



SYLLABUS OF THE EDUCATIONAL COMPONENT

PATHOLOGICAL PHYSIOLOGY

The specialty	211 Veterinary medicine	The mandatory discipline	the discipline is mandatory
The educational program	Veterinary medicine	The faculty	Faculty of veterinary medicine
The educational level	not limited	Department	the Department of Animal Physiology and Biochemistry

TEACHER

Iryna Oleksiivna Zhukova



High education - The specialty is the Veterinary medicine
 Scientific degree - Doctor of the Veterinary Sciences: 16.00.04 Veterinary pharmacology and toxicology
 The academic title is Professor of the Department of Animal Physiology and Biochemistry
 Work experience - more than 35 years

Indicators of professional activity on the subject of the course:

- author of more than 20 methodological developments;
- co-author of more than 10 thematic publications;
- participant of scientific and methodical conferences.

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To teach the discipline, the following are represented: Associate Professor, the Candidate of Agriculture Sciences Kostiuik Inna Oleksandrivna, the Senior teacher Kochevenko Olena Serhiyivna

GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

The Goal	formation of theoretical knowledge and practical skills for understanding the basic concepts of general nosology, the role of pathological factors of the external and internal environment and protective and compensatory means in the development of the disease, analysis of typical pathological processes and diseases, their general patterns of development and termination, as well as the role of etiological and pathogenetic prevention and therapy. The main task of the educational discipline "Pathological Physiology" is to instill medical thinking in students.
Format	lectures, practical classes, independent work, individual tasks, team work
Detailing of learning results and forms of their control	<ul style="list-style-type: none"> • - Ability to think abstractly, analyze and synthesize, conduct research at the appropriate level, learn and master modern knowledge, develop strategies for safe, sanitary animal husbandry, know the terminology of pathophysiology, be able to use it correctly in their work (GC1, SC2, SC5, PLO1) / individual tasks, training • - Ability to apply knowledge in practical situations, make informed decisions, communicate with representatives of other professional groups of different levels, formulate conclusions about the effectiveness of selected methods and means of keeping, feeding and treating animals, prevention of contagious and non-contagious diseases, as well as production and technological processes at enterprises for keeping, breeding or exploiting animals (GC2, SC1, SC3, PLO2) / individual tasks • - Ability to use tools, special devices, instruments, laboratory equipment and other technical means to carry out the necessary manipulations during professional activities, to develop quarantine and health measures, methods of therapy, prevention, diagnosis and treatment of diseases of various etiologies, to carry out educational activities among industry workers and the public (GC2, SC1, SC2, PLO3) / individual tasks • - implementation of environmental protection mechanisms, application of knowledge of biosafety, bioethics and animal welfare in professional activities
Scope and forms of control	8 ECTS credits (240 hours): 30 hours of lectures, 108 hours of laboratory and practical classes; current control (4 chapters); final control - exam.
Requirements of the teacher	timely completion of tasks, activity, teamwork
Terms of enrollment	“free enrollment”

COMPLIANCE WITH THE EDUCATION STANDARD AND EDUCATIONAL PROGRAM

Competencies	GC1.Ability to think abstractly, analyze and synthesize GC2. Ability to apply knowledge in practical situations SC1.Ability to determine the features of the structure and functioning of cells, tissues, organs, their systems and apparatus	Program learning outcomes	PLO1. Know and correctly use the terminology of veterinary medicine PLO2. To know and correctly use the terminology of veterinary medicine
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of the body of animals of different classes and species - mammals, birds, insects (bees), fish and other vertebrates
 SC2. Ability to use tools, special devices, instruments, laboratory equipment and other technical means to carry out the necessary manipulations during professional activities
 SC 5. Ability to change methods and techniques of pathological and anatomical diagnosis of animal disease to establish a final diagnosis and cause of their death.

PLO3. Determine the essence of what happens in the body of animals in normal and pathological conditions

STRUCTURE OF THE EDUCATIONAL COMPONENT

Chapter 1: Pathophysiology as a science. Nosology. Pathophysiology of reactivity and immunity. Disorders of peripheral circulation and microcirculation.

