



MINISTRY OF SCIENCE AND HIGHER EDUCATION OF RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
Far Eastern Federal University
(FEFU)
SCHOOL OF BIOMEDICINE

AGREED
Head of OP

(Signed) (Full name)



CLAIM

Director of the Department of Medical Biology and
Biotechnology

(Signed) (I. A. Surname)
"28" January 2021

WORK PROGRAM OF THE DISCIPLINE
Comparative histology
Direction of training 06.04.01 Biology
(Molecular and Cell Biology)
Form of training: full-time

Course 1 semester 1
lectures 18 h.
practical exercises - hour.
lab work 6 hours
total hours of classroom load 36 hours.
independent work 108 hours.
of these, 45 hours to prepare for the exam.
exam 1 semester

The work program is drawn up in accordance with the requirements of the Federal State Educational Standard in the direction of training 06.04.01 Biology, approved by the order of the Ministry of Science of the Republic of Russia dated 11.08.2020. № 934.

The work program was discussed at a meeting of the Department of Medical Biology and Biotechnology protocol of "28" January 2021. № 5

Director of the Department of Implementing Structural Unit Ph.D., Associate Professor Kumeiko V.V.
Compiled by: assistant Farniev V.M

Vladivostok
2021

Reverse side of the RPD cover page

1. The work program was revised at the meeting of the Department / department / department (implementing the discipline) and approved at the meeting of the Department / department / department (issuing structural unit), the protocol from " _____ № _____

2. The work program was revised at the meeting of the Department / department / department (implementing the discipline) and approved at the meeting of the Department / department / department (issuing structural unit), the protocol from " _____ № _____

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4. The work program was revised at the meeting of the Department / Department / Department (implementing the discipline) and approved at the meeting of the Department / Department / Department (issuing structural unit), the protocol from " _____ № _____

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1. Goals and objectives of mastering the discipline:

Objective: Formation of students' knowledge about the phylogenetic development of the main types of tissues.

Tasks:

1. Formation of students' fundamental knowledge about the evolutionary process of formation and development of the main groups of tissues of the body of invertebrates and vertebrate animals.

2. Formation of students' skills in working with microscopic equipment for the study of finished micropreparations.

3. Formation of students' skills in the manufacture of histological micropreparations of vertebrate and invertebrate animals.

Professional competencies of graduates and indicators of their achievement:

Task type	Code and name of professional competence (the result of mastery)	Code and name of the competency achievement indicator
research	PC-1 Is able to creatively use in scientific and production-technological activities knowledge of fundamental and applied sections of disciplines (modules) that determine the scope of molecular and cell biology.	PC-1.1 Works with scientific and technical information and special literature, studies the achievements of domestic and foreign science in the field of molecular and cell biology using new technologies and electronic databases.
		PC-1.2 Conceives and formulates diagnostic solutions to the problems of molecular and cellular biology by integrating fundamental biological concepts and specialized knowledge in the field of professional activity
		PC-1.3 Uses in scientific and production-technological activities knowledge of fundamental and applied sections of disciplines that determine the scope of molecular and cellular biology
	PC-2 is able to apply the methodological foundations of design, perform laboratory biological, environmental research, use modern equipment and computing complexes in molecular and cell biology.	PC-2.1 Develops rules and algorithms for the design, implementation of laboratory biological and environmental research.
		PC-2.2 Performs laboratory biological, environmental research using the scientific methodological foundations of fundamental research.
		PK-2.3 Applies the methodological foundations of design, laboratory biological, environmental research, uses modern equipment and computing complexes in molecular and cellular biology.
	PC-3 is capable of conducting research on biopolymers, their components and	PC-3.1 Studies the structure and functions of biopolymers, their components and complexes, mechanisms of storage, transmission and implementation of genetic

	complexes, the structure and function of genes and genomes.	information at the molecular level.
		PC-3.2 Detailedly characterizes the main processes occurring in a living cell: the processes of replication, transcription, translation, recombination, repair, processing of RNA and proteins, protein folding and docking.
		PC-3.3 The study of the main methods of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism.
		PC-3.4 Analyzes the structure and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.

