APPROVED
by
the Academic Board of the Institute
for Medicine, Ecology and Physical Education at
Ulyanovsk State University
May 16th, 2024, Record № 9/260
date
Chairperson _____ V. V. Mashin
signature *surname, initials*

COURSE SYLLABUS

Course Title	Immunology
Faculty	Faculty of Medicine named after T.Z. Biktimirov
Department	Department of General and Clinical Pharmacology with Microbiology course
Year of study	2

Field of study General Medicine 31.05.01
Name *code*
Speciality/ profile not provided
Mode of study full-time
full-time, part-time (specify those implemented)
First introduced in the educational process at Ulyanovsk State University September 1st, 2024

Updated at the department session: record №_____ of _____ .

Course designer

Full name	Department	Job title, Academic Qualification (Degree)
Artamonova Marina Nikolayevna	Department of General and Clinical Pharmacology with Microbiology course	PhD in Biological Science Associate Professor
Potaturkina-Nesterova Natalia Iosifovna	Department of General and Clinical Pharmacology with Microbiology course	PhD in Medical Science Professor

AGREED by	AGREED by
Head of the department of General and Clinical Pharmacology with Microbiology course implementing the discipline	Head of the Graduating Department of Hospital Therapy
_____ Markevich M. P. *Signature* *Surname, initials*	_____ Vise-Khripunova M.A. *Signature* *Surname, initials*
«April 24th» 2024	«April 24th» 2024

1. COURSE AIMS AND OBJECTIVES:

The course of Immunology contributes to a better understanding of the role of innate and acquired immunity in normal human activity and in diseases, mastering the most important methods of immunodiagnostics of diseases.

Course objectives:

-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. THE COURSE POSITION WITHIN THE FRAMEWOK OF THE NATIONAL CURRICULUM FOR HIGHER PROFESSIONAL EDUCATION:

The discipline “Microbiology, virology” is referred to part formed by participiants of educational relationships.(B1.B.O1) of GEP of speciality 31.05.01 «General medicine». The total complexity is 3 SET (108 academic hours). Discipline is mastered in English.

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

Immunology is the preceding discipline for study of such disciplines as Hygiene, Faculty Therapy, Outpatient therapy, Public health and Healthcare, Pedagogy and Psychology of doctor’s action, Medical rehabilitation, Nanotechnologies in Medicine, Epidemiology, Basics of the rational nutrition, Marketing in the HealthCare, Organization of drug supply of people, Modern medical informational systems, Management in quantity of medical care.

3. EXPECTED LEARNING OUTCOMES

The study of the subject «Immunology» within the completion of the educational program is directed towards the formation of the following general and professional competences in students:

Code and name of the general professional competence	**Code and name of the indicator of achievement of general professional competence**
PC-5 Ability and readiness to implement a set of 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	To know: medical and social factors affecting the health of the population 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 To be skilled in: the main methods of sanitary educational and hygienic education of the population
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	To know: legislation in health and regulatory legal acts, as well as other documents, defining the activities of medical organizations and medical professionals 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 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

4.COURSE ESTIMATED WORKLOAD

4.1. Estimated workload in credits - 3

4.2. Estimated workload in academic hours - 108

Educational activities	Academic hours (mode of study: full-time)		
	Total academic hours	Term	
		Term 3	Term 4
1	2	3	4
Classroom activities	72	36	36
Classes:			
lectures	18	18	-
practical classes	54	18	36
Independent study	36	18	18
Formative assessment (tests, quizzes, essays etc)			
Interim Assessment/ Summative Assessment (exams, tests/credit			credit
Total academic hours	108		

4.3. Course structure diagram. Allocation of academic hours to types of educational activities
Mode of study: full-time

Sections and topics	Total	Session types				
		Classroom sessions		Interactive classes	Self-study work	form of current knowledge control
		lectures	practical classes			
1	2	3	4	6	7	8
Section 1. General Immunology						
Immunology as a science. Immunity, its classification. Structure of the immune system.	14	2	2		2	oral survey, test
Organs and cells of the immune system.			2	1	2	oral survey, test