Lecture 1.	Pathophysiology as a science. The general doctrine of disease as the highest form of pathology. General nosology.	LPC 1 LPC 2	Experiment as the main method of studying pathophysiology The effect of pathogenic environmental factors	Independent work	The main historical stages of pathophysiology development. Pathogenetic effect on the body of physical factors: ultraviolet, X-ray and ionizing rays, laser, atmospheric pressure. Etiotropic principle of prevention and therapy. Pathogenetic principle of therapy.
Lecture 2.	Pathophysiology of the cell	LPC 3	Pathophysiology of the cell. Changes in the physical and chemical properties of tissues during injury. Apoptosis		Basic mechanisms of cell damage. Hereditary diseases of animals caused by gene mutations. Changes in the body during aging.
Lecture 3.	Reactivity of the body and its importance in pathology Disorders of immunological reactivity of the body. Immunodeficiencies. Pathological immunological tolerance. Allergies.	LPC 4 LPC 5 LPC 6	Nonspecific factors of the body's defense. Barrier devices. Allergies. Anaphylactic shock and the Arthus phenomenon. Phagocytosis. The infectious process.		Reactivity and resistance. The importance of the nervous, endocrine and immune systems in the formation of the body's reactivity. The infectious process. Antibodies, their importance, structure and classification. Immunity. Types of immunity. Mechanisms of immune response formation. Immunological tolerance.

				Immunological memory. Delayed allergic reactions. Autoallergy. Paraallergy. Idiosyncrasy.
Lecture 4	Pathophysiology of peripheral circulation and microcirculation. Etiology and pathogenesis of the main pathologies of the peripheral circulation (arterial, mixed and venous hyperemia, ischemia, stasis, thrombosis, embolism). Typical disorders of microcirculation.	LPC 7	Disorders of peripheral circulation and microcirculation. Hyperemia, ischemia, heart attack	Intravascular disorders. Etiology and pathogenesis of sludge phenomenon. Disorders of metabolic vessel permeability. Extravascular disorders. Mechanisms of bleeding control. Causes of blood coagulation disorders. Rheological properties of blood and their role in microcirculatory disorders. DIC syndrome (disseminated intravascular coagulation syndrome). DIC syndrome in animals. Thrombophlebitis, varicose veins. Etiology and pathogenesis.
		LPC 8	Disorders of peripheral circulation and microcirculation, Embolism, stasis, thrombosis.	
		LPC 9	Test quizzes and case studies.	

Chapter 2: Typical pathological processes. Inflammation. Pathophysiology of thermal regulation. Pathology of fever. Pathology of tissue growth. Tumor growth. Pathology of metabolism and energy.

Lecture 5.	Inflammation Etiology and pathogenesis of inflammation. The main phases of the inflammatory process: alteration, exudation, proliferation. Types of inflammation. Mediators of inflammation. Vascular changes in acute inflammation Types of exudate and the corresponding classification of inflammation. Features of inflammation in different species of animals	LPC 10	Experimental modeling of inflammation. Vascular changes in the inflammatory process	Independent work	Describe the main theories that explain the genesis and significance of inflammation for the body. The role of I. I. Mechnikov in the doctrine of inflammation. Factors of chemotaxis. Neuroendocrine and immune mechanisms of regulation of the inflammatory process. What are the features of inflammation in animals of different species? Mechanisms of proliferation. Proliferative type of inflammation.
		LPC 11	Types of exudate. Properties of purulent exudate		
		LPC 12	Proliferative inflammation		

Lecture 6.	Fever Definition of fever; general characteristics. Etiology and pathogenesis. Mediators of the febrile process. The role of interleukins as pyrogenic factors. Types of febrile reactions. Completion of fever. Lysis and crisis.	LPC 13	Features of the basic metabolism in laboratory animals in case of fever Pyrogenic substances as the main criterion for the occurrence of a febrile reaction LPC 14 Study of the peculiarities of neurohumoral regulation in the development of the febrile process.		Dependence of the nature of the febrile reaction on the state of the nervous system.
Lecture 7.	Tissue growth pathology. Tumors	LPC 15 LPC 16 LPC 17 LPC 18 LPC 19 LPC 20 LPC 21 LPC 22	Causes and classification of hypo- and hyperbiotic processes. Study the mechanisms of regeneration and the causes of their disruption. Tumors. Microscopic examination of tumor smears. Classification of tumors by tissue type. Pathogenesis of the tumor process. The effect of tumors on the body. Tumors of epithelial, nervous, melanin-forming tissue Multimedia demonstration of tumor development Disorders of the main metabolism, Disorders of water and electrolyte metabolism. Edema Disorders of protein, carbohydrate and lipid metabolism. Test quizzes and case studies.		What changes occur in the body during aging? Fasting, its types. Complete starvation (causes, pathogenesis and main manifestations, metabolism, organs and systems during starvation). Incomplete starvation (causes, pathogenesis and main manifestations). Partial fasting (carbohydrate, protein, fat, vitamin, etc.). Therapeutic fasting, diet therapy.

