



MINISTRY OF EDUCATION AND SCIENCE OF THE KYRGYZ REPUBLIC

**OSH STATE UNIVERSITY
INTERNATIONAL MEDICAL FACULTY**

Department of anatomy, histology and normal physiology

«Approved» 
at the meeting of the Department № 2,
from “_07_”_09_____ 2021 y.
PhD, associate Professor. Sakibaev K.Sh.

«Agreed» 
Chairman of the faculty's EMS
PhD, associate Professor Keneshbaev B.K.
from “_07_”_09_____ 2021y.

**STUDENT TRAINING PROGRAM (SYLLABUS)
the discipline "Histology, Cytology and embryology"
part 2
for students studying in the specialty:
560001-General Medicine (GM)**

Form of training: full-time

Total credits: 3, course - 2; semester-3.

Total hours: 90, including: classroom-45 h (lectures-18 h, practical-63 h);
SIW – 45 h.

Number of boundary controls (CW): module-2, exam-3 semester.

Information about the teacher: *Alimbekova A.A.*

Department, office number: *"Anatomy, histology and normal physiology",
morphological educational-scientific laboratory complex, 1st floor, room №103.*

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date: *2021-2022 academic year*

Osh – 2021

1. GOALS OF THE DISCIPLINE

The purpose of the discipline "histology, Cytology and embryology" is to form students' knowledge of microscopic functional morphology and the development of human cellular, tissue and organ systems that provide a basis for the study of clinical disciplines and contribute to the formation of medical thinking.

2. LEARNING OUTCOMES

Based on the results of studying histology, Cytology and embryology in combination with other disciplines, the student should have the following competencies (expected results):

- **Expected learning outcomes (LOd-1):**
To be able and ready to analyze the main physical phenomena and biological patterns underlying the processes occurring in the human body, the origin and development of life, human anthropogenesis and ontogenesis (OK-1, CJK-2);
- **Expected learning outcomes (LOd-2):**
able and ready to work in histological laboratories, use the basic methods and skills of microscopy, prepare histological sections, read and describe histological, embryological, histochemical preparations, drawings and draw up a conclusion of histological research (IK-5);
- **Expected learning outcomes (LOd -3):**
able and ready to apply knowledge of micromorphology to explain the processes of life of your own body, the General laws of origin, development of life, the basis for the occurrence of pathological conditions (JK-3);
- **Expected learning outcomes (LOd -4):**
able and ready to give a histophysiological assessment of the state of various cellular, tissue and organ structures, analyze and recognize the ultramicroscopic structure of cells, microscopic structure of tissues and organs, determine their location, calculate the leukocyte formula (IK-12).

Upon completion of the course in histology, Cytology and embryology, students should:

Know and understand:

- Safety regulations and work in physical, chemical, and biological laboratories with reagents, devices, and animals;
- The physical and chemical nature of the processes occurring in a living organism at the molecular, cellular, tissue and organ levels;
- Basic laws of development and vital activity of the body based on the structural organization of cells, tissues and organs; histofunctional features of tissue elements; methods of their research;
- Structure, topography and development of cells, tissues, organs and systems of the body in interaction with their function in normal and pathological conditions, features of the organizational and population levels of life organization;

Be able to:

- Use educational, scientific, popular science literature, the Internet for professional activities;
- Use physical, chemical and biological equipment;
- Work with magnifying equipment (microscopes, optical and simple magnifiers);
- Provide histophysiological assessment of various cellular, tissue, and organ structures;
- Explain the nature of deviations in the course of development that can lead to the formation of variants of anomalies and defects;

Own:

- Medical and anatomical conceptual apparatus;
- Skills in microscopy and analysis of histological preparations and electronic micrographs, drawings;

3. PREREQUISITES:

To study this discipline, you need knowledge, skills and abilities formed by the course of General human anatomy and General biology in the framework of educational standards of full secondary education

4. POSTREQUISITES:

The main provisions of the discipline and its sections should be used in the future when studying the following fundamental and clinical disciplines: pathological anatomy, pathological physiology and other clinical disciplines.

5. Technological map of the discipline (for example, one semester)

total	Classroom hours	ISW	1-module (48 h., 30 p.)				2-module (42 h., 30 p.)				Total control (40 p.)				Final control
			Ауд. часы		SIW	1-Current control (PK1)	Ауд. часы		SIW	2-Current control (PK2)	Lecture	Practice.	ISW	Final control (FC)	
			Lecture	Practice			Lecture	Practice							
90	45	45	10	16	24	30 б.	8	11	41	30 б.	40	40	40	40 б	100б
points			30	30	30		30	30	30		30	40	40		
Type of control			$TK = (\text{Лек} + \text{Прак} + \text{CPC})/3,$ $M1 = (TK1 + \dots + TKN + PK1)/(N+1)$				$TK = (\text{Лек} + \text{Прак} + \text{CPC})/3,$ $M1 = (TK1 + \dots + TKN + PK1)/(N+1)$				$ИК = (\text{Лек} + \text{Прак} + \text{CPC})/3,$ $ЭКЗ = M1 + M2 + ИК$				

Примечание: AUD - classroom, CC-current control, BC-boundary control, M-module, ISW-independent .students ' work, IR-final control.

