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

Approved by
Deputy Rector for Academic Affairs

_____ E.V. Konovalova

“ 13 ” June 2024, Record No. 5

Adaptive and age-related physiology

Syllabus

Department	Morphology and physiology
Curriculum	s310501-ЛечДеLoИИн-24-2.pli.xml Specialty 31.05.01 General Medicine
Qualification	General Practitioner
Form of education	Full-time
Total (in credits)	2
Total academic hours	72
including:	
Classes	48
Self-study	24

Control:
Credit 4th Term

Course outline in terms

Academic year (Term)	4 (2.2)		Total	
	Cur	Syl	Cur	Syl
Weeks	17 2/6			
Types of classes	Cur	Syl	Cur	Syl
Lectures	16	16	16	16
Practical	32	32	32	32
Total classes	48	48	48	48
Contact work	48	48	48	48
Self-study	24	24	24	24
Total	72	72	72	72

The Syllabus

Adaptive and age-related physiology

Developed in accordance with Federal State Educational Standard:

Federal State Educational Standard of higher education in the specialty 31.05.01 General medicine (Order of the Ministry of Education and Science of the Russian Federation on August 12 2020 No. 988)

Based on the Curriculum:

31.05.01 GENERAL MEDICINE

Specialization: General Medicine

Approved by the Academic Council of Surgut State University, “ 13 ” June 2024, Record No. 5

The Syllabus was approved by the department

Morphology and physiology

Head of Department, Doctor of Medicine, Professor Stolyarov V.V..

1. COURSE OBJECTIVES	
1.1	to form a system of knowledge and ideas among students about the functioning of the human body as a whole, its systems, organs, tissues and cells, about the basic laws of functioning and mechanisms of regulation of vital activity, about the influence of environmental factors on the body's functions, as well as the skills necessary for a doctor to make a preliminary diagnosis and provide qualified medical care to patients at the pre-hospital stage.;
	to develop professional competencies in the preparation of a specialist by forming modern natural science knowledge in the field of general and private physiology on the basis of a systematic approach, ideas about the vital activity of the human body as an open self-regulating system that ensures adaptive interaction of the body with the external environment.
2. COURSE OVERVIEW	
Course code (in curriculum)	B1.O.04.11
2.1	Assumed background:
2.1.1	Biology
2.1.2	Human anatomy
2.2	Post-requisite courses and practice:
2.2.1	Homimal physiology
2.2.2	Pathophysiology
2.2.3	Human Genetics
2.2.4	Physiological Basics of Human Adaptation in the North
3. COMPETENCES UPON COMPLETION OF THE COURSE (MODULE)	
GPC-5.1: Knows the histological structure of organ tissues - knows how to differentiate them microscopically; the anatomy of the human body - the macroscopic structure and topography of organs and body parts; human physiology - the mechanisms of homeostasis regulation and the functional systems of the body in the normal condition	
GPC-5.9: Demonstrates knowledge of the theoretical foundations of immunology, allergology, understanding of immune defence mechanisms, types of immunological reactions and their role in the pathogenesis of human diseases	

By the end of the course students must:

3.1	Know:
3.1.1	basic concepts used in age physiology
3.1.2	basic concepts of the neurobiology and neurophysiology fields
3.1.3	possibilities of application of end-to-end technologies in biomedical research
3.1.4	mechanisms of functioning of physiological systems
3.1.5	regularities of functioning and mechanisms of regulation of the activity of cells, tissues, organs, systems of a healthy organism, considered from the standpoint of general physiology, private physiology and integrative human activity
3.1.6	the essence of research methods for various functions of a healthy body, which are widely used in practical medicine
3.1.7	ways of working with electronic databases of physiological indicators
3.1.8	the possibilities of using Internet things in the management of patients of different ages
3.1.9	methodology of the study of the adult and child population health in order to preserve, strengthen and restore it
3.1.10	methodology to determine the impact of environmental factors on the health of the population or its individual groups
3.1.11	forms and methods of organization of hygienic education and upbringing of the population; the main problems and directions of modern public health and international policy in this area
3.2	be able to:
3.2.1	correctly interpret and apply the basic concepts of hominal physiology when studying biomedical and medical literature and when working with medical specialists together
3.2.2	explain the principle of the most important methods of studying the functions of a healthy body
3.2.3	independently perform laboratory work, conduct experiments on experimental animals, protect the protocol of the study, solve test tasks and situational tasks, prepare scientific reports, etc.
3.2.4	explain the informational value of various indicators (constants) and the mechanisms of regulation of the activity of cells, tissues, organs, systems and the whole organism
3.2.5	evaluate and explain the basic laws of the formation and regulation of physiological functions of the body when achieving an adaptive result
3.2.6	evaluate and explain the general principles of state, activity and significance of the leading functional systems of the body
3.2.7	to evaluate and explain the patterns of formation and regulation of the main forms of behaviour of the organism, depending on the conditions of its existence
3.2.8	evaluate and explain the age-related features of the physiological systems of the body
3.2.9	use hardware and software complexes to assess the functional state and age characteristics of the body
3.2.10	use information about the health of adults and children in the activities of medical organizations
3.2.11	analyse information about the health status of the population; compile a list of measures aimed to improve the quality and effectiveness of preventive assistance to the population in the formation of a healthy lifestyle

