MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION,
MINISTRY OF SCIENCE, HIGHER EDUCATION AND INNOVATION
OF THE KYRGYZ REPUBLIC
OF SCIENCE, HIGHER EDUCATION AND INNOVATION
KYRGYZ REPUBLIC
Interstate Higher Education Organization Kyrgyz-Russian Slavic University
named after the first President of the Russian Federation B.N. Yeltsin

"ENDORSED»
Director of the ICM and BT
Abilova S.S.

04.11.2026

4 ноября

PROFESSIONAL CYCLE
IMMUNOLOGY

Work program for a discipline (module)

Assigned to **Hygiene, epidemiology, and microbiology**

Academic Curriculum 310501_26_1ILD.plx
560001 KR General medicine (foreign student)

Qualification: physician
Mode of study: Intramural

Total Credit Value **3 credit points**
Course Hours 90

Scope of Testing Semesters:
exam credit 3

In-class lerning 48
Individual work 41,7

Course Hours Scheduling (per semester)

(<Cours> (<Semester>)	3 (2.1)		Total	
Week	18			
Type of class	AC	CO	AC	CO
Lectures	16	16	16	16
Practical Session	32	32	32	32
Contact work during the theoretical training	0,3	0,3	0,3	0,3
Including Interactive Session.	4	4	4	4
Total In class Srssion	48	48	48	48
Face -to- face Learning	48,3	48,3	48,3	48,3
Individual work	41,7	41,7	41,7	41,7
Total	90	90	90	90

Program prepared by:

A.Dzh. Alymkulova, Senior Lecturer in the Department of Hygiene, Epidemiology, and Microbiology at the Institute of Clinical Medicine and Biomedical Technologies, B.N. Yeltsin Kyrgyz-Russian Slavic University (KRSU),

Reviewer(s):

Candidate of MS, Associate Professor of the Department of General and Clinical Epidemiology of KSMA named after. I.K. Akhunbaeva, Mainazarova E.S.

Approved. EWP. EP: Zhamanculova M.K.

Course Syllabus

developed in accordance with FSES 3++:

Federal State Educational Standard of Higher Education – Specialist's Degree Program in the field of study 560001 General Medicine (for international students) (Order of the Ministry of Education and Science of Russia dated [date] No. [number])

prepared on the basis of the curriculum:

560001 General Medicine (For international students)

approved by the university's Academic Council on June 26, 2026, minutes No. 11.

The syllabus was approved at a meeting of Department of Hygiene, epidemiology, microbiology

Protocol No. 1 dated August 28, 2026
Program duration: 2026–2031 academic years
Head of department: Head. Department Doctor of Medical Sciences, Professor: Rano Omorovna Kasymova

RECORD OF AMENDMENTS
to the course (module) syllabus

Immunology

_____ name of the discipline

No.	Basis for making an amendment	Section/item	Content of the change
1.			
2.			
3.			
4.			
5.			

1. OBJECTIVES OF THE COURSE	
1.1	Prepare students for independent work on the clinical diagnosis of syndromes based on immunopathological mechanisms.

2. Place of the discipline in the structure of the main educational program		
	Cycle (section)	Б1.О.03
2.1	Requirements for the learner's prior preparation:	
2.1.1	Anatomy	
2.1.2	Medical biology	
2.2	**Disciplines and practices for which mastering this discipline (module) is a prerequisite:**	
2.2.1	Biochemistry	
2.2.2	Histology, embryology, cytology	
2.2.3	Normal physiology	
2.2.4	Microbiology, virology	

3. Student competencies developed through completion of the discipline (module)

As a result of mastering the discipline, the student must

3.1	**Know:**
3.1.1	- principles of organization of the service of allergology and immunology;
3.1.2	structure and functions of the human immune system, its age characteristics, cellular and molecular mechanisms of development and functioning of the immune system, the main stages, types, genetic control of the immune response, methods of immunodiagnostics;
3.1.3	- types of immune pathologies, their classification, diagnosis and differential diagnosis, etiology and pathogenesis;
3.1.4	- modern methods of treatment and prevention of immunopathologies, drugs used in immunological
3.1.5	and allergic practice;
3.1.6	-safety regulations and work in laboratories with reagents, instruments;
3.1.7	- basic concepts and problems of the biosphere and ecology; the phenomenon of parasitism and bioecological diseases;
3.1.8	- classification, morphology and physiology of microorganisms and viruses, their impact on human health, methods of microbiological diagnosis; use of basic antibacterial, antiviral and biological
3.1.9	products;
3.1.10	- anatomical, physiological, age-sex and individual characteristics of the structure and development of a healthy and sick body
3.2	**Be able to:**
3.2.1	- take anamnesis and prescribe a clinical examination of a patient with immune pathology;
3.2.2	- conduct a physical examination of the immune system organs (condition of the tonsils, skin, mucous membranes, lymph nodes, spleen);
3.2.3	- interpret the results of the main diagnostic allergological tests; justify the need for clinical and immunological examination of the patient, to interpret the results of
3.2.4	the assessment of the immune status of tests of the 1st level;
3.2.5	-characterize and assess the levels of organization of the human immune system, evaluate the mediator role of cytokines;
3.2.6	- analyze the effect of drugs on the basis of their pharmacological properties and the possibility of their use for therapeutic treatment, justify the need for the use of immunocorrective therapy;
3.2.7	- keep medical records.
3.2.8	- conduct immunological and serological diagnostics.
3.3	**To possess:**
3.3.1	-an algorithm for making a preliminary immunological diagnosis, followed by referral to a doctor, an allergist-immunologist;
3.3.2	- basics of medical diagnostic and therapeutic measures for the provision of first medical aid in emergency and life-threatening conditions with immune disorders;
3.3.3	- drug use skills in the treatment, rehabilitation and prevention of diseases based on disorders in the immune system.

4.STRUCTURE AND CONTENT OF THE DISCIPLINE (MODULE)								
Class code	**Names of sections and topics /type of class/**	**Semester /cours**	**Hours**	**Compe-tencies**	**Literature**	**Inter-active**	**Practical training**	**Note**
	Section 1. Basics of Immunology. Immunity, types of immunity.							
1.1	Section 1. Basics of Immunology. Innate immunity. Acquired immunity: active, passive. Innate and acquired immunity factors. Nonspecific resistance. Complement, phagocytosis and macrophages, natural killers. Cytokines: interferons, interleukins (Lecture)	3	2					
1.2	Objectives and history of the development of immunology.	3	2					
1.3	Innate immunity. Acquired immunity: active, passive. Innate and acquired immunity factors. (Pr. L.)	3	2					
1.4	Nonspecific resistance. Complement, phagocytosis and macrophages, natural killers. Cytokines: interferons, interleukins (Ind.w.).	3	2			1		Presentation
1.5	Innate immunity. Acquired immunity: active, passive. Factors of innate and acquired immunity.	3	3					Report
	Section 2. The organization and function of the immune system. Assessment of immune system conditions							
2.1	The organs of the immune system. Natural resistance. Cellular and humoral components of the human immune system. The formation and implementation of cellular and humoral immune response. Regulation of the immune response, the genetic basis of the immune response (Lecture)	3	2					
2.2	The organs of the immune system are central, peripheral. T-lymphocytes, Blymphocytes. Immune response: humoral, cellular. Cell co-operation in the immune response (Pr. L.).	3	2					

2.3	The organs of the immune system are central, peripheral. Tlymphocytes, Blymphocytes. Immune response: humoral, cellular. Cell co -operation in the immune response (Ind.w.)	3	3					Report
2.4	Antigens. Properties of antigens. Antigens of bacteria, viruses. Human antigens MHC I class, MHC II class. Antibodies. The structure and function of immunoglobulins (Lecture).	3	2					
2.5	Antigens. Properties of antigens. Antigens of bacteria, viruses, human antigens. MHC I class, MHC II class, their role in the immune. Antibodies, structure and function of immunoglobulins. Immunodiagnostic reactions and therapeutic and prophylactic and immunobiological preparations response. (Pr. L.)	3	2					
2.6	Antigens. Properties of antigens. Antigens of bacteria, viruses, human antigens. MHC I and II classes, their role in the immune response (Ind.w.)	3	3					Report
2.7	Antibodies, structure and function of immunoglobulins. Immunodiagnostic reactions and therapeutic and prophylactic and immunobiological preparations (Pr.L.)	3	2			1		Presentation
2.8	Antibodies, structure and function of immunoglobulins. Avidity and affinity of antibodies. The concept of antibody valence./Ind.w./	3	3					Report
2.9	Assessment of the functional state of phagocytes, the main methods for the detection of antibodies and antigens, the definition of complement. Reactions of CFR, RPGA and CIC (Pr. L.).	3	2					
2.10	Assessment of the functional state of phagocytes, the main methods for the detection of antibodies and antigens, the definition of complement. Reactions of CFR, RPGA and CIC (Ind.w.)	3	3					Report

2.11	The collection of immunological history and characteristics of the main immunopathological syndromes (infectious, allergic, autoimmune, lymphoproliferative, primary and secondary immunodeficiency). Immune status and principles of its evaluation. Age features of the immune status. Methods for the study of lymphocytes, evaluation of the functional state of phagocytes. Tests of the first and second level, their clinical interpretation (Lecture)	3	2					
2.12	Collect immunological history. Methods for studying the immune status and principles of its clinical evaluation. Evaluation of T-cell system immunity (cellular immunity). Evaluation of the B -cell system of immunity (humoral immunity). Assessment of the functional state of phagocytes, the main methods for measuring antibodies and antigens, the definition of complement, tests of the first and second levels, their clinical interpretation (Pr. L.)	3	2					
2.13	Differential diagnosis of major immunopathological syndromes (Pr. L.)	3	2					
	Section 3. Clinical Immunology							

3.1	Allergology .Definition of allergies, stages of an allergic reaction, true and pseudo -allergic reactions, types of allergic reactions according to the classification of P. Gell and R. Coombs. Anaphylactic shock etiology, pathogenesis, clinic, diagnosis, treatment .Atopic dermatitis - etiology, pathogenesis, clinic, diagnosis, treatment. Allergic rhinitis seasonal and year -round. Urticaria and angioedema - etiology, pathogenesis, classification, diagnosis, treatment and prevention. Bronchial asthma. Drug allergies (etiology, clinical presentation, diagnosis, treatment and prevention). Food allergies. The most important food allergens, especially food allergies in children and adults, clinic, diagnosis, treatment and prevention (Lecture)	3	2					
3.2	Allergy. Immediate and delayed Hypersensitivity . Types of Allergen -low olecular proteins or heptenes that cause allergies. Allergens: inhalation, food, medicinal, infectious, industrial. Classification according to Jelle and Coombs. Types and mechanisms of allergic reactions:anaphylactic, cytotoxic, immunocomplex, cell mediated (Pr. L.)	3	2			1		Presentation
3.3	Drug and food allergies.Clinical options, diagnosis,Atopic dermatitis. Allergic rhinitis. Bronchial asthma, urticaria, angioedema, etiology, pathogenesis, diagnosis, treatment, prevention treatment, prevention. (Pr. L.)	3	2					"Doctor and patient" role-playing games
3.4	Allergy. Immediate and delayed hypersensitivity. Types of allergen -low molecular proteins or heptenes that cause allergies. Allergens: inhalation, food, medicinal, infectious, industrial. Classification according to Jelle and Coombs. Types and mechanisms of allergic reactions:anaphylactic, cytotoxic, immunocomplex, cell - mediated (Ind.w.)	3	3					Report
3.5	Drug and food allergies. Clinical options, diagnosis,treatment, prevention (Ind.w.)	3	3					Presentation

3.6	Atopic dermatitis. Allergic rhinitis. Bronchial asthma, urticaria, angioedema, etiology, pathogenesis, diagnosis, treatment, prevention (Ind.w.)	3	3					Presentation
3.7	Immunodeficiency Genetics of immunodeficiency, features of inheritance. Congenital immunodeficiencies (classification, clinical options, diagnosis, treatment tactics). Congenital immunodeficiency in adults. Acquired immunodeficiency (AIDS) - classification, etiology, clinical variants, diagnosis and treatment. The role of AIDS in the pathogenesis of various /Lecture/	3	2					
3.8	Immunodeficiency Primary (congenital) immunodeficiency with B lymphocyte defects. Classification, clinical options, diagnosis, treatment tactics. Primary (congenital) immunodeficiencies with T lymphocyte defects. Classification, clinical options, diagnosis, treatment tactics. Congenital immunodeficiency in adults (Pr. L.).	3	2			1		Presentation
3.9	Secondary (acquired) immunological deficiency (SID) - classification, etiology, clinical options, diagnosis and treatment. The role of SID in the pathogenesis of various human diseases. Acquired Immunodeficiency Syndrome (PR. L)	3	2					
3.10	Primary (congenital) immunodeficiencies with T - lymphocyte defects. Classification, clinical options, diagnosis, treatment tactics. Congenital immunodeficiency in adults (Ind.w.)	3	3					Presentation
3.11	Secondary (acquired) immunological deficiency (SID) - classification, etiology, clinical options, diagnosis and treatment. The role of SID in the pathogenesis of various human diseases. Acquired Immunodeficiency Syndrome (Ind.w.)	3	3					Presentation

3.12	Immunotropic Therapy Classification of immunotropic drugs. Immunosuppressantsclassification and mechanisms of action, indications for use, contraindications, side effects. Glucocorticosteroid drugsmechanisms of action, indications for use, complications, tactics of choice of treatment regimens. Immunostimulants-classification and mechanisms of action, indications for use, contraindications, side effects. Immunocorrectorsmechanisms of action, indications for use, tactics of choice of treatment egimens. Vaccines (Lecture)	3	2					
3.13	Immunotropic Therapy. Principles of immunotherapy, classification of immunotropic drugs. Modern immunocorrective drugs. Applications, treatment regimens (Pr. L.).	3	2					
3.14	Principles of immunotherapy, classification of immunotropic drugs. Modern immunocorrective drugs. Applications, treatment regimens (Ind.w.)	3	3					
3.15	Autoimmune Pathology Classification of autoimmune diseases. Systemic lupus erythematosus, immunopathogenesis, main clinical manifestations, immunodiagnostics, treatment. Rheumatoid arthritis, immunopathogenesis, immunodiagnostics, main clinical manifestations, treatment Systemic vasculitis, classification, pathogenesis, clinical forms, diagnosis, treatment. Autoimmune aspects of endocrine pathology (Lecture).	3	2					
3.16	Autoimmune Pathology Immunological tolerance and autoimmunity. Mechanisms for the development of auto aggression. Classification of autoimmune diseases (Pr. L.)	3	2					

3.17	Systemic vasculitis. Immunopathogenesis and clinical options. Systemic lupus erythematosus. Immunopathogenesis and clinical options. Rheumatoid arthritis, immunopathogenesis, main clinical manifestations, immunodiagnostics, treatment . (Pr. L.).	3	2					
3.18	Immunological tolerance and autoimmunity. Mechanisms for the development of autoaggression. Classification of autoimmune diseases (Ind.w.).	3	3					Report
3.19	Systemic vasculitis. Immunopathogenesis and clinical options. Systemic lupus erythematosus. Immunopathogenesis and clinical options (Ind.w.)	3	3					Presentation
3.20	Autoimmune aspects of endocrine pathology. Antiphospholipid syndrome - clinic, diagnosis, treatment (Ind.w.).	3	2,7					Presentation
3.21	/KpTO/	3	0,3					

5. POOL OF ASSESSMENT TOOLS

5.1. Review questions and assignments

Questions to test the level of KNOWLEDGE:
1. The subject and objectives of immunology. Sections of immunology (general and private).
2. The concept of immunity. Types of immunity (innate and acquired). Innate and acquired immunity factors.;
3. Nonspecific resistance. Types (humoral and cellular factors).
4. Complement. Ways of activation of a complement (Classical, alternative and lectin-dependent).
5. What is a membrane-attack complex and the complement system.
6. Phagocytosis. Chemotaxis. Chemoattractants. Opsonins.
7. Macrophage, types and functions of macrophages, TOLL and PATTERN receptors.
8. Natural killers - localization and functions.
9. APC cells. Types and functions. Dendritic cells - function and localization.
10. Cytokines: proinflammatory and anti-inflammatory.
11. Interferons and interleukins.
12. Organs of the immune system: central and peripheral.
13. Structure and function of the thymus and thymic hormones.
14. The structure and function of the bone marrow, the concept of polypotent stem cells.
15. Structure and function of the spleen as a peripheral organ of the immune system.
16. The structure and function of the lymph node, the localization of lymphatic follicles.
17. The structure and function of the tonsils, Peyer's patches and appendix.
18. Immune competent cells. Ways of migration and recycling of cells of the immune system.
19. Functions of T-lymphocytes. Receptors and subpopulations of T-lymphocytes.
20. Major differentiation antigens (CD antigens) on the surface: T-cytotoxic and T-helper cells.
21. B-lymphocytes, receptors and functions. Plasma cells.
22. Immune response: cellular and humoral.
23. Cell co-operation in the immune response.
24. Hormones and mediators of the immune system.
25. The main methods for the detection of antibodies and antigens.
26. Assessment of the functional state of phagocytes.
27. Methods for determining complement.
28. Principles of assignment of the reaction of CFR, RPGA and the CIC.
29. ELISA. The principle of ELISA.
30. Immunochromatography. The principle of the method.
31. Statement of the reaction of agglutination and precipitation.
32. Methods for the determination of immunoglobulins - the method of radial immunodiffusion (method Manchini) ;.

33. Antigen, the concept of antigens. Classification of antigens.
34. Structure and properties of antigens.
35. Antigens of bacteria and viruses.
36. Human antigens. MHC class I and II, their role in the immune response.
37. Haptens, their difference from antigens. Cross-reactive antigens. (examples).
38. The concept of adjuvants, antigenic mimicry and superantigens.
39. Autoantigens concept and classification.
40. Definition of the concept and principles of classification of antibodies.
41. The structure and function of immunoglobulins.
42. Class IgG and its subclasses, structure and function of IgG.
43. IgM structure, function and rate in serum.
44. IgE and IgD structure, functions. Difference from other classes of immunoglobulins.
45. IgA types, structure, function and norm in serum.
46. Methods for producing monoclonal antibodies and scope.
47. The role of the main classes of Ig in immunological reactions.
48. The structure and function of Fab and Fc fragments.
49. The definition of the concept of immune status. Collect immunological history.
50. Age features of the immune status and principles of its evaluation.
51. Tests of the first and second level, their clinical interpretation.
52. Evaluation of the T-cell system of immunity (cellular immunity).
53. Evaluation of the B-cell system of immunity (humoral immunity).
54. Assessment of the functional state of phagocytes.
55. The concept of immunopathological syndromes and classification.
56. Allergic syndrome.
57. Infectious syndrome.
58. Autoimmune syndrome.
59. Immunoproliferative syndrome.
60. Immunodeficiency syndrome (primary and secondary).
61. The definition of the concept of allergy and the principles of classification of allergens: (endo and
exogen62. The concept of true and pseudo-allergies. The mechanism of development stages of allergic reactions.
63. Classification of allergic reactions according to Jelle and Coombs and Ado.
64. Hypersensitivity I type, cause, mechanism of development and manifestation.
65. Hypersensitivity type II, the cause, mechanism of development and manifestation.ous allergens).
66. Hypersensitivity type III, the cause, mechanism of development and manifestation.
67. Hypersensitivity type IV, the cause, mechanism of development and manifestation.
68. Types and methods of allergy tests for allergens.
69. Anaphylactic shock. Etiology, pathogenesis, diagnosis, treatment, prevention.
70. Drug allergies. Etiology, pathogenesis, diagnosis, treatment, prevention.
70. Drug allergies. Etiology, pathogenesis, diagnosis, treatment, prevention.
71. Food allergies. Etiology, pathogenesis, diagnosis, treatment, prevention.
72. Quincke edema. Etiology, pathogenesis, diagnosis, treatment, prevention.
73. Bronchial asthma. Etiology, pathogenesis, diagnosis, treatment, prevention.
74. Urticaria. Etiology, pathogenesis, diagnosis, treatment, prevention.
75. Atopic dermatitis. Etiology, pathogenesis, diagnosis, treatment and prevention.
76. Allergic rhinitis. Etiology, pathogenesis, diagnosis, treatment and prevention.
77. What is the immunodeficiency state.
78. Classification of immunodeficiencies.
79. Primary (congenital) immunodeficiencies with B-lymphocyte defects.
80. Causes of defects of the humoral link.
81. Classification, clinical options, diagnosis, treatment tactics of humoral defects.
82. Primary (congenital) immunodeficiencies with T-lymphocyte defects.
83. The causes of the defect cell link.
84. Classification of T-cell immunodeficiencies.
85. Congenital immunodeficiency in adults.
86. Clinical options, diagnosis, treatment tactics.
87. Secondary (acquired) immunological deficiency.
88. Classification of Secondary (acquired) immunodeficiency.
89. Etiology, clinical variants, diagnosis, treatment of Secondary immunodeficiency.
90. The role of the Secondary immunodeficiency in the pathogenesis of various human diseases.
91. The structure and structure of HIV.
92. Ways of HIV transmission.
93. AIDS, etiology, pathogenesis, clinic, diagnosis and treatment.
94. Principles of immunotherapy.
95. Classification of immunotropic drugs, modern immunocorrective drugs.
96. Immunomodulators of thymic and bone marrow origin, mechanism of action and indications for use.
97. Immunomodulators of microbial and plant origin, mechanism of action and indications for use.
98. Immunomodulators of synthetic origin, mechanism of action and indications for use.
99. Immunomodulators based on interferon (IFN) and interleukins (IL). Applications, treatment regimens.

100. Classification of immunosuppressants, mechanism of action and indications for use.
101. Immunological tolerance, types of immunological tolerance. Immunological memory.
102. Autoantigens and autoantibodies. Mechanisms for the development of auto-aggression.
103. Classification of autoimmune diseases. Target organs in autoimmune diseases.
104. Diabetes mellitus type I: etiology, pathogenesis, clinic, diagnosis and treatment.
105. Diseases of the thyroid gland: Graves disease, etiology, pathogenesis, clinic diagnosis and treatment.
106. Rheumatoid arthritis: etiology, pathogenesis, clinic, diagnosis and treatment.
107. Systemic lupus erythematosus. Etiology, pathogenesis, clinic, diagnosis and treatment.
108. Antiphospholipid syndrome. Etiology, pathogenesis, clinic, diagnosis and treatment.
109. Vasculitis, etiology, pathogenesis, clinic, diagnosis and treatment.
110. To which organs and tissues does not develop natural immunological tolerance.
Tasks for testing the level of learning to SKILLS and EXPERTISE:
1. To characterize and assess the levels of organization of the human immune system.
2. To evaluate the mediator role of cytokines.
3. Jjustify the need for clinical and immunological examination of the patient.
4. To collect an immunological history and prescribe a clinical examination of a patient with immune pathology.
5. To interpret the results of the assessment of the immune status of the tests of the first level.
6. To interpret the results of the assessment of the immune status of the tests of the II level.
7. Interpret the results of the main diagnostic allergological tests.
8. To conduct immunological analysis.
9. Select materials for immunological studies at the organism, cellular and molecular levels using modern laboratory equipment.
10. To characterize the main methods for the detection of antibodies and antigens.
11. To evaluate immunological reactions.
12. Clinical interpretation of the evaluation of the T-cell system of immunity (cellular immunity).
13. Clinical interpretation of the assessment of the B-cell immune system (humoral immunity).
14. To assess the functional state of phagocytes.
15. To characterize methods for the determination of complement.
16. Describe the principles for the assignment of the response of the CFR, RPGA and the CIC.
17. Describe the principle of the ELISA method.
18. Describe the principle of the method of immunochromatography.
19. To carry out the formulation of the reaction of agglutination and precipitation and their clinical interpretation.20. Describe the methods for the determination of immunoglobulins - the method of radial immunodiffusion (the Manchini method).
21. To use computer technology in their activities for the interpretation of immunological methods.
22. To assess the immune status.
23. Describe the methods for assessing the immune status.
24. Describe the age characteristics of the immune status and the principles of its evaluation.
25. Describe the main immunopathological syndromes.
26. Apply skills to study the functions of organs and immune systems in the clinic.
27. To develop skills in laboratory equipment.
28. To evaluate the in vivo allergic tests and their interpretation.
29. To conduct an evaluation of in vitro allergy tests and their interpretation.
30. To conduct methods of observing immunological reactions in the experiment.
31. Describe the main methods of experimental immunologists.
32. To characterize the main methods of experimental immunology.
33. Simulate immune responses at the organic and cellular levels.
34. Apply knowledge of the mechanisms of development of immune disorders in the clinic.
35. To characterize the diagnostic methods of immunopathologies.
36. Predict the development of immune-related diseases.
37. Aalyze the mechanism of action of immunocorrective agents.
38. Substantiate the need for the use of immunocorrective therapy.
39. Analyze the algorithm for making a preliminary immunological diagnosis.

5.2. Topics for term papers (projects)

Discipline is not provided for the implementation of term papers (projects)

5.3. Pool of assessment tools

5.3. Assessment Fund
Presentation. Subject:
1. Age-related features of the development of the immune system.
2. Immunology of reproduction
3. Anti-infective immunity
4. Features of the immune response in fungal diseases.
5. Immune transplantation, the response during transplantation of various organs.
6. Ways to overcome immune rejection
7. Immunology of the tumor process. Causes of tumor escaping from immune surveillance.
8. Immunoecology. The influence of environmental factors on the immune system

9. Immunodeficiency diseases. Primary immunodeficiencies.
10. Secondary immunodeficiencies. HIV and AIDS.
1. Autoimmune diseases, autoaggression mechanism.
12. Modern problems of immunodiagnostics.
13. The phenomenon of immune memory. Formation mechanisms.
14. "Naive cells" and memory cells, their characteristics.
15. Phylogenesis of immunity
16. Ontogenesis of immunity.
17. Human isoantigens (system of antigens of erythrocytes, leukocytes, platelets and other cells).
18. Phylogenesis and ontogenesis of antibodies.
19. Scheme of immunopoesis. Lymphoid and myeloid progenitor cells, pathways of development.
20. Stem cell. The origin, characteristics, markers, circulation in the body.
21. Bone marrow peptides (myelopeptides). Classification, characterization, mechanisms of action on the cells of the immune system.
22. Immunity and stress.
Test:
Examination "Introduction to immunology. Types of immunity and non-specific factors of the immune reactivity of the body ":
1. Introduction to immunology.
2. The subject and objectives of immunology.
3. The history of the development of immunology.
4. Tasks and prospects of modern immunology.
5. The doctrine of immunity.
6. Definition and types of immunity.
7. Innate immunity.
8. Constitutional, species immunity.
9. Adaptive immunity. Specific mechanisms of immunity.
10. The concept of the immune and lymphoid system.
11. Immune homeostasis. Immunological supervision and maintenance of antigenic constancy of the internal environment of the body.
12. Nonspecific factors of immune reactivity of an organism.
13. Cellular and humoral non-specific protective factors.
14. Cellular factors of resistance.
15. The MFS system of mononuclear phagocytes.
16. Monocytes, granulocytes, mast cells, large granular lymphocytes.
17. APC cells. Types and functions. Dendritic cells - function and localization.
18. Humoral factors of resistance.
19. Protein acute phase.
20. Mediators of inflammation.
34. The complement system.
35. Alternative and classical pathway of activation of the complement system.
36. Other nonspecific immunity factors. Lysozyme. Interferon.
Test:
Examination "The organization and function of the immune system. Evaluation of the states of the immune system ":
1. Ontogenesis and phylogenesis of the immune system.
2. Organs of the immune system: central and peripheral.
3. Structure and function of the lymphoid system. Bone marrow as an organ of lymphopoiesis.
4. Structure and function of the central organ of the immune system - the thymus.
5. The structure and function of the peripheral organs of the immune system - lymph nodes.
6. Spleen, structure and function.
7. Peyer's Patches, structure and function.
8. Immunobiological activity of primary, secondary and tertiary organs of the lymphoid system.
9. Leukocytes, their types.
10. Tissue and circulating macrophages.
11. T-cell immune system.
12. Cellular immunity, meaning and induction.
13. Effectors of cellular immunity (CCI).
14. T-cell receptor.
15. Mediators of cellular immunity.
16. Cell cytotoxicity.
17. The mechanisms of activation of T and B cells.
18. Cooperative mechanisms of intercellular interactions.
19. Lymphokines.
20. T-helpers and T-suppressors are regulatory cells of the immune system.
21. The system of human B-lymphocytes.
22. H23. B-cell receptor.
24. Mediators of humoral immunity.

25. Immunocompetent cells. Ways of migration and recycling of cells of the immune system.
26. Hormones and mediators of the immune system.
27. Immunological memory. Definition Forms of manifestation.
28. The mechanism of immunological memory.
29. Methods of induction of immunological memory. T-and B-cell memory.
30. Features of the development of immunological memory in cellular and humoral immune response.
31. The role of immunological memory in protecting the body against infection.
32. The use of the phenomenon of immunological memory in the diagnosis and prevention of infectious diseases.
33. Antigen, the concept of antigens. Classification of antigens.
34. Structure and properties of antigens.
35. Types of antigens: full-fledged antigens, haptens, half-haptens.
36. Immunogenic activity of antigens.
37. Antigens of bacteria and viruses.
38. Human antigens. MHC class I and II, their role in the immune response.
39. Haptens, their difference from antigens.
40. Cross-reactive antigens.
41. The concept of adjuvants, antigenic mimicry and superantigens.
42. Autoantigens concept and classification.
43. Definition of the concept and principles of classification of antibodies.
44. The structure and function of immunoglobulins.
45. Molecular structure, classes of immunoglobulins, properties of immunoglobulins (IgG, IgM, IgA. IgD. IgE).
46. Avidity and affinity of antibodies.
47. The concept of the valence of antibodies.
48. Antigenic structure of immunoglobulins: isotypic, allotypic. idiotypical determinants.
49. Theories of synthesis and diversity of antibodies.
50. Genetics of antibody formation.
51. The mechanism of interaction of antibodies with antigen. Immune complex.
52. The study of cellular and humoral factors of the immune system and their clinical significance.
53. The clinical significance of the study of the content and functional activity of blood granulocytes, blood monocytes, natural killer cells.
54. The clinical significance of the study of the content and functional activity of non-specific humoral factors.umoral immunity, meaning and induction.
55. The clinical significance of the study of the content and functional activity of T-lymphocytes and their subpopulations.
56. The clinical significance of the study of the content and functional activity of B-lymphocytes and their subpopulations.
57. The clinical significance of the study of the content and functional activity of immunoglobulins of different classes and subclasses.
58. Immune system during infection.
59. Viral infections, bacterial infections, parasitic infections.
60. Principles of immunodiagnostics of infectious diseases.
61. Transplantation immunity. Types of transplants.
62. Genetic basis of donor and recipient compatibility.
63. Cellular and humoral factors of transplant immunity.
64. Clinical manifestations of tissue incompatibility.
65. The definition of the concept of immune status. Collect immunological history.
66. Methods for assessing the immune status.
67. Age features of immune status and principles of its evaluation.
68. Tests of the first and second level, their clinical interpretation.
69. The main methods for the detection of antibodies and antigens.
70. Methods for the determination of immune complexes.
71. Methods for the quantitative and qualitative determination of immunoglobulins.
72. Evaluation of the functional state of phagocytes.
73. Methods for the determination of complement.
74. Principles of assignment of the reaction of CFR, RPGA and CIC.
75. The principle of formulation of reactions using chemical and physical labels of antibodies and antigens (ELISA, immunofluorescence, radioimmunoassay, flow cytometry) and their variants and diagnostic value.
76. Modern immunochromatographic tests, the principle of the method.
77. Phenomena of specific agglutination and precipitation, staging options, use in medicine.
78. Reactions using labeled antigens and antibodies.
79. Immunoelectron microscopy (using antibodies labeled with ferritin, colloidal gold, isotopes).
80. Methods for producing monoclonal antibodies and scope.
81. The concept of immunopathological syndromes and their classification.
82. Differential diagnosis of major immunopathological syndromes.

Test:

Examination "Clinical Immunology":

1. Definition of the concept of allergy and principles of classification of allergens.

2. Characteristics of allergens.
3. The concept of true and pseudo-allergies.
4. The mechanism of development of allergic reactions.
5. Classification of allergic reactions according to Jelle and Coombs.
6. Hypersensitivity type I, the cause, the mechanism of development and manifestation.
7. Hypersensitivity type II, the cause, mechanism of development and manifestation.
8. Hypersensitivity type III, the cause, mechanism of development and manifestation.
9. Hypersensitivity IV type, the cause, mechanism of development and manifestation.
10. Immunological mechanisms of allergy. .
11. Immunological mechanisms of allergy. Immediate type of hypersensitivity.
12. The concept of sensitization.
13. Desensitization.
14. Signs of the difference between humoral and cellular allergic reactions.
15. Diagnostic tests for the detection of humoral type allergies.
16. Skin allergy tests, their diagnostic value.
17. Anaphylactic shock. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
18. Drug allergies. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
19. Food allergies. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
20. Angioedema. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
21. Bronchial asthma. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
22. Urticaria. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
23. Atopic dermatitis. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
24. Allergic rhinitis. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
25. Immunodeficiency states.
26. Classification of immunodeficiencies.
27. Immunogenetic mechanisms of congenital immunodeficiency formation.
28. Primary (congenital) immunodeficiencies with B-lymphocyte defects.
29. Causes of defects of the humoral link.
30. Classification, clinical options, diagnosis, treatment tactics.
31. Prim32. The causes of the defect cell link.
33. Classification, clinical options, diagnosis, treatment tactics of T-cell immunodeficiency.
34. Protein deficiency of the complement system and their clinical manifestations.ary (congenital) immunodeficiencies with T-lymphocyte defects.
35. Deficiencies of the mononuclear phagocyte system and their clinical manifestations.
36. Secondary (acquired) immunological deficiency.
37. Classification of Secondary immunological deficiency (SID) .
38. Etiology, clinical variants, diagnosis, treatment of the SID.
39. The role of the (SID) in the pathogenesis of various human diseases.
40. The structure and texture of HIV.
41. Ways of HIV transmission.
42. AIDS, etiology, pathogenesis, clinic, diagnosis and treatment.
43. The basic principles of the appointment of immunotherapy.
44. Classification of immunotropic drugs.
45. Modern immunocorrective drugs.
46. Immunomodulators of thymic and bone marrow origin, mechanism of action and indications for use.
47. Immunomodulators of microbial and plant origin, mechanism of action and indications for use.
48. Immunomodulators of synthetic origin, mechanism of action and indications for use.
49. Immunomodulators based on interferon (IFN) and interleukins (IL). Applications, treatment regimens.
50. Classification of immunosuppressants, mechanism of action and indications for use.
51. Immunological tolerance, types of immunological tolerance.
52. Immunological memory. The mechanism of immunological memory.
53. Autoantigens and autoantibodies. Mechanisms for the development of auto-aggression.
54. Classification of autoimmune diseases. Target organs in autoimmune diseases.
55. Diabetes mellitus type I: etiology, pathogenesis, clinical manifestations, diagnosis and treatment.
56. Diseases of the thyroid gland: Graves disease, etiology, pathogenesis, clinic diagnosis and treatment.
57. Rheumatoid arthritis: etiology, pathogenesis, clinic diagnosis and treatment.
58. Systemic lupus erythematosus. Etiology, pathogenesis, clinic, diagnosis and treatment.
59. Antiphospholipid syndrome. Etiology, pathogenesis, clinic, diagnosis and treatment.
60. Vasculitis, etiology, pathogenesis, clinic, diagnosis and treatment.
61. To which organs and tissues does not develop natural immunological tolerance.

Topics of essays for Individual Work :

1. Works of eminent researchers, founders of modern immunology (E. Jenner, L. Pasteur, R. Koch, P. Erlich, II Mechnikov, and others).
2. The theory of immunity - features of ideas about the protective mechanisms of the body in different historical periods.
3. Modern ideas about the system of resistance of living organisms.
4. Leukocytes - features of the structure and functions.
5. Inflammation - flow mechanisms and biological role.

6. The most important antigens and haptens in the world around man.
7. Features of the population composition, structure and functions of lymphocytes.
8. Humoral immune response - the structure and diversity of antibodies. Mechanisms of functioning of immunoglobulins.
9. Cellular immune response - T-killers, structural features and mechanisms of functioning.
10. Immunological memory.
11. Cytokines - structure, classification, biological role.
12. Comparative characteristics of mechanisms of innate and adaptive immunity.
13. Evolutionary value of the immune system.
14. The evolution of cellular immunity.
15. The history of the formation of immunology as a science.
16. The definition of "immune system".
17. Primary and secondary lymphoid organs.
18. Cells of the immune system: structure, function, origin and maturation.
19. Lymphocyte circulation, mobility and leukocyte lifetime.
20. Innate immunity. Constitutional, species immunity.
21. Cellular and humoral non-specific protective factors.
22. Phagocytosis. Oxygen-dependent and oxygen-independent mechanisms for the destruction of foreign antigens.
23. Cellular factors of resistance. MFS- system of mononuclear phagocytes. Monocytes, granulocytes, mast cells, large granular lymphocytes.
24. Humoral factors of resistance. Acute phase proteins. Complement system. Mediators of inflammation. Anafilotoxins.

25. Alternative, classical and lectin-dependent pathways of activating the complement system.
26. Acquired immunity. Specific mechanisms of immunity. Population composition of lymphocytes.
27. Antigens. Basic concepts and concepts. Classification of antigens. Immunogenicity The specificity of the antigen. Examples of some antigens.
28. Antibodies. The structure of immunoglobulins.
29. Molecular structure, classes of immunoglobulins, properties of immunoglobulins (IgG, IgM, IgA. IgD. IgE).
30. Genetics of antibody formation.
31. Cellular immunity, meaning and induction. Effects of cellular immunity (CI).
32. Mediators of cellular immunity. Cell cytotoxicity.
33. The mechanisms of activation of T and B cells. Cooperative mechanisms of intercellular interactions. Lymphokines.
34. Natural and acquired tolerance.
35. Cytokines. Principles of functioning of the cytokine system.
36. Ontogenesis of the immune system.
37. Antigens of the cluster of differentiation.
38. Evolution and phylogenesis of the immune response.
39. Anti-infective immunity.
40. Immunodeficiency and its prevention.
41. Vaccination. Vaccination based on killed and attenuated microorganisms.
42. Classical and modern methods of attenuation.
43. Use of purified antigens.
44. Molecular cloning, synthetic peptides.
45. Idiotypical vaccines.
46. Primary immunodeficiencies.
47. Secondary immunodeficiencies.
48. AIDS.
49. Allergic reactions: Immediate type of hypersensitivity and Cellular type of hypersensitivity.
50. Hypersensitivity. Reactions of hypersensitivity I-IV types.
51. Etiology, manifestations and mechanisms of autoimmune diseases.
52. Transplant immunology

5.4. List of types of assessment tools

6. EDUCATIONAL, METHODOLOGICAL, AND INFORMATION SUPPORT FOR THE DISCIPLINE (MODULE)

6.1. Recommended literature

6.3. List of information and educational technologies

6.3.1 Competence-based educational technologies

6.3.1.1	List of Information and Education Technologies

6.3.1.2	Competence-based Educational Technologies
6.3.1.3	Traditional educational technologies - lectures, practical exercises, consultations focused on the
6.3.1.4	communication of knowledge transferred to students in finished form.
6.3.1.5	Innovative educational technologies - classes in an interactive form, which form systems thinking and
6.3.1.6	the ability to generate ideas in solving various problems. These include electronic texts of lectures with presentations.
6.3.1.7	Information educational technologies - independent use by a student of computer equipment and Internet resources for carrying out practical tasks and independent work
6.3.2 List of information reference systems and software	
6.3.2.1	Allimmunologi.org - a site dedicated to immunology, immunity, immunization. [El. resource]. Access
6.3.2.2	mode: http://allimmunology.org/ On this site you can freely find immunological journals, links to various
6.3.2.3	websites on immunology
6.3.2.4	http://www.biblioclub.ru
6.3.2.5	Immunology in Russia On-Line »- [El. resource]. Access mode: http://www.rji.ru/ruimmr.htm - electronic journal
6.3.2.6	Scientific electronic library. [El. resource]. Access Mode: elibrary.ru.
6.3.2.7	http://www.nature.ru - site for all sections of biology, medicine, genetics, physiology
6.3.2.8	Russian National Library http://www.nlr.ru

7. MATERIAL AND TECHNICAL SUPPORT FOR THE DISCIPLINE (MODULE)	
7.1	COURSE (MODULE) LOGISTICS
7.2	The department is located - at the address: Bishkek, Leo Tolstoy st., 102/5
7.3	Classroom №4.13 for 14 seats, for practical training, individual work and watching multimedia, video, visual aids - stands, board, sets of tables and diagrams.
7.4	Classroom №4.15 for 16 seats, for practical training, individual work and viewing multimedia, video materials, visual aids - stands, board, sets of tables and diagrams.
7.5	Classroom №4.4 (big lecture hall) for 100 seats, for conducting practical exercises, performing individual work and watching multimedia, video materials, visual aids - stands, board, sets of slides, tables, multimedia
7.6	visual materials on various sections of the discipline.
7.7	Classroom №4.16 for 16 seats for practical training.
7.8	Classroom №4.2 for 16 seats, for practical training.
7.9	Information sources: - library - 80 copies;
7.10	Computer
7.11	Projector
7.12	Printer
7.13	Scanner
7.14	Netbook

8. GUIDELINES FOR STUDENTS ON MASTERING THE DISCIPLINE (MODULE)

COURSE (MODULE) PROFICIENCY METHODICAL GLUIDELINES (FOR STUDENT)
Starting to study the discipline, the student should carefully read the thematic lesson plan, a list of recommended literature. Should understand the sequence of individual learning tasks. Independent work of a student involves working with scientific and educational literature, the ability to create texts. The level and depth of mastering the discipline depends on the active and systematic work at the lectures, the study of the recommended literature, the performance of written control tasks.
When studying the discipline, students perform the following tasks:
- study the recommended scientific-practical and educational literature;
- perform the tasks provided for independent work;
The course program is based on the principles of consistency and continuity of the content of the topics studied.
Learning technology is focused on the use of traditional forms.
The main types of classroom work of students are lectures and practical exercises.
During the lectures, the teacher sets out and explains the basic, most complex concepts of the topic, as well as the theoretical and practical problems associated with it, gives recommendations for the seminar lesson and instructions for individual work.
Practical classes complete the study of the most important topics of the academic discipline. They serve to consolidate the material studied, develop the skills and abilities to prepare reports, reports, gain experience of oral public speaking, lead discussions, argue and defend put forward positions, and also control the teacher’s degree of students' readiness in the discipline.
Practical classes
Topic 1. Tasks and history of the development of immunology.
Plan: The emergence and formation of immunology as a science, the stages of formation of immunology. The

role of domestic and foreign scientists in the development of immunology. The main directions of modern immunology: cellular, molecular, clinical, transplantation.
Questions for self-control:
1. Tell us about the emergence and formation of immunology as a science. 2. What is the role of domestic and foreign scientists in the development of immunology? 3. List the main directions of modern immunology.
Questions for self-study: environmental immunology; immunogenetics, immunopathology, allergology, immunomorphology, immunochemistry, immunohematology. immunology of reproduction, etc. The role of immunology in the development of medicine and biology, its relationship with other sciences.
Topic 2. The modern definition of the term “immunity”.
Plan: Immunity as the main function of the immune system, aimed at maintaining the genetic constancy of the internal environment of the body. Formation of human immunity. The role of the immune system in humans. The main directions of development of modern immunology.
Questions for self-control: 1. Describe the immune system as the main function of the immune system, aimed at maintaining the genetic constancy of the internal environment of the body. 2. How is the formation of human immunity? 3. List the main directions of development of modern immunology.
Questions for self-study: Types of immunity (innate, acquired, natural, artificial, active, passive, sterile, nonsterile, local, etc.). Immunity in ontogeny and phylogenesis. Immunity theory.
Topic 3. Nonspecific factors of protection of the human body.
Plan: The concept of mechanical, physico-chemical biological barriers. Mechanical protective reactions of the skin, mucous membranes. Physical and chemical protection of the body: pH, pepsin enzymatic activity, etc. Biological factors are protected. Nonspecific protection factors (barrier structures of the skin and mucous membranes, liver, acute phase proteins, secretions and biological fluids of the body, enzymes, lysozyme, properdin, inflammatory reactions, the organism's microflora), their role in the body's resistance to infections, a fundamental difference from specific immune factors. The main stages and mechanisms of phagocytosis.
Questions for self-control: 1. Expand the concept of mechanical, physico-chemical biological barriers. 2. Name the mechanical protective reactions of the skin, mucous membranes. 3. List the main stages and mechanisms of phagocytosis.
Questions for self-study: The complement system and its role in protective and regulatory reactions. Classic and alternative pathways to activate complement. The system of natural cytotoxicity (natural killer, interferons). Natural killers, their role in protecting the body. Humoral non-specific protection factors. Complement system, lysines, interferons, leukins, antiviral serum inhibitors, lysozyme, plaquins, properdin, fibronecty, etc. Interferons. Interferon classification, inductors, mechanism of formation and action of interferons. Immunobiological value of interferons (antiviral, immunomodulatory, anti-proliferative), their production and practical use.
Topic 4. The immune system of the human body and its main functions. Organs and cells of the human immune system.
Plan: The immune system as a set of organs, tissues and cells that perform immunological functions. Central organs of the immune system: bone marrow, thymus. Peripheral organs of the immune system: spleen, lymph nodes and follicles. Age features of the immune system. Modern scheme of immunogenesis. Lymphocyte is a central figure in the immune system. Modern ideas about the development of lymphocytes. The concept of the stem (parental) hematopoietic cell. The origin of the stem cell, its characteristics. Stem cell circulation. The concept of the precursors of T-and B-lymphocytes, their characteristics, identification. Thymus-dependent pathway for the development of lymphocytes (T-cells).
Questions for self-control: 1. Describe the immune system as a set of organs, tissues and cells that perform immunological functions. 2. List the central organs of the immune system. 3. Tell us about the role of the spleen, lymph nodes, tonsils and other tissues of the peripheral part of the immune system in immunity.
Questions for self-study: Features of lymphoid accumulations associated with mucous membranes in the intestines, lungs, urogenital system, skin, etc. The role in the immunity of the spleen, lymph nodes, tonsils and other tissues of the peripheral part of the immune system, their morphological features. T-and B-lymphocytes, their characteristics, methods of identification. The concept of subpopulations of T-and B-lymphocytes.
Topic 5. Basics of immunodiagnostics.
Plan: The concept of serological reactions. Characterization of the reaction of antigen - antibody: specificity, biphasic nature, reversibility, the optimal ratio of ingredients, qualitative and quantitative, sensitivity, etc. The mechanism of reactions. Practical use of serological reactions: identification of the antigen, diagnostic detection of antibodies. The main components of serological reactions. Diagnostic immune sera, diagnosticum. Monoclonal antibodies, their use. Phenomena of manifestation and methods of registration of serological reactions. The main methods for the detection of antibodies and antigens. Assessment of the functional state of phagocytes. Methods for determining complement. Principles of assignment of the reaction of CFR, RPGA and CIC. The principle of formulation of reactions using chemical and physical labels of antibodies and antigens (ELISA, immunofluorescence, radioimmunoassay, flow cytometry), their variants and diagnostic value. Modern immunochromatographic tests, the principle of the method.
Questions for self-control: 1. List the main components of serological reactions. 2. What are monoclonal antibodies, what is their use? 3. List modern immunochromatographic tests and explain the principle of the method. 4. What is an ELISA? .5. Tell the phenomena of specific agglutination and precipitation, staging options, use in medicine.
Questions for self-study: Reactions based on the phenomenon of agglutination. Reactions based on precipitation phenomenon. Reactions involving the complement. Reactions using labeled antigens and antibodies. Immunoelectron microscopy (using antibodies labeled with ferritin, colloidal gold, isotopes).

Topic 6. Antigens.
Plan: Definition. The concept of foreignness, antigenicity, immunogenicity, antigen specificity. Characteristics of molecules with antigenic properties (proteins, polysaccharides, lipopolysaccharides, etc.). Complete and incomplete antigens. Haptens The structure of the macromolecule antigen. Antigenic determinants (epitopes) and their role in the formation of the specificity of antigens.
Questions for self-control: 1. Give the definition of antigen. 2. Give the characteristic of molecules with antigenic properties. 3. Describe the diversity of antigens.
Questions for self-study: Immunochemical specificity of antigens, its manifestations: species, group, type, organ, heterospecific. Microbial antigens, localization, chemical composition, their role in the infectious process and the development of the immune response. Thymus-dependent and thymus-independent antigens. Variety of antigens.
Topic 7. Antibodies.
Plan: Antibodies. Definition. Physico-chemical, biological properties and functions. Immunoglobulins. The main classes, their structural and functional features. The mechanism of interaction of antibodies with antigen. Immune complex. Avidity and affinity of antibodies. The concept of valency antibodies. Antigenic structure of immunoglobulins: isotypic, allotypic. idiotypical determinants. Theory of synthesis and diversity of antibodies.
Questions for self-control: 1. Expand the concepts of antibodies and immunoglobulins 2. Tell us about the antigenic structure of immunoglobulins. 3. Name the properties of antibodies. 4. Tell the molecular structure, classes of immunoglobulins, properties of immunoglobulins (IgG, IgM, IgA. IgD. IgE).
Questions for self-study: Definition of the concept and principles of classification of antibodies. The structure and function of immunoglobulins. Molecular structure, classes of immunoglobulins, properties of immunoglobulins (IgG, IgM, IgA. IgD. IgE). Avidity and affinity of antibodies. The concept of valency antibodies. Antigenic structure of immunoglobulins: isotypic, allotypic. idiotypical determinants. Theory of synthesis and diversity of antibodies. Genetics of antibody formation. The mechanism of interaction of antibodies with antigen. Immune complex.
Topic 8. The human immune status.
Plan: Principles of formation. Age dynamics. Factors affecting the immune status: climatic, geographical, social, medical. Collect immunological history. Methods of investigation of the immune status and principles of its clinical evaluation. Evaluation of T-cell system immunity (cellular immunity). Evaluation of the B-cell system of immunity (humoral immunity). Assessment of the functional state of phagocytes. The main methods for the detection of antibodies and antigens. Definition of complement. Tests of the first and second level, their clinical interpretation.
Questions for self-control: 1. Name the factors affecting the immune status. 2. List the methods for assessing the immune status. 3. Expand the age features of the immune status and principles of its evaluation.
Questions for self-study: Methods for assessing the immune status. Detection of antibodies. Methods for the determination of immune complexes. Methods for the quantitative and qualitative determination of immunoglobulins. Determination of subpopulations of T-and B-lymphocytes: cluster analysis. E- and EACrosette; assessment of mitotic and killer lymphocyte activity, determination of NK-cell activity. Skin tests as a method of indicating cellular immunity. Tests of the first and second level, their clinical interpretation. Evaluation of T-cell system immunity (cellular immunity). Evaluation of the B-cell system of immunity (humoral immunity). Assessment of the functional state of phagocytes.
Topic 9. Differential diagnosis of major immunopathological syndromes.
Plan: The concept of immunopathological syndromes and their classification. Allergic syndrome. Infectious syndrome. Autoimmune syndrome. Immunoproliferative syndrome. Primary immunodeficiency. Secondary immunodeficiency. Differential diagnosis of major immunopathological syndromes.
Questions for self-control: 1. What are the factors influencing the development of immunopathological syndromes. 2. List the main immunopathological syndromes 3. Describe the differential diagnosis of the main immunopathological syndromes.
Questions for self-study: The concept of immunopathological syndromes and their classification. Allergic syndrome. Infectious syndrome. Autoimmune syndrome. Immunoproliferative syndrome. Primary immunodeficiency. Secondary immunodeficiency. Differential diagnosis of major immunopathological syndromes.
Topic 10. Allergic reactions.
Plan: The concept of allergies. The classification of allergic reactions according to Jelle and Coombs: type I - due to IgE anaphylactic (atopic) reactions; type II - cytotoxic reactions; type III - immunocomplex reactions; Type IV - T cell lymphocyte mediated reactions. History of discovery. The concept of sensitization. Characteristics of allergens. The mechanism of development of allergic reactions of the humoral type. Signs of difference between humoral and cellular allergic reactions. Manifestations (anaphylactic shock. Serum sickness, local anaphylaxis, etc.).
Questions for self-control: 1. Expand the concept of allergies. 2. List allergic reactions according to Gel and Coombs. 3. Name the signs of the difference between humoral and cellular allergic reactions.
Questions for self-study: Diagnostic tests to identify the humoral allergy type. Immunological basis of prevention and treatment. Desensitization. The concept of cell-mediated immunity. Mechanisms of development of reactions, the role of mediators. Forms of manifestation: infectious, contact, transplant. Antitumor, autoimmune allergy. Detection methods. Allergy skin tests, their diagnostic value.
Topic 10. Allergy pathology.
Plan: The concept of anaphylaxis. Anaphylactic shock. Etiology, pathogenesis, clinic, diagnosis, treatment, prevention. Drug allergies. Etiology, pathogenesis, diagnosis, treatment, prevention. Food allergies. Etiology,

