

PROGRAMME OF THE SUBJECT „MEDICAL BIOCHEMISTRY 2“

STUDY BRANCH: „DENTISTRY“
2nd YEAR – FACULTY OF MEDICINE CU

LECTURES

Summer semester 2023/2024

1st week: 26.02. – 01.03.2024

Metabolism of nucleotides – synthesis of purine and pyrimidine nucleotides. Regulation of nucleotide synthesis. Degradation of nucleotides.

2nd week: 04.03. – 08.03.2024

Transfer of genetic information – replication of DNA, synthesis of RNAs, proteosynthesis.

3rd week: 11.03. – 15.03.2024

Meaning and mechanisms of regulation of biochemical processes in the organism. Regulation of metabolic processes at the cellular level and at the level of the organism.

4th week: 18.03. – 22.03.2024

Mechanisms of transfer of chemical signals into the cell. Types of receptors, cytosolic, membrane receptors. G-proteins and their role.

5th week: 25.03. – 29.03.2024

Principles of regulations by endocrine system. Hormones of pancreas.

6th week: 01.04. – 05.04.2024

Hormones of adrenal cortex – glucocorticoids, mineralocorticoids. – metabolic roles and regulation of their secretion.

7th week: 08.04. – 12.04.2024

Acid-base balance and its regulation. Role of buffer systems, kidneys and lungs. Disorders of acid-base balance.

8th week: 15.04. – 19.04.2024

Biochemical basis of nervous system functions. Vegetative nervous system and role in integration of organ functions.

9th week: 22.04. – 26.04.2024

Biochemistry of connective tissue. Protein and carbohydrate components of connective tissue. Synthesis of collagen.

10th week: 29.04. – 03.05.2024

Biochemistry of hard tissues – bones and teeth. Mineralization and factors influencing it.

11th week: 06.05. – 10.05.2024

Biochemistry of parodontopathies.

12th week: 13.05. – 17.05.2024

Relation of several diseases of organism and hypovitaminosis to pathologic situations in mouth cavity – diabetes, osteoporosis.

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SEMINARS AND LABORATORY PRACTICES

Summer semester 2023/2024

1st week: 26.02. – 01.03.2024

Role of vitamins as the essential components of the food in metabolic processes. Vitamins deficiency and its effect on metabolism.

Practical part: Determination of methylmalonic acid in urine

2nd week: 04.03. – 08.03.2024

Defects in purine nucleotides metabolism - hyperuricaemia (gout).

Practical part: Determination of uric acid in blood serum and in urine

3rd week: 11.03. – 15.03.2024

Regulation of gene expression in prokaryotes and eukaryotes.

Mechanism of proteosynthesis

4th week: 18.03. – 22.03.2024

Gastrointestinal system and digestion. Basis of chemical mechanisms of digestion of individual nutrients, mechanism of HCl secretion and its regulation in stomach. Examination of basal and stimulated secretion of HCl, preparation of the patient and evaluation of the test.

Practical part: Examination of gastric secretion under basal conditions and after its stimulation

5th week: 25.03. – 29.03.2024

Metabolism of iron. Absorption and transport of iron, regulation of iron metabolism.

Practical part: Determination of iron ions concentration in blood, absorption curve of iron

6th week: 01.04. – 05.04.2024

Mechanisms of the transfer of chemical signals into the cells. Vegetative nervous system - neurotransmitters, receptors and mechanisms of the action.

Classification of receptors at the terminals of vegetative nervous system, Physiological actions of sympathetic and parasympathetic nervous systems at the molecular level.

7th week: 08.04. – 12.04.2024

Metabolism of water and minerals. Water - functions in the organism, regulation of water balance, Defects - dehydration, hyperhydration. Na⁺, K⁺, Cl⁻ - meaning in the organism, regulation, mineralocorticoids, defects.

Practical part: Concentration and dilution and acidification tests

8th week: 15.04. – 19.04.2024

The roles of calcium and phosphates in the organism. Regulation of calcium level – parathyroid hormone, vitamin D, calcitonin

Practical part: Determination of calcium concentration of blood

9th week: 22.04. – 26.04.2024

Acid-base balance. Regulation of stable pH value. Buffer systems, roles of respiratory system and kidneys in regulation of acid-base balance. Basic disorders in acid-base balance status – acidosis and alkalosis.

10th week: 29.04. – 03.05.2024

Biochemistry of the blood. Blood plasma proteins and their roles.

Disorders of blood plasma proteins, changes in amounts and spectrum of blood plasma proteins in several diseases.

Practical part: Determination of total proteins and albumin in blood plasma

11th week: 06.05. – 10.05.2024

Functional biochemistry of the liver. Synthesis and degradation of tetrapyrroles, metabolism of bilirubin.

Practical part: Determination of bilirubin in serum

12th week: 13.05. – 17.05.2024

Blood plasma enzymes and meaning in medicine. Factors affecting enzyme activities in blood plasma. Application of determination of blood plasma enzyme activities during myocardial attack and in damage of different organs.

Practical part: Determination of alkaline and acidic phosphatases