6. Map of accumulation of points on the subject of histology, cytology and embryology on the section of module 1

№	Group ____	Average daily TC score	Lecture	ISW	CC	Total
	Name of students	30 points	30 points	30 points	30 points	30 баллов
1.						
2.						

Module = Average score of a practical lesson + L + ISW + CC/4

Technological map of student group points accumulation _____

(discipline: "histology, cytology and embryology", specialty: 560001-General medicine (GM), 3-semester, 2021-2022 academic year)
(on the example of one class)

class №1		Theme №1							Date of rework
№	I-week	Class attendance	Copybook	Album	Activity	Test	total		
	Name of students	3	3	4	10	10	30		
1.									
...									

7. SUMMARY OF THE DISCIPLINE

Histology, cytology and embryology belongs to the professional cycle and is part of the basic part of the educational program (B. 3.), which is studied during the II, III semesters and includes the following sections (didactic units):

GENERAL HISTOLOGY:

1. Cytology – the study of the cell. Studies the General structure and physiology of cellular structures.
2. Embryology-the science of the laws of development of the embryo.
3. General histology-the study of the development, structure and functions of tissues.

HUMAN HISTOLOGY is a branch of histology that studies the microscopic structure of morphofunctional units of organs and organ systems.

4. Nervous system and sensory organs
5. Cardiovascular system
6. The endocrine system
7. Digestive system
8. Respiratory system and skin
9. Urogenital system

**8. Calendar and thematic plan of lectures for 2nd year students the subject:
HUMAN HISTOLOGY 2
(3rd semester, 2021-2022 academic years)**

Week №	clas s№	Date	Name of the topic	Hours	
By semester curriculum	Module 1				
	1.		15.09.21-18.09.21.	Cardio-vascular system. Histology of blood vessels, lymph vessels and heart. Histology of lymphoid organs.	2
	2.		20.09.21-25.09.21	Endocrine system. Classification. Histological structure of hypophysis, pineal gland, thyroid gland, adrenal gland.	2
	3.		27.09.21-02.10.21.	Digestive system. Histological structure of oral cavity, esophagus, stomach.	2
	4.		04.10.21-09.10.21	Histological structure of small and large intestine, liver, pancreas, gallbladder.	2
	5.		11.10.21-16.10.21	The respiratory system	2
	6.		18.10.21-23.10.21	Skin and it's appendages.	2
	7.		25.10.21-30.10.21	The urinary system.	2
	8.		01.11.21-06.11.21	The male reproductive system	2
	9.		08.11.21-13.11.21	The female reproductive system	2
				24 hours	

**Calendar and thematic plan of practical classes for 2nd year students the subject:
HUMAN HISTOLOGY 2
(3rd semester, 2021-2022 academic years)**

Week №	date	Name of the topic	Hours
1 week	15.09.21-18.09.21.	Cardio-vascular system. Histology of blood vessels: arteries, veins. Structure of lymph vessels and heart.	2
2 week	20.09.21-25.09.21	Histology of lymphoid organs. Classification. Structure of thymus, bone marrow, spleen, lymph nodes.	2

3 week	27.09.21-02.10.21.	Endocrine glands. Classification. Histology of pituitary, pineal glands.	2
4 week	04.10.21-09.10.21	Histology of thyroid, parathyroid and adrenal glands.	2
5 week	11.10.21-16.10.21	Digestive system. Histological structure of oral cavity	2
6 week	18.10.21-23.10.21	Digestive system. Histological structure of esophagus and stomach.	2
7 week	25.10.21-30.10.21	Histological structure of small and large intestine.	2
8 week	01.11.21-06.11.21	Histological structure of liver, pancreas, gallbladder	2
9 week	08.11.21-13.11.21	The respiratory system. Module №1	2
10 week	15.11.21-20.11.21	Skin and it's appendages	2
11 week	22.11.21-27.11.21	The urinary system.	2
12 week	29.11.21-04.12.21	The male reproductive system	2
13 week	6.12.21-11.12.21	The female reproductive system. Histological structure of ovary, uterine tube	2
14week	13.12.21-18.12.21	Histological structure of uterus, cervix and vagina. Module №2	1
Итого часов	Lectures		18 hours
	Practical classes		27 hours
	Modules		2

9. EDUCATIONAL AND METHODOLOGICAL SUPPORT OF THE COURSE

Main literature:

1. Junqueira's Basic Histology/ Text and Atlas (14th ed.) p. 560.
2. Histology/ Color Atlas and textbook/ Leslie P. Gartner, James L. Hiatt (6th ed.)
3. Inderbir Singh's textbook of Human Histology/ Neelam Vasudeva, Sabita Mishra/ Color Atlas and practical guide (7th ed)

Additional:

1. Textbook of Histology/ Leslie P. Gartner (4th ed.)
2. Histology/ textbook. Eduardo G. Gonzales, M.D. (5th ed.)
3. Human histology/ Alan Stevens, James Lowe. (3rd ed.)

