

SYLLABUS OF SECOND PROFESSIONAL M.B.B.S.

- (A) GENERAL PATHOLOGY
- (B) PHARMACOLOGY AND THERAPEUTICS
- (C) FORENSIC MEDICINE AND TOXICOLOGY
- (D) BEHAVIOURAL SCIENCES

(Syllabus published with the curriculum of first professional M.B.B.S. Part-I and II).

(A) GENERAL PATHOLOGY

CELL INJURY

1. Necrosis, Ischemia, Hypoxia, Infarction and Gangrene
Oncosis and Autolysis.
2. Sequence of the ultrastructural and biochemical changes which occur in the cell in response to the following:
 - Ischemia
 - Immunological injury, e.g., Asthma / SLE / Anaphylactic reaction
 - Physical agents, e.g., Radiation
 - Genetic defects, e.g., Thalassemia / Hemophilia
 - Nutritional deficiency, e.g., Kwashiorkor
 - Infectious agents
 - Viruses, e.g., Hepatitis
 - Bacteria, e.g., Staphylococcus aureus
 - Fungi, e.g., Candida
 - Parasites, e.g., Malaria
 - Nutritional deficiency
3. Irreversible and reversible injury
4. Apoptosis and its significance.
5. Necrosis and its types
6. Exogenous and endogenous pigmentation.
7. Dystrophic and metastatic calcification along with clinical significance.
8. Metabolic disorders
 - Lipid disorders, Steatosis of liver, Hyperlipidemia
 - Protein disorders
 - Carbohydrate disorders

INFLAMMATION, MEDIATORS OF INFLAMMATION

1. Role of inflammation in the defense mechanisms of the body.
2. Vascular changes of acute inflammation and their relation to morphological and tissue effects.
3. Process of Chemotaxis, Opsonization and Phagocytosis.
4. Role of cellular components in inflammatory exudate.
5. Exudates and transudate.
6. Important chemical mediators of inflammation.
7. Pathway of Arachidonic Acid metabolism.
8. Role of products of Arachidonic acid metabolism in inflammation.
9. Mechanism for development of fever, with reference to exogenous and endogenous pyrogens.
10. Chronic inflammation including Granulomas.
11. Granuloma and its types along with causes.
12. Systemic effects of acute and chronic inflammation and their possible outcomes.
13. Significance of ESR.
14. Induced hypothermia in medicine.
15. Healing in specialized tissue.

WOUND HEALING

1. Repair and regeneration.
2. Wound healing by first and second intention.
3. Factors that influence the inflammatory reparative response.
4. Wound contraction and cicatrisation.
5. Formation of granulation tissue.
6. Complications of wound healing.

DISORDERS OF CIRCULATION

a. Thrombo-embolic disorders and their modalities

1. Etiology and pathogenesis of thrombosis.
2. Possible consequences of thrombosis
3. Difference between thrombi and clots
4. Classification of emboli according to their composition.
5. Difference between arterial and venous emboli.

b. Hemorrhage, Hyperemia and Congestion

1. Definitions of common types of Hemorrhage
2. Types of hyperemia
3. Difference between hyperemia and congestion

c. Infarction

1. Types of infarction
2. Difference between anemic and hemorrhagic infarct
3. Morphological picture of infarction in different organ systems

d. Disorders of the circulation and shock

1. Edema, ascites, hydrothorax and anasarca.
2. Pathophysiology of edema with special emphasis on CHF.
3. Pathogenesis of four major types of shock (Hypovolemic, cardiogenic, vasovagal & septic) and their causes.
4. Compensatory mechanisms involved in shock.

MICROBIOLOGY

1. Defence mechanisms of the body.
2. Microbial mechanisms of invasion and virulence.
3. Difference between sterilization and disinfection.
4. Methods of disinfection and sterilization of the following:
 - a. Facility where the doctor practices,
 - b. Examination table,
 - c. Any spillage e.g. sputum, vomitus, stool, urine, blood,
 - d. Examination tools, e.g., thermometer, nasal and ear specula and spatula,
5. Principles of aseptic techniques such as Venepuncture, urinary catheterization, bandaging, suturing and lumbar puncture.
6. Universal precautions for infection control.
7. General principles of the following serological tests:
 - a. ELISA – Hepatitis (A,B,C,D,E,G) Rubella, CMV and HIV
 - b. PCR
 - c. Haemagglutination – TPHA
 - d. Western Blot –HIV
Malaria.
8. Interpretation of :
 - a. Culture reports
 - b. Serological reports and
 - c. Microscopic reports of gram stain and ZN stain.
9. Principles of proper collection and submission of specimens for laboratory investigations
9. General characteristics and taxonomy of Bacteria, Rickettsia, Chlamydia, Viruses and Fungi.
11. Communicable, Endemic, Epidemic, and Pandemic Diseases, Carriers Pathogens, Opportunists, Commensals and Colonizers.
12. Microorganisms responsible for infection of the following organ systems:
 - Central Nervous System
 - Respiratory System
 - Gastrointestinal System
 - Genital System
 - Urinary System
 - Infections of Bones and Joints
 - Zoonosis
 - Infection of the Skin
 - Hepatic Infections

