

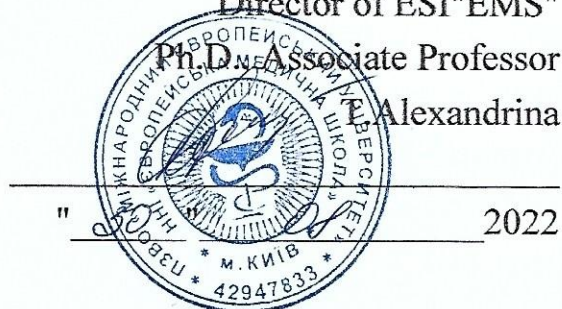
**INTERNATIONAL EUROPEAN UNIVERSITY  
EDUCATIONAL AND SCIENTIFIC INSTITUTE  
"EUROPEAN MEDICAL SCHOOL"**

APPROVED

Director of ESI"EMS"

Ph.D. Associate Professor

Alexandrina




**COURSE TRAINING PROGRAM  
on  
PATHOMORPHOLOGY**

<b>Degree level</b>	Master
<b>Field of study</b>	22 "Health care"
<b>Specialty</b>	222 "Medicine"

**Kyiv - 2022**

DEVELOPED AND SUBMITTED: Educational and Scientific Institute "European Medical School", Department of Fundamental and Medical and Preventive Disciplines.

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Discussed and approved by the Department of Fundamental and Medical Preventive Disciplines №.1 from " 25 " 08 2022  
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Approved at the meeting of the Scientific Council of the ESI"EMS"  
№ 1 of " 29 " 08 of 2022

## INTRODUCTION

**The study program of the academic discipline "Pathomorphology"** is compiled in accordance with the Standard of Higher Education of Ukraine of *the second (master's) level* fields of knowledge *22 "Health care"* specialty *222 "Medicine"* educational qualifications **"Master of Medicine"**

### 1. Description of the academic discipline (abstract)

**Pathomorphology** is an educational discipline that provides concepts about the structural basis of human diseases for in-depth learning of the fundamental foundations of medicine and the clinical picture of diseases with further use of the acquired knowledge in the practical work of a doctor.

Pathomorphology as an educational discipline is based on students' mastery of human anatomy and physiology, histology, cytology, embryology and genetics, microbiology, virology and immunology, biological chemistry, medical biology and medical physics. Learning pathomorphology is integrated with the study of pathological physiology and clinical disciplines.

The study of the structural foundations of human diseases consists of two sections: **general** and **clinical pathomorphology (special pathological anatomy)** and **thanatology**.

**General pathomorphology** lays down an understanding of the structural foundations of cellular and organ pathology — typical general pathological processes, the totality of which determines the morpho-functional manifestations of certain diseases.

**Special (clinical) pathomorphology** provides knowledge of the structural foundations of the development of human diseases and their clinical manifestations, recovery, complications and consequences; knowledge of changes in diseases that develop in connection with changes in the living conditions of a person and the environment ( pathomorphosis ); knowledge of diseases that arise as a result of various medical measures - preventive, diagnostic, therapeutic, cosmetological, anesthesiological, intensive care (pathology of therapy, intensive care pathology, iatrogenic).

**Thanatology** lays down knowledge about the causes, mechanisms and types of death of patients, on which modern anticipatory intensive therapy is based.

The basis of pathomorphology is pathological anatomy. Pathological anatomy (from the Greek *pathos* — suffering) — the science of the structural foundations of diseases and pathological processes, which sheds light on structural changes in organelles, cells, the intercellular matrix, tissues and organs of a sick person, as well as the causes and mechanisms of death of patients. Pathological anatomy is a clinical science and at the same time a branch of practical medicine, it plays a central role in intravital and postmortem diagnosis of human diseases. Diagnosis ( Greek *diagnōsis* ) in medicine is the recognition, definition of a disease. Pathologists (pathologists), who work in medical institutions and specialized pathology bureaus, recognize diseases during the lives of patients, as well as after their death.

**The subject of study of the academic discipline** is the structural basis of human diseases for in-depth learning of the fundamental foundations of medicine and the clinical picture of diseases with further use of the acquired knowledge in the practical work of a doctor.

**Interdisciplinary connections:** based on students' study of medical biology, anatomy, histology and embryology, integrated with these disciplines; lays the foundations for students to study physiology, biochemistry, pathological physiology, propaedeutics of clinical disciplines, which involves the integration of teaching with these disciplines and the formation of skills to apply knowledge of pathomorphology in the process of further education and professional activity.

The structure of the academic discipline	Number of credits, hours, of them			Year, semester of study	type of control	
	In total	Auditory				SRS
		Lectures	Practical classes			
Subjects: " pathomorphology " <i>Chapters 2</i>	6 credits/ 180 hours	24	88	68	3 (V, VI semesters)	Exam
<b>By semesters</b>						
<i>Chapter 1 General pathomorphology</i>	3.0 credits / 90 hours	8	40	42	V semester	(Test)
<i>Chapter 2 Special pathomorphology</i>	3.0 credits / 90 hours	16	48	26	VI semester	(Exam)

## 2. The purpose and tasks of the educational discipline

**a. The purpose of teaching the educational discipline "Pathomorphology"** is the study of etiology, pathogenesis, microscopic and ultramicroscopic changes of organs and tissues of the human body in various conditions of life, which involves:

- i. the study of typical general pathological processes, the totality of which determines the morphological manifestations of diseases,
- ii. study of the structural basis of the development of diseases and their clinical manifestations, the structural basis of recovery, complications and consequences,
- iii. study of pathomorphological research methods: autopsy , biopsy, study of biopsy material, experimental modeling of diseases.

**b. The main tasks of studying the discipline " Pathomorphology " are the following :**

- i. understanding the basics of cell pathology and general pathological processes, the totality of which determines the morphological manifestations of certain diseases;
- ii. knowledge of the morphology of diseases at different stages of their development (morphogenesis), structural foundations of recovery, complications and consequences of diseases;
- iii. study of options for the pathomorphosis of diseases that arise in connection with the conditions of human life, change as a result of various medical measures (pathology of therapy);
- iv. comparison of morphological and clinical manifestations of diseases at all stages of their development, pathological conditions and diseases of the oral cavity;
- v. acquiring the skills of clinical and anatomical analysis, synthetic generalization of diagnostic signs of diseases and their correct interpretation in cause-and-effect relationships.

**c. Competences and learning outcomes** , the formation of which contributes to the discipline

**"Pathomorphology"**

According to the requirements of the Higher Education Standard, the discipline ensures that students acquire the following *competencies* :

<b>General competences (CG)</b>	
ZK-1	Ability to abstract thinking, analysis and synthesis
ZK-2	Ability to learn and master modern knowledge.
ZK-3	Ability to apply knowledge in practical situations.
ZK-4	Knowledge and understanding of the subject area and understanding of professional activity.
ZK-5	Ability to adapt and act in a new situation.
ZK-6	Ability to make informed decisions.

ZK-7	Ability to work in a team.
ZK-8	Ability to interpersonal interaction.
ZK-10	Ability to use information and communication technologies.
ZK-11	Ability to search, process and analyze information from various sources.
ZK-12	Determination and persistence in relation to assigned tasks and assumed responsibilities.
<b>Professional competences (FC)</b>	
FC-1	Ability to collect medical information about the patient and analyze clinical data.
FC-2	Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results.
FC-3	Ability to establish a preliminary and clinical diagnosis of the disease.
FC-6	Ability to determine the principles and nature of treatment and prevention of diseases.
FC-7	Ability to diagnose emergency conditions.
FC 11.	Ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
FC 21	It is clear and unambiguous to convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists, in particular to people who are studying.
FC 24.	Adherence to ethical principles when working with patients and laboratory animals.
FC 25.	Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results.
<b>Program Learning Outcomes (PLP)</b>	
PRN 1.	Have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.
PRN 3.	Specialized conceptual knowledge, which includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems.
PRN 4.	Identify and identify leading clinical symptoms and syndromes (according to list 1); according to standard methods, using preliminary data of the patient's history, data of the patient's examination, knowledge about the person, his organs and systems, establish a preliminary clinical diagnosis of the disease (according to list 2).
PRN 21.	Search for the necessary information in the professional literature and databases of other sources, analyze, evaluate and apply this information.
PRN 23.	Assess the impact of the environment on human health in order to assess the morbidity of the population.
PRN 25.	It is clear and unambiguous to convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists.