Code and name of the competency achievement indicator	Name of the assessment indicator (the result of training in the discipline)
PC-1.1 Works with scientific and technical information and special literature, studies the achievements of domestic and foreign science in the field of molecular and cell biology using new technologies and electronic databases.	Knows the methods of working with scientific and technical information and special literature Able to use scientific and technical information and special literature He has the skills to study the achievements of domestic and foreign science in the field of molecular and cell biology using new technologies and electronic databases.
PC-1.2 Conceives and formulates diagnostic solutions to the problems of molecular and cellular biology by integrating fundamental biological concepts and specialized knowledge in the field of professional activity	Knows diagnostic solutions to problems in molecular and cell biology Able to formulate diagnostic solutions to problems of molecular and cell biology by integrating fundamental biological concepts Possesses the skills to make diagnostic solutions to problems of molecular and cellular biology by integrating fundamental biological concepts and specialized knowledge in the field of professional activity
PC-1.3 Uses in scientific and production-technological activities knowledge of fundamental and applied sections of disciplines that determine the scope of molecular and cellular biology	He knows the fundamental and applied sections of the disciplines that determine the scope of molecular and cellular biology Able to use in scientific and production-technological activities knowledge of fundamental and applied sections of disciplines that determine the scope of molecular and cell biology Possesses the skills of using in scientific and production-technological activities knowledge of fundamental and applied sections of disciplines that determine the scope of molecular and cellular biology
PC-2.1 Develops rules and algorithms for the design, implementation of laboratory biological and environmental research.	Knows the algorithms of design, performance of laboratory biological, environmental studies. Able to develop rules and algorithms for designing, performing laboratory biological and environmental research. He has the skills to develop rules and algorithms for designing, performing laboratory biological and environmental studies.
PC-2.2 Performs laboratory biological, environmental research using the scientific methodological foundations of fundamental research.	Knows the basics of methods of laboratory biological, environmental research using the scientific methodological foundations of fundamental research Able to perform laboratory biological, environmental research using the scientific methodological foundations of fundamental research. He has the skills to perform laboratory biological, environmental

	research using the scientific methodological foundations of fundamental research.
PK-2.3 Applies the methodological foundations of design, laboratory biological, environmental research, uses modern equipment and computing complexes in molecular and cellular biology.	<p>Knows the methodological foundations of design, laboratory biological, environmental research</p> <p>He is able to use modern equipment and computing complexes in molecular and cellular biology.</p> <p>He has the skills to apply the methodological foundations of design, perform laboratory biological, environmental research, use modern equipment and computing complexes in molecular and cell biology.</p>
PC-3.1 Studies the structure and functions of biopolymers, their components and complexes, mechanisms of storage, transmission and implementation of genetic information at the molecular level.	<p>He knows the structure and functions of biopolymers, their components and complexes, mechanisms for storing, transmitting and implementing genetic information at the molecular level.</p> <p>It is able to study the structure and functions of biopolymers, their components and complexes, mechanisms for storing, transmitting and implementing genetic information at the molecular level.</p> <p>He has the skills to study the structures and functions of biopolymers, their components and complexes, mechanisms for storing, transmitting and implementing genetic information at the molecular level.</p>
PC-3.2 Detailedly characterizes the main processes occurring in a living cell: the processes of replication, transcription, translation, recombination, repair, processing of RNA and proteins, protein folding and docking.	<p>He knows the main processes occurring in a living cell: the processes of replication, transcription, translation, recombination, repair, processing of RNA and proteins, protein folding and docking.</p> <p>It is able to describe the main processes occurring in a living cell: the processes of replication, transcription, translation, recombination, repair, processing of RNA and proteins, protein folding and docking.</p> <p>He has the skills to describe the main processes occurring in a living cell: the process of replication, transcription, translation, recombination, repair, processing of RNA and proteins, protein folding and docking.</p>
PC-3.3 The study of the main methods of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism.	<p>He knows the basic methods of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism.</p> <p>It is able to investigate the main methods of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism.</p> <p>He has the skills to study the main methods of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism.</p>
PC-3.4 Analyzes the structure and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.	<p>He knows the structure and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.</p> <p>It is able to analyze the structure and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.</p> <p>He has the skills to analyze the structures and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.</p>

1. Labor intensity of discipline and types of training sessions in the discipline

The total labor intensity of the discipline is 4 credited units (144 academic hours), (1 credit unit corresponds to 36 academic hours).

