

# Protein

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Protein Q Describe the alanine-glucose cycle. The alanine-glucose cycle is responsible for the exchange of alanine molecule between skeletal muscles and liver. Like glutamine, alanine is a very important resultant of amino acid degradation that is used in the body. Alanine is the product of transamination of pyruvate that happens in the muscles. From the muscles, the alanine is absorbed in the liver where the process of transamination occurs. The process occurs in the presence of alpha-ketoglutarate. This cycle generates pyruvate which enters the gluconeogenesis cycle and glutamate which enters the urea cycle. The enzyme which is required for these processes to occur is alanine amino transferase.

Q 2. List as many protein functions as you can recall.

Proteins have various functions. They are broken down to amino acids which then provide energy to the body. Thus they serve as an energy source. They also form various enzymes, blood transporters and plasma proteins that perform the function of transport and help to control water balance. Proteins are also an integral part of clotting factors. Muscle proteins are also very important as they bring about contractions. Hormones such as insulin and glucagon are also made of proteins. Elastin and collagen which are integral parts of connective tissues are also made up of proteins.

Q 3. How small must protein be in order to be absorbed and transported?

Compared to the digestion and absorption of other nutrients, the digestion and absorption of proteins is complex as various enzymes are involved in manufacturing of the end-products of proteins. Stomach is the major part of the gastrointestinal tract where protein digestion occurs. Acidity of the stomach allows activation of pepsin and denaturing of proteins which involves uncoiling. Further digestion occurs in the small intestine in the

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presence of proteolytic enzymes which form amino acids. Absorbed form of proteins are amino acids.

Q 4. What are detrimental effects of consuming too many amino acid supplements?

The main harmful effect of amino acid supplementation is that it may hinder and decrease the absorption of other amino acids which may lead to an amino acid imbalance. This defect may occur because amino acids share absorption transport systems. Hence, it is advised that individual amino acid supplements should be avoided.

Q 5. Why would it be useful to know information about nitrogen balance?

Nitrogen balance is a standard which has been set to understand the excess or deficiency of proteins in the diet. The nitrogen balance keeps the amount of protein consumed and lost in balance. If the balance is disturbed, the person is said to have lost nitrogen equilibrium. Nitrogen balance is necessary to understand if the body is growing properly or not.

Q 6. What are some health consequences of protein under-nutrition?

Protein under-nutrition is also referred to as protein-energy malnutrition. Two most common consequences that may occur are Kwashiorkor and Marasmus. Kwashiorkor is a resultant of lack of dietary proteins. The patient presents with edema, depigmented skin, fatty liver and patient has some body fat. On the other hand, marasmus also occurs due to low proteins in the diet along with other nutrients. Undernourished females may give birth to mentally and physically ill infants.

Q 7. Where does urea cycle occur in the cell?

Urea cycle is a process that converts ammonia, carbon dioxide and nitrogen into urea. The cycle consists of five reactions. Out of the five reactions two

take place in the mitochondria whereas the rest take place in the cytoplasm of the cell.