УТВЕРЖДАЮ
заведующий кафедрой
микробиологии
ФГБОУ ВО ВолгГМУ Минздрава России

И. С. Степаненко

«17» марта 2025 г.

Exam questions on “Microbiology, virology” discipline for students of 2023, 2024 years of enrollment under the educational program 31.05.01. General Medicine (specialty program), full-time training, for 2024-2025 academic year

1. Medical microbiology: goals and tasks, relation with other medical sciences.
2. Origination and development of microbiology. The role of local scientists and microbiologists in the development of world science.
3. General characteristics of microorganisms and their roles in the natural environment.
4. Microbiological laboratory. Tools of a microbiological laboratory. Rules of work in a microbiological laboratory.
5. Methods of studying microorganisms the microscopic method, bacteriological method, experimental biological method, serologic method, cutano-allergic method, the molecular genetic method).
6. The microscopic method. Magnification and microscope design. Varieties of an optical microscope. Technique of immersion in oil.
7. The ability to perceive stain. Preparing specimens for optical microscopes. The simple staining methods.
8. Bacterial morphology. Bacterial shape, arrangements and sizes. Classification of bacteria by shapes.
9. Taxonomy: organization, classification and designation of microorganisms.
10. Prokaryotic cell structure. Permanent and non-permanent structures of prokaryotic cells.
11. Permanent structures of prokaryotic cells: a cell wall, cytoplasmic membrane, nucleoid, ribosomes, cytoplasm, mesosomes. Chemical composition and functions. Methods of detection.
12. The structure of a cell wall. The chemical composition and functions of a cell wall.
13. The main distinction between Gram-positive cell wall and Gram-negative cell envelope. Features of the morphological organization of protoplasts, spheroplasts and L-forms of bacteria.
14. Gram’s method as a method to reveal the structure of a cell wall. Procedure and mechanism of Gram’s staining. Practical value of Gram’s staining.
15. Non-permanent structures of prokaryotic cells: capsules and loose slime, flagella, pili and fimbriae, spores, intracellular inclusions, plasmids. The chemical composition and functions. Methods of detection.
16. The study of motile microorganisms by the wet-mount and hanging-drop technique.
17. Complete methods of staining the non-permanent structures of prokaryotic cells.
18. Comparing eukaryotic and prokaryotic cells. Destinctions and main characteristics of the prokaryote and eukaryote.
19. Bacteria of unique morphology and biology: *Actinomycetes, Spirochaetes Rickettsia, Chlamydia, Mycoplasmas.*
20. Characteristic taxonomic position of *Actinomycetes*. Biological characteristics of the *Actinomycetes.* Infections by *Actinomycetes.*
21. Characteristic taxonomic position of *Spirochetes*. Morphology and ultrastructure of *Spirochetes*. Classification of *Spirochaetes*. Differences between structures of *Treponema*, *Borrelia* and *Leptospira*.

22. Characteristic taxonomic position of obligate parasitic bacteria: the *Rickettsia and Chlamydia*. Biological characteristics of the *Rickettsia and Chlamydia*: morphology, ultrastructure and classification.
23. Biological characteristics of the Mycoplasmas. Bacteria that have lost their cell walls – L-forms.
24. The Kingdom of the Fungi. Organization of microscopic fungi. Reproductive strategies and spore formation. Fungal classification.
25. Fungal identification and cultivation.
26. Chemical analysis of cell contents.
27. Pathways of bioenergetics. The metabolism of microbes: catabolism and anabolism. Biosynthesis and the crossing pathways of metabolism.
28. Microbial nutrition. Forms, sources and functions of essential nutrients. Classification of nutritional types.
29. Transport: movement of substances across the cell membrane. Diffusion and molecular motion.
30. Nutrient media: foundations of culturing. Types of nutrient media. Physical states of nutrient media. Chemical content of nutrient media. Nutrient media to suit every function.
31. The bacteriological method: inoculation, growth, and identification of cultures. 32. Differentiate between a pure culture, subculture, mixed culture and contaminated culture. Inoculation: growth and identification of cultures. Isolation techniques. Identification techniques.
33. Enzymes: catalyzing the chemical reactions of life. Enzyme specificity and efficiency. Naming enzymes.
34. Identification techniques of pure culture: a) growth on nutrient medium; b) biochemical tests and bacterial identification.
35. Physical methods used to control microbial growth.
36. Catabolism: an overview of nutrient breakdown and energy release. Energy strategies in microorganisms. Aerobic respiration. Anaerobic respiration.The importance of fermentation.
37. Anaerobic growth media and methods.
38. The growth and reproduction of bacteria.
39. Chemical methods of microbial control. Principles of effective disinfection. Evaluating a disinfectant. Types of disinfectants.
40. Introduction to genetics and genes: unlocking the secrets of heredity. Structure and function of the genetic material. DNA replication: preserving the code and passing it on.
41. Mutation: change in the genetic material. Types of mutations. Causes of mutations. Categories of mutations. Repair of mutations. Positive and negative effects of mutations.
42. Genetic transfer and recombination.
43. Transformation in bacteria: the mechanism and phases; Griffith's original transformation experiment.
44. Conjugation in bacteria: the mechanism, phase; strains F +, F -, Hfr.
45. Transduction in bacteria: the mechanism of common specific and abortive transduction; its significance.
46. Plasmids and transposons. The groups of plasmids and their function. Transposable elements. Differences between IS-elements, transposons and plasmids.
47. Tools and techniques of DNA technology.
48. Classification of phages. Differentiation of bacteriophages on the basis of genetic material.
49. Composition of bacteriophages. Morphology of bacteriophage.
50. Differentiation of bacteriophages on the basis of their life cycle. The replication of a bacteriophage: lytic cycle, lysogenic cycle.
51. Lysogenic (temperate) bacteriophages. What is meant by lysogeny, prophage and lysogenic? Lysogeny: the silent virus infection.
52. Significance of bacteriophages. Applications of bacteriophage therapy. Possible problems in the applications of bacteriophages. Improvement of bacteriophages. Bacteriophages in therapy and prophylactics of bacterial diseases: history, contemporary state, and perspectives.

53. Microbes and ecosystem niches. Microbial role in biogeochemical cycling.
54. Ecology of microorganisms. Sanitary microbiology: goals and objectives. The concept of sanitary-indicative microorganisms.
55. Microflora of air. Sanitation - indicative bacteria of air. Examination of air microflora: Koch's sedimentation method; Krotov's aspiration method. Microbial diseases transmitted through the air.
56. Microflora of water. Sanitation - indicative bacteria of water. Examination of water microflora: membrane filters method; titration method. Microbial diseases transmitted through the water.
57. Microflora of soil. Sanitary - indicative bacteria of soil. Examination of soil microflora: membrane filters method; titration method. Microbial diseases transmitted through the soil.
58. Resident Microbiota: The Human as a Habitat. Normal microflora of the human body. Importance of normal flora. Change of a quantitative relation and composition of a normal microflora of an organism: dysbiosis, dysbacteriosis.
59. What do «infection», «infectious process», «infectious disease» signify?
Factors, contributing to the development of an infectious process.
60. Pathogenicity and virulence of bacteria. Factors of virulence of bacteria.
61. Dynamics of development of infectious diseases.
62. Basic forms of manifestation of infections.
63. Spreading of bacteria, viruses, toxins in an organism: bacteriemia, septicemia, septicopyemia, virusemia, toxaemia.
64. Experimental infection. The methods of inoculation of animals, their autopsy and bacteriological investigation.
65. Concept of chemotherapeutic drugs.
66. What does the term «antibiotics» mean? Characteristics of an ideal antimicrobial drug.
67. Classification of antibiotics according to their origin, spectrum of action, mechanism of action, chemical structure. Antibiotics and mechanisms of their action.
68. Main principles of a rational chemotherapy.
69. Side effects of antibiotics, complications of chemotherapy.
70. Resistance of microbes to antibiotics.
71. Methods of preventing the spread of antibiotic-resistant microorganisms.
72. Methods of determining of antibiotic sensitivity of bacteria.
73. Classification of pathogenic cocci. General characteristics of pathogenic cocci.
74. Biological properties of staphylococci.
75. Microbiological diagnostics of staphylococcal infections. Prevention and treatment of staphylococcal infections.
76. Modern classification of streptococci and its principles.
77. Biological properties of streptococci.
78. Microbiological diagnosis of streptococcal infections. Treatment and prevention of streptococcal infections.
79. Biological properties of pneumococci.
80. Microbiological diagnostics of pneumococcal infections.
81. Biological properties of meningococci. Diseases caused by meningococci.
82. Microbiological diagnostics of meningococcal infections. Prevention and treatment of meningococcal infections.
83. Biological properties of gonococci. Diseases caused by gonococci.
84. Techniques for the laboratory diagnostics of gonococcal infections. Treatment and prevention.
85. Biological properties of veilonella. Specific features of diseases caused by veilonella.
86. Microbiological diagnostics of veilonella infection. Prevention and treatment.
87. The concept of an anaerobic wound infection. Classification of pathogens.
88. Biological properties of clostridia, pathogens of gas gangrene.
89. Microbiological diagnostics, specific therapy and prevention of gas gangrene.

90. Biological properties of tetanus pathogen. Features of clinical manifestations of tetanus in humans and animals.
91. Microbiological diagnostics of tetanus. Specific prevention and treatment of tetanus.
92. Bacteroids as opportunistic microorganisms. Biological properties of bacteroids.
93. Features of microbiological diagnostics of bacteroidosis. Prevention and treatment of bacteroidosis.
94. Biological properties of fusobacteria. Diseases caused by fusobacteria.
95. Microbiological diagnosis of fusobacterial infections. Prevention and treatment of fusobacteriosis.
96. The concept of the pathogenic and conditionally pathogenic corynebacteria.
97. Biological properties of the pathogen of diphtheria. Characteristics of pathogenicity factors.
98. Microbiological diagnostics, specific therapy and prevention of diphtheria.
99. Biological properties of pertussis and parapertussis. Distinctive features of pertussis and parapertussis.
100. Microbiological diagnostics of pertussis and parapertussis. Specific prevention and treatment.
101. Biological properties of legionella. Discovery of the pathogen.
102. Features of microbiological diagnostics of legionellosis. Prevention and treatment of legionellosis.
103. General characteristics of opportunistic mycobacteria. Runyon's classification of atypical mycobacteria.
104. Role of atypical mycobacteria in human pathology. Features of mycobacteriosis.
105. Microbiological diagnostics of mycobacteriosis.
106. Biological properties of the tuberculosis pathogens. Epidemiology and pathogenesis of tuberculosis infection.
107. Laboratory diagnostics of tuberculosis. Specific prevention and treatment of tuberculosis.
108. Biological properties of the leprosy pathogen. Epidemiology and pathogenesis of leprosy.
109. Features of microbiological diagnostics of leprosy. Prevention and treatment of leprosy.
110. Biological properties of actinomyces as a transitory group of organisms from bacteria to fungi.
111. Biological properties of actinomyces.
112. Microbiological diagnostics of actinomycosis. Treatment and prevention of actinomycosis.
113. General features of the anthropozoonosis pathogens.
114. Basic biological properties of plague bacteria.
115. Epidemiology, pathogenesis, clinical forms of plague.
116. Techniques laboratory diagnostics of plague. Prevention and treatment of plague.
117. Biological properties of *Brucell*a.
118. Laboratory diagnosis of brucellosis. Specific prevention and treatment of brucellosis.
119. Biological properties of a pathogen of tularemia. Epidemiology, pathogenesis and clinical manifestations of tularemia.
120. Features of microbiological diagnostics of tularemia. Prevention and treatment of tularemia.
121. Biological properties of anthrax. Epidemiology, pathogenesis and clinical manifestations of anthrax.
122. Microbiological diagnostics of anthrax. Treatment and prevention of anthrax.
123. General characteristics of diseases belonging to a group of acute intestinal infections (AII).
124. Biological properties of pathogens of acute intestinal infections.
125. Laboratory techniques for diagnostics of acute intestinal infections.
126. Specific features of isolating pathogens depending on the test material (blood, feces, urine, swabs from objects and other.).
127. Identification of the pathogens of acute intestinal infections.
128. Biological properties of pathogens of typhoid and paratyphoid fever. Pathogenesis of typhoid and paratyphoid fever.

129. Microbiological diagnostics of typhoid and paratyphoid diseases depending on the stage of the disease. Isolation of hemo- and stool culture. Serodiagnosis of typhoid and paratyphoid diseases.
130. Diagnostics of bacteria carrying.
131. Treatment and prevention of typhoid and paratyphoid diseases.
132. Biological properties of *Escherichia*.
133. Antigenic structure of Escherichia.
134. Classification of diarrheagenic coliforms and their characteristics.
135. Laboratory diagnostics of colibacillosis.
136. Prevention and treatment of colibacillosis.
137. Biological properties of the pathogens of bacterial dysentery. Classification of *Shigella*.
138. Epidemiology, pathogenesis and characteristics of immunity in dysentery.
139. Microbiological diagnostics of dysentery. Specific prevention and treatment.
140. Biological properties of the pathogens of intestinal yersiniosis and pseudotuberculosis. Epidemiology, pathogenesis and clinical manifestations of intestinal yersiniosis and pseudotuberculosis.
141. Prevention and treatment of intestinal yersiniosis and pseudotuberculosis.
142. Classification of food intoxication of bacterial origin. General characteristics of food toxic infections and their pathogens.
143. Salmonella, causative agents of food poisoning, biological properties. Classification of Salmonella. Epidemiology, pathogenesis, clinic of salmonellosis.
Diagnosis of salmonellosis. Prevention and treatment of salmonellosis.
144. General characteristics of food intoxication: causative agents. Staphylococcal food poisoning. Features of staphylococcal enterotoxin. Conditions for its formation. Epidemiology, clinical picture of staphylococcal toxemia. Laboratory diagnostics of staphylococcal intoxications.
145. Biological properties of botulism pathogens. Epidemiology, pathogenesis and clinical picture of botulism.
146. Diagnostics of botulism. Prevention and treatment of botulism.
147. General characteristics of microorganisms of the genus Vibrio. Biological properties of cholera pathogens. Epidemiology, pathogenesis and clinic of cholera.
148. Microbiological diagnosis of cholera. Prevention and treatment of cholera.
149. *Campylobacter* genus, biological properties. Epidemiology, pathogenesis and clinic.
150. Laboratory diagnostics, prevention and treatment of campylobacteriosis.
151. *Helicobacter* genus, biological properties. Epidemiology, pathogenesis and clinic helicobacteriosis.
152. General characteristics of pathogenic spirochetes, their distinction from the bacteria and protozoa.
153. Classification of spirochetes, their role in the nature and human pathology.
Biological properties of *Borrelia*, *Treponema* and *Leptospira*. Common features of spirochetosis.
154. Epidemiology of transmissive borreliosis. Specific features of pathogenesis, clinic and immunity of relapsing fever. Laboratory diagnostics of relapsing fever. Characteristics of the principal techniques of diagnostics (microscopic, serological and biological). Prevention and treatment of relapsing fever.
155. Morphology and physiology of *Treponema pallidum*. Ecology and dissemination. Epidemiology, pathogenesis and clinical manifestations of syphilis. Laboratory diagnostics of syphilis. Prevention and treatment of syphilis.
156. Biological properties of *Leptospira*. Epidemiology, pathogenesis, clinic of leptospirosis. Microbiological diagnostics of leptospirosis. Prevention and treatment of leptospirosis.
157. Biological properties of chlamydia. Diseases caused by *C.trachomatis, C.psittaci, C.pneumonia*. Microbiological diagnostics of diseases caused by chlamydia. Treatment and prevention of chlamydial infections.

158. General characteristics of mycoplasmas. Biological properties of mycoplasmas. Diseases caused by *Mycoplasma*, genus *Mycoplasma* and *Ureaplasma*. Laboratory diagnostics of diseases caused by pathogenic mycoplasmas. Treatment and prevention of mycoplasmic infections.
159. General characteristics of the pathogenic *Rickettsia*. Classification of *Rickettsia*, *Rickettsia* place in nature. Biological properties of *Rickettsia*, pathogens of epidemic and endemic typhus. Epidemiology, pathogenesis, clinic of typhus. Microbiological diagnostics of epidemic and endemic typhus. Brill's disease. Specific features of diagnostics. Prevention and treatment of typhoid fevers.
160. Biological properties of Q fever pathogen. Epidemiology, pathogenesis and clinics of Q fever. Microbiological diagnostics of the disease. Prevention and treatment.
161. Biological properties of the pathogen of tsutsugamushi fever. Epidemiology, pathogenesis and clinical picture of the disease. Microbiological diagnostics. Treatment and prevention of tsutsugamushi fever.
162. General characteristics of Ehrlichia. Classification and biological properties of Ehrlichia. Epidemiology, pathogenesis, clinics of ehrlichiosis. Microbiological diagnostics of ehrlichiosis. Prevention and treatment of ehrlichiosis.
163. The notion of "opportunistic infection" (OI). Characteristics of opportunistic infection. Conditionally opportunistic pathogens, causative agents of this infection.
Etiology of opportunistic etiology pus-inflammatory, bronchopulmonary, urological, intestinal infections. Principles of laboratory diagnostics of opportunistic infection.
164. Candida as conditionally pathogenic fungi. Biological properties of *Candida*. Role of endogenous and exogenous factors in development of candidiasis. Specific features of manifestation of *Candida* infection in humans. Laboratory diagnostics of *Candida* infection. Prevention and treatment of candidiasis.
165. Taxonomic place of *Pneumocystis*. Stages of development and biological properties of *Pneumocystis*. Features of *Pneumocystis* infection. risk groups exposed to *Pneumocystis* infection. Laboratory diagnostics of pneumocystosis. Prevention and treatment of pneumocystosis.
166. Pathogens and characteristics of the course of the systemic and deep mycosis: biological properties, pathogenicity. Epidemiology, pathogenesis, clinical features.
The notions of "epidermomycosis", "ceratomycosis". Pathogens and features of these diseases. General biological properties of the pathogens. Laboratory diagnostics, prevention and treatment.
166. Organization and equipment of a virology laboratory. Terms and conditions of work in a virology laboratory.
167. General characteristics of viruses, their place in the biosphere. The nature and origin of viruses, their distinction from bacteria. Basic criteria for the modern classification of viruses.
168. Chemical composition of viruses. The role of nucleic acids, proteins, lipids and carbohydrates. Structural components of the virion: genome, capsid, capsomers, nucleocapsid, supercapsid. Reproduction of viruses. Stages in the interaction of viruses with a host cell.
169. Virus culturing methods: in the body of susceptible animals; in a chicken embryo; in a cell culture (a tissue culture). Characteristics of a tissue culture. Methods of detection (indentification) of a virus in a cell culture: cytopathic effect (CPE); intracellular inclusions; hemadsorption reaction; hemagglutination reaction (RHA); plaque method; color sample.
170. Features of antiviral immunity: a) mechanisms of innate immunity; b) mechanisms of adaptive immunity.
171. Diagnostic techniques of viral infections (viroscopic, virologic, serologic), their specific features.
172. Non-specific and specific prophylaxis of viral diseases. Chemotherapy of viral infections.
173. Viruses that cause acute respiratory viral infections (ARI). General characteristics of ARI.
174. The family of *Orthomyxoviridae*. Biological properties of influenza viruses types A, B, C, specific features of their interaction with a cell. Epidemiology and pathogenesis, causes of variability of influenza virus type A. Laboratory diagnostics of influenza. Treatment and prevention.

175. *Paramyxoviridae* family. Biological features of parainfluenza virus, specific features of its interaction with a cell. Epidemiology, pathogenesis and laboratory diagnosis of parainfluenza. Principles of treatment and prevention.
176. *Adenoviridae* family. Biological properties, specific features of interaction with a cell. Epidemiology of adenovirus infection, its role in human pathology. Laboratory diagnostics and prevention of adenovirus infection.
177. Biological properties of rhinoviruses. Epidemiology, pathogenesis and laboratory diagnostics of rhinovirus. Principles of treatment and prevention.
178. Measles virus, Specific features of the disease, diagnostics, prevention.
179. Epidemic mumps virus, specific features of the disease, diagnostics, prevention.
180. Biological properties of rubella virus, specific features of the disease, diagnostics, prevention. Rubella and neonatal malformations.
181. Family of *Herpesviridae*: classification, biological properties, specific features of interaction with a cell. Laboratory diagnostics of herpetic infections and their prevention.
182. Epidemiology of herpes infections, role in human pathology. *Herpes* simplex viruses type I and II: caused disease, reasons for recurrence. *Varicella zoster* virus and herpes zoster, specific features of the caused diseases. *Cytomegalovirus*, and *Epstein-Barr* virus, non-classified herpes viruses.
183. General characteristics of enteroviral diseases and their agents. *Picornaviridae* family. Biological properties of a poliomyelitis virus. Epidemiology and pathogenesis of the disease. Prevention of poliomyelitis.
184. Viruses of *Coxsackie* and *ECHO*. Laboratory diagnostics of enteroviral infections. Express diagnostic techniques of enteroviral infections.
185. Tick-borne encephalitis virus, biological properties. Epidemiology, pathogenesis characteristics, diagnostics, prevention.
186. Rabies virus, biological properties. Features of the disease, diagnostics, prevention.
187. Viruses-agents of intestinal infections: rotavirus, enterovirus. Biological properties. epidemiology, pathogenesis characteristics, diagnostics, prevention.
Express diagnostic techniques of viral infections.
188. Oncogenic viruses and their characterization. Features of interaction between oncoviruses and a cell.
189. Genetic, virological and immunological aspects of oncogenesis. Viruses - activators of slow infections.
190. Prions: structure and features. Prion protein. Persistence of viruses.
191. Papilloviridae family, biological properties. Epidemiology, features of pathogenesis, diagnostics, prevention.
192. General characteristics of hepatotropic viruses. Classification of hepatotropic viruses.
193. Viruses, pathogens of hepatitis types A and E, biological properties. Epidemiology, specific features of pathogenesis, diagnostics, prevention.
194. Viruses, pathogens of hepatitis types B and D, biological properties. Epidemiology, specific features of pathogenesis, diagnostics, prevention.
195. Viruses, pathogens of hepatitis types C and G, biological properties. Specific features of the disease, diagnostics, prevention.
196. Viruses TT and SEN. Biological properties. Their role in development of hepatitis.
197. Viruses - activators of hemorrhagic fevers. Ebola and Marburg viruses, biological feaatures. Features of the disease, diagnostics, prevention.
198. HIV infection: biological properties of pathogens. Specific features of the disease (AIDS), diagnostics, prevention.
199. The concept of immunity. The history of the development of immunology. Types of immunity, their features. Innate immunity: types, general characteristics.
200. Innate immunity: its types, general characteristics. Pathogen-associated molecular patterns and pattern recognition receptors. Toll-like, membrane and cytoplasmic pattern recognition receptors, their role in the regulation of the immune response.

201. Humoral factors of innate immunity (normal antibodies, lysozyme, complement system, -lysine, etc.).
202. Complement system: structure, activation pathways, role in the body. Interferon system: characteristics, functions.
203. Anatomical and physiological mechanisms and normal microbiota as factors of non-specific defense of the body.
204. I.I. Mechnikov's doctrine of phagocytosis. Micro- and macrophages. Stages of phagocytosis. Incomplete and complete phagocytosis. Phagocyte cytotoxicity systems.
205. Macrophages: origin, types, markers and receptors. Biological functions of macrophages. Dendritic cells: origin, types, functions.
206. The immune system of the body. Organs of the immune system, their functions.
207. Cells of the immune system. Characteristics of T- and B-lymphocytes, functions, subpopulations, markers. Normal killers: subpopulations, markers, functions, cytotoxicity.
208. The concept of antigens. Properties of substances of antigenic nature. Antigen structure. Antigenic determinant (epitope) and aggretope.
209. Antigens: concept, classification by origin, nature of the immune response, by the ability to cause the formation of antibodies. HLA and the major histocompatibility complex (MHC classes I and II): concept, role in the implementation of the immune response.
210. Antigens of microorganisms. Their importance in the pathogenesis of infectious diseases, diagnostics and prevention. Superantigens, cross-reacting antigens: concept, role in immunopathology.
211. Antibodies: concept, structure, classification. Active center of antibodies. Interaction of cells of the immune system in the formation of humoral specific immunity.
212. Characteristics of immunoglobulins G and M. Complete and incomplete antibodies, methods for detecting incomplete antibodies.
213. Characteristics of immunoglobulins A, E, D. The concept of local immunity, its role.
214. Dynamics of antibody formation. Primary and secondary immune response, their characteristics, distinctive features, interaction of cells.
215. Patterns of immunogenesis. The role of antigen and macroorganism in the formation of an immune response.
216. Agglutination reactions: mechanism, types, practical application.
217. Precipitation reactions: mechanism, types, practical application. Passive hemagglutination reaction, mechanism, application. Neutralization reaction, mechanism, application.
218. Features of the lysis reaction. Complement fixation reaction, its phases and practical application. The complement system: structure, activation pathways, role in the body.
219. Hemagglutination inhibition reaction, enzyme immunoassay: mechanism, application.
220. B-lymphocytes. Phases of their differentiation, subpopulations, markers. Formation of a humoral immune response to thymus-dependent and thymus-independent antigens. Plasma cells, their differentiation and characteristics.
221. T-lymphocytes. Phases of differentiation, subpopulations. Cellular immune response, mechanisms of antigen destruction.
222. T-system of immunity. T-lymphocytes: differentiation phases, subpopulations, markers. Stages of formation of cellular immune response. Cytotoxic and inflammatory types of cellular immune response.
223. Immunity mediators (cytokines): concept, nature, classification.
224. Theories of immunity: instructive and selective. Features of each theory. Modern views on antigen recognition. Immunological tolerance.
225. Principles of immunoprophylaxis and immunotherapy. Indications and contraindications for the use of vaccines. Routine preventive vaccinations. Evaluation of post-vaccination immunity.
226. Vaccines: classification, methods of production and use. Characteristics of various types of vaccines, side effects. Post-vaccination complications.
227. Serums, immunoglobulins: production, use, methods of administration. Passive immunity, its features.