### 3. Information volume of the academic discipline

180 hours - 6.0 ECTS credits are allocated to the study of the educational discipline "Pathomorphology". The program is structured in two semesters:

V semester – Section of discipline 1 "General pathomorphology "

VI semester - Section of discipline 2 "Special pathomorphology "

### 4. Structure of the educational discipline "Pathomorphology"

#### a. Section of the discipline "General pathomorphology "

Topic	Lectures	Practical training	SRS
<b>Discipline section 1. General pathomorphology</b>			
<b>Topic 1.</b> Subject and tasks of pathomorphology . Pathomorphological research methods : autopsy and biopsy. General information about pathogenic factors (endogenous and exogenous) and types of cellular reactions to them (adaptation, damage, accumulation, aging). Stages of development of pathomorphology .	1	2.5	2
<b>Topic 2 .</b> The concept of damage. Morphology of reversible and irreversible damage to cells and tissues. Necrosis and apoptosis . Selective cell death induced by the immune system and cell destruction by activated complement. The basics of thanatology. Death, definition, signs of death.	1	2.5	2
<b>Topic 3 .</b> Chronic damage. The concept of dystrophy. Parenchymatous dystrophies (intracellular accumulation of proteins, fats and carbohydrates). Thesaurus .	1	2.5	2
<b>Topic 4 .</b> Disorganization of connective tissue. Vascular- stromal dystrophies (extracellular accumulations). Amyloidosis.	1	2.5	2
<b>Topic 5 .</b> Accumulation of endogenous and exogenous pigments ( hemoglobinogenic , tyrosinogenic , lipidogenic ). Pathomorphological manifestations of disruption of nucleoprotein metabolism and mineral metabolism (iron, copper). Calcification ( calcification ): metastatic, dystrophic. Formation of stones.	-	2.5	3
<b>Topic 6 .</b> Violation of ion-osmotic, water balance and acid-base state. Violation of lymph formation and circulation. Swelling, exicosis . Disorders of blood supply: hyperemia, ischemia, bleeding, hemorrhages. Heart failure: causes, types, morphological equivalents.		2.5	2
<b>Topic 7 .</b> Violations of hemostasis: thrombosis, DVZ-syndrome. Embolism: types, morphological characteristics. Infarct. Shock: causes, pathogenesis, pathological manifestations.		2.5	2
<b>Topic 8 .</b> Causes, pathogenesis, macro and microscopic manifestations, complications and consequences of alterations and disorders of blood circulation. Pathological autopsy.		2.5	-
<b>Topic 9.</b> Protective mechanisms and their morphological equivalents. Concept of non-specific and specific protection mechanisms. Basics of the immune response. Features of the immune response in children. Age-related involution and accidental transformation of the thymus . The general doctrine of inflammation. Acute and chronic inflammation. Exudative inflammation. Morphology of exudative inflammation.	1	2.5	3

<b>Topic 10</b> . Productive inflammation . Granulomatosis . Specific proliferative inflammation.	1	2.5	2
<b>Topic 11</b> . Pathomorphology of the immune system. Hypersensitivity reactions and mechanisms . Autoimmune diseases. Immunodeficiency states. Transplant rejection reactions.		2.5	2
<b>Topic 12</b> . Adaptation and compensation processes. Structural basis of physiological adaptation of organs and cells. Types and morphological manifestations of adaptation processes (hyperplasia, hypertrophy, hypoplasia, aplasia, atrophy, metaplasia ). Regeneration and reparation. Sclerosis. Pathomorphology of organ failure.		2.5	2
<b>Topic 13</b> . General doctrine about tumors. Nomenclature and morphological features of epithelial tumors	2	2.5	2
<b>Topic 14</b> . Nomenclature and morphological features of tumors mesenchymal and neuroecto-dermal origin		2.5	2
<b>Topic 15</b> . Hematopoietic tumors.		2.5	2
<b>Topic 16</b> . Macro- and microscopic signs, complications and consequences of inflammation, immunopathological and compensatory -adaptive processes and tumors. Pathological autopsy	-	2.5	2
<b>Final control</b>	<b>Test</b>		
<b>Total hours - 90</b> / <b>Credits – 3.0</b>	<b>8</b>	<b>40</b>	<b>42</b>

**b. Chapter 2 "Special pathomorphology "**

<b>Topic</b>	<b>Lectures</b>	<b>Practical lessons</b>	<b>SRS</b>
<b>Chapter 2. Special pathomorphology</b>			
<b>Topic 17</b> . Introduction to nosology. The concept of "disease", manifestations and complications of diseases . Principles of classification of diseases. The concept of "diagnosis", the structure of the diagnosis. The concept of " pathomorphosis " of the disease. Types of pathomorphosis .	-	3	2
<b>Topic 18</b> . Anemia. Hemorrhagic syndromes : vasopathies , thrombocytopenia , thrombocytopathies , coagulopathy .	-	3	1
<b>Topic 19</b> . Diseases of the cardiovascular system. Atherosclerosis and arteriosclerosis ( media calcinosis Menkeberg , arteriolosclerosis ). Aneurysms of the aorta (atherosclerotic, exfoliating ). Essential and symptomatic arterial hypertension. Coronary heart disease. Cerebrovascular diseases. Cardiomyopathies.	2	3	1
<b>Topic 20</b> . Rheumatism. Systemic connective tissue diseases with autoimmunization : systemic lupus erythematosus, rheumatoid arthritis, systemic scleroderma, dermatomyositis , Bechterev 's disease , Sjogren 's syndrome . Systemic vasculitis : nodular periarteritis , Takayasu arteritis , temporal ( giant cell ) arteritis, obliterative thromboangiitis , Kawasaki disease, Schoenlein-Henoch purpura , Raynaud 's disease and syndrome . ANCA-associated vasculitis : microscopic polyangiitis , granulomatosis with polyangiitis (Wegener's), eosinophilic granulomatosis with polyangiitis ( Chorz-Strauss syndrome ). Damage to the endocardium: infectious endocarditis, Lefleur 's eosinophilic endocarditis . Damage to the -Fidler idiopathic myocarditis .	-	3	1

<b>Topic 21.</b> Acute inflammatory diseases of respiratory organs: upper respiratory tract (rhinitis, sinusitis, laryngitis, epiglottitis, laryngotracheobronchitis), bronchiolitis, pneumonia. Chronic obstructive diseases of the respiratory organs: chronic obstructive bronchitis, chronic obstructive emphysema, bronchiectasis and bronchiectatic disease, bronchial asthma). Chronic restrictive lung diseases (fibrotic, granulomatous; allergic and smoking-related). Pulmonary hypertension, pulmonary heart. Tumors of the upper respiratory tract, lung cancer.	2	3	1
<b>Topic 22.</b> Diseases of the oropharynx, salivary glands, esophagus, stomach. Acute and chronic gastritis (autoimmune, Helicobacter pylori-associated), Menetriere's disease. Peptic ulcer, peptic ulcer. Enteritis, colitis, idiopathic non-specific intestinal diseases (non-specific ulcerative colitis, Crohn's disease). Diverticula. Hirschsprung's disease. Appendicitis. Malabsorption syndrome. Tumors of the oropharynx, esophagus, stomach, small and large intestine.	1	3	1
<b>Topic 23.</b> Diseases of the liver, biliary system and pancreas. Hepatosis, hepatitis, cirrhosis, tumors. Hepatocellular failure. Portal hypertension. Gallstone disease, acute and chronic cholecystitis, tumors. Acute and chronic pancreatitis, tumors.	1	3	1
<b>Topic 24.</b> Etiology, pathogenesis, macro and microscopic changes, complications and consequences of diseases of the cardiovascular, respiratory system, and gastrointestinal tract. Pathological autopsy.	-	3	2
<b>Topic 25.</b> Kidney diseases: glomerulopathy, acute tubulonecrosis, tubulointerstitial nephritis, pyelonephritis, urolithiasis, chronic kidney failure. Hydronephrosis. Cystic diseases of the kidneys: Defects in the development of the urinary system. Tumors of the kidneys and urinary bladder	2	3	1
<b>Topic 26.</b> Diseases of the female and male reproductive system. Breast disease. Sexually transmitted infections (syphilis, gonorrhea, papilloma virus infection, chlamydia, ureaplasmosis, trichomoniasis). Pathology of pregnancy and the postpartum period. Spontaneous and medical abortions. Ectopic pregnancy. NPG-gestosis. Trophoblastic disease. Pathology of litter.	-	3	1
<b>Topic 27.</b> Prenatal pathology (gametopathy, blasto-, embryo-, fetopathy) and perinatal pathology (asphyxia of the fetus and newborn, birth trauma, intracranial hemorrhages, infectious diseases of the TORCH complex. Congenital syphilis). Congenital malformations: morphological characteristics.	-	2	1
<b>Topic 28.</b> Diseases of the organs of the endocrine system: Hypothalamic-pituitary disorders. Adrenal gland pathology. Pathology of the thyroid gland. Pathology of the endocrine apparatus of the pancreas. MEN syndrome.	2	2	1
<b>Topic 29.</b> Diseases of the central nervous system: Neurodegenerative (neurodystrophic) (Alzheimer's disease) and demyelinating diseases (multiple sclerosis), amyotrophic lateral sclerosis. Neuritis (neuropathy). Infectious diseases: encephalitis, meningitis. Slow viral neuroinfections and prion diseases (kuru, Creutzfeldt-Jakob disease). Tumors of the central nervous system (astroglial, oligodendroglial, ependymal, neuronal, meningeal), cranial and paraspinal nerves.	1	2	1