Types of training sessions and work of the student in the discipline are:

Designation	Types of training sessions and work of the student
Lek	Lecture
Lek electr.	
Lr	Labs
Lr electr.	
WED:	Independent work of the student during the period of theoretical training
including control	Independent work of the student and contact work of the student with the teacher during the period of intermediate certification

Structure of the discipline:

The form of training is full-time.

№	Name of the section Discipline	Se me ster	Number of hours by types of training sessions and work of the student						Intermediate attestation forms
			Lek	Lab	Av e	OK	WE D	Cont rol	
1.	Section No1		6	6			20	45	Oral interview, testing
2.	Section No2		12	12			43		Oral interview, testing
	Total:	1	18	18	-	-	63	45	Exam

THE STRUCTURE AND CONTENT OF THE THEORETICAL PART OF THE COURSE

Lectures 18 hours.

1. Section No1. Fundamentals of Evolutionary Histology (6 hours).
 - a. Lecture class No1. Evolutionary ideas in histology (3 hours).
 - b. Lecture class No2. From ontogeny to tissue phylogeny (3 hours).
2. Section No2. Particular issues of comparative histology (12 hours).
 - a. Lecture class No1. Epithelial tissues (3 hours).
 - b. Lecture class No2. Muscle tissue (3 hours).
 - c. Lecture class No3. Tissues of the internal environment (3 hours).

- d. Lecture class No4. Tissues of the nervous system (3 hours).

IV. STRUCTURE AND CONTENT OF THE PRACTICAL PART OF THE COURSE AND INDEPENDENT WORK

Laboratory work 18 hours.

1. Section No1. Fundamentals of Evolutionary Histology (6 hours).
 - a. Laboratory work No1. Evolutionary ideas in histology study and preparation of micropreparations, staging biochemical reactions, immunohistochemical studies of tissues (3 hours).
 - b. Laboratory work No. 2. From ontogenesis to tissue phylogeny, study and preparation of micropreparations, staging biochemical reactions, immunohistochemical studies of tissues (3 hours).
2. Section No2. Particular issues of comparative histology (12 hours).
 - a. Laboratory work No1. Epithelial tissues study and preparation of micropreparations, staging biochemical reactions, immunohistochemical studies of tissues (3 hours).
 - b. Laboratory work No. 2. Muscle tissues study and preparation of micropreparations, staging biochemical reactions, immunohistochemical studies of tissues (3 hours).
 - c. Laboratory work No3. Tissues of the internal environment study and preparation of micropreparations, staging biochemical reactions, immunohistochemical studies of tissues (3 hours).
 - d. Laboratory work No4. Tissues of the nervous system study and preparation of micropreparations, staging biochemical reactions, immunohistochemical studies of tissues (3 hours).

INDEPENDENT WORK

Independent work consists of such types of work as the study of material on textbooks, reference books, videos and presentations, as well as other reliable sources of information; exam preparation.

V. EDUCATIONAL AND METHODOLOGICAL SUPPORT OF INDEPENDENT WORK OF STUDENTS

Recommendations for independent work of students

The purpose of the independent work of the student is to work meaningfully and independently first with educational material, then with scientific information, to lay the foundations of self-organization and self-education in order to instill the ability to further continuously improve their professional qualifications.

The process of organizing the independent work of the student includes the following stages:

- preparatory (setting goals, drawing up a program, preparing methodological support, preparing equipment);
- basic (implementation of the program, the use of methods of information retrieval, assimilation, processing, application, transfer of knowledge, fixation of results, self-organization of the work process);
- final (assessment of the significance and analysis of the results, their systematization, assessment of the effectiveness of the program and methods of work, conclusions on the directions of labor optimization).

