Foundation in Pathology - End of Year 2 Semester II
and Foundation in Clinical Pathology -Year 3 Semester I
2013/14 Batch

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Duration: **Foundation in Pathology - 4 Weeks**
Foundation in Clinical Pathology – 3 Weeks

Topic & Concepts	Objectives	Time	Dept.	T/L activity
	At the end of the module, the student should be able,			
2013-3/PATH-SBM-1/01				
Introduction to Pathology	to understand the purpose of the module and the basis for the design of the module	1h	Pathology	Introductory session - Lecture
2013-3/PATH-SBM-1/02				
Cell injuries and death				
a. Cell response to injury **b. Cell death – Necrosis, Apoptosis** **c. Clinical manifestations of cell death**	1. to outline the injurious agents to cells and describe the mechanisms of cell injury. 2. to outline the different cell response to injury 3. to outline the non reversible types of cell injury. 4. to describe the morphological changes that occur in necrosis 5. to describe the pathogenesis and pathology of different types of necrosis 4. to describe the clinical manifestations of necrosis and the methods of diagnosing. 5. to define the term apoptosis and describe the mechanism of apoptosis 6. to discuss the importance of apoptosis in physiology and the clinical significance of defective apoptosis. 8. to differentiate apoptosis from necrosis 9. to define the term reperfusion injury and describe the process	5h	Pathology	Lecture
2013-/PATH-SBM-1/03				
Acute inflammation and suppuration	1. to define the process of acute inflammation and discuss its uses 2.to describe in detail* the various steps, controlling factors (cells and chemical mediators), sequale, complications and clinicopathological effects of acute inflammation. (includes suppuration)	5h	Pathology	Lecture
2013-3/PATH-SBM-1/04				
Chronic inflammation	1.to define the process of chronic inflammation 2. to describe in detail* the non-specific and specific types of chronic inflammation, its sequele and complications			
2013-3/PATH-SBM-1/05				
Tuberculosis	1. to describe the pathogenesis of tuberculosis 2. to understand the concepts of primary and postprimary tuberculosis 3. to describe the complications of the tuberculosis 4. to explain pathological basis of the clinical effects	2h	Pathology	Lecture

2013-3/PATH-SBM-1/06				
Leprosy	1.to describe the aetiopathogenesis of leprosy 2.to describe the different types of leprosy and there pathogenesis and clinical features 3.describe the pathological basis of the clinical features	1h	Pathology	Lecture
2013-3/PATH-SBM-1/07				
Atherosclerosis	1. to describe the risk factors of atherosclerosis 2 to describe the pathogenesis and pathological processes involved in atherosclerosis 3. to describe the complications and clinicopathological effects of atherosclerosis.	1h	Pathology	Lecture
2013-3/PATH-SBM-1/08				
Cellular adaptations of growth and differentiation	1. to outline the ways in which different cell types react to altered environment e.g. increased work demand and chronic irritation. 2. to describe in detail* the processes, hypertrophy, hyperplasia, atrophy and metaplasia, and the pathology of these processes. 3. to give examples and also to state the clinico pathological effects of the processes mentioned above.	2h	Pathology	Lecture
2013-3/PATH-SBM-1/09				
Cellular accumulations and Pathologic calcification	1. to describe the process of pathological calcification and to state clinical examples. 2. to outline the types of abnormal pigments and accumulations in cells and their pathogenesis and clinical importance.	2h	Pathology	Lecture
2013-3/PATH-SBM-1/10				
Wound healing	1.to describe the process of healing in injured tissue and its complications 2.define the terms, resolution, regeneration and organization 3.to describe the process of organization 4.to describe the healing processes in different types of tissue including skin wounds.	2h	Pathology	Lecture
2013-3/PATH-SBM-1/11				
Congestion and Oedema	1.to define the term oedema and outline 2.describe the mechanisms of oedema 3.describe the effect of rennin angiotensin aldosteron system on oedema 4.outline the causes of localized and generalized oedema and the different clinical manifestations. 5.to list the processes that injure lymphatics and the clinicopathological outcome due to injured lymphatics. 6. to define the processes hyperaemia (active congestion) and congestion (passive congestion) 7. to describe the pathogenesis of these processes. 8. describe the aetiopathogenesis, morphological changes and clinical manifestations in acute and chronic venous congestion of liver and lung.	3h	Pathology	Lecture