3.2.12	interpret the results of laboratory and radiological research methods					
3.2.13	use medical equipment, computer technology in their professional activities; use methods of primary and secondary prevention (based on evidence-based medicine), preventing the development of diseases					
4. STRUCTURE AND CONTENTS OF THE COURSE (MODULE)						
Class Code	Topics /Class type	Term / Academic year	Academic hours	Competences	Literature	Notes
	Unit 1. Ontogenesis					
1.1	Patterns of ontogenesis /Lecture/	4	2	GPC-5.1; GPC-5.9	L1.2 L1.3L2.4L3.1 E1E2E3E4E5	
1.2	Patterns of ontogenesis /Practice/	4	2	GPC-5.1; GPC-5.9	L1.2 L2.18L3. 1	
1.3	The patterns of ontogenesis. Maturation of human body systems /Practice/	4	2	GPC-5.1; GPC-5.9	L1.2 L1.2L2.18L3. 1	
1.4	Neural network technologies as end-to-end technologies in the study of age-related features of the organism at various stages of ontogenesis. /Self-study/	4	2	GPC-5.1; GPC-5.9	L2.18L3. 1 E1E2E3E4E5	
	Unit 2. Age-related and adaptive features of the nervous system					
2.1	Age-related and adaptive features of the nervous system at different stages of ontogenesis. Age-related features of the central nervous system /Lecture/	4	2	GPC-5.1; GPC-5.9	L1.2L2.4 L2.19L3.1 E1E2E3E4E5	
2.2	Investigation of tendon reflexes. Study of motor functions of the cerebellum /Practice/	4	2	GPC-5.1; GPC-5.9	L1.2 L2.2 L2.4L3.1	
2.3	Features of regulatory processes. Systemogenesis. /Practice/	4	2	GPC-5.1; GPC-5.9	L2.13 L2.18L3.1	
2.4	Private nervous system. The possibilities of neurobiology and neurophysiology in the study of the properties of the human nervous system using information and end-to-end technologies at various stages of ontogenesis / Self-study /	4	2	GPC-5.1; GPC-5.9	L2.13 L2.16L3.1 E1E2E3E4E5	
2.5	Age-related aspects of the physiology of higher nervous activity. Age-related features of the peripheral nervous system /Lecture/	4	2		L1.1L2.4 L2.16L3.1 E1E2E3E4E5	
2.6	Physiology of higher nervous activity. Properties of nervous processes. Information processing speed /Practice/	4	2		L1.1 L1.3L2.9 L2.12L3.1	
	Unit 3. Age-related and adaptive features of the musculoskeletal system					

3.1	Morphofunctional features of the musculoskeletal system at different stages of ontogenesis /Lecture/	4	2	GPC-5.1; GPC-5.9	L1.1L2.1 L2.17L3.1 E1E2E3E4E5	
3.2	Age-related features of movement and musculoskeletal system / Practice/	4	2	GPC-5.1; GPC-5.9	L2.1 L2.11L3.1	
3.3	Neural network technologies as end-to-end technologies in the study of age-related features of the organism at ontogenesis various stages /Self-study/	4	4	GPC-5.1; GPC-5.9	L1.1L2.6 L2.13L3.1 E1E2E3E4E5	
3.4	Features of the musculoskeletal system at different stages of ontogenesis. Influence of the level of motor activity on the functional state of the musculoskeletal system /Self-study/	4	2	GPC-5.1; GPC-5.9	L1.2L2.3L3.1	
	Unit 4. Age-related and adaptive features of the					
4.1	Morphofunctional features of the cardiovascular system at different stages of ontogenesis /Lecture/	4	2	GPC-5.1; GPC-5.9	L2.5L3.2 E1E2E3E4E5	
4.2	Study of the properties of the cardiovascular system. Features of adaptation of the cardiovascular system to the effects of various factors /Practice/	4	4	GPC-5.1; GPC-5.9	L2.14L3.1	
4.3	Cardiovascular system at different stages of ontogenesis /Self-study/	4	2	GPC-5.1; GPC-5.9	L2.5 L2.10L3.4 E1E2E3E4E5	
	Unit 5. Blood. Age and adaptive features					
5.1	Age and adaptive features of blood /Lecture/	4	1	GPC-5.1; GPC-5.9	L2.15L3.4	
5.2	Age features of white and red blood /Practice/	4	2	GPC-5.1; GPC-5.9	L1.2L2.10L3.4	
5.3	Age-related features of the immune system /Self-study/	4	2	GPC-5.1; GPC-5.9	L2.8L3.4 E1E2E3E4E5	
	Unit 6. Age and adaptive features of the respiratory system					
6.1	Age-related features of the respiratory system /Lecture/	4	2	GPC-5.1; GPC-5.9	L2.4L3.4	
6.2	Methods for determining the main indicators of respiration /Practice/	4	4	GPC-5.1; GPC-5.9	L2.8L3.1	
6.3	Age-related features of the respiratory system /Self-study/	4	2	GPC-5.1; GPC-5.9	L1.1L2.3L3.2 E1E2E3E4E5	
	Unit 7. Age-related and adaptive features of the digestive system and metabolism					
7.1	Age-related and adaptive features of the digestive system and metabolism /Lecture/	4	1	GPC-5.1; GPC-5.9	L2.4L3.2 E1E2E3E4E5	

