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Khanty-Mansiysk Autonomous Okrug-Ugra  
 "Surgut State University"

Approved by  
 Deputy Rector for Academic Affairs

\_\_\_\_\_ E.V. Konovalova

June 11 2025, Record No. 5

### Syllabus

## Histology, Embryology, Cytology

Department **Pathophysiology and General Pathology**  
 Curriculum s310501-ЛечДелоИн-25-1.pli.xml  
 Specialty 31.05.01 General Medicine  
 Qualification **General Practitioner**  
 Form of education **Full-time**  
 Total (in credits) **6**

Total academic hours 216  
 including:  
 Classes 144  
 Self-study  
 Control hours 36  
 Classes 36

Control:  
 Exam – 3<sup>rd</sup> term  
 Credit – 2<sup>nd</sup> term

### Distribution of the discipline hours by semesters

Academic year (Term)	2 (1.2)		3 (2.1)		Total	
	Weeks	17 2/6	17 2/6	17 2/6		
Types of classes	Cur	Syl	Cur	Syl	Cur	Syl
Lectures	16	16	16	16	32	32
Practical	64	64	48	48	112	112
Contact	80	80	64	64	144	144
Self-study	28	28	8	8	36	36
Control hours			36	36	36	36
<b>Total</b>	<b>108</b>	<b>108</b>	<b>108</b>	<b>108</b>	<b>216</b>	<b>216</b>

The Syllabus is compiled by:

*PhD Associate Professor Khizhnyak A.S.;*

*PhD Associate Professor Khizhnyak I.V.;*

*Assistant Pyankina E.A.*

The Syllabus

**Histology, embryology, cytology**

Developed in accordance with Federal State Educational Standard:

Federal State Educational Standard of Higher Education - Specialist in specialty 31.05.01 General Medicine (Order of the Ministry of Education and Science of Russia dated 12.08.2020 No. 988)

Based on the Curriculum:

31.05.01 General medicine

Specialization: General medicine

Approved by the Academic Council of Surgut State University 11.06.2025, Record No. 5.

The Syllabus was approved by the department **Pathophysiology and General Pathology**

Head of the Department, Doctor of Medical Sciences Professor Kovalenko L.V.

<b>1. COURSE OBJECTIVES</b>	
1.1	The aim of the course "Histology, Embryology, and Cytology" in higher medical schools is to master the knowledge of the microscopic functional morphology and development of the cellular, tissue and organ systems of the human body. It provides the basis for studying clinical disciplines and contributes to the formation of medical thinking.
1.2	The objectives of mastering the discipline "Histology, Embryology, and Cytology" are:
1.2.1	- to study general and specific structural and functional properties of body cells and tissues and their patterns of embryonic and post-embryonic development;
1.2.2	- to study the histo-functional characteristics of main body systems, patterns of their embryonic development, as well as functional, age-related and protective-adaptive changes in organs and their structural elements;
1.2.3	- to form students' skills in microscopic examination of histological specimens.

<b>2. COURSE OVERVIEW</b>	
Course code (in curriculum):	B1.O.04
<b>2.1 Assumed background:</b>	
2.1.1	Human Anatomy
2.1.2	Biology
2.1.3	Latin language
2.1.4	Chemistry
<b>2.2 Post-requisite courses and practice:</b>	
2.2.1	Pathological anatomy
2.2.2	Pathophysiology
2.2.3	Propaedeutics of Internal Diseases
2.2.4	Pharmacology
2.2.5	Radiation Diagnostics
2.2.6	Clinical Pathological Physiology
2.2.7	Otorhinolaryngology
2.2.8	Pathological Syndromes in Clinical Medicine
2.2.9	Faculty therapy
2.2.10	Faculty surgery
2.2.11	Obstetrics
2.2.12	Dermatovenereology
2.2.13	Ophthalmology

<b>3. COMPETENCES UPON COMPLETION OF THE COURSE (MODULE)</b>	
<b>GPC-5.1: Demonstrates knowledge and understanding in the areas of fundamental medicine - anatomical and histological structures (anatomy of the human body, structure of organ tissues and their microscopic differentiation), physiological processes (human physiology, mechanisms of homeostasis regulation, functional systems of the body under normal conditions)</b>	
<b>GPC-5.2: Demonstrates knowledge of cell structure, cell division phases, theoretical foundations of genetics, and understanding of insect and helminth biology and their role in the etiology of human diseases</b>	
<b>GPC-5.6: Demonstrates knowledge and skills to identify: human body structure, morphological macro- and microscopic parameters in pathological conditions; diagnostic criteria for general pathological and pathophysiological processes in various diseases; based on which the student has skills in topographic anatomy and is able to address issues related to surgical operations</b>	