Chapter 3: Pathophysiology of organs and systems (blood, circulation, respiration)

Lecture 8.	Pathological physiology of the blood system General characteristics of blood system disorders. Changes in total blood volume. Changes in the quantitative and qualitative composition of red blood cells.	LPC 23 LPC 24	Pathophysiology of the blood system. Determination of quantitative blood parameters (red blood cells and hemoglobin) using a spectrophotometer. Determination and analysis of hematocrit.	Independent work	Etiology and pathogenesis of blood loss. Compensatory (urgent and long-term) mechanisms in case of blood loss. Blood transfusion. Hematransfusion shock. Disorders of hemostasis. Hemophilia and features of its manifestation in animals.
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	<p>Anemia. Principles of anemia classification. Etiology and pathogenesis. Blood picture in case of anemia.</p> <p>Disorders of function and compensatory phenomena in anemia.</p>		<p>Red blood counts in various pathologies. Study of quantitative and qualitative changes in red blood cells in anemia. Microscopic examination of animal blood smears in various pathologies.</p>	<p>Disorders of blood coagulation in leukemia (hemorrhagic syndrome). Pathology of platelets. Etiology and pathogenesis of thrombocytopathies. Changes in the physicochemical properties of blood.</p>
Lecture 9.	<p>Pathological physiology of the blood system.</p> <p>Changes in the quantitative and qualitative composition of leukocytes. Leukocytosis and leukopenia, their types. Blood picture in case of leukocytosis and leukopenia. Leukemias, their definition and classification, etiology and pathogenesis. Blood picture in case of leukemia. Disorders of blood cell functions and changes in reactivity in leukemia.</p>	<p>LPC 25</p> <p>LPC 26</p> <p>LPC 27</p>	<p>Changes in white blood counts in various diseases. Study of changes in the quantitative and qualitative composition of leukocytes. Determination of the leukoformula.</p> <p>Analyze blood leukograms of different species of animals in case of different forms of leukocytosis and leukopenia.</p> <p>Study the blood picture in different forms of leukemia. Changes in white blood count in leukemia</p>	<p>Impaired function and reactivity in leukemia.</p>
Lecture 10.	<p>Pathological physiology of the circulatory system</p> <p>General characteristics of circulatory system disorders.</p> <p>Cardiac and vascular circulatory failure, etiology and pathogenesis.</p> <p>Physiological and pathological myocardial hypertrophy.</p> <p>Tonogenic and myogenic dilatation. Causes and manifestations of arrhythmia.</p> <p>Types of arrhythmias.</p>	<p>LPC 28</p> <p>LPC 29</p> <p>LPC 30</p> <p>LPC 31</p>	<p>Pathophysiology of the circulatory system. Heart failure</p> <p>Pathophysiology of the circulatory system. Arrhythmias of the heart</p> <p>General characteristics of circulatory system disorders. Vascular circulatory failure. Study of the causes and mechanisms of hypotension and hypertension.</p> <p>Etiology and pathogenesis and clinical manifestations of coronary heart disease in animals. Compensation for coronary heart disease</p>	<p>Myocardial fatigue due to its overloading with excessive volume and additional resistance to blood flow. Neurogenic heart damage. Coronary and non-coronary myocardial damage.</p> <p>Circulatory failure in case of impaired blood flow to the heart. Violation of the physicochemical properties of blood vessels. Hypotension. Atherosclerosis. Determination of total cholesterol in the serum of animals. Study of the causes and mechanisms of hypotension and hypertension. Pathology of the pericardium.</p>

Lecture 11	Pathological physiology of the respiratory system Acute and chronic insufficiency of external respiration. Disorders of respiratory regulation. Shortness of breath. Respiratory disorders caused by lung damage. Disorders of the pleura, respiratory muscles, internal respiration: impaired oxygen transport and cellular respiration. Respiratory failure.	LPC 32 LPC 33	Pathophysiology of the respiratory system. Disorders of external respiration. Types of shortness of breath. Respiratory failure Atelectasis, emphysema and pneumothorax Content chapter 3 (writing control test tasks)	Respiratory dysfunction caused by pathological changes in the structure and damage to the chest and respiratory muscles. Respiratory disorders due to perfusion disorders. Disorders of non-respiratory functions of the lungs. The effect of hypoxia on the function of the nervous, cardiovascular, respiratory and excretory systems.
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Chapter 4. Pathophysiology of organs and systems (digestion, liver, kidneys, nervous and endocrine systems)

