



MaxQ Nutrition® Intra-Workout White Papers

PERFORMANCE | ENDURANCE | RECOVERY

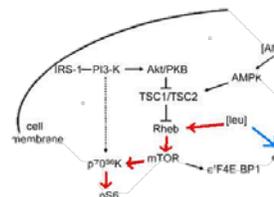
BCAA

Branched Chain Amino Acids

Scientific Article Summary: Muscle Recovery | Endurance

Source: <https://www.ncbi.nlm.nih.gov/pubmed/18974721>

Research targets the effects of BCAA on the muscle protein matrix and the immune system. Data show that BCAA supplementation **before and after** exercise has beneficial effects for decreasing exercise-induced muscle damage and promoting muscle-protein synthesis. Muscle damage develops delayed onset muscle soreness: a syndrome that occurs 24-48 h after intensive physical activity that can inhibit athletic performance.

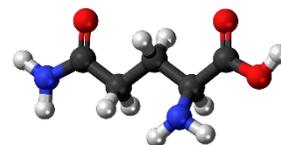


L Glutamine

Scientific Article Summary: Fatigue | Aminos

Source: <https://www.ncbi.nlm.nih.gov/pubmed/20499249>

A conditionally essential amino acid which only appears to benefit the body as supplementation when otherwise deficient (vegans, vegetarians with low dairy intake) or **during prolonged endurance exercise**. Anecdotally reported to reduce sugar cravings.



Research shows glutamine **builds muscle** when tested on those suffering from physical trauma such as burns or muscular wounds (knife wounds) or in disease states in which muscle wasting occurs, such as AIDS. In these individuals, however, glutamine is effective at building muscle and alleviating a decrease in muscle mass typical of the ailment.

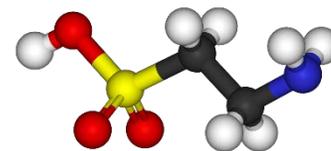
Studies have shown that L-Glutamine supplementation can **minimize breakdown of muscle** and **improve protein metabolism**. **Glutamine is the most common amino acid found in your muscles - over 61% of skeletal muscle is Glutamine**. Glutamine consists of 19% nitrogen, making it the primary transporter of nitrogen into your muscle cells. **During intense training, Glutamine levels are greatly depleted in your body, which decreases strength, stamina and recovery**. It could take up to 6 days for Glutamine levels to return to normal - and Glutamine plays a key role in protein synthesis. Studies have shown that L-Glutamine supplementation can minimize breakdown of muscle and improve protein metabolism.

Taurine

Scientific Article Summary: Endurance

Source: <https://www.ncbi.nlm.nih.gov/pubmed/27725411>

Research showed that taurine (2-aminoethanesulfonic acid; dose: 0.5 mg/g body weight) administration after treadmill running at 25 m/min for 90 min **increased the glycogen concentration in the skeletal muscle** of ICR mice at 120 min after the exercise (Takahashi et al. 2014).



In the current study, researchers investigated the effects of taurine administration on glycogen repletion and carbohydrate metabolism in the tibialis anterior muscle after endurance exercise. The metabolomic profiles of the tibialis anterior muscle at 120 min after the exercise were analyzed by a capillary electrophoresis-time-of-flight mass spectrometry (n=6). Fructose-1,6-bisphosphate (F1,6P), a glycogenolytic/glycolytic intermediate produced by phosphofructokinase, was significantly lower in the taurine-treated group than that in the control group (p<0.01). Dihydroxyacetonephosphate (DHAP), a downstream product of F1,6P was lower (p=0.05) and glycerol 3-phosphate, a downstream product of F1,6P and DHAP, tended to be lower (p=0.09) in the taurine-treated group than in the controls. At that time, phosphorylated Ser293 on the E1 α subunit of pyruvate dehydrogenase (PDH) tended to be higher in the taurine-treated mice than in the controls (p=0.09, n=5). There was a positive correlation between phosphorylation of the PDH E1 α subunit at Ser293 and glycogen concentration (r=0.73, p<0.05). **Results showed that the enhanced glycogen repletion in skeletal muscle by taurine treatment during the post-exercise phase was accompanied by the lower levels of glycogenolytic/glycolytic intermediates.** As it has been indicated that elevation of blood FFA levels leads to an **increase in fat oxidation (9, 10)**, the possibility exists that taurine administration may lead to sparing carbohydrate toward glycogen repletion in skeletal muscle during post-exercise recovery.

