

**Assessment tools for conducting attestation
in discipline «Immunology»
for students of 2023 year of admission
under the educational programme
31.05.01. General Medicine,
specialisation (profile) General Medicine
(Specialist's degree),
form of study full-time
for the 2025-2026 academic year**

1. Assessment tools for conducting current attestation in discipline

The current attestation includes the following types of tasks: testing, clinical task solving, interview on control questions.

Test examples:

1. Who established concept of humoral immunity?

- a) Emil Von Behring
- b) Carl Landsteiner
- c) Elie Metchnikoff
- d) Paul Erlich

2. Professional antigen-presenting cells are:

- a) monocytes
- b) macrophages
- c) T-cells
- d) mast cells

3. Which is smaller?

- a) antigen
- b) antibody
- c) epitope
- d) B-cell

4. Antigens are defined as:

- a) substances which induce an immune response
- b) substances which are released by T-cells to kill microbes
- c) own proteins with non-regular structure
- d) foreign proteins which induce immune tolerance

5. Positive and negative selection in thymus results in death of:

- a) 5% of cells
- b) 20% of cells
- c) less than 2% of cells
- d) 90% of cells

6. Mature T-cell surface molecule is:

- a) CD5
- b) CD3
- c) CD34
- d) CD45

7. Transplantation in individuals with the same genotype:

- a) autotransplantation
- b) isograft transplantation
- c) allograft transplantation
- d) xenograft transplantation

8. Autoimmune diseases include:

- a) Hashimoto's thyroiditis
- b) urticaria
- c) Lyell's syndrome
- d) phenomenon of Arthus

9. Thymus preparations are used:

- a) to improve the effectiveness of anticancer therapy
- b) in the treatment of systemic lupus erythematosus
- c) if hyperplasia of the thymus
- d) in the treatment of allergic rhinitis

10. Secondary immunodeficiency includes:

- a) Job's syndrome
- b) Bruton's disease
- c) acquired immunodeficiency syndrome
- d) hereditary angioedema

Clinical task example:

Patient F., 33 years old.

Complains: weakness, fatigue, increase in weight, memory impairment.

Anamnesis vitae. A child from the 3d pregnancy, delivery on time. He grew and developed according to his age. Previous diseases: chickenpox – at 1 years old, acute respiratory viral infections – 4-5 times a year. Hereditary history: the father suffers from bronchial asthma.

Objectively:

The condition is satisfactory. The skin is clean, dry, especially on the elbows. The visible mucous membranes are clean, normally colored. Nasal breathing is not difficult; there is no discharge. Vesicular breathing, no wheezing. The heart tones are clear, rhythmic. The belly is soft, painless.

Laboratory blood testing:

Total blood count: RBC - $3.5 \times 10^{12}/l$, leukocytes - $5.8 \times 10^9 /l$, hemoglobin - 136 g/l. Blood cholesterol - 5.8 mmol/l. TSH: 14 mMU/l, FT4 – 5.6 pmol/ml, anti-TPO - 364 IU/MI, ESR-10 mm/h.

Blood for liver tests – bilirubin total - 3 mmol/l, bilirubin direct - 4 mmol/l, bilirubin indirect – 8 mmol/l, AlAT – 7 IU/ml, AsAT – 9 IU/ml.

Answer the questions:

1. Suggest the most likely diagnosis. Justify your diagnosis.
2. What is treatment plan for this patient?

Examples of control questions for interview:

1. The concept of immunity and immunology. The subject, tasks and basic concepts of immunology.
2. Presentation of endogenous antigens to immune cells.
3. Structure and functions of various classes of immunoglobulins.
4. Autoimmune diseases. The concept of autoantigens and autoantibodies.
5. Immunological causes of infertility.

2. Assessment tools for conducting independent work of a student in discipline

The student's independent work includes report (Current issues in clinical immunology).

3. Assessment tools for conducting intermediate attestation in a discipline

Intermediate attestation is carried out in the form of credit.

The intermediate attestation includes the following types of tasks: testing, interview.

