vegetables. Supplemental forms include capsules, powder and tablets.	Antioxidant vitamin necessary for tissue growth and repair. Protects against infection, and strengthens the immune system. Studies have shown that it plays a part in increasing muscular strength, reducing lactic acid, sparing glycogen and reducing muscle damage.	500–1,000 mg 3 times a day. You may have to work up to this dose to avoid gastrointestinal problems.
<b>Whey Protein</b> A protein supplement derived from milk.	As a supplement in powder form; dissolves easily in water.	It enhances the production of glutathione, one of the most powerful antioxidants in the body. It also has the highest levels of BCAAs and has been shown to boost immune system functioning.	Up to 20 grams/day during periods of hard training.