7.2	Age-related features of the digestive system /Practice/	4	2	GPC-5.1; GPC-5.9	L2.7L3.4	
7.3	Age-related features of metabolism. Preparation of food ration for different ages /Practice/	4	2	GPC-5.1; GPC-5.9	L2.7L3.1	
7.4	Metabolism and nutrition at different stages of ontogenesis /Self-study/	4	2	GPC-5.1; GPC-5.9	L2.10L3. 4 E1E2E3E4E5	
	Unit 8. Age-related and adaptive features of the excretory and reproductive systems					
8.1	Age and adaptive features of the excretory and reproductive systems /Practice/	4	2	GPC-5.1; GPC-5.9	L1.2 L1.3L2.10L3. 3	
8.2	The sexual formula /Practice/	4	2	GPC-5.1; GPC-5.9	L2.10L3.1	
8.3	The use of end-to-end and information technologies for the study of age-related and adaptive properties of the respiratory system /Self-study/	4	2	GPC-5.1; GPC-5.9	L2.10L3. 4 E1E2E3E4E5	
	Unit 9. Age-related and adaptive features of the endocrine system					
9.1	Age-related and adaptive features of the endocrine system /Lecture/	4	2	GPC-5.1; GPC-5.9	L2.4L3.1 L3.4 E1E2E3E4E5	
9.2	Features of the endocrine system at different stages of ontogenesis /Practice/	4	2	GPC-5.1; GPC-5.9	L1.2L2.10L3. 4	
9.3	Features of endocrine regulation during puberty, peri- and postmenopause /Self-study/	4	2	GPC-5.1; GPC-5.9	L2.8L3.4 E1E2E3E4E5	
	Unit 10. Final lesson					
10.1	Control work	4	0	GPC-5.1; GPC-5.9	L2.2 L2.4	Abstract
10.2	Credit /Test/	4	0	GPC-5.1; GPC-5.9	L2.2 L2.4 E1E2E3E4E5	Oral quiz Test

5. ASSESSMENT TOOLS

5.1. Tests and tasks

Presented by a single document

5.2. Topics for written papers

Presented by a single document

6. COURSE (MODULE) RESOURCES

6.1. Recommended Literature

6.1.1. Core

	Authors	Title	Publish., year	Quantity
L1.1	Maltsev V.P., Gregoryeva E.V.	Age anatomy and physiology: Textbook	Moscow: Izdatelstvo Yurayt, 2023, electronic resource	1
L1.2	Lyakso E. E., Nozdrachev A.D., Sokolova L. V.	Age physiology and psychophysiology: Textbook	Moscow: Izdatelstvo Yurayt, 2019, electronic resource	1

