

# L-Glutamine



## The supernutrient for digestive health and immune power

By David Brady, ND, DC, CCN, DACBN & Suzanne Copp, MS

THIS INFORMATION IS PROVIDED FOR THE USE OF PHYSICIANS AND OTHER LICENSED HEALTH CARE PRACTITIONERS ONLY. THIS INFORMATION IS INTENDED FOR PHYSICIANS AND OTHER LICENSED HEALTH CARE PROVIDERS TO USE AS A BASIS FOR DETERMINING WHETHER OR NOT TO RECOMMEND THESE PRODUCTS TO THEIR PATIENTS. THIS MEDICAL AND SCIENTIFIC INFORMATION IS NOT FOR USE BY CONSUMERS. THE DIETARY SUPPLEMENT PRODUCTS OFFERED BY DESIGNS FOR HEALTH ARE NOT INTENDED FOR USE BY CONSUMERS AS A MEANS TO CURE, TREAT, PREVENT, DIAGNOSE, OR MITIGATE ANY DISEASE OR OTHER MEDICAL CONDITION.

### Benefits of Glutamine

- Optimizes muscle growth
- Promotes wound healing
- Protects the body from stress
- Fights colds & flus
- Balances blood sugar
- Helps stop sugar & alcohol cravings
- Helps heal leaky gut & food allergies
- Promotes healthy acid-alkaline balance
- Helps counter the side-effects of chemotherapy

The functions of glutamine are many and include: substrate for protein synthesis, anabolic precursor for muscle growth, acid-base balance in the kidney, substrate for ureagenesis in the liver, substrate for hepatic and renal gluconeogenesis, an oxidative fuel for intestine and cells of the immune system, inter-organ nitrogen transport, precursor for neurotransmitter synthesis, precursor for nucleotide and nucleic acid synthesis and precursor for glutathione production.<sup>1</sup>

Glutamine is a nutrient with an impressive range of health benefits. It helps balance blood sugar, build lean muscle, and strengthen the body's defenses. How does this amino acid do so many things? Because of its unique Robin Hood-like nature: it distributes nitrogen freely to the cells which need it most. Since many cells throughout the body – including immune, gut and muscle cells – need nitrogen as a fuel and basic building block, giving your body glutamine has powerful and wide-ranging health effects.<sup>2</sup> Glutamine is also an excellent brain fuel which helps keep mental energy up and cravings down.<sup>3</sup>

### Maintain Muscle Tissue

Glutamine is a must supplement for anyone who skips meals. Why? One of the most important reasons to eat regular meals is to maintain muscle tissue. Your body needs a steady supply of protein or it will break muscle down for energy. For example, when you

wake up in the morning, your body is already in the process of breaking down muscle tissue because you have not eaten for approximately 12 hours. To stop this catabolic state, it is important to begin the day with protein, either by eating a healthy protein-rich breakfast or, if that is not possible, by taking 1-2 teaspoons of glutamine in water or juice. By doing so the body will instantly get the nitrogen it needs to build and maintain muscle.

### Sports Applications

Glutamine is an ideal supplement to combine with exercise. Prolonged exercise lowers glutamine levels in the body, sometimes for as long as two weeks after the event.<sup>4</sup> Glutamine also helps the body store more glycogen, the energy reserve in the liver and muscle that fuels exercise.<sup>5</sup> It enhances growth hormone secretion, which in turn increases muscle growth and overall health.<sup>6</sup> Glutamine also helps prevent muscle soreness by speeding muscle recovery. Thus, taking a teaspoon before and after exercise is a good idea to help attain maximum results.