13 Pathogenesis, Treatment, Epidemiology, Prevention and Control of the following organisms:

(i) **Bacteria**

Staphylococcus aureus

Streptococcus pneumoniae

Beta hemolytic streptococcus group a & b

Diphtheria sp.

Bordetella sp.

Bacillus anthracis

Clostridium perfringens

Clostridium botulinum,

Clostridium difficile

Clostridium tetani

Actinomyces israelii

Nocardia asteroides

Neisseria meningitidis

Neisseria gonorrhoeae

Gardnerella vaginalis

Haemophilus influenzae

Mycobacterium tuberculosis

Mycobacterium leprae

E.coli

Klebsiella

Proteus

Salmonella

Shigella

Yersinia pestis

Pseudomonas

Vibrio cholera

Vibrio parahaemolyticus

Campylobacter jejuni

Helicobacter pylori
Legionella
Mycoplasma pneumoniae
Chlamydia
Treponema pallidum
Leptospira
Rickettsia sp.

(ii) Viruses

Mumps
Herpes
Measles
Influenza,
Para influenza
RSV
Hepatitis A, B, C, D, E
Rota
CMV
EBV
Rubella
Chicken Pox
HIV
Rabies

(iii) Fungus

Cryptococcus neoformans
Candida albicans
Tinea species

(iv) Protozoa

Plasmodium species
Giardia lamblia
Entamoeba histolytica

Cryptosporidium
Leishmania species
Trichomonas vaginalis
Toxoplasma gondii
Pneumocystis carinii

(v) Helminths

Ascaris lumbricoides
Ancylostoma duodenale
Trichuris trichuria
Enterobius vermicularis
Filaria species
Strongyloides stercoralis
Schistosoma species
Echinococcus species
Taenia solium
Taenia saginata
Hymenolepis nana

PRINCIPLES OF ANTI MICROBIAL ACTION.

1. Antibiotics, selective toxicity, bacteriostatic and bactericidal.
2. Host determinants in relation to selection of an antimicrobial drug for therapy.
3. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC)
4. Bacterial resistance and the mechanisms involved in acquiring bacterial resistance
5. Mechanisms involved in transfer of drug resistance to bacterial resistance.
6. Mode of action of various antimicrobial drug groups.
7. Superinfection and cross sensitivity.

LIST OF COMMON ORGANISMS CAUSING ORGAN SYSTEM EFFECTS

a. Common organisms causing CNS Infections

(i) **Bacteria**

Streptococcus pneumoniae

Beta hemolyticus streptococcus group b

Neisseria meningitidis

Haemophilis influenzae

Mycobacterium tuberculosis.

E.coli

Listeria monocytogenes

(ii) **viruses**

Enterovirus

Mumps

Herpes

Adenovirus

(iii) **fungus**

Cryptococcus neoformis

- (iv) **protozoa**
 - Malaria
 - Toxoplasma

B. Common organisms causing respiratory tract infection

(i) bacteria:

- Streptococcus pneumoniae
- Beta hemolyticus streptococcus group b
- Diphtheria sp.
- Bordetella sp.
- Haemophilus influenzae
- Mycobacterium tuberculosis
- Klebsiella
- Legionella
- Mycoplasma pneumoniae

(ii) viruses

- Herpes
- Adeno virus
- Measles
- Influenza
- Para influenza
- Rhinovirus
- RSV

(iii) protozoa

- Pneumocystis carinii

C. Organisms causing gastrointestinal tract infection / infestation

(i) Bacteria

Clostridium difficile
Mycobacterium tuberculosis
Salmonella
Shigella
Vibrio cholera
Vibrio parahaemolyticus
Campylobacter jejuni
Helicobacter pylori