In the process of independent work, the student acquires the skills of self-organization, self-control, self-government, self-reflection and becomes an active independent subject of educational activity. Independent work of students should have an important impact on the formation of the personality of the future specialist, it is planned by the student independently. Each student independently determines the mode of his work and the measure of work spent on mastering the educational content in each discipline. He performs extracurricular work according to a personal individual plan, depending on his preparation, time and other conditions.

Methodical recommendations for independent work of students

As the material on the subject of the discipline is mastered, it is planned to perform independent work of students on the collection and processing of literary material to expand the field of knowledge in the discipline under study, which allows you to deepen and consolidate specific practical knowledge gained in classroom classes. To study and fully master the program material on the discipline, educational, reference and other literature recommended by this program, as well as specialized periodicals, are used.

When independently preparing for classes, students take notes on the material, independently study the issues on the topics covered, using the educational literature from the proposed list, periodicals, scientific and methodological information, databases of information networks.

Independent work consists of such types of work as the study of material on textbooks, reference books, videos and presentations, as well as other reliable sources of information; To consolidate the material, it is enough to flip through the synopsis or read it, mentally restore the material. If necessary, refer to the recommended educational and reference literature, write down incomprehensible moments in the questions to understand them in the upcoming lesson.

Preparation for practical exercises. This type of independent work consists of several stages:

1) Repetition of the studied material. For this purpose, lecture notes, recommended basic and additional literature are used;

2) Deepening knowledge on the proposed topics. It is necessary to differentiate the available material in lectures, textbooks in accordance with the points of the plan of the practical lesson. Separately write out unclear questions, terms. It is better to do this in the margins of the lecture notes or textbook. Clarification should be carried out with the help of reference literature (dictionaries, encyclopedic publications, etc.);

3) Drawing up a detailed plan for the speech, or conducting calculations, solving problems, exercises, etc. In preparation for practical exercises, students take notes on the material, prepare answers to the above questions on the topics of practical exercises. In addition to the practical material, students independently study questions on the proposed topics, using educational literature from the proposed list, periodicals, scientific and methodological information, databases of information networks (Internet, etc.).

Requirements for the presentation and design of the results of independent work

There are no special requirements for the provision and design of the results of this independent work.

Control over the implementation of the plan of independent work of students is carried out by the teacher in practical classes by interviewing and by including in the final tasks specified in the lesson from the plan of independent work.

VI. MONITORING THE ACHIEVEMENT OF COURSE OBJECTIVES

No p/n	Supervised sections / topics of the discipline	Achievement indicator code and name	Learning outcomes	Assessment tools	
				current control	Intermediate-accurate certification
1.	Section No1. Fundamentals of Evolutionary Histology	PC-1.1; PC-1.2; PK-1.3 PK-2.1; PK-2.2; PK-2.3 PC-3.1; PC-3.2; PC-3.3; PC-3.4	Knows the methodological foundations of design, laboratory biological, environmental research He is able to use modern equipment and computing complexes in molecular and cell biology. He has the skills to apply the methodological foundations of design, perform laboratory biological, environmental	Oral interview, testing	Exam

			research, use modern equipment and computing complexes in molecular and cell biology.		
2.	Section No2. Particular Issues of Comparative Histology	PC-1.1; PC-1.2; PC-1.3 PK-2.1; PC-2.2; PC-2.3 PC-3.1; PC-3.2; PC-3.3; PC-3.4	He knows the structure and functions of biopolymers, their components and complexes, mechanisms for storing, transmitting and implementing genetic information at the molecular level. It is able to study the structure and functions of biopolymers, their components and complexes, mechanisms for storing, transmitting and implementing genetic information at the molecular level. He has the skills to study the structure and function of biopolymers, their components and complexes, mechanisms for storing, transmitting and implementing genetic information at the molecular level.	Oral interview, testing	Exam