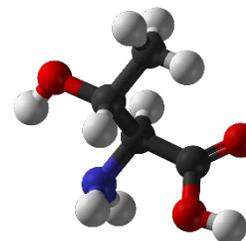
Threonine

Scientific Article Summary: Fat Metabolizer | Protein Balance

Source: <https://pubchem.ncbi.nlm.nih.gov/compound/L-threonine#section=Top>

Journal of the International Society of Sports Nutrition

L-Threonine is an essential amino acid that helps to **maintain the proper protein balance** in the body. It is important for the formation of collagen, elastin, and tooth enamel, and aids liver and lipotropic function when combined with aspartic acid and [methionine](#).



Threonine is an essential amino acid in humans (provided by food), also plays an important role in porphyrin and **fat metabolism and prevents fat buildup in the liver**. Useful with intestinal disorders and indigestion, threonine has also been used to alleviate anxiety and mild depression.

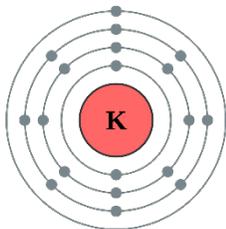
Potassium Glycinate Complex

Scientific Article Summary: Absorption | Energy | Cardiovascular health

Source: <http://albion.com>

Source: <https://www.ncbi.nlm.nih.gov/pubmed/18724413>

Source: <http://www.medicalnewstoday.com/authors/dr-helen-webberley-mbchb-mrcgp-mfsrh>

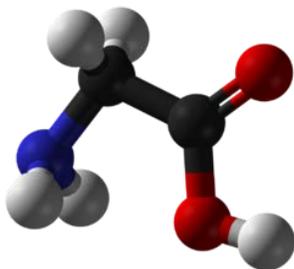


It is a high quality form of the electrolyte mineral potassium, complexed (bonded) to glycine amino acid molecules, gives this organic mineral optimal absorption over other inorganic mineral forms.

Albion® magnesium glycinate chelate buffered and potassium glycinate complex for enhanced absorption, optimal utilization and gastrointestinal (GI) comfort. Albion® scientists have bonded magnesium with amino acids, which the body easily recognizes and absorbs. Albion's Chelated Magnesium is nutritionally functional because it remains intact throughout the gastrointestinal system.



Because Albion's magnesium chelate does not ionize in the gut, it is well tolerated and does not cause the G.I. distress evident with other magnesium sources.



Much evidence shows that increasing potassium intake has beneficial effects on human health. Epidemiological and clinical studies show that a high-potassium diet **lowers blood pressure** in individuals with both raised blood pressure and average population blood pressure. Prospective cohort studies and outcome trials show that increasing potassium intake **reduces cardiovascular disease mortality**. This is mainly attributable to the blood pressure-lowering effect and may also be partially because of the direct effects of potassium on the cardiovascular system.

High potassium intakes are associated with a **20% decreased risk of dying from all causes**, a reduced risk of stroke, lower blood pressure, **protection against loss of muscle mass, preservation of bone mineral density** and reduction in the formation of kidney stones.⁷

Potassium's primary functions in the body include **regulating fluid balance and controlling the electrical activity of the heart and other muscles**. Potassium is an electrolyte that counteracts the effects of sodium, helping to maintain a healthy blood pressure to support. It is also needed to maintain acid-base balance.³

Magnesium Bisglycinate Chelate

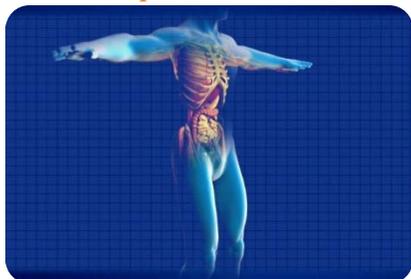
Scientific Article Summary: Endurance | Energy | Delayed Fatigue

Source: <https://examine.com/supplements/magnesium/>

Source: <http://storefronts.supplysideshow.com/~media/Files/Storefronts/supplyside/resources/72105/298-Magnesium.pdf>