**By the end of the course students must:**

<b>3.1 Know:</b>	
3.1.1	safety and operating instructions for work in physical, chemical, biological laboratories with reagents, equipment, and animals;
3.1.2	chemical and biological essence of the processes occurring in living organisms at the molecular, cellular, tissue and organ levels;
3.1.3	the basic patterns of development and functioning of organisms based on the structural organization of their cells, tissues and organs;
3.1.4	histo-functional characteristics of tissue elements and their research methods;
3.1.5	the structure, topography and development of cells, tissues, organs and systems of the organism in correlation with their function, characteristics of organismic and population levels of life organization;

3.1.6	functional systems of the human body, their regulation and self-regulation when exposed to the external environment;
3.1.7	the structure and functions of the human immune system, its age-related characteristics, cellular-molecular mechanisms of development and functioning of the immune system, the main stages, types, and genetic control of the immune response;
3.1.8	microscopic structure, functions and sources of cell development;
3.1.9	tissue and microscopic structure, functions and sources of organ development;
3.1.10	the main stages of embryonic development and their characteristics;
3.1.11	critical periods of human embryonic development;
3.1.12	age-related characteristics of tissue and organ structure.
<b>3.2</b>	<b>Be able to:</b>
3.2.1	use educational, scientific, popular scientific literature and the internet for professional activity;
3.2.2	use physical, chemical and biological equipment;
3.2.3	work with magnifying equipment (microscopes, optical and simple lenses);
3.2.4	make a histophysiological assessment of the state of various cellular, tissue and organ structures;
3.2.5	explain the nature of deviations in the development pattern which can lead to variants of abnormalities and malformations;
3.2.6	interpret the results of the most common functional diagnostic methods used to detect pathology of blood, heart and blood vessels, lungs, liver, kidneys and other organs and systems;
3.2.7	draw histological and embryological specimens and designate the structural elements in them;
3.2.8	examine histological and embryological specimens with the microscope;
3.2.9	analyze histological and embryological specimens;
3.2.10	examine electron micrographs of cells and non-cellular structures;
3.2.11	prepare oral and written descriptions of specimens;
3.2.12	apply the knowledge of histology in practice for solving standard problems in the professional activity of a physician (solving situational problems).

#### 4. STRUCTURE AND CONTENTS OF THE COURSE (MODULE)

Class Code	Topics /Class type	Term / Academic	Academic hours	Competences	Literature	Notes
	<b>Section 1. Cytology</b>					
1.1	Cell structure /lecture	2	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
1.2	Microscopy, Cell structure /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4	
1.3	Microscopy, Cell structure /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4	
1.4	Cell Nucleus, DNA, Cell Division /lecture	2	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
1.5	Cell Nucleus, DNA, Cell Division /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4	
1.6	Cell Nucleus, DNA, Cell Division /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
	<b>Section 2. General histology</b>					
2.1	Epithelial Tissue and Glands /lecture	2	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4	
2.2	Epithelial Tissue /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4	

2.3	Epithelial Tissue /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4
2.4	Glands /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4
2.5	Glands /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4
2.6	Connective Tissue /lecture	2	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4
2.7	Connective Tissue I /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4
2.8	Connective Tissue II /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.9	Connective tissue /self-study	2	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.10	Cartilage and Bone /lecture	2	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.11	Cartilage and Bone /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.12	Cartilage and Bone /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.13	Muscular Tissue /lecture	2	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.14	Muscular Tissue /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.15	Muscular Tissue /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.16	Lymphatics and Lymphoid Tissue /lecture	2	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.17	Lymphatics and Lymphoid Tissue /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.18	Lymphatics and Lymphoid Tissue /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5
2.19	Nervous Tissue /lecture	2	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5

2.20	Nervous Tissue /practical classes	2	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
2.21	Nervous Tissue /self-study	2	3	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
2.22	Histology specimen diagnostics / self-study	2	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
2.23	Credit test on general histology /Assessment: credit test	2		GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3	Oral survey
	<b>Section 3. Specific histology</b>					
3.1	Integumentary System /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.2	Integumentary System /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.3	Integumentary System /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.4	Cardiovascular System /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.5	Cardiovascular System /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.6	Cardiovascular System /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.7	Respiratory System /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.8	Respiratory System /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.9	Respiratory System /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.10	Digestive system /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.11	Digestive system I /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	

3.12	Digestive system II /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.13	Digestive system I and II /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.14	Urinary system and Reproductive System (male and female) /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.15	Urinary system /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.16	Urinary system /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.17	Male Reproductive System /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.18	Female Reproductive System /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.19	Male and Female Reproductive System /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.20	Sense Organs /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.21	Sense Organs /practical classes	3	4	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
3.22	Sense Organs /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
	<b>Section 4. Embryology</b>					
4.1	Early stages of human development /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
4.2	Early stages of human development /practical classes	3	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
4.3	Provisional organs of a human /lecture	3	2	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	
4.4	Provisional organs of a human /practical classes	3	6	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	

4.5	Early stages of human development and provisional organs of a human /self-study	3	1	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	Essay
4.6	Histology, cytology, embryology / exam	3	36	GPC-5.1 GPC-5.2 GPC-5.6	L1.1 L1.2 L2.1 L3.1 L3.2 E1 E2 E3 E4 E5	Description of specimen, oral survey

## 5. ASSESSMENT TOOLS

### 5.1. Tests and tasks

Supplement 1

### 5.2. Assessment materials for diagnostic testing

Supplement 2

## 6. COURSE (MODULE) RESOURCES

### 6.1. Core

	Authors	Title	Publish., year	Quantity
L1.1	Kuznetsov S. L., Mushkambarov N. N.	Histology, cytology and embryology: textbook	Moscow: Medical Information Agency, 2016	1
L1.2	Afanasyev Yu.I., Aleshin B.V., Barsukov N.P., Yurina N.A.	Histology, cytology and embryology: textbook	Moscow: GEOTAR-Media, 2023, electronic resource	1

### 6.1.2. Supplementary

	Authors, compilers	Title	Publisher, year	Quantity
L2.1	Boychuk N.V., Islamov R.R., Kuznetsov S.L., Chelyshev Yu.A.	Histology. Atlas for practical classes: a study guide	Moscow: GEOTAR-Media, 2014, electronic resource	1

### 6.1.3. Tutorials

	Authors, compilers	Title	Publisher, year	Quantity
L3.1	Studenikina T.M., Vylegzhanina T.A., Ostrovskaya T.I., Stelmakh I.A.	Histology, Cytology and Embryology: Study manual	Moscow: LLC "Scientific Publishing Center INFRA-M", 2024, electronic resource	1
L3.2	Lenchenko E.M.	Histology and Basics of Embryology: Study manual	Moscow: LLC "Scientific and Publishing Center INFRA-M", 2022, electronic resource	1

### 6.2. Internet resources

E1	Electronic library of medical University <a href="http://www.studmedlib.ru">www.studmedlib.ru</a>
E2	Electronic library system <a href="http://www.znaniy.com">www.znaniy.com</a>
E3	FreeMedicalJournals
E4	<a href="http://e.lanbook.com/">http://e.lanbook.com/</a>
E5	Histology guide: virtual microscopy laboratory. <a href="https://histologyguide.com/">https://histologyguide.com/</a>

### 6.3.1 Software

6.3.1.1	Operational system Microsoft, applied programs pack Microsoft Office
6.3.1.2	Internet access (Wi-Fi)

### 6.3.2 Information Referral systems

6.3.2.1	E-data bases: ПГБ, Orbicon, Medline.
6.3.2.2	Student Consultant <a href="http://www.studmedlib.ru">http://www.studmedlib.ru</a>

## 7. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE (MODULE)



7.1	The lecture hall is equipped with a multimedia projector, screen, laptop, stationary educational board for chalk, and typical educational furniture: desks and chairs.
7.2	<p>The training room for practical classes, group and individual consultations, ongoing monitoring and interim assessment is equipped with:</p> <ul style="list-style-type: none"> <li>• Portable Epson projector (1 unit)</li> <li>• Laptop (1 unit)</li> <li>• Zeiss microscopes (12 units)</li> <li>• Video films, charts, and models</li> <li>• Microscope slides (specimens)</li> <li>• Study tables (10 units)</li> <li>• Chairs (24 units)</li> <li>• Interactive pathology classroom "VIRCHOW"</li> <li>• Full HD Samsung IPS displays (6 units)</li> <li>• Interactive Smart Board SB480iv4</li> <li>• Lenovo laptop</li> <li>• Primo Star microscopes (8 units)</li> </ul>
7.3	<p>The Morphological Laboratory of the Department of Pathophysiology and General Pathology is equipped with:</p> <ul style="list-style-type: none"> <li>• Microscope</li> <li>• Video camera with software</li> <li>• Computer</li> <li>• Microscope with camera and morphometric program</li> <li>• Equipment for histological preparation of materials (microtome, water bath, thermostats)</li> <li>• Accessories for staining and immunohistochemical examination of materials</li> <li>• Tools and consumables in quantities sufficient for students to master the skills provided by the program</li> </ul>