



# GLUTAMINE

- STIMULATES MUSCLE GROWTH & REPAIR
- DECREASES FATIGUE & RECOVERY TIME
- PROMOTES WEIGHT LOSS
- PREVENTS MUSCLE LOSS
- IMPROVES IMMUNE FUNCTION

Support for promoting and maintaining cell function, repairing lower gut, assisting in muscle repair, and giving fast recovery from strenuous exercise.\*

**DOSAGE** Mix two scoops with your favorite citrus juice, drink or water, up to two times a day. One serving 30 minutes prior to your workout and another serving immediately after.

## RELATED PRODUCTS

ZEN PROTEIN, ZEN ENERGY, CREATINE

## DETAILS

There is no doubt of the physiological importance of the amino acid L-glutamine for promoting and maintaining cell function. It is now well known that a large number of tissues and cells in the body utilize glutamine at high rates, and that glutamine utilization is essential for their function. Glutamine is important in alcoholism, sugar craving, mental ability, impotence, fatigue, epilepsy, senility, schizophrenia, mental retardation, peptic ulcers, and maintenance of a healthy digestive tract. It is utilized by many tissues including kidneys, gut, and some cells of the immune system. Recent evidence suggests that the state of cellular hydration (cell volume) is an important factor in the control of many cellular functions. These include modulation of hormones, oxidative stress, effects of cortisol, and gene expression. Glutamine seems to also control, stabilize and enhance intracellular pH and can be helpful in the treatment of arthritis, autoimmune diseases, fibrosis, intestinal disorders, and peptic ulcers, connective tissue diseases such as polymyositis and scleroderma, and tissue damage due to radiation treatment for cancer.



## NUTRITION FACTS

**Serving Size 3.5 grams (1 scoops)**  
**Servings: About 40**

NAG Glutamine.....3 g.  
 Brown Rice Protien(80% Protein).....500 mg.

Brown Rice Fiber, Natural Flavors, Stevia Leaf Extract, Brown Rice Protein contains the following amino acids: Alanine, Arginine, Aspartic Acid, Cystine, Glutamic Acid, Glycine, Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Proline, Serine, Threonine, Tryptophan, Tyrosine, & Valine.

Contains EDS (Amylase, Protease, Lipase, and Cellulase).



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## WHY IS OUR FORMULA DIFFERENT?

We've added brown rice protein to our N-A-G glutamine formulation, making it even more stable in water and metabolically efficient at delivering glutamine's biological effects, more so than conventional Glutamine forms, or Glutamine Peptides, thus making it the best choice for total benefit. By adding our enzyme-delivery system, absorption and uptake in the intestines is even faster, resulting in improved nutrient benefits.

## NEED SUPPLEMENTATION?

The body is able to meet its need for amino sugars under normal circumstances, but as the body ages this changes. Research has revealed that under a variety of less-than-optimal conditions, the body's production of amino sugars—and their assembly into larger molecules—may be impaired. These conditions can include surgery and/or surgical recovery, severe stress, burns and major injuries, as well as aging. By supplementing your diet with N-A-G, key advantages may be obtained: Numerous steps in the conversion of glucose and amino acids to amino sugars are eliminated; amino sugar production may be enhanced; and tissue-building properties may increase. Not only is N-A-G a source for production of many other amino sugars, it is stable, pH neutral, tasteless, and freely water soluble. It has the special ability to bind large amounts of water, and thus help to keep our skin moist, elastic and youthful. It is readily absorbed from the intestines, stays in the blood for several hours, and is used exclusively for cell structures, with very little being excreted.

Continuing investigation into the roles amino sugars play in our health is proving to be a promising area of nutritional research. N-A-G is a key component of the glue that holds our bodies together. Found in all body tissues, cells, cell membranes, inter connective tissues, bone matrix, cartilage, skin, and mucous membranes, N-A-G may be one of the most important supplements to add to your nutritional program.

## WHY IS GLUTAMINE SO IMPORTANT?

There is no doubt of the physiological importance of the amino acid L-glutamine for promoting and maintaining cell function. It is now well known that a large number of tissues and cells in the body utilize glutamine at high rates, and that glutamine utilization is essential for their function. Glutamine is important in alcoholism, sugar craving, mental ability, impotence, fatigue, epilepsy, senility, schizophrenia, mental retardation, peptic ulcers, and maintenance of a healthy digestive tract. It is utilized by many tissues including kidneys, gut, and some cells of the immune system. To maintain these extreme demands; glutamine must be synthesized by several organs, including skeletal muscle, kidneys, liver, lungs, and heart.

It is now widely accepted that glutamine is utilized at high rates by isolated cells of the immune system, such as the lymphocytes, macrophages and neutrophils. These cells can be placed under considerable pressure during situations of elevated stress, with the consequence of immune suppression. Therefore it makes sense that glutamine feeds a variety of immune-functioning cells. One of the most important of these is Lymphocyte Activated Killer cell (LAK) activity of an immune cell type that destroys invading organisms and has been shown to be directly linked to glutamine concentrations. Depression of glutamine concentrations negatively affects LAK activity. Glutamine also stimulates cell swelling, tuning up the anabolic signal. Cellular swelling is often a symptom of a change in the osmotic gradient within the cell. What this means is that if you increase the concentration of a compound outside of the cell membrane above that found inside of the cell, there will be a movement of this compound until extracellular and intracellular contents are equal. The movement of these compounds result in the uptake of water as they are transported inside the cell and hence a transient expansion of cellular volume.

Recent evidence suggests that the state of cellular hydration (cell volume) is an important factor in the control of many cellular functions. These include modulation of hormones, oxidative stress, and gene expression—to name a few. Cell swelling inhibits protein breakdown; conversely, cell shrinkage stimulates breakdown. The mechanisms proposed for improved protein turnover as mediated via glutamine-induced cell swelling are two-fold: 1) It may influence the function of cyclic AMP, a chemical messenger associated with many cellular functions including the inhibition of protein synthesis as such; cell swelling may prevent or enhance protein synthesis, and 2) it may have a direct effect on cellular stability.



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