

**Schedule and plan of lectures and laboratory classes in Microbiology, Virology, Immunology  
for students of the group 6139**

**(Medical Faculty for International Students specialty GENERAL MEDICINE)**

<b>Date</b>	<b>Time</b>	<b>Topic</b>	<b>Lecturer</b>	<b>Room</b>
09.12.2025	8.00–9.00	Lecture 1. Microbiology as a science. World of microbes	Gavrilova I.A.	607
	9.10–10.10	Lecture 2. Physiology of microorganisms. Genetics of microorganisms	Gavrilova I.A.	607
10.12.2025	8.00–13.25	<p>Topic 1. Morphology of microorganisms. Basic forms of bacteria. Bacterioscopic research method. Simple methods of staining</p> <p>Topic 2. Bacterioscopic research method. The structure of the bacterial cell. Complex methods of staining. Features of morphology and methods of studying spirochetes, rickettsia, chlamydia, mycoplasmas</p> <p>Topic 3. Genetics of microorganisms. Methods for studying the genetics of bacteria. Methods of molecular diagnostics</p> <p><b>Questions for self-study:</b></p> <p><i>Morphology of bacteria.</i> Forms and size of bacteria. Features of the chemical composition of bacteria compared to eukaryotic organisms. The structure of a bacterial cell. Nucleoid. Plasmids. Ribosomes. Inclusions. A cytoplasmic membrane, mesosomes. Periplasmic space. The cell wall of Gram-positive and Gram-negative bacteria. Capsule. Flagella. Pili. Sex-pili. Cell wall defective forms of microbes (protoplasts, spheroplasts, L-forms).</p> <p><i>Morphology of Actinomyces, Spirochetes, Rickettsia, Chlamydia, Mycoplasma.</i> Main forms, ultrastructure, distinctive features, methods of studying.</p> <p><i>Methods of bacteria morphology research.</i> The microscopic method, task, steps, advantages and disadvantages. Types of microscopic preparations. Technics of fixed and native smears preparation. Microscopy of preparations with a light microscope and its variants: bright field, dark field, phase contrast, luminescent. Technics of light microscopy. Studying microorganism's morphology in an electronic microscope. Tinctorial properties of microbes. Dyes. Simple and differential methods of fixed</p>	Adamovich T.G.	604

		<p>preparations staining. Technics of staining by Gram, Ziel-Nielsen, Ozheshko, Burri-Gins, Neisser, Romanovsky-Giemsa. Methods for alive microorganism's research.</p> <p>Preparation of fixed smears from agar and broth cultures of bacteria, staining with aqueous solutions of fuchsin, methylene blue and by Gram method; microscopy of preparations using an immersion system; detection and determination of the morphology of staphylococci, streptococci, enterobacteria, vibrio, bacilli in smears stained by Gram method.</p> <p><i>Heredity.</i> Value of microbiology in development of molecular genetics. The organization of the genetic apparatus in bacteria (nucleoid, plasmids, Is-sequences, transposons, integrones). Principles of bacterial genome functioning. Operone organization. A genotype and a phenotype. CRISPR/Cas9 - genome editing technology.</p> <p>Genomics of microorganisms. Proteomics of microorganisms.</p> <p><i>Variability of microbes.</i> Modifications in bacteria, value, the basic characteristics (not hereditary character, adaptability, high frequency of direct and reverse changes, inducing factors). Genotypic variability. Mutations and their classification. Mutagens. Phenotypic manifestations of mutations. Transposition. Dissociation in bacteria. System of genome damages reparation. Recombinational variability. Mechanisms of combined genome formation. Frequency of changes of separate attributes. Transformation, transduction, conjugation, transposition. The fate of mutants and recombinants. Selective influence of discriminative factors.</p> <p><i>Methods of the genetic analysis.</i> Practical value of knowledge about microbes' genetics. Principles of genetic mapping. Molecular hybridization, polymerase chain reaction (PCR), blotting, sequencing. The value of genetic methods in laboratory diagnosis of infectious diseases and epidemiological analysis.</p>		
	13.35–14.35	Lecture 3. Microbiological basics of chemotherapy and antiseptics of bacterial infections	Gavrilova I.A.	607
11.12.2025	8.00–13.25	<p>Topic 4-1. Cultural (bacteriological) research method. Methods for isolating pure cultures of bacteria</p> <p>Topic 6. Basics of the infection doctrine. Methods of human normal flora investigation</p> <p>Ecology of microorganisms.</p> <p><b>Questions for self-study:</b></p>	Gavrilova I.A.	604

