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ENZYMES: HOW THEY WORK AND WHAT THEY DO

Proteins are among the major players in our life. Proteins work together in a complicated and coordinated way to support our life. Structural biology is an area of research that studies protein function based on protein structure.

In order to correctly understand the characteristics and properties of such a proteins, we need to understand how life began and evolved on Earth.

Enzymes are specific protein substances which are found all cells and tissues of the body and play the role of biological catalysts that is accelerating the course of chemical reactions. They determine both the processes of synthesis and the processes of decay of substances in the body [3].

The study of the chemical composition of enzymes made it possible to establish that they are all protein substances. Enzymes like proteins are in the colloid state, exhibit amphoteric properties, are inactivated under the influence of high temperatures, undergo hydrolytic cleavage with the participation of proteolytic enzymes in solutions. They operate as organic catalysts, lowering the amount of energy needed to power a reaction thus speeding it up [2].

Enzymes show high catalytic activity not only in the cells of the body, but also beyond the body under certain conditions. Some are released to catalyze reactions outside cells, such as the digestion of food in the stomach and intestines. Enzymes need be present only in minute quantities to affect the rate of a reaction. Catalase is one of the most rapid enzymes; it is found in the liver. It has been estimated that catalase can break up hydrogen peroxide molecules into water and oxygen at the rate of 40,000 molecules per second. In the absence of a catalyzing enzyme, most metabolic processes would proceed far too slowly to maintain life. Most enzymes are

found within cells. All known enzymes are divided into two large groups: simple enzymes and complex.

The molecules of simple enzymes consist only of protein. By chemical properties, they belong to albumins, globulins and a number of other groups of simple proteins. Simple enzymes are also enzymes of the gastrointestinal tract, in particular trypsin, chymotrypsin and others.

Complex enzymes consist of simple protein and nonprotein part. The protein component of complex enzymes is often called apoenzyme, and non-protein - prostatitis, if it is firmly and permanently bound to the protein portion, or coenzyme (coenzyme), if the non protein portion is weakly bound to the protein and can easily be separated [4].

An example of enzymes in which the protein part is permanently and firmly bound to non-protein can be catalase and peroxidase. In a group of enzymes such as dehydrogenase (glucose-6-phosphate dehydrogenase, alcohol dehydrogenase), the non-protein portion acts as a typical coenzyme.

Numerous studies have shown that the role of non-protein part in complex enzymes is performed by a number of vitamins and their derivatives, peptides, nucleotides, metal-containing complexes, iron atoms, and copper.

Considering the chemical nature of complex enzymes, it should be emphasized that protein and non-protein particles separately do not exhibit proper enzymatic activity. Such activity is observed only when they are interconnected. It is believed that non-protein group increases the stability of the protein part, and the latter determines the specificity of the catalytic action of the enzyme. The non-protein portion, by joining different proteins, can catalyze completely different processes. [1]

Consequently, the study of some enzymes is an extremely important process because they are used used in pharmacy and medicine. Enzymes use the production of bread, cheese, wine, alcohol, beer, tea, amino acids, protein concentrates, and more. Application of enzymes can intensify processes, improve the quality of finished products, increase its output.Some products use enzymes to accelerate

chemical reactions: starches or fat stains on clothing, enzymes in biological detergent powders decompose proteins.

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