Postresuscitation encephalopathy and brain death syndrome.			
<b>Topic 30.</b> Diseases of muscles, bones, joints: Paget 's disease ; fibrous dysplasia ; osteomyelitis; Duchenne muscular dystrophy ; myotonia ; congenital and toxic myopathies; damage to the neuromuscular junction - myasthenia ( myasthenia gravis ).	1	2	1
<b>Topic 31.</b> Infectious and parasitic diseases. Characteristics of the infectious process. General characteristics of the infectious process: entrance gate of infection, primary infectious complex, spread and dissemination, ways of transmission of pathogens of infectious diseases; classification of infectious and parasitic diseases. Morphological variants of local and general reactions depending on the etiology of the infection (bacterial, viral, parasitic, fungal, etc.): involving neutrophils (purulent inflammation); involving lymphocytes and macrophages ( mononuclear infiltration and granulomatous inflammation); under the action of viruses ( cytopathic ); with a preference for a necrotic local reaction.	2	2	1
<b>Topic 32.</b> Infectious diseases with an enteric infection mechanism of various etiologies (bacterial - typhoid fever, dysentery, cholera, salmonellosis, staphylococcal infection, coli infection, campylobacter , yersiniosis and viral enteritis). Helminthiasis (trichinellosis, echinococcosis, cysticercosis, opisthorchosis , schistosomiasis )	-	2	1
<b>Topic 33.</b> Bacterial infections: diphtheria, scarlet fever, meningococcal infection, whooping cough. Anthroozoonous infections: plague, tularemia, brucellosis, anthrax.	-	2	2
<b>Topic 34.</b> Viral infections. Acute respiratory viral infections. Children's viral infections: measles, rubella, infectious mononucleosis, chickenpox, epidemic parotitis, poliomyelitis. Rabies, natural smallpox.	-	2	2
<b>Topic 35.</b> Infections with multi -organ lesions. Sepsis as a special form of infection. HIV infection. Tuberculosis.	2	2	2
<b>Exam</b>			
<b>Total for section 2 - 90 hours / Credits - 3.0</b>	<b>16</b>	<b>48</b>	<b>24</b>
<b>Total hours in the discipline – 180/6.0 ECTS credits</b>			
	<b>24</b>	<b>88</b>	<b>68</b>
<b>Final control of discipline</b>	<b>Exam</b>		

### 5. Thematic plan of lectures on the discipline "Pathomorphology"

No. z.p.	TOPIC	Number of hours
<b>SECTION I. General pathomorphology</b>		
1.	The subject and tasks of pathomorphology . Pathomorphological research methods . General information about pathogenic factors and types of cellular reactions to them. Morphology of reversible and irreversible acute damage. Necrosis, apoptosis .	2
2.	Chronic damage. The concept of "dystrophy". Intracellular and extracellular accumulations. Disorganization of connective tissue. Blood circulation disorders.	2
3.	Defense mechanisms and their morphological equivalents. Non-specific and specific protection. The general doctrine of inflammation. Morphology of exudative and productive	2

	inflammation. Acute and chronic inflammation.	
4.	General doctrine about tumors. Morphological features of epithelial tumors. Nomenclature and morphological features of tumors of mesenchymal and neuroectodermal origin. Hematopoietic tumors	2
	<b>Total according to section 1</b>	<b>8</b>
<b>SECTION 2. Special pathomorphology</b>		
5.	Introduction to nosology. Pathology of the cardiovascular system.	2
6.	Respiratory diseases.	2
7.	Diseases of the stomach and intestines. Liver diseases	2
8.	Kidney diseases	2
9.	Diabetes, thyroid diseases	2
10.	Diseases of the nervous system and musculoskeletal system	2
11.	General manifestations of infectious diseases. Characteristics of the infectious process.	2
12.	HIV infection. Sepsis. Tuberculosis.	2
	<b>Total according to section 2</b>	<b>16</b>
	<b>The total number of lecture hours in the discipline</b>	<b>24</b>

## 6. Thematic plan of practical classes in the discipline "Pathomorphology"

No _	TOPIC	Number of hours
<b>CHAPTER 1. General pathomorphology</b>		
1.	The subject and tasks of pathomorphology . Pathomorphological research methods . The concept of damage to cells and tissues. Pathological autopsy.	2.5
2.	Acute damage. Morphology of reversible and irreversible damage to cells and tissues. Necrosis and apoptosis . The basics of thanatology. Death, definition, signs of death.	2.5
3.	Chronic damage. Parenchymatous dystrophies (intracellular accumulation of proteins, fats and carbohydrates).	2.5
4.	Vascular- stromal dystrophies. Disorganization of connective tissue. Amyloidosis.	2.5
5.	Accumulation of pigments. Calcinosis . Formation of stones.	2.5
6.	Blood circulation disorders: edema, hyperemia, hemorrhages . Violation of lymphatic circulation.	2.5
7.	Violations of hemostasis: thrombosis, DVZ-syndrome. Shock. Embolism. Infarct.	2.5
8.	Causes, pathogenesis, macro and microscopic manifestations, complications and consequences of alterations and disorders of blood circulation. Pathological autopsy.	2.5
9.	Defense mechanisms and their morphological equivalents. Exudative inflammation.	2.5
10.	Productive inflammation. Granulomatosis . Specific inflammation.	2.5
11.	Immunopathological processes.	2.5
12.	Adaptation and compensation processes. Regeneration and reparation. Sclerosis.	2.5
thirteen.	General doctrine about tumors. Nomenclature and morphological features of tumors originating from the epithelium.	2.5
14.	Nomenclature and morphological features of tumors of mesenchymal and neuroectodermal origin.	2.5
15.	Hematopoietic tumors.	2.5

