



## Micronized L-glutamine

- Pharmaceutical Grade
- Rapid Absorption

L-glutamine is a protein amino acid found in proteins of all life forms. It is classified as a semi-essential or conditionally essential amino acid. This means that under normal circumstances the body can synthesize sufficient L-glutamine to meet physiological demands. However, there are conditions where the body cannot do so. Recently, L-glutamine has come to be regarded as one of the most important of the amino acids when the body is subjected to such metabolic stress situations as trauma (including surgical trauma), cancer, sepsis and burns. Under such conditions, L-glutamine becomes an essential amino acid, and it is therefore very important to ensure adequate intakes of the amino acid in order to meet the increased physiological demands created by these situations.

L-glutamine is the most abundant amino acid in the body, and plasma glutamine levels are the highest of any amino acid. L-glutamine is predominantly synthesized and stored in skeletal muscle. The amino acid L-glutamate is metabolized to L-glutamine in a reaction catalyzed by the enzyme glutamine synthase, a reaction which, in addition to L-glutamate, requires ammonia, ATP and magnesium.

L-glutamine is a very versatile amino acid and participates in many reactions in the body. It is important in the regulation of acid-base balance. L-glutamine allows the kidneys to excrete an acid load, protecting the body against acidosis. This is accomplished by the production of ammonia, which binds hydrogen ions, to produce ammonium cations that are excreted in the urine along with chloride anions. Bicarbonate ions are simultaneously released into the bloodstream. L-glutamine helps protect the body against ammonia toxicity by transporting ammonia, in the form of L-glutamine's amide group, from peripheral tissues to visceral organs, where it can be excreted as ammonium by the kidneys or converted to urea by the liver.

The amide group can also participate in other metabolic activities, as can the amino group of L-glutamine. L-glutamine serves as the most important nitrogen shuttle, supplying nitrogen for metabolic purposes (from glutamine-producing tissues, such as skeletal muscle) to glutamine-consuming tissues.

L-glutamine participates in the formation of purine and pyrimidine nucleotides, amino sugars (such as glucosamine), L-glutamate and other amino acids, nicotinamide adenine dinucleotide and glutathione. It also participates in protein synthesis, energy production and, if necessary, the production of D-glucose and glycogen. Importantly, L-glutamine can serve as the primary respiratory substrate for the production of energy in enterocytes and lymphocytes. L-glutamine is considered an immunonutrient, and supplemental L-glutamine is used in medical foods for such stress situations as trauma, cancer, infections and burns.

The typical dietary intake of L-glutamine is 5 to 10 grams daily. Most dietary L-glutamine comes from animal and plant proteins. Small amounts of free L-glutamine are found in vegetable juices and fermented foods, such as miso and yogurt. L-glutamine is the amide of L-glutamic acid. Its molecular formula is  $C_5H_{10}N_2O_3$ .

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