



SYDNEY MEDICAL SCHOOL FOUNDATION BLOCK 1

- **an outline of the main learning objectives of the basic and clinical science disciplines in block 1**
- **list of recommended texts for block 1 (+ for Med1/2)**

BASIC SCIENCES

ANATOMY

Outline

- Introduction to general anatomical terms, planes, movements and structures. The basic language of anatomy and the system of structures (eg, vessels, muscles, bones, nerves, viscera), their functions and their relationships with other structures in the body.
- Introduction to major body regions and systems, from head and neck to brain and from thorax to lower limb
- Detailed anatomical organisation of the upper limb, from bones to muscles and from vessels to nerve supply.

Texts

- *Moore: Clinically Oriented Anatomy 5th ed 2005 Lippincott Williams & Wilkins*
- *Drake: Gray's Anatomy for Students, Elsevier, 2nd Edition*
- *Abrahams: McMinn's Colour Atlas of Human Anatomy 6th ed 2007 Mosby*
- *Snell: Clinical neuroanatomy, 6th edition Lippincott Williams & Wilkins 2006*
- *Young: Basic clinical neuroanatomy, international edition, Lippincott Williams & Wilkins, 1997*

HISTOLOGY & EMBRYOLOGY

Outline

- The general histological organisation of cells and tissues, from epithelium to connective tissue and muscle
- The major embryological stages in humans and common defects associated with the developing embryo during pregnancy

Texts

- *Ross: Histology: A text & Atlas with correlated cell and molecular biology 5th ed 2006 Lippincott Williams & Wilkins*
- *Kerr: Functional Histology, 2nd Edition Mosby Australia*
- *Ovalle: Netter's Essential Histology, Elsevier, 2007*
- *Moore: Developing Human 8th ed 2007 W.B. Saunders*

PHYSIOLOGY

Outline

- Key concepts of homeostasis and their application to the regulation of body temperature and plasma osmolarity.
- Mechanisms that regulate and maintain intracellular homeostasis and intracellular/intercellular communication
- Processes of cell division and growth, with reference to key mechanisms for normal and disordered events in the cell cycle
- Main maternal physiological adaptations to pregnancy.

Texts

- *Sherwood: Human Physiology- From Cells to Systems 6th ed 2006 Brooks Cole*
- *Guyton: Textbook of Medical Physiology, with STUDENT CONSULT Online Access, 12th Edition*

IMMUNOLOGY

Outline

- The function and organisation of innate and adaptive immunity. The significance of primary and secondary lymphoid tissue. The function of different types of immune cells. The meaning of MHC complex. The endogenous/exogenous antigen pathways.
- The different classes of antibodies, the development of receptor repertoires and the clonal selection theory.
- Mechanisms of antigen recognition of the MHC-peptide complex by T cells, the co-stimulation for maximum activation of T cells, the T cell response to activation, the differentiation to effector and memory T cells, and the expression of cytokines and cytokine receptors. The changes in lymphocyte migration to sites of infection and inflammation
- The different types of cell-mediated immunity and the functions of CD4 lymphocytes and Th1-Th2 T cells and CD8 T cells.
- B cell activation by antigens, general primary and secondary antibody responses, B cell responses to antigen activation and the T helper cell function in antibody response to protein antigens.
- The principles effector mechanisms of antibodies.

Texts

- *Roitt: Roitt's Essential Immunology 11th ed 2006 Blackwells*
- *Abbas: Basic Immunology. Functions and Disorders of the Immune System, 3rd Edition*
- *Abbas: Cellular and Molecular Immunology, 6th Edition*

INFECTIOUS DISEASES

Outline

- Significance of microbial diversity, prokaryotic, eukaryotic and sub-cellular microbes. Function of parasites and medically important fungi.
- The differences in structure and function between the following pathogens: bacteria, mycoplasmas, chlamydiae, rickettsiae
- The organisation and function of RNA viruses, DNA viruses and Prions
- The factors promoting colonisation, adherence, motility and Fe acquisition. The mechanisms involved in evading host defences; capsules, inhibition of phagocytosis, protein A. The factors that damage the host; exotoxins, endotoxin, hydrolytic enzymes.
- The means by which viruses spread through the host, the genetic determinants of viral virulence, and the mechanisms of disease production. The mechanisms of viral damage to tissues and organs, virus-induced immunopathology, persistent and latent infections and viral oncogenesis.
- The mechanisms of: Central T and B cell tolerance, peripheral T and B cell tolerance, genetic factors in autoimmunity, the role of infections in autoimmunity.
- The mechanisms of hypersensitivities and congenital and acquired immune deficiencies.

Texts

- *Yung: Infectious diseases: a clinical approach 2nd ed 2005 IP Communications*
- *Goering: Mims' Medical Microbiology, 4th Edition, Mosby*

BIOCHEMISTRY

Outline

- The major nutrients and nutrient-sensing systems; significance of lipids, carbohydrates, oligo- and disaccharides, monosaccharides and proteins and amino acids and the control of digestion, absorption, appetite and satiety.
- The metabolic pathways converting nutrients to energy, for example, the anaerobic and aerobic metabolism of glucose, fatty acid oxidation and the concept and function of ATP.
- The mechanisms by which oxygen makes energy from nutrients
- The evidence that DNA is the "genetic material" and that bacteriophage DNA changes the morphology/phenotype of bacterial cells. The constraints used to model the structure of DNA, the identity of genes and the genetic code.
- The structures of DNA and RNA, the different species of RNA and their roles, the role of the nucleolus in the genesis of ribosomes, the modifications to messenger RNA in eukaryotes, the origin of complex structures in RNA, the composition of ribosomes, DNA and RNA viruses, retroviruses, reverse transcription and finally, ribozymes.
- The general structure and function of proteins. Protein function from analysis of protein structure, and how mutations can disturb protein structure and/or function.
- How enzymes facilitate chemical reactions, influence reaction rates. The three modes of inhibition and that enzymes are important drug targets in medicine and also toxin targets. Enzymes as both extracellular and intracellular; they are regulated in many different ways. Allosteric modulation of enzymes controls activity of metabolic pathways.
- The major nutrient stores and tissues and what occurs during feast and famine. The significance of the key hormonal controllers.
- The significance of genetic mutations and their impact on the structure and function of proteins.

