Exam Topics/Subtopics in Medical Microbiology

Faculties of Medicine

(Medical Microbiology 1: General Microbiology, Bacteriology

Medical Microbiology 2: Medical Virology, Mycology, Protozoology)

General Microbiology

1. The Science of Microbiology. Classification of microorganisms.

1.1. Microbes That Cause Infectious Diseases.

1.2. Important Features of Microbes.

1.3. Eukaryotes and Prokaryotes. Bacteria Compared with Other Microorganisms.

2. **Structure of Bacterial Cells**

2.1. Structure of Bacteria.

2.1.1. Essential components (cell wall, peptidoglycan, outer membrane of gram-negative bacteria, surface fibers of gram-positive bacteria, plasma membrane, ribosome, nucleoid, mesosome, periplasm).

2.1.2. Nonessential components (capsule, pilus or fimbria, flagellum, spore, plasmid granule, glycocalyx).

2.2. Shape and Size of Bacteria - cocci (spheres), bacilli (rods), and spirochetes (spirals). Pleomorphic bacteria.

3. Microbial Metabolism.

3.1. Role of Metabolism in Biosynthesis and Growth**.** Focal Metabolites and Their Interconversion. Assimilatory Pathways. Biosynthetic Pathways.

3.2. Patterns of Microbial Energy-Yielding Metabolism. Regulation of Metabolic Pathways.

4. Growth of Bacteria

4.1. Growth Cycle. Growth curve of bacteria: lag phase; log phase; stationary phase; death phase.

4.2. Obligate Intracellular Growth

4.3. Aerobic and Anaerobic Growth. Enzymes - superoxide dismutase and catalase.

4.4. Fermentation of Sugars - as the basis of the laboratory identification of some important pathogens. Beta-galactosidase in E. Coli. Krebs cycle

4.5. Iron Metabolism. iron-binding compounds - siderophores.

5. Cultivation of Microorganisms.

5.1. Requirements for Growth (anhydride bonds between building blocks, proton motive force).

5.2. Sources of Metabolic Energy (Fermentation, respiration, and photosynthesis).

5.3. Nutrition (carbon source, nitrogen source, sulfur source, phosphorus source, growth factors).

5.3. Environmental Factors Affecting Growth (nutrients, hydrogen Ion Concentration (pH), yemperature, aeration, ionic Strength and Osmotic Pressure).

5.4. Cultivation Methods. Medium. Growing Cells of a Given Species. Microbiologic Examination of Natural Materials. Isolation of a Particular Type of Microorganism. Isolation of Microorganisms in Pure Culture. Dilution.

6. Laboratory Diagnosis. Approach to Laboratory Diagnosis. Sterilization and Disinfection

6.1. Laboratory Diagnosis. Approach to Laboratory Diagnosis.

6.1.1. Bacteriologic Methods (Blood Cultures. Throat Cultures. Sputum Cultures. Spinal Fluid Cultures. Stool Cultures. Urine Cultures. Genital Tract Cultures. Wound and Abscess Cultures).

6.1.2. Immunologic Methods **(**Identification of an Organism with Known Antiserum**.** Identification of Serum Antibodies with Known Antigens)..

6.2. Sterilization and Disinfection.

6.2.1. Modification of Proteins

6.2.2. Modification of Nucleic Acids.

6.2.3. Physical agents. Heat. Radiation. Filtration

6.2.4. Disruption of Cell Membranes

7. Genetics.

7.1. Mutations. missense mutation; nonsense mutation. frameshift mutation. Integration of transposons or insertion sequences into the DNA. Mutations caused by chemicals, radiation, or viruses. Conditional lethal mutations.

7.2.Transfer of DNA within bacterial cells. Programmed rearrangements.

7.3. Transfer of DNA between bacterial cells

7.3.1. Conjugation. F (fertility) plasmid (F factor). Sex pilus (conjugation tube). Hfr (high-frequency recombination) . Resistance plasmids (R plasmids).

7.3.2. Transduction. Role of bacteriophages. Lysogenic conversion. Two types of transduction: generalized and specialized.

7.3.3. Transformation. Transfection.

7.3.4. Recombination. Homologous recombination. Nonhomologous recombination,

8. General Properties of Viruses.

8.1. Classification of Viruses. Structure and Replication of Viruses.

8.2. Pathogenesis. Laboratory Diagnosis. Antiviral Drugs. Viral Vaccines

9. **Human Microbiome. Normal Flora.**

9.1. Permanent residents. Commensals. Carrier state. Colonization. Colonization resistance.

9.2. Normal Flora of the Skin. Normal Flora of the Respiratory Tract.

9.3. Normal Flora of the Intestinal Tract. Normal Flora of the Genitourinary Tract

10. Pathogenesis of Bacterial Infection.

10.1**.** Principles of Pathogenesis. Opportunistic pathogens. Virulence. Infectious dose. Obligate intracellular parasites.