Mechanism of interaction of immune cells in immune response. Types of immune response. Theories of immune response			2		2	oral survey, test

Innate immunity. Factors of the innate immunity. Mechanical, chemical and physiological barriers.	14	2	2		2	oral survey, test
Humoral mechanisms of the innate immunity			2	1	2	oral survey, test
Cellular mechanisms of the innate immunity			2	1	2	oral survey, test
Antigens: definition, classification.	14	2	2		2	oral survey, test
Antibodies: definition, classes of immunoglobulins.			2	1	2	oral survey, test
Immunological memory. Immunological tolerance. Colloquium.			2		2	oral survey, test
Section 2. Allergology						
Topic 4. Hypersensitivity.	8	2	4	1	2	oral survey, test
Section 3. Clinical Immunology						
Pathologies of the immune system. Immunodeficiencies.	14	2	4	1	2	oral survey, test
Autoimmune diseases.			4		2	oral survey, test
Topic 6. Evaluation of the immune status	8	2	4		2	oral survey, test
Serological tests: definition, classification. Simple and complex serological tests.	14	2	4		2	oral survey, test
Serological tests using labeled			4		2	oral survey, test

antibodies and antigens (ELISA, IFT, RIA)						
Section 4. Immunotherapy.						
Topic 8. Specific prevention and treatment of infectious diseases. Imminization.Immunotherapy.	8	2	4		2	oral survey, test
Section 5. Special Immunology						
Anti-infectious immunity: antibacterial, antiviral, antifungal antiparasitic immunities.	14	2	4		2	oral survey, test
Non-infectious immunity: transplantation immunity, immunity in pregnancy, tumor immunity.			4		2	oral survey, test
Total	108	18	54	-	36	

If it is necessary to use partially or exclusively distance learning technologies in the educational process, it should be noted that the total number of hours (c.u.) set by the Department of discipline/specialty for each discipline/practice remains unchanged and is implemented in full. In this case, in the corresponding section of the educational program the total number of hours of work with students in accordance with the educational plan is allocated and the number of hours for conducting classes in a remote format using e-learning (online courses, lectures and seminars in videoconference mode, virtual practical classes, laboratory work in the form of virtual analogues, calculation and graphic works, individual tasks in the electronic information and educational environment, etc.) Training and industrial practice for all areas of discipline/specialties of all forms of training can be partially or fully implemented in a remote format.

Interactive forms of classes

№	Name of the subject section	Interactive form of classes	Hours
1	**Section 1. General Immunology.** Organs and cells of the immune system.	Watching of the film and its discussion: "Our immune system"	1
2	Humoral mechanisms of the innate immunity	Watching of the film "Complement activation" and its discussion	1
3	Cellular mechanisms of the innate immunity	Watching of the film "Phagocytosis" and its discussion	1
4	Antibodies: definition, classes of immunoglobulins.	Watching of the film "Immunoglobulin classes" and its discussion	1
5	**Section 2. Allergology**. Hypersensitivity.	Watching of the film "Allergy" and its discussion	1
6	Pathologies of the immune system. Immunodeficiencies.	Watching of the film "David Vetter is the Bubble Boy (SCID)" and its discussion	1
	Total		6

5. COURSE CONTENT

Section 1. General Immunology

Topic 1. Immunology as a science. Immunity, its classification. Structure of the immune system.

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.

Topic 2. Organs and cells of the immune system.

Primary organs of the immune system. Secondary organs of the immune system. The role of blood cells in immunity. Immunocompetent cells: definition, classification. The main

cell populations of the immune system.

Topic 3. Mechanism of interaction of immune cells in immune response. Types of immune response. Theories of immune response.

The forms of immune response. The mechanism of interaction of immune cells. Theories of immune response. Side-chain theory. Template theories. Selection theories. Jernes Network Hypothesis.

