

**Thematic lesson plan of lectures
in the discipline "Physiology"
for students of the educational program
specialist degree
in the specialty 33.05.01 Pharmacy,
direction (profile) Pharmacy,
form of study full-time
for the 2023-2024 academic year**

№	Topics of lectures	Hours (academic)
1.	Subject and tasks of physiology. Basic concepts of physiology¹. The place of normal physiology in the pharmaceutical education system. Physiology of excitable tissues. General and particular properties of excitable tissues. Irritants, their classification. Modern concepts about the structure and functions of biological membranes. Electrical processes in excitable tissues. Resting potential and action potential. Mechanisms of their origin. Changes in excitability during excitation. The relationship between the phases of excitability and the phases of the action potential. Laws of irritation ²	2
2.	Physiology of synapses¹. Neuron as a structural and functional unit of the central nervous system. Classification of of nerve fibers. Mechanisms of excitation propagation along non-myelinated and myelinated fibers. Characteristics of nerve excitability. Laws of excitation conduction along the nerve fibers. Features of the structure and classification of synapses. The mechanism of excitation transmission in synapses. Functional properties of synapses. Mediator processes in synapses. Electrical phenomena on postsynaptic membranes. Neuromuscular junction ² .	2
3.	Physiology of muscle tissue¹. Classification of skeletal muscle fibers. Types and modes of muscle contraction. The mechanism of muscle contraction. Single and tetanic contraction. The relationship between the phases of excitability and the phases of action potential and muscle contraction. Features of the refractory period. Tetanus and its types. Strength and muscle function. Physiological properties of smooth muscles ²	2
4.	Physiology of the central nervous system¹. General plan of the structure of the nervous system. The role of the central nervous system in the adaptive activity of the body. Reflex. Reflex arc and reflex ring. Classification of reflexes. Nerve	2

	centers and their properties. Inhibition in the central nervous system. Basic principles of coordination of reflex activity ²	
5.	Physiology of the autonomic nervous system ¹ . Structural and functional features of the autonomic nervous system. Sympathetic and parasympathetic divisions. Autonomic ganglia. Cholinergic and adrenergic nerve fibers. General characteristics of the sympathetic and parasympathetic effects on the functions of tissues and organs. Metasympathetic nervous system ²	2
6.	Endocrine system ¹ . The role of endocrine system in humoral regulation. Hormones. Functions of hormones. Chemical nature of hormones. Topography and structure of the endocrine glands. Hypothalamic-pituitary system. Hormones of the adeno- and neurohypophysis. Peripheral endocrine glands and the physiological role of their hormones. Hypofunction and hyperfunction of the endocrine glands. Central and peripheral mechanisms of regulation of endocrine functions ² .	2
7.	Sensory systems ¹ . Teaching of I.P. Pavlov about analyzers. General principles of the structure of sensory systems. Physiology of visual and auditory analyzers. Vestibular apparatus. Gustatory and olfactory analyzers. Tactile and temperature reception. Visceroception. Nociceptive and antinociceptive sensitivity ² .	2
8.	Higher nervous activity ¹ . Teaching of I.P. Pavlov about higher nervous activity. Unconditioned and conditioned reflexes. Classification of conditioned reflexes. Physiological mechanisms formation of conditioned reflexes. Inhibition of the higher nervous system activities. Types of inhibition. Dynamic stereotype. Types of HNA. Features of human higher nervous activity. Sleep. Emotions and motivations. Behavior ²	2
9.	Metabolism and energy ¹ . Energy needs of the body. General concept of metabolism in the body. Plastic and energetic role of nutrients. A general idea of the metabolism of proteins, fats and carbohydrates in the body. Nutrition. Calorie content of food products. Nutrition standards ² .	2
10.	Thermoregulation ¹ . Human body temperature. Iso-, hypo- and hyperthermia. Heat production and heat loss. Chemical and physical thermoregulation. Neural and humoral mechanisms of thermoregulation. Hardening ²	2
11.	Physiology of the heart ¹ . Structure and function of the heart. Physiological properties of the myocardium. Excitability, conductivity, contractility. Conduction system of the heart. The nature of heart automaticity. Gradient of automaticity . Cardiac cycle, its periods and phases. Stroke and cardiac output.	2

	Electrocardiography. Extrasystole ²	
12.	Regulation of cardiac activity¹ . Innervation of the heart. The influence of autonomic nerves on the heart activity. Tone of the regulating the heart activity centers. Neural regulation of cardiac activity. Intracardiac and extracardiac regulatory mechanisms. Humoral regulation of cardiac activity ² .	2
13.	Blood vessels physiology¹ . Arterial, venous and lymphatic systems. Functional classification of blood vessels. Basic laws of hydro- and hemodynamics. Blood pressure. Arterial pulse. Microcirculatory bed. Innervation of blood vessels. Vasomotor center. Neural and humoral regulation of vascular tone. Vasoconstrictor and vasodilator substances. Blood depot ² .	2
14.	Excretion. Kidney physiology¹ . Excretory organs. Structure and functions of the kidneys, ureters and bladder. Nephron. Features of blood supply and innervation of the kidneys. The process of urine formation. Glomerular filtration. Clearance. Tubular reabsorption and secretion. Regulation of kidney activity. Amount and composition of urine. The role of the kidneys in the elimination of drugs ² .	2
15.	Body fluids¹ . Quantity and composition of blood. Plasma and formed elements, their quantity, characteristics and functions. Hemopoiesis. Regulation of hemopoiesis. Leukocyte formula. Phagocytosis. Hemostasis. Blood groups and Rh factor ² .	2
16.	External respiration¹ . Structure and functions of the respiratory tract. Topography, structure and functions of the lungs. Biomechanics of inhalation and exhalation. Pressure in the pleural cavity. Pneumothorax. Vital capacity of the lungs and its components. Effective pulmonary ventilation. Gas exchange in the lungs. Partial pressure and tension of gases in inspired and alveolar air, in the blood of pulmonary capillaries and tissues. Transport of gases by blood. Exchange of gases in tissues ² .	2
17.	Regulation of breathing¹ . Modern concept about the structure and localization of the respiratory center. Automatism of the respiratory center of the medulla oblongata. Dependence of the activity of the respiratory center on the gas composition of the blood. The role of chemoreceptors in the regulation of respiration. The role of mechanoreceptors in the regulation of breathing. The role of carbon dioxide in the regulation of respiration. The mechanism of the first breath of a newborn. Conditioned reflex regulation of breathing ² .	2
18.	Physiology of digestion¹ . General aspects of digestion and the structure of the gastrointestinal tract. Functions of the digestive system. Digestion in the oral cavity and in the stomach.	2

	Digestion in the duodenum and small intestine. Structure and functions of the pancreas and liver. Digestion in the large intestine. Absorption. Thirst, hunger and satiety ² .	
	Total	36

¹ -Subject

² - essential content (if necessary)

Considered at the meeting of the department of Normal physiology "25" May 2023, protocol N 9 a

Head of the Department



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