MICROBIOLOGY EXAMINATION QUESTIONS
Current certification of 3d year students of the Faculty of Foreign Students
2022/2023 academic year

MORPHOLOGY, PHYSIOLOGY AND GENETICS OF BACTERIA

1. Definitions of «microbiology» and «microorganisms». Medical microbiology. Main groups of medically important microbes. Taxons used in bacteriology. Intraspecific variants (biotype, serotype, phagotype, etc.).
2. Methods of microbiological diagnostics. Principles and characteristics of methods. Bacterioscopical method. Stages of the method. Methods of staining. Types of microcopies used in microbiology.
3. Basic shapes of bacteria. Arrangement of cocci and rods. Spiral forms of bacteria.
4. Morphology of prokaryotic cell. Obligate and facultative organoids, their functions. Difference between prokaryotic and eukaryotic cells.
5. Gram staining (stages and result). Structure of Gram-positive and Gram-negative bacterial cell walls. Morphological groups of bacteria according to Gram staining.
6. Mobility of bacteria. Flagella and fimbria. Mobile bacteria. Types of flagellation. Detection of mobility. Capsules of bacteria. Functions of capsules. Capsulated bacteria. Methods of capsule revealing. Spore-forming bacteria. Functions of bacterial endospores. Methods of staining for endospores and acid-fast bacteria (AFB).
7. Atypical forms of bacteria (spirochetes, mycoplasma, actinomycetes, rickettsia and chlamydia). Species of medical importance, morphology and methods of microscopical detection and cultivation.
8. Physiology of microorganisms. Bacterial metabolism. Classification of bacteria by their nutritional requirements (to carbon, inorganic ions, growth factors, electron donors and acceptors).
9. Nutrient media. Classification of media (on consistence, on composition, on destination).
10. Cultivation of bacteria. Bacteriological method. Aims and stages of the method. Definition of a “pure culture”, “strain”, “colony” of bacteria. Methods of a pure culture identification.
11. Biochemical identification of pure cultures. Bacterial enzymes, methods and principles of their revealing. Cultural properties of bacteria on solid and in liquid media. Practical application of phage typing and serotyping of pure cultures.
12. Types of bacterial respiration. Cultivation of anaerobic bacteria: nutrient media, techniques of anaerobic conditions creation. Stages of bacteriological method for the cultivation of obligate anaerobes.
13. Microbial decontamination. Asepsis. Methods of asepsis. Antimicrobial agents (antiseptics, disinfectants, chemotherapeutic preparations).
14. Sterilization. Methods of sterilization. Types of thermal sterilization. Disinfection. Types and methods of disinfection. Common disinfectants.
15. Antiseptics. Types and methods of antiseptics. Common antiseptics.
16. Chemotherapeutic preparations (CTPs) and antibiotics. Classifications of CTPs on the group of sensitive microbes. Classification of antibiotics due to source of receiving, effect,

spectrum of action). Classification of antibiotics according to mechanisms of action on bacterial cell (with examples of antibiotics).
17.Problem of drug resistance. Types of resistance. Problematic bacteria. Genetic mechanisms of drug resistance. Nongenetic mechanisms of drug resistance. Groups of bacteria on sensitivity to antibiotics (S, R, I).
18.Bacteriophages. Structure and main properties of bacteriophages. Morphological types of phages. Practical application of phages in medicine (phage therapy, phage prophylaxis, phage typing).
19.Virulent (lytic) and temperate (lysogenic) phages. Stages of the lytic cycle. Stages of lysogenic cycle. Lysogeny. Lysogenic conversion. Prophage. Properties of prophages.
20.Organization of bacterial genetic material. Characteristics of nucleoid (bacterial chromosome) and extrachromosomal factors (transposons, IS-elements, plasmids).
21.Plasmids. Functions. Location of plasmids. Classification of plasmids.
22.Characteristics of F-plasmid. Structure and functions. Location of F-plasmid in bacterial cell. Characteristics of R-plasmid. Structure and functions. Ways of plasmid transfer.
23.Types of variability in bacteria. Modifications. Mutations. Categories of mutagens. Classification of mutations. Characteristics of S- and R-forms of bacteria.
24.Recombinant variability in bacteria. Recombinant cells. Forms of recombinations. Transformation (affecting factors, steps of transformation). Transduction. Temperate transducing phages. Types of transduction.
25.Conjugation. Conjugative plasmids. Mating types of bacteria (F^+, F^--cells, Hfr-cells). Biological value of recombinations.
26.Molecular-genetic method. Principle. Methods of genetics applied in microbiological diagnosis. Polymerase-chain reaction (PCR): principle, components, steps (procedure). Types of PCR.

