

ANNEXURE III

Syllabus for NEB Examination (Medical) Standard 4 (for transfer to MBBS Year 4)

PHARMACOLOGY AND THERAPEUTICS

General Pharmacology:

- Definition & Branches/divisions of pharmacology, objectives of learning pharmacology.
- Definition of drug, drug nomenclature & sources of drugs.
- Standard sources of drug information, Pharmacopoeas and Formularies (only relevant information)
- Dosage forms and doses of drugs.
- Pharmacokinetics: basic principles and their clinical application
- Route of drug administration.
- Transport of drugs across cell membranes
- Absorption of drugs and bioavailability
- Drug reservoirs, distribution and redistribution of drugs, plasma protein binding and volume of distribution.
- Bio-transformation of drugs.
- Excretion of drug, enterohepatic recirculation, plasma half-life, clearance
- Pharmacodynamics
- Mechanism of drug action.
- Receptors and post receptor molecular mechanism of drug action
- Mechanism of drug action other than mediated through drug receptors.
- Dose response curves, structure-activity relationship.
- Factors modifying action and doses of drugs.
- Pharmacogenetics.
- Adverse drug reactions & drug toxicity/poisoning
- Drug Interactions

Locally Acting Drugs (definitions with examples)

- Dermatological and topical drugs
- Demulcents, emollients, irritants, counter irritants, astringents.
- Antiseborrheics, locally acting enzymes.
- Antiseptics and disinfectants.

Autacoids

- Histamine & antihistamines
- Introduction to other Mediators:
- Eicosanoids
- Serotonin
- Substance P
- Bradykinin

Drugs Acting on Gastrointestinal Tract:

- Emetics and anti-emetics.
- Pharmacotherapy of Peptic ulcer disease,
- Pharmacotherapy of Constipation
- Pharmacotherapy of Diarrhea
- Pharmacotherapy of irritable bowel syndrome
- Prokinetics

Drugs Acting on Autonomic Nervous System:

- Neurohumoral Transmission
- Parasympathetic nervous system
- Parasympathomimetics
- Parasympatholytics
- Autonomic ganglionic stimulants and blockers
- Skeletal muscle relaxants
- Sympathetic nervous system
- Sympathomimetics
- Sympatholytics
- Adrenergic neuron blockers

Drugs acting on renal system

- Diuretics
- Anti-Diuretics
- Drugs for acid base and electrolyte balance

Drugs acting on Cardiovascular System

- Antihypertensive drugs.
- Anti-anginal drugs
- Drug management of C Heart F and Inotropic drugs.
- Thrombolytics/anticoagulants/antiplatelets.
- Anti-arrhythmic drugs.
- Antihyperlipidemic drugs.
- Drugs used in anaemias

Drugs Acting on Respiratory System

- Pharmacotherapy of cough:
- Antitussives, Expectorants and Mucolytics.
- Bronchial asthma.

Drugs Acting on Endocrine System

- Pituitary-hypothalamic drugs.
- Thyroid antithyroid drugs.
- Pancreatic hormones and anti-diabetic drugs.

- Adrenocorticoids.
- Anabolic steroids.
- Reproductive hormones: Testosterone, Estrogen, Progesterone,
- Contraceptives

Drugs acting on Central Nervous System

- Introduction to CNS Neuronal organisation and Neurotransmitters
- Sedative-hypnotics, Pharmacotherapy of sleep disorder
- Pharmacotherapy of Epilepsy, Parkinsonism, Migraine.
- Psychopharmacology: antipsychotics, antidepressants, anxiolytics, anti-mania drugs
- Anaesthetics: Local and general anaesthetics.
- CNS stimulant drugs
- Pharmacotherapy of Pain and inflammation:
- Opioids and Non-Steroidal Anti-inflammatory Drugs (NSAIDs)
- Pharmacotherapy of Gout, Rheumatoid arthritis
- Drugs for movement disorder/muscle relaxant.

