

Objectives and tasks of BIOCHEMISTRY

Biological chemistry (biochemistry) is the branch of science that studies structures and chemical properties of compounds in living organisms; chemical conversions of these compounds, and their relations to the functioning of organs and tissues. Biochemistry is composed of following parts: static biochemistry, analyzing chemical composition of the living body; dynamic biochemistry, which objective is the study of all metabolic conversions in the body; functional biochemistry, investigating the relationship between chemical reactions and body functions. Static, dynamic, and functional biochemistry are highly interrelated and should be considered within the framework of the modern biological chemistry.

Student must know:

- general laws of chemistry that explain chemical processes in the human body;
- general characteristics of metabolic pathways in cells;
- common principals of metabolic regulations, action of hormones on metabolism;
- composition of the human body, the structure and physicochemical properties of the main classes of compounds: proteins, nucleic acids, carbohydrates, lipids; metabolic conversions of these compounds; and common mechanisms of metabolic regulation.
- structure of enzymes; mechanisms of enzymatic reactions (using conversions of proteins, nucleic acids, carbohydrates and lipids as the examples); regulation of the enzyme activity; hierarchies of regulation; mechanisms of enzymatic catalysis;
- mechanisms of oxidative phosphorylation, molecular mechanisms of energy coupling processes;
- protein synthesis, sequences and mechanisms of reactions, regulation and energy supply of the process; mechanisms of formation of three-dimensional structure of proteins;
- reactions of biological oxidation and their role in health and disease;
- biochemical basis of healthy nutrition and consequences of malnutrition on human health.

Student should be able to:

- perform simple laboratory tests;
- determine the values of pH in solutions;
- operate with the equipment in biochemical laboratories.
- conduct biochemical investigation according to an instruction, using laboratory equipment and tools;
- analyze results of the investigation and sum up the conclusion.

Student must possess skills:

- in working with laboratory equipment and tools;
- in performing of qualitative and quantitative analysis of nucleic acids, proteins, lipids, carbohydrates, vitamins and hormones in a biological material.