

**OSH STATE UNIVERSITY
INTERNATIONAL MEDICAL FACULTY
Department of Public Health**

APPROVED
Head of Department of Public Health,

_____ A.K. Turusbekova
_____ 2022

COURSE SYLLABUS

MICROBIOLOGY, VIROLOGY AND IMMUNOLOGY

Spring 2023

For students of international medical faculty

1st year II semester

4 credits (120 h., including 60 class hours, 60h. of independent study)

Lecturer:

3 semester, all groups

4 semester, all groups

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Practice:

2 semester, groups #

1,3,5,7,9,11,13,15,17,19,21,23-A

4 semester, groups #

1,3,5,7,9,11,13,15,17,19,21,23-A

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IMF 413

2 semester, groups #

2,4,6,8,10,12,14,16,18,20,22-B

4 semester, groups #

2,4,6,8,10,12,14,16,18,20,22-B

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BaM 11b

2 semester, groups #

1,3,5,7,9,11,13,15,17,19,21,23-B

4 semester, groups #

1,3,5,7,9,11,13,15,17,19,21,23-B

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BaM 11

2 semester, groups

#2,4,6,8,10,12,14,16,18,20,22-A

4 semesters, group #

2,4,6,8,10,12,14,16,18,20,22-A

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BaM 02

| | |
|--------------------------|---------------------------------------|
| Lecture Sessions: | according timetable |
| Location: | zoom\ whatsApp\ Google classroom |
| Class Sessions: | Monday - Saturday according timetable |
| Location: | IMF / BaM |

Pre-requisites:

Before this course it is recommended to complete the courses of Biology, Biochemistry and Physiology.

Course Policies and Procedures:

1. The Microbiology subjects highly interactive and student attendance, and participation is critical. The lecturer expects a respectful environment to discuss different positions. Teaching includes three independent sciences: bacteriology, virology and immunology, information volume on which progressively increases. Active participation is promoted taking care do not be dominant. Attendance will be taken for each class. Absenteeism, tardiness, and lack of participation will be reflected in the student's grade. Please notify the instructor in advance if you will not be attending a class.
2. Writing assignments must be presented in the following format, 12-font, and double-spaced. Projects and presentations must be completed or turned in on the assigned due date. **No** late assignments will be accepted. **If you know in advance** that you will have to miss a class in which an assignment is due, you may make arrangements with the instructors to turn the assignment in early.
3. *Academic Conduct.* Students at IMF are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. IMF is committed to upholding standards of academic behavior consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the IMF Student Conduct Code. We expect you to know and follow the faculty policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to IMF regulations.
4. Students must be ready for online classes, not distracted by conversations with family members, must wear uniform. Mobile phones must be charged, and internet connection has to be checked out. Any technical difficulties are expected as an absence on the classes.
5. *Students with disabilities (with special needs):* Qualified students with disabilities needing appropriate academic adjustments should contact the dean and the lecturer as soon as possible to ensure your needs are met in a timely manner. Students must inform the lecturer of the disability early in the class so appropriate accommodations can be met. Handouts are available in alternative accessible formats upon request.

Course schedule

Grading for each practical classes

| | | |
|---|------------------|------------------|
| 1 | Class activity | 15 points |
| 2 | Test | 5 points |
| 3 | Home assignments | 5 points |
| 4 | Album | 5 points |
| | Total | 30 points |

Grading for each lecture

| | | |
|---|---------------------------------|------------------|
| 1 | Attendance | 5 points |
| 2 | Activity in discussion of theme | 5 points |
| 3 | Test | 20 points |
| | Total | 30 points |

Grading for individual work of student

| | | |
|---|-------------------------------------|------------------|
| 1 | Read and write a notes on the topic | 20 point |
| 2 | Write a glossary on the topic | 5 point |
| 3 | Prepare poster | 5 point |
| | Total | 30 points |

Introduction.

Microbiology occupies a special place in the general system of physician training: it is a science that provides fundamental general biological knowledge and shapes medical thinking, and on the other hand, it is the basis for the study of other disciplines, especially infectious disease clinical features. The study includes three separate sciences: bacteriology, virology and immunology, which information that is progressively increasing.