GENERAL INFECTOLOGY. GENERAL AND MEDICAL IMMUNOLOGY

27.Microflora (normal flora). Composition of human body microflora. Normally sterile biotopes. Role (functions) of microflora. Dysbacteriosis (dysbiosis): conditions for development and principles of correction (probiotics, prebiotics).
28.Concept about an infection and infectious disease. Main characteristics of infectious diseases. Periods of infectious disease and their characteristics.
29.Pathogenicity and virulence. Types of pathogenic bacteria. Characteristics of opportunistic pathogens (types of infections, representatives, conditions for establishment).
30.Pathogenic factors. Factors of adhesion and colonization, invasion and aggression. Mechanisms of persistence. Biofilm formation.
31.Toxins of microorganisms. Characteristics endo- and exotoxins. Types of exotoxins due to affected cells and mechanism of action. Toxoid (anatoxin) and its application in medicine. Effects of endotoxin.
32.Classification of infections. Forms of infections on base of nature and number of causative agents, on origin, on localization of pathogens (sepsis, bacteremia, toxenemia, virusemia), repeated infections, on duration and clinical manifestations.
33.Epidemiology of infections. Sources of infections. Definition of “microbocarriage”. Mechanisms and modes of infectious disease transmission. Spreading of infections

(pandemy, epidemy, endemy, sporadic cases). Definition of “hospital acquired infection” (HAI).
34.Immunity. Types of immunity (on base of mechanism, on direction, on participation of own immune system, on base of origin). Definition of “innate immunity”. Comparison between innate and adaptive immunity.
35.Innate immunity. Levels of innate immunity. Factors of nonspecific resistance. Inflammation (inflammatory factors).
36.Cellular level of innate immunity. NK-cells and K-cells (surface markers, functions). Dendritic cells (types and functions).
37.Phagocytosis. Characteristics of macrophages and their receptors. Stages of phagocytosis. Opsonins. Mechanisms of killing. Functions of macrophages.
38.Humoral level of innate immunity. Tissue bacteriocidal substances (bacteriocides). Complement system. Composition. Classical and alternative pathways of complement activation. Functions of complement system.
39.Cytokines. General functions of cytokines. Types of cytokines. Interferons (IFNs). Mechanisms of action of IFN. Classification (types) of IFN. Role of INFs.
40.Immune system. Functions. Levels of organization of immune system. Organic level. Primary and secondary lymphoid organs. Local immunity. Mucosa-associated lymphoid tissue (MALT).
41.Antigens. Epitope. Determinants of antigenicity. Classification of antigens (by foreignness, by type of immune response, by source of receiving, by immunogenicity). T-dependent and T-independent antigens. Bacterial antigens. Superantigens. Cross-reactive antigens. Antigenic mimicry.
42.Major histocompatibility complex (MHC). Structure, function, localization of MHC I class and MHC II class. Importance of MHC.
43.Antigen presenting cells (APCs). Examples of nonprofessional and professional APCs. Presentation of Ag. Schemes of Ag presentation for T helpers and for T cytotoxic lymphocytes.
44.Definition of “adaptive immunity”. Comparison between active and passive immunity. General scheme of induction and development of specific immune response.
45.Immunocompetent cells. Characteristics of T- and B-lymphocytes. Surface markers.
46.T-lymphocytes. T-cell types (populations). Structure and function of T-cell receptor (TCR). Differences between Th1 and Th2 subtypes.
47.B-lymphocytes. Functions of B-cells. Structure and function of B-cell receptor (BCR). B-cell types (populations).
48.Antibodies (Ab) (immunoglobulins). Clonal selection theory. Functions of Ab in host defense. Basic structure of immunoglobulin (Ig) molecule.
49.Classes of immunoglobulins. Characteristics of Ig classes (concentration, structure, forms, functions).
50.Antibody-mediated immune response (AMI). T-dependent activation and T-independent activation of B-cells. Targets for AMI. Cells of AMI. General scheme of AMI. Effector mechanisms of Ab.
51.Primary and secondary immune response. Monoclonal and polyclonal Ab.

