

The evaluation of knowledge ENZYMES AND COENZYMES

1. Enzymes as biocatalyzers (definition)
2. Preliminary thermodynamic concepts:
 - egzo- and endothermic reactions
 - law of mass action
 - chemical equilibrium constant
 - thermodynamic free energy
 - activation energy
 - entropy and enthalpy
3. Active side and regulatory side - the structure
4. Bonds, which participate in the formation of enzyme-substrate complex (hydrogen, covalent, hydrophobic and electrostatic interactions, van der Waals forces)
5. The mechanism of enzymatic catalysis on the example of selected enzymes, e.g. catalase
 - specificity of action
 - specificity to substrate
6. Enzyme classification and nomenclature (characteristics of classes)
7. Enzyme kinetics - explain the definition
8. Velocity of enzymatic reaction
 - dependence on temperature
 - dependence on substrate concentration (Michaeli constant - definition and interpretation)
 - wpływ modulatorów
9. Enzyme activity:
 - enzyme units (katal, international enzyme unit, specific activity, turnover number)
10. Inhibition of enzyme-catalyzed reactions
 - competitive inhibitor
 - noncompetitive inhibitor
 - uncompetitive inhibitor
 - practical significance of inhibition and enzymatic inhibitors (examples)
11. Regulation of enzyme activity:
 - proteolytic enzyme activity
 - regulation by binding and detaching of regulator proteins
 - phosphorylation and dephosphorylation of the proteins
 - allosteric control
 - regulation by natural inhibitors
 - regulation by feedback



- regulation by the formation of multi-enzymatic complexes
- 12. Isoenzymes and heteroenzymes - definition and biological significance
- 13. Clinical application of the determination of enzyme activity
- 14. Coenzymes derived from vitamins and its participation in metabolic reactions (characterization of water-soluble vitamins)
- 15. Structure, division and function of coenzymes
 1. Coenzymes. which transfer hydrogen
 - Nicotinamide adenine dinucleotide (NAD) - structure¹
 - Nicotinamide adenine dinucleotide phosphate (NADP) - structure¹
 - Flavin mononucleotide (FMN) - structure¹
 - Flavin adenine dinucleotide (FAD) - structure¹
 2. Coenzyme Q
 - lipoic acid
 2. Coenzymes, which transfer chemical groups:
 - adenosyno-5'-triphosphate (ATP) - structure¹
 - cytidine triphosphate (CDP) - structure¹
 - uridine diphosphate (UDP) - structure¹
 - 3'-Phosphoadenosine-5'-phosphosulfate (PAPS)
 - S-adenosyl methionine (SAM)
 - Biotin - structure¹
 - Coenzyme A - structure¹
 - Thiamine pyrophosphate
 - Pyridoxal phosphate - structure¹
 - Tetrahydrofolic acid (FH₄)

structure¹ - the knowledge of the chemical structure of the molecule is valid

