

PATHOLOGY & MICROBIOLOGY

Subject Description

This subject follows the basic subjects of Anatomy, Physiology and Biochemistry and it forms a vital link between preclinical subjects and clinical subjects. Pathology involves the study of causes and mechanisms of diseases. Microbiology involves the study of common organisms causing diseases including nosocomial infections and precautionary measures to protect one from acquiring infections. The knowledge and understanding of Microbiology & Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

PATHOLOGY

Subject Title	: PATHOLOGY
Duration	: 13 – 24 Months
Total Hours	: 60
Theory	: 45 Hrs
Practical	: 15 Hrs
Lecture + Practical	: 2 Hours / Week
Method of Assessment	: Written

Theory [45 Hours]

General Pathology

1. Introduction to Pathology [1 Hour]

2. Cell injuries: [3 Hours]

Aetiology and Pathogenesis with a brief recall of important aspects of normal cell structure. Reversible cell injury : Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Muroid changes. Irreversible cell injury: Types of Necrosis & Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic. Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations, Pigments - Melanin / Hemosiderin. Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains.

3. Inflammation and Repair [3 Hours]

Acute inflammation: features, causes, vascular and cellular events.

Inflammatory cells and Mediators. Chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples.

Repair, Wound healing by primary and secondary union, factors promoting and delaying the process.

Healing in specific site including bone healing.

4. Immunopathology [2 Hours]

Immune system: General concepts.

Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. .
Secondary immunodeficiency including HIV infection. Auto-immune disorders: Basic concepts and classification, SLE.

AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

5. Infectious diseases [3 Hours]

Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.

Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.

Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Ricktsia, Chlamydial infection, HIV infection.

Fungal disease and opportunistic infections.

Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

6. Circulatory Disturbances [3 Hours] Hyperemia/Ischemia and Haemorrhage Edema:
Pathogenesis and types.

Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology

Thrombosis and Embolism: Formation, Fate and Effects.

Infarction: Types, Common sites.

Shock: Pathogenesis, types, morphologic changes.

7. Growth Disturbances and Neoplasia [3 Hours]

Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia.

Precancerous lesions.

Neoplasia: Definition, classification, Biological behaviour : Benign and Malignant, Carcinoma and Sarcoma.

Malignant Neoplasia: Grades and Stages, Local & Distant spread.

Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer.

Benign & Malignant epithelial tumours Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours Eg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma.

8. Nutritional Disorders [1 Hour]

Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples.

9. Genetic Disorders [1 Hour]

Basic concepts of genetic disorders and some common examples and congenital malformation.
Systemic pathology

10. Hematology [4 Hours]

Constituents of blood and bone marrow, Regulation of hematopoiesis.

Anemia: Classification, clinical features & lab diagnosis.

Nutritional anemias: Iron deficiency anemia, Folic acid, Vit. B 12 deficiency anemia including pernicious anemia. Hemolytic Anaemias: Classification and Investigations. Hereditary hemolytic anaemias: Thalassemia, Sick cell anemia, Spherocytosis and Enzyme deficiencies. Acquired hemolytic anaemias i. Alloimmune, Autoimmune ii. Drug induced, Microangiopathic Pancytopenia - Aplastic anemia.

Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis.

Coagulopathies - (i) Inherited (ii) Acquired with lab diagnosis.

Leukocytic disorders: Leukocytosis, Leukopenis, Leukemoid reaction.

Leukemia: Classification, clinical manifestation, pathology and Diagnosis.

Multiple myeloma and dysproteinemias.

Blood transfusion; Grouping and cross matching, untoward reactions, transmissible infections including HIV & hepatitis, Blood-components & plasma-pheresis.

11. Respiratory System [2 Hours]

Pneumonia, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Carcinoma of lungs, Occupational lung diseases

12. Cardiovascular Pathology [2 Hours]

Congenital Heart disease: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus.

Endocarditis.

Rheumatic Heart disease.

Vascular diseases: Atherosclerosis, Monckeberg's medial calcification, Aneurysm and Arteritis and tumours of Blood vessels.

Ischemic heart Disease: Myocardial infarction.

Hypertension and hypertensive heart Disease.

13. Alimentary tract [3 Hours]

Oral Pathology: Ulcers, leukoplakia, Carcinoma, oral cavity diseases and tumour of salivary gland & esophagus and precancerous lesions, Esophagus inflammatory, functional disorders and tumours.

Stomach : Gastritis, Ulcer & Tumours.

Tumours and tumour like condition of the small and large Intestine: Polyps, carcinoid, carcinoma, Lymphoma.