16.	Etiology, pathogenesis, macro- and microscopic changes, complications and consequences of inflammation, immunopathological and compensatory -adaptive processes and tumors. Pathological autopsy . Credit .	2.5
	<b>Total according to section 1</b>	<b>40</b>
<b>SECTION 2. Special pathomorphology</b>		
17.	Introduction to nosology. The concept of "disease", manifestations and complications of diseases . Principles of classification of diseases. The concept of "diagnosis", the structure of the diagnosis. The concept of " pathomorphosis " of the disease. Types of pathomorphosis .	3
18.	Anemia. Hemorrhagic syndromes : vasopathies , thrombocytopenia , thrombocytopathies , coagulopathy .	3
19.	Diseases of the cardiovascular system. Cerebrovascular diseases. Cardiomyopathies.	3
20.	Rheumatism. Systemic diseases of the connective tissue with autoimmunization . Damage to the endocardium: infectious endocarditis, Lefleur 's eosinophilic endocarditis . Damage to the myocardium ,	3
21.	Acute inflammatory diseases of the respiratory organs Chronic restrictive lung diseases ( fibrotic , granulomatous ; allergic and smoking-related). Pulmonary hypertension, pulmonary heart. Tumors of the upper respiratory tract, lung cancer.	3
22.	Diseases of the oropharynx, salivary glands, esophagus, stomach . Malabsorption syndrome . Tumors of the oropharynx, esophagus, stomach , small and large intestine.	3
23.	Diseases of the liver, biliary system and pancreas.	3
24.	Etiology, pathogenesis, macro and microscopic changes, complications and consequences of diseases of the cardiovascular, respiratory system, and gastrointestinal tract. Pathological autopsy.	3
25.	Kidney disease. Defects in the development of the urinary system. Kidney and bladder tumors.	3
26.	Diseases of the female and male reproductive system. Breast disease. Sexually transmitted infections . Pathology of pregnancy and the postpartum period.	3
27.	Prenatal pathology ( gametopathies , blastopathies , embryopathies , fetopathy ), asphyxia of the fetus and newborn, birth trauma, intracranial hemorrhages, infectious diseases of the TORCH complex. Congenital syphilis. Congenital malformations: morphological characteristics.	2
28.	Diseases of the organs of the endocrine system: Hypothalamic-pituitary disorders. Adrenal gland pathology. Pathology of the thyroid gland. Pathology of the endocrine apparatus of the pancreas. MEN syndrome.	2
29.	Diseases of the central nervous system: Tumors of the central nervous system, cranial and paraspinal nerves. Postresuscitation encephalopathy and brain death syndrome.	2
30.	Diseases of muscles, bones, joints; damage to the neuromuscular junction.	2
31.	Infectious and parasitic diseases. Characteristics of the infectious process.	2
32.	Infectious diseases with an enteral infection mechanism.	2
33.	Bacterial infections: diphtheria, scarlet fever, meningococcal infection, whooping cough. Anthroozoonous infections: plague, tularemia, brucellosis, anthrax.	2
34.	Viral infections. Acute respiratory viral infections. Children's viral infections: measles, rubella, infectious mononucleosis, chickenpox, epidemic parotitis, poliomyelitis. Rabies, natural smallpox.	2

35.	Infections with multiple organ lesions. Sepsis as a special form of infection. HIV infection. Tuberculosis.	2
	Exam	
	<b>Total according to section 2</b>	<b>48</b>
	<b>The total number of hours of practical classes in the discipline</b>	<b>88</b>

### 7. Thematic plan of students' independent work

No z.p. –	TOPIC	Mr hours	Form control
<b>Chapter 1. General pathomorphology</b>			
1.	History of the development of pathological anatomy and pathomorphology . The place and role of pathomorphology in the system of medical knowledge. General information about pathogenic factors ( exogenous and endogenous) and types of cellular response to them. The main pathogenetic mechanisms of hypoxic , free-radical, chemical and biological cell damage.	2	Current control in a practical lesson
2.	Elements of ultrastructural cell pathology. Cell-matrix interactions. Cellular and extracellular mechanisms of trophic regulation.	2	
3.	Death of an organism from biological, social and medical points of view. Determination of intrauterine death. Thanatogenesis . Mechanisms and morphological manifestations of cessation of activity of vital organs during the natural course of the disease.	2	
4.	Selective death of specialized cells in a living organism.	2	
5.	Genetic diseases are caused by enzyme defects: lysosomal diseases, accumulation diseases ( thesaurismoses ). Lesions caused by disorders of protein folding and intracellular transport.	2	
6.	Clinical and morphological features of various forms of amyloidosis	2	
7.	Mechanisms of accumulation of exogenous pigments. Jaundice: etiological factors, definitions, classifications, mechanisms. Disorders of iron metabolism (hereditary and acquired hemochromatosis ) and copper (Konovalov-Wilson disease). Stone formation: localization, types of stones, consequences and complications of stone formation.	2	
8.	Violation of ion-osmotic and water balance. Hyper- and hypokalemia : role in thanatogenesis . Violation of water balance, hypo- and hypernatremia : the role of intercellular and cellular dehydration in thanatogenesis .	2	
9.	The role of the vascular wall, blood coagulation system in physiological hemostasis and thrombosis. Hypercoagulable states.	2	
10.	Pathogenesis and main stages of development of various types of shock, typical morphological changes in organs during shock. DVZ syndrome: pathogenesis, stages, their morphological features, meaning.	2	
11.	Basics of the immune response. Morphological manifestations of immune reactions in peripheral lymphoid organs, thymus . The concept of innate and acquired immunity. Features of the immune response in children. Accidental and age-related involution of the thymus .	2	
12.	The role of neutrophils in the development of acute inflammation. Stages of development and resolution of acute inflammation.	2	

	Differences between acute and chronic inflammation. Features of fibrinous and purulent inflammation in various organs: morphological changes and consequences.		
thirteen.	Macrophages and their role in chronic inflammation. Mechanisms of granuloma formation. Features of granulomatous inflammation in leprosy, sclerosis, syphilis, felinosis , sarcoidosis : morphological changes and consequences.	2	
14.	Immunological tolerance and mechanisms of its formation. Pathogenesis of autoimmune diseases. Transplant rejection reactions ( subacute , acute and chronic); graft versus host reaction). Immunodeficiency states: primary and secondary. The mechanism of immunodeficiency in HIV infection.	2	
15.	Molecular bases of cell and tissue proliferation. Stem cells and their role at different stages of embryo and ontogenesis. Peculiarities of cell proliferation in various organs. Mechanisms of wound healing and repair of individual tissues. Pathomorphology of organ failure.	2	
16.	Molecular bases and main stages of carcinogenesis. Tumor progression, tumor dissemination. Local and general effects of tumors on the body. Violation of the body's homeostasis during tumor growth. Secondary changes in the tumor. Cancer cachexia, paraneoplastic syndromes. Modern methods of morphological diagnosis of tumors. Rules for collection and referral of biopsy material for histological examination.	2	
17	Morphology of tumors of exo- and endocrine glands and epithelial covers.	3	
18.	Nomenclature and morphological features of tumors of mesenchymal origin	2	
19.	Nomenclature and morphological features of tumors of nervous and melanin -forming tissues.		
20.	Features of tumor growth in childhood. Tumors from cambial embryonic tissues. Tumors of children's age, which develop according to the type of tumors of adults.	2	
21.	Basic principles of morphological diagnosis of blood cell tumors. Features of individual forms of myeloid, lymphoid and histiocytic tumors.	3	
	<b>Total according to section 1</b>	<b>42</b>	
<b>Chapter 2. Special pathomorphology</b>			
22.	The concept of "disease", manifestations and complications of diseases . Principles of classification of diseases. The concept of "diagnosis", the structure of the diagnosis. The concept of " pathomorphosis " of the disease. Types of pathomorphosis .	1	Current control in a practical session
23.	Certain forms of hereditary anemias ( spherocytosis , sickle cell anemia, thalassemia ) and hemorrhagic diatheses (hemophilia, Willebrand 's disease )	1	
24.	Diseases of the cardiovascular system. Aneurysms of the aorta (atherosclerotic, exfoliating ). Symptomatic hypertension. Subarachnoid hemorrhages and cerebral vascular malformations. Reperfusion syndrome .	1	