VII. LIST OF REFERENCES AND INFORMATION AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE

Main literature

1. Histology, cytology and embryology : textbook / T.M. Studenikina, T.A. Vylegzhanina, T.I. Ostrovskaya, I.A. Stelmakh ; ed. by T.M. Studenikina. — Moscow : INFRA-M, 2023. — 574 p. — (Higher education: Bachelor's degree). - ISBN 978-5-16-006767-4. - Text : electronic. - URL: <https://znanium.com/catalog/product/1916106> (date of access: 2023-02-17). – Access mode: by subscription.
2. Yaglov, V. V. Osnovy histologii : uchebnik / V.V. Yaglov, N.V. Yaglova. — Moscow : INFRA-M, 2022. — 634 p. + Add. materialy [Elektronnyi resurs]. – (Higher education: Specialist's degree). — DOI 10.12737/24562. - ISBN 978-5-16-012281-6. - Text : electronic. - URL:

<https://znanium.com/catalog/product/1047183> (date of access: 2023-02-17). – Access mode: by subscription.

3. Boev, V. I. Anatomy of animals : textbook / V.I. Boev, I.A. Zhuravleva, G.I. Bragin. — Moscow : INFRA-M, 2023. — 352 p. — (Higher education: Bachelor's degree). — DOI 10.12737/3065. - ISBN 978-5-16-006826-8. - Text : electronic. - URL: <https://znanium.com/catalog/product/1913978> (accessed 2023-02-17). – Access mode: by subscription.

4. Anatomy with private histology of domestic animals / compiled by S. K. Isembergenova, G. K. Dzhanabekova, M. M. Zhylykshybayeva. — Almaty : Nur-Print, 2015. — 471 p. — Text : electronic // Digital educational resource IPR SMART : [site]. — URL: <https://www.iprbookshop.ru/69053.html> (date of access: 2023-02-17). - Access mode: for authorized. Users

5. Vrakin, V. F. Morphology of agricultural animals. Anatomy with the basics of cytology, embryology and histology / V. F. Vrakin, M. V. Sidorova ; edited by N. I. Emelyanova. — 2nd ed. — St. Petersburg : Quadro, 2021. — 528 p. — Text : elektronnyi // Fillektsiya obrazovatel'nyi resurs IPR SMART : [site]. — URL: <https://www.iprbookshop.ru/103107.html> (date of access: 2023-02-17). - Access mode: for authorized. Users

Further reading

1. Strukov, A. I. Pathological anatomy : textbook : textbook / A. I. Strukov, V. V. Serov; ed. by V. S. Paukov. - 6th ed. , pererab. i dop. - Moscow : GEOTAR-Media, 2015. - 880 p. - ISBN 978-5-9704-3260-0. - Text : electronic // EBS "Student Consultant" : [site]. - URL : <https://www.studentlibrary.ru/book/ISBN9785970432600.html> (date of access: 2023.02.17). - Access mode: by subscription.

2. Paukov, V. S. Pathological anatomy. In 2 vols. T. 1. Obshchaya patologiya : uchebnik / Pod red. V. S. Paukova - Moscow : GEOTAR-Media, 2015. - 720 p. - ISBN 978-5-9704-3252-5. - Text : electronic // EBS "Student Consultant" : [site]. - URL : <https://www.studentlibrary.ru/book/ISBN9785970432525.html> (date of access: 2023.02.17). - Access mode: by subscription.

3. Anisimova, S. A. Pathological anatomy of inflammation : a textbook for students of the 3rd year in the specialty "General Medicine" / S. A. Anisimova. - Ryazan : OOP UITTiOP, 2019. - 42 p. - Text : electronic // EBS "Student Consultant" : [site]. - URL : https://www.studentlibrary.ru/book/RZNGMU_029.html (date of access: 2023.02.17). - Access mode: by subscription.

List of resources of the information and telecommunication network
"Internet"

1. <https://nsau.edu.ru/>
2. <http://www.histology-world.com/>

IX. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

Training sessions on the discipline are held in rooms equipped with appropriate equipment and software.

The list of material and technical and software of the discipline is given in the table.