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- c) acquired immunodeficiency syndrome
- d) hereditary angioedema

List of questions to prepare for the intermediate attestation:

1. The concept of immunity and immunology. The subject, tasks and basic concepts of immunology.
2. The development of immunology in the ancient and medieval period. The contribution of B. Jesty and E. Jenner. L. Pasteur is the founder of immunology as a science.
3. The role of I.Mechnikov and P.Ehrlich in the development of immunology. The concept of humoral and cellular immunity.
4. The development of immunology and the main achievements of the 20th century.
5. Types of immunity.
6. Functional organization of the immune system.
7. Organization and safety rules when working in the immunological laboratory and the office of an allergologist-immunologist.
8. Antigens: concept, chemical nature, structure, classification. The concept of antigenic determinants.
9. Properties of antigens: antigenicity, foreignness, immunogenicity, macromolecularity, specificity.
10. Mechanisms of antigen persistence in the body (pathways of penetration, localization, pathways of elimination).
11. The concept of antigen-presenting cells. Presentation of endogenous antigens to immune cells.
12. The concept of antigen-presenting cells. Presentation of exogenous antigens to T-lymphocytes.
13. Phagocytosis is a stage of the immune response. Cells that carry out phagocytosis.
14. Methods of studying the phagocytic activity of leukocytes.
15. History of the study of the humoral link of immunity. Antibodies (immunoglobulins): definition, chemical nature, structure, domain organization. The role of antibodies in the elimination of antigens.
16. Structure and functions of various classes of immunoglobulins.
17. Dynamics of the production of various types of immunoglobulins in the primary and secondary immune response. The method of paired sera in the diagnosis of infectious diseases.
18. B-lymphocytes as producers of immunoglobulins. Classification, receptor apparatus. The structure and functioning of the B-cell receptor. Genetic control of the synthesis of immunoglobulins of various classes.
19. General ideas about the complement system. The history of discovery. Composition and main functions.
20. The classical way of complement activation. The effector role of complement. Formation of the membrane-attacking complex and its role in cell lysis.
21. Alternative and lectin ways of complement activation. The effector role of complement. Formation of the membrane-attacking complex and its role in cell lysis.
22. General characteristics of antigen-antibody reactions. Serological methods based on

the physical properties of the reaction participants (precipitation, agglutination).

23. Serological methods based on the biological properties of the participants in the reaction (biological neutralization, immobilization, cytotoxicity).
24. Serological methods using (immunofluorescence analysis, enzyme immunoassay, radioimmunoprecipitation); ways to increase the sensitivity of serological methods.
25. Complement binding reaction. The principle of reaction. Evaluation of the results. Clinical application. Assessment of the total activity of the complement system by 50% hemolysis. Determination of the activity of complement components.
26. The main stages of lymphocyte differentiation in the thymus. The receptor system. Types of T-lymphocytes. Positive and negative breeding. Migration and settlement of T-lymphocytes in the body.
27. Regulatory function of T-lymphocytes. The concept of Th1, Th2, Th17, Treg cells.
28. The main inducers, the physiological and pathological role of the Th1-dependent immune response.
29. The main inducers, the physiological and pathological role of the Th2-dependent immune response.
30. Structure and functioning of the T-cell receptor (TCR). Coreceptor molecules, signal transduction, and activation of T-lymphocytes.
31. Antigen recognition, selection of CD4 or CD8 pathways of T-cell response.
32. Mechanism of specific cytotoxicity. The physiological and pathological significance of T-cell cytotoxicity.
33. Cytokines: definition, classification, types of action. Types of cytokine interactions.
34. Interferons: definition, classification, properties. Antiviral, antitumor and immunomodulatory activity.
35. Methods of studying cytokines.
36. Immunological tolerance: definition, history of discovery, differences from immunodeficiency.
37. Types of immunological tolerance. Features of the formation of immunological tolerance depending on the state of the immune system.
38. The importance of immunological tolerance in maintaining homeostasis.
39. Clinical significance and induction of artificial immunological tolerance.
40. Immunological mechanisms of antibacterial resistance. Mechanisms of bacterial escape from immune elimination.
41. Factors of antiviral immunity. Mechanisms of virus evasion from immune elimination.
42. Factors of anthelmintic and antifungal immunity. Mechanisms of escape of fungi and helminths from immune protection.
43. The main factors of immune protection against intracellular infections not accompanied by genetic parasitism (mycoplasma, chlamydia). Pathways of pathogen elimination. Mechanisms of evading immune protection
44. Tumor cells as antigens. Evidence of the immune system's involvement in tumor growth.
45. Mechanisms of antitumor immunity.
46. Mechanisms of tumor "escape" from immunobiological surveillance.

