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Protein

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Protein

The word protein means "to come first." Protein is built from an alphabet of 22 amino acids. Eight of these are considered essential in that the body can not synthesize them. The others are considered non-essential.

The designation of non-essential can be misleading because internal synthesis or dietary intake of these amino acids is not always adequate to meet needs under varying circumstances.

The definition of a "contingent" nutrient is one which is not normally required, but which may become essential or important under certain circumstances. Dietary non-essentials may become beneficial if internal synthesis is not adequate to meet needs at a given point in time. Some items considered non-essentials not normally synthesized within the body may be needed or beneficial under some circumstances or in particular individuals.

Carotenoids and flavonoids, neither of which is produced within the body, are currently considered non-essential yet they are clearly beneficial under certain circumstances. Non-essential amino acids, synthesized within the body, can easily become contingent nutrients.

As an example, children require more arginine for growth and development than can be internally synthesized. Internal synthesis of the non-essential amino acid histidine is marginal at best. Dr. Hinton Jonez was successfully treating multiple sclerosis in 1946 with injectable histamine, a derivative of the amino acid histidine.[1]

I often think of the work of Dr. Jonez when I remember the story of a young lady who suffered terribly with multiple sclerosis. She made a remarkable reversal when she began using the GNLD protein. She had tried many other nutritional products including other protein formulations with no improvement. I think the GNLD protein must have provided the amino acid histidine in a form which she could use.

Glutamine, a non-essential amino acid, has shown benefit in healing ulcers, reducing alcohol consumption, improving IQ in mentally deficient children, and benefiting epileptic children. Glutamine is a primary nutrient for the cells that line the small intestine.

Other circumstances like stress, pregnancy, or exposure to toxins or pharmaceutical drugs may increase demands for specific amino acids. Davis wrote, "Any of the other aproximately dozen 'nonessential' amino acids are also candidates as contingent nutrients which may be needed by certain individuals in amounts larger than are provided by synthesis and diet."[2]

References:

1. Wright, Jonathan,V., Multiple Sclerosis: A Revival of Hope, *Nutrition and Healing*, October 1999.

2. Davis, Donald R., Nutritional needs and biochemical diversity, in *Medical Applications of Clinical Nutrition* edited by Bland, Jeffrey, New Canaan, CT: Keats Publishing1983, 51-53.

Eight Essential Amino Acids

- Phenylalanine
- Tryptophan
- Methionine
- Valine
- Leucine
- Isoleucine
- Threonine
- Lysine[1]

Fourteen Nonessential Amino Acids

- Cysteine
- Tyrosine
- Asparagine
- Glutamine
- Arginine
- Histidine
- Alanine
- Glycine
- Serine
- Proline
- Aspartic acid
- Glutamic aid
- 4-hydroxyproline
- 5-hydroxylysine[1]

Reference:

1. Philpott, William H., and Kalita, Dwight K., *Victory Over Diabetes*, New Canaan, CT: Keats Publishing, 1983, 53-55.

Protein Deficiency

The American diet is often high in protein intake. In this sense a deficiency of protein intake is not a common event. It is a mistake to think that the large intake of protein in the American diet supplies adequate quantities of all 22 amino acids. Testing of amino acids levels often reveals deficiencies of specific amino acids.

Dr. Jonathan Wright has learned though years of experience that half of all depressed individuals respond to amino acid supplementation. He finds that the most common cause of amino acid deficiencies is low stomach acid.

Stomach acid can be low for a number of reasons. The most frequent reason for deficiency in the United States is the widespread use of antacids. Protein is simply incapable of digestion without a robust hydrochloric acid production in the stomach.

Nutrient deficiencies can also lead to hydrochloric acid deficiency. A partial list of nutrients essential for hydrochloric acid production would include the amino acids methionine, tryptophan, phenylalanine, histidine and cysteine, vitamins B6 and B5, acetic acid, choline, and the minerals magnesium, potassium, and zinc. Production of hydrochloric acid is a very energy demanding process and lack of nutrients can easily rob the body of the energy necessary for production of digestive substances.