2013-3/PATH-SBM-1/12				
Thrombosis	1. to define thrombosis and heamostasis 2. to list the main factors which predispose to thrombosis. 2. to describe the pathogenesis and sequelae of thrombosis in different types of blood vessels and the heart, and the fate of thrombi 3. to mention the clinicopathological features of thrombosis in the different types of blood vessels.	2h	Pathology	Lecture
2013-3/PATH-SBM-1/13				
Embolism	1. to define the process of embolism. 2. to describe the aetiopthogenesis of different types of emboli (thromboemboli, fat, bonemarrow, gas and amniotic fluid) and the outcomes and clinicopathological effects.	1h	Pathology	Lecture
2013-3/PATH-SBM-1/14				
Ischaemia and infarction	1.to define the terms; hypoxia, Ischaemia and infraction 2.to describe the aetiopathogenesis of ischaemia and infraction in different tissues. 3.to describe the pathological changes in infractions in different tissues 4.to outline the clinical manifestations of infarctions 5.to outline the healing process of infarction in different tissues.	2h	Pathology	Lecture
2013-3/PATH-SBM-1/15				
Amyloidosis	1. to define the process of amyloidosis 2. to describe the physical and chemical characteristics of amyloid. 3. outline the methods of identification of amyloid. 4. to describe the different types of amyloidosis and their aetiopathogenesis and clinical effects.	1h	Pathology	Lecture
2013-3/PATH-SBM-1/16				
Neoplasia and Carcinogenesis				
Introduction to Neoplasia	1.to define the term neoplasia and outline the differences between neoplasia and hyperplasia. 2.describe the properties of amalignant tumour 3.to compare and contrast benign and malignant tumours 4.to describe the concepts of dysplastic and premalignant lesions.	2h	Pathology	Lecture
2013-3/PATH-SBM-1/17				
Spread of tumours	1. to describe the modes of spread of malignant tumours and the clinicopathological effects.	2h	Pathology	Lecture

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2013-3/PATH-SBM-1/18				
a. Oncogenesis	1. to describe the cell cycle and the genes controlling it. 2. to outline the genes involved in carcinogenesis and describe the mechanism by which the defects in these genes promote carcinogenesis. 3. to describe the process of carcinogenesis and tumour progression 4.to outline the common carcinogens 5.to describe the mechanisms by which carcinogenesis by chemicals, viruses and radiation.	3h	Pathology	Lecture
b. Clinical aspects of tumours	1. to outline the clinicopathological features of benign and malignant tumours (local and systemic) and describe their pathological basis. 2. describe the term paraneoplastic syndrome and discuss the common examples. 3. describe the pathogenesis and clinical manifestations of tumour cachexia. 4. outline the prognostic indicators of malignant tumours	1h	Pathology	Lecture
c. Methods of tumour diagnosis	1.to outline the different methods available for tumour diagnosis 2. to outline the screening methods available for tumour detection 3. describe what are tumour markers and their uses. 4. to outline commonly used tumour markers	2h	Pathology	Lecture
2013-3/PATH-SBM-1/19				
Applied general pathology	1.to describe the applications of the general pathological processes in the pathogenesis of diseases in the respiratory system, circulatory system, central nervous system, gastrointestinal tract, liver and the urinary tract.	10h	Pathology	Lecture
2013-3/PATH-SBM-1/20				
Clinical Hematology				
a. Introduction to anaemia **b. History and exa mination findings in heamatological disorders** **c. Specimen collection for haematological investigations** **d. Interpretation of hae matology reports** **e. Problems in interpreting heamatological investigations**	1. to know the definition of anaemia and classification of anaemia according to the morphology and red cell indices 2. to describe the common clinical manifestations of anaemia 3. to identify the laboratory errors in the reports issued (problems in collection of the specimen (collection into the incorrect container, haemolized sample, delayed separation of plasma, exposure of the sample to sunlight, specimen collection from drip arm, etc. 4.list the tests included in a full blood count 5. list the commonly requested haematological investigations 6. state the physiological changes of haemoglobin value in neonate, infant, childhood, adult male & female& in pregnancy 7. state the changes in the red cell count (e.g. polycythaemia, anaemia) 8. describe the physiological changes of WBC/DC in a neonate, infant, child below 6 yrs, adult & pregnancy 9. describe the clinical significance and common causes of leucopenia, neutropenia, neutrophil leucocytosis, lymphocytosis (absolute and relative)	6h	Pathology	Lecture