At the same time, for the last years, besides extremely growing amount of new information, infectious pathology has evolved:

chronic infections and persistence frequency of infectious agents have grown in number, causing diseases by opportunistic pathogen microorganisms and antibiotic-resistant strains of microorganisms have become widespread.

The number of diseases caused by opportunistic microorganisms in surgical, therapeutic, obstetric, gynecological and other non-infectious departments of hospitals has increased and continues to grow.

As laboratory practice shows, microbiological diagnosis of infectious diseases in many cases is complex and difficult. The reason for this is a change in the properties and nature of infectious agents, which reveal resistance to many antibacterial and disinfectants, and their wide circulation among the population and circulation on environmental objects.

When microbiology, virology and immunology studied, the requirements claimed for students have significantly increased – nowadays it is necessary that the study to be goal oriented. There is a need to prepare specialists of new type, all-round scholars knowledgeable and skilled not only at microbiology but also at related areas as molecular biology, genetics, pharmacoepidemiology.

The study of the discipline is aimed to give students knowledge in the following positions
- Peculiarities of morphology, physiology and laboratory diagnostics of bacteria, viruses, fungi and protozoa

- Spread and role of microbes in the environment. Influence of environmental factors on microorganism
- Morphology, ultrastructure, classification and nature of viruses. Peculiarities of DNA and RNA replication of genomic viruses, their cultivation, antigens, obtaining and application of phages.
- Genetic features of bacteria and viruses, the role of plasmid mutations and recombinations in the evolution of bacteria. To have a concept of genetic engineering, practical application.
- Sources and methods of obtaining antibiotics, their classification by structure, spectrum and mechanism of action. About the reasons of drug resistance formation. Complications in antibiotic therapy, methods of determining the sensitivity of microbes to antibiotics.
- The concept of the infectious process, its classification. Pathogenicity and virulence, toxicity of microbes. About the role of opportunistic microflora in human pathology, about hospital-acquired infections.
- What is immunity, its types, mechanisms and factors; immunocompetent cells, their interaction in cellular and humoral immunity. Antigens, their properties, species. Antibodies, characteristics of different classes of immunoglobulins, mechanisms of interaction between antigens and antibodies.
- Immunodeficiencies, their classification. Immediate and delayed allergies, forms of manifestation, mechanisms of occurrence and prevention measures.
- Vaccines, their types, diagnostic and therapeutic agents. Principles of their production and use.
- Morphology, main physiological properties of pathogens: coccus, bacterial, droplet, intestinal, zoonotic, rickettsiosis, spirochetosis, viral, fungal, protozoic infections. To have an idea of pathogenesis, main clinical manifestations, methods of laboratory diagnostics, preventive measures and treatment principles.
- To teach students how to use the theoretical knowledge in the field of biology obtained earlier in clinical practice;
- To extend knowledge in the field of laboratory diagnostics of infectious diseases;
- To extend knowledge in the field of interaction between macroorganism and microorganism;
- To integrate modern microbiological knowledge into the clinical thinking of a prospective physician.
- As a result of the study of the discipline, microbiology, the student can use the knowledge and practical skills in medical and diagnostic work: in the diagnosis of infectious diseases, purulent-septic infections and other pathologies caused by microorganisms, prescription of treatment and development and implementation of preventive measures.

Course schedule

Lectures:

| # | Date | Lecture topics |
|---|------|---|
| 1 | | The subject and tasks of medical microbiology, virology and immunology. History of microbiology development, modern aspects Morphology and ultrastructure of bacteria, viruses, fungi, parasite |
| 2 | | Physiology of microorganisms (composition, nutrition, respiration, reproduction, growth, metabolism). Principles and methods of cultivation of bacteria and viruses. Microbial and Viral Genetics. Intracellular parasites |
| 3 | | The concept of infection and the infectious process |
| 4 | | An overview and components of immune system. Structure of immunoglobulins. |
| 5 | | Humoral and cellular immune response. |