52.Cell-mediated immune response (CMI). Cells of CMI. Target cells for T cytotoxic lymphocytes. Types of cytotoxicity. General scheme of CMI.

53.Immunological method (directions). Serological method. Aims of serological method (serotyping, serodiagnostics and express-diagnostics). Criteria of serodiagnostics.

54.Serological reactions. Diagnosticum. Types of diagnosticums. Diagnostic antisera. Types of diagnostic antisera. Classification of serological reactions (double, complex and labeled reactions).

55.Double serological reactions. Reaction of agglutination (principle, estimation of results, classification). Reaction of precipitation (principle, estimation of results, classification). Reaction of neutralization (principle and types).

56.Labeled serological reactions. Immunofluorescent assay (IFA) (principle, estimation of results, types). Enzyme linked immunosorbent assay (ELISA) (principle, estimation of results, types). Immunoblotting (principle, estimation of results).

57.Allergy (hypersensitivity). Allergens. Types of allergens. Classification of allergic reactions. Immediate type of hypersensitivity (ITH). Pathogenesis. Atopy. Types of clinical forms of anaphylactic hypersensitivity.

58.Cytotoxic type of hypersensitivity. Mechanism of tissue destruction. Clinical forms. Immune complex type of hypersensitivity. Mechanism of development. Clinical forms.

59.Delayed type of hypersensitivity (DTH). Allergens for DTH. Mechanism of DTH development. Clinical forms. Allergological method of diagnosis. Skin testing. Principle and estimation of results.

60.Immunoprophylaxis of infectious diseases. Forms of immunoprophylaxis (routine and individual, active and passive immunization).

61.Active immunization. Vaccines. Main bacterial and viral vaccines used in routine immunization. Classification of vaccines (alive attenuated, killed inactivated, toxoid or anatoxin, recombinant, conjugate, DNA-vaccines).

62.Passive immunization. Preparations for passive immunization. Classification and types of antisera. Immunoglobulins. Application of antisera and Ig in medicine. Immunotherapy. Preparations for immunotherapy.

MEDICAL BACTERIOLOGY

63.**Staphylococci.** Species. Morphological, biological properties and factors of pathogenicity. Media for cultivation. Diseases caused by *S.aureus*. Laboratory diagnostics. Epidemiology. Problem of drug resistance. Prevention.

64.**Streptococci.** Lancefield classification (groups, type of hemolysis, localization). Morphological and biological properties. Factors of pathogenicity of *S.pyogenes*. Media for cultivation. Diseases caused by streptococci (groups A, B, C, D). Laboratory diagnostics. Epidemiology. Prevention.

65.**Enterococci.** Species. Morphological and biochemical characteristics. Problem of drug resistance. Clinical forms of enterococcal infections.

66.**Pneumococci.** Species. Morphological, biological properties and factors of pathogenicity. Media for cultivation. Clinical forms of pneumococcal infections. Laboratory diagnostics. Epidemiology. Prevention.

67.**Gonococci.** Taxonomy. Morphological, biological properties and factors of pathogenicity. Media for cultivation. Caused diseases. Laboratory diagnosis of chronic and acute gonorrhea. Epidemiology. Prevention.