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	10. describe the clinical significance of platelet count and causes of abnormally high and low platelet counts 11. describe the clinical significance of erythrocyte sedimentation rate (ESR) and causes of high ESR 12. list the tests included in a coagulation profile i.e. bleeding time (BT), clotting time (CT), prothrombin time(PT), activated partial thromboplastin time (APTT) & platelet count 13. state the importance of reticulocyte count 14. list the basic laboratory tests necessary for investigation of haemolytic anaemia			
2013-3/PATH-SBM-1/21				
Specimen collection and transport in Histology, Cytology and Frozen section	1. describe the proper collection and transport method specimen for histological, cytological and frozen section investigations	1h	Pathology	Lecture
2013-3/PATH-SBM-1/22				
Clinical Pathology **a. Clinical enzymology and investigation of liver diseases**	1. explain the enzyme kinetics, isoenzymes and causes of increased enzyme levels 2. describe the use of enzymes in the diagnosis of various diseases 3. outline the component of liver function tests and their interpretation	4h	Pathology	Lectures
b. Body fluid analysis and markers of inflammation **(i). Urine analysis**	1. to know the commonly requested urine tests (urine sugar, urine albumin, urine deposit, urine full report, creatinine clearance, urine for specific gravity, 24 hour urinary protein excretion, creatinine clearance, urine for micro albuminuria) 2. state the advice given to the patients and importance of preparation of the patients for these investigations 3. describe the basic procedure for performing urine ward tests 4. describe the importance of abnormalities of urine deposit (different types of cells and casts) 5. describe how to relate the urine biochemical tests with the urine deposit and the causes for likely incompatibilities 6. describe the common special urine tests (urine for Bence Jones proteins, urine for haemosiderinuria, urinary protein electrophoresis)			
(ii). CSF examination	7. describe the normal function and composition of CSF 8. describe the alteration in CSF in different clinical conditions 9. describe how to send CSF specimens to the laboratory for CSF analysis 10. outline the components of peritoneal/ plural fluid analysis			
(iii). Markers of inflammation	11. describe an acute phase response 12. outline the biochemical and serological markers of inflammation 13. outline the biochemical and haematological indicators of inflammation and discuss their relationship to acute phase response			

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c. Investigations for diabetes, lipid disorders and renal diseases	1. to outline the basic investigations done in diagnosis and management of diabetes mellitus, dyslipidemia and renal diseases			
d. Specimen collection for biochemical investigations and collection errors	1. to outline the common errors in specimen collection and transportation for biochemical investigations and how to identify such errors			
SGD				
a. Acute and chronic inflammation **b. Thro mbosis and Embolism** **c. Ischemic and Infraction** **d. Congestion and Oede ma** **e. Neoplasia**	1. to discuss the clinical correlations of the mentioned general pathological processes	5 hrs	Pathology	SGD
Museum Classes				
a. Acute and chronic inflammation **b. Thro mbosis and Embolism** **c. Ischemic and Infraction** **d. Congestion and Oede ma** **e. Neoplasia**	1. to identify the macroscopic changes due to mentioned general pathological processes	9 hours	Pathology	Guided SGL
Histology Practicals				
a. Acute and chronic inflammation **b. Thro mbosis and Embolism** **c. Ischemic and Infraction** **d. Congestion and Oede ma** **e. Neoplasia**	1. to identify the microscopic changes due to mentioned general pathological processes.	8 hours	Pathology	Practical