Программное обеспечение, электронные источники

- <http://anatomy-portal.info>
- <http://www.ksma.edu.kg/>
- <http://www.library.ru/>
- <http://www.medicalstudent.com>
- <http://www.medicinform.net>
- <http://www.mma.ru/>
- <http://www.rmj.ru>
- <http://www.rsmu.ru/>

10. INFORMATION ON ASSESSMENT (POINTS TABLE)

100 ball system	30 ball system	Rating by letter system	Digital equivalent of the rating	Assessment using the traditional system
87 – 100	26 – 30	A	4,0	Excellent
80 – 86	24 – 25	B	3,33	Good
74 – 79	22 – 23	C	3,0	
68 -73	20 – 21	Д	2,33	Satisfactorily
61 – 67	18 – 19	E	2,0	
31-60	9 – 17	FX	0	Unsatisfactorily
0-30	0 – 8	X	0	

11. POINTS POLICY

According to the points accumulation card, a student can receive points for all types of classes. At lectures, in practical classes, and for performing the SRS. At the same time, for current and foreign controls- a maximum of 30 points for 1 module; final control – a maximum of 40.

The educational process is organized using a modular rating system for evaluating student performance using the AVN information system.

A) Students are presented with the following systems of requirements and rules of conduct in the classroom:

1. Mandatory attendance of classes;
2. Activity during classes;
3. Preparation for classes, homework and SRS.
4. Turnout for self-training.

Unacceptably:

5. Being late and leaving classes;
6. Use of cell phones during classes;
7. Fraud and plagiarism;
8. Late delivery of tasks.

B) mastering the topic is monitored in practical classes in accordance with specific goals. It is recommended to use the following forms of current control of students' level of training:

9. written (or computer) testing in the scope of control works;
10. answers to tickets and solving situational problems;
11. control of practical skills of microscopy of drugs, followed by analysis and evaluation of the features of the structure of human organs;
12. analysis of sources and patterns of prenatal and early postnatal development of human organs, variants of organ variability, and malformations.

The final control of learning modules is carried out at their completion and includes:

13. oral interview (control of practical skills).
14. computer or written test control on the volume of tests and situational tasks of control works (semantic modules);
 - the tasks of the job.

B) the organization of the educational process is based on the systematic work of students during the entire academic year. Types of training sessions in histology, Cytology and embryology in accordance with the curriculum are:

- Lectures;
- Practical class;
- Independent (extracurricular) work of students;
- Individual work of your choice.