Topic 4. Innate immunity. Factors of the innate immunity. Mechanical, chemical and physiological barriers.

The concept of a non-specific (innate) immunity. The main barriers of nonspecific immunity. The innate immune factors - the skin, mucous membranes. Normal microflora, its role in human immunity.

Topic 5. Humoral mechanisms of the innate immunity.

Lysozyme - chemical composition, function. Complement - chemical composition and functions. The activation of the complement. Cytokines - classification, properties. The clinical significance of cytokine detection. Interferon - chemical composition, properties. Classification. Interleukins. Protective serum proteins - acute phase reactants, C-reactive protein (CRP), β-lysine, mannose proteins, properdin, fibronectin.

Topic 6. Cellular mechanisms of the innate immunity

Phagocytosis, mononuclear phagocyte system. Functions of phagocytes. Opsonins. Phagocytosis mechanism, its stages. "Oxygen burst." Complete and incomplete phagocytosis. Indicators of activity of phagocytes - phagocytic index, opsonic index.

Topic 7. Antigens: definition, classification.

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. Major histocompatibility complex. MHC class I. MHC class II. The antigens of bacteria, viruses, tumor antigens. Ways of penetration of antigens into the human body.

Topic 8. Antibodies: definition, classes of immunoglobulins.

Antibodies: definition, structure. The structure of the immunoglobulin. Immunoglobulin classes. Serum immunoglobulins. The properties of antibodies. Phases of antibody synthesis. Functions of antibodies.

Topic 9. Immunological memory. Immunological tolerance. Colloquium.

Immunological memory: definition, mechanisms. Advantages and disadvantages of

immunological memory. Immunological memory: definition, classification. Mechanisms of immunological memory. The using of immunological memory in medicine.

Section 2. Allergology

Topic 10. Hypersensitivity.

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.

Section 3. Clinical Immunology

Topic 11. Pathologies of the immune system. Immunodeficiencies

The definition of immunodeficiency, the classification of immunodeficiencies. Causes of congenital immunodeficiencies. 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.

Topic 12. Autoimmune diseases.

Autoimmunity, its mechanism. Autoimmune diseases: definition, classification. Cytotoxic autoimmune reactions: Graves' disease. Immune complex autoimmune reactions: Systemic lupus erythematosus, rheumatoid arthritis. Cell-Mediated autoimmune reactions: Multiple sclerosis, Insulin-dependent diabetes mellitus.

Topic 13. Evaluation of the immune status.

Laboratory diagnosis of immunodeficiencies in children and adults: methods, assessment criteria, interpretation. Methods of assessment of the immune status. Levels of assessment of immune status. General rules of immunogram evaluation.

Topic 14. Serological tests: definition, classification. Simple and complex serological tests.

The main principles and aims of the serological tests in medical practice. Agglutination test: definition, mechanism and practical using. Classification of agglutination tests. Precipitation test: identification, mechanism, types, practical using. Agglutination and precipitation sera: preparation, titration, practical use. Complement fixation test (CFT):

components, mechanisms.

Topic 15. Serological tests using labeled antibodies and antigens (ELISA, IFT, RIA)

Immunofluorescent test (IFT): components, mechanism. Direct and indirect IFT. Enzyme linked immunosorbent assay (ELISA): components, mechanism. Direct and indirect ELISA. Radioimmunoassay (RIA): components, mechanism.

Section 4. Immunotherapy

Topic 16. Specific prevention and treatment of infectious diseases. Imminization.Immunotherapy.

Immunoprophylaxis, immunotherapy: definitions. Immunobiological preparations - classification. The history of immunization. Vaccines - classification, characteristics. Requirements to vaccines. Complications, contraindications. Scheme of vaccine administration. The immunological antibody-based preparations. Classification. Monoclonal antibodies. Characteristic. Rules of vaccine and serum injection. Immunomodulators : using, classification.

Section 5. Special Immunology

Topic 17. Anti-infectious immunity: antibacterial, antiviral, antifungal antiparasitic immunities.

Local immunity - skin and mucous membranes. Mechanisms of antibacterial and antitoxic immunity. Mechanisms of antiviral immunity. Features of antifungal immunity. Features of immunity in protozoa and helminthes infestations.

Topic 18. Non-infectious immunity: transplantation immunity, immunity in pregnancy, tumor immunity.

Transplantation immunity, its mechanisms. Immunity in tumors. Features of immunity in pregnancy. Age features of immunity.

6. TOPICS OF PRACTICAL CLASSES

Section 1. General Immunology

Topic 1. Immunology as a science. Immunity, its classification. Structure of the immune system.

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.

Topic 2. Organs and cells of the immune system.

Questions:

1. Primary organs of the immune system.
2. Secondary organs of the immune system.
3. The role of blood cells in immunity.
4. Immunocompetent cells: definition, classification.
5. The main cell populations of the immune system.

Topic 3. Mechanism of interaction of immune cells in immune response. Types of immune response. Theories of immune response.

Questions:

1. The forms of immune response. The mechanism of interaction of immune cells.
2. Theories of immune response. Side-chain theory.
3. Template theories.
4. Selection theories.
5. Jernes Network Hypothesis.

Topic 4. Innate immunity. Factors of the innate immunity. Mechanical, chemical and physiological barriers.

Questions:

1. The concept of a non-specific (innate) immunity.
2. The main barriers of nonspecific immunity.
3. The innate immune factors - the skin, mucous membranes.
4. Normal microflora, its role in human immunity.

Topic 5. Humoral mechanisms of the innate immunity.

Questions:

1. Lysozyme - chemical composition, functions.
2. Complement - chemical composition and its functions.
3. Pathways of complement activation.
4. Cytokines - classification, properties. The clinical significance of cytokine detection.
5. Interferon - chemical composition, properties. Classification.
6. Interleukins: definition, classification, its role.
7. Protective serum proteins - acute phase reactants, C-reactive protein (CRP), β-lysine,

mannose proteins, properdin, fibronectin.

Topic 6. Cellular mechanisms of the innate immunity

Questions:

1. Phagocytosis, mononuclear phagocyte system.
2. The functions of phagocytes. Opsonins.
3. Phagocytosis mechanism, stages of phagocytosis. "Oxygen burst." Complete and incomplete phagocytosis.
4. Indicators of activity of phagocytes - phagocytic index, opsonic index.

Topic 7. Antigens: definition, classification.

Questions:

1. Antigens: definition, chemical composition.
2. The structure of the antigen.
3. Properties of antigens: antigenicity, immunogenicity, specificity, foreigness.
4. Types of antigens according to the degree of foreignness.
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. Major histocompatibility complex. MHC class I. MHC class II.
9. The antigens of bacteria, viruses, tumor antigens.
10. Ways of penetration of antigens into the human body.

Topic 8. Antibodies: definition, classes of immunoglobulins.

Questions:

1. Antibodies: definition. The structure of the immunoglobulin.
2. Immunoglobulin classes. Serum immunoglobulins.
3. The properties of antibodies.
4. Phases of antibody synthesis.
5. Functions of antibodies.

Topic 9. Immunological memory. Immunological tolerance. Colloquium.

1. Immunological memory: definition, mechanisms.
2. Advantages and disadvantages of immunological memory.

3. Immunological tolerance: definition, classification.
4. Mechanisms of immunological memory. The using of immunological memory in medicine.

Section 2. Allergology.

Topic 10. Hypersensitivity.

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 manifestations.
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.

Section 3. Clinical Immunology.

Topic 11. Pathologies of the immune system. Immunodeficiencies.

Questions:

1. The definition of immunodeficiency, 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.

Topic 12. Autoimmune diseases.

1. Autoimmunity, its mechanism.
2. Autoimmune diseases: definition, classification.
3. Cytotoxic autoimmune reactions: Graves' disease.
4. Immune complex autoimmune reactions: Systemic lupus erythematosus, rheumatoid arthritis.

5. Cell-Mediated autoimmune reactions: Multiple sclerosis, Insulin-dependent diabetes mellitus.

Topic 13. 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 14. Serological tests: definition, classification. Simple and complex serological tests.

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.

Topic 15. Serological tests using labeled antibodies and antigens (ELISA, IFT, RIA)

Questions:

1. Immunofluorescent test (IFT): the variety, aim of its carrying out, components, mechanism.
2. Enzyme linked immunosorbent assay (ELISA): the purpose of its carrying out, components, mechanism.
3. Radioimmunoassay (RIA): the purpose of its carrying out, components, mechanism.
4. Western blot: mechanism, using.

Section 4. Immunotherapy

Topic 16. Specific prevention and treatment of infectious diseases. Imminization. Immunotherapy.

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 17. Anti-infectious immunity: antibacterial, antiviral, antifungal antiparasitic immunities.

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.

Topic 18. Non-infectious immunity: transplantation immunity, immunity in pregnancy, tumor immunity.

Questions:

1. Transplantation immunity.
2. Immunity in tumors.
3. Immunity of pregnancy.
4. Age features of immunity. Neonatal immunity.

7. LABORATORY SESSIONS

This type of sessions is not provided by the Curriculum

8.TOPICS OF COURSE ASSIGNMENTS, TESTS AND ESSAYS

These types of educational activities are not provided by the curriculum

9.QUESTIONS FOR CREDIT ON DISCIPLINE "IMMUNOLOGY"

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.
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-lysine, 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.
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. Autoimmunity, its mechanism.
51. Autoimmune diseases: definition, classification.
52. Cytotoxic autoimmune reactions: Graves' disease.
53. Immune complex autoimmune reactions: Systemic lupus erythematosus, rheumatoid arthritis.
54. Cell-Mediated autoimmune reactions: Multiple sclerosis, Insulin-dependent diabetes mellitus.
55. Laboratory diagnosis of immunopathological diseases in children and adults: methods, assessment criteria, interpretation.
56. Methods of assessing the immune status.
57. The levels of assessment of immune status. General rules of immunograms evaluation.
58. The main principles and aims of the serological tests in medical practice.
59. Agglutination test and indirect (passive) haemagglutination test (PHAT): definition, mechanism, and practical use.
60. Precipitation reaction: identification, mechanism, types, practical use. Agglutination and precipitation sera: preparation, titration, practical use.
61. Complement fixation test (CFT): the aim of its carrying out, components, mechanisms.
62. Immunofluorescent test (IFT): the variety, aim of its carrying out, components, mechanism.
63. Enzyme linked immunosorbent assay (ELISA): the purpose of its carrying out,

components, mechanism.

64. Radioimmunoassay (RIA): the purpose of its carrying out, components, mechanism.
65. Immunoprophylaxis, immunotherapy: definitions. Immunobiological preparations - group, the route of administration.
66. The history of immunization.
67. Vaccines - classification, characteristics. Anatoxins - obtaining, application.
68. Requirements to vaccines. Complications, contraindications. Scheme administration.
69. The immunological antibody-based drugs. Classification. Characteristic.
70. Rules of vaccines and serums.
71. Immunomodulators : using, classification.
72. Features of local immunity - skin and mucous membranes.
73. Antibacterial and antitoxic immunity. Factors of antibacterial immunity.
74. Antiviral immunity.
75. Features of antifungal immunity.
76. Features of immunity in protozoa infestations.
77. Features of parasitic immunity.
78. Transplantation immunity.
79. Immunity in tumors.
80. Immunity of pregnancy.
81. Age features of immunity.

10. INDEPENDENT STUDY

Mode of study: full-time.