Another factor which contributes to protein deficiency is the cooking of foods. Francis Pottenger, Jr., found that cooking foods resulted in deterioration of health of laboratory animals. He attributed the deterioration to what he called "heat labile" factors. He wrote, "What vital elements were destroyed in the heat processing of the foods fed the cats? The precise factors are not known. Ordinary cooking precipitates proteins, rendering them less easily digested. Probably certain albuminoids and globulins are physiologically destroyed. All tissue enzymes are heat labile and would be materially reduced or destroyed... It is possible that the alteration of the physiochemical state of the foods may be all that is necessary to render them imperfect foods for the maintenance of health. *It is our impression that the denaturing of proteins by heat is one factor responsible.*"

Digestion of protein requires not only hydrochloric acid, but also enzymes. Digestive enzymes are of two types: exogenous and, endogenous. Exogenous enzymes are those which we bring in from outside in the form of supplements or the enzymes inherently present in raw foods such as the bromelain in pineapple. Endogenous enzymes are those produced by the pancreas.

Cooking of foods destroys the enzymes that are often abundant in raw foods. As a consequence, the pancreas must compensate for the cooking of foods by an increased production of digestive enzymes. This has been documented in animal studies.

Professor Jackson of the Department of Anatomy at the University of Minnesota conducted a study in which rats were given 80% of the diet cooked foods. The pancreas of the animals increased in weight 20-30% in weight within 155 days. Edward Howell observed that the pancreas of a laboratory rat eating heat processed laboratory chow could weigh twice as much as the pancreas of wild rats.

The eating of cooked foods and a nutrient depleted diet can lead to a deterioration in pancreatic function over the course of a lifetime.William Philpott wrote, "Reduced pancreatic function...should be considered as the foundation on which many different degenerative diseases are built."

Philpott goes on to say, "Low production of pancreatic proteolytic enzymes...has the following consequences: amino acid deficiency due to lack of digestion of proteins to amino acids; poorly digested and undigested proteins being absorbed into the blood through the intestinal mucous membrane and evoking kinin-inflammatory reactions in various tissue and organ targets."

The cascading consequence of pancreatic failure and amino acid deficiency has serious consequences.. Philpott wrote, "It is important to remember than when the pancreas is functioning poorly, in addition to a disordered acid-base balance and the resulting increase of nonusable and sometimes toxic protein particles (peptides) circulating in the blood, there is always an accompanying amino-acid deficiency. An amino acid deficiency is a very serious problem because the central nervous system, as well as many other biochemical systems within the human body, malfunctions when there is a short supply of these necessary nutrients--the very building blocks of life."

References:

1. Wright, Jonathan, and Lenard, Lane, *Why Stomach Acid is Good for You*, New York: M. Evans and Company, 2001, 172-173.

2. Seaman, David, Whole food and nutritional

supplementation interactions in the digestive process, *In Clinical Chemistry & Nutrition Guidebook: A Physician's Dest Reference*, edited by Paul Yanick Jr. and Russell Jaffe. Prepublication for professionals, 463.

3. Pottenger, Francis M., Jr., The effect of heat processed foods and metabolized vitamin D mink on the dentofacial structures of experimental animals, *American Journal of Orthodontics and Oral Surgery*, August 1946; 32(8):467-485.

4. Philpott, William, and Kalita, Dwight, *Victory over Diabetes*, New Canaan, CT: Keats Publishing, 1983, 63.

5. Howell, Edward, *Enzyme Nutrition*, Wayne, New Jersey: Avery Publishing Group, Inc., 82.

6. Philpott, William, and Kalita, Dwight, Brain Allergies, New Canaan, CT: Keats Publishing, 1980, 99-100.

Digestion of Protein

The digestion of protein is a process known as hydrolysis ("water" + "to loose"). The body inserts water molecules between each amino acid in the digestive process. When a protein is completely broken down, one has free form amino acids. The advantage of free form amino acids is that one can blend the amino acids to create any profile one wishes.

A protein which is only partially broken down or digested is referred to as a partially hydrolyzed protein. Partially broken down proteins contain not only free form amino acids, but also dipeptides (two amino acids joined together) and tripeptides (three amino acids joined together). Dipeptides and tripeptides confer some unique properties to a protein supplement as discussed below.

Many traditional cultures allowed foods to ferment because of the realization that such foods were easier on the digestive tract. Yogurt, buttermilk, cheese, and aged meats are partially hydrolyzed or predigested proteins.

A protein which has undergone no digestion is referred to as an intact protein. Intact proteins are the most difficult for the body to break down and use. Heavily cooked intact proteins can be particularly taxing on the pancreas and digestive tract. The best argument for intact protein is that the human digestive tract is designed to obtain amino acids in this way. Unfortunately, intact proteins go through a very harmful denaturing process when they are heated. The consequence is that proteins digest poorly and can cause digestive upset or allergic response.

Which form of protein works best for supplementation? The edge has to go to partially digested protein. Partially digested protein absorbs better because the digestive tract has special transport for dipeptides and tripeptides.