25.	Systemic vasculitis : nodular periarteritis , Takayasu arteritis , temporal ( giant cell ) arteritis, obliterative thromboangiitis , Kawasaki disease, Schoenlein-Henoch purpura , Raynaud 's disease and syndrome . ANCA-associated vasculitis : microscopic polyangiitis , granulomatosis with polyangiitis (Wegener's), eosinophilic granulomatosis with polyangiitis ( Chorz-Stauss syndrome ). Damage to the endocardium: infectious endocarditis, Lefleur 's eosinophilic endocarditis . Myocardial damage: Abramov - Fidler idiopathic myocarditis .	1	
26.	Chronic restrictive lung diseases ( fibrotic , granulomatous ; allergic and smoking-related). Respiratory distress syndrome of the adult type. Tumors of the upper respiratory tract, lung cancer.	1	
27.	Diseases of the oropharynx, salivary glands, esophagus. Diverticula. Hirschsprung 's disease . Malabsorption syndrome (celiac disease, sprue , Whipple 's disease , lactase deficiency, abetalipoproteinemia ). Tumors of the oropharynx, esophagus, stomach , small and large intestine.	1	
28.	Gallstone disease, acute and chronic cholecystitis, tumors. Acute and chronic pancreatitis, tumors. Medicinal hepatitis. Metabolic liver diseases (non-alcoholic fatty liver disease, hemochromatosis , Wilson's disease, A1- antitrypsin deficiency ).	1	
29.	Secondary glomerulopathies . Tubulointerstitial nephritis. Hydronephrosis. Cystic diseases of the kidneys: Defects in the development of the urinary system. Kidney and bladder tumors	1	Current control in a practical lesson
30.	Breast disease. Sexually transmitted infections (syphilis, gonorrhea, papillomavirus infection, chlamydia , ureaplasmosis , trichomoniasis . Pathology of pregnancy and the postpartum period. Spontaneous and medical abortions. Ectopic pregnancy. NPG- gestosis . Trophoblastic disease. Pathology of litter.	1	
31.	Genetic diseases: Mendelian diseases, cytogenetic diseases, lesions with multifactorial and non-classical inheritance. Congenital malformations: morphological characteristics. Syndrome of sudden death of newborns.	1	
32.	Diseases of the organs of the endocrine system: Hypothalamic-pituitary disorders. Adrenal gland pathology. Pathology of the endocrine apparatus of the pancreas. MEN syndrome.	1	
33.	Slow viral neuroinfections and prion diseases ( kuru , Creutzfeldt - Jakob disease). Tumors of the central nervous system ( astroglial , oligodendroglial , ependymal , neuronal , meningeal ), cranial and paraspinal nerves. Postresuscitation encephalopathy and brain death syndrome.	1	
34.	Diseases of muscles, bones, joints; congenital and toxic myopathies; damage to the neuromuscular junction - myasthenia ( myasthenia gravis ).	1	
35.	Skin Disease: Terminology reflecting skin pathology. Inflammatory and cystic skin diseases. Pigmentation disorders: albinism, vitiligo , nevi . Other diseases: keratoacanthoma , dermatofibroma , epidermal cysts , hemangiomas, fibroepithelial polyp. Keloid . Malignant skin tumors: skin cancer, basal cell cancer, melanoma.	1	

36.	Pathomorphological changes in diseases related to nutrition. Occupational diseases associated with exposure to chemical production factors, dust; atmospheric pressure changes; industrial noise; electromagnetic waves; temperature; electric current; ionizing radiation . Iatrogenic medical pathology, morphological characteristics.	1	
37.	Infectious and parasitic diseases. Characteristics of the infectious process. Morphological variants of local and general reactions depending on the etiology of the infection (bacterial, viral, parasitic, fungal, etc.): involving neutrophils (purulent inflammation); involving lymphocytes and macrophages ( mononuclear infiltration and granulomatous inflammation); under the action of viruses ( cytopathic ); with a preference for a necrotic local reaction.	2	
38.	Helminthiasis (trichinellosis, echinococcosis, cysticercosis, opisthorchosis , schistosomiasis )	1	
39.	Anthropozoonous infections: plague, tularemia, brucellosis, anthrax.	1	
40.	Viral infections. Rabies, natural smallpox.	2	
41.	Mycobacterial infections	2	
42.	Diseases caused by rickettsia, protozoa (malaria, balantidiasis , amebiasis), fungi.	2	
	<b>Total hours for content module 2</b>	<b>26</b>	
	<b>The number of hours of independent work on the discipline</b>	<b>68</b>	

## 8. Individual tasks.

Individual tasks are one of the forms of organization of education at the university, which aims to deepen, generalize and consolidate the knowledge that students receive in the process of learning, as well as the application of this knowledge in practice. Individual tasks are performed by students independently under the guidance of the teacher.

Individual tasks include: writing essays and creating multimedia presentations with reports at meetings of the department's scientific student circle, participation in the department's scientific and research work, participation in writing theses and articles for reports at student scientific conferences.

List of tasks for individual work of the student: compilation of crosswords from the relevant sections of the academic discipline; participation in the work of the student scientific circle and speeches at scientific forums; participation in the student Olympiad in discipline; selection of video and audio materials from sections of the academic discipline; selection of materials and creation of a presentation on a relevant topic or section of the discipline.

## 9. Teaching methods

According to the sources of knowledge, teaching methods are used: verbal - story, explanation, lecture, instruction; visual - demonstration, illustration; practical - practical work, problem solving. According to the nature of the logic of knowledge, methods are used: analytical, synthetic, analytical-synthetic, inductive, deductive. According to the level of independent mental activity, the following methods are used: problem-based, searching, research.

1. Verbal methods: lecture, interactive lecture, conversation;
2. Visual methods: illustration, demonstration.
3. Practical methods: performing practical work and solving situational tasks to develop skills and abilities;
4. Students' independent work on understanding and assimilation of new material
5. Use of control and educational computer programs
6. Innovative teaching methods: Case-based learning (Learning through the analysis of a clinical

case, situation); brainstorming; educational discussion; educational debate; role play; team-based learning; think-pair-share.

The types of training according to the curriculum are: lectures; practical training; independent work of students.

## 9. Control methods

**Current control** is carried out on the basis of control theoretical knowledge, practical skills and abilities.

**Forms of current control** are: *in the* dream survey (frontal, individual, combined), interview; practical verification of professional skills (conducted based on the results of practical work at the end of the class); test control ("open" and "closed" test tasks).

Current control is mandatory. During the evaluation of mastering of each topic from all disciplines of the curriculum for the current educational activity, the student is given grades on a 4-point (traditional scale) taking into account the approved evaluation criteria for the discipline. All types of work provided by the curriculum are taken into account. The student must receive a grade in each topic. The teacher conducts a survey of each student in the group at each lesson and assigns a grade in the journal of attendance and student performance according to the traditional scale ("5", "4", "3", "2").

When evaluating the student's current educational activity, 20% of the grade is the student's independent work, which takes into account the knowledge of the topic of independent study and the performance of work in the notebook.

The final (summary) control of the sections is carried out at the end of the section in the form of a written test, which includes test tasks from the "Step-1" bank, theoretical questions and control of practical skills (solving situational problems, defining and describing macro- and micropreparations, etc.)

Such methods of control as oral, written and test are used, which should contribute to increasing the motivation of students-future specialists for educational and cognitive activities. According to the specifics of professional training, preference is given to test and written control. In the case of final control, preference is given to written or test control.

## 10. Form of final control of study success .

The final control of the discipline is carried out on the basis of theoretical control knowledge, practical skills and abilities.

**Grading** is a form of final control, which consists in the assessment of the student's assimilation of educational material solely on the basis of the results of his performance of certain types of work in practical, seminar or laboratory classes. The semester credit for the discipline is carried out after the end of its withdrawal, before the beginning of the examination session.

**An exam (differential assessment)** is a form of final control of a student's assimilation of theoretical and practical material from an educational discipline.

## 11. Scheme of accrual and distribution of points received by students.

The maximum number of points for a discipline is 200 points. The ratio between the results of the evaluation of the current educational activity and the final control of knowledge is 60% and 40%.

**The first semester of studying the discipline ends with a test.**

***The maximum number of points*** that a student can score for the current educational activity while studying the discipline is 200 points, ***the minimum number of points*** - the minimum number of points - is 120 points.

The number of points is calculated on the basis of the student's 4-point grades (national) scale during the study of the discipline, by calculating the arithmetic mean, rounded to two decimal places.

The student receives a credit in the last lesson of the discipline based on the results of the current assessment.



Only those students who do not have academic debt and whose average score for the current academic activity in the academic discipline is at least 3.00 are admitted to the credit.

The average grade for the current activity is converted into points on a 200-point scale, according to the conversion table (Table 1).