Source: <http://www.albionminerals.com/human-nutrition/products-trade/traacs>

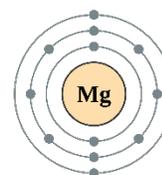
Source: <http://www.albionminerals.com/human-nutrition/magnesium-white-paper>



Magnesium bisglycinate chelate buffered with magnesium oxide to increase the pH (alkalinity) of the formula, making it more gentle on the digestive tract and easier to absorb-and so it can get past the stomach acid so it passes through intact and absorbed in intestinal tract. Magnesium balances out potassium. Potassium, holds electrolytes. If Magnesium is lost from the body it will have a harder time maintaining energy.

Albion® scientists have bonded magnesium with amino acids, which the body easily recognizes and absorbs. Albion's Chelated Magnesium is nutritionally functional

because it remains intact throughout the gastrointestinal system.



Because Albion's magnesium chelate does not ionize in the gut, it is well tolerated and does not cause the G.I. distress evident with other magnesium sources.

Magnesium is an essential dietary mineral, and the second most prevalent electrolyte in the human body. Magnesium deficiencies are common in developed countries. A deficiency increases blood pressure, reduces glucose tolerance and causes neural excitation.

Not only is magnesium necessary for the generation of energy within the body as an enzymatic co-factor in the ATP molecule, it is also essential for the synthesis of carbamoyl phosphate synthesis which is directly involved with glutamine in protein synthesis.

Lysine

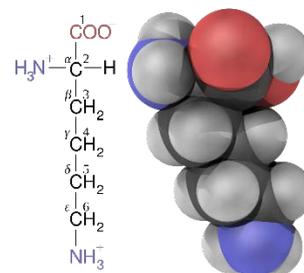
Scientific Article Summary: Muscle Mass Recovery

Source: Lysine. Review of Natural Products. Facts & Comparisons [database online]. St. Louis, MO: Wolters Kluwer Health Inc; February 2011.

Source: <http://umm.edu/health/medical/altmed/supplement/lysine>

Lysine is an essential amino acid in human nutrition because **the body cannot produce it**; therefore, it must be taken in either by diet or supplementation.

Lysine was first isolated from casein (a milk phosphoprotein) in 1889. It was first introduced in the United States as lysine hydrochloride in 1955. There was an interest in fortifying bread with lysine to target populations with lysine-poor diets. However, the FDA refused to modify the standards of identity for white bread. Since 1970, lysine has been commonly added to animal feed. Lysine has been studied for the prevention and treatment of herpes infections and cold sores. It also increases the intestinal absorption of calcium and eliminates its excretion by the kidney, suggesting that it might be helpful in osteoporosis.



Lysine has been investigated for its effects on increasing muscle mass, lowering glucose, and improving anxiety. Case reports suggest lysine may ameliorate angina. Lysine acetylsalicylate has been used to treat pain and to detoxify the body after heroin use. Lysine clonixinate has been used to treat migraine headaches and other painful conditions.

Athletes sometimes use lysine as a protein supplement. Some studies suggest lysine **helps muscle tissue recover after stress.**

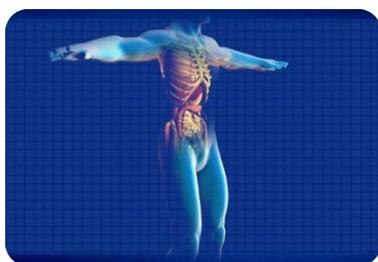
Magnesium Glycyl Glutamine Chelate

Scientific Article Summary: Muscle Building | Rehydration | Performance

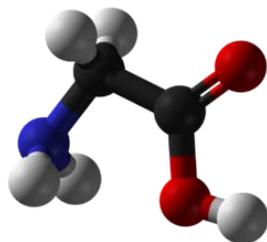
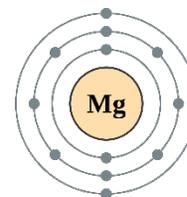
Source: THE ROLE OF MAGNESIUM GLYCYL GLUTAMINE CHELATE IN MUSCLE REGENERATION H.