10.2. Types of Bacterial Infections (communicable, contagious, epidemic, pandemic, subclinical, latent, chronic state).

10.4. Stages of Bacterial Pathogenesis

10.5. Determinants of Bacterial Pathogenesis.

10.5.1. Transmission. Fomites. Human to human transmission (direct contact, no direct contact, transplacental, Bloodborne). Nonhuman to human transmission (soil source, water source, animal source, via insect vector, via animal excreta). vertical transmission. Horizontal transmission. Infection source (reservoir) and vector.

10.5.2. Adherence to Cell Surfaces. Specialized structures (pili), production of substances (e.g., capsules or glycocalyces). Quorum sensing. Curli.

10.5.3. Invasion, Inflammation, & Intracellular Survival. Opsonization. Two types of inflammation: pyogenic and granulomatous. Pathogenisity islands. Pseudomembranes.

10.5.4. Toxin Production.Comparison of exotoxins and endotoxins. A–B subunit structure of exotoxins. Important bacterial toxins and their mode of action. Bacterial Secretion systems. Mode of action of endotoxin. Effects of Endotoxin.

10.5.5. Immunopathogenesis

10.6. Bacterial Infections Associated with Cancer

10.7. Different Strains of the Same Bacteria Can Produce Different Diseases

10.8. Typical Stages of an Infectious Disease. The incubation period. The prodrome period.The specific-disease period. The recovery period.

11. Host Defenses. Bacterial Vaccines. Antigen-antibody reactions.

11.1. Principles of Host Defenses

11. 2. Innate (nonspecific) immunity. Skin and Mucous Membranes. Inflammatory Response & Phagocytosis.Fever.

11.3. Adaptive (Specific) Immunity

11.4. Failure of Host Defenses Predisposes to Infections

11.5. Bacterial Vaccines. Active Immunity. Passive Immunity

11.6. Antigen-antibody reactions in the laboratory.

11.6.1. Agglutination Precipitation (Precipitin)

11.6.2. Radioimmunoassay (RIA)

11.6.3. Enzyme-Linked Immunosorbent Assay (ELISA)

11.6.4. Immunofluorescence (Fluorescent Antibody)

11.6.5. Complement Fixation

11.6.7. Neutralization Tests

11.6.8. Immune Complexes

11.6.9. Hemagglutination Tests

11.6.10. Antiglobulin (Coombs) Test

11.6.11. Western Blot (Immunoblot)

11.6.12. Fluorescence-Activated Cell Sorting (Flow Cytometry)

11.7. Antigen–Antibody Reactions Involving Red Blood Cell Antigens

11.7.1. The ABO Blood Groups and Transfusion Reactions

11.7.2. Rh Blood Type and Hemolytic Disease of the Newborn

12. **Antimicrobial Drugs: Mechanism of Action.**

12.1. Inhibition of Cell Wall Synthesis. Antibacterial activity inhibition of cross-linking (transpeptidation) of peptidoglycan. Inhibition of other steps in peptidoglycan synthesis. Antifungal activity inhibition of β-glucan synthesis

12.2. Inhibition of Protein Synthesis. Action on 50S ribosomal subunit. Action on 30S ribosomal subunit.

12.3. Inhibition of Nucleic Acid Synthesis. Inhibition of nucleotide synthesis. Inhibition of DNA synthesis. Inhibition of mRNA synthesis.

12.4. Alteration of Cell Membrane Function. Antibacterial activity. Antifungal activity.

12.5. Additional Drug Mechanisms. Antibacterial activity. Antifungal activity.

12.6. Chemoprophylaxis. Probiotics

13. **Antimicrobial Drugs: Resistance.**

13.1. Genetic Basis of Resistance

13.1.1.. Chromosome-Mediated Resistance

13.1.2. Plasmid-Mediated Resistance

13.1.3. Transposon-Mediated Resistance

13.2. Specific Mechanisms of Resistance

13.3. Nongenetic Basis of Resistance

13.4. Selection of Resistant Bacteria by Overuse & Misuse of Antibiotics

13.5. Antibiotic Sensitivity Testing. Antibiogram**.** Minimal Inhibitory Concentration**.** Minimal Bactericidal Concentration**.** Serum Bactericidal Activity**.** beta-Lactamase Production