Nitrogen retention and recovery from injury is faster with partially digested protein than it is with free-form amino acids. Animals fed partially predigested protein grew 50% faster than animals fed free form amino acids and 30% faster than animals consuming intact protein.

Dr. Michael Colgan summarizes why partially predigested protein is superior, "When two or more aminos are joined together they carry information. That information causes physiological responses that do not occur to single (information-less) aminos. New studies show that dipeptides and tripeptides signal the liver to produce somatomedin C, the anabolic growth factor that stimulates muscle growth."

Colgan also emphasizes the importance of the inclusion of the non-essential amino acids in a protein formula. He wrote, "Information from the essential and non-essential amino acids linked together as dipeptides signals the body to accept the protein into its store. If you leave out the non-essential amino acids from a protein formula, studies show that the human body can't hold onto it."

Reference:

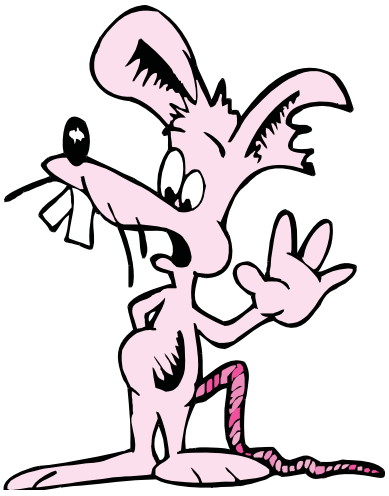
Colgan, Michael, *Optimum Sports Nutrition Your Competitive Edge*, New York: Advanced Research Press, 1993, 159-161.

GNLD Protein

GNLD protein products are derived from multiple sources. The use of multiple sources is utilized to obtain an optimal quantity of all 22 amino acids--essential and non-essential. Very few foods in nature have an ideal amino acid balance. This is why the intake of a diversity of amino acid sources offers the best chance to obtaining a balanced intake of all amino acids. GNLD utilized the protein content of a whole egg as the blueprint for the establishment of an ideal protein profile.

GNLD utilizes a Protogard Process in manufacture of all protein products. This is a low temperature process in which plant derived enzymes are mixed with the protein raw materials allowing a partial predigestion to take place. The protein is then dried out at body temperature. This process allows a mixture of free form amino acids, partially digested protein, and intact protein.

The government standard for protein quality is now PDCAAS (Protein Digestibility Corrected Amino Acid Score). A perfect score is 1.0 on this scale. All GNLD protein products



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meet or exceed this standard. Due to the incorporation of pre-digestion technology some of the products can be calculated to exceed the perfect score of 1.0 with scores of 1.3 and 1.4.

Digestibility of protein is critical. One of our extended family members living in Germany underwent colon surgery. After the surgery he developed a chronic diarrhea and wasted away. Only when his sister began dripping small amounts of GNLD protein into his mouth (he was on tube feeding) did his condition stabilize. He made a rapid total recovery and went to the airport to see his sister off on her return trip to the United States.

GNLD protein products also have a glycemic edge. There is enough carbohydrate so spare the protein so it is more readily available for tissue repair. All GNLD protein products have superior taste and the ability to mix in liquids.

The most popular GNLD protein supplement is the GR^2 Meal Replacement which comes in Vanilla Whisper and Chocolate Dream flavors. The advantage of this product is that it supplies approximately one-third of daily nutrient requirements. It was designed to be an ideal product for weight loss. It can be mixed with water. The PDCAAS score of this product is 1.31.

GNLD Super Ease protein has the highest quantity of free form amino acids for energy and muscle development The supplement is often preferred by athletes. This product of exceptional quality has a PDCAAS of 1.49. Flavors include chocolate and vanilla.

Nourishake was designed to have a superior taste. The product has a PDCAAS of 1.35. This protein contains a unique blend of simple and complex carbohydrates in addition to the protein to provide quick energy without a blood sugar spike. It has a low lactose content for those intolerant to dairy products. Flavors include chocolate, vanilla, and berry.

Premium protein is unsweetened and unflavored. It is designed to be a product which can be added to other foods without changing flavors. Premium protein has a PDCAAS over 1.40.

The Bottom Line

Digestive failure can lead to amino acid deficiencies. Amino acid deficiencies, in turn, can lead to digestive failure. Protein digesting enzymes and insulin itself are manufactured from amino acids. Serious amino acid deficiencies may require both digestive aids and protein supplementation or an exceptionally digestible protein such as that produced by GNLD.

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