Drugs Acting on Uterus

- Drugs increasing and drugs decreasing uterine motility
- Drugs decreasing uterine motility

Chemotherapy

- Introduction to chemotherapy
- Antimicrobials acting on cell wall
- Protein synthesis inhibitors
- Nucleic acid synthesis inhibitors
- Antifolates
- Gyrase inhibitors
- Anti-mycobacterial drugs.
- Anti-fungal drugs.
- Antiviral drugs.
- Anti-protozoal drugs: Antimalarials and Anti-amoebic drugs.
- Chemotherapy for Sexually Transmitted Diseases (STDs)
- Cancer chemotherapy: Principle and general consideration, treatment approach in some common malignancies

Immunopharmacology

- Immunostimulants including Probiotics
- Immunosuppressants
- Vaccines and sera

Miscellaneous

- Pharmacotherapy of Glaucoma and Cataract
- Pharmacotherapy of anaemias

- Drug therapy in children, elderly, during pregnancy and lactation.
- Drug therapy in disease states such as renal and hepatic disease.
- Overview of radiation therapy.

PATHOLOGY AND MICROBIOLOGY

GENERAL PATHOLOGY

- Differentiate between normal and altered state of homeostasis
- recognize various types and causes of cell injuries and cell death.
- understand the pathogenesis and morphology of necrosis and apoptosis
- knowledge of cell adaptation (physiological / pathological)
- describe the various cellular accumulation

CELL INJURY

- Definition of necrosis, apoptosis, ischemia, hypoxia, infarction and gangrene.
- Sequence of the structural 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. Thalassaemia / haemophilia
 - Nutritional deficiency e.g. anemia
 - Infectious agents
 - Viruses: e.g. Hepatitis
 - Bacteria: e.g. Staphylococcus aureus
 - Fungi: e.g. Candida
 - Parasites: e.g. Malaria
 - Irreversible and reversible injury.
 - Critical mechanisms in cell injury.
 - Especially with reference to ATP, mitochondria, calcium ions and
 - Cell membrane
 - Role of free radicals
 - Apoptosis and its significance.
 - Exogenous and endogenous pigment deposition.
 - Dystrophic and metastatic calcification along with clinical significance.
 - Metabolic disorders
 - Lipid disorders, steatosis of liver, hyperlipidemia
 - Protein disorders
 - Carbohydrate disorders
 - Adaptation to cell injury, atrophy, hypertrophy, hyperplasia,
 - Metaplasia, dysplasia.

- The necrosis and its types.
- Patterns of necrosis, the mechanism and characteristic gross and
- Microscopic findings
- The term gangrene and its pathological mechanism
- Intracellular accumulations
- Hyaline change

INFLAMMATION AND NEOPLASIA

- Vascular and cellular events with chemical mediations in acute and
- Chronic inflammation with
- sequelae of acute inflammation
- transudate and exudate
- types of chronic inflammation (simple and granulomatous) and
- Their effector cells with functions
- morphologic patterns of chronic inflammation
- sequence of events in formation, types and causes of granuloma
- the different types of necrosis with prototypic examples
- role of complement in inflammation and immunity with various cellular events
- structure and formation of antibodies with their functions
- characteristic of bacterial structure with its virulence and pathogenesis
- the structure (cell wall) of bacteria with their staining properties
- (Gram stain)
- histology of lymph node with their normal and abnormal functions
- proto-oncogenes, oncogenes, tumor suppressor genes and
- Apoptosis regulating genes in carcinogenesis with their mode of activation and with common human tumours
- tumour markers with their use in clinical practice
- the virulence factors of Streptococci and Staphylococci with acute Inflammation

WOUND HEALING

- Differences between repair and regeneration.
- Wound healing by first and second intention.
- Factors that influence the inflammatory reparative response.
- Wound contraction with cicatrization.
- Formation of granulation tissue.
- Complications of wound healing.

DISORDERS OF CIRCULATION

Thrombo-embolic disorders and their modalities:

- Hemorrhage and congestion
- Pathogenesis of thrombosis.
- Possible consequences of thrombosis
- Define and classify emboli according to their composition.
- Infarction: red (hemorrhagic) and white (anemic)

Disorders of the circulation and shock:

- Definition of edema, ascites, hydrothorax and anasarca.
- Pathophysiology of edema with special emphasis on Congestive Heart Failure (CHF).
- Pathogenesis of four major types of shock (hypovolemic, cardiogenic, vasovagal & septic) and their causes.
- Compensatory mechanisms involved in shock.