13.6. Use of Antibiotic Combinations

Bacteriology

1. **Gram-Positive Cocci - *Staphylococci. Streptococci.***

*1.1. Staphylococcus aureus***.** *Staphylococcus epidermidis. Staphylococcus saprophyticus* -

Morphology and Identification. Antigenic Structure. Enzymes and Toxins. Pathogenesis. Regulation of Virulence Determinants. Clinical Findings. Diagnostic Laboratory Tests. Treatment

1.2. Classification of Streptococci. *Streptococcus pyogenes*. *Streptococcusagalactiae*. Groups C and G. Group D Streptococci. Viridans Streptococci. Peptostreptococcus and Related Genera *Streptococcus pneumoniae*. Enterococci

2. Gram-Negative Cocci – *Neisseria meningitides. Neisseria gonorrhoeae*

2.1.Important Properties.

2.2. Pathogenesis & Epidemiology.

2.3. Clinical Findings. Laboratory Diagnosis.

2.4.Treatment. Prevention

3. Gram-Positive Rods

3.1. Spore-forming gram-positive rods.

3.1.1. Bacillus antracis, Bacillus cereus (important properties, pathogenesis, antigens, clinical findings, laboratory diagnosis, coliforms and public health, treatment, prevention)

3.1.2. Clostridium tetani, Clostridium perfringens, Clostridium botulinum (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

3.2. Aerobic Non–Spore-Forming Gram-Positive Bacilli

3.2.1. Corynebacterium diphtheriae (important properties, pathogenesis, antigens, clinical findings, laboratory diagnosis, coliforms and public health, treatment, prevention). Other Coryneform Bacteria

3.2.2. Listeria monocytogenes (important properties, pathogenesis, antigens, clinical findings, laboratory diagnosis, coliforms and public health, treatment, prevention)

3.2.3. Complex Aerobic Actinomycetes. Actinomycetoma. Nocardiosis

4. Enterobacteriaceae

4.1. Escherichia (important properties, pathogenesis, antigens, clinical findings, laboratory diagnosis, coliforms and public health, treatment, prevention)

4.2. Salmonella (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

4.3. Shigella (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

4.4. Klebsiella–Enterobacter–Serratia Group (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

4.5. Proteus–Providencia–Morganella Group (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

5.Pseudomonads and *Acinetobacter*

5.1.Pseudomonas aeruginosa (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

5.2.Burkholderia pseudomallei (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

5.3. Acinetobacter (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6. Haemophilus, Bordetella, Brucella*, and *Francisella

6.1. Haemophilus

6.1.1. *Haemophilus influenza* (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6.1.2. Haemophilus aegyptius (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6.1.3. Haemophilus ducreyi (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6.2. The Bordetellae

6.2.1. Bordetella pertussis (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6.2.3. Bordetella parapertussis (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6.2.4. Bordetella bronchiseptica (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6.3. The Brucellae (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

6.3.1. Brucella suis

6.3.2. Brucella melitensis

6.3.3. Brucellae abortus

6.4. Francisella tularensis and Tularemia (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

7. Yersinia* and *Pasteurella

7.1. Yersinia pestis and Plague (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

7.2.Yersinia enterocolitica (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

7.3. Pasteurella multocida (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

8. Infections Caused by Anaerobic Bacteria

8.1. Physiology and Growth Conditions for Anaerobes

8.2. Anaerobic Bacteria Found in Human Infections. Bacteria That Cause Vaginosis - *Gardnerella vaginalis*

8.3. Pathogenesis of Anaerobic Infections. The Polymicrobial Nature of Anaerobic Infections

8.4. Diagnosis of Anaerobic Infections. Treatment of Anaerobic Infections

***9. Legionella, Bartonella,* and Unusual Bacterial Pathogens**

9.1. Legionella pneumophila and Other Legionellae (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

9.2. Bartonella henselae - cat-scratch disease and bacillary angiomatosis (cat-scratch disease and bacillary angiomatosis)

*9.3. Streptobacillus moniliformis***.** Whipple Disease

10. Mycobacteria

10.1. Mycobacterium tuberculosis (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

10.2. Other Mycobacteria (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

10.3. Mycobacterium leprae (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

11. Spirochetes and Other Spiral Microorganisms

11.1. Treponema pallidum and Syphilis (important properties, pathogenesis, antigens, clinical findings, laboratory diagnosis, coliforms and public health, treatment, prevention)

