

Topics for the examination in immunology (third year 2024/2025)

1. Antigen. The basis of antigenicity and immunogenicity. Epitope, Hapten. Cross reactivity of antigens
2. Antigens of medical importance: Antigens of microorganisms. Allergens. Auto-, allo-, and xeno- antigens. Protective and non-protective antigens Adjuvants. Superantigens
3. Mechanisms of the innate immunity: overview, PAMPs, PRR
4. Phagocytosis. Cells involved in the process of phagocytosis. Stages of phagocytic process.
5. The complement system. Classic and alternative pathways of activation of the complement system. Complement inhibitors. Clinical significance of the complement system.
6. Inflammation. Initiation, regulation, consequences for the organism. Treatment of inflammation.
7. NK cells, Interferons
8. Interleukins and other cytokines. Cytokine and anti-cytokine treatment.
9. HLA system, structure, genetic aspects, clinical significance.
10. The role of the HLA system in immune reactions.
11. Cells involved in the immune response.
12. Primary and secondary organs of the immune system.
13. Primary and secondary immune reaction. Immunological memory.
14. Clonal selection theory. Rearrangement of immunoglobulin genes. Somatic hypermutation of immunoglobulin genes.
15. B-lymphocytes, development of B-cells, production of antibodies, isotype switching.
16. T-lymphocytes, Th-cell subsets, their effector function
17. Regulatory T-cells
18. CD8⁺ cells, effector function
19. Antigen-presenting cells, antigen presentation
20. Immunoglobulins, structure, function. Isotypes, idiotypes. Reaction between antigen and antibody.
21. Reaction of antigen and antibody in vivo. Consequences of this reaction in vivo.
22. Regulation of the immune system. Th, Treg cells, check-points of the immune response, clinical implication.
23. Immunity to viruses. Mechanisms of the host defence. Immunopathological consequences of the reactions against invading organism.

24. Immunity to bacteria. Mechanisms of the host defence. Immunopathological consequences of the reactions against invading organism.
25. Mucosal immunity.
26. Vaccines, vaccination.
27. Primary defects of antibody production, SCID. Clinical manifestation, diagnosis, treatment.
28. Deficiencies of the complement and phagocytic system. Hereditary angioedema. DiGeorge syndrome. Wiskott-Aldrich syndrome, ataxia telangiectasia. Clinical manifestation, diagnosis, treatment.
29. Non-AIDS secondary immune deficiencies.
30. HIV-disease, pathogenesis, diagnostic approach
31. HIV disease – clinical manifestation,
32. Passive immunisation. Specific immunoglobulins and antisera. Non-specific immunoglobulin derivatives and their clinical use.
33. Anaphylactic shock. Immunopathological mechanisms, diagnosis, principles of treatment.
34. Atopy. The role of IgE. Mediators of the allergic reaction. Early and late phase of type-I immunopathological reaction. Allergens.
35. Diagnosis and therapy of atopic diseases.
36. Type-III hypersensitivity, Immune complex diseases
37. Type-IV hypersensitivity, its role in pathogenesis of diseases Tuberculin test. In vivo testing of T-lymphocyte function.
38. Immune tolerance. Autoimmune reactions: mechanisms of triggering the autoimmune reaction. Genetic and environmental influences.
39. Autoimmune diseases Laboratory tests for the detection of autoantibodies. Clinically important autoantibodies.
40. Transplantation immunology. Organ transplantation. Bone marrow transplantation.
41. Immunological aspects of blood transfusion. Polysaccharide and protein blood group antigens. Adverse reactions to transfusion.
42. Immune interactions between mother and fetus. Immunology of reproduction.
43. Immune system and tumours, mutual relations. Tumour antigens. Protective mechanism against tumours.
44. Immunotherapy in oncology. Immunological diagnosis in oncology. Paraproteins, clinical significance, diagnosis.
45. Immunity in childhood and in elderly.
46. Manipulation with the immune system - immunopotential, immunosuppressive agents.
47. Monoclonal antibodies. Production, properties, therapeutic and diagnostic use.

48. Lymphocyte subsets determination
49. Serum. Classic serological reactions: Agglutination, precipitation.
50. Immunoassays: ELISA, RIA, Immunofluorescence.