68.**Meningococci**. Taxonomy. Morphology, biological properties and factors of pathogenicity. Serogroups. Media for cultivation. Clinical forms of meningococcal infection. Laboratory diagnosis. Epidemiology. Prevention.

69.Modern classification of **Enterobacteriaceae**. Obligately pathogenic and opportunistic enterobacteria. General characteristics of enterobacteria (morphology, biological properties, media for cultivation – DDM, Kligler iron agar, lactose fermenters and lactose nonfermenters, antigens, pathogenic factors, role in human pathology).

70.**Escherichia.** Taxonomy. Morphological, biological properties and factors of pathogenicity. Antigens. Serogroups and serotypes. Pathogenic groups of *E.coli* (EPEC, ETEC, EHEC, EIEC, UPEC, MENEC and SEPEC). Clinical forms of escherichioses. Laboratory diagnostics. Epidemiology. Prevention.

71.**Shigella.** Taxonomy. Morphological, biological properties and factors of pathogenicity. Clinical symptoms, forms and epidemiology of dysentery. Laboratory diagnostics. Prevention.

72.**Salmonella.** Taxonomy. Kauffmann-White classification. Antigens and serotyping of salmonella. Morphological, biological properties and factors of pathogenicity. Caused diseases and their epidemiology.

73.**Typhoid**: stages of pathogenesis, clinical symptoms and features of laboratory diagnostics at each stage. Diagnostics of typhoid carriers. Prevention.

74.Causative agents of **salmonellosis**. Causative agents. Problem of drug resistance. Clinical forms of salmonellosis. Epidemiology and prevention.

75.***Klebsiella pneumoniae***. Morphological, biological properties and factors of pathogenicity. Antigens and important serogroups. Clinical forms and epidemiology of infections. Laboratory diagnostics. Prevention.

76.**Yersinia (intestinal species).** Species and caused diseases. Morphological, biological properties and factors of pathogenicity. Antigens. Motility. Clinical symptoms and epidemiology of intestinal yersiniosis and pseudotuberculosis. Laboratory diagnostics. Prevention.

77.**High risk infections** of bacterial etiology. Diseases and their causative agents.

78.**Vibrio.** Taxonomy. Antigenic classification. O1-serogroup. Biotypes and serotypes. O139-serogroup. Morphological, biological properties and factors of pathogenicity. Media for cultivation. Clinics and epidemiology of cholera. Laboratory diagnostics. Prevention.

79.Species of **Brucella.** Morphological, biological properties and factors of pathogenicity. Cultivation of Brucella. Antigens. Clinical manifestations of brucellosis. Epidemiology. Laboratory diagnostics. Prevention.

80.Causative agent of **plague**. Its morphology and factors of pathogenicity. Antigenic structure. Media for cultivation. Clinical forms of plague. Epidemiology and laboratory diagnostics. Prevention.

81.***Bacillus anthracis***: morphology and factors of pathogenicity. Media for cultivation. Clinical forms of anthrax. Epidemiology and laboratory diagnostics. Prevention.

82.**Bordetella.** Species and caused diseases. Its morphology and factors of pathogenicity. Antigenic structure. Media for cultivation. Stages of whooping cough. Epidemiology and features of laboratory diagnostics at each stage. Prevention. Cellular and acellular vaccines.

83.**Hemophilus.** Species and diseases. Morphology. Properties (growth factors). Pathogenic factors. Antigenic structure. **Hib**: role in human pathology. Epidemiology. Laboratory diagnostics. Prevention.

84.Group of **nonfermenting bacteria** (genera, species). ***Pseudomonas aeruginosa.*** Morphology, biological properties and factors of pathogenicity. Pigmentation. Drug resistance. Compromising conditions and caused infection. Laboratory diagnostics. Prevention.

85.**Mycobacteria.** Taxonomy. Classification of mycobacteria (on duration of growth, on pigmentation, on pathogenicity). Species and caused diseases. Characteristics of atypical mycobacteria and mycobacterioses.

