Image Awareness Wellness Institute

Why Protein is Amazing

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May 2013 Volume 9: Issue 5

To Come First

The word protein means "of first importance." Protein is the central substance which makes life possible on earth. Its very existence and nature are a mystery. Proteins and the amino acids from which they are made are very complicated substances.

There are 22 amino acids which are involved in building a multitude of proteins. Nine are considered essential because they can not be manufactured in the human body. Non-essential amino acids can be conditionally essential as a result of conditions such as stress, toxicity or pregnancy.

Amino acids link together to form chains called peptides. Peptides are proteins. The average protein has about 120 amino acids but some are much larger. For example, hemoglobin consists of 574 amino acids. Albumin, a blood protein contains 526 amino acids of 18 different types. The largest proteins are called titins, a component of muscle tissue with a total length of almost 27,000 amino acids. Proteins must be broken down into amino acids by the digestive tract to be of nutritional value.

The complete amino acid sequence of one of the simplest proteins was mapped in 1953 by Frederick Sanger. The molecule was insulin. The project took eight years from start to finish!

The arrangement of amino acids in a protein must be very specific for the protein to function properly. A variation of only one amino acid can cause a protein to cease performing its function. The insulin of a cow differs from human insulin by three amino acids. Many scientists think that feeding infants cow's milk causes autoimmune attack against the infant's pancreas resulting in Type 1 or juvenile diabetes.

Amino acids in animals have only a left-handed configuration. When the scientist synthesizes amino acids in a laboratory he gets an equal mixture of both left handed L forms and right handed D forms of amino acids. D forms of amino acids are generally considered to be harmful. They can be produced in foods during processing. Synthetic amino acids such as D-L methionine are sometimes added to protein supplements to improve the amino acid profile although the nutritional benefits are questionable.

References:

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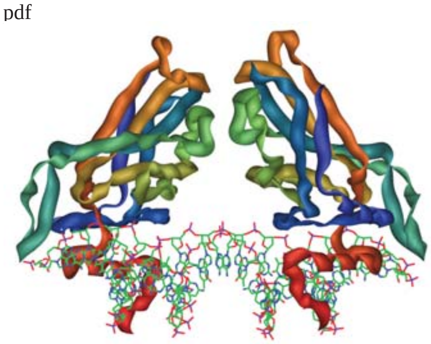

http://en.wikipedia.org/wiki/Protein

Folding

Proper functioning of proteins is dependent upon proper folding. Nearly all types of proteins bend and twist back and forth in an amazing highly complex three-dimensional pattern. If these folds do not occur in the proper way the protein cannot perform its function in the body properly. Cooking can destroy this elaborate three-dimensional folded pattern of protein.

Proteins hold a straight line pattern while being synthesized. As soon as a new protein has been manufactured it automatically folds itself into the correct three-dimensional pattern in a fraction of a second.

Why proteins do not fold as they are synthesized is a mystery. Proteins have parts which like water and parts that do not. Water fearing protein components fold to the inside of the protein molecule while the parts that like water move to the outside.

Do proteins fold improperly? Indeed they do! Scientists have recently been able to observe complex molecules called chaperonins which prevent and correct errors in protein folding. They prevent newly manufactured protein molecules from clumping into disorganized, useless globs.

The water loving side chains of the protein molecules that face toward the outside of the molecule, also known as fingers, allow chemical reactions to

take place in the watery environment of the cell. Amino acids and lipids which do not like water are synthesized where water is shut out at the center of a protein molecule.

The fingers on the surface of protein molecules have the ability to form strong and weak bonds. Strong bonds are 20 times stronger than weak bonds. Weak bonds allow temporary chemical reactions to take place, while strong bonds allow proteins to connect powerfully with one another to form tissues like muscle. Muscle proteins with weak bonds would not be very useful.

Weak bonds make possible enzymatic actions as often as one million times a second. The enzyme catalase can break down 44,000 molecules of hydrogen peroxide per second. Imagine having an employee that could work like that! The deadly poison cyanide kills by blocking the functioning of enzymes in the body.

The amazing thing about the body's protein enzymes is that they are highly specific working on only one type of substance while inorganic catalysts often work on a variety of substances.

Proteins have the ability to chemically alter other substances, to receive and incorporate special information within themselves, and to alter their own behavior in response to this information.

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https://commons.wikimedia.org/wiki/File:TBR1_Protein.png

Protein and DNA

The proteins used to build our body are built using the DNA template. The DNA is used to build RNA which then builds proteins. One RNA molecule can manufacture 20 amino acids per second. Deficiency of amino acid intake in the diet will impair the process of protein manufacture in the body.

When we look in a mirror, most of what we see is protein. This includes the skin, hair, nails, muscle, internal organs, hormones and even the molecules of the immune system which allow us to fight off invaders or heal from wounds.

Protein Deficiency

A number of years ago I met a physician named Dr. Keith Lowell. Earlier in life he had been diagnosed with a disease which he knew from his medical education was incurable. He developed a technique of scraping the gums to obtain living cells for study. He then altered the composition of his diet to find which foods produced the greatest increase in vitality of his cells. He learned that protein supplementation ultimately had the greatest effect and he was able to reverse his condition and went on to make his analytical technique a key component of his medical practice.

Protein deficiency is considered an abnormality by many in the medical profession. Newer analytical techniques which measure amino acid levels in blood and urine suggest that it may not be all that uncommon to be lacking specific amino acids. Deficiencies of amino acids can result from inadequate protein intake or inability to digest and absorb protein.

