Enzymes definition, examples, functions and structure

Student's name9

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Course

Date

Definition

Enzymes are proteins that help speed up metabolism or the chemical reactions in our body. They build some substances and break others down.All living things have enzymes.Our bodies naturally produce enzymes.But enzymes are also in manufactured products and food

Example of enzymes and their functions

Lipases: This group of enzymes helps digest fats in the gut.

Amylase: In the saliva,amylase help digest starch into sugars.

Maltase: This enzyme is also present in the saliva and facilitates the breakdown of the sugar maltose into glucose.

Trypsin: These enzymes break down proteins into amino acids in the small intestine.

Lactase: Lactase breaks the lactose,the sugar in milk into glucose and galactose.

Acetylcholinesterase: These enzymes break down the neurotransmitter acetylcholine in nerves and muscles.

Helicase: Helicase enzymes unravel DNA.

DNA polymerase: These enzymes synthesize DNA from deoxyribonucleotides.

DNA ligase: This enzyme plays a crucial role in DNA replication by joining the Okazaki fragments on the lagging strand.

Proteases: Proteases are enzymes responsible for breaking down proteins into amino acids during digestion.

Ribonuclease: This enzyme is involved in the breakdown of RNA molecules into nucleotides

Catalase: Catalase is an enzyme that helps convert hydrogen peroxide into water and oxygen, protecting cells from oxidative damage.

Phosphorylase: Phosphorylase enzymes are essential for glycogen breakdown into glucose units in the liver and muscles.

Lysozyme: Lysozyme is an enzyme that destroys bacterial cell walls, contributing to the body's immune defense.

ATP synthase: ATP synthase is an enzyme responsible for producing ATP, the energy currency of cells, during cellular respiration.

Carbonic anhydrase: This enzyme catalyzes the conversion of carbon dioxide and water into bicarbonate ions, crucial for maintaining acid-base balance in the body.

Enzymes structure

Enzymes are a linear chain of amino acids that give rise to a "three - dimensional structure". The sequence of amino acids specifies the structure, which in turn identifies the catalytic activity of the enzyme.Upon heating, the enzyme's structure denatures, resulting in a loss of enzyme activity, which in turn is associated with temperature.

Compared to its substrates, enzymes are typically large with varying sizes, ranging from 62 amino acids to an average of 2500 residues found in fatty acids synthase.Only a small section of the structure is involved in catalysis and is situated next to the binding sites. The catalytic sites and the binding site together constitute the enzyme's active site. A small number of ribozymes exist which serve as an RNA - based biological catalyst.It reacts in complex with the protein.

References

1. Enzymes: Biochemistry, Biotechnology, Clinical Chemistry by Trevor Palmer and Phil Bonner.
2. Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis by Robert A. Copeland
3. Introduction to Enzymology by Tadhg Begley.