(ii) Viruses

Hepatitis A
Rota
Astro

(iii) Fungus

Cryptococcus neoformis

(vi) Protozoa

Giardia lamblia
Entameba histolytica
Cryptosporidium

D. Common organisms causing hepatic infections

(i) Bacteria

Streptococcus species
Coliforms
Anaerobes

(ii) Viruses

Herpes
Hepatitis A, B, C, D, E
CMV
EBV

(iii) Protozoa

Entameba histolytica

Tape worms

Echinococcus granulosus

E. Common organisms causing skin infection

(i) bacteria

Staphylococcus aureus

Streptococcus pyogenes

Actinomyces israeli

Nocardia asteroides

Mycobacterium tuberculosis

Mycobacterium leprae

Corynebacterium diphtheriae

(ii) viruses

Herpes

Measles

Rubella,

Chicken pox

Moluscum contagiosum

(iii) fungus

Candida albicans

Tinea species

(iv) arthropodes

Sarcoptes scabiei

Pediculus species

Cinex lectularius

(v) helminths

Filaria species

Strongyloides stercoralis

Schistosoma sp.

(vi) protozoa:

Leishmania species.

f. Common organisms causing bone and joint infection

Bacteria: Staph aureus, Streptococcus pyogenes, Haemophilus influenzae, Neisseria gonorrhoeae, Brucella melitensis, Salmonella typhi, Strep. pneumoniae, Pseudomonas sp. and Mycobacterium tuberculosis.

g. Common organisms causing genital infection

- (i) **Bacteria:** Mycoplasma urealyticum
- (ii) **Viruses:** Pox, Herpes, Hepatitis B, HIV
- (iii) **Fungus:** Candida albicans
- (iv) **Arthropodes:** Sarcoptes scabiei
- (v) **Protozoa:** Tricomonas vaginalis

h. Common organisms causing zoonosis

- (i) **Viruses:** Rabies,
- (ii) **Protozoa:** Toxoplasma gondii, Leishmania sp.
- (iii) **Helmenthics:** Echinococcus sp.

GENETICS

1. Common sex linked, autosomal recessive and autosomal dominant disorders.
2. Common genetic mutations.
3. Diseases associated with consanguineous marriages.
4. Molecular biology techniques.

GROWTH DISORDERS/NEOPLASIA

1. Atrophy and Hypertrophy, Agenesis, Dysgenesis, Aplasia, Hypoplasia, Hyperplasia, Metaplasia, Dysplasia, Neoplasia, Anaplasia,.
2. Cell cycle and cell types (stable, labile, permanent)
3. Mechanisms controlling cell growth
4. Classification systems of tumors.
5. Characteristics of benign and malignant tumors
6. Difference between Carcinoma and Sarcoma.
7. Grading and staging system of tumors.
8. Biology of tumor growth
9. Process of carcinogenesis
10. Host defense against tumors.
11. Mechanism of local and distant spread.
12. Local and systemic effects of tumors.
13. Tumor markers used in the diagnosis and management of cancers.
14. Common chemical, physical agents and viruses related to human cancer.
15. Epidemiology of common cancers in Pakistan.
16. Radiation and its effects on tissues.
17. Cancer screening.

IMMUNOLOGY

1. Antigen, antibody, epitope, hapten and adhesion molecules.
2. Difference between innate and acquired immunity.
3. Structure and function of major histocompatibility complex (MHC).
4. Cytokines.
5. Mechanism of humoral and cell mediated immunity.
6. Hypersensitivity reactions, Type I, Type II, Type III and Type IV.
7. Autograft, homograft, allograft and xenograft.
8. Immunotolerance and immunoparalysis.
9. Mechanism involved in allograft rejection and steps that can be taken to combat rejection.
10. Classification of Immunodeficiency disorders
11. Basis of autoimmunity.
12. Tissue transplantation.
13. Pathology and pathogenesis of AIDS.
14. Lab diagnosis of immunological diseases.

RECOMMENDED BOOKS

1. **Pathological Basis of Disease** by Kumar, Cortan and Robbins, 7th Ed., W.B. Saunders.
2. **Medical Microbiology and Immunology** by Levinson and Jawetz, 9th Ed., Mc Graw-Hill.
3. **Medical Genetics** by Jorde, 3rd Ed., Mosby.
4. **Clinical Pathology Interpretations** by A. H. Nagi