86.Causative agents of **tuberculosis**. Morphology. Properties of *M.tuberculosis* (MBT). Cell wall composition and functions. Biological properties. Media for cultivation. Characteristics of colonies. Pathogenic factors.

87.**Tuberculosis** (TB). Pathogenesis of primary and secondary TB. Clinical forms of TB. TB-infection and TB-disease differences. Immunity. Laboratory diagnostic. Tuberculin test. Prevention.

88.**Corynebacteria**. Species and diseases. *C.diphtheriae:* morphology and factors of pathogenicity. Biovars, its properties. Detection of toxigenicity. Pathogenesis and clinical forms of diphtheria. Laboratory diagnostics and epidemiology. Prevention.

89.**Actinomycetes**. Taxonomy. Morphology. Characteristics. Cultivation. Definition about the druse. Caused diseases. Laboratory diagnostics.

90.Obligate anaerobes (sporing and non-sporing anaerobes). Characteristics of **Clostridia** (morphology, localization of spores, biological and biochemical properties). The most important clostridioses.

91.Clostridia of anaerobic wound infection (**gas gangrene**). Species. Ecology. Morphological and biological properties, factors of pathogenicity of *C.perfringens*. Clinical symptoms of gas gangrene. Epidemiology. Laboratory diagnostics and prevention.

92.Causative agent of **tetanus**. Morphology, factors of pathogenicity. Favorable factors for toxin formation. Mechanism of tetanospasmin action. Clinical forms and symptoms of tetanus, its epidemiology and diagnostics. Type of specific prevention of tetanus.

93.Causative agent of **botulism**. Morphology, factors of pathogenicity. Mechanism of botulotoxin action. Serotypes of *C.botulinum*. Clinical forms and symptoms of botulism, its epidemiology and diagnostics. Control and prevention of botulism.

94.***Clostridium difficile***. Morphological, biological properties and factors of pathogenicity. Clinical forms of *Clostridium difficile*-associated infections. Laboratory diagnostics. Prevention.

95.**Nonsporing obligate anaerobes** (NOA). Genera. Morphology. Ecology. Caused diseases. Laboratory diagnostics.

96.**Listeria.** Taxonomy. Species and caused diseases. Morphological, biological properties and factors of pathogenicity. Listeriosis: clinical forms, epidemiology. Laboratory diagnostics and prevention.

97.**Spirochetes.** Taxonomy. Species, subspecies and caused diseases. Morphology of genera. Ultrastructure of spirochetes. Detection of spirochetes (staining and cultivation).

98.**Treponema.** Taxonomy. Species and caused diseases. Morphological, biological properties and factors of pathogenicity. Cell wall components. Cultivation. Epidemic syphilis: clinical stages, epidemiology. Laboratory diagnostics at the different stages of disease. Screening and confirmatory serological tests for syphilis. Prevention.

99.**Borrelia.** Taxonomy. Species and caused diseases. Morphology and antigenic structure. Clinical symptoms and epidemiology of relapsing fevers (epidemic, endemic) and Lyme disease. Diagnostics. Prevention.

100. **Leptospira.** Taxonomy, morphology and factors of pathogenicity. Cultivation of leptospira. Leptospirosis: clinical forms, epidemiology and laboratory diagnostics. Prevention.

101. ***Helicobacter pylori*.** Species. Morphology. Biological and biochemical properties. Pathogenic factors. Caused diseases. Epidemiology. Prevention. Invasive and non-invasive methods of diagnostics.

102. **Chlamydia.** Taxonomy. Species, biotypes, serotypes and caused diseases. Morphology and cultivation of chlamydia. Pathogenic factors. Reproduction life cycle of chlamydia (stages).

103. Diseases caused by Chlamydia. Their clinical and epidemiological characteristics. Laboratory diagnostics of chlamydial infections. Prevention.

104. **Mycoplasma** and **Ureaplasma.** Taxonomy. Morphology and cultural features. Pathogenic factors. Caused diseases. Laboratory diagnostics.