**Table 1.**

**Recalculation of the average grade for the current activity into a multi-point scale (for disciplines ending with credit)**

4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale
5	200	4.47	179	3.94	158	3.42	137
4.97	199	4.44	178	3.92	157	3.39	136
4.94	198	4.42	177	3.89	156	3.37	135
4.92	197	4.39	176	3.87	155	3.34	134
4.89	196	4.37	175	3.84	154	3.32	133
4.87	195	4.34	174	3.82	153	3.29	132
4.84	194	4.32	173	3.79	152	3.27	131
4.82	193	4.29	172	3.77	151	3.24	130
4.79	192	4.27	171	3.74	150	3.22	129
4.77	191	4.24	170	3.72	149	3.19	128
4.74	190	4.22	169	3.69	148	3.17	127
4.72	189	4.19	168	3.67	147	3.14	126
4.69	188	4.17	167	3.64	146	3.12	125
4.67	187	4.14	166	3.62	145	3.09	124
4.64	186	4.12	165	3.59	144	3.07	123
4.62	185	4.09	164	3.57	143	3.04	122
4.59	184	4.07	163	3.54	142	3.02	121
4.57	183	4.04	162	3.52	141	3	120
4.54	182	4.02	161	3.49	140	< 3	70-119 (refolding)
4.52	181	4.00	160	3.47	139		
4.49	180	3.97	159	3.44	138		

The learning result is also evaluated on a two-point scale (passed/failed).

**Table 2**

**The scale of transferring points to the national system**

According to the national system	On a 200-point scale
counted	from 120 to 200 points
not counted	less than 119 points

Students' independent work, which is provided for by the topic of the lesson along with classroom work, is evaluated during the current control of the topic in the corresponding lesson.

**The second semester of studying the discipline** ends with a final control in the form of an exam.

Only those students who do not have academic debt (all missed classes have been completed) and whose average score for the current educational activity in the academic discipline is at least "3" are admitted to the exam.

**The maximum number of points** that a student can score for the current educational activity for admission to the exam is 120 points and is defined as the sum of the arithmetic average of all grades received in the semester.

**The minimum number of points** that a student must score for the current educational activity for admission to the exam is 72 points. Recalculation of the average grade for the current academic performance (on a 120-point scale) in the table. 3.

Table 3.

**Recalculation of the average grade for the current academic performance in a multi-point scale for disciplines ending with an exam**

4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale
5	120	4.29	103	3.58	86
4.96	119	4.25	102	3.54	85
4.92	118	4.21	101	3.50	84
4.87	117	4.17	100	3.46	83
4.83	116	4.12	99	3.42	82
4.79	115	4.08	98	3.37	81
4.75	114	4.04	97	3.33	80
4.71	113	4.00	96	3.29	79
4.67	112	3.96	95	3.25	78
4.62	111	3.92	94	3.21	77
4.58	110	3.87	93	3.17	76
4.54	109	3.83	92	3.12	75
4.50	108	3.79	91	3.08	74
4.46	107	3.75	90	3.04	73
4.42	106	3.71	89	3	72
4.37	105	3.67	88	Less than 3	Not enough
4.33	104	3.62	87		

The maximum number of points that a student can score when taking the exam is 80 (the minimum number is at least 50).

Discipline assessment is defined comprehensively as the sum of points for the current educational activity and points for the exam.

From the allocated 120 points for the current educational activity, 4 to 12 additional points are allocated for the assessment of individual independent work of higher education applicants, according to the work curriculum. Encouragement points are added to the final grade for the discipline at the end of its study.

Points with disciplines for students, which successfully completed the program are converted into the national scale and ECTS system (tables 4, 5).

Table 4.

Discipline points	Evaluation on a 4-point scale
From 180 to 200 points	5
From 150 to 179 points	4
From 149 points to the minimum number of points that the student must score	3
Below the minimum number of points that the student must score	2

**Table 5**

**Scale assessment: national and ECTS**

Total points	RatingECTS	Rating by national scale	
		for exam, difzalik	for offset
180-200	A	perfectly	counted
160-179	B	okay	
150-159	C		
130-149	D	satisfactorily	
120-129	E		
50-119	FX	unsatisfactorily with the possibility of refolding	not counted with possibility rearrangement
0-49	F	unsatisfactorily with mandatoryrepeated studying the discipline	not counted with mandatory repeated studying the discipline

**12. Methodological support**

1. Working curriculum of the discipline;
2. Plans of lectures, practical classes and independent work of students;
3. Abstracts of lectures on the discipline;
4. Methodical instructions for practical classes for students;
5. Methodical materials that ensure independent work of students;
6. Test and control tasks for practical classes;
7. List of exam questions

**13. List of questions submitted to the exam in the discipline "Pathomorphology"**

**GENERAL PATHOMORPHOLOGY**

1. Pathological anatomy as a science, a branch of practical medicine and a subject of study.
2. Content, tasks, objects and methods of pathomorphological research.
3. Levels of research on the structural basis of diseases.
4. The main stages of the development of pathomorphology .
5. Contribution of domestic scientists to the development of world pathomorphology .
6. The concept of ultrastructural cell pathology.
7. Morphogenesis and morphology of parenchymal dystrophies .
8. Morphogenesis and morphology of vascular and stromal dystrophy \_
9. Morphogenesis and morphology of mixed dystrophies .
10. Damage and death of cells and tissues. Necrosis and apoptosis are morphological manifestations of cell death.
11. Structural mechanisms and clinico-pathological characteristics of the main periods of thanatogenesis .
12. Death: definition, signs and term of development.
13. Morphology of ion-osmotic and water balance disorders.
14. Morphology and consequences of disorders in various types of hyperemia.
15. Morphogenesis and pathomorphology of ischemia.
16. Morphogenesis and pathomorphology heart attack
17. Definition and morphogenesis of types of bleeding, hemorrhage.
18. Morphogenesis, pathomorphology , consequences of stasis.
19. Pathomorphology , consequences of plasmarrhagia .
20. Pathomorphology, types, consequences of embolism.
21. Morphogenesis, pathomorphology , consequences of shock .
22. Pathomorphology , consequences of lymphatic circulation disorders.
23. Morphogenesis, pathomorphology , consequences of thrombosis, DVZ-syndrome.
24. Definition of exudative inflammation. Types, morphological characteristics,

clinical significance of exudative inflammation.

25. Definition of productive inflammation. Morphological features, consequences of productive inflammation.

26. Types, morphological characteristics of granulomatous inflammation.

27. Types, morphological characteristics of specific inflammation.

28. Morphological characteristics of various types of hypersensitivity .

29. Definition, classification and general morphological characteristics of autoimmune diseases \_

30. Definition, general morphological characteristics of primary and secondary immune deficiency.

31. Definition, types, morphological characteristics of hyperplasia.

32. Definition, types, morphological characteristics of atrophy .

33. Definition, types, morphological characteristics of metaplasia .

34. Phase nature of compensation processes in pathological conditions.

35. Definition, types, morphological characteristics of hypertrophy.

36. Morpho-functional features of myocardial hypertrophy.

37. Cellular and intracellular forms of regeneration.

38. Types of regeneration: physiological, reparative, pathological.

39. Morphogenesis of the regenerative process.

40. Granulation tissue: morphological characteristics.

41. Types of wound healing.

42. Determination of tumor growth.

43. Modern theories of carcinogenesis.

44. Definition of dysplasia , its types, the role of dysplasia in carcinogenesis.

45. Tumor cell features.

46. Morphogenesis and histogenesis of tumors.

47. Types of tumor growth . Morphological features of benign tumors.

48. Morphological features of malignant tumors.

49. Metastasis: types, regularities, mechanisms.

50. General characteristics and nomenclature of tumors from tissues originating from the epithelium.

51. Morphological features of epithelial tumors without specific localization: benign ( papilloma , adenoma) and malignant (cancer).

52. Histological variants of cancer.

53. Features of cancer metastasis.

54. General characteristics and nomenclature of tumors of tissues originating from mesenchyme.

55. Morphological features of tumors from tissues originating from mesenchyme.

56. Nomenclature of nervous tissue tumors.

57. Features of tumors of the central nervous system.

58. Nomenclature and morphological features of tumors of the autonomic nervous system.

59. Nomenclature and morphological features of tumors of the peripheral nervous system.

60. Nomenclature of tumors originating from melanin -producing tissue. Nevus , their varieties.

61. Morphological features of melanoma, its morphological forms. Significance of precancerous changes.

62. Features of tumor growth in children compared to adults.

63. Dysontogenetic tumors: hamartomas and hamartoblastomas - morphological manifestations.

64. Teratomas and teratoblastomas - morphological manifestations.

65. Tumors from cambial embryonic tissues - morphological manifestations.

66. Definition, classification, general morphological characteristics of leukemias.

67. Types, stages of the course, morphological characteristics of acute leukemia .
68. Types, stages of the course, morphological characteristics of chronic leukemia .
69. Pathohistological types, morphological characteristics of Hodgkin 's disease , causes of death.
70. Tumors of childhood, which develop according to the type of tumors of adults - morphological manifestations.

