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Biochemical Significance of Protein Digestion

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Annatation. Protein digestion is a very important process. Our life depends on proteins. Biochemical study of protein digestion is required. Proteins are made up of amino acids, and we need to know the biochemical mechanism by which proteins are broken down into amino acids. Many protein-related diseases are now known and pose a great threat to humanity. If we apply the knowledge we have learned from biochemistry in the treatment of diseases, it will be a good thing.

Key words: Digestion of proteins, amino acids, proteins, HCl acid, digestion by enzymes, digestion in the gastrointestinal tract.

Indroduction: Digestion of proteins takes place in the gastrointestinal system. Proteins are made up of amino acids, so this article is also related to amino acids. The importance of amino acids for the body is primarily determined by their use in protein synthesis, their metabolism is the exchange of substances between the body and the external environment. Takes a special place in the process. This protein enters the main components of cells, tissues and organs in human and animal bodies, performs enzymatic functions, transports substances through the membrane, etc. is explained by Protein hormones play an important role in coordinating the work of all cellular systems. Proteolysis enzymes involved in the digestion of proteins and peptides are synthesized and released as proenzymes in the gastrointestinal tract. They are inactive and do not break down their own proteins. The problem of parenteral protein nutrition is important for clinical practice. It is known that the human body can use proteins only after they are broken down into free amino acids in the gastrointestinal tract. If the proteins are administered parenterally (i.e., if they are injected into the intestinal tract), it leads to the development of sensitization (increased sensitivity of the body to a foreign protein), and if the protein is repeatedly administered, it can lead to anaphylaxis, that is, the body is in a state of shock. . However, clinicians are forced to inject protein with this method, especially after burns and poisoning of the esophagus during surgery, severe asthmatic injuries of the esophagus and stomach, and after operations on the stomach and intestines. After parenteral administration of protein solutions, hydrolyzates of proteins (mixture of amino acids) are currently used for protein nutrition to prevent severe complications. Administration of amino acid mixtures does not cause allergic reactions, because amino acids, unlike proteins, do not have species and tissue specificity. Observations of patients in clinical conditions showed that the mixture of amino acids fully satisfies the need for proteins. However, it is necessary to mention a number of negative reactions in the body after the administration of

hydrolyzate of proteins, in particular, changes in mental activity. That was the gist of the introduction.