105. **Rickettsia.** Taxonomy. Morphology. Methods of staining and cultivation. Pathogenic factors. Classification of Rickettsia (typhus group, spotted fever group and scrub typhus group). Epidemiological features of each group.

106. Causative agents of epidemic and endemic **typhus**. Clinical picture and epidemiology of typhus and Briil-Zinsser disease. Laboratory diagnostics of typhus and Brill-Zinsser disease. Prevention.

GENERAL MEDICAL VIROLOGY

107. Virus. The main properties of viruses. Structure and size of viruses. Simple and complex viruses. Classification of viral nucleic acids. Taxonomy. Modern classification of viruses (Baltimore classification).

108. Reproduction of viruses. Stages. Antiviral immunity (the most Important antiviral factors and their characteristics).

109. Classification of viral infections on the level of a cell and on the level of an organism. Epidemiology of viral infections.

110. Methods of laboratory diagnosis of viral infections. Virological method. Methods of cultivation. Stages of virological method. Indication and identification of the viruses in the cell cultures.

111. **Orthomyxoviruses.** Classification. Structure of influenza virus. Antigens. Antigenic drift and shift. Important types and subtypes. Epidemiology of influenza type A, B and C. Immunity. Laboratory diagnostics of influenza. Prevention.
112. **Paramyxoviruses.** Classification. Structure. Antigens. Types of cytopathic effect. Caused diseases. Epidemiology and clinical symptoms of the main diseases. Laboratory diagnostics of parainfluenza and RS-infection. Prevention.
113. Viruses of **mumps, measles, rubella**. Taxonomy. Morphology. Clinical symptoms and epidemiology of the diseases. Immunity. Specific prophylaxis. Laboratory diagnostics.
114. **Coronaviruses.** Classification. Morphology. Caused diseases. Laboratory diagnostics. Prevention.
115. **Picornaviruses.** Classification of the family. Structure of the picornavirus. Important diseases caused by picornaviruses. Epidemiology.
116. **Polioviruses**. Classification. Structure. Serotypes. Types of cytopathic effect. Clinical forms of poliomyelitis. Epidemiology. Immunity. Specific prevention (characteristics of vaccines). Laboratory diagnostics of poliomyelitis.
117. Enteroviral infections caused by **Coxsackieviruses A** and **B**, **Echoviruses**. Epidemiology. Laboratory diagnosis of enteroviral infections.
118. **Reoviruses.** Classification. Morphology. Caused diseases. Laboratory diagnostics. Prevention.
119. **Caliciviruses** and **Astroviruses.** Morphology. Characteristics. Caused diseases. Epidemiology. Laboratory diagnostics.
120. **Hepatitis viruses**. Enteral and parenteral hepatitis viruses. Mechanisms of transmission of infections. Taxonomy and the comparative characteristics of the causative agents of the viral hepatitis A, B, C, D, E.
121. **Hepatitis viruses A** and **E**. Structure. Pathogenesis and clinical forms of hepatitis A and E. Methods of laboratory diagnostics. Serological and molecular markers of viral hepatitis A and E. Prevention.
122. **Hepatitis virus B** (HBV). Taxonomy. Structure. Reproduction of HBV. The antigens of HBV and their characteristics. Pathogenesis of hepatitis B. Forms of HBV-infection on the level of cell and on the level of organism. Laboratory diagnostics of hepatitis B. Serological and molecular markers of hepatitis B. Prevention.
123. **Hepatitis C virus** (HCV) and **delta-virus** (HDV). Taxonomy. Structure. Clinical forms of hepatitis C. Epidemiology. Laboratory diagnostics. Prevention.
124. **Rhabdoviruses.** Rabies virus. Taxonomy. Structure. Types of cytopathic effect. Pathogenesis and stages of the rabies. Clinical symptoms. Laboratory diagnostics of rabies. Epidemiology. Specific and nonspecific prevention.
125. **Arboviruses** and **roboviruses**. The main families and genera of arboviruses. Clinical forms of arboviral and roboviral infections. Features of epidemiology. Specific and nonspecific prophylaxis of the infections.
126. **Viral hemorrhagic fevers** (VHFs). The characteristic of families and genera. Structure of viruses. Clinical characteristics of VHFs. Epidemiology. Yellow fever. Dengue fever and its clinical forms.