Logistics and Software Discipline

Name of special premises and premises for independent work	Equipment special premises and rooms for independent work	List of licensed software. Details of the supporting document
690922, Primorsky Krai, Vladivostok, Russky Island, Saperny Peninsula, Ajax village, 10, aud. L307	Multimedia audience: Screen with electric drive 236 * 147 cm Trim Screen Line; Projector DLP, 3000 ANSI Lm, WXGA 1280x800, 2000:1 EW330U Mitsubishi; Subsystem of specialized fasteners of equipment CORSA-2007 Tuarex; Video switching subsystem: DVI DXP 44 DVI Pro Extron matrix switch; DVI twisted pair extender DVI 201 Tx/Rx Extron; Subsystem of audio switching and sound amplification; acoustic system for ceiling mounting SI 3CT LP Extron; digital audio processor DMP 44 LC Extron; extension for IPL T CR48 management controller; Wireless LANs for trainees are provided with a system based on 802.11a/b/g/n 2x2 MIMO(2SS) access points. HP All-in-One 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200	

	SATA, DVD+/-RW, GigEth, Wi-Fi, WT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty	
690922, Primorsky Krai, Vladivostok, Russky Island, Saperny Peninsula, Ajax village, 10, aud. L433	Multimedia audience: Monoblock HP ProOne 400 G1 AiO 19.5" Intel Core i3-4130T 4GB DDR3-1600 SODIMM (1x4GB)500GB; Projection screen Projecta Elpro Electrol, 300x173 cm; Multimedia projector, Mitsubishi FD630U, 4000 ANSI Lumen, 1920x1080; Mortise interface with TLS TAM 201 Stan automatic cable retraction system; Avervision CP355AF Visualizer; Microphone cordless radio system UHF band Sennheiser EW 122 G3 consisting of a wireless microphone and receiver; LifeSizeExpress 220- Codeonly- Non-AES video conferencing codec; Network video camera Multipix MP-HD718; Two 47" LCD panels, Full HD, LG M4716CCBA; Subsystem of audio switching and sound amplification; centralized uninterrupted power supply Light microscope Carl Zeiss GmbH Primo Star 3144014501 (13 pcs.); Light microscope with digital camera Altami BIO8 (2 pcs).	
690922, Primorsky Krai, Vladivostok, Russky Island, Saperny Peninsula, Ajax village, 10, aud. M 627	Light microscope Carl Zeiss GmbH Primo Star 3144014501 (13 pcs.); Light microscope with digital camera Altami BIO8 (2 pcs).	
Computer Class of the School of Biomedicine Aud. L310, 15 workplaces	Screen with electric drive 236 * 147 cm Trim Screen Line; Projector DLP, 3000 ANSI Lm, WXGA 1280x800, 2000:1 EW330U Mitsubishi; Subsystem of specialized fasteners of equipment CORSA-2007 Tuarex; Video switching	

	<p>subsystem: DVI DXP 44 DVI Pro Extron matrix switch; DVI twisted pair extender DVI 201 Tx/Rx Extron; Subsystem of audio switching and sound amplification; acoustic system for ceiling mounting SI 3CT LP Extron; digital audio processor DMP 44 LC Extron; extension for IPL T CR48 management controller; Wireless LANs for trainees are provided with a system based on 802.11a/b/g/n 2x2 MIMO(2SS) access points. HP All-in-One 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, WT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty Light microscope Carl Zeiss GmbH Primo Star 3144014501 (13 pcs.); Light microscope with digital camera Altami BIO8 (2 pcs.).</p>	
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X. VALUATION FUNDS

The following assessment tools are used for discipline:

1. Oral questioning
2. Testing

Oral questioning.

Oral questioning allows you to assess the knowledge and logic of the student, the ability to use terminology, speech skills and other communication skills.

The training function is to identify details that for some reason were not sufficiently understood during the training sessions and in preparation for the test.

A survey is a means of control, organized as a special conversation of the teacher with the student on topics related to the discipline being studied, and designed to clarify the amount of knowledge that the student is studying on a

certain section, topic, problem, etc.