Main part: Digestion of proteins in the stomach. In the stomach, proteins are digested under the influence of the proteolytic enzyme pepsin, and hydrochloric acid of gastric juice plays an important role in this process. One of the components of hydrochloric acid - H+ is formed in the accessory cells of the gastric glands and is released into the gastric cavity, the components of HC1 (H+ and Cl' ions) are released from the lining cells of the gastric glands into the stomach. goes to the 'space. Its concentration in the stomach cavity is 0.16 M (about 0.5%). Therefore, gastric juice has a low pH value, that is, it is around 1-2. There are 4 types of acidity of gastric juice: 1) hydrochloric acid (free HC1) that is not associated with any compound; 2) protein-bound hydrochloric acid (bound HC1); 3) the sum of free and bound hydrochloric acid (total HC1); 4) the sum of free, bound and total HCI and the sum of other acidic substances that create an acidic environment in gastric juice (total acidity). These acidities of gastric juice are determined by titration with a 0.1 mol/1 solution of NaOH in the presence of an indicator. In the duodenum, proteins and polypeptides of various sizes released from the stomach are affected by pancreatic and intestinal juice enzymes. In particular, the pancreas Peptides of different sizes and free amino acids are formed from proteins and polypeptides under the influence of proteolytic enzymes trypsin, chymotrypsin, carboxypeptidases A and B. Trypsinogen, chymotrypsinogen enzymes, procarboxypeptidases A and B, and proelastase are synthesized in the cells of the pancreatic foci. Activation takes place with the participation of the enteropeptidase enzyme produced by intestinal cells a is absorbed. After these substances are absorbed into the blood through blood vessels in the intestinal wall, only indigestible substances and water remain. The chyme then passes into the large intestine. Here, water is absorbed and indigestible substances are broken down by bacteria to synthesize important vital substances (such as vitamin K). Concentrated waste, called feces, passes through the rectum and out through the anus. Stomach and intestinal cells are protected from the effect of digestive peptide hydrolases due to the formation of inactive precursors of fermentation in gland cells, which become active only after these enzyme precursors are used up. In addition, when entering the stomach or intestinal tract, enzymes do not collide with cellular proteins, because the mucous membrane is protected by a mucous layer, and the outer surface of the plasma membrane is protected by polysaccharides, which are not considered substrates of peptide hydrolases. However, in gastric and duodenal ulcers, cells are destroyed under the influence of proteinases. After the amino acids are absorbed from the intestine and pass through the portal vein to the liver, a large part of the amino acids are distributed throughout the body through the blood and undergo a number of changes in this organ, in addition to being used for various physiological purposes. In the liver, amino acids are used in the synthesis of special nitrogen-fixing compounds - purine and pyrimidine nucleotides, creatine, uric acid, NAD, etc., in addition to the synthesis of body proteins and blood plasma proteins. The liver, meanwhile, provides a balanced pool of free amino acids in the body by redistributing nitrogen due to exchangeable amino acid synthesis and transamination. Maintaining the balance of amino acids in the blood serum during fasting depends on the release of bile from the tissues. Maintaining the balance of amino acids in the blood serum during fasting depends on the release of bile from the tissues. Muscle tissues play an important role in this, they supply more than 50% of amino acids, and the liver contains enzymes for the synthesis of uric acid. Therefore, the liver and kidneys play an important role in maintaining the balance of amino acids in the blood and in their renewal. Pancreatitis is a disease that develops as a result of the passage of the horse (and the infection) into the pancreatic duct. As a result, proteolytic enzymes of the pancreas trypsin, chymotrypsin, carboxypeptidase A and B, elastase and collagenase are actively released in this disease and can break down the tissues of the pancreas. Accordingly, in order to prevent and treat tissue disintegration, trasilol and contrical are used. Trasylol polypeptide is a natural substance that is an inhibitor of the above-mentioned fermentation (obtained from the pre-ear glands of black cattle). It is used in the treatment of acute pancreatitis, pancreonecrosis and chronic pancreatitis. In various diseases of the gastrointestinal tract, the production of KCI and pepsinogen in the stomach is disturbed, and the digestion of proteins is significantly reduced. Pathological changes in the acidity of gastric juice are the most common. Violations of pepsin production are rare and can be detected only in severe stomach injuries. Determination of the acidity of gastric juice is used in the diagnosis of various stomach diseases. High acidity of gastric juice is usually accompanied by heartburn, diarrhea, and can be a sign of gastric and duodenal ulcers as well as hyperacid gastritis. Low acidity occurs in some types of gastritis. Incomplete HCl and pepsin deficiency (gastric achilia) occurs in atrophic gastritis and often in pernicious anemia when production of Kasl factor is insufficient and vitamin B absorption is impaired. Anacidic state (gastric juice pH>6.0) indicates a

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significant enrichment of the lining cells that secrete hydrochloric acid in the gastric mucosa, which often leads to gastric cancer.

Conclusion: The conclusion about the protein balance is made by measuring the nitrogen balance. If there is enough protein in the food, the amount of nitrogen entering and leaving the body will be equal, and this is called nitrogen balance. Anabolic processes prevail in a young, growing body, protein weight increases in muscles, hormones and enzymes are produced. Therefore, children have a positive nitrogen balance, that is, the amount of nitrogen that enters the body with food is greater than what is excreted. In the elderly and when eating low-protein and incomplete protein food, the opposite is observed, that is, a negative nitrogen balance. In this case, the amount of nitrogen that enters with food is less than what is excreted. Negative nitrogen balance occurs even if vitamins, some amino acids and mineral substances are consumed less than the norm or are not consumed at all, and absorption processes in the gastrointestinal tract are disturbed.

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