127. **Togaviruses.** Classification. Structure. Alphaviral infections. Epidemiology. Laboratory diagnostics. Prevention.
128. **Flavivruses.** Classification. Structure. Flaviviral infections. Epidemiology. Laboratory diagnostics. Prevention.
129. **Filoviruses.** Classification. Structure. Filoviral infections. Ebola fever and Marburg fever. Clinical forms and pathogenesis. Epidemiology. Laboratory diagnostics. Prevention.
130. **Bunyaviruses.** Classification. Structure. Bunyaviral infections. Epidemiology. Laboratory diagnostics. Prevention.
131. **Retroviruses.** Classification. Human immunodeficiency virus (HIV). Structure of HIV. HIV-genes and HIV-antigens. Reproduction of HIV. Clinical stages of HIV-infection. AIDS. Classification of the opportunistic infections. Epidemiology. Laboratory diagnostics of HIV-infection. Prevention.
132. **Slow infections**. Classification (groups A, B, C) and their characteristics. Causative agents of slow viral infections. Prion infections. Prions. PrP^{C} and PrP^{SC}. Pathogenesis of prion infections. Examples of prion diseases in humans and animals. Epidemiology. Laboratory diagnostics.
133. **DNA-viruses.** Families. **Papillomaviruses**. Structure. Oncogenic serotypes. Pathogenesis. HPV-infections (clinical forms and names). Epidemiology. Laboratory diagnostics. Prevention.
134. **Polyomaviruses:** structure and role in human pathology. **Parvoviruses**: structure and role in human pathology.
135. **Adenoviruses.** Taxonomy. Classification. Clinical forms of adenoviral infection. Oncogenic serotypes. Epidemiology. Laboratory diagnostics.
136. **Herpesviruses**. Classification. Structure. Characteristics of herpes infections. Pathogenesis. Important serotypes. Caused diseases. Epidemiology. Laboratory diagnostics of herpes infections. Prevention.
137. **Oncogenic viruses.** Classification. Mechanisms of viral oncogenesis.

MEDICAL MYCOLOGY

138. **Medically important fungi.** Characteristics. Types of growth. Classification of mycosis. Examples. Laboratory diagnosis.
139. **Causative agents of cutaneous and subcutaneous mycoses.** Morphology. Factors of pathogenicity. Laboratory diagnosis and prevention.
140. **Causative agents of endemic respiratory mycoses.** Morphology. Factors of pathogenicity. Laboratory diagnosis and prevention.
141. **Causative agents of opportunistic mycoses.** Morphology. Factors of pathogenicity. Laboratory diagnosis and prevention.

CLINICAL MICROBIOLOGY

142. **Opportunistic infections**. Conditions for development, risk factors, etiology and pathogenesis. Methods of laboratory diagnostics. Criteria for estimation of etiological importance of isolated from pathological material microorganisms.
143. Etiology and pathogenesis of **bacteremia, sepsis, bacterial shock**. Microbiological diagnostics of septic infections.

144. Etiology, pathogenesis and laboratory diagnostics of **pyoseptic infections of skin, subcutaneous tissues, internal organs**.
145. Clinical forms and etiology of **nonspecific infections of bronchi and lungs**. Methods of microbiological diagnostics.
146. Clinical forms and etiology of **opportunistic uroinfections**. Methods of microbiological diagnostics.
147. **Intrahospital (nosocomial) infections**. Etiological structure. Problematic intrahospital strains of bacteria. Principles of microbiological diagnostics of intrahospital infections. Prevention.

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Examination questions were approved at a meeting of the Department of Microbiology, Virology and Immunology (protocol No. 11 dated 11.11.2022).