Pancreatitis and pancreatic tumours : i) Exocrine, ii) Endocrine

Salivary gland tumours : Mixed, Warthin's

14. Hepato – biliary pathology [2 Hours] Jaundice: Types, aetio-pathogenesis and diagnosis.

Hepatitis: Acute, Chronic, neonatal.

Alcoholic liver disease

Cirrhosis: Postnecrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic. Tumours of Liver

15. Lymphatic System [2 Hours]

Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma.

Lymphadenitis - Non specific and granulomatous

Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours - Hodgkin's and Non hodgkin's Lymphomas, Metastatic Tumours. Causes of Splenic Enlargements.

16. Musculoskeletal System [3 Hours]

Osteomyelitis, acute, chronic, tuberculous, mycetoma

Metabolic diseases: Rickets/Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease.

Tumours Classification: Benign, Malignant, Metastatic and synovial sarcoma. Arthritis: Suppurative, Rheumatoid. Osteoarthritis, Gout, Tuberculous.

17. Endocrine pathology [3 Hours]

Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis

Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis,

Thyrototoxicosis, myxedema, Hashimoto's thyroiditis.

Tumours of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic.

Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumours of cortex and medulla.

18. Neuropathology [3 Hours]

Inflammations and Infections : TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess

Tuberculosis, Cysticercosis

CNS Tumors, Astrocytoma, Neuroblastoma, Meningioma, Medulloblastoma

19. Dermatopathology [1 Hour]

Skin tumors : Squamous cell carcinoma, Basal cell carcinoma, Melanoma

Practical [15 Hours]

Demonstration of Slides – The students may be demonstrated the common histopathological, hematological and cytological slides and specimens and charts and their interpretations.

Recommended Textbooks

1. Text book of pathology: Harshmohan
2. General systemic pathology: Churchill Livingstone
3. Text book of Pathology: Robbins

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Theory

1. General Microbiology [5 Hours]

Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.

Normal flora of the human body.

Routes of infection and spread; endogenous and exogenous infections; source at reservoir of infections.

Bacterial cell. Morphology limited to recognizing bacteria in clinical samples Shape, motility and arrangement. Structures, which are virulence, associated.

Physiology: Essentials of bacterial growth requirements.

Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection.

Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.

2. Immunology [5 Hours]

Basic principles of immunity immunobiology : lymphoid organs and tissues. Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.

Humoral immunity and its role in immunity Cell mediated immunity and its role in immunity.

Imunology of hypersensitivity, Measuring immune functions.

3. Bacteriology [12 Hours]

To be considered under the following headings

Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports

Staphylococci,

Streptococci and Pneumococci,

Mycobacteria: Tuberculosis, M.leprae, atypical mycobacteria,

Enterobacteriaceae,
Vibrios : V. cholerae and other medically important vibrios, Campylobacters and Helicobacters,
Pseudomonas,
Bacillus anthracis,
Sporing and non-sporing anaerobes: Clostridia, Bacteroides and Fusobacteria,

4. General Virology [8 Hours]

General properties: Basic structure and broad classification of viruses. Pathogenesis and pathology of viral infections. Immunity and prophylaxis of viral diseases. Principles of laboratory diagnosis of viral diseases. List of commonly used antiviral agents.

5. Mycology [3 Hours]

General properties of fungi. Classification based on disease: superficial, subcutaneous, deep mycoses opportunistic infections including Mycotoxins, systemic mycoses. General principles of fungal diagnosis, Rapid diagnosis. Method of collection of samples. Antifungal agents.

6. Clinical/Applied Microbiology [12 Hours]

Streptococcal infections: Rheumatic fever and Rheumatic heart disease,
Meningitis.
Tuberculosis,
Pyrexia of unknown origin,
leprosy,
Sexually transmitted diseases,
Poliomyelitis,
Hepatitis,
Acute-respiratory infections,
Central nervous System infections,
Urinary tract infections,
Pelvic inflammatory disease,
Wound infection,
Opportunistic infections,
HIV infection,
Malaria,
Filariasis,
Zoonotic diseases.

Practical [15 Hours]

1. Demonstration of Microscopes and its uses
2. Principles, uses and demonstration of common sterilization equipment
3. Demonstration of common culture media
4. Demonstration of motility by hanging drops method

5. Demonstration of Gram Stain, ZN Stain
6. Demonstration of Serological test: ELISA
7. Demonstration of Fungus *Recommended Textbooks:*

1. *Short text book of Medical Microbiology by Sathish Gupta*
2. *Text book of Microbiology by Jayaram Panicker*
3. *Microbiology & Parasitology by Rajeshwar Reddy*
4. *Text book of Microbiology by Anantha Narayanan*
5. *Microbiology by Baveja*
6. *Text book of microbiology by Chakraborty*