11.2. Borrelia

11.2.1. Borrelia Species and Relapsing Fever (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

11.2.2. Borrelia burgdorferi and Lyme Disease (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

11.3. Leptospira and Leptospirosis (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

12. Vibrio, Campylobacter, and Helicobacter

12.1. The Vibrios

12.1.1. Vibrio cholera (important properties, pathogenesis, antigens, clinical findings, laboratory diagnosis, coliforms and public health, treatment, prevention)

12.1.2. Vibrio parahaemolyticus (important properties, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention)

12.1.3. *Vibrio vulnificus* (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

12.2. Campylobacter (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

12.2.1. Campylobacter jejuni(important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

12.3. Helicobacter pylori(important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

13. Mycoplasmas and Cell Wall–Defective Bacteria

13.1. Mycoplasma pneumoniae and Atypical Pneumonias (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

13.2. Mycoplasma hominis. *Ureaplasma urealyticum*(important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

14. Rickettsia and Related Genera

14.1. Rickettsia and *Orientia*(important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

14.2. Ehrlichia and *Anaplasma*(important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

14.3. Coxiella burnetii (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

15. *Chlamydia* spp.

15.1. Chlamydia trachomatis - Ocular, Genital, and Respiratory Infections. Trachoma (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

15.2. Chlamydia trachomatis - Genital Infections and Inclusion Conjunctivitis (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

15.3. Chlamydia trachomatis - Neonatal Pneumonia. Lymphogranuloma Venereum (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

15.4. Chlamydia pneumoniae and Respiratory Infections (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

15.5. Chlamydia psittaci and Psittacosis (important properties, pathogenesis. clinical findings, laboratory diagnosis, treatment, prevention)

Medical Virology

1. **Parvoviruses** (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

2. Adenoviruses (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.Herpesviruses

3.1.Properties of Herpesviruses. Herpesvirus Infections in Humans.

3.2. Herpes Simplex Viruses (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.3. Varicella-Zoster Virus (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.4. Cytomegalovirus (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.5. Epstein-Barr Virus (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.6. Human Herpesvirus 6 (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.7. Human Herpesvirus 7 (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.8. Human Herpesvirus 8 (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

3.9. Herpes B Virus (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

4. Poxviruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

4.2. Poxvirus Infections in Humans: Vaccinia and Variola

4.3. Monkeypox Infections

4.4. Cowpox Infections

4.5. Buffalopox Infections

4.6. Orf Virus Infections

4.7. Molluscum Contagiosum

4.8. Tanapox and Yaba Monkey Tumor Poxvirus Infections

5. Hepatitis Viruses

5.1. Hepatitis A Virus (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

5.2. Hepatitis B Virus (important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention)

5.3. Non-A, Non-B Hepatitis Viruses (important properties, transmission and epidemiology. Pathogenesis and immunity, clinical findings, laboratory diagnosis, treatment, prevention)

5.4. Hepatitis C Virus (important properties, transmission and epidemiology. Pathogenesis and immunity, clinical findings, laboratory diagnosis, treatment, prevention)

5.5. Hepatitis D Virus (important properties, transmission and epidemiology. Pathogenesis and immunity, clinical findings, laboratory diagnosis, treatment, prevention)

5.6. Hepatitis E Virus (important properties, transmission and epidemiology. Pathogenesis and immunity, clinical findings, laboratory diagnosis, treatment, prevention)

5.7. Hepatitis G Virus (important properties, transmission and epidemiology. Pathogenesis and immunity, clinical findings, laboratory diagnosis, treatment, prevention)

6. Picornaviruses (Enterovirus and Rhinovirus Groups)

6.1. Properties of Picornaviruses

6.2. Enterovirus Group

6.2.1. Polioviruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

6.2.2. Coxsackie viruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

6.2.3. Other Enteroviruses

6.2.4. Enteroviruses in the Environment

6.3. Rhinoviruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

6.3.1. Foot-and-Mouth Disease

7. Reoviruses, Rotaviruses, and Caliciviruses

7.1. Reoviruses and Rotaviruses

7.1.1. Rotaviruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

7.2.2. Reoviruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

7.2.Orbiviruses and Coltiviruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

7.3. Caliciviruses**.** Astroviruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9. Arthropod-Borne and Rodent-Borne Viral Diseases

9.1. Human Arbovirus Infections

9.1.1. Togavirus and Flavivirus Encephalitis - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.2.Yellow Fever Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.3. Dengue Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.4. Bunyavirus Encephalitis Viruses - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.5. Sandfly Fever Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.6. Rift Valley Fever Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.7. Severe Fever with Thrombocytopenia Syndrome Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.8. Heartland Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.1.9. Colorado Tick Fever Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.2. Rodent-Borne Hemorrhagic Fevers

9.2.1. Bunyavirus Diseases - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.2.2. Arenavirus Diseases - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

9.2.3. Filovirus Diseases - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

10.Orthomyxoviruses

10.1. Human Influenza Virus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

10.2. Avian Influenza Virus (H5N1, N7N9)

10.3. Swine Influenza Virus (H1N1)

11. Paramyxoviruses and Rubella Virus

11.1. Parainfluenza Virus Infections - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

11.1.1. Respiratory Syncytial Virus Infections - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

11.1.2. Mumps Virus Infections - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

11.1.3. Measles (Rubeola) Virus Infections - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

11.2. Rubella (German Measles) Virus Infections - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

11.2.1 Postnatal Rubella

11.2.2. Congenital Rubella Syndrome

12. Coronaviruses – important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

13. Rabies, Slow Virus Infections, and Prion Diseases

13.1. Rabies - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

13.2. Borna Disease

13.3. Slow Diseases Caused By Conventional Viruses

13.3.1. Progressive Multifocal Leukoencephalopathy

13.3.2. Subacute Sclerosing Panencephalitis

13.3.3. Acquired Immunodeficiency Syndrome

13.4. Slow Diseases Caused by Prions

13.4.1. Kuru

13.4.2. Creutzfeldt-Jakob Disease

13.4.3. Variant Creutzfeldt-Jakob Disease (vCJD)

13.5. Slow Diseases of Animals

13.5.1. Scrapie

13.5.2. Visna

13.5.3. Bovine Spongiform Encephalopathy

13.5.4. Chronic Wasting Disease

14. Human Cancer Viruses

14.1. General Features of Viral Carcinogenesis

14.1. 1. Molecular Mechanisms of Carcinogensis

14.1.2. Interactions of Tumor Viruses with Their Hosts

14.2. RNA Tumor Viruses

14.2. 1. Hepatitis C Virus

14.2.3. Retroviruses

14.3. DNA Tumor Viruses

14.3.1. Polyomaviruses

14.3.2. Papillomaviruses

14.3.3. Adenoviruses

14.3.4. Herpesviruses

14.3.5. Poxviruses

14.3.6. Hepatitis B Virus

15. Aids and Lentiviruses

15.1. Properties of Lentiviruses

15.2. HIV Infections in Humans - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

MYCOLOGY.

1. Basic Mycology - General Properties, Structure and growth. Virulence, and Classification of Pathogenic Fungi. Fungal Toxins & Allergies. Laboratory Diagnosis of Mycoses. Antifungal drugs.

2. Cutaneous & Subcutaneous Mycoses

2.1. Cutaneous Mycoses

2.1.1. Dermatophytoses - important properties of causative agents, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.1.2. Tinea Versicolor - important properties of causative agent, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.1.3. Tinea Nigra - important properties of causative agent, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.2. Subcutaneous Mycoses

2.2.1. Sporotrichosis - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.2.2. Chromomycosis - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.2.3. Mycetoma - important properties of causative agent, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3. Systemic Mycoses

3.1. Coccidioides - important properties of causative agent, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.2. Histoplasma - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.3. Blastomyces - important properties of causative agent, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.4. Paracoccidioides - important properties of causative agent, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

4. Opportunistic Mycoses

4.1. Candida - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

4.2. Cryptococcus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

4.3. Aspergillus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

4.4. Mucor and Rhizopus - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

4.5. Pneumocystis - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

Protozoology

1. Intestinal and Urogenital Protozoa

1.1. Intestinal protozoa

1.1.1. *Entamoeba* - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

1.1.2. *Giardia*- important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

1.1.3. *Cryptosporidium* - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

1.2. Urogenital protozoa – *Trichomonas vaginalis* - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2. Blood and Tissue Protozoa

2.1. Plasmodium - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.2. Toxoplasma - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.3. Pneumocystis - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.4. Trypanosoma - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

2.5. Leishmania - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3. Minor Protozoan Pathogens

3.1. *Acanthamoeba* and *Naegleria* -- important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.2. Babesia - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.3. Balantidium - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.4. Cyclospora - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.5. Isospora - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention

3.6. Microsporidia - important properties, transmission and epidemiology. Pathogenesis and immunity. clinical findings, laboratory diagnosis, treatment, prevention