L1.3	Shchelchkova N.N.	Human anatomy and physiology: Educational and methodological literature	Moscow: INFRA-M Scientific Publishing Center LLC, 2019, electronic resource	1
6.1.2. Supplementary				
	Authors	Title	Publish., year	Quantity
L2.1	Solodkov A. S., Sologub E. B.	Human physiology : general, sports, age: Textbook for higher educational institutions of physical culture M.: Terra-Sport, 2001	M.: Terra-Sport, 2001	10
L2.2	Brin V. B.	Human physiology in diagrams and tables	Moscow: Lan, 2017, electronic resource	1
L2.3	Tulyakova. O. V.	State of health, physical and mental development of children depending on various factors: Monograph	Saratov: University education, 2014, electronic resource	1
L2.4	R Aizman. I., Lysova N. F.	Age physiology and psychophysiology: Textbook	Moscow: INFRA-M Scientific Publishing Center LLC, 2014, electronic resource	1
L2.5	Gribanova O. V., Novikova E. I., Shcherbakova T. G.	Anatomy and physiology of the cardiovascular system: Textbook	Volgograd: Volgograd State Socio-Pedagogical University, 2016, electronic resource	1
L2.6	Belchenko L. A., Lavrinenko V. A.	Human physiology. The organism as a whole: Educational and Methodical complex	Novosibirsk: Siberian University Publishing House, 2017, electronic resource	1
L2.7	Sergeev. I. Yu., Dubynin. V.A., Kamensky A. A.	Physiology of man and animals in 3 vols. Vol. 1 nervous system: Anatomy, Physiology, Neuropharmacology: Textbook and workshop	Moscow: Yurayt Publishing House, 2019, electronic resource	1
L2.8	Say Yu. V., Kuznetsova N. M.	Human anatomy and physiology. Dictionary of terms and concepts: textbook	St. Petersburg: Lan, 2019, electronic resource	1
L2.9	Karakhanyan K. G., Karpova E. V.	Human anatomy and physiology. Collection of situational tasks: textbook	St. Petersburg: Lan, 2020, electronic resource	1
L2.10	Degtyarev V.P.	Normal physiology. Typical test tasks: textbook	Moscow: GEOTAR-Media, 2014, electronic resource	1
L2.11	Sudakov K.V., V. Andrianov.V., Vagin Yu.E.,	Human Physiology: Atlas of dynamic circuits: educational visual aid	Moscow: GEOTAR - Media, 2015, electronic resource	1
L2.12	Sudakov K.V., V. Andrianov.V., Vagin Yu.E., Dzhebrailova	Normal Physiology: textbook	Moscow: GEOTAR - Media, 2015, electronic resource	1
L2.13	Degtyar V.P.	Normal Physiology: textbook	Moscow: GEOTAR - Media, 2016, electronic resource	2
L2.14	Degtyarev V.P., Sorokina N.D.	Normal physiology: textbook	Moscow: GEOTAR - Media, 2016, electronic resource	2
L2.15	Telya L.Z., Aghajanyan N.A.	Normal Physiology: textbook	Moscow: Litterra, 2015, electronic resource	1
L2.16	Titova T.A., About Yeletskaia.V.	Speech and mental development of young children: Bachelor's degree	Moscow: building "FORUM", 2019, electronic resource	1
L2.17	Kapilevich L. V.	Human physiology. Sport: Textbook	Moscow: building Yurayt, 2019, electronic resource	1

L2.18	Tulyakova, O. V.	State of health, physical and mental development of children depending on various factors: monograph	Saratov: University education, 2014, electronic resource	1
L2.19	R Aizman.I., Abaskalova N.P.	Human physiology: Textbook	Moscow: INFRA-M Scientific Publishing Center LLC, 2018, electronic resource	1
6.1.3. Methodological developments				
	Authors	Title	Publish., year	Quantity
L3.1	Sai Yu. V.	Workbook on the academic discipline "Human anatomy and physiology"	Moscow: Lan, 2017, electronic resource	1
L3.2	Solodkov A.S., Sologub E.B.	Human physiology. General. Sports. Age group. - 7th edition	Moscow: Sport, 2017, electronic resource	2
L3.3	Morozkina A.V.	Human and animal physiology with the basics of higher nervous activity: methodological recommendations and tasks for laboratory classes and control works	Surgut: Publishing Center of SurSU, 2020, electronic resource	1
L3.4	Yurina M. A., Lopatskaya Zh. N.	Normal physiology: guidelines for performing laboratory work	Surgut: Publishing Center of SurGU, 2020, electronic resource	1
6.2. Internet resources				
E1	«Consilium medicum» - http://www.consilium-medicum.com/media/consilium			
E2	http://www.rmj.ru			
E3	http://www.iqlib.ru			
E4	www.biblioclub.ru			
E5	http://medlecture.ru/			
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	"Garant", http://www.garant.ru			
6.3.2.2	"Consultant-plus", http://www.consultant.ru			
7. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE (MODULE)				
7.1	Classrooms for conducting lecture-type classes, seminar-type classes (practical classes), group and individual consultations, formative and summative assessment are equipped with: standard educational furniture, technical training tools that serve to present educational information.			
7.2	The lecture hall is equipped with a multimedia projector, a screen, a laptop, a stationary chalk board, standard educational furniture: tables, chairs.			
7.3	The classroom for practical classes is equipped with a personal projector, a laptop, computers, videos, tables, electrocardiographs, a spirometer and a "Micro LAB" are included.			
7.4	Tools and consumables in an amount that allows students to master the skills and abilities provided for by professional activities.			