Lecture 12	Pathological physiology of the digestive system. The main manifestations of digestive pathology. Violation of appetite, thirst. Digestive disorders in the oral cavity, one-chamber stomach and rennet. Gastric ulcer disease. Digestive disorders are associated with impaired secretion of bile and pancreatic juice. Pancreatitis. Intestinal dysfunction.	LPC 34 LPC 35 LPC 36 LPC 37 LPC 38	Pathophysiology of the digestive system. Disorders of gastric digestion Digestive disorders in ruminants Disorders of pancreatic secretion, bile secretion and intestinal juice secretion Disorders of bile secretion and intestinal juice secretion Test quizzes and case studies.	Digestive disorders in the oral cavity. The main pathological processes in the oral cavity Gastric ulcer and duodenal ulcer (etiology and pathogenesis). Hormones of the digestive system, disorders of their regulatory functions (make a table). Digestive disorders in the fore stomach of ruminants. Disorders of fermentation of the contents in the fore stomach: causes and consequences. Changes in the motor function of the fore stomach. Overflow of the rumen. Tip. Impaired function of the fore stomach in case of traumatic reticulitis. Pancreatic dysfunction. Causes and types of pancreatitis.
Lecture 13	Pathological physiology of the liver Etiology and pathogenesis of liver diseases. Disorders of metabolic, protective, bile-forming functions of the liver.	LPC 39 LPC 40	Study of functional parameters of the liver in its diseases Pathogenesis of different types of jaundice in animals	Disorders of the liver barrier function. Effect of bile components on the body in case of mechanical jaundice. Gallstone disease.

	Classification, etiology and pathogenesis of jaundice. Cholemic and acholic syndromes, dyscholism.	<p>LPC 41 Inflammatory and dystrophic processes in the liver (hepatitis, hepatosis, cirrhosis)</p> <p>LPC 42 Cholelithiasis, etiology and pathogenesis.</p> <p>LPC 43 Test and control work, solving situational tasks.</p>	
Lecture 14	<p>Pathological physiology of the kidneys</p> <p>General characteristics of renal dysfunction.</p> <p>Disorders of the function of nephron and tubular glomeruli, filtration, reabsorption, secretion and excretion. The concept of renal dysfunction. Acute and chronic renal failure. General characteristics of the main syndromes and diseases of the kidneys.</p>	<p>LPC 44 Pathophysiology of the urinary system and kidneys. Impaired renal function in nephritis and nephrosis.</p> <p>LPC 45 Renal insufficiency. Uremia.</p> <p>LPC 46 Urolithiasis. Cylindruria. Types of cylinders.</p> <p>LPC 47 Cylindruria. Types of cylinders. Microscopy of urine sediment.</p> <p>LPC 48 Test control work, solving situational problems.</p>	<p>Disorders of neurohumoral regulation of urine formation and urination. Extrarenal and renal factors of kidney damage. Pathogenesis of renal edema. Causes and mechanisms of urolithiasis in animals. Consequences of non-diuretic renal dysfunction (arterial hypertension, anemia, blood coagulation disorders). Mechanism of renal hypertension. Quantitative and qualitative indicators of diuresis disorders.</p>
Lecture 15	<p>Pathophysiology of the nervous and endocrine systems.</p> <p>Common causes of nervous system disorders.</p> <p>Disorders of nerve cells, conductors, inhibitory, adrenergic and cholinergic synapses. Pathological parabiosis and dominance. Disorders of motor and sensory function of the nervous system. Disorders of higher nervous activity. Neuroses in animals.</p>	<p>LPC 49 Pathophysiology of the urinary system and kidneys. Impaired renal function in nephritis and nephrosis.</p> <p>LPC 50 Renal insufficiency. Uremia.</p> <p>LPC 51 Urolithiasis. Cylindruria. Types of cylinders.</p> <p>LPC 52 Cylindruria. Types of cylinders.</p> <p>LPC 53 Microscopy of urine sediment</p> <p>LPC 54 Test control work, solving situational problems.</p>	<p>Nerve trophism and dystrophic process. Biochemical, structural and functional changes in denervated tissues. Nervous disorders in poisoning with neurotropic substances of various origins. Pathological pain, its importance for the body. Antinociceptive system, its importance in the pathogenesis of diseases.</p> <p>Endocrine disorders in animals. Disorders of the hypothalamus, pituitary gland, pineal gland. Disorders of the thyroid gland and parathyroid gland. Disorders of the adrenal glands. Disorders of the gonads.</p>