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| 6 | Antigen antibody reactions. Serological reactions. Hypersensitivity. |
| 7 | Chemotherapy and chemoprophylaxis of infectious diseases. Mechanisms of formation of drug resistance of microbes. Antibiotics. Antibiotic resistance. Prevention. |
| 8 | The causative agents of purulent inflammatory processes: gram-positive cocci (staphylococci, streptococci). Gram-negative cocci: meningococci, gonococci. |
| 9 | Pathogens of diphtheria, pertussis, tuberculosis. |
| 10 | The causative agents of gas gangrene, tetanus, botulism. Pathogens of intestinal infections. Family enterobacteriaceae |
| 11 | Pathogens of plague, tularemia, anthrax, brucellosis. |
| 12 | Pathogens of typhus and Q fever. Treponema, Borrelia, Leptospira. |

Seminars and classes:

| Unit | Topics for 1st module | Hours |
|-------------|---|--------------|
| 1 | <p>Topic 1 Applied microbiology. Rules of working in the laboratory.</p> <p>Research methods in microbiology. Types of microscopes, principles of their work (light, luminescent, phase contrast, electron).</p> <p>Topic 2 The structure of the microbial cell. Capsule, methods for identifying. Intracellular structures, volutin grains, and their color. Mobility of bacteria, study of motility. Spore formation in bacteria, staining the spores.</p> <p>A simple staining method. Complex staining methods.</p> | 2 |
| 2 | <p>Topic 3 Physiology of microorganisms. Rules for the collection of biological material. Cultivation and isolation of pure cultures. Respiration of bacteria, types of breathing, classification. Cultivation methods for anaerobic and aerobic bacteria.</p> | 2 |
| 3 | <p>Topic 4. Infection. Infectious process. Factors of virulence and pathogenicity of microorganisms. Routes of transmission of microorganisms Clinical microbiology. Sterilization, methods, rules for working with sterilizing equipment.</p> <p>Topic 5 Ecology of microorganisms. Sanitary microbiology. The microflora of human body.</p> | 2 |
| 4 | <p>Topic 6 Types of immunity. Host specific and non-specific defense factors. Antibodies. Antigen. Humoral and cellular immune response.</p> <p>Topic 7 Immunological reactions. Serological methods for the diagnosis of immunological processes. Reactions of bacteriolysis, hemolysis, complement binding. Immunoassay reactions.</p> | 2 |

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| | Topic 8 Pathogenic immunology. Allergy. Allergy diagnostics. Anaphylaxis. Immunodeficiencies. | 2 |
| | Topics for 2nd Module | 16 |
| 5 | Topic 9 Pathogenesis of Bacterial infection. Identifying bacteria that cause disease. Microbiological diagnosis of diseases caused by staphylococci, streptococci | 2 |
| | Topic 10 Microbiological diagnostics of meningococcal infection and gonococcal infection. Non-gonorrhoeal urethritis (mycoplasma, chlamydia) | 2 |
| | Topic 11 Microbiological diagnostics of diphtheria, whooping cough and paratuberculosis. | 2 |
| | Topic 12 Microbiological diagnostics of acid-fast bacteria - tuberculosis, leprosy. | 2 |
| | Topic 13 Microbiological diagnostics of colienteritis, typhoid and paratyphoid fever | 2 |
| | Topic 14 Bacteriological diagnostics of typhoid-paratyphoid (salmonellosis, dysentery) and cholera | 2 |
| | Topic 15 Microbiological diagnostics of anaerobic infections - gas gangrene, tetanus, botulism | 2 |
| | Topic 16 Microbiological diagnostics of zoonotic infections - plague, tularemia, anthrax, brucellosis | 2 |
| | Topic 17 Microbiological diagnostics of pathogenic treponemas, spirochetes and leptospira (syphilis, relapsing fever and leptospira). Laboratory diagnostics of rickettsia. | 2 |

Themes IWS FOR 2 SEMESTERS

| Week | 1 module topics | Timing |
|-----------------------|--|--------|
| 1st | <p>1. Microbiology: definition, sections, research methods. The tasks of medical microbiology. The importance of microbiology in the work of a doctor.</p> <hr/> <p>2. The main stages in the development of microbiology. The contribution of scientists to the development of microbiology (Louis Pasteur, Robert Koch, Ilya Mechnikov, and others).</p> <hr/> | |