Texts

- *Smith: Mark's Basic Medical Biochemistry, A Clinical Approach 2nd ed, 2004 eds Lippincott, Williams and Wilkins*
- *Gaw: Clinical Biochemistry, An Illustrated Colour Text, 4th Edition*
- *Baynes: Medical Biochemistry, 3rd Edition, Mosby Ltd.*
- *Alberts: Molecular Biology of the Cell 4th ed 2002 Garland (available electronically free on the Web and through the Library Catalogue.)*
- *Textbook of Biochemistry with Clinical Correlations 6th ed, 2006 T.M. Devlin, Editor Wiley-Liss*
- *Kuchal: Schaum's Outlines in Biochemistry. 3rd edition, McGraw Hill*

PHARMACOLOGY

Outline

- The diversity of mechanisms by which drugs can have beneficial effects in treating human disorders.
- The concepts of dose-response, antagonism and the associated metrics such as EC50 and ED
- The mechanisms by which the body absorbs and metabolises drugs and the potential for disease states (or other drugs) to compromise the body's drug metabolising capacity.
- The assessment of drug effects in patients and to describe circumstances where measurement of drug concentrations in the blood may assist in optimising drug dosing.
- The issues underlying adverse events (AEs) associated with drug administration and the clinical management of drug overdose.
- The use and abuse of legal and illicit drugs for non-medical purposes.

Texts

- *Rang: Pharmacology 6th ed 2007 Churchill Livingstone*

PATHOLOGY

Outline

- The basic principles underlying the processes of cell injury, adaptation, ageing, and the two mechanisms leading to cell death.
- The major processes of tissue renewal and repair in the body
- The role of acute and chronic inflammation in normality and disease, the cellular and soluble components associated with and that produce inflammation and the outcomes and control mechanisms of inflammation.
- The meaning of neoplasia and nomenclature of tumours. The mechanism of underlying neoplastic transformation and accumulation of genetic damage, the basic morphology of tumours, both in macroscopic and microscopic terms, the mechanism underlying metastasis and finally, the overall risk factors for cancer.
- The morphological appearance of normal, dysplastic and malignant tissue and the morphological appearance of metastasis.

Texts

- *Kumar: Robbins and Cotran Pathologic Basis of Disease, 8th Edition, 2009, Saunders (available electronically through MDConsult database and Library Catalogue)*
- *RCPA manual 4th ed. Royal College of Pathologists of Australasia. Previously Manual of Use and Interpretation of Pathology Tests. (available electronically free on the Web and through the Library Catalogue.)*

GENETIC MEDICINE

Outline

- The basic concepts of cell cycle and nuclear events, mitosis and meiosis.
- The overall genetic paradigm DNA→RNA→Protein, the chemical nature of DNA, the organisation of the double helix, the mechanisms of transcription and translation, the significance of the genetic code, the different types of mutations, and the concept of protein misfolding.
- Cancer is caused by multiple mutations that affect the processes regulating cellular growth and division. The mechanisms of carcinogenesis and consequent uncontrolled growth.
- The epidemiology of genetic disorders, the levels of treatment and the significance of triplet mutations. The ethical dilemmas in treatment of genetic disorders, and finally, the basic prenatal genetic diagnostic strategies

Texts

- *As for physiology/biochemistry*

CLINICAL TEXTS

Medicine

- Talley & O'Connor: *Clinical Examination, A Systematic Guide to Physical Diagnosis, 6th Edition, 2009*
- Lloyd: *Communication Skills for Medicine, 3rd Edition, 2009*
- Haslett: *Davidson's Principles & Practice of Medicine 20th ed 2006 Churchill Livingstone*
- Lindsay: *Neurology and neurosurgery illustrated 3rd edition, Churchill Livingstone 1997*
- Stedman's *Illustrated Medical Dictionary 27th ed 2000 Lippincott Williams & Wilkins (available electronically through STAT!Ref database and the Library Catalogue.)*
- Rees, P.J., Pattison, J., Williams, G. (2007) *100 Cases in Clinical Medicine, 2nd Edition, Hodder/Arnold*
- Houghton, A. R., Gray, D. (2010) *Chamberlain's Symptoms and Signs in Clinical Medicine : An Introduction to Medical Diagnosis, 13th Edition, Hodder/Arnold*
- Model, D. (2006) *Making sense of clinical examination of the adult patient, Hodder/Arnold*

Obstetrics & Gynaecology

- Llewellyn-Jones: *Fundamentals of Obstetrics & Gynaecology 8th ed 2005 Mosby*

Paediatrics

- Robinson: *Practical Paediatrics 6th ed 2007 (feb) Churchill Livingstone*

Psychological Medicine

- Beth Adler: *Psychology and Sociology Applied to Medicine 2nd Ed 2004 Churchill Livingstone * new to list 2005*
- Vivian Stevens: *Rapid Review: Behavioural Science 2006 Elsevier * new to list 2005*

Surgery

- Burkitt: *Essential Surgery 3rd ed 2002 Churchill Livingstone*
- Smith: *Hunt & Marshall's Clinical Problems in Surgery, 2nd Edition, Churchill Livingstone Australia 2010*