Abstract of the working program on normal physiology

for second-year students of the Faculty of Medicine

1. **The purpose of the discipline:** the mastery of knowledge about the vital activity of the whole organism and its individual parts, the basic laws of functioning and the mechanisms of their regulation in interaction with each other and with environmental factors, the physiological bases of clinical and physiological research methods used in functional diagnostics and in the study integrative activity of a person.

2. **Place of discipline in the structure of the MEP:** The academic discipline "Normal physiology" refers to the natural science cycle of disciplines.

3. **Requirements for the results of the discipline:**

The process of studying the discipline is aimed at the formation and development of competencies: GCC- 2, PC-21

As a result of studying the discipline, the student must

Know:

- basic properties and conditions of excitable tissues, mechanisms of bioelectric phenomena and their role in coding biological information;
- structural and functional properties and peculiarities of the regulation of the processes of contraction of the striated and smooth musculature;
- principles of organization and functioning of the central nervous system (CNS) in humans and other mammals, cephalization of functions in the process of evolution;
- the role of various departments and structures of the central nervous system in the regulation of somatic and visceral functions of the body. Reflex arcs with visceral and somatic components;
- individual features of the organization and reflex activity of the autonomous nervous system, its participation in the formation of holistic forms of behavior;
- mechanisms of functioning and principles of regulation of endocrine cells, glands of internal secretion and peculiarities of their interaction in conditions of purposeful behavior and pathology;
- the blood system and its role in maintaining and regulating the homeostatic constants of the body, blood functions, characteristics and functional characteristics of the physiological constants of the blood; blood groups and methods for their determination, Rh factor and its role in pathology, blood transfusion rules, blood coagulation processes;
- the main stages and indicators of the function of external respiration, the respiratory center and its structure, the features of the regulation of breathing under various loads;
- the role of proteins, fats, carbohydrates, minerals, vitamins and water in providing vital functions;
- physiological features of the regulation of the metabolism and energy in the body in the conditions of extreme environmental factors and professional activity, the basis for healthy and adequate nutrition, the principles of making rations;

- digestion as a process necessary for the realization of the energy and plastic functions of the body; features and patterns of the structural and functional organization of the functions of the gastrointestinal tract, the formation of hunger and saturation;
- the main processes and mechanisms for maintaining a constant body temperature;
- the main stages of urine formation and mechanisms for their regulation;
- basic non-excretory (homeostatic) kidney function;
- the main properties of the heart muscle and their differences from skeletal muscles, mechanisms of electromechanical interface, cavity and valvular heart apparatus;
- basic mechanisms of regulation of heart activity, cardiac cycle;
- physiological role of the vascular system departments, linear and volumetric blood flow velocity, neurohormonal mechanisms of vascular tone regulation and systemic hemodynamics;
- features of the structural and functional organization of the microcirculatory bed of various regions of the body of a healthy person, transcapillary exchange and its regulation;
- the basic morpho-functional features of the organization of various departments of sensory systems;
- forms of manifestations of higher nervous activity (HNA) in humans, classification and characterization of types of HNA, variants of interhemispheric asymmetry and its importance in the activity of a doctor;
- mechanisms of formation of the conditioned reflex and its inhibition, role in clinical practice, components of the functional system of the behavioral act;
- concept and classification of pain; features of morpho-functional organization of nociceptive and antinociceptive systems;
- mechanisms and features of the formation of the basic functional systems (BFS) of the organism (maintenance of the constancy of the level of nutrients in the blood, arterial pressure, temperature of the internal environment, preservation of the integrity of the organism, etc.).

Be able to:

Use knowledge about:

- methodological approaches (analytical and systemic) for understanding the patterns of activity of a holistic organism;
- the theory of functional systems for understanding the mechanisms of self-regulation of homeostasis and the formation of a useful result in adaptive activity;
- properties and functions of various body systems in the analysis of regularities in the formation of functional systems of the organism of a healthy person;
- mechanisms for the formation of specific and integrative functions, their dependence on environmental factors and the functional state of the organism;
- types and mechanisms of formation of manifestations of higher nervous activity in the analysis

Analyze:

- regularities in the functioning of excitable tissues, the central nervous system and endocrine glands;
- manifestations of blood functions;
- features of the organization of different stages of breathing and their regulation;
- functioning of cardiovascular, respiratory, excretory digestive and thermoregulatory systems while ensuring the purposeful activity of the organism;
- patterns of functioning of human sensory systems;
- features of the higher nervous activity of a person;
- regularities of the activity of various systems of the organism under different functional states;
- dynamics of physiological processes in different types of stress;

Carry out investigations of:

- the body's clotting system, evaluation of blood groups and Rh factor;
- basic physiological properties of excitable tissues;
- reflex activity of the nervous system and vegetative reactivity;
- functions of sensory systems;
- pain sensitivity;
- higher mental functions;
- individual-typological characteristics of a person;
- performance indicators of somatic and visceral systems (respiration, cardiovascular) with different functional states of the body.

Own:

Methods of:

- determination of blood groups and Rh factor;
- evaluation of the results of a general blood test;
- evaluation of blood coagulation time;
- assessing the osmotic stability of red blood cells;
- counting of red blood cells and leukocytes;
- evaluation of the results of a general urinalysis;
- palpation of the pulse;
- blood pressure measurement;
- studies of mental performance by means of proofreading;
- evaluation of the functional state by the method of variation pulsometry;
- determination of physical performance (by the methods of the Harvard step test and PWC170);
- assessing the types of GNI.

4. **Total labor intensity of the discipline:** is 7 credit units (252 hours)

5. **Semesters:** 3 and 4.

6. **The main sections of the discipline:**

Introduction to the subject. Basic concepts of physiology.

Physiology of excitable tissues

Physiology of blood circulation

Blood physiology

Physiology of breathing

Metabolic basis of physiological functions

Physiology of thermoregulation

Physiology of excretion

Physiology of digestion

Physiology of the endocrine system

Physiology of functional states

Authors:

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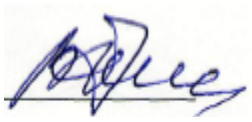
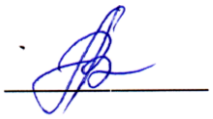
MD, professor  V.B. Brin

Associate Professor, Ph D  V.O. Akhpolova