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| | <u>3. Structure and functions of the immune system.</u> | |
| | <u>4. Autoimmunity</u> | |
| | <u>5. Chemotherapy and chemoprophylaxis of infectious diseases.</u> <u>6. Mechanisms of the formation of drug resistance of microbes, prevention.</u> | |
| 2 nd | <u>7. Organization of the workplace, anti-epidemic regime, safety measures and personal protective equipment in the microbiological laboratory. Biological safety, its significance.</u> <u>Rules of conduct for emergencies in the laboratory.</u> | |
| | <u>8. Enzymes of bacteria, their classification. Enzymes of pathogenicity. Pigment formation of bacteria and its significance.</u> | |
| | <u>9. Protein metabolism - significance and methods of studying Carbohydrate metabolism, significance and methods of study.</u> | |
| | <u>10. Phagocytosis</u> <u>11. Genetics of Bacteria</u> | |

| Week | 2 module topics | Timing |
|-----------------|---|--------|
| 1 st | 1. Clinical and laboratory diagnostics of causative agents of purulent inflammation. 2. Clinical and laboratory diagnostics of intestinal infections. 3. Clinical and laboratory diagnostics of diseases caused by spore-forming rods. 4. Clinical and laboratory diagnostics of diseases caused by yeast-like fungi. 5. Causative agents of respiratory diseases. 6. Pathogens of the gastrointestinal tract. | |
| 2 nd | 7. Microbiological methods of diagnostics of causative agents of respiratory infections. 8. Microbiological methods of diagnostics of causative agents of gastrointestinal infections. 9. Causative agents of childhood infections and their diagnosis. 10. Pathogens of blood-borne infections and their diagnosis. | |

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| | 11. Protozoal human infections and their diagnosis. | |
| | 12. Causative agents of diseases of the genitourinary system. | |
| 3rd | 13. Causative agents of diseases of the cardiovascular system. | |
| | 14. Causative agents of diseases of the nervous system. | |
| | 15. Causative agents of diseases of the musculoskeletal system. | |
| | 16. Pathogens of the skin and soft tissues. | |
| | 17. Methods of laboratory diagnosis of diseases: microscopic, immunological, genetic. | |

Readings:

1. Textbook of Microbiology. Seven edition. By Ananthanarayan and Paniker`s/ Orient Longman Private Limited.- India, 2017
2. Medical Microbiology. 28th Ed. Jawetz, Melnick, & Adelberg`s.- LANGE medical book.- 2019

Practical lesson number 1

Topic 1: Applied microbiology.

PLAN:

1. Biological safety, its significance.
2. Principles of organizing a microbiological laboratory.
3. Rules for working in laboratory. Rules of conduct for emergencies in the laboratory.
4. Research methods in microbiology.
5. Types of microscopes, principles of their work (biological, luminescent, phase contrast, electronic).

Control questions

1. What are the goals and objectives of the performs medical microbiology?
2. The relationship of microbiology and other disciplines.
3. Biological safety, its significance.
4. List the facilities in the bacteriological laboratory.
5. What rules of work and behavior in the laboratory should be observed?
6. List and describe the items for bacteriological work.
7. Washing and processing of laboratory glassware.
8. Rules of conduct for emergencies in the laboratory.
9. Research methods in microbiology.
10. Types of microscopes, principles of their work (biological, luminescent, phase contrast, electronic).

Practical lesson number 2

Topic 2 The structure of the microbial cell.

PLAN:

1. Capsule, methods for identifying.

2. Intracellular structures, volutin grains, and their color.
3. Mobility of bacteria, study of motility
4. A simple staining method. Complex staining methods.
5. Gram staining. Zeehl-Nilson staining.
6. Spore formation in bacteria, staining the spores.

Control questions

1. The structure of the microbial cell. Morphology of bacteria, size of bacteria
2. What are the differences between prokaryotic and eukaryotic cells? (cell wall, cytoplasmic membrane, cytoplasm, ribosomes, mesosomes, intracytoplasmic inclusions, nucleus, slime layer and capsule, flagella, plasmids etc.)
3. Preparation for microscopy of living microorganisms.
4. The crushed drop. Hanging drop.
5. Drying and fixing the smear.
6. Dyeing techniques the smear.
7. A simple staining method.
8. Negative staining.
9. Silver impregnation
10. Differential staining methods (Gram staining, Staining of acid-proof bacteria.)
11. Intracellular structures, Staining of cytoplasmic inclusions.
12. Capsules and its staining methods
13. Spore formation, and its staining methods
14. Mobility of bacteria, study of motility

Practical lesson number 3

Topic 3: Physiology of microorganisms.