The unit title	Type of self-study work	Amount of hours	Type of control
Immunology as a science. Immunity, its classification. Structure of the immune system.	Preparation for classes, performing of tasks for self-guided work in the copybooks	2	Discussion of home tasks, checkup of tasks in copybook

Organs and cells of the immune system.	Preparation for classes, performing of tasks for self-guided work in the copybooks, preparation of multimedia presentations	2	Discussion of home tasks, checkup of tasks in copybook, checkup of presentation
Mechanism of interaction of immune cells in immune response. Types of immune response. Theories of immune response.	Preparation for classes, performing of tasks for self-guided work in the copybooks	2	Discussion of home tasks, checkup of tasks in copybook
Innate immunity. Factors of the innate immunity. Mechanical, chemical and physiological barriers.	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	2	Discussion of home tasks, checkup of tasks in copybook
Humoral mechanisms of the innate immunity	Preparation for classes, performing of tasks for self-guided work in the copybooks, preparation of multimedia presentations	2	Discussion of home tasks, checkup of tasks in copybook
Cellular mechanisms of the innate immunity	Preparation for classes, performing of tasks for self-guided work in the copybooks	2	Discussion of home tasks, checkup of tasks in copybook
Antigens: definition, classification.	Preparation for classes, performing of tasks for self-guided work in the copybooks, work with literature and other information sources, writing of abstract	2	Discussion of home tasks, checkup of tasks in copybook
Antibodies: definition, classes of immunoglobulins.	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	2	Discussion of home tasks, checkup of tasks in copybook

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	2	Discussion of home tasks, checkup of tasks in copybook
Hypersensitivity	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	2	Discussion of home tasks, checkup of tasks in copybook
Pathologies of the immune system. Immunodeficiencies.	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	2	Discussion of home tasks, checkup of tasks in copybook
Autoimmune diseases.	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	2	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, work with literature and other information sources, writing of abstract, preparation of multimedia presentations	2	Discussion of home tasks, checkup of tasks in copybook

Serological tests: definition, classification. Simple and complex serological tests.	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	2	Discussion of home tasks, checkup of tasks in copybook
Serological tests using labeled antibodies and antigens (ELISA, IFT, RIA)	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	2	Discussion of home tasks, checkup of tasks in copybook
Specific prevention and treatment of infectious diseases. Imminization.Immunotherapy.	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	2	Discussion of home tasks, checkup of tasks in copybook
Anti-infectious immunity: antibacterial, antiviral, antifungal antiparasitic immunities.	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	2	Discussion of home tasks, checkup of tasks in copybook
Non-infectious immunity: transplantation immunity, immunity in pregnancy, tumor immunity.	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	2	Discussion of home tasks, checkup of tasks in copybook

11. INSTRUCTIONAL AND INFRORMATION 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. - 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 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:

Leading specialist Стадольникова/_____  _/_____2024_

The position of the worker scientific library Full name signature date

Профессиональные базы данных, информационно-справочные системы

1. Электронно-библиотечные системы:

1.1. Цифровой образовательный ресурс IPRsmart : электронно-библиотечная система : сайт / ООО Компания «Ай Пи Ар Медиа». - Саратов, [2024]. – 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, [2024]. - 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, [2024]. – 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, [2024]. – URL: https://www.rosmedlib.ru. – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.5. Большая медицинская библиотека : электронно-библиотечная система : сайт / ООО «Букап». – Томск, [2024]. – 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, [2024]. – URL: https://e.lanbook.com. – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.7. ЭБС Znanium.com : электронно-библиотечная система : сайт / ООО «Знаниум». - Москва, [2024]. - URL: http://znanium.com . – Режим доступа : для зарегистрир. пользователей. - Текст : электронный.

2. КонсультантПлюс [Электронный ресурс]: справочная правовая система. / ООО «Консультант Плюс» - Электрон. дан. - Москва : КонсультантПлюс, [2024].