### Supporting Digestive Health

Glutamine is the single most important nutrient needed for a healthy digestive tract. Glutamine is called "the intestinal permeability factor" because of its ability to maintain the integrity of the intestinal wall.<sup>7</sup> It is important to keep our intestinal tract from becoming permeable. If our gut wall allows large food molecules into the body, a host of problems can develop: arthritis, disturbed immune function, autoimmune diseases, food allergies, and even mood disorders and mental illness. This "leaky gut" syndrome can be greatly helped by taking 10-30 grams of glutamine (3-10 tsp.) per day for a month. Glutamine is also beneficial for Crohn's disease, colitis<sup>8</sup>, inflammatory bowel disease<sup>9</sup>, ulcers, and diarrhea<sup>10</sup>, and has even been shown to lessen stomach inflammation during chemotherapy.<sup>11</sup>

## Fighting Colds and Flu

Glutamine is a major energy source for the immune system and its varied cells.<sup>12</sup> Viral infections from colds and flu to conditions like HIV all dramatically lower glutamine levels, making supplementation essential.<sup>13</sup> We never want a glutamine deficiency, because this will lower levels of our protective T cells<sup>14</sup> and reduce the ability of macrophages to kill viruses and bacteria.<sup>15</sup> For this reason, glutamine plays a critical role in helping to fight any kind of cold, flu or immune weakness. It is especially important when patients are sick and not able to eat well.

## Speeds Wound Healing

Glutamine helps to speed wound healing<sup>16</sup> and is very important for burn and trauma victims.<sup>15</sup> The body cannot make enough glutamine to meet its needs during any periods of physical stress or injury, and supplementation is essential under such circumstances.<sup>17</sup> Glutamine is an ideal nutrient for post-surgical patients, as it improves hospital outcomes and shortens hospital stays.<sup>17, 18</sup> In cirrhosis, glutamine is also very beneficial.<sup>20</sup> It may not be desirable in very late stage liver failure, however, for then the liver cannot handle glutamine very effectively.

## Helping Cancer Patients

Cancer patients may benefit from glutamine supplements because it 1.) enhances immune function 2.) protects the body from side effects from radiation, chemotherapy and surgery and 3.) enhances the effectiveness of chemotherapeutic drugs, including methotrexate.<sup>21</sup> Glutamine also protects against infections in patients undergoing bone marrow transplants.<sup>22</sup> Doses used with cancer patients are in the range of 10 to 40 grams (3-14 teaspoons) per day given in divided doses.

## More Benefits of Glutamine

Glutamine increases production of glutathione, the main antioxidant of the body. This in turn boosts immune function, protects all tissues from damage, and detoxifies harmful substances. Glutamine is also an important precursor for neurotransmitter substances in the brain, and helps to support brain wellness and mental energy. When 12 grams (four teaspoons) was given to alcoholics, glutamine eliminated alcohol cravings in 75% of those studied.<sup>23</sup> Glutamine also helps promote milk production in lactating women. Since glutamine dissolves instantly in water and has no taste, the powder form is recommended, although capsules are highly effective, too. For this reason, DFH also offers glutamine in capsules (850 mg per cap). Glutamine is very safe and without side effects.

Glutamine converts to glutamate and back again as a very normal process in the body. Glutamine is not neurotoxic as has been suggested in the book *The Taste That Kills*. Unfortunately, there are many scientifically incorrect inferences in this book.