*Bacteriological (cultural) research method.* Principles and methods of bacteria culturing. Nutrition requirements of microbes. Nutrient media for bacteria. Requirements to nutrient media. Classification of nutrient media. Conditions and technics of bacteria culturing. Regularities and character of bacterial growth on solid and liquid nutrient media. Dynamics (phases) of development of a bacterial population in a periodic culture.

Objectives, steps, advantages and disadvantages of a bacteriological method. Rules of sampling and transportation of investigated material. Technics of culture medium inoculation. Methods for isolation and identification of pure culture of aerobic and anaerobic bacteria. Automatic microbiological analyzers, principles of operation. Time-of-flight mass spectrometry (MALDI-TOFF MS) for bacteria identification.

Inoculation of a solid nutrient medium in Petri dish to get isolated colonies; determination of the colony morphotype; preparation of fixed preparations from an agar culture of bacteria with Gram staining; plating an isolated colony onto a slanted meat-peptone agar to accumulate a pure bacterial culture.

Features of Rickettsia, Chlamydia, Mycoplasma culturing.

Ecological microbiology emerging into an independent section (S.N. Vinogradsky, 1945). Value of microbes in formation, existence and development of the Earth's biosphere. The concept of a microbic dominant. Microbiological aspects of environment protection. Ecological niches of microbes. Soil microflora. Water microflora. Microflora of an open air and air of premises. Microflora of anthropogenic environments (objects, food, medicines, medical devices, etc.). Criteria for microbiological safety of the human environment. Sanitary-indicative microorganisms.

Ecological interactions of microbes (symbiosis, commensalism, neutralism, competition, parasitism, predatoriness). Influence of ecological factors on microbes.

Ecological factors influence on microorganisms. Effect of physical (temperature, drying, radiations, ultrasound, osmotic pressure) and chemical factors.

*Microflora of a human body.* Normal (resident) microflora. Autochthonous and allochthonous, parietal and luminal microflora. The concept of microbiota. Formation and development of normal microflora. Species and quantitative structure of normal microflora of distinct biotopes of a human body. The role of normal microflora: antiinfection, metabolic, immunobiological, antitoxic. Biofilms. Colonization resistance. Quorum sensing. The factors influencing structure of normal microflora.

Dysmicrobiocenosis (dysbacteriosis), the reasons, types, correction principles. Preparations for restoration of microflora. The role of normal microflora in infectious processes, conditions of manifestation. Methods for studying human microflora. Gnotobiology. Human microbiome, metagenomic approach to study.

Registration of PCR results (detection of amplification products, interpretation of results).

Concept of genetic engineering and use of the methods in microbiology and biotechnology. Creation and application of gene-engineered vaccines and cytokines.

*Infection (infection process) and invasion*: definition, general characteristics. Differences between infectious and non-infectious diseases. The history of ideas about the causes of infectious diseases. Miasmatic (Hippocrates) and contagious (Varron, Fracastoro, Pliny) hypothesis, monocausalism (R. Koch). Causes and conditions for the infectious process.

The role of microorganisms in the infectious process. The infectious dose. Ways of infection. Entrance gate. Pathogenicity. Virulence. Heterogeneity and variability in virulence in microbial populations. Genetic control of pathogenicity and virulence. Pathogenicity islands. Factors that increase and decrease the virulence of bacteria. Pathogenicity factors. Adhesins. Colonization factors. Invasins. Factors that suppress the immune system of the host. Exotoxins, endotoxins, enzyme-toxins, heat shock proteins, their properties. Types of bacterial exotoxins, targets and mechanisms of action. Methods for determination of pathogenicity factors. Intracellular pathogens. Pathogenic, opportunistic and nonpathogenic microbes.

The role of the macroorganism in the development of infectious diseases. Hereditary factors. Anatomical and physiological condition of the body, lifestyle. The role of living conditions in the development of infectious diseases, the influence of natural and social factors.

The evolution of infectious diseases, positive and negative changes in infectious pathology in the second half of the 20<sup>th</sup> and early 21<sup>st</sup> centuries. The concept of emerging infections and global epidemiological surveillance.

Classification of infectious processes: by severity (carrier state, asymptomatic infection, infectious disease); by nature of the pathogen (bacterial, viral, prion, fungal, protozoan); by source of infection (anthroponoses, zoonoses, sapronoses); by the

		mechanism of transmission and routes of infection (aerosol, fecal-oral, contact, transmissible, transplacental, exo-, endo-, autoinfection); by the prevalence and intensity of the epidemic process (ubiquitous, endemic, pandemic, epidemic, sporadic infections); by localization (local, systemic (respiratory, gastrointestinal, urogenital, skin, nervous system), generalized infection (bacteremia, toxemia, septicemia, septicopyemia, bacterial shock); by duration (acute, subacute, chronic, slow infection); by the multiplicity of infection (primary, secondary, mixed infection, superinfection, reinfection, relapse).		
	13.35–14.35	Lecture 4. Immunology. Immune system. Innate immunity	Adamovich T.G.	607
12.12.2025	8.00–9.25	<p>Topic 5. Cultural (bacteriological) research method. Methods for identification of pure cultures of bacteria</p> <p><b>Questions for self-study:</b></p> <p><i>Metabolism and energy exchange in microorganisms.</i> Features of a metabolism and energy exchange in microbes. Enzymes of microbes, classification. Types of bacterial secretory systems.</p> <p>Holozoic and holophytic nutrition.</p> <p><i>Nutrition in bacteria.</i> Nutrients - sources of carbon and nitrogen, oxygen, hydrogen. Autotrophs and chemoorganotrophs. Factors of growth and their sources. Sources of mineral elements. Extracellular digestion of polymers. Ways and mechanisms of nutrient transfer across the cell wall and cytoplasmic membrane of a bacterial cell.</p> <p><i>Respiration in bacteria.</i> Energy needs of bacteria. The respiratory apparatus of bacteria. Ways of energy production in autotrophs (photosynthesis, chemosynthesis). Sources and ways of energy production in chemoorganotrophs. Biological oxidation. Aerobic and anaerobic types of biological oxidation in bacteria. Aerobic, anaerobic, facultatively anaerobic and microaerophilic bacteria. Capnophiles.</p> <p><i>Growth and reproduction of microorganisms.</i> Ways of reproduction. Binary (simple, isomorphic) fission, mechanism. Schizogony. Budding. Sporulation. Growth and reproduction conditions, regulation mechanisms. Reproduction of bacterial populations. Periodic and continuous bacterial cultures. Features of reproduction of Rickettsia, Chlamydia, Mycoplasma. Resting forms of microorganisms, their properties and significance.</p>	Gavrilova I.A.	604

		<b>Biological (experimental) research method:</b> tasks, steps, advantages, disadvantages. Laboratory animals. Methods of infection. Application for isolation and identification of the causative agent, assessment of virulence, toxicity and toxigenicity of microbial cultures, immunogenicity, sterility, biosafety, pyrogenicity of drugs.		
	9.35–10.35	Lecture 5. Immune response. Antigens. Antigen presenting cells. T- and B-lymphocytes. Humoral and cellular immune response. Antibodies. Immunological tolerance	Chernoshey D.A.	607
15.12.2025	8.00–12.20	<p>Topic 4-2. Antimicrobial measures: methods of sterilization and disinfection, antiseptics, asepsis.</p> <p>Topic 7. Microbiological basics of chemotherapy and antiseptics of bacterial infections. <b>Questions for self-study:</b></p> <p><i>Antimicrobial measures.</i> Sterilization, disinfection, asepsis, definition of concepts. Purposes, methods, means and objects for sterilization and disinfection in medicine and microbiology. Sterilization and disinfection quality control. Sanitary and anti-epidemic regimen in healthcare organizations.</p> <p>Methods for determining the sensitivity of microbes to antibiotics. Biological research method.</p> <p>Chemotherapy and chemoprophylaxis: definition, place in the therapeutic and anti-epidemic measures. History of chemotherapy. Empirical period. Establishment of the doctrine of chemotherapy (D.L. Romanovsky, 1882; P. Erlih, 1906). Implementation of sulfonamides in the practice of therapy (G. Domagk, 1936), antibiotics (A. Fleming, 1926, X. Florey, E. Chain, 1940; Z.V. Ermoleva, 1942), nitrofurans (M. Dodt, W. Stillman, 1944). Modern directions in chemotherapy development: the search for natural compounds, chemical synthesis and modification, improvement of application schemes. Principles of rational chemotherapy, peculiarities in children and elderly.</p> <p>Antimicrobial agents: properties, requirements, etiotropic and organotropic features, chemotherapeutic index. The concept of selectivity and «targets» of antimicrobial drugs action, the effect and spectrum of action, mechanisms of action on microorganisms.</p> <p>Side effects of chemotherapy: dysbacteriosis, disease exacerbation (Jarisch–Herxheimer reaction), secondary infection, the negative organotropic effect (toxic, allergenic, teratogenic, mutagenic, carcinogenic).</p>	Gavrilova I.A.	604

		<p>The main groups of antimicrobial drugs: sulfonamides, azoles, quinolones, nitrofurans, fluoroquinolones, oxazolidinones and others.</p> <p>Antibiotics, definition. Natural producers of antibiotics. Synthetic and semi-synthetic antibiotics. The main groups of antibiotics: beta-lactam (penicillins, cephalosporins, carbapenems, monobactams), aminoglycosides, tetracyclines, macrolides and azalides, lincosamides, chloramphenicol, ansamycins (rifamycins), polymyxins, cyclopeptides, glycopeptides, lipopeptides, streptogramins, polyenes.</p> <p>Bacterial resistance to antimicrobial drugs. Natural resistance. Acquired resistance, its genetic and biochemical mechanisms. The role of plasmids and transposons in the emergence and spread of multidrug-resistant strains. Extreme and total resistance to antimicrobial drugs. The concept of international clones of microorganisms with a high epidemic risk.</p> <p>Indications and methods for determining the sensitivity (resistance) of bacteria to antibiotics. Technics of performance and evaluation of the disk-diffusion method. Epsilometric method (E-tests). Method of antibiotics serial dilutions in liquid and solid nutrient media. Sensitivity interpretation using thresholds for minimum inhibitory concentrations and inhibition zone diameters. Devices and test systems for automated determination of antibiotic sensitivity. Molecular genetic methods (PCR).</p> <p>Determination of sensitivity/resistance of bacterial culture to antibiotics using the disk diffusion method (performance, recording, interpretation of results).</p> <p>Antisepsis, definition, types (preventive, therapeutic). Categories of preventive antiseptics. Antiseptics (chemical, biological, physical, mechanical).</p> <p>Chemical antiseptics: requirements, origin, properties, groups, mechanisms of action on microorganisms.</p>		
	12.30 – 13.25	<b>Concluding test «General microbiology»</b>	Adamovich T.G.	607
	13.35– 14.35	Lecture 6. Allergy and ecological immunology	Adamovich T.G.	607
16.12.2025	8.00–9.00	Lecture 7. Immunoprophylaxis and immunotherapy of infectious diseases	Adamovich T.G.	607
	9.10–14.35	<p>Topic 9. Immune system. Innate immunity</p> <p>Topic 10. Antigens. Humoral immune response. Antibodies</p> <p><b>Questions for self-study:</b></p>	Adamovich T.G.	604

Immune system. Organs of the immune system (central and peripheral): structure, function, changes in ontogeny. Immunocompetent cells: types, morphology, CD-markers, identification methods. Major histocompatibility complex (MHC). Molecule I, II and III classes of MHC, structure, expression on cells and tissues. The biological significance of MHC molecules, role in recognition and elimination of antigens. Factors of intercellular interaction in the immune system (the selectins, integrins, immunoglobulin superfamily molecules).

Pattern recognition receptors. Toll-like receptors.

Cytokines: classification (interleukins, interferons, growth factors, chemokines), characteristics, structure, function, receptors.

Pro-inflammatory cytokines. Cytokines – regulators of hematopoiesis. Interferon system, classification, structure, function.

The protective function of the respiratory, digestive, endocrine and other systems of the human body.

Cooperative mode of an immune system functioning.

Innate immunity. Definition. Characteristics. Non-immune mechanisms of innate immunity: barrier and antimicrobial properties of the skin, mucous membranes, lymph nodes, tissue unresponsiveness, normal microflora. Protective function of the respiratory, digestive, endocrine and other systems of the human body. Immune factors: humoral and cellular factors of innate immunity. The complement system, structure, activation pathways (classical, alternative, lectin). Activators of the complement system. Inhibitors of the complement system. Complement receptors, expression on cells, function. Biologically active fragments of complement proteins and their functions. Anaphylatoxins. The membrane attack complex. Control mechanisms for complement system activation. Methods for the complement system activity assaying. Lysozyme. Acute-phase proteins. Natural antibodies.

Polymorphonuclear and mononuclear phagocytes (origin, characteristics, functions). Phagocytic reaction (phases, factors and mechanisms of intracellular killing). Phagocytosis outcomes. Persistence of bacteria in phagocytes. Phagocytosis indices and methods for evaluation. Principles of recognition and response in innate immunity system Toll-dependent signaling pathways of phagocytes activation. Activated macrophages (classical and alternative) and the regulation of their functions. Neutrophil extracellular traps.

		<p>Natural killer cells, the mechanism of damage to the target cells. <math>\gamma\delta</math>-T-lymphocytes.</p> <p>Immune response. Definition, the types of the immune response. Primary and secondary immune response. Immunological memory. Relationships and interactions between innate and acquired immunity.</p> <p>Antigens: structure, properties, classification. Adjuvants. Antigenic structure of bacteria: O, H, K, fimbrial, cytoplasmic, membrane, extracellular antigens (toxins and exoenzymes). Group, species, typhal antigens. Antigenic variation. Cross-reacting antigens. Antigenic mimicry. Antigens of viruses, fungi and protozoa. T-dependent and T-independent antigens. Superantigens: structure, function.</p> <p>Antigen-presenting cells (APC): the types and characteristics. APC interaction with antigen: antigen processing and presentation, APC activation.</p> <p>B-lymphocytes: development, markers. B-cell receptor: structure, constant and variable regions. Mechanisms of B-cell activation. The function of B-lymphocytes. Memory B-cells. Methods for assaying B-lymphocytes amount and functional activity.</p> <p>Humoral immune response: the dynamics of development, manifestation. Primary and secondary immune response, switching of immunoglobulin classes, affinity maturation.</p> <p>Antibodies. The structure of immunoglobulin molecules: variable and constant regions, the location and structure of the domains, the antigen and complement-binding regions. Classes and subclasses of immunoglobulins, isotypes, allotypes, idiotypes. Biological properties of the immunoglobulins. Biosynthesis, specificity, and genetic control of antibody diversity. Immunoglobulin genes. The mechanism of interaction of antibodies with antigens. Valence, affinity and avidity of antibodies. Cross-reactions. Complete and incomplete antibodies. Immune complexes. Utilization of immune complexes. Biological effects of the interaction of antibodies with antigens: activation of the complement, toxins and viruses neutralization, lysis, agglutination and opsonization of microorganisms, inhibition of adhesion, invasion. Transport of antibodies into tissues (fetus), regulation of the synthesis (quantity) of antibodies.</p>		
17.12.2025	8.00–13.25	<p>Topic 11. Cellular immune response. Allergy and ecological immunology Immunodiagnosics of infectious diseases.</p> <p>Topic 12. Immunodiagnosics of infectious diseases. Serological research method.</p>	Pavlov K.I.	604

Topic 13. Methods of clinical and infectious immunology. Solid phase immunological assay. **Questions for self-study:**

T-lymphocyte: development, markers. Subpopulations of T-lymphocytes (helper T cells: T-helper 1, 2 and other types, T-regulators, cytotoxic T-lymphocytes, memory T-lymphocytes). T-cell receptor: structure, types, genetic control, diversity. T-cell epitopes. T-cell restriction (MHC molecules, CD4/CD8). T-lymphocyte activation: a model of two signals, the role of the T-cell receptor, costimulatory interactions (CD28–CD80/86, CD40–CD40L, ICOS-ICOSL, PD-PDL, CD28/CTLA4), cytokines, hormones. Anergy, apoptosis. Methods for assaying the amount and functional activity of T- lymphocytes.

Cellular immune response: the dynamics of development, manifestation. T-dependent effector and regulatory mechanisms.

Immunological tolerance, central and peripheral. Conditions for the development and manifestation of immunological tolerance.

*Serological method of investigation:* tasks, steps, evaluation. Diagnosticum, diagnostic antisera, methods of preparation. Polyvalent, monospecific adsorbed (polyclonal) and monoclonal diagnostic serum and test systems. Monoclonal antibodies: methods of production, application. Hybridoma biotechnology.

Quantitative evaluation of serological reactions, antiserum titer, diagnostic titer, increase in antibody titer, affinity. Types of serological tests. Agglutination tests, indirect / passive hemagglutination, latex agglutination. Immunoprecipitation: variants of performance, methods of results accounting, evaluation, application. Immune lysis reactions. Toxin neutralization test.

Performance and recording the slide agglutination tests for identification of bacteria; recording the tube agglutination test and indirect (passive) hemagglutination for determination of antibody titer.

*Solid-phase immunoassay:* fluorescent antibodies test, immunoelectron microscopy (IEM), enzyme-linked immunosorbent assay (ELISA), immunochromatography assay (ICA) - the principles, variants of performance, results accounting, evaluation, application. Immunoblotting (Western blotting). Express tests.

Registration of results of the enzyme immunoassay (filling out research protocol, assessing the reliability of the experiment and interpreting the results).

		<i>Ecological immunology</i> : definition, objects of study. Immunotropic ecological factors (IEF), natural and anthropogenic. Mechanisms and conditions of the IEF effect on the human immune system. Bioaccumulation and biodegradation of IEF in the environment and in the body. Range and immune mechanisms of adaptation in ecosystems with extreme conditions (the Arctic, desert). Ecoimmunological monitoring in the areas of working and living of people burdened by environmental conditions.		
	13.35–14.35	Lecture 8. Basics of clinical immunology. Immune status. Immunodeficiencies	Chernoshey D.A	607
18.12.2025	8.00–10.15	<p>Topic 14. Immunoprophylaxis and immunotherapy of infectious diseases. Methods of vaccinal immunity evaluation</p> <p><b>Questions for self-study:</b></p> <p><i>Immunoprophylaxis</i>: definition. Active immunoprophylaxis. National immunization schedule and the list of preventive vaccinations for epidemiological indications. Vaccine, requirements: immunogenicity, safety, areactogenicity, stability, associability. Types of vaccines: inactivated, live, toxoids, chemical, subunit, genetically engineered. Adjuvants. The main vaccines against bacteria, viruses, and parasites. New approaches to the creation of vaccines (vector vaccines, DNA and mRNA vaccines, with MHC gene products, based on the principle of «reverse» vaccinology, etc.). Factors affecting the effectiveness of post-vaccination immunity: associated with the vaccine (dose, interval, competition of antigens, duration of antigenic stimulation (“depot” principle), booster effect) and with the state of the human body (age, hormonal status, nutritional status, etc.). Dynamics of development and methods for assessing post-vaccination immunity. Protective antibody titer.</p> <p>Passive immunoprophylaxis: definition, indications for use.</p> <p><i>Immunotherapy</i>: definition. Therapeutic and prophylactic immune sera and immunoglobulins: types and methods of production, activity determination.</p> <p>Complications of immunization and immunotherapy.</p> <p><i>Allergy</i>, definition. Allergens. Domestic, pollen, epidermal, food, chemical, pharmaceutical, microbial exoallergens. Routs for allergens entering the human body. Endoallergens. Stages of allergy development: sensitization, challenge, de- and hyposensitization. Role of T-helper cells type 1 and 2 and cytokines synthesized in the development of hypersensitivity. Types of allergic reactions. Immediate type</p>	Pavlov K.I.	604

		<p>hypersensitivity (ITH). ITH of mediator type (I). Anaphylactic shock, the mechanism of development. Atopy: the mechanism of development, clinical forms. Cytotoxic (II) and immunocomplex (III) types: anemia, Goodpasture's syndrome, serum sickness, infection immunocomplex allergy. Delayed Type Hypersensitivity (DTH, IV). Contact allergy. Infection allergy. Drug allergy. Exudative erythema multiforme. Lyell's syndrome. Food allergy. Idiosyncrasy. Methods of allergic diseases diagnostics. Specific immunotherapy. Prevention of allergic diseases at the workplace, at home, in health care.</p> <p>Molecular Allergology. Modern approaches to allergen classification, diagnosis and treatment of ITH type I.</p>		
10.25-14.35		<p>Topic 15. Basics of clinical immunology. Methods of determination and estimation of the immune status. Immunopathology. Transplant immunity. Anti-tumor immunity</p> <p><i>The immune status of an organism</i>, definition. Parameters, methods of determination and estimation of the immune status. Immunogram. Flow cytometry to assess immunocompetent cell subpopulations.</p> <p><i>Immunodeficiencies</i> (congenital and acquired): classification, mechanisms, clinical syndromes, principles of diagnosis and correction. Diagnosis/monitoring system for primary immunodeficiencies in the Republic of Belarus.</p> <p><i>Autoimmune diseases</i>: classification, mechanisms of damage to organs, cells and tissues, principles of diagnosis and treatment.</p> <p>Autoantigens. Autoantibodies.</p> <p><i>Transplant immunity</i>. Types of transplants. Transplant antigens. Conditions for development of transplant rejection and its mechanisms. Methods for diagnosing and suppressing the transplant reaction, complications. Graft-versus-host reaction.</p> <p><i>Antitumor immunity</i>. The concept of immune surveillance. Characteristics of tumor antigens. Mechanisms of anti-tumor immunity. Mechanisms of tumor escape from immune surveillance. Immunodiagnostics and immunotherapy of tumors. Tumor markers.</p> <p><i>The concept of immune correction</i>: indications, means, methods, monitoring the effectiveness of immune correction. Immunotropic drugs: groups, mechanisms of action, indications. The use of the immunotropic drugs in the treatment of transplant</p>	Chernoshey D.A.	607

		rejection, autoimmune and allergic diseases. Immunotherapy of malignant neoplasms. Immunotherapy with monoclonal antibodies.		
19.12.2025	8.00–9.00	<b>Concluding test «Theoretical and applied medical immunology»</b>	Gavrilova I.A.	607
	9.10–12.15	<p>Topic 17. Special medical microbiology. Methods for microbiological diagnostics of diseases caused by Staphylococci, Streptococci, Neisseria</p> <p><i>Staphylococci</i>: systematic position, general characteristics, main species, sensitivity to environmental factors, resistance to chemotherapeutic drugs and antiseptics. Pathogenicity factors of staphylococci: alpha-toxin, exfoliative toxin, toxic shock syndrome toxin, enzyme-toxins, enterotoxins. Staphylococcal infections (local, systemic, generalized). Staphylococcal food intoxication, pathogenesis, immunity and methods for microbiological diagnostics. Toxic shock syndrome. “Scalded skin” syndrome. Hospital ecovars of staphylococci: phage-, resistance- and genotyping. Methicillin and vancomycin resistant <i>Staphylococcus aureus</i> (MRSA, VRSA); <i>S.aureus</i> intermediate resistant to vancomycin (VISA). Drugs for etiologic therapy of staphylococcal infections, antiseptics.</p> <p>Preparation of fixed smears from agar culture of <i>S.aureus</i>, staining by Gram method; detection and determination of staphylococci morphology in smears stained by Gram method.</p> <p><i>Streptococci</i>: systematic position, general characteristics, classification by biological properties and antigenic structure. Pyogenic streptococci, properties, antigenic structure and serovars, sensitivity to environmental factors, pathogenicity factors (erythrogenic toxin, cross-reactive antigens, enzymes toxins, capsular substance, toxic shock syndrome toxin). Etiology, pathogenesis, immunity, diagnostics, prevention of acute and chronic streptococcal infections and poststreptococcal diseases (purulent-septic infections, streptoderma, chronic tonsillitis, scarlet fever, erysipelas, rheumatic fever, glomerulonephritis). Antibodies to toxins and enzymes of streptococci and their role in immunity and diagnostic value. <i>Streptococcus pneumoniae</i>, properties, differentiation by capsular antigen, pathogenicity factors. Pneumococcal infection, pathogenesis, immunity, microbiological diagnostics. Invasive strains of pneumococcus as the causative agents of childhood purulent meningitis. Preparations for specific prevention and chemotherapy of pneumococcal infections.</p>	Gavrilova I.A.	604

	<p>Preparation of fixed smears from a broth culture of streptococci, staining by Gram method; determination of the morphology of streptococci in smears stained by Gram method.</p> <p>The basics of <i>enterococci</i> and enterococcal infections.</p> <p>Neisseria. Systematic position, general characteristics. Pathogenic Neisseria. Gonococci: properties, differentiation by fimbrial antigens, sensitivity to environmental factors, pathogenicity factors. Prevalence, pathogenesis, immunity, diagnostics of gonorrhea and gonoblenorrhoea. Gonoblenorrhoea prevention in newborns.</p> <p>Detection and determination of morphology of gonococcus in a smear of pus.</p> <p>Meningococci: properties, differentiation by surface antigen, sensitivity to environmental factors, pathogenicity factors. Pathogenesis and clinical forms of meningococcal infections, immunity, microbiological diagnostics, carrier state. Preparations for specific prevention and chemotherapy of meningococcal infection.</p>		
12.25– 13.25	Lecture 9. Special medical microbiology. Gram-positive and gram-negative cocci: Staphylococci, Streptococci	Gavrilova I.A.	607
13.35– 14.35	Lecture 10. Aerobic and facultative anaerobic gram-negative rod-shaped bacteria: Enterobacteria, Vibrio, Campylobacter, Helicobacter	Gavrilova I.A.	607

Head of the Department



I.A.Gavrilova