47. Tumor-associated antigens. Origin, types, clinical significance. Immunodiagnostics of neoplastic diseases.
48. Cancer markers, types, requirements for an ideal cancer marker, clinical significance.
49. Principles of immunotherapy and immunoprophylaxis of tumors.
50. Immunological monitoring of infectious and non-communicable diseases. Goals and objectives.
51. Immunoprophylaxis. Goals and objectives.
52. Vaccination. Types of vaccines. Modern approaches.
53. The concept of the National Vaccination Calendar.
54. Post-vaccination reactions and complications. Kinds. Ways of prevention.
55. The concept of immunobiotechnology. The main methods of obtaining immunobiotechnological preparations.
56. Immunobiotechnology in vaccine development and immunoprophylaxis of infectious and non-communicable diseases.
57. Immunological relationships in the "mother-father" system.
58. Immunological relationships in the mother-fetus system. Immunosuppression factors in normal pregnancy.
59. Immunological causes of infertility.
60. Immunological mechanisms of intrauterine development disorders due to incompatibility of spouses according to the Rh-antigen system.
61. The intrauterine period of development of the immune system. Features of the structure and functioning of the immune system at birth.
62. The immune system of a newborn baby. Features of the structure and functioning. Dynamics of development in the first year of life.
63. The immune system in early childhood. Features of the structure and functioning. Development of the immune system in the period from 2 to 6 years.
64. The immune system in adolescents. Features of the structure and functioning. The development of the immune system in the period from 12-15 years.
65. Involutional changes in the immune system.
66. Autoimmune diseases. The concept of autoantigens and autoantibodies.
67. Hypotheses of the development of autoimmune diseases. The role of infectious agents in the development of autoimmune diseases.
68. The concept of transplantation. Types of transplants.
69. Selection of the donor-recipient pair.
70. The mechanism of allograft rejection.
71. Immunological monitoring of the recipient after transplantation.
72. Immunosuppressive therapy during allotransplantation.
73. Complications in allograft recipients.
74. Ways to prevent and overcome transplant rejection.
75. The subject and objectives of clinical immunology. The main types of immunopathology

76. Clinical assessment of immune status. Methods of laboratory assessment of immune status. Tests of the first and second levels.
77. Immunodeficiency states (IDS). Definition and classification.
78. Mechanisms of formation of clinical manifestations of IDS (IDS marker syndromes).
79. Principles of diagnosis of primary immunodeficiency states (PIDS). Warning signs regarding PIDS.
80. Principles of treatment of primary immunodeficiency conditions.
81. General concepts of secondary immunodeficiency states (SIDS). Classification of SIDS.
82. The dynamics of the formation of SIDS under the influence of the environmental factor.
83. SIDS caused by infection: nonspecific immunosuppressive effect of the infectious process; immunosuppressive effect of bacteria, viruses, chlamydia and mycoplasmas. Indications for immunocorrection.
84. SIDS caused by the action of xenobiotics. Causes and mechanism of SIDS development. Indications for immunocorrection.
85. Post-traumatic stress disorder. Mechanism of development, biological expediency. Indications for immunocorrection.
86. The concept of immunomodulation. Classification of immunotropic drugs.
87. Thymic peptides and their synthetic analogues as they are. Classification. Biological effects. Indications and contraindications.
88. Immunotropic medicinal products of bacterial origin. Classification. Biological effects. Indications and contraindications.
89. Chemically pure IM. Medication. Biological effects. Indications and contraindications.
90. Allergen-specific immunotherapy. The principle of the method, mechanisms of effectiveness, indications and contraindications.
91. Immunoglobulin preparations and its use in clinical practice. Monoclonal antibodies.
92. Infection caused by Human immunodeficiency virus. Clinical manifestations, diagnosis, principles of treatment.
93. Infection caused by Epstein-Barr virus. Clinical manifestations, diagnosis, principles of treatment.
94. Infection caused by Cytomegalovirus. Clinical manifestations, diagnosis, principles of treatment.
95. Infections caused by Herpesvirus types 6 and 7. Clinical manifestations, diagnosis, principles of treatment.
96. Allergens and their classification. Characteristics of allergens. Hereditary aspects of allergic diseases. Cross reactivity. Inhaled allergens. Food allergens.
97. Types of allergic reactions. The immediate type hypersensitivity: anaphylactic type, cytotoxic and immune complex types. Hypersensitivity of the delayed type. Stages of development of allergic reactions.
98. General principles of diagnosis of allergic diseases.
99. General principles of treatment of allergic diseases.
100. Pseudoallergic reactions (PAR). Definition, prevalence, classification.

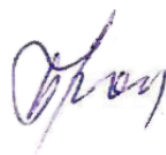
Common causes, clinics, treatment.

101. Differential diagnosis of allergic and pseudoallergic reactions.

The full fund of assessment tools for the discipline is available in the VolgSMU Electronic Information and Educational System at the link:
<https://elearning.volgmed.ru/course/view.php?id=4738>

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Head of the Department



E.B. Belan