## References

1. Glutamine-dependent changes in gene expression and protein activity. *Cell Biochem Funct.* 2005 Mar-Apr;23(2):77-84. Curi R, Lagranha CJ, Doi SQ, Sellitti DF, Procopio J, Pithon-Curi TC.
2. Nurjhan N, Bucci A, Perriello G, et al. Glutamine: a major gluconeogenic precursor and vehicle for interorgan carbon transport in man. *J Clin Invest* 1995;95(1):272-7.
3. Curthoys NP, Watford M. Regulation of glutaminase activity and glutamine metabolism. *Annual Rev Nutr* 1995;15:133-59.
4. Keast D, Arstein D, Harper W, Fry RW, Morton AR. Depression of plasma glutamine concentration after exercise stress and its possible influence on the immune system. *Med J Aus* 1995;162(1):15-8.
5. Varnier M, Leese GP, Thompson J, Rennie MJ. Stimulatory effect of glutamine on glycogen accumulation in human skeletal muscle. *Am J Physiol* 1995;269(2 Pt 1):E309-15.
6. Welbourne TC. Increased plasma bicarbonate and growth hormone after an oral glutamine load. *Am J Clin Nutr* 1995;61(5):1058-61.
7. van der Hulst RR, van Kreef BK, von Meyenfeldt MF, et al. Glutamine and the preservation of gut integrity [see comments]. *Lancet* 1993;341(8857):1363-5.
8. Harding K. The Use of Glutamine and its Implications for the WOC Nurse. *J Wound Ostomy Continence Nurs* 2000;27(1):32-35.
9. Peck. Glutamine Should Be Figured Into Inflammatory Bowel Disease Formulations. *Family Practice News* 1994(June 1, 1994):22.
10. Savarese D, Al-Zoubi A, Boucher J. Glutamine for irinotecan diarrhea. *J Clin Oncol* 2000;18(2):450.
11. Skubitz KM, Anderson PM. Oral glutamine to prevent chemotherapy induced stomatitis: a pilot study. *J Lab Clin Med* 1996;127(2):223-8.
12. Newsholme EA, Parry-Billings M. Properties of glutamine release from muscle and its importance for the immune system. *JPEN J Parenter Enteral Nutr* 1990;14(4 Suppl):63S-67S.
13. Greig JE, Rowbottom DG, Keast D. The effect of a common (viral) stress on plasma glutamine concentration [letter]. *Med J Aust* 1995;163(7):385, 388.
14. Ziegler TR, Young LS, Benfell K, et al. Clinical and metabolic efficacy of glutamine-supplemented parenteral nutrition after bone marrow transplantation. A randomized, double-blind, controlled study. *Ann Intern Med* 1992;116(10):821-8.
15. Parry-Billings M, Evans J, Calder PC, Newsholme EA. Does glutamine contribute to immunosuppression after major burns? *Lancet* 1990;336(8714):523-5.
16. Moskowitz B, Katz Y, Singer P, Nativ O, Rosenberg B. Glutamine metabolism and utilization: relevance to major problems in health care. *Pharmacol Res* 1994;30(1):61-71.
17. Gore DC, Jahoor F. Glutamine kinetics in burn patients. Comparison with hormonally induced stress in volunteers. *Arch Surg* 1994;129(12):1318-23.
18. Klimberg VS, Salloum RM, Kasper M, et al. Oral glutamine accelerates healing of the small intestine and improves outcome after whole abdominal radiation. *Arch Surg* 1990; 125(8):1040-5.
19. Pastores SM, Kvetan V, Katz DP. Immunomodulatory effects and therapeutic potential of glutamine in the critically ill surgical patient. *Nutrition* 1994;10(5):385-91.
20. Teran JC, Mullen KD, McCullough AJ. Glutamine—a conditionally essential amino acid in cirrhosis? *Am J Clin Nutr* 1995;62(5):897-900.
21. Kovacevic Z, Morris HP. The role of glutamine in the oxidative metabolism of malignant cells. *Cancer Res* 1972;32(2):326-33.
22. MacBurney M, Young LS, Ziegler TR, Wilmore DW. A cost-evaluation of glutamine-supplemented parenteral nutrition in adult bone marrow transplant patients. *J Am Diet Assoc* 1994;94(11):1263-6.
23. Rogers P. Review of Nutrition. *Journal Stud. Alcohol* 1957;18(4):581-587.

## How to Use Glutamine

Controlling appetite ..... 1-3 tsp.  
Balancing blood sugar ..... 1-3 tsp.  
Supporting muscle  
growth ..... 3-5 tsp.  
Colds & Flu ..... 3-10 tsp.  
Leaky Gut/  
Food Allergies ..... 3-10 tsp.  
Wound Healing ..... 3-10 tsp.  
HIV Infection ..... 3-10 tsp.  
Cancer/Chemotherapy ..... 3-14 tsp.

Glutamine can be taken in water, juice, or mixed into healthy shakes.

Cofactor nutrient: vitamin B6, 50 mg per day, helps the body use glutamine more effectively. Taking 5 tsp. or more per day of glutamine decreases protein needs slightly, as glutamine helps the body use protein more effectively.

Contraindications: liver or kidney failure.