### **SPECIAL PATHOMORPHOLOGY**

1. Definition, classification and morphological characteristics of anemias.
2. Definition, classification, morphological characteristics of thrombocytopenia and thrombocytopenia .
3. Classification, morphological characteristics of coagulopathy .
4. General characteristics, classification, morphological manifestations and prognosis of non-Hodgkin 's lymphomas.
5. Definition of atherosclerosis , risk factors, modern theories.
6. Morphogenesis of macroscopic changes in atherosclerosis.
7. Morphogenesis of microscopic changes in atherosclerosis.
8. Clinical and morphological forms of atherosclerosis, organ lesions in atherosclerosis.
9. Definition, risk factors, connection of coronary heart disease with atherosclerosis and hypertension.
10. Morphological bases of arteriosclerosis ( mediocalcinosis Menkeberg , arteriolosclerosis ).
11. Pathomorphology of aneurysms of the aorta (atherosclerotic, exfoliating ).
12. Morphology of acute, recurrent and repeated myocardial infarction.
13. Consequences, complications, causes of death in myocardial infarction.
14. Morphological characteristics, complications, causes of death in chronic ischemic heart disease.
15. Hypertensive disease: definition, risk factors.
16. Morphological changes in blood vessels, heart, changes in organs in hypertensive disease.
17. Definition, classification of secondary (symptomatic) hypertension.
18. General characteristics, classification, background diseases and risk factors of cerebrovascular disease.
19. Infarct (ischemic stroke) of the brain: morphological characteristics.
20. Morphogenesis, morphological characteristics of selective necrosis of neurons (ischemic encephalopathy).
21. Morphological characteristics, consequences of hemorrhagic stroke.
22. Morphological characteristics, complications of spontaneous intracranial hemorrhage.
23. Morphological characteristics, complications of spontaneous subarachnoid hemorrhage.
24. General characteristics of systemic diseases of connective tissue: violation of immune homeostasis and systemic progressive disorganization of connective tissue in rheumatic diseases.
25. Classification, morphogenesis, morphological characteristics of rheumatism .
26. Endocarditis, myocarditis, pericarditis and pancarditis : classification, morphological characteristics, complications.
27. Morphology of joint manifestations (stages of progression of rheumatoid polyarthritis), complications and consequences of rheumatoid arthritis arthritis \_
28. Morphology of Bekhterev 's disease .
25. Morphogenesis, pathomorphology , complications and causes of death in systemic lupus erythematosus.
29. Pathological anatomy, visceral manifestations, complications, causes of death in systemic scleroderma.
30. Pathological anatomy of dermatomyositis . Complications, causes of death.
31. Pathomorphology of systemic vasculitis : nodular periarteritis , Takayasu arteritis , temporal ( giant cell ) arteritis, obliterative thromboangiitis , Kawasaki disease, Schoenlein-Henoch

purpura , Raynaud 's disease and syndrome .

32. ANCA-associated vasculitis : microscopic polyangiitis , granulomatosis with polyangiitis (Wegener's), eosinophilic granulomatosis with polyangiitis ( Chorz-Strauss syndrome ).
33. Pathological anatomy of lesions of the endocardium: infectious endocarditis, eosinophilic endocarditis of Lefleur .
34. Myocardial damage: Abramov -Fidler idiopathic myocarditis .
35. Pathological anatomy of acquired heart defects.
36. Pathological anatomy of acquired (secondary) cardiomyopathies.
37. Morphological manifestations of acute inflammatory diseases of the upper respiratory tract (rhinitis, sinusitis , laryngitis, epiglottitis , laryngotracheobronchitis ), bronchiolitis .
38. Morphological characteristics of acute bronchitis.
39. Modern classification of pneumonia.
40. Morphological characteristics and complications of lobar pneumonia.
41. Morphological characteristics and complications of acute focal pneumonia.
42. Morphological characteristics and complications of acute interstitial pneumonia.
43. Morphological characteristics of acute destructive processes of the lungs.
44. Definition and classification of chronic obstructive and restrictive respiratory diseases.
45. Morphological characteristics and complications of chronic bronchitis.
46. Morphological characteristics of chronic obstructive emphysema.
47. Morphological characteristics and complications of bronchiectasis .
48. Morphological characteristics and complications of bronchial asthma.
49. Morphological characteristics of chronic diffuse interstitial lung diseases
50. Morphological characteristics of idiopathic pulmonary fibrosis.
51. Morphological characteristics of tumors of the upper respiratory tract, lung cancer.
52. Diseases of the esophagus: morphological characteristics.
53. Morphological characteristics of acute and chronic gastritis.
54. Pathomorphology of ulcer disease.
55. Complications of ulcer disease.
56. Stomach cancer. Macroscopic and histological forms. Peculiarities of metastasis.
57. Pathomorphology of nonspecific ulcerative colitis.
58. Pathomorphology of Crohn's disease.
59. Clinical and morphological forms of appendicitis.
60. Complications of appendicitis.
61. Malabsorption syndrome : causes, morphological manifestations.
62. Intestinal tumors.
63. Morphological characteristics, prognosis of fatty hepatosis .
64. Definition, morphological characteristics, prognosis of toxic liver dystrophy.
65. Morphogenesis, forms, morphological characteristics of acute hepatitis.
66. Morphological characteristics of chronic hepatitis, degree of activity and chronicity .
67. Morphological characteristics of the most important types of cirrhosis.
68. Liver cancer, morphological characteristics.
69. Pathomorphology of gallstone disease.
70. Pathomorphology of acute and chronic cholecystitis.
71. Morphological characteristics, complications of acute and chronic pancreatitis in
72. Tumors of the pancreas, morphological characteristics.
73. Modern clinical and morphological classification of kidney diseases.
74. Post-infectious glomerulonephritis : morphological characteristics, consequences.
75. Rapidly progressive : morphological characteristics, consequences.
76. Chronic glomerulonephritis : morphological characteristics, consequences.
77. Classification, morphological manifestations of idiopathic nephrotic syndrome.
78. Morphological manifestations of membranous nephropathy.

79. Morphological manifestations of focal segmental sclerosis.
80. Morphological characteristics, prognosis of necrotic nephrosis .
81. Morphological characteristics, prognosis of tubulointerstitial nephritis.
82. Morphological characteristics, prognosis of acute and chronic pyelonephritis.
83. Morphogenesis and morphological characteristics of nephrolithiasis, consequences.
84. Chronic kidney failure. Nephrosclerosis. Pathological anatomy.
85. Cystic kidney diseases. Defects in the development of the urinary system.
86. Tumors of the kidneys and urinary bladder
87. Morphological characteristics, consequences of inflammatory diseases , precancerous processes of the cervix.
88. Morphological manifestations of inflammatory diseases endometrium and myometrium .
89. Morphological manifestations of precancerous processes and tumors of the endometrium and myometrium .
90. Morphological characteristics, complications, consequences of inflammatory diseases of the mammary glands.
91. Morphological characteristics of fibrocystic changes of mammary glands.
92. Morphological characteristics, complications, consequences of benign nodular hyperplasia of the prostate gland.
93. Morphological characteristics of inflammatory diseases of the testicles.
94. Classification, morphological diagnosis, complications and consequences of ectopic pregnancy .
95. Classification, morphological characteristics of ORH- gestoses .
96. Classification, morphological characteristics and prognosis of trophoblastic disease.
97. Sexually transmitted infections (syphilis, gonorrhea, papilloma virus infection, chlamydia , ureaplasmosis , trichomoniasis .
98. Prenatal pathology ( gametopathy , blasto- , embryo- , fetopathy ).
99. Perinatal pathology (asphyxia of the fetus and newborn, birth trauma, intracranial hemorrhages, infectious diseases of the TORCH complex. Congenital syphilis).
100. Congenital malformations: morphological characteristics.
101. Genetic diseases: Mendelian diseases, cytogenetic diseases, lesions with multifactorial and non-classical inheritance.
102. Morphological characteristics, complications and causes of death in Itsenko-Cushing's disease .
103. Morphological characteristics, complications of acromegaly.
104. Morphological characteristics of diabetes insipidus.
105. Morphological characteristics of diabetes.
106. Complications of diabetes mellitus: morphological characteristics of diabetic macro- and microangiopathy .
107. Multinodular goiter. Morphological characteristics, complications, consequences.
108. Graves' disease (diffuse toxic goiter, Based's disease): morphological features of the thyroid gland, visceral manifestations.
109. Hypothyroidism . Cretinism. Myxedema. Morphological characteristic.
110. Definition, pathomorphology thyroiditis Hashimoto 's.
111. Morphological features of primary and secondary hyperparathyroidism .
112. Primary chronic insufficiency of the cortical substance of the adrenal glands ( Addison 's disease ): morphological manifestations.
113. Waterhouse-Friederiksen syndrome : morphological manifestations.
114. Morphological characteristics, complications of Alzheimer's disease.
115. Morphological characteristics, complications of multiple sclerosis .
116. Morphological characteristics, complications of amyotrophic lateral sclerosis.
117. Morphological characteristics, complications of postresuscitation encephalopathy.
118. Morphological characteristics, complications of diseases of the peripheral nervous system.

