


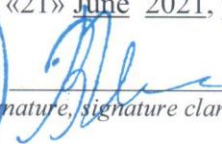
RF Ministry of Education and Science Ulyanovsk State University	Форма	
F – Educational plan		

APPROVED

by the decision of the Academic Council of the Institute of Medicine, Ecology and Physical Culture of ULSU of «21» June 2021, protocol № 10/230



Chairman

 /V. I. Midlenko/
(signature, signature clarification)

«21» June 2021.

EDUCATIONAL PLAN

Subject:	Immunology
Faculty	Faculty of Postgraduate Medical and Pharmaceutical Education
Department	Department of General and Clinical Pharmacology with Microbiology course
Year	2

Speciality 31.05.01 – General Medicine

Form of education full-time

Date of introduction at the education process at ULSU: « 01 » September 2021.

The program was updated at the department session: protocol № 1 of 29.08.2022.

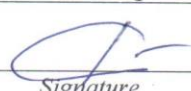
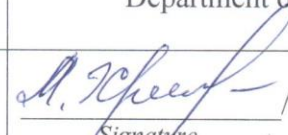
The program was updated at the department session: protocol № of 20 .

The program was updated at the department session: protocol № of 20 .



The program was updated at the department session: protocol № of 20 .

Information about authors:

Initials	Department abbreviation	Position, Degree, title
Artamonova Marina Nikolaevna	Department of General and Clinical Pharmacology with Microbiology course	Associate professor, PhD in Biological Sciences
Potaturkina Nesterova Natalia Iosifovna	Department of General and Clinical Pharmacology with Microbiology course	Professor, Doctor of Medical Sciences, professor

AGREED	AGREED
Head of the Department of General and Clinical Pharmacology with Microbiology course that implements the discipline	Head of the Graduating Department of Hospital Therapy
 /M. P. Markevich / <i>Signature</i> <i>Name</i> « <u>27</u> » <u>May</u> <u>2021</u> г.	 / M. A. Vise-Khripunova / <i>Signature</i> <i>Name</i> « <u> </u> » <u> </u> <u>2021</u> г.

LIST OF CHANGES of
Educational plan of discipline "IMMUNOLOGY"
Speciality 31.05.01. «General medicine»

№	Content of the change or a link to the attached text of the	Full name of the head of the Department developing the discipline	Signature	Date
1	Introduction of changes to item a) Recommended Literature item 11 "Educational, methodological and information support of the discipline" with the design of Appendix 1	Markevich M.P.		29.08.2022
2	Introduction of changes to item b) Professional databases, information and reference systems item 11 "Educational, methodological and information support of the discipline" with the design of Appendix 2	Markevich M.P.		29.08.2022

11. INSTRUCTIONAL AND INFORMATION SUPPORT OF THE SUBJECT

a) the list of recommended literature

general

- 1) Khaitov, R. M. Immunology: textbook / Rakhim M. Khaitov. - 2nd updated edition. - Moscow : GEOTAR-Media, 2021. - 272 с. - ISBN 978-5-9704-5861-7. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : <https://www.studentlibrary.ru/book/ISBN9785970458617.html>
- 2) Artamonova, M. N. Medical Microbiology, Virology and Immunology. Lecture Notes : textbook / Artamonova M. N., Potaturkina-Nesterova N. I., Пуина N. A., Nemova I. S. - Москва : ГЭОТАР-Медиа, 2021. - 352 с. - ISBN 978-5-9704-6043-6. - Текст: электронный // ЭБС "Консультант студента" : [сайт]. – URL : <https://www.studentlibrary.ru/book/ISBN9785970460436.html>

additional

- 1) Artamonova M. N. Immunology : guidelines for practical classes for foreign students / M. N. Artamonova, N. I. Potaturkina-Nesterova, I.S. Nemova; Ulyanovsk State University, The Institute of Medicine, Ecology and Physical Culture. - Ulyanovsk : ULSU, 2017. - На англ. яз.; Загл. с экрана. - Электрон. текстовые дан. (1 файл : 1,70 МБ). - Текст : электронный. <http://lib.ulsu.ru/MegaPro/Download/MObject/911>
- 2) Островцова С. А. General Microbiology and Immunology. Summaries of the lectures = Общая микробиология и иммунология. Краткий курс лекций: пособие для студентов учреждений высшего образования, обучающихся на английском языке по специальности «Лечебное дело» : training appliance for Medical Faculty for International Students (English medium) / С. А. Островцова, А. И. Жмакин. - 2-е изд.. - Гродно : ГрГМУ, 2019. - 264 с. - ISBN 9789855951774. - Текст : электронный // ЭБС "Букар" : [сайт]. - URL : <https://www.books-up.ru/ru/book/general-microbiology-and-immunology-summaries-of-the-lectures-12050876/>

educational methodological

- 1) **Artamonova M. N.** Guidelines for students' self-guided work for the discipline «Immunology» for specialty 31.05.01 «General medicine» / M. N. Artamonova, N. I. Potaturkina-Nesterova; Ulyanovsk State University. - Ulyanovsk : ULSU, 2022. - 24 p. - Неопубликованный ресурс; На англ. яз. - URL:

<http://lib.ulsu.ru/MegaPro/Download/MObject/11551> . - Режим доступа: ЭБС УлГУ. - Текст : электронный.

AGREED:

The main librarian _____ / Stadolnikova D.R. / _____ / 29.08.2022
The position of the worker scientific library Full name signature date

Appendix 2

b) Professional databases, information and reference systems

1. Электронно-библиотечные системы:

1.1. Цифровой образовательный ресурс IPRsmart : электронно-библиотечная система : сайт / ООО Компания «Ай Пи Ар Медиа». - Саратов, [2022]. — URL: <http://www.iprbookshop.ru>. — Режим доступа: для зарегистрир. пользователей. - Текст : электронный.