BASIC LITERATURE AND METHODOLOGICAL MATERIALS

Literature

1. Zhukova I.O. Lecture notes on pathological physiology for students of higher educational institutions in the specialty 211 "Veterinary Medicine": SBTU, 2022. 420 c.
2. Zhukova IO, Denisova OM, Bobrytska OM, Kostiuk IO, Kochevenko OS, Vodopianova LA, Yugai KD Pathological physiology: explanatory dictionary. Kharkiv: Publishing house "City Printing House", 2023. 239 c.
3. Berezniakova AI, Kuznetsova VM, Filimonova NI, Berezniakova ME, Tyshchenko IY Pathological physiology: Textbook for students of higher pharmaceutical schools and pharmaceutical faculties of higher medical schools. Kh.: NUPh Publishing House: Golden pages, 2003. 424 c.
4. Zayko M.N., Byts Y.V., Kryshtal M.V. et al. Pathophysiology: textbook (universities of III-IV years of study); edited by M.N. Zayko, Y.V. Byts, M.V. Kryshtal. 6th edition, revised and supplemented. Kyiv: "Medicine", 2017. 736 c.
5. Ataman O.V. Pathophysiology: in 2 vols. T1. General pathology: a textbook for students. 3rd edition. Vinnytsia: "New book", 2006. 584c. Атаман О.В. Патолофізіологія: в 2 т. Т2. Патолофізіологія органів і систем : підручник для студ. ВНЗ 3-тє видання. Вінниця: «Нова книга», 2019. 448 с.
6. Ataman O.V. Pathophysiology: in 2 vols. T2. Pathophysiology of organs and systems: a textbook for students. 3rd edition. Vinnytsia: "Nova Knyha, 2019. 448 c.
7. Kryshtal MV, Gozhenko AI, Sirman VM Pathophysiology of the kidneys: a textbook. Odesa: Phoenix, 2020. 144 c.
8. Kostenko VO, Akimov OE, Yelinska AM, Kovaleva IO Pathophysiology of the blood system: Study guide. Lviv, 2022. 164 c.
9. Rykalo N.A. Typical pathological processes. Study guide. Vinnytsia, 2015. 150 c.
10. Oncology / G.V. Bondar, A.I. Shevchenko, I.I. Galaychuk, Y.V. Dumansky et al: K. "Medicine", 2019, 520 p.
11. Shevchenko AI, Kolesnik OP, Shevchenko NF, et al. Oncology: textbook; edited by A. I. Shevchenko. Vinnytsia: Nova Knyha, 2020. 488 c.
12. Regeda MS, Trutyak IR, Gaiduchok IG, et al. Emergency conditions; edited by Regeda M.S., MD, Lviv, 2001. 847.

Methodological support

1. Zhukova IO, Kostiuk IO, Kochevenko OS, Bobrytska OM, Vodopianova LA, Antipin SL, Yugai KD Pathological physiology. Workbook for laboratory and practical classes /., - Kharkiv: DBTU, 2023. - 112 p.
2. Mazurkevych A.Y. Danilov V.B., Kuts N.V. Pathophysiology of animals. Workshop. K.: Meta, 2003. 176 p., ill.
3. Manual for practical classes in pathological physiology / Edited by Y.V. Byts, L.Ya.
4. Multimedia demonstration.

EVALUATION SYSTEM

	SYSTEM	POINTS	ACTIVITY TO BE EVALUATED
Final assessment	100 point ECTS (standard)	up to 50	50% of the average grade for the chapters
		up to 50	final testing
Rating of section	100 points total	up to 50	answers to test questions
		to 20	oral answers in laboratory-practical classes
		to 30	the result of mastering the block of independent work

NORMS OF ACADEMIC ETHICS AND CHARITY

All participants in the educational process (including those seeking education) must adhere to the code of academic integrity and the requirements set forth in the provision "On academic integrity of participants in the educational process of DBTU": show discipline, education, respect each other's dignity, show kindness, honesty, responsibility.