DeWayne Ashmead, Ph.D., FACN

Source: <http://www.albionminerals.com/human-nutrition/magnesium-white-paper>



Magnesium glycinate is made up of magnesium, an essential mineral, and glycine, a non-essential amino acid. It is easily absorbed by your body, likely because it gets carried to your cells bound to the amino acid. This form of magnesium also is desirable because it's less likely to cause a laxative effect. Supplementing with magnesium glycinate can have several benefits. However, you need to consult a health care provider before using it, especially if you are attempting to treat a deficiency or health issue.



This chelate stabilizes glutamine so it can be absorbed in the intestinal tract rather than wasted in stomach acid. Providing higher bioavailability for glutamine in the body. Research shows glutamine builds muscle when tested on those suffering from physical trauma such as burns or muscular wounds (knife wounds) or in disease states in which muscle wasting occurs, such as AIDS. In these individuals, however, glutamine is effective at building muscle and alleviating a decrease in muscle mass typical of the ailment.

Studies have shown that L-Glutamine **supplementation can minimize breakdown of muscle and improve protein metabolism.** Glutamine is the most common amino acid found in your muscles - over 61% of skeletal muscle is Glutamine. Glutamine consists of 19% nitrogen, making it the primary transporter of nitrogen into your muscle cells. **During intense training, Glutamine levels are greatly depleted in your body, which decreases strength, stamina and recovery.** It could take up to 6 days for Glutamine levels to return to normal - and **Glutamine plays a key role in protein synthesis.** Studies have shown that L-Glutamine supplementation can minimize breakdown of muscle and improve protein metabolism.

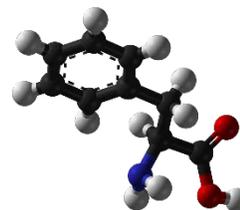
Phenylalanine

Scientific Article Summary: Aerobic & Anaerobic Performance & Power

Source: <http://umm.edu/health/medical/altmed/supplement/phenylalanine>

Phenylalanine is an essential amino acid (a building block for proteins in the body), meaning the body needs it for health but cannot make it. You have to get it from food. Phenylalanine is found in 3 forms:

- L-phenylalanine, the natural form found in proteins
- D-phenylalanine (a mirror image of L-phenylalanine that is made in a laboratory)
- DL-phenylalanine, a combination of the 2 forms



The body changes phenylalanine into tyrosine, another amino acid that is **needed to make proteins and brain chemicals, including L-dopa, epinephrine, norepinephrine, and thyroid hormones**. Because norepinephrine affects mood, different forms of phenylalanine have been proposed to treat depression. Symptoms of phenylalanine deficiency include:



- Confusion
- Lack of energy
- Depression
- Decreased alertness
- Memory problems
- Lack of appetite

Black Pepper Fruit Extract (BioPerine®)

Scientific Article Summary: Nutrient Absorption

Source: <https://examine.com/supplements/black-pepper/>

Black Pepper is a spice commonly used in many areas of the world for flavor. Through its active component Piperine, Black Pepper is able to modify supplement and **drug metabolism**.

Piperine is known for **changing metabolism of various drugs** and supplements, most notably increasing [Curcumin](#) bioavailability by 2000%.¹²⁴ A process in the liver called glucuronidation, which attaches a molecule (glucuronide) to drugs to signal for their urinary excretion, is inhibited with piperine. This process prevents excessive levels of drugs and supplements in the body, but sometimes inhibits all uptake and renders some supplements useless. In the scenario of piperine ingestion, excretion of supplements is hindered and certain drugs and supplements can bypass this regulatory stage (as not all are subject to it).



Histidine

Scientific Article Summary: Recovery | Growth | Tissue Repair

Source: <https://pubchem.ncbi.nlm.nih.gov/compound/L-histidine#section=Top>

Histidine is an amino acid. Amino acids are the building blocks of protein in our bodies. People use histidine as medicine. Histidine is a semi-essential amino acid (children should obtain it from food) needed in humans for **growth and tissue repair**, Histidine is important for maintenance of myelin sheaths that protect nerve cells and is metabolized to the neurotransmitter histamine. Histamines play many roles in immunity, gastric secretion, and sexual functions. Histidine is also required for blood cell manufacture and protects tissues against damage caused by radiation and heavy metals. (NCI04).

