Asparagine

Asparagine is a dietarily dispensable amino acid synthesized from aspartate and glutamine. Asparagine has three major functions: 1) incorporation into amino acid sequences of proteins; 2) storage form for aspartate (is a required precursor for synthesis of DNA, RNA and ATP); and 3) source of amino groups for production of other dispensable amino acids via trasaminases. Asparagine in proteins is an attachment site for carbohydrates (N-linked oligosaccharides) to form collagen assembly, enzymes and cell-cell recognition. Asparagine can be readily converted into aspartate, providing aspartate on demand for many cellular functions. Aspartate can increase cellular energy production by contributing carbon skeletons to the Citric Acid Cycle. Aspartate is also a component of the urea cycle, which removes excess ammonia. The conversion of asparagine to aspartate involves transfer of the extra amino group from asparagine to another keto acid, forming a dispensable amino acid. In this way, asparagine can be a precursor for many amino acids to be produced on demand to meet cell requirements.

Deficiency Symptoms:

Data from testing over 10,000 physician office patients has found that 22.8% have deficient asparagine function, as indicated by increased lymphocyte growth response after addition of asparagine to the lymphocyte growth media. Significantly increased prevalence of asparagine deficiencies has been detected in two clinical manifestations: 1) fatigue; and 2) immune system stress. For example, in 75 subjects with rheumatoid arthritis, 32.0% exhibited an asparagine deficiency. There are no published deficiency symptoms for asparagine in the medical literature, partly due to previous lack of adequate assessment tests. Therefore, tentative associates of asparagine deficiencies with clinical complaints of fatigue, and clinical findings of immune dysfunction (autoimmune disorders, severe allergies, infections) have been identified by the MicroNutrient Test for asparagine.

Repletion Information:

Since asparagine is a dispensable amino acid, no RDA exists. Asparagine is present in all proteins, but is partially degraded into aspartate by heat (cooking), storage or acid. Asparagine supplementation appears safe in modest doses (up to 6 grams daily).