PLAN:

1. Types of bacteria nutrition, classification.
2. Nutrient media (classification, method of preparation of media, reproduction of microbes.)
3. Isolation of pure culture
4. Aerobic and Anaerobic conditions

Control questions:

1. What is the mechanism of bacterial Nutrition?
2. Multiplication of bacteria. Generation time.
3. Growth curve of bacteria
4. Bacterial counts
5. Factors that affect growth of the bacteria
6. Bacteriocins. Bacteriophages.
7. Explain process of catabolism and anabolism.
8. Composition of basic media
9. Solid and liquid culture
10. Selective media
11. Differential media
12. Enrichment media
13. Transport media

Practical lesson number 4

Topic 4: Infection. Infectious process. Factors of virulence and pathogenicity of microorganisms. Routes of transmission of microorganisms. Clinical microbiology. Hospital-acquired infection. Infection control.

Control questions:

1. Definitions important terms such as saprophytes, parasite, commensals, pathogen, pathogenicity, virulence, infections.
 2. Infection, factors of the infectious process. Types of infections: focal, generalized, primary, secondary, reinfection, relapse, acute, chronic, carriage, persistence, sepsis, septicopyemia, bacteremia, pyemia.
 3. Types of carriers and their definitions.
 4. Modes of transmission and their examples.
- Factors of virulence and pathogenicity of microorganisms.
5. Differences between exotoxins and endotoxins.
 6. Hospital-acquired infection.
 7. Infection control.
 8. Difference between sterilization and disinfection.
 9. List of physical methods and chemical methods of sterilization.
 10. Principle, temperature and time period, uses of hot air oven, autoclave.
 11. Uses of filtration and types of filters.
 12. Types of radiations and their uses.
 13. Uses of formaldehyde and glutaraldehyde as disinfectants.
 14. Sterilization by flowing steam. Tyndalization.

Practical lesson number 5

Topic 5: Ecology of microorganisms. The microflora of soil, water and air. The microflora of human body.

Control questions:

1. The dissemination of the microorganisms in the nature and role of them in the dynamic balance of the biosphere.
2. The micro flora of the soil.
3. The micro flora of water.
4. The micro flora air.
5. The role of microorganisms in the circulation of substances in nature.
6. The cycling of nitrogen and Microbes, participating in it.
7. Carbon cycles.
8. The participation of microorganisms in the whirlwind of sulfur, phosphorus and iron.
9. Microflora of Healthy people, their microbiology and its value

Practical lesson number №6

Topic 6: Types of immunity. Host specific and non-specific defense factors. Phagocytosis. Antibodies. Humoral and cellular immune response.

Control questions:

- 1.Types of Innate immunity.
- 2.Factors influencing Innate immunity.
3. Mechanisms of Innate immunity.
4. Acquired Immunity.
- 5.Active immunity and Passive immunity.
- 6.Combined Immunization. Adoptive Immunity. Local Immunity. Herd Immunity.
- 7.Definition of antibody and structure of immunoglobulin.
- 8.Properties of immunoglobulin classes Ig G, Ig A, Ig M, Ig D, Ig E.
9. Humoral and cellular immune response.
10. Antigen and antibody reaction.
- 11.Types of Antigen-Antibody reactions.

Practical lesson number №7

Topic 7: Antigens. Immunological reactions. Serological methods for the diagnosis of immunological processes. Reactions of bacteriolysis, hemolysis, complement binding. Immunoassay reactions.

Control questions:

1. Differences between precipitation and agglutination.
2. Mechanism and applications of precipitation reaction.
3. Types of precipitation reaction.
4. Types of agglutination reaction and their uses.
5. Principle of complement fixation test.
6. Principle and uses of immunofluorescence test and enzyme linked immunosorbent assay (ELISA).

Practical lesson number №8

Topic 8: Pathogenic immunology. Allergy. Allergy diagnostics. Anaphylaxis. Immunodeficiencies.

Control questions :

- 1.Classification of Hypersensitivity.
- 2.Type 1(Anaphylactic) Reaction.
- 3.Type 2 (Cytotoxic)Reaction.
- 4.Type 3(Immune Complex) Reaction.
- 5.Type 4 (Delayed or Cell Mediated) Reaction.
- 6.Type 5 (Stimulatory Type) Reaction.
- 7.Primary Immunodeficiency.
- 8.Secondary Immunodeficiency.

Practical lesson № 9

Topic 9: Pathogenesis of Bacterial infection. Identifying bacteria that cause disease. Microbiological diagnosis of diseases caused by staphylococci, streptococci

Control questions:

1. Koch's Postulates, Molecular Koch's Postulates, Molecular Guidelines for establishing Microbial Disease Causation
2. Genomics and bacterial pathogenicity
3. Regulation of bacterial virulence factors
4. Bacterial virulence factors
5. Staphylococcus. Morphology and culture characteristics of Staph. aureus.
6. Toxins and enzymes of Staph. aureus.
7. Diseases caused by Staph. aureus.
8. Laboratory diagnosis of infection caused by Staph. aureus.
9. Differences between Staph. aureus., Staph. Epidermidis and Staph. Saprophyticus.
10. Streptococcus. Classification of streptococci.
11. Morphology and culture characteristics of Streptococcus pyogenes.
12. Toxins and enzymes of Streptococcus pyogenes.
13. Diseases caused by Streptococcus pyogenes.
14. Laboratory diagnosis of infection caused by Streptococcus pyogenes.
15. Pneumococcus. Morphology, culture characteristics, biochemical reactions and antigenic structure of streptococcus pneumonia

Practical lesson №11

Topic 11: Microbiological diagnostics of meningococcal infection and gonococcal infection. Non-gonorrheal urethritis (mycoplasma, chlamydia)

Control questions:

1. Gram-negative cocci. Gonococci, meningococci
2. Classification, morphology, biochemical reaction, pathogenicity factors, resistance, features of the epidemiology of gonococci and meningococci.
3. General characteristics of pathogenic mycoplasmas. Classification, morphology, biochemical reaction, pathogenicity factors, resistance.
4. Respiratory mycoplasmosis.
5. Mycoplasmas are the causative agents of urogenital diseases.
6. Mycoplasmas are pathogens of arthritis.
7. Microbiology Chlamydia and chlamydiosis
8. Laboratory diagnosis of chlamydia

Practical lesson № 12

Topic 12: Microbiological diagnostics of diphtheria, whooping cough and paraptussis.

Control questions:

1. Microbiology of diphtheria: morphology, cultivation, enzymatic properties, biovars C. diphtheria.
2. Differential signs of gravis, mitis, intermedius.

3. Antigenic structure, phage typing, resistance
4. pathogens of diphtheria.
5. Factors of pathogenicity, epidemiology, features of pathogenesis and clinics, post-infection immunity of diphtheria pathogens.
6. Laboratory diagnostics, treatment, specific prevention of diphtheria pathogens.
7. Microbiology of pertussis and paracoccus: morphology, cultivation, enzymatic properties of B. pertussis, B. parapertussis.
8. Epidemiology, pathogenesis and clinic, immunity, laboratory diagnostics, treatment, specific prophylaxis and treatment of causative agents of pertussis and paracoccus

Practical lesson № 13

Topic 13: Microbiological diagnostics of acid-fast bacteria - tuberculosis, leprosy.

Control questions:

1. Microbiology of tuberculosis, classification of mycobacteria.
2. Antigenic structure, pathogenicity for laboratory animals, epidemiology, features of pathogenesis, features of immunity M. tuberculosis.
3. Tuberculin test and its significance, laboratory diagnostics, treatment, prevention of tuberculosis.
4. Microbiology of leprosy. Factors of pathogenicity M. leprae. Resistance, epidemiology, pathogenesis and leprosy clinic.
5. Tuberculoid form of leprosy.
6. Lepromatous form of leprosy, immunity, laboratory diagnostics, treatment, prevention of leprosy.

Practical lesson № 14

Topic 14: Microbiological diagnostics of colienteritis, typhoid and paratyphoid fever

Control questions:

1. General characteristics of the family Enterobacteriaceae.
2. Microbiology of Escherichiosis
3. Microbiology of typhoid fever
4. Microbiology of food toxic infections.
5. Microbiology of salmonellosis.

Practical lesson № 15

Topic 15: Bacteriological diagnostics of dysentery and cholera

Control questions:

1. Microbiology of Shigella.
2. Morphology, Culture, resistance, Antigenic structure, Classification, Toxins, Pathogenesis, Lab. diagnosis.
3. Subgroups of Shigella.
4. Microbiology of Vibrio Cholerae.
5. Morphology, Culture, resistance, Antigenic structure, Classification, Toxins, Pathogenesis, Lab. diagnosis.
6. Serotypes of V. Cholerae.
7. Differences between classical and El Tor vibrios.

Practical lesson № 16

Topic 16: Microbiological diagnostics of anaerobic infections - gas gangrene, tetanus, botulism

Control questions:

1. Pathogenic anaerobes. General characteristics.
2. Clostridia. Key signs of the genus Clostridium.
3. Microbiology of gas gangrene, the main properties of causative agents of gas gangrene.
4. Clostridium perfringens: morphology, cultivation, antigenic structure, toxin formation.
5. Clostridium novyi: morphology, cultivation, antigenic structure, toxin formation.
6. Clostridium septicum:: morphology, cultivation, antigenic structure, toxin formation.
7. Clostridium histolyticum:: morphology, cultivation, antigenic structure, toxin formation.
8. Clostridiumsoedellii:: morphology, cultivation, antigenic structure, toxin formation.
9. Features of pathogenesis, postinfection and postvaccinal immunity, laboratory diagnostics, treatment and prevention, specific prevention of gas gangrene.
10. Microbiology of tetanus: morphology, cultivation, antigenic structure, pathogenicity factors, tetanus resistance.
11. Peculiarities of epidemiology, pathogenesis and clinic, post-infection immunity, laboratory diagnostics, treatment, specific tetanus prophylaxis.
12. Microbiology of botulism: morphology, cultivation, antigenic structure, toxin formation.

Practical lesson № 17

Topic 17: Pathogens of zoonanthropous infections. Microbiology of plague, brucellosis, tularemia, anthrax.

Control questions:

1. Pathogens of especially dangerous infections, general characteristic.
2. Microbiology of plague, morphology, cultivation, resistance, antigenic composition, factors of plague pathogenicity.
3. Epidemiology, pathogenesis and clinic, post-infection immunity, laboratory diagnosis, treatment, prevention of plague.
4. Microbiology of brucellosis, morphology, cultivation, resistance, factors of pathogenicity of brucellosis.
5. Features of epidemiology, pathogenesis and clinic, post-infection immunity, laboratory diagnosis, specific prevention of brucellosis.
6. Microbiology of tularemia, morphology, cultivation, resistance, epidemiology of tularemia.
7. Features of pathogenesis and clinic, post-infection immunity, laboratory diagnosis, specific prevention of tularemia.
8. Microbiology of anthrax, morphology, cultivation, antigenic structure, pathogenicity factors of anthrax.
9. Features of epidemiology, postinfection immunity, laboratory diagnosis, treatment, specific prevention of anthrax.

Practical lesson № 18

Topic 21: Microbiological diagnostics of pathogenic treponemas, spirochetes and leptospira (syphilis, relapsing fever and leptospira). Laboratory diagnostics of rickettsia.

Control questions:

1. General characteristics of rickettsia and rickettsiosis.
2. General characteristics of treponemas, spirochetes and Leptospira.
3. Disease caused by different spirochetes.
4. List of pathogenic treponemas.
5. Morphology of T.pallidum.
6. Disease caused by Treponema pallidum and their lab.diagnosis.
7. Serological diagnosis of syphilis.
8. Yaws, Pinta
9. Borrelia recurrentis
10. Borrelia vincentii
11. Lyme borreliosis
12. Leptospirosis.