Examples of topics for oral inquiry

1. Epithelial tissues. Glandular epithelium. Exocrine glands. Endocrine glands. Intestinal epithelium. Intestinal suction epithelium of vertebrate animals. Intestinal epithelium of invertebrates (arthropods, polychaetes, priapulids, mollusks echinoderms). Lower invertebrates (sponges, coelacanth, turbellaria)

2. Muscle tissue. Somatic muscle tissue of vertebrates. Somatic muscle tissue of arthropods. Somatic muscle tissue of invertebrates. Coelomic muscle tissue.

Testing.

Testing is the most effective and objective form of assessing knowledge, skills and abilities, which allows to identify not only the level of educational achievements, but also the structure of knowledge, the degree of its deviation from the norm. Testing involves a standardized, verified procedure for collecting and processing data, as well as their interpretation, allows you to check the knowledge of students on a wide range of issues. Testing excludes the subjectivity of the teacher, both in the process of control and in the process of assessment.

Examples of test tasks

1. What is not included in the functions of astrocytes?
 - A) secrete substances that support the growth of axons
 - B) participate in the transmission of nerve impulses
 - B) participate in the metabolism of glutamine
 - D) isolate the receptive surfaces of neurons
 - E) participate in the formation of the blood-brain barrier
2. There is no transport on the axon...
 - (A) Ribosomes
 - B) vesicle
 - B) neurotransmitters
 - D) mitochondria
 - E) protein molecules
3. What is included in the concept of "perineurium"?
 - A) a thin layer of connective tissue around each nerve fiber
 - B) nerve cells near the nerve trunk
 - C) reticular tissue around bundles of nerve fibers

D) controls permeability and maintains endoneurial homeostasis

E) formed by oligodendrocytes

4. What is not related to the structures of the peripheral nerve?

A) endoneurium

B) blood vessels

C) fibroblasts

D) nerve nerves

E) astrocytes

5. Specify nerve endings whose function does not include mechanoreception

A) Pacini's body

B) Golgi tendon organ

C) muscle spindle

D) Mèrkel cell complex with nerve terminal

Test Evaluation Criteria

evaluation	50-60 points (unsatisfactory)	61-75 points (satisfactory)	76-85 points (good)	86-100 points (excellent)
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Methodological recommendations that determine the procedures for assessing the results of mastering the discipline

Assessment tools for intermediate attestation

Intermediate certification of students in the discipline is carried out in accordance with local fevu regulations and is mandatory. The form of reporting on the discipline is an exam.

Methodical instructions for passing the exam

The exam is taken by the leading teacher (associate professor, professor), for whom this type of educational load is assigned in an individual plan. The form of the exam is oral.

The time allowed to the student to prepare for the answer to the exam should be no more than 40 minutes. After this time, the student should be ready to respond.

The presence at the examination of unauthorized persons (except for persons carrying out the inspection) without the permission of the relevant persons (rector or vice-rector for academic affairs, director of the School, head of the OBOR or director of the department) is not allowed. Disabled persons and persons with

disabilities who do not have the opportunity to move independently are allowed to take the exam with accompanying persons.

With an intermediate assessment, students are given a grade of "excellent", "good", "satisfactory" or "unsatisfactory". If the student does not appear for the exam, an entry "did not appear" is made in the statement.

Exam Questions

1. Cloth. Classification of tissues. Morphological classification of tissues. Characteristics of epithelial tissue.

2. Basement membrane. Intestinal epithelium. Types of secretion: Merocrine, Apocrine, Microapocrine,

3. Macroapocrine, Holocrine. Intestinal epithelium (sponges, coelenterate turbellaria). Intestinal epithelium

4. Invertebrates of medium levels of organization Polychaeta, priapulids, mollusks, echinoderms. Intestinal epithelium Insects.

5. Peritrophic membrane. Intestinal epithelium Vertebrates. The structure of the villi.

6. Glandular epithelium and its classification. Goblet cells of vertebrates and invertebrates.

7. Small cell glands. Small cell glands priapulids trunk gland. Multicellular glands.

8. Multicellular glands Pancreas. Multicellular glands Mammary gland.

9. Multicellular glands Sebaceous gland. Multicellular glands Endocrine glands. Pancreas.

10. Multicellular glands. Endocrine glands. Thyroid. Adenohypophysis. Hormones of the anterior lobe of the pituitary gland.