Faulty Digestion

Deficiency of amino acids can be a result of at least four major factors. Firstly, protein may be difficult to break down and digest. Secondly, medical interventions such as the use of antacids or surgery for removal of part of the digestive tract may impair protein digestion. Thirdly, the functioning of the digestive tract may be impaired by inflammation, bacterial overgrowth, allergy or other disease processes. Finally, aging and poor nutrient intake can result in decreased production of the hydrochloric acid and enzymes necessary for proper breakdown and assimilation of protein.

Difficult to Digest

Some foods such as soybeans and other legumes contain digestive inhibitors as a defense mechanism to prevent them from being eaten off the face of the earth. These foods can inhibit digestion of both carbohydrates and protein foods through inhibition of digestive enzymes.

Heat processing of foods may also alter both protein structure and digestibility. Francis M. Pottenger, Jr. realized this in his early nutritional studies. 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 our impression that the denaturing of proteins by heat is one factor responsible."

One of the peculiarities of protein is that it can change from liquid to solid when heated. This change is called the change from a water loving compound (hydrophyllic) to a water fearing compound (hydrophobic).

The process of digestion of protein is called hydrolysis. It involves inserting water molecules between the individual amino acids in the protein chain. Changing the nature of protein so it does not relate as well to water can not help but make protein foods more difficult to digest and utilize for nutritional purposes.

One of the byproducts of heating protein foods which also contain sugars is a browning effect or Maillard reaction in which the amino acid lysine combines with sugars. Studies have shown that heating of wheat products makes potentially allergic components of grains more resistant to digestion *greatly increasing the allergenicity of the grain*. We should not be surprised that heating of other foods increases allergic sensitivity by decreasing digestive efficiency. Pottenger found milk allergies common in his second and third generation cats being fed heated milk products.

Boxed cereals are often highly heated and contain large quantities of browned protein products. This not only makes them more difficult to digest, but also results in absorption of what are called advanced glycation endproducts (AGE's). AGE's induce inflammation in body tissues and also speed the process of aging.

When protein foods are blackened they become even more difficult to digest. Browned and blackened proteins are potential mutagens and carcinogens. They can damage the DNA.

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Medical Interventions

The administration of antacid medications to patients in the hospital setting is common, despite the fact that protein is essential for healing.

Between 40 and 70 percent of patients admitted to a hospital are given some form of acid-suppressive medication. Up to 70% of these patients have conditions for which there is not support for acid-suppressive medication in the medical literature. Half of patients put on antacids while in the hospital also receive a prescription when they leave. Antacid medication was shown to increase the risk of hospital-acquired pneumonia by 30%.

The acid secretions of the stomach are essential for proper breakdown and absorption of protein. Routine use of antacids in or out of the hospital carries the potential for creating amino acid deficiencies. Antacid use also increases the likelihood of developing an allergic response to proteins foods and may also increase the severity of allergic response.

In 2010 one in 10 people bought an antacid at least once a month resulting in 1.2 billion dollars in income for the pharmaceutical industry. The fact that most antacids are used by older people suggests that the digestive problem is inadequate digestive secretions rather than an excess. Excess digestive secretions would be much more likely in a younger population.

Bariatric surgery for weight loss can induce a wide variety of nutrient deficiencies by impairing the digestive process. Most gastrointestinal surgery has negative effects upon nutritional status.

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Inflammation

Food allergy or infection can result in inflammation and damage to the digestive tract which can severely impair digestion. We have already seen how heating of foods can increase allergenicity. In one study Finnish investigators found severely impaired stomach digestive secretions in infants who were milk intolerant. Stomach biopsies proved serious damage to the stomach mucosal lining. Removal of cow's milk from the diet caused stomach function to return to normal. Any food allergy can interfere with protein digestion.

References:

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Hydrochloric Acid Deficiency

Production of hydrochloric acid tends to decline with age. A wide variety of nutrient deficiencies which become more common with aging can impair production of hydrochloric acid.

Bouts of illness can temporarily depress stomach acid secretion. One study found that a mild illness depressed stomach acid function for an average of 126 days (range 53-235).

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One common infection which has profound impact on stomach acid secretion is overgrowth of the H pylori bacteria responsible for ulcers.

Hydrochloric acid deficiency can result in digestive distress, belching, heartburn, and ulcer-like symptoms. Other symptoms include intolerance to fats, nausea, burning tongue, metalic taste and bad breath. Deficiency of stomach acid can cause constipation or diarrhea.

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Quality Protein

Quality protein is now hard to find. Corn fed meats are saturated with inflammatory omega-6 fatty acids. Government agencies have attempted to erradicate raw milk.

Neo-Life provides one of the finest protein products available. To achieve a high-quality protein both quality raw materials and processing technology are of great importance.

Neo-Life uses the highest quality raw materials including the exclusion of synthetic amino acids and genetically modified ingredients. The technological difference in manufacture is called the Protogard Process. Protein'structure and nutritional value is damaged by high temperature, acids or bases. The Protogard Process protects amino acids by blending high-quality raw materials at low temperatures and allowing plant-based enzymes to predigest the protein.

The official protein quality assessment method connected with the Nutrition Labeling and Education Act (NLEA) and food labeling regulations is called PDCAAS (Protein Digestibility Corrected Amino Acid Score).

This means of quality assessment involves first identifying the limiting amino acid in a protein formula. This is followed by taking into account the digestibility of the protein involved. The result is a number score. The highest quality natural sources of protein have a score of about 1.0. All Neo-Life protein products have a PDCAAS score of 1.0 or significantly greater. The high scores are a consequence of not only choosing the finest quality raw materials but also the predigestion technology which is an outgrowth of the Protogard Process. All Neo-Life protein products contain all 22 amino acids considered important for human nutrition.

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