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Foundation in Pharmacology (End of Year 2 Semester II & Year 3 Semester I)

Topic	Objectives	Time (hrs)	T/L activity
	At the end of the module, the student should be able to		
2013-3/PHARM-SBM-1/01			
Introduction to Pharmacology **a. Definitions of basic concepts in Pharmacology** **b. Sources of drug information**	1. define the following terms- Drug, Medicine, Pharmacology, Therapeutics, Clinical Pharmacology, Pharmacokinetics, Pharmacodynamics, Generic name, Brand name 2. list the different sources of drug information	1	Lecture
2013-3/PHARM-SBM-1/02			
Drug action – Pharmacodynamics **a. Modes of action of drugs at different levels: molecular, cellular, tissue/organ & overall individuals**	1. list the mechanisms by which drugs exert chemical influences at cellular level to produce a pharmacological response 2. define • receptor • drug binding sites • ligand • agonist • antagonist • partial agonist • inverse agonist • receptor affinity • receptor occupancy • spare receptors • efficacy • potency	9 2	Lecture SGD
b. Receptor as target for drug action	1. classify receptors based on their structure and function 2. briefly explain the signaling mechanisms by which receptor activation is coupled to cellular effector systems		
c. Drug-target interaction	Explain 1. competitive antagonism 2. non competitive antagonism 3. physiological antagonism 4. tolerance, tachyphylaxis 5. placebo and placebo effect		

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d. Dose-response relationship	Draw the concentration-effect curves for the relationship of the effect against, • full agonist concentration • logarithm of full agonist concentration • log partial agonist concentration • log full agonist concentration in the presence of a fixed/increasing amounts of competitive antagonist • log full agonist concentration in the presence of a non-competitive antagonist • log full agonist concentration in the presence of a partial agonist • log inverse agonist		
2013-3/PHARM-SBM-1/03			
Pharmacokinetics **a. Transport across cell membrane:**	Describe the mechanisms of transport of drug molecules across the cell membrane and the factors that influence such mechanisms		
b. Absorption	1. explain how drugs are absorbed into blood after administration 2. list the factors that influence the absorption of drugs		
c. Routes of administration	1. list different routes of administration of drugs 2. list the different types of dosage forms/special drug delivery systems 3. explain the advantages and disadvantages of different routes of administration		
d. Distribution in tissues, body compartments and across barriers	1. list the different compartments of the body into which drugs are distributed 2. describe the factors which influence the distribution of drugs into different compartments 3. explain the concept of redistribution of drugs 4. explain the concept of barriers across tissues for transport of drugs	10 2	Lectures SGD
e. Metabolism (Biotransformation)	1. explain the basic mechanisms by which drugs undergo biotransformation in the body 2. list the common drugs which induce/inhibit the cytochrome P 450 enzyme system		
f. Elimination	1. define elimination of drugs 2. list the physiological processes of different organ-systems that are involved in drug elimination 3. describe the mechanisms by which drugs are eliminated from the body		

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g. Pharmacokinetic parameters	1. define the following • bioavailability • bioequivalence • first pass effect • area under the Concentrate-time curve (AUC) • (apparent) volume of distribution • clearance • half life • steady state concentration • loading dose • maintenance dose • dosage regimen 2. explain the principles of calculating the bioavailability, volume of distribution, clearance, loading dose & maintenance dose		
h. Drug concentration vs time curve in different dosing regimes	draw the concentration-time curves for • single intravenous bolus injection • intermittent intravenous bolus injection • continuous intravenous infusion • single intramuscular injection • single subcutaneous injection • single-dose oral administration • intermittent oral administration • modified-release formulations		
i. First-order & Zero-order kinetics	explain first order kinetics and zero order kinetics		
j. Clinical application of pharmacokinetic parameters	explain the clinical significance of pharmacokinetic principles		
2013-3/PHARM-SBM-1/04			
Adverse and Toxic effects **a. Basis of adverse/toxic effects**	1. define adverse effects and toxic effects of drugs 2. describe the mechanisms of adverse effects of drugs 3. classify adverse effects based on their mechanisms briefly explain teratogenicity, mutagenecity and carcinogenicity 5. explain how these reactions could be minimized/prevented. 6. define therapeutic index 7. explain the clinical significance of therapeutic index	6	Lecture
b. Drug interactions	1. classify drug interactions (eg. Drug-drug, drug-food and drug-herb) 2. describe mechanisms of drug interactions 3. explain the clinical significance of drug interactions		