3. eLIBRARY.RU: научная электронная библиотека : сайт / ООО «Научная Электронная Библиотека». – Москва, [2024]. – URL: http://elibrary.ru. – Режим доступа : для авториз. пользователей. – Текст : электронный

4. Федеральная государственная информационная система «Национальная электронная библиотека» : электронная библиотека : сайт / ФГБУ РГБ. – Москва, [2024]. – URL: https://нэб.рф. – Режим доступа : для пользователей научной библиотеки. – Текст : электронный.

5. Российское образование : федеральный портал / учредитель ФГАУ «ФИЦТО». – URL: http://www.edu.ru. – Текст : электронный.

6. 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.

Инженер ведущий Щуренко Ю.В. 2024

12. EDUCATIONAL FACILITIES

Room № 1 is used for conducting workshops, tutorials, for formative and summative assessment and equipped to demonstrate visual aids designed to implement the syllabus. The room is furnished with a set of student furniture seating 16 people. The 35 square meter room is equipped with a blackboard, fluorescent lamps on each desk, UV lamp for sterilization, sink with tap, lab cupboard for dishes. There are 8 individual places equipped with laboratory tools and dishes necessary for microbiological manipulations: light microscope, clean glass slides, laboratory tray, wash bottles with sterile distilled water, loop, tubes with physiological solution, test tubes with bacterial pure culture, spirit lamp, set of dyes: crystal violet, fuchsine), iodine, pipettes, sets disks with antibiotics, diagnostic preparations: vaccines, sera, bacteriophages.	4, Surova Street, Ulyanovsk, the Ulyanovsk Region (City Clinical Hospital №1)
Room № 2 is used for conducting workshops, tutorials, for formative and summative assessment and equipped to demonstrate visual aids designed to implement the syllabus. The room is furnished with a set of student furniture seating 16 people. The 39 square meter room is equipped with a blackboard, fluorescent lamps on each desk, UV lamp for sterilization, sink with tap, lab cupboard for dishes. There are 8 individual places equipped with laboratory tools and dishes necessary for microbiological manipulations: light microscope, clean glass slides, laboratory tray, wash bottles with sterile distilled water, loop, tubes with physiological solution, test tubes with bacterial pure culture, spirit lamp, set of dyes: crystal violet, fuchsine), iodine, pipettes, sets disks with antibiotics, diagnostic preparations: vaccines, sera, bacteriophages.	4, Surova Street, Ulyanovsk, the Ulyanovsk Region (City Clinical Hospital №1)
Room №3 is used for storage of lab dishes, equipment and bacterial culture. It is equipped with fridge, thermostat for cultivation of bacteria, anaerobic jar for cultivation of anaerobic bacteria, UV lamp and lab cupboards for dishes.	4, Surova Street, Ulyanovsk, the Ulyanovsk Region (City Clinical Hospital №1)

13.OPTIONS FOR STUDENTS WITH DISABILITIES

Training students with disabilities is carried out taking into account the peculiarities of psychophysical development, individual capabilities and health of such students. Education of students with disabilities can be organized in conjunction with other students, and separately. If necessary, students from among persons with disabilities (at the request of the student) may be offered one of the following options for the perception of information, taking into account their individual psychophysical characteristics:

- for persons with visual impairment: in printed form in large print; in the form of an electronic document; in the form of an audio file (translation of educational materials into audio format); in printed form in Braille; individual consultations with the involvement of a sign language interpreter; individual tasks and tutorials.

- for persons with hearing disabilities: in printed form; in the form of an electronic
- document; video materials with subtitles; individual consultations with the assistance of a sign language interpreter; individual tasks and tutorials.
- for persons with musculoskeletal disorders: in printed form; in the form of an electronic document; in the form of an audio file; individual tasks and tutorials.

Course designer _____Associate Professor at the Department of General and Clinical Pharmacology with Microbiology course

Signature job title

Artamonova M.N.

name

Course designer _____Professor at the Department of General and Clinical Pharmacology with Microbiology course

Signature job title

Potaturkina-Nesterova N.I.