1.2. Образовательная платформа ЮРАЙТ: образовательный ресурс, электронная библиотека: сайт / ООО Электронное издательство ЮРАЙТ. — Москва, [2022]. - URL: <https://urait.ru>. — Режим доступа: для зарегистрир. пользователей. - Текст: электронный.

1.3. База данных «Электронная библиотека технического ВУЗа (ЭБС «Консультант студента»): электронно-библиотечная система: сайт / ООО Политехресурс. — Москва, [2022] . —URL: <https://www.studentlibrary.ru/cgi-bin/mb4x>. Режим доступа: для зарегистрир. пользователей. — Текст: электронный.

1.4. Консультант врача. Электронная медицинская библиотека: база данных: сайт / ООО Высшая школа организации и управления здравоохранением-Комплексный медицинский консалтинг. — Москва, [2022]. — URL: <https://www.rosmedlib.ru>. — Режим доступа: для зарегистрир. пользователей. — Текст : электронный.

1.5. Большая медицинская библиотека : электронно-библиотечная система : сайт / ООО Букап. — Томск, [2022]. — URL: <https://www.books-up.ru/ru/library/> Режим доступа: для зарегистрир. пользователей. — Текст: электронный.

1.6. ЭБС Лань : электронно-библиотечная система : сайт / ООО ЭБС Лань. — Санкт-Петербург, [2022]. — URL: <https://e.lanbook.com>. — Режим доступа: для зарегистрир. пользователей. — Текст : электронный.

1.7. ЭБС Znanium.com: электронно-библиотечная система: сайт / ООО Знаниум. Москва, [2022]. - URL: <http://znanium.com> . — Режим доступа: для зарегистрир. пользователей. - Текст : электронный.

1.8. Clinical Collection : научно-информационная база данных EBSCO // EBSCOhost : [портал]. — URL: <http://web.a.ebscohost.com/ehost/search/advanced?vid=1&sid=e3ddfb99-a1a7-46dd-a6eb-2185f3e0876a%40sessionmgr4008>. – Режим доступа: для авториз. пользователей. – Текст: электронный.

1.9. База данных «Русский как иностранный»: электронно-образовательный ресурс для иностранных студентов : сайт / ООО Компания «Ай Пи Ар Медиа». — Саратов, [2022]. — URL: <https://ros-edu.ru>. — Режим доступа: для зарегистрир. пользователей. — Текст: электронный.

2. **КонсультантПлюс [Электронный ресурс]:** справочная правовая система/ ООО «Консультант Плюс» - Электрон. дан. - Москва : КонсультантПлюс, [2022].

3. **Базы данных периодических изданий:**

3.1. База данных периодических изданий EastView : электронные журналы / ООО ИВИС. - Москва, [2022]. — URL: <https://dlib.eastview.com/browse/udb/12>. — Режим доступа : для авториз. пользователей. — Текст: электронный.

3.2. eLIBRARY.RU: научная электронная библиотека: сайт / ООО Научная Электронная Библиотека. — Москва, [2022]. — URL: <http://elibrary.ru>. — Режим доступа: для авториз. пользователей. — Текст : электронный

3.3. Электронная библиотека «Издательского дома «Гребенников» (Grebinnikon): электронная библиотека / ООО ИД Гребенников. — Москва, [2022]. — URL: <https://id2.actionmedia.ru/Personal/Products>. — Режим доступа: для авториз. пользователей. — Текст: электронный.

4. **Федеральная государственная информационная система «Национальная электронная библиотека»:** электронная библиотека : сайт / ФГБУ РГБ. — Москва, [2022] . — URL: [URL: https://нэб.рф](https://нэб.рф). Режим доступа: для пользователей научной библиотеки. — Текст: электронный.

5. **SMART Imagebase:** научно-информационная база данных EBSCO I/ EBSCOhost . [портал]. — URL: EBSCOhost: [портал]. — URL: <https://ebco.smartimagebase.com/?TOKEN=EBSCO-1a2ff8c55aa76d8229047223a7d6dc9c&custid=s6895741> — Режим доступа : для авториз. пользователей. — Изображение : электронные.

6. **Федеральные информационно-образовательные порталы:**

6.1. Единое окно доступа к образовательным ресурсам : федеральный портал . — URL: <http://window.edu.ru/> . — Текст : электронный.


6.2. Российское образование: федеральный портал / учредитель ФГАУ «ФИЦТО». URL: <http://www.edu.ru>. — Текст : электронный.

7. **Образовательные ресурсы УлГУ:**

7.1. Электронная библиотечная система УлГУ: модуль «Электронная библиотека» АБИС Мега-ПРО / ООО «Дата Экспресс». — URL: <http://lib.ulsu.ru/MegaPro/Web>. Режим доступа: для пользователей научной библиотеки. — Текст: электронный.

Agreed:

зам. нач. УИИТ Клюкова В. 29.08.2022
position name date

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1. GOALS AND OBJECTIVES OF DISCIPLINE

The goals of the discipline: the formation of a scientific understanding in future doctor of the role of innate and acquired immunity in normal human activity and in diseases, mastering the most important methods of immunodiagnostics of diseases, which will prepare the student for further study of the complex of biomedical, preventive and clinical training disciplines in the specialty 31.05.31 “General Medicine”.

Tasks of the discipline:

- learning of the structure of the system, the function of the human immune system and its role in preserving the structural and functional integrity of the organism, maintaining its homeostasis and biological individuality;
- acquisition by students of knowledge in the field of immunodeficiency conditions, allergic and autoimmune diseases with immune inflammation syndrome;
- teaching of students the basic methods of assessment of the immune status of a person, interpreting the results of studies of the immune system state, forming methodological bases for setting an immunological and allergic diagnosis;
- formation of the ability and readiness to carry out advisory, informational and educational activities, to explain immunologically the choice of medical immunobiological and immunotropic drugs for diagnosis, treatment and prevention of diseases;
- forming the skills of studying scientific literature.

2. PLACE OF THE SUBJECT IN THE STRUCTURE OF BASIC EDUCATIONAL PROGRAM:

The discipline B1.O.55 "Immunology" refers to the obligatory part of the basic educational program of higher education of specialty 31.05.01 - "General Medicine".

Studying the discipline "Immunology" is preceding subject for the learning of the following disciplines: Emergency Medicine, Life safety, General surgery, Pharmacology, Dentistry, Dermatovenerology, Neurology, medical genetics, neurosurgery, Propaedeutics of internal diseases, Pathological anatomy, Obstetrics and gynecology, Faculty therapy, Hospital therapy, Otorhinolaryngology, Pediatrics, Faculty surgery, Professional diseases, Psichiatria and medical psychology, Endocrinology, Ophthalmology, Infectious diseases, Outpatient therapy, Hospital surgery and pediatric surgery, Anesthesiology, resuscitation and intensive care, Clinical Pharmacology, Clinical psychology, Modern aspects of neurology, Traumatology, orthopaedy, Oncology, radiation therapy, Radiation diagnostics, Forensic Medicine, Palliative care, Urology, andrology, Surgical Gastroenterology and Endoscopy, Diabetology and emergency endocrinology. Actual problems of AIDS.

The discipline "Immunology" refers to the basic part of the medical-biological cycle. The total complexity is 3 SET (108 academic hours).

3. THE LIST OF EXPECTED LEARNING RESULTS ON THE SUBJECT (UNIT), MATCHED TO EXPECTED RESULTS OF MASTERING THE PROGRAM

The study of the discipline "Immunology" is aimed at the formation of the following competences among students: general professional competence – GPC-8, professional competences: PC-5, PC-6, PC-8 according to the plan for the development of the educational program.

Competence content (or its main parts)	The proposed results of the course students are
<p>UC-8 Able to create and maintain safe living conditions in everyday life and in professional activity to preserve the natural environment, ensure sustainable development of society, including in the event of the threat and occurrence of emergencies and military conflicts</p>	<p>To know: the causes, signs and consequences dangers, methods of protection against emergency situations and military conflicts; basics life safety, telephones rescue services</p> <p>To be able to: how to identify signs, causes and emergency conditions and military conflicts; estimate the likelihood potential danger and take measures to prevention in educational institutions; provide first aid in emergency situations</p> <p>To be skilled in: methods occurrence of dangerous or emergency situations; skills to maintain safe living conditions</p>
<p>GPC-7 Able to prescribe treatment and monitor its effectiveness and safety</p>	<p>To know: methods of general and local anesthesia, indications for their use; medicines used for premedication, prescription method schemes and protocols for the use of drugs for emergency and urgent states.</p> <p>To be able to: develop a treatment plan for the patient taking into account the course of the disease, select and prescribe drug therapy, use non-drug treatment methods; select an individual type of care for the patient's treatment in accordance with the situation: primary care, ambulance, emergency medical care; determine the method of anesthesia for the patient in order to conduct an operative intervention or diagnostic procedure; prescribe a premedication.</p> <p>To be skilled in: algorithm for performing the main medical diagnostic and therapeutic measures to provide first aid for urgent and threatening living conditions; methods of relief of acute and chronic pain syndrome by prescribing analgesics of various groups.</p>
<p>PC-5 Ability and readiness to implement a set of</p>	<p>To know: medical and social factors affecting the health of the population</p>

measures aimed at maintaining and strengthening health and including the formation of a healthy lifestyle, prevention of the onset and (or) spread of diseases, their early diagnosis, identification of the causes and conditions of their occurrence and development, as well as aimed at eliminating harmful effects on human health of environmental factors	<p>To be able to: apply the methodology for determining the influence of medical and social factors on the health of the population and its individual groups</p> <p>To be skilled in: the main methods of sanitary educational and hygienic education of the population</p>
<p>PC-6 Ability to apply the basic principles of organization and management in the field of public health protection, in medical organizations and their structural units</p>	<p>To know: legislation in health and regulatory legal acts, as well as other documents, defining the activities of medical organizations and medical professionals</p> <p>To be able to: navigate existing regulatory legal acts; protect civil rights of doctors and patients different ages; fill in correctly medical documentation; right understand the essence of control on the implementation of official duties as a nurse precinct and other located in disposal of medical workers</p> <p>To be skilled in: moral and ethical skills argumentation; skills in conducting medical supervision for the implementation job responsibilities of medical sister of the precinct and other available medical professionals</p>

4. SUBJECT VOLUME

4.1. Subject volume in credits (total) 3

4.2. on types of academic workload (in hours) 108


Type of academic workload	Number of hours (form of training -full-time)	
	Total in the plan	Throughout the semesters
		semester № 4
1	2	3
Student-Teacher activity	36	36
Classes:		
Lectures	18	18
Practical classes	18	18
Self-study work	72	72
Concurrent checking	-	-

(number and type: a test, a colloquium, a report)		
Term thesis		
Types of midterm assessment (an exam, a test)		offset
Total number of hours on the subject	108	108

4.3. The content of a subject (unit.) Distribution of hours on themes and types of academic workload:

Form of training full-time

Name of sections and topics	Total	Types of classes					form of current knowledge control
		Classes		Interactive classes	Self-study work		
		lectures	practical classes and seminars				
1	2	3	4	6	7	8	
Section 1. General Immunology							
Immunology as a science	12	2	2	-	8	oral survey, test	
Innate immunity. Factors and mechanisms of the innate immunity	12	2	2	-	8	oral survey, test	
Antigens. Antibodies	12	2	2	-	8	oral survey, test	
Section 2. Allergy							
Hypersensitivity. Immunological memory. Immunological tolerance	12	2	2	-	8	oral survey, test	
Section 3. Clinical Immunology							
Pathology of the immune system	12	2	2	-	8	oral survey, test	
Evaluation of the immune status	12	2	2	-	8	oral survey, test	
Serological tests: agglutination, precipitation test, complement fixation test (CFT), tests using labeled antibodies and antigens (ELISA, IFT, RIA)	12	2	2	-	8	oral survey, test	
Section 4. Immunotherapy.							

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Specific prevention and treatment of infectious diseases. Therapeutic, prophylactic, and diagnostic immunological preparations	12	2	2	-	8	oral survey, test
Section 5. Special Immunology						
Antiviral and antibacterial immunity. Immunity in transplantation, cancer and immunity in mycoses. Immunity and age.	12	2	2	-	8	oral survey, test
Total	108	18	18	-	72	

5. COURSE CONTENT

Section 1. General Immunology


Topic 1. Immunology as a science. Introduction in immunology.

Immunology, its definition, problems. The history of immunology, the main periods in the development of immunology. The concept of immunity. Classification of immunity. Sections of modern immunology. Structure of the immune system. The central organs of the immune system. The peripheral organs of the immune system. The role of blood cells in immunity. Immunocompetent cells: definition, classification. The main cell populations of the immune system. The forms of immune response. The mechanism of interaction of immune cells.

Topic 2. Innate immunity. Factors and mechanisms of the innate immunity.

The concept of a non-specific (innate) immunity. The main barriers of nonspecific immunity. The innate immune factors - the skin, mucous membranes, the normal microflora, lysozyme. Lysozyme - chemical composition, function. Complement - chemical composition and functions. The activation of the complement pathway. Phagocytosis, mononuclear phagocyte system. The functions of phagocytes. Opsonin. Phagocytosis mechanism stage. "Oxygen explosion." Complete and incomplete phagocytosis. Indicators of activity of phagocytes - phagocytic index, opsono-phagocytic index. Cytokines - classification, properties. The clinical significance of cytokines detection. Interferon - chemical composition, properties. Classification. Protective serum proteins - acute phase proteins, C-reactive protein (CRP), β - lysine, mannose proteins, properdin, fibronectin.

Topic 3. Antigens. Antibodies.

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Antigens: definition, chemical composition. The structure of the antigen. Properties of antigens: heterogeneity, immunogenicity. Types of antigens according to the degree of foreignness. Specificity antigens, types antigenic specificity. Classification antigens on its origin, chemical structure, the degree of immunogenicity. Classification of antigens by the immune response. Haptens. Adjuvants. The antigens of the human body. The antigens of bacteria, viruses, tumor antigens. Autoantigens. Ways of penetration of antigens in the macro-organism. Antibodies: definition, structure. The structure of the immunoglobulin, immunoglobulin classes. Serum immunoglobulins. The properties of antibodies. Phases of antibody synthesis. The antibody functions in the formation of an immune complex.

Section 2. Allergology

Topic 4. Hypersensitivity. Immunological memory. Immunological tolerance.

Hypersensitivity, its definition. The definition of allergy, stages of allergic reaction. Classification of allergies. I type reactions of immediate type hypersensitivity: anaphylaxis (mechanism of development, manifestations of anaphylaxis, principles of therapy). Anaphylactic shock. Atopy. II type of immediate hypersensitivity: cytotoxic: mechanisms of development, clinical manifestations. III type of immediate hypersensitivity reactions: immune complex: mechanisms of development, clinical manifestations. Delayed type of hypersensitivity: mechanism of development, manifestations of contact allergy. Classification of allergens. Infectious allergy. Drug allergies: the immune response to the drug-haptens, clinical manifestations of drug allergy. The principles of treatment and prevention of drug allergy. Laboratory diagnosis of allergies. Immunological memory: concept, mechanisms. Immunological tolerance: concept, causes, mechanisms. Classification of immunological tolerance. Using the phenomenon of immunological tolerance to solve medical problems. Artificial cancellation state of immunological tolerance.

Section 3. Clinical Immunology


Topic 5. Pathology of the immune system.

The definition of immune deficiency, the classification of immune deficiencies. Causes of congenital immunodeficiency states. Primary immunodeficiencies: characteristics, classification. Combined immunodeficiencies. Secondary (acquired) immunodeficiency: characteristics, classification. The causes of acquired immune deficiencies. Clinical manifestations of immunodeficiency states. Factors affecting the immune status. Immunotherapy, immunomodulators: definition, classification.

Topic 6. Evaluation of the immune status.

Laboratory diagnosis of immunopathological diseases in children and adults: methods, assessment criteria, interpretation. Methods of assessing the immune status. The levels of assessment of immune status. General rules of immunograms evaluation.

Topic 7. Serological tests: agglutination, precipitation test, complement fixation test (CFT), tests using labeled antibodies and antigens (ELISA, IFT, RIA).

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The main principles and aims of the serological tests in medical practice. Agglutination test and indirect (passive) haemagglutination test (PHAT): definition, mechanism, and practical use. Precipitation reaction: identification, mechanism, types, practical use. Agglutination and precipitation sera: preparation, titration, practical use. Complement fixation test (CFT): the aim of its carrying out, components, mechanisms. Immunofluorescent test (IFT): the variety, aim of its carrying out, components, mechanism. Enzyme linked immunosorbent assay (ELISA): the purpose of its carrying out, components, mechanism. Radioimmunoassay (RIA): the purpose of its carrying out, components, mechanism.

Section 4. Immunotherapy

Topic 8. Specific prevention and treatment of infectious diseases. Therapeutic, prophylactic and diagnostic immunological preparations.

Immunoprophylaxis, immunotherapy: definitions. Immunobiological preparations - group, the route of administration. The history of immunization. Vaccines - classification, characteristics. Anatoxins - obtaining, application. Requirements to vaccines. Complications, contraindications. Scheme administration. Vaccines. The immunological antibody-based drugs. Classification. Characteristic. Rules of vaccines and serums. Immunomodulators : using, classification.

Section 5. Special Immunology

Topic 9. Antiviral and antibacterial immunity. Immunity in transplantation, cancer and immunity in mycoses. Immunity and age.

Features of local immunity - skin and mucous membranes. Antibacterial and antitoxic immunity. Factors of antibacterial immunity. Antiviral immunity. Features of antifungal immunity. Features of immunity in protozoa infestations. Features of parasitic immunity. Transplantation immunity. Immunity in tumors. Immunity of pregnancy. Rhesus-conflict. Age features of immunity. Neonatal immunity with aging.


6. TOPICS OF PRACTICAL CLASSES

Section 1. General Immunology

Topic 1. Immunology as a science. Introduction in immunology.

Questions:

1. Immunology, its definition, problems.
2. The history of immunology, the main periods in the development of immunology.
3. The concept of immunity. Classification of immunity.
4. Sections of modern immunology.
5. Structure of the immune system. The central organs of the immune system.
6. The peripheral organs of the immune system.
7. The role of blood cells in immunity.
8. Immunocompetent cells: definition, classification.
9. The main cell populations of the immune system.

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10. The forms of immune response.
11. The mechanism of interaction of immune cells.

Topic 2. Innate immunity. Factors and mechanisms of the innate immunity.

Questions:

1. The concept of a non-specific (innate) immunity. The main barriers of nonspecific immunity.
2. The innate immune factors - the skin, mucous membranes, the normal microflora, lysozyme.
3. Lysozyme - chemical composition, function.
4. Complement - chemical composition and functions.
5. The activation of the complement pathway.
6. Phagocytosis, mononuclear phagocyte system.
7. The functions of phagocytes. Opsonin.
8. Phagocytosis mechanism stage. "Oxygen explosion." Complete and incomplete phagocytosis.
9. Indicators of activity of phagocytes - phagocytic index, opsono-phagocytic index.
10. Cytokines - classification, properties. The clinical significance of cytokines detection.
11. Interferon - chemical composition, properties. Classification.
12. Protective serum proteins - acute phase proteins, C-reactive protein (CRP), β -lysine, mannose proteins, properdin, fibronectin.

Topic 3. Antigens. Antibodies.

Questions:


1. Antigens: definition, chemical composition.
2. The structure of the antigen.
3. Properties of antigens: heterogeneity, immunogenicity. Types of antigens according to the degree of foreignness.
4. Specificity antigens, types antigenic specificity.
5. Classification antigens on its origin, chemical structure, the degree of immunogenicity.
6. Classification of antigens by the immune response. Haptens. Adjuvants.
7. The antigens of the human body.
8. The antigens of bacteria, viruses, tumor antigens. Autoantigens.
9. Ways of penetration of antigens in the macro-organism.
10. Antibodies: definition, structure.
11. The structure of the immunoglobulin, immunoglobulin classes. Serum immunoglobulins.
12. The properties of antibodies.
13. Phases of antibody synthesis.
14. The antibody functions in the formation of an immune complex.

Section 2. Allergology.

Topic 4. Hypersensitivity. Immunological memory. Immunological tolerance.

Questions:

1. Hypersensitivity, its definition. The definition of allergy, stages of allergic reaction.
2. Classification of allergies.
3. I type reactions of immediate type hypersensitivity: anaphylaxis (mechanism of development, manifestations of anaphylaxis, principles of therapy). Anaphylactic shock. Atopy.
4. II type of immediate hypersensitivity: cytotoxic: mechanisms of development, clinical manifesta-

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tions.

5. III type of immediate hypersensitivity reactions: immune complex: mechanisms of development, clinical manifestations.
6. Delayed type of hypersensitivity: mechanism of development, manifestations of contact allergy.
7. Classification of allergens. Infectious allergy.
8. Drug allergies: the immune response to the drug-haptens, clinical manifestations of drug allergy.
9. The principles of treatment and prevention of drug allergy. 10. Laboratory diagnosis of allergies.
11. Immunological memory: concept, mechanisms.
12. Immunological tolerance: concept, causes, mechanisms.
13. Classification of immunological tolerance. Using the phenomenon of immunological tolerance to solve medical problems. Artificial cancellation state of immunological tolerance.

Section 3. Clinical Immunology.

Topic 5. Pathology of the immune system.

Questions:

1. The definition of immune deficiency, the classification of immune deficiencies. Causes of congenital immunodeficiency states.
2. Primary immunodeficiencies: characteristics, classification. Combined immunodeficiencies.
3. Secondary (acquired) immunodeficiency: characteristics, classification.
4. The causes of acquired immune deficiencies.
5. Clinical manifestations of immunodeficiency states. Factors affecting the immune status.
6. Immunotherapy, immunomodulators: definition, classification.

Topic 6. Evaluation of the immune status.


Questions:

1. Laboratory diagnosis of immunopathological diseases in children and adults: methods, assessment criteria, interpretation.
2. Methods of assessing the immune status.
3. The levels of assessment of immune status.
4. General rules of immunograms evaluation.

Topic 7. Serological tests: agglutination, precipitation test, complement fixation test (CFT), tests using labeled antibodies and antigens (ELISA, IFT, RIA).

Questions:

1. The main principles and aims of the serological tests in medical practice.
2. Agglutination test and indirect (passive) haemagglutination test (PHAT): definition, mechanism, and practical use.
3. Precipitation reaction: identification, mechanism, types, practical use.
4. Agglutination and precipitation sera: preparation, titration, practical use.
5. Complement fixation test (CFT): the aim of its carrying out, components, mechanisms.
6. Immunofluorescent test (IFT): the variety, aim of its carrying out, components, mechanism.
7. Enzyme linked immunosorbent assay (ELISA): the purpose of its carrying out, components, mechanism.
8. Radioimmunoassay (RIA): the purpose of its carrying out, components, mechanism.

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Section 4. Immunotherapy

Topic 8. Specific prevention and treatment of infectious diseases. Therapeutic, prophylactic and diagnostic immunological preparations.

Questions:

1. Immunoprophylaxis, immunotherapy: definitions. Immunobiological preparations - group, the route of administration.
2. The history of immunization.
3. Vaccines - classification, characteristics.
4. Anatoxins - obtaining, application.
5. Requirements to vaccines. Complications, contraindications. Scheme administration.
6. Vaccine.
7. The immunological antibody-based drugs. Classification. Characteristic.
8. Rules of vaccines and serums.
9. Immunomodulators : using, classification.

Section 5. Special Immunology.

Topic 9. Antiviral and antibacterial immunity. Immunity in transplantation, cancer and immunity in mycoses. Immunity and age.

Questions:


1. Features of local immunity - skin and mucous membranes.
2. Antibacterial and antitoxic immunity. Factors of antibacterial immunity.
3. Antiviral immunity.
4. Features of antifungal immunity.
5. Features of immunity in protozoa infestations.
6. Features of parasitic immunity.
7. Transplantation immunity.
8. Immunity in tumors.
9. Immunity of pregnancy. Rhesus-conflict.
10. Age features of immunity. Neonatal immunity with aging.

7. LABORATORY CLASSES: this type of work is not provided by the curriculum.


8. TOPICS OF COURSE, CONTROL WORKS, ABSTRACTS: this type of work is not provided by the curriculum.

9. LIST OF QUESTIONS FOR THE OFFSET:

1. Immunology, its definition, problems. Sections of modern immunology.
2. The history of immunology, the main periods in the development of immunology.
3. The concept of immunity. Classification of immunity.
4. Structure of the immune system.
5. The central organs of the immune system. The peripheral organs of the immune system.
6. The role of blood cells in immunity.
7. Immunocompetent cells: definition, classification.

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8. The main cell populations of the immune system.
9. The forms of immune response.
10. The mechanism of interaction of immune cells.
11. The concept of a non-specific (innate) immunity. The main barriers of nonspecific immunity.
12. The innate immune factors - the skin, mucous membranes, the normal microflora, lysozyme. Lysozyme - chemical composition, function.
13. Complement - chemical composition and functions.
14. The activation of the complement pathway.
15. Phagocytosis, mononuclear phagocyte system. The functions of phagocytes. Opsonin.
16. Phagocytosis mechanism stage. "Oxygen explosion." Complete and incomplete phagocytosis.
17. Indicators of activity of phagocytes - phagocytic index, opsono-phagocytic index.
18. Cytokines - classification, properties. The clinical significance of cytokines detection.
19. Interferon - chemical composition, properties. Classification.
20. Protective serum proteins - acute phase proteins, C-reactive protein (CRP), β -lysinase, mannose proteins, properdin, fibronectin.
21. Antigens: definition, chemical composition.
22. The structure of the antigen.
23. Properties of antigens: heterogeneity, immunogenicity. Types of antigens according to the degree of foreignness.
24. Specificity antigens, types antigenic specificity.
25. Classification antigens on its origin, chemical structure, the degree of immunogenicity.
26. Classification of antigens by the immune response. Haptens. Adjuvants.
27. The antigens of the human body.
28. The antigens of bacteria, viruses, tumor antigens. Autoantigens.
29. Ways of penetration of antigens in the macro-organism.
30. Antibodies: definition, structure.
31. The structure of the immunoglobulin, immunoglobulin classes. Serum immunoglobulins.
32. The properties of antibodies.
33. Phases of antibody synthesis.
34. The antibody functions in the formation of an immune complexes.
35. Hypersensitivity, its definition. The definition of allergy, stages of allergic reaction.
36. Classification of allergies.
37. I type reactions of immediate type hypersensitivity: anaphylaxis (mechanism of development, manifestations of anaphylaxis, principles of therapy). Anaphylactic shock. Atopy.
38. II type of immediate hypersensitivity: cytotoxic: mechanisms of development, clinical manifestations.
39. III type of immediate hypersensitivity reactions: immune complex: mechanisms of development, clinical manifestations.

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40. Delayed type of hypersensitivity: mechanism of development, manifestations of contact allergy.
41. Classification of allergens. Infectious allergy.
42. Drug allergies: the immune response to the drug-haptens, clinical manifestations of drug allergy. The principles of treatment and prevention of drug allergy.
43. Laboratory diagnosis of allergies.
44. Immunological memory: concept, mechanisms. Immunological tolerance: concept, causes, mechanisms.
45. Classification of immunological tolerance. Using the phenomenon of immunological tolerance to solve medical problems. Artificial cancellation state of immunological tolerance.
46. The definition of immune deficiency, the classification of immune deficiencies.
47. Causes of congenital immunodeficiency states. Primary immunodeficiencies: characteristics, classification. Combined immunodeficiencies.
48. Secondary (acquired) immunodeficiency: characteristics, classification. The causes of acquired immune deficiencies.
49. Clinical manifestations of immunodeficiency states. Factors affecting the immune status.
50. Immunotherapy, immunomodulators: definition, classification.
51. Laboratory diagnosis of immunopathological diseases in children and adults: methods, assessment criteria, interpretation.
52. Methods of assessing the immune status.
53. The levels of assessment of immune status. General rules of immunograms evaluation.
54. The main principles and aims of the serological tests in medical practice.
55. Agglutination test and indirect (passive) haemagglutination test (PHAT): definition, mechanism, and practical use.
56. Precipitation reaction: identification, mechanism, types, practical use. Agglutination and precipitation sera: preparation, titration, practical use.
57. Complement fixation test (CFT): the aim of its carrying out, components, mechanisms.
58. Immunofluorescent test (IFT): the variety, aim of its carrying out, components, mechanism.
59. Enzyme linked immunosorbent assay (ELISA): the purpose of its carrying out, components, mechanism.
60. Radioimmunoassay (RIA): the purpose of its carrying out, components, mechanism.
61. Immunoprophylaxis, immunotherapy: definitions. Immunobiological preparations - group, the route of administration.
62. The history of immunization.
63. Vaccines - classification, characteristics. Anatoxins - obtaining, application.
64. Requirements to vaccines. Complications, contraindications. Scheme administration.
65. The immunological antibody-based drugs. Classification. Characteristic.
66. Rules of vaccines and serums.
67. Immunomodulators : using, classification.
68. Features of local immunity - skin and mucous membranes.

69. Antibacterial and antitoxic immunity. Factors of antibacterial immunity.
70. Antiviral immunity.
71. Features of antifungal immunity.
72. Features of immunity in protozoa infestations.
73. Features of parasitic immunity.
74. Transplantation immunity.
75. Immunity in tumors.
76. Immunity of pregnancy. Rhesus-conflict.
77. Age features of immunity. Neonatal immunity with aging.

10. SELF-STUDY WORK OF STUDENTS

Form of training full-time

The unit title	Type of self-study work	Amount of hours	Type of control
Immunology as a science. Introduction in immunology	Preparation for classes, performing of tasks for self-guided work in the copybooks	8	Discussion of home tasks, checkup of tasks in copybook
Innate immunity. Factors and mechanisms of the innate immunity	Preparation for classes, performing of tasks for self-guided work in the copybooks, preparation of multimedia presentations	8	Discussion of home tasks, checkup of tasks in copybook, checkup of presentation
Antigens. Antibodies	Preparation for classes, performing of tasks for self-guided work in the copybooks	8	Discussion of home tasks, checkup of tasks in copybook
Hypersensitivity. Immunological memory. Immunological tolerance	Preparation for classes, performing of tasks for self-guided work in the copybooks, work with literature and other information sources, writing of abstract, preparation of multimedia presentations	8	Discussion of home tasks, checkup of tasks in copybook
Pathology of the immune system	Preparation for classes, performing of tasks for self-guided work in the copybooks, preparation of multimedia presentations	8	Discussion of home tasks, checkup of tasks in copybook
Evaluation of the immune status	Preparation for classes, performing of tasks for self-guided work in the copybooks	8	Discussion of home tasks, checkup of tasks in copybook
Serological tests: agglutination, precipitation test, complement fixation	Preparation for classes, performing of tasks for self-guided work in the copybooks, work with literature and other information sources,	8	Discussion of home tasks, checkup of tasks in copybook

test (CFT), tests using labeled antibodies and antigens (ELISA, IFT, RIA)	writing of abstract		
Specific prevention and treatment of infectious diseases. Therapeutic, prophylactic, and diagnostic immunological preparations	Preparation for classes, performing of tasks for self-guided work in the copybooks, work with literature and other information sources, writing of abstract, preparation of multimedia presentations	8	Discussion of home tasks, checkup of tasks in copybook
Antiviral and antibacterial immunity. Immunity in transplantation, cancer and immunity in mycoses. Immunity and age	Preparation for classes, performing of tasks for self-guided work in the copybooks, work with literature and other information sources, writing of abstract, preparation of multimedia presentations	8	Discussion of home tasks, checkup of tasks in copybook

11. INSTRUCTIONAL AND INFORMATION SUPPORT OF THE SUBJECT

a) the list of recommended literature

general

1) Khaitov, R. M. Immunology : textbook / Rakhim M. Khaitov. - 2nd updated edition. - Moscow : GEOTAR-Media, 2021. - 272 с. - ISBN 978-5-9704-5861-7. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL :


<https://www.studentlibrary.ru/book/ISBN9785970458617.html>

2) Artamonova, M. N. Medical Microbiology, Virology and Immunology. Lecture Notes : textbook / Artamonova M. N., Potaturkina-Nesterova N. I., Ilyina N. A., Nemova I. S. - Москва : ГЭОТАР-Медиа, 2021. - 352 с. - ISBN 978-5-9704-6043-6. - Текст: электронный // ЭБС "Консультант студента" : [сайт]. –

URL : <https://www.studentlibrary.ru/book/ISBN9785970460436.html>

Additional

1) Artamonova M. N. Immunology : guidelines for practical classes for foreign students / M. N. Artamonova, N. I. Potaturkina-Nesterova, I.S. Nemova; Ulyanovsk State University, The Institute of Medicine, Ecology and Physical Culture. - Ulyanovsk : ULSU, 2017. - На англ. яз.; Загл. с экрана.

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- Электрон. текстовые дан. (1 файл : 1,70 МБ). - Текст : электронный.
<http://lib.ulsu.ru/MegaPro/Download/MObject/911>

2) Островцова С. А. General Microbiology and Immunology. Summaries of the lectures = Общая микробиология и иммунология. Краткий курс лекций: пособие для студентов учреждений высшего образования, обучающихся на английском языке по специальности «Лечебное дело» : training appliance for Medical Faculty for International Students (English medium) / С. А. Островцова, А. И. Жмакин. - 2-е изд. - Гродно : ГрГМУ, 2019. - 264 с. - ISBN 9789855951774. - Текст : электронный // ЭБС "Букап" : [сайт]. - URL : <https://www.books-up.ru/ru/book/general-microbiology-and-immunology-summaries-of-the-lectures-12050876/>

educational methodological

1) Artamonova M. N. Guidelines for students' self-guided work for the discipline "Immunology" for students of the Medical faculty 31.05.01 – "General Medicine" / M. N. Artamonova, N. I. Potaturkina-Nesterova; Ulyanovsk State University. - Ulyanovsk : ULSU, 2019. - На англ. яз.; Загл. с экрана. - Электрон. текстовые дан. (1 файл : 633 Кб). - Текст : электронный.
<http://lib.ulsu.ru/MegaPro/Download/MObject/6788>

Agreed:

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position name signature

b) Professional databases, information and reference systems


1. Электронно-библиотечные системы:

1.1. IPRbooks : электронно-библиотечная система : сайт / группа компаний Ай Пи Ар Медиа. - Саратов, [2024]. – URL: <http://www.iprbookshop.ru>. – Режим доступа: для зарегистрир. пользователей. - Текст : электронный.

1.2. ЮРАЙТ : электронно-библиотечная система : сайт / ООО Электронное издательство ЮРАЙТ. – Москва, [2024]. - URL: <https://www.biblio-online.ru>. – Режим доступа: для зарегистрир. пользователей. - Текст : электронный.

1.3. Консультант студента : электронно-библиотечная система : сайт / ООО Политехресурс. – Москва, [2024]. – URL: http://www.studentlibrary.ru/catalogue/switch_kit/x2019-128.html. – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.4. Лань : электронно-библиотечная система : сайт / ООО ЭБС Лань. – Санкт-

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Петербург, [2021]. – URL: <https://e.lanbook.com>. – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.5. **Znanium.com** : электронно-библиотечная система : сайт / ООО Знаниум. - Москва, [2021]. - URL: <http://znanium.com>. – Режим доступа : для зарегистрир. пользователей. - Текст : электронный.

1.6. Clinical Collection : коллекция для медицинских университетов, клиник, медицинских библиотек // EBSCOhost : [портал]. – URL: <http://web.a.ebscohost.com/ehost/search/advanced?vid=1&sid=e3ddfb99-a1a7-46dd-a6eb-2185f3e0876a%40sessionmgr4008>. – Режим доступа : для авториз. пользователей. – Текст : электронный.

2. **КонсультантПлюс** [Электронный ресурс]: справочная правовая система. /ООО «Консультант Плюс» - Электрон. дан. - Москва : Консультант Плюс, [2021].

3. Базы данных периодических изданий:

3.1. База данных периодических изданий : электронные журналы / ООО ИВИС. - Москва, [2021]. – URL: <https://dlib.eastview.com/browse/udb/12>. – Режим доступа : для авториз. пользователей. – Текст : электронный.

3.2. eLIBRARY.RU: научная электронная библиотека : сайт / ООО Научная Электронная Библиотека. – Москва, [2021]. – URL: <http://elibrary.ru>. – Режим доступа : для авториз. пользователей. – Текст : электронный

3.3. «Grebennikon» : электронная библиотека / ИД Гребенников. – Москва, [2021]. – URL: <https://id2.action-media.ru/Personal/Products>. – Режим доступа : для авториз. пользователей. – Текст : электронный.


4. **Национальная электронная библиотека** : электронная библиотека : федеральная государственная информационная система : сайт / Министерство культуры РФ ; РГБ. – Москва, [2021]. – URL: <https://нэб.пф>. – Режим доступа : для пользователей научной библиотеки. – Текст : электронный.

5. **SMART Imagebase** // EBSCOhost : [портал]. – URL: <https://ebsco.smartimagebase.com/?TOKEN=EBSCO-1a2ff8c55aa76d8229047223a7d6dc9c&custid=s6895741>. – Режим доступа : для авториз. пользователей. – Изображение : электронные.

6. Федеральные информационно-образовательные порталы:

6.1. **Единое окно доступа к образовательным ресурсам** : федеральный портал / учредитель ФГАОУ ДПО ЦРГОП и ИТ. – URL: <http://window.edu.ru/>. – Текст : электронный.

6.2. **Российское образование** : федеральный портал / учредитель ФГАОУ ДПО ЦРГОП и ИТ. – URL: <http://www.edu.ru>. – Текст : электронный.

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7. Образовательные ресурсы УлГУ:

7.1. Электронная библиотека УлГУ : модуль АБИС Мега-ПРО / ООО «Дата Экспресс». – URL: <http://lib.ulsu.ru/MegaPro/Web>. – Режим доступа : для пользователей научной библиотеки. – Текст : электронный.

7.2. Образовательный портал УлГУ. – URL: <http://edu.ulsu.ru>. – Режим доступа : для зарегистрир. пользователей. – Текст : электронный.

Agreed:

зам. н.с. УлГУ / Киселева Д.В. / [Signature]
 position name signature

12. MATERIAL AND TECHNICAL SUPPORT OF THE SUBJECT

Specialized training laboratory microbiology must have individual jobs for students, equipped with microscopes, and facilities for making micropreparations, bacteriological research and productions of immunological reactions (dyes, alcohol lamp, racks, trays, bacterial loop, tubes, automatic dispensers, pipettes, sets disks with antibiotics thermostat, vaccines, sera, diagnostic preparations). It also requires basic equipment for the preparation and storage of culture media and disinfection / sterilization: autoclave ("clean" and "dirty"), dry-heat sterilizer, distiller, fridge. Visual aids (tables, posters and are fixed preparations of bacteria) in the diagnosis of major infectious diseases, and others.

13. SPECIAL CONDITIONS FOR STUDENTS WITH DISABILITIES OF HEALTH AND DISABILITIES

If it is necessary, students with disabilities (at the request of the student) may be offered the following options for perceiving information, according their individual psychophysical characteristics:

- for persons with visual impairment: printed information in large print; in the form of an electronic document; in the form of an audio file (translation of training materials into audio format; individual tasks and consultations;
- for persons with hearing impairment: in print; in the form of an electronic document; individual tasks and consultations;
- for persons with disorders of the musculoskeletal system: in print; in the form of an electronic document; in the form of an audio file; individual tasks and consultations.

If it is necessary to use partially or only distance educational technologies in the educational process, the organization of work of teaching staff with students with disabilities and disabled people is provided in the electronic information and educational environment, taking into account their individual psychophysical characteristics.

Creators [Signature] / associate professor / Artamonova M. N.
 signature position full name

Форма А [Signature]