119. Morphological changes of bones in hyperparathyroid dystrophy.
120. Morphological characteristics, complications of Paget 's disease .
121. Morphological characteristics, complications of fibrous dysplasia .
122. Morphological characteristics, complications of osteomyelitis.
123. Duchenne muscular dystrophy .
124. Morphological characteristics, causes of death in myotonia .
125. Skin Disease: Terminology reflecting skin pathology. Morphological characteristics of inflammatory and vesicular skin diseases (eczematous dermatitis, neurodermatitis, psoriasis, chicken pox and shingles, herpetiform dermatitis, pemphigus , bullous pemphigoid , erythema multiforme.
126. General characteristics of the infectious process: entrance gate of infection, primary infectious complex, spread and dissemination, ways of transmission of pathogens of infectious diseases.
127. Variants of local and general reactions in infections.
128. Morphological characteristics, complications, consequences, causes of death in bacterial dysentery.
129. Morphological characteristics, complications, consequences, causes of death in typhoid fever.
130. Morphological characteristics, complications, consequences, causes of death in salmonellosis.
131. Morphological characteristics, complications, consequences, causes of death in yersiniosis .
132. Morphological characteristics, complications, consequences, causes of death in respiratory viral infections.
133. Morphological characteristics, complications, consequences, causes of death in typhoid fever.
134. Morphological characteristics, complications of infectious diseases of the brain (viral, tick-borne encephalitis).
135. Morphological characteristics, complications of prion lesions of the central nervous system.
136. Morphological characteristics, complications, causes of death in AIDS.
137. Morphological characteristics, complications, consequences, causes of death in measles.
138. Morphological characteristics, consequences, causes of death in infectious mononucleosis.
139. Morphological characteristics, complications, consequences, causes of death in epidemic parotitis.
140. Morphological characteristics, complications, consequences, causes of death in diphtheria.
141. Morphological characteristics, complications, consequences, causes of death in scarlet fever.
142. Morphological characteristics, complications, consequences, causes of death in whooping cough.
143. Morphological characteristics, complications, consequences, causes of death in poliomyelitis.
144. Tissue reactions in tuberculosis.
145. Pathological anatomy of primary tuberculosis complex.
146. Morphology of progression of primary tuberculosis.
147. Pathological anatomy of the chronic course of primary tuberculosis.
148. Morphological characteristics, complications, consequences, causes of death in hematogenous tuberculosis with predominant lung damage.
149. Morphological characteristics, complications, consequences, causes of death in hematogenous tuberculosis with predominant damage to internal organs and bone system.
150. Morphological characteristics, complications, consequences, causes of death in secondary tuberculosis.
151. Modern pathomorphosis of tuberculosis.
152. Clinical and anatomical forms of sepsis: septicemia, septicopyemia , septic (infectious)



endocarditis.

153. Plague: clinical and morphological forms, complications, causes of death.
154. Tularemia: clinical and morphological forms, causes of death.
155. Anthrax: clinical and morphological forms, causes of death.
156. Cholera: clinical and morphological forms, complications, causes of death.
157. Pathomorphology of congenital syphilis.
158. Pathomorphology of acquired syphilis.
159. Morphological characteristics, complications, consequences, causes of death in malaria.
160. Morphological characteristics of balantidiasis .
161. Morphological characteristics of amebiasis.
162. Morphological characteristics of trichinellosis.
163. Morphological characteristics of echinococcosis.
164. Morphological characteristics of cysticercosis.
165. Morphological characteristics of opisthorchiasis .
166. Morphological characteristics of schistosomiasis .
167. Pathological anatomy of dermatomycoses.
168. Pathological anatomy of actinomycosis.
169. Pathological anatomy of candidiasis .
170. Pathological anatomy of aspergillosis .

#### 14. Recommended literature:

1. Pathomorphology : Nat . at hand / V.D. Markovskiy , V.O. Tumanskiy , I.V. Sorokina et al., edited by V. D. Markovskiy , V. O. Tumanskiy . — K.: VSV "Medicine", 2015 — 936 p., color edition
2. " Pathomorphology and histology: fundamental atlas" /ed. D. D. Zerbino , M. M. Bagria, Y. Ya. Bodnara, V. A. Dibrovyy. – Vinnytsia: Nova Kniga, 2014. 800
3. Kumar V.-Fundamentals of pathology according to Robbins: trans. of the 10th Eng. kind. : in 2 volumes / Vinay Kumar, Abdul K. Abbas, John K. Aster ; of science ed. trans. prof.: I. Sorokina, S. Hychka, I. Davydenko. - K.: VSV "Medicine", 2019. - XII, 420 p.
4. Sorokina Pathological anatomy . Pathological anatomy: Textbook for students / I.V. Sorokina, A.F. Yakovtsova .- Kh.: Fakt, 2014. - 648 p.: ill.
5. Pathomorphology : textbook / IV Sorokina , VD Markovskiy , DI Halata et al . ; edited by IV Sorokina , VD Markovskiy , DI Halata . – Kyiv : AUS Medicine publishing , 2019. – 320 p. + 2 colors inserts (8 p. + 12 p.).
- 6 . BRS Pathology by Schneider & Szanto , 2017. 340p Master Medicine : General and Systematic Pathology by Paul Bass & Susan Burroughs & Norman Carr & Claire Way
7. Hyriavenko N, Lundin M, Sikora K, Pidubnyi A, Karpenko L, Kravtsova O, Hyriavenko D, Diachenko O, Sikora V, Romaniuk A. Serous Adenocarcinoma of Fallopian Tubes : Histological and Immunohistochemical Aspects . J Pathol Translation Med . 2019;53: 236–43.

#### Additional:

1. Tomashova S.A., Servetnyk M.I., Hrytsyna I.V., Havrilyuk O.M., Kuzyk Yu.I., Vovk V.I., Vovk V.V. Under the editorship of Pospisil Yu.O. Workbook on pathomorphology . General pathology section. Methodological developments for students of the Faculty of Medicine. – Lviv, 2016. – 100 p.
2. Hrytsyna I.V., Tomashova S.A., Gavrilyuk O.M. Under the editorship of Pospisil Yu.O. Methodological recommendations for students of the Faculty of Medicine. Module 1 "General pathology". Content module 1 "Damage". - Lviv: PP "Aral", 2016. - 60 p.
3. Tomashova S.A., Hrytsyna I.V., Servetnyk M.I., Vovk V.I. Under the editorship Hastily Yu.O. Workbook on pathomorphology . Section " Special pathology". Methodological developments for students of the Faculty of Medicine. – Lviv, 2014. - 120 p.

**Information resources:**

1. Testing center - database of licensing test tasks "Step-1"
2. <http://library.med.utah.edu/WebPath/webpath.html>
3. <http://www.webpathology.com/>
4. <https://www.geisingermedicallabs.com/lab/resources.shtml>
5. <https://digitalpathologyassociation.org/whole-slide-imaging-repository>
6. <https://www.pathologyoutlines.com/stains.html>