

Anatomy and Physiology

1. Integumentary System:

- Define the general classification of tissues within an organ and apply this to skin.
- Describe the structure and functions of skin.
- Describe the different types of skin cell and explain how their structure helps them to fulfil their function.
- Identify the characteristic features in histological sections of human skin (epidermis, dermis, hair follicles)
- Preparation of tissue for visualisation under a microscope.
- Describe how skin can regenerate under normal physiological conditions.
- Describe wound healing in the skin (at molecular, cell, and tissue levels).

2. Cells and organelles

- Label the major organelles/sub-cellular structures of a typical human cell.
- Describe the functions of major organelles/sub-cellular structures.
- Relate particular structural features to the specific function of a cell type (using skin cells as an example).
- Describe key intracellular processes, (e.g., protein trafficking, protein degradation).
- Describe some of the behaviours/activities of human cells (using skin cells as an example).
- Give examples of some clinical consequences of abnormal cell structure or abnormal cell behaviour/activity.

3. Gene Expression

- Understand the term "The Central Dogma"
- Define the terms "transcription" and "translation" and outline the main features of these processes
- Describe how mutations, insertions, deletions and translocations arise
- List some conditions that arise as a consequence of altered gene expression

4. Stem cells and differentiation

- Appreciate the concept of 'life from single cell'.
- Explain potency of cells and process of differentiation to form diverse tissue types using skin as an example.
- Define multiple biological processes that a stem cell can undergo using blood as a model tissue.
- Describe factors controlling stem cell fate.
- Understand the background molecular biology managing stem cell and differentiation i.e. gene expression and regulation.

5. Protein Biochemistry

- describe how the structure and conformation of proteins explains how they function
- describe how protein function is regulated
- illustrate these points with appropriate examples

6. Blood

- Describe the main components of blood and outline its functions.
- Describe the major cells types in blood and outline their functions
- Describe haemopoiesis
- Describe how blood loss stops (haemostasis) after wounding.
- Describe the processes by which blood clots (coagulation).

7. Shock

- define shock;
- list three types of shock;
- describe the changes in pulse rate, respiration and responsiveness which occur in haemorrhagic shock;

8. Cell Cycle and Cancer

- Define and distinguish between the terms 'tumour' and 'cancer'.
- Explain how tumours arise at a molecular and cellular level, as a consequence of mutations in proto-oncogenes and tumour suppressor genes.
- Define the cell cycle, describe its various stages and outline how it is normally regulated.
- Explain the basic principles of an X-ray, CT scan and MRI scan and say when it would be appropriate to use each of these.
- Describe the events of the normal cell cycle and control mechanisms.
- Describe the role of signaling molecules in the cell cycle
- Explain the difference between proto-oncogenes, and tumour suppressor genes
- Describe how gene mutations can lead to cancer

9. Neoplasia

- Define neoplasia, and describe the essential features of neoplasia
- Describe the differences between benign and malignant disease
- List and define the terminology used in the description of neoplasms
- Explain the concept of pre-malignancy

10. Bones and joints

- Describe the composition of bone at a tissue, cellular and molecular level
- Describe the structure of a synovial joint
- Describe the normal anatomy of joints (hip and knee as examples)
- Classify the different types of joint according to their composition and according to the movements they allow.
- Describe the composition of cartilage.
- Describe the anatomy of the shoulder joints (gleno-humeral and acromio-clavicular) and vaguely related, sterno-clavicular.
- Describe the muscles of the shoulder and relate their contraction or relaxation to specific movements of the shoulder.

- Distinguish between a ligament and tendon.
- Describe the inflammatory response.
- Discuss the nature and management of an acromio-clavicular joint disruption/injury.

11. Signalling

- Demonstrate an understanding of basic principles of cell signalling;
- Classify signalling molecules according to their chemical nature, their range of action and/or their mechanism of action;
- Distinguish between first and second messengers;
- Describe the mechanisms of RTK signalling; G-protein-mediated signalling; and steroid receptor signalling;
- Give examples of aberrant signalling leading to clinical conditions or disease;
- Give examples of signalling molecules or pathways relevant to the weekly theme (musculoskeletal systems: bones and joints).

12. Osteoarthritis

- Define osteoarthritis and understand the changes in articular cartilage
- Describe the pathophysiology of osteoarthritis
- Discuss clinical signs and x-ray findings in osteoarthritis
- List the medical and surgical treatment options for osteoarthritis

13. Extracellular Matrix

- Describe the nature and function of extracellular matrix (ECM) components, including proteoglycans and fibrous proteins;
- Describe the composition of osteