



УТВЕРЖДАЮ

Заведующий кафедрой
микробиологии и вирусологии

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«30» июня 2023 г.

СПИСОК ВОПРОСОВ ДЛЯ ПОДГОТОВКИ К ЭКЗАМЕНУ

дисциплины «МИКРОБИОЛОГИЯ, ВИРУСОЛОГИЯ»

для студентов 3 курса Лечебного факультета

(ИНОСТРАННЫЕ СТУДЕНТЫ)

V семестр 2023-2024 учебного года

Section 1. MORPHOLOGY AND CLASSIFICATION OF MICROORGANISMS

1. Principles of classification of prokaryotes. Species as the main taxonomic category. Category, subspecies: biovar, serovar, pagevar, pathovar. Features of formation in the human body.
 2. Microscopic research method in bacteriology. Native and fixed strokes.
 3. The difference between prokaryotic cells from eukaryotes. The morphology of the bacteria
 4. Basic anatomical structures of bacterial cells: structure and function. Study method
 5. Capsule, chemical composition, structure of true and false capsules, methods of detection of microcapsules and macrocapsules. The functional significance of the capsules
 6. Cell wall, functions, structural features of gram-positive and gram-negative bacteria. Methods of detection.
 7. Cytoplasmic membrane and mesosomes, chemical composition, structure, functional significance, detection methods.
 8. Bacteria with cell wall defects: protoplasts, spheroplasts, L-forms.
 9. Flagella of bacteria, their structure, value, methods of detection.
 10. Hairs (pili) of bacteria, classification, composition, significance.
 11. The inclusion of bacteria, the chemical nature and significance. Detection of volutin grains.
 12. Nucleoid and ribosomes, chemical nature, structure, value.
 13. Bacterial spores, formation conditions, significance. Ultrastructure of spores, detection methods.
 14. Actinomycetes, taxonomic position, morphology, features of ultrastructure and physiology, methods of study.
 15. Rickettsia, taxonomic position, morphology, ultrastructure features, methods of study.
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16. Chlamydia, taxonomic position, morphology, ultrastructure features, methods of study.
17. Spirochetes, taxonomic position, morphology, ultrastructure features, methods of study.
18. Mycoplasma, taxonomic position, morphology, ultrastructure features, methods of study.
19. Modern methods of microscopy dark-field, phase-contrast, fluorescent microscopy. Methods of preparation of smears.
20. Simple and complex painting methods. The essence of the method of gram, ZIL-Nelsen, Ozheshko, burry-Gins, Leffler, Neisser.

Section 2. PHYSIOLOGY OF MICROORGANISMS. THE DOCTRINE OF INFECTION

21. Nutrition of bacteria. Sources of carbon, nitrogen, minerals. Growth factor. Autotrophs and heterotrophs. Mechanisms of nutritions.
22. Energy of microbial cells. The main types of biological oxidation of the substrate (aerobic and anaerobic). The use of bacteriological method.
23. Growth and reproduction of bacteria. Phases of reproduction of bacterial population.
24. Bacterial enzymes. Practical application of the study of the biochemical activity of bacteria in medical Microbiology. Study method.
25. Principles and methods of cultivation of bacteria. Nutrient media, the requirements imposed on them. Classification of nutrient media.
26. Methods of isolation of pure cultures of aerobic and anaerobic bacteria. Methods for creating anaerobic conditions.
27. The concept of "antibiotics". Classification of antibiotics by mechanism and spectrum of action, sources of production.
28. Side effects of antibiotics. Principles of rational antibiotic therapy.
29. Mechanisms of resistance of bacteria to antibiotics. Role of plasmids. Phenotypic manifestation of antibiotic resistance.
30. Methods for determining the sensitivity of bacteria to antibiotics. Evaluation of results.
31. Infectious process. Types of infectious processes.
32. Forms of infection and their characteristics. Periods of infectious disease.
33. Pathogenicity and virulence of bacteria. Units of virulence.
34. Pathogenicity factors of bacteria with the function of adhesion, invasion and protection against phagocytosis.
35. Exo-and endotoxins of bacteria, their characteristics and mechanisms of action.

3. GENETICS OF MICROORGANISMS



36. Organization of genetic material in bacteria. Mobile genetic elements: transposons, Is-elements.
37. Plasmids of bacteria, classification of plasmids, their General biological value.
38. Genotypic and phenotypic variability in bacteria: classification, mechanisms.
39. Mutation: types, mechanisms and significance. Mechanisms of repair of the damaged genome.
40. Types of recombinant variability in bacteria. Characteristics of the processes of transformation, conjugation, transduction and lysogenic conversions in bacteria.

Section 4. IMMUNODIAGNOSTIC REACTIONS.

41. The definition of "antigen". The properties of the antigen. The concept of "determinant groups" of antigen. The concept of haptens.
 42. Types of antigenic specificity: group, species, type and heterospecific. The concept of autoantigens, superantigens and cross-reacting antigens.
 43. Antigenic structure of bacterial cells: O-, H-, K -, Vi-antigens, exoantigens. Antigenic properties of toxins. Protective antigens.
 44. Antibodies (immunoglobulins). Classes of immunoglobulins, their characteristics, functions.
 45. Molecular structure of antibodies. Valence of antibodies. The concept of domain, active center, paratope.
 46. Monoclonal antibodies: principles of preparation, properties, application.
 47. General characteristics of serological reactions: goals of formulation, classification.
 48. Agglutination reaction and its modifications: indicative agglutination reaction on the steele, expanded agglutination reaction, rnga, Coombs reaction.
 49. The reaction of a precipitation test, mechanism, characteristics. Methods of setting and application.
 50. Reaction of immune lysis (bacteriolysis, hemolysis). The purpose of the statement, ingredients, mechanism, accounting results.
 51. The reaction of binding complement (RAC). The ingredients of phase a mechanism and the results.
 52. Serological reactions with "label" - immunofluorescence (IFM), enzyme immunoassay (ELISA) and radioimmune assay (RIA).
 53. Reaction of the immune blotting. The essence of the method, stages, application in the diagnosis of infections.
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54. Reactions used in Virology: inhibition of hemagglutination (rtga), immune electron microscopy (IEM), biological neutralization (RBN).
55. Vaccines. The main groups of vaccines. Modern vaccines (genetically engineered, synthetic, "liposomal", DNA vaccines.).
56. Therapeutic and prophylactic serums and immunoglobulins: antitoxic, antibacterial and antiviral. Receiving, cleaning, titration.
57. Diagnostic sera: luminescent, hemolytic, agglutinating, precipitating, enzyme immunoassay, etc. Preparation and application.
58. The antigens and the antigens used for the production of serological reactions.
59. Allergens used for allergic tests in the diagnosis of infectious diseases.
60. Preparations of bacteriophages for the treatment, prevention and diagnosis of infectious diseases.
61. Preparations for the correction of normal intestinal microflora. Receiving, application.

Section 5. PRIVATE BACTERIOLOGY

62. Organization and categories of microbiological laboratories. Equipment of laboratories. Personnel requirements. Rules of work with biological material in microbiological laboratories of basic level and maximum retention.
 63. Methods of laboratory diagnostics of infectious diseases – bacteriological (stages), molecular genetic (PCR, molecular hybridization). Advantages and disadvantages.
 64. Staphylococci, taxonomic position, biological properties. The role of staphylococci in the development of ICMP. Microbiological diagnosis of sepsis and localized GVZ. Treatment and prevention of staphylococcal infections.
 65. Streptococci, taxonomic position, properties. The role of different types of streptococci in human pathology. Methods of laboratory diagnostics of streptococcal sepsis and localized forms of GVZ. Immunobiological preparations for diagnosis, treatment and prevention.
 66. Meningococci, taxonomic position, properties, pathogenesis and clinic of meningococcal infections. Methods of laboratory diagnostics, treatment and prevention.
 67. General characteristics of the family Enterobacteriaceae. Signs underlying the differentiation of enterobacteria within the family. Factors of pathogenicity of enterobacteria. Role in the occurrence of opportunistic infections. ОПК-9, ПК-5
 68. Escherichia. Taxonomy and characterization. Role in medical pathology. Epidemiology, pathogenesis of infections. Microbiological diagnosis of infections.
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69. Typhoid and paratyphoid pathogens. Taxonomy and characterization. Role in medical pathology. Epidemiology, pathogenesis of infections. Microbiological diagnosis of infections, specific prevention.
 70. The causative agents of salmonellosis. Taxonomy and characterization. Epidemiology, pathogenesis of infections. Microbiological diagnosis of salmonellosis, specific prevention
 71. Causative agents of gas gangrene, the taxonomic position and characterization. Pathogenicity factors and pathogenesis of infection. Laboratory diagnosis, prevention and treatment of gas gangrene.
 72. The causative agents of tetanus, the taxonomic position and characterization. Pathogenicity factors and pathogenesis of tetanus. Laboratory diagnosis, prevention and treatment of tetanus.
 73. Non-spore-forming anaerobes as pathogens of purulent inflammatory diseases. Bacteroides and fusobacteria. Taxonomy. Characteristic. Epidemiology, pathogenesis, role in human pathology. Microbiological diagnostics.
 74. Causative agent of diphtheria, taxonomic position and main properties. Differences causative agent of diphtheria from diptheroids. Methods of laboratory diagnostics. Determination of antitoxic immunity. Immunobiological preparations for the diagnosis, prevention and treatment of diphtheria.
 75. The taxonomic position of tuberculosis pathogens, the main biological properties due to the unique chemical composition of the cell wall. Methods of laboratory diagnosis of tuberculosis. Biological preparations for the diagnosis and prevention of tuberculosis.
 76. Conditionally pathogenic mycobacteria. Classification by Runyon. Characteristic. Role in human pathology. Microbiological diagnostics.
 77. The causative agent of syphilis, the taxonomic position and basic properties. Pathogenesis of syphilis. Congenital syphilis. Methods of laboratory diagnosis of syphilis.
 78. The causative agent of gonorrhea, taxonomic position and basic properties. Pathogenesis of gonorrhea. Methods of microbiological diagnostics. Immunobiological preparations for diagnosis and treatment.
 79. Chlamydia, taxonomic position, biological properties. Role in human pathology. Features of laboratory diagnostics of chlamydia infections.
 80. Mycoplasma, taxonomic position, biological properties, main Mycoplasma infections. Methods of microbiological diagnostics.
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81. Pathogens of intestinal yersiniosis and pseudotuberculosis. Taxonomy and characterization. Microbiological diagnostics. Treatment.
82. The causative agents of shigellosis. Taxonomy and characterization. Microbiological diagnostics. Specific prevention and treatment.
83. The causative agents of cholera. Taxonomy. Characteristic. Microbiological diagnostics. Specific prevention and treatment.
84. The causative agents of tetanus, the taxonomic position and characterization. Pathogenicity factors and pathogenesis of tetanus. Laboratory diagnosis, prevention and treatment of tetanus.
85. Taxonomic position and characteristics of the causative agent of botulism. Ecology and distribution. Epidemiology, pathogenesis of botulism. Laboratory diagnostics, specific prevention, treatment.
86. Natural focal infections, characteristics. Lyme disease pathogens, their properties, epidemiology, pathogenesis, clinical manifestations, microbiological diagnosis.
87. The concept of zoonotic infections. The main pathogens. Prevalence. Especially dangerous zoonotic infections and working conditions with pathogens. Methods of laboratory diagnostics.
88. Pathogens of brucellosis, taxonomic position, biological properties, epidemiology, methods of microbiological diagnosis. Specific prevention and treatment.
89. The causative agent of tularemia, taxonomic position, biological properties, epidemiology, methods of laboratory diagnosis. Specific prevention and treatment.
90. The causative agent of plague, biological properties, epidemiology, methods of microbiological diagnosis. Specific prevention and treatment.
91. Anthrax causative agent, taxonomic position, biological properties, epidemiology. Specific prevention and treatment.
92. Rickettsia Burnet-pathogens pneumotropic rickettsiosis. Characteristics of Coxiella and their taxonomic position. Laboratory diagnosis of pneumonia caused by Rickettsia Burnet. Prevention.
93. Causative agent of leptospirosis. Taxonomy and characterization. Microbiological diagnostics. Specific prevention and treatment principles.
94. Causative agent of typhus. Taxonomy and characterization. Microbiological diagnostics. Differential diagnosis of primary typhus and Brill's disease. Specific prophylaxis.

Section 6. GENERAL AND PRIVATE MYCOLOGY



95. General characteristics of mushrooms, classification. Characteristics of the main departments of the Kingdom of Fungi, the role in medical practice.
96. Morphology and features of the structural organization of fungi.
97. Candidiasis of various biotopes. Characteristics of fungi of the genus *Candida*. Causes of candidiasis, risk groups. Methods of laboratory diagnostics. Principle of treatment. Modern antimicrobics.