11. Endocrine glands of invertebrates. Ecdysal gland of insects. Osmoregulatory epithelium. Salt cell of the naekomi.

12. Cutaneous (Integumentary) epithelium. Single-layered and Multi-row ciliary epithelium. Submerged Acoela epithelium. Complicated type nemertoid epithelium NEMERTINI. Airways of vertebrates.

13. The structure of the flagellum. Single-layered glandular epithelium. Epithelial-muscular and glandular-muscular cell of hydra. Cuticular epithelium.

14. Insect cuticle. Cuticle Lumbricus terrestris. Cuticular epithelium priapulid, ascidium, holothurium. Parasitic worms. Cuticle of cestodes, nematodes. Multilayered epithelium. Lower vertebrates (amphibians, fish, round-mouthed)

15. Mesenchyme. Functions of tissues of the internal environment. Connective tissue fibers. Collagen. Elastin.

16. Reticular fibers. Cellular composition of connective tissue. Fibroblasts. Blood Vertebrate animals.

17. Blood Invertebrate animals. hemerythrin and hemocyanin. Trophic and protective varieties of tissues of the internal environment of invertebrate animals Interstitial interstitial tissues.

18. Interstitial interstitial tissues are mollusks. Interstitial interstitial tissues (insects and crustaceans).

19. Trophic and protective varieties of tissues of the internal environment of invertebrate animals

20. Cellular elements of blood, cavity and tissue fluid. Supporting and skeletal varieties of tissues of the internal environment

21. Dense connective tissue of vertebrates. Composition: Cells, fibers (chondrin) main substance,

22. Hyaline cartilage, as one example.

23. Supporting and skeletal varieties of tissues of the internal environment. Cartilaginous and dense tissues of invertebrate animals. Sponges. Spongia. The formation of the skeleton and its different types.

24. Cartilaginous and dense tissues of invertebrate animals.

25. Muscle tissue. Somatic muscle tissue of arthropods. Somatic muscle tissue of other invertebrates. Coelomic muscle tissue. Vertebrates and shells.

26. Higher prototyledon cephalopods and arthropods. Visceral smooth vertebrate muscles. Muscle tissue. Smooth musculature of invertebrates.

27. Coloration of Hematoxylin-Eosin. Coloration on connective tissue - Azocarmine according to Heidenhein.

28. Bone tissue Osteoblasts, Osteocytes, Osteoclasts. intercellular substance. osteonectin (binds collagen, Ca, P), osteocalcin, cytokines, growth factors, bone morphogenetic proteins, enzymes (alkaline phosphatase), phosphoproteins. glycosaminoglycans. Coarse-fibrous (reticulofibrosic) bone tissue. Lamellar tissue.

Criteria for grading a student on the exam

Evaluation of the test	Requirements for the formed competencies
"Excellent"	The "excellent" grade is given to the student if he has deeply and firmly mastered the program material, exhaustively, consistently, clearly and logically coherently presents it, is able to closely link the theory with practice, freely copes with tasks, questions and other types of application of knowledge, and does not find it difficult to answer when modifying tasks, uses the material of monographic literature in the answer, correctly justifies the decision made, has versatile skills and techniques implementation of practical tasks on the methodology of scientific research.
"Good"	The "good" grade is given to the student if he firmly knows the material, correctly and substantively presents it, avoiding significant inaccuracies in the answer to the question, correctly applies theoretical provisions when

	solving practical questions and problems, possesses the necessary skills and techniques for their implementation.
"satisfactory"	The grade "satisfactory" is given to the student if he has knowledge only of the basic material, but has not mastered its details, admits inaccuracies, insufficiently correct wording, violations of the logical sequence in the presentation of the program material, has difficulties in performing practical work.
"unsatisfactory"	The grade "unsatisfactory" is given to a student who does not know a significant part of the program material, makes significant mistakes, uncertainly, with great difficulties performs practical work. As a rule, the grade "unsatisfactory" is given to students who cannot continue their studies without additional classes in the relevant discipline.