MICROBIOLOGY

- Defense mechanisms of the body.
- Microbial mechanisms of invasion and virulence.
- Differentiation between sterilization and disinfection.
- Appropriate methods of disinfection and sterilization for the following:
- Spillage: blood and body fluids such as sputum, vomitus, stool, urine,
- Principles of aseptic techniques for venepuncture, urinary catheterisation, wound dressing, suturing and lumbar puncture.
- Healthcare associated infections and basic concepts of infection control including standard precautions
- General principles of the following serological tests:
- Precipitation (VDRL) and agglutination (Latex particle) and Haemagglutination TPHA test
- Immunofluorescent FTA
- ELISA Hepatitis (A, B, C,D,E,) Rubella, Cytomegalovirus (CMV) and Human Immunodeficiency Virus (HIV)
- Western blot for HIV
- ICT Hepatitis Band C.
- Interpretation:
- Culture reports,
- Serological reports and
- Microscopic reports of Gram and AFB stain.
- Laboratory diagnosis of infectious diseases: Principles of proper sample collection and submission of specimens for laboratory investigations with due precautions.
- Classification of microorganisms: General characteristics and taxonomy of Bacteria, Rickettsia, Chlamydia, Viruses and Fungi.

- Definition of communicable endemic, epidemic and pandemic diseases, carriers, pathogens, opportunists, commensals and colonizers.
- Micro-organisms responsible for infection of the following organ systems:
 - Central nervous system
 - Respiratory system
 - Gastrointestinal system
 - Genital infections
 - Urinary system
 - Infections of bone and joints
 - Systemic infections
 - Infection of the skin
 - Hepatobiliary and pancreatic infections
 - Zoonosis
- Pathogenesis, treatment, epidemiology, prevention and control of following organisms.

Bacteria

- Staphylococcus aureus
- Streptococcus pneumoniae
- Beta hemolytic streptococcus group A & B
- Diphtheria sp
- Bordetella sp
- Bacillus anthracis
- Clostridia (perfringens, botulinum, difficile, tetani),
- Actinomyces israeli
- Nocardia asteroides
- Neisseria (meningitides and gonorrhoeae)
- Gardnerella vaginalis, Ha
- mophilus influenzae,
- Mycobacterium tuberculosis and leprae
- Escherichia coli
- Klebsiella
- Proteus
- Salmonella
- Shigella
- Yersinia pestis
- Pseudomonas
- Vibrio cholera
- Vibrio parahaemolyticus
- Campylobacter jejuni
- Helicobacter pylori
- Legionella
- Lycoplasma pneumoniae
- Chlamydia

- *Treponema pallidum*
- *Leptospira*
- *Rickettsia* sp.

Viruses

- nterovirus
- Mumps
- Herpes
- Adenovirus
- Measles
- Influenza,
- Parainfluenza
- Rhinovirus
- Respiratory Syncytial Virus (RSV)
- Hepatitis A, B, C, D, E
- Rotavirus
- Astrovirus
- Cytomegalo Virus (CMV),
- bstein Barr
- Virus (EBV)
- Rubella
- Chicken pox
- Arbovirus
- HIV
- Rabies.

Fungus

- *Cryptococcus neoformis*
- *Candida albicans*
- *Tinea* species

PARASITOLOGY

Protozoa

- *Plasmodium* species
- *Giardia lamblia*
- *Entamoeba histolytica*
- *Leishmania* species
- *Trichomonas vaginalis*
- *Toxoplasma gondii*
- *Pneumocystis carinii*
- *Trypanosoma*
- *Balantidium coli*

Helminths

Cestodes

- Taenia (Solium, Saginata)
- Echinococcus species
- Hymenolepis nana
- Diphyllbothrium latum.

Nematodes

- Filaria species
- Ascaris lumbricoides
- Ancylostoma duodenale,
- Enterobius vermicularis
- Trichuris trichiuria
- Trichinella spiralis
- Strongyloides stercoralis
- Loa Loa.

Trematodes

- Schistosoma (Haematobium, Mansoni, Japonicum)
- Fasciola
- Hepatica
- Clonorchis sinensis

PRINCIPLES OF ANTI-MICROBIAL ACTION

- Definitions: antibiotics, selective toxicity, bacteriostatic and bactericidal.
- Host determinants in relation to selection of an antimicrobial drug for therapy.
- Minimum inhibitory concentration (MIC) and minimum bactericidal concentration(MBC)
- Bacterial resistance and the mechanisms involved in acquiring bacterial resistance.
- Mechanisms involved in transfer of drug resistance to bacterial resistance.
- Mode of action of various antimicrobial drug groups.
- Cross resistance
- Super infection