Section 7. ECOLOGY OF MICROBES

98. Microflora of the human body and its functions. Taxonomy and characteristics of the main representatives of the normal intestinal microflora.
99. Concepts of eubiosis, dysbiosis and dysbiosis. The reasons for the development of microecological disorders, classification. Laboratory diagnostics of violations of microecology of the colon. Principles of correction of microecological disorders
100. The concept of "aseptic and antiseptic". Methods of asepsis and antiseptics. Antiseptic. Dry heat sterilization, autoclaving, modes, objects. Sterilization quality control.
101. Disinfection methods. Disinfectants. Disinfection quality control.
102. Food poisoning, classification, differences from infectious diseases with alimentary way of transmission. The causative agents of food poisoning and food toxicosis, taxonomy, characteristics. Etiopathogenesis of food poisoning.
103. Doctor's tactics in food poisoning. Collection and preparation of samples for research. The procedure for the study of different groups of materials at PTI, proof etiological role of opportunistic microflora in the occurrence of PTI. Studies in food toxicosis. Specific prophylaxis, immunotherapy botulism's.
104. Collection and preparation of samples for research. The order of research of various groups of materials at PTI, the proof of an etiological role conditionally-pathogenic microflora in emergence of PTI. Studies in food toxicosis. Specific prevention, immunotherapy of botulism.

Section 8. GENERAL AND PRIVATE VIROLOGY

105. Characteristics of the virus Kingdom. The concept of virions, viruses, viroids and prions. Principles of classification and nomenclature of viruses. The prion properties of prion diseases.
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106. The morphology and structure of the virions. The influence of the morphology of the virions in the pathogenesis and clinical course of diseases.
107. Types of virion-cell interaction. Stages of interaction. The concept of viagenie. Features of reproduction of DNA and RNA containing viruses. Features of interaction of retroviruses with a cell.
108. Methods of culturing viruses in the laboratory. Stages of virological research. Characteristics of biological models used in Virology.
109. Morphology and classification of bacteriophages. The practical use of bacteriophages (vasodentinal, the phage typing).
110. Virulent and moderate phages. Lysogeny. The concept of prophage, defective phage. Preparation of bacteriophages, titration by Grazia.
111. Features of material sampling in case of suspected viral infection. Methods of diagnosis of viral infections. Characteristics of virological method, purpose, stages. Indication of viruses, depending on the biological model.
112. Parainfluenza viruses and RS viruses. Taxonomy. Characteristic. Laboratory diagnostics.
113. Adenoviruses. Characteristic. Laboratory diagnosis of adenovirus infection.
114. Coronaviruses: characteristics caused by diseases. Laboratory diagnostics.
115. The causative agent of influenza. Taxonomy. Characteristic. Laboratory diagnostics. Specific prevention and treatment principles.
116. The causative agents of hepatitis A and E. the Taxonomy. Characteristic. Epidemiology. Laboratory diagnostics. Specific prevention and treatment.
117. Arboviruses, composition, General characteristics. Characteristics of the main families of the ecological group of arboviruses (Togaviridae, Flaviviridae, Bunyaviridae).
118. Causative agent of tick-borne encephalitis. Taxonomy. Characteristic. Epidemiology. Laboratory diagnostics. Specific prophylaxis.
119. Causative agents of hemorrhagic fevers: Omsk, Crimea-Congo. Taxonomy, characteristics. Epidemiology, pathogenesis of infections. Laboratory diagnostics, specific prophylaxis.
120. The causative agent of rabies. Taxonomy. Characteristic. Laboratory diagnostics. Specific prophylaxis.
121. Causative agent of rubella. Taxonomy. Characteristic. Laboratory diagnostics. Specific prophylaxis.
122. The causative agent of measles and SSPE. Taxonomy. Characteristic. Laboratory diagnostics. Specific prophylaxis.
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123. Herpes viruses: taxonomy, characteristics. Laboratory diagnostics. Immunotherapy of herpes virus infection
124. The causative agents of hepatitis b, C, D. a Taxonomy. Characteristic. Laboratory diagnostics. Serological marker. Specific prophylaxis.
125. Human immunodeficiency virus. Taxonomy. Characteristic. Epidemiology, pathogenesis of HIV infection. Laboratory diagnostics.
126. Human oncoviruses. Taxonomy. Characteristic.
127. Vaccines of the national calendar of mandatory vaccinations, characteristics, timing of vaccination.
128. The viruses of mumps. Characteristic. Laboratory diagnostics, prevention.
129. Rotaviruses. Characteristics and laboratory diagnostics of rotavirus infection. Specific prophylaxis.
130. Enteroviruses: taxonomy, characteristics. Medical role. Epidemiology, pathogenesis, clinical forms of polio. Laboratory diagnosis of polio and other enterovirus diseases. Specific prevention of polio.
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