pathogenesis, clinic, diagnosis, treatment and prevention. Angioedema. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention
Questions for self-control: 1. Expand the concept of anaphylaxis. 2. List the types of drug allergies 3. Name the signs of food allergic reactions.
Questions for self-study: Mechanisms of development of anaphylactic shock. Lyell syndrome - etiology, pathogenesis, clinic, diagnosis, treatment and prevention. Stevens-Johnson syndrome - etiology, pathogenesis, clinic, diagnosis, treatment and prevention. First aid for anaphylactic shock. Rehabilitation with swelling of the larynx. Food allergies - etiology, pathogenesis, clinical manifestations, diagnosis, treatment and prevention. Angioedema-Quincke's edema - etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
Topic 11. Allergic diseases.
Plan: Bronchial asthma. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention. Urticaria. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention. Atopic dermatitis. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention. Allergic rhinitis. Etiology, pathogenesis, clinic, diagnosis, treatment and prevention.
Questions for self-control: 1. Expand the concept of atopic diseases. 2. List the types of asthma and allergic rhinitis. 3. What are the main symptoms of urticaria and atopic dermatitis? 4. What is ASIT therapy.
Questions for self-study: Mechanisms of development of bronchial asthma. Quincke edema, etiology, pathogenesis, clinic, diagnosis, treatment and prevention. Allergic rhinitis - etiology, pathogenesis, clinic, diagnosis, treatment and prevention. ASIT therapy for atopic dermatitis.
Topic 12. Immunopathology.
Plan: Primary and secondary immunodeficiencies. Lack of humoral, cellular immunity, combined disorders of immunity. The role of infection in the development of human immunodeficiency.
Questions for self-control: 1. What is the role of infection in the development of human immunodeficiency? 2. Tell about the etiology and pathogenesis of primary immunodeficiencies. 3. What is an immunodeficiency condition? 4. Classification of immunodeficiencies.
Questions for self-study: The role of environmental factors in the induction of primary and secondary immunodeficiencies. Primary (congenital) immunodeficiencies with B-lymphocyte defects. Causes of defects of the humoral link. Bruton disease, clinical options, diagnosis, treatment tactics. Selective IgG deficiency - clinic, diagnosis, treatment tactics. Hyper IgE - syndrome - etiology, pathogenesis, clinic, diagnosis, treatment tactics.
Topic . Primary T-cell immunodeficiencies. Congenital immunodeficiencies with defects in the macrophage system.
Plan: Primary (congenital) immunodeficiencies with T-lymphocyte defects. Classification of T-cell immunodeficiencies. Causes of cellular defects. Causes of macrophage defect
Questions for self-control: 1. What are the causes of cellular defects? 2. Tell us about the etiology and pathogenesis of primary immunodeficiency of the macrophage.
Questions for self-study: Primary (congenital) immunodeficiencies with T-lymphocyte defects. Di-Georgie syndrome, clinical signs, diagnosis, treatment tactics. Louis-Barr Clinic syndrome, diagnosis, treatment tactics. Chediak-Higashi syndrome - etiology, pathogenesis, clinic, diagnosis, treatment tactics. TKID clinical signs, diagnosis, treatment. Chronic granulomatous disease clinical signs, diagnosis, treatment tactics. Wiskott-Aldrich syndrome, clinical signs, diagnosis and treatment.
Topic 13. Secondary (acquired) immunological deficiency.
Plan: Secondary (acquired) immunological deficiency. Classification VIEW. The role of species in the pathogenesis of various human diseases. The structure and structure of HIV. Ways of HIV transmission. AIDS, etiology, pathogenesis, diagnosis and treatment.
Questions for self-control: 1. What is the induced form of the VIEW? 2. Tell us about the spontaneous form of VIEW. 3. What is HIV? 4. How is HIV different from AIDS? 4. List ways to transmit AIDS.
Questions for self-study: Secondary (acquired) immunological failure. Classification SID . The role of species in the pathogenesis of various human diseases. The structure and structure of HIV. Ways of HIV transmission. AIDS, etiology, pathogenesis, diagnosis and treatment.
Topic 14. Immunotropic therapy.
Plan: Principles of immunotherapy. Reportations to the use of immunotropic drugs. Classification of immunotropic drugs, modern immunocorrective drugs. Immunomodulators of thymic and bone marrow origin, mechanism of action and indications for use. Immunomodulators of microbial and plant origin, mechanism of action and indications for use. Immunomodulators of synthetic origin, mechanism of action and indications for use. Immunomodulators based on interferon (IFN) and interleukins (IL). Applications, treatment regimens. Classification of immunosuppressants, mechanism of action and indications for use.
Questions for self-control: 1. What groups of immunocorrective drugs know 2. Tell the basic principles of the appointment of immunotropic drugs. 3. Which immunomodulators have a membrane-protective action?
Questions for self-study: Immunomodulators of thymic and cerebral origin, mechanism of action and indications for use. Immunomodulators of microbial and plant origin, mechanism of action and indications for use. Immunomodulators of synthetic origin, mechanism of action and indications for use. Immunomodulators based on interferon (IFN) and interleukins (IL). Applications, treatment regimens. Classification of immunosuppressants, mechanism of action and indications for use.
Topic 15. Autoimmune pathology.
Plan: Immunological tolerance, types of immunological tolerance. Immunological memory. Autoantigens and autoantibodies. Mechanisms for the development of auto-aggression. Classification of autoimmune diseases. Target organs in autoimmune diseases.
Questions for self-control: 1. What are the causes of autoimmune pathology? 2. Tell the mechanism of

immunological tolerance. 3. What are organ-specific and organ-specific diseases?
Questions for self-study: The concept of auto-aggression. Mechanisms for the development of auto-aggression. Immunological tolerance, types of immunological tolerance. Diabetes mellitus type I: etiology, pathogenesis, clinic, diagnosis and treatment. Autoimmune diseases of the thyroid gland: Graves disease, etiology, pathogenesis, clinic diagnosis and treatment. Hashimoto disease, etiology, pathogenesis, clinic diagnosis and treatment.
Topic 16. Autoimmune diseases.
Plan: What organs and tissues do not develop natural immunological tolerance. Rheumatoid arthritis: etiology, pathogenesis, clinic diagnosis and treatment. Systemic lupus erythematosus. Etiology, pathogenesis, clinic, diagnosis and treatment. Antiphospholipid syndrome. Etiology, pathogenesis, clinic, diagnosis and treatment. Vasculitis, etiology, pathogenesis, clinic, diagnosis and treatment.
Questions for self-control: 1. To which organs and tissues does not develop natural immunological tolerance? 2. Tell us about the etiology and pathogenesis of rheumatoid arthritis. 3. What is rheumatoid factor? 4. What is the Lupus test?
Questions for self-study: Rheumatoid arthritis: etiology, pathogenesis, clinic diagnosis and treatment. Systemic lupus erythematosus. Etiology, pathogenesis, clinic, diagnosis and treatment. Antiphospholipid syndrome. Etiology, pathogenesis, clinic, diagnosis and treatment. Vasculitis, etiology, pathogenesis, clinic, diagnosis and treatmen