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c. Pharmacogenetics	describe the influence of genetic variation on response to drug therapy		
d. Drug therapy in special populations	describe the principles underlying the precautions that should be taken during drug therapy in special situations such as pregnancy, breast feeding, renal and hepatic dysfunction, extremes of age		
e. Measurement & monitoring of drug effect	1. describe the methods by which the effects of drug therapy could be measured 2. describe how the measurement of plasma drug concentrations helps in monitoring drug therapy		
2013-3/PHARM-SBM-1/05			
Autonomic Nervous System	1. recall the anatomical and functional organization of autonomic nervous system 2. recall the anatomy and the physiology of the cholinergic and the noradrenergic 'junctions 3. recall the types of autonomic receptors with examples of typical sites 4. describe the mechanisms of action and clinical uses of drugs acting on autonomic nervous system	1 1	Lecture SGD
2013-3/PHARM-SBM-1/06			
Pain Control **a. Physiology of pain**	1. recall the definition of pain and briefly explain theories of pain 2. list the types of pain 3. recall physiology of pain perception (stimuli, receptors, pathways and central connection) 4. list methods of pain relief 5. classify pharmacological agents used in pain relief (with main indications) 6. explain the basis of neuropathic pain		
b. Opioid Analgesics	1. classify the agents acting on opioid receptors 2. describe the mechanisms of action of opioid analgesics. 3. describe the pharmacokinetics of the drugs acting on opioid receptors. 4. describe the adverse effects of opioid analgesics. 5. list the clinical uses of opioid receptor antagonists	2 2	Lecture SGD
c. Non-steroidal anti-inflammatory drugs (NSAIDs)	1. describe the physiological/pathological roles of cyclo-oxygenase-I (COX-1) and COX-2 enzymes. 2. describe the pharmacokinetics, clinical uses, important adverse effects and drug interactions of NSAIDs (including COX-2 inhibitors). 3. list the commonly used NSAIDs		
2013-3/PHARM-SBM-1/07			
Drug therapy in neoplastic disease	1. state how neoplastic cells/tissues differ from normal cells/tissues with respect to potential targets for drug therapy in neoplastic disease 2. explain the basis of • combination chemotherapy • resistance to chemotherapy • adverse effects of chemotherapy 3. classify antineoplastic drugs based on the mechanism of action	1	Lecture

2013-3/PHARM-SBM-1/08			
Drug Information **a. Sources, Reliability and Interpretation**	1. identify different sources of drug information 2. differentiate unbiased information from promotional material. 3. critically analyse the information in a given source of drug information. 4. carry out a literature search on drug information	2	Lecture
b. Drug Discovery and Development	1. state the history of drug discovery 2. list the sources from which new drugs are developed 3. describe the different stages of the development of a new drug	1	Lecture
2013-3/PHARM-SBM-1/09			
Antimicrobial agents	1. define an "antimicrobial agent" 2. classify antimicrobial agents based on their chemical structure/mechanism of action with examples 3. describe the mechanism of action, pharmacokinetics, clinical uses, adverse effects, interactions and limitations for the use of commonly used antimicrobial drugs 4. explain the basis of chemoprophylaxis in infections 5. explain the principles underlying the selection of appropriate antimicrobial agents in infectious diseases	8 4	Lecture SGD

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