13. LIST OF QUESTIONS AND TASKS ON TOPICS AND FORMS OF CONTROL

1. Cardiovascular system. Vessels of the microcirculatory bed, medium and large calibers. Heart.
2. Central organs of hematopoiesis. Red bone marrow. Thymus. Stages of embryonic hematopoiesis. Scheme of hematopoiesis. Cellular bases of immunity. Peripheral hematopoietic organs. Spleen, lymph nodes.
3. Main functional devices: dioptric, accommodative and receptor.
4. Structure and pathophysiology of rod-and cone-bearing retinal neurons.
5. Features of the structure of the Central fossa of the optic disc.
6. The retinal pigment epithelium, structure and value. Features of blood supply to the eyeball. Age change. Auxiliary organs of the eye (eyelids, lacrimal apparatus).
7. The olfactory organ. General characteristic. Structure and cellular composition of the olfactory lining: receptor, supporting and basal cells.
8. Histophysiology of the olfactory organ.
9. Age-related changes. Vomeronasal organ.
10. The organ of taste. General characteristic. Structure and cellular composition of taste buds: taste, supporting and basal cells. Innervation of the taste buds. Histophysiology of the taste organ. Age change.
11. Organs of hearing and balance. General characteristic. External ear: the structure of the external ear canal and eardrum. Middle ear: auditory bones, characteristics of the epithelium of the tympanic cavity and auditory tube.
12. Inner ear: bony and membranous labyrinths.
13. Vestibular part of the membranous labyrinth: elliptical and spherical sacs and semicircular channels. Their receptor divisions: structure and cellular composition of spots and ampullary scallops. Innervation. Histophysiology of the vestibular labyrinth.
14. the Cochlear part of the membranous labyrinth: the structure of the cochlear canal, the structure and cellular composition of the spiral organ, its innervation. Histophysiology of sound perception. Age change.
15. Cardiovascular system. Vessels of the microcirculatory bed, medium and large calibers. Heart.
16. The Central organs of hematopoiesis. Red bone marrow. Thymus. Stages of embryonic hematopoiesis. Scheme of hematopoiesis. Cellular bases of immunity. Peripheral hematopoietic organs. Spleen, lymph nodes.
17. The organs of internal secretion. Thyroid and parathyroid glands. Adrenal. Neuroendocrine link.
18. Hypothalamic-pituitary connections.
19. Three pituitary lobes, their histo- and ultrastructure. Ultrastructural structure of glandular cells of the adenohypophysis and neurohypophysis.
20. Epiphysis.
21. Anterior part of the digestive system. Oral epithelium and its derivatives (glands).
22. Anterior part of the digestive system. Organs of the oral cavity. Lip, tongue, mucosa of the oral cavity.
23. Histogenetically characteristics of the mucous membrane of the oral cavity: lip and cheek. Age change.
24. Histogenetically characteristics of the mucous membrane of the mouth: the gums, hard and soft palate. Age change.
25. Development of teeth. Diphyodont.
26. Structure of hard tooth tissues (enamel, dentin, cement).
27. Soft tissues of the tooth. Pulp: morphofunctional characteristics, reactive properties and regeneration. Denticle.
28. The structure of the periodontium: the periodontal and bone alveolus, the gums.
29. Age-related periodontal changes and their role in the implementation of pathological processes.
30. Dental alveolus: morphofunctional characteristics. Reconstruction of the dental alveoli of the upper and lower jaw when the functional load changes.
31. Language: features of the structure of the mucous membrane on the back, lower and side surfaces. Taste buds.
32. Salivary glands: parotid and submandibular and sublingual.
33. Histophysiology of large and small salivary glands. Endocrine functions and age-related changes.
34. Lymphoid apparatus of the oral cavity. Local immunity on the example of the Palatine tonsil.
35. Esophagus, the passage of the esophagus into the stomach. Stomach, fundal and pyloric divisions.

- Intestine. Duodenum, jejunum, and ileum. Colon.
36. The liver. Sources of liver development.
 37. Structure of the classical and portal lobes of the liver.
 38. Hepatocytes, hepatic beams, sinusoid capillaries, stellate cells. Disse space, its ultra-structural structure and meaning.
 39. the Gallbladder and bile ducts, the structure of their walls.
 40. Large glands of the digestive tract.
 41. Pancreas. Sources of liver and pancreas development.
 42. Exo-and endocrine part of the pancreas, cellular composition and hormones of the endocrine part. Micro - and ultramicroscopic data.
 43. Digestive system. The digestive tube, its development, tissue composition and General plan of structure, and the meaning of the term "mucosa". Anterior part of the digestive system. Small and large salivary glands, their classification and ultrastructural organization of end sections.
 44. Respiratory organs. Airways, respiratory parts of the lung.
 45. Surfactant. Diagram of the air-blood barrier.
 46. The acini of the lung. Structural components of the acinar. Alveoli. Histo-and ultrastructural structure of the alveolar wall.
 47. Aerogematically barrier, its histological and ultrastructural structure, mechanisms of gas exchange.
 48. Surfactant, its morphofunctional value. Cells that produce surfactant components.
 49. General principle of organization of the respiratory system. Sources of development of the respiratory system.
 50. Features of the structure of external and intra-pulmonary Airways. Histological picture in the structure of the walls of the bronchi as their caliber decreases.
 51. Skin and its derivatives. The skin of the finger and the scalp.
 52. Excretory system. General characteristics of the excretory system.
 53. Development of the genitourinary system. Kidney, primary kidney, and final kidney.
 54. A nephron. Features of the structure of various departments of the nephron in connection with their function.
 55. the circulatory system of the kidneys, the renal body and its components, the bladder, the ureter.
 56. Ultramicroscopic structure of the nephron. Age-related changes in the kidneys.
 57. Organs of the male reproductive system. The testis with the epididymis.
 58. Characteristics of the spermatogenic epithelium of the testis in connection with the stages of spermatogenesis.
 59. Differentiation of spermatids into spermatozoa. Ultramicroscopic characteristics of the sperm.
 60. Prostate gland.
 61. Organs of the female reproductive system. Female genital organs.
 62. Development of the female reproductive system.
 63. Structure and functions of the ovary, the structure of ovarian follicles in connection with the periods of oogenesis.
 64. Age-related changes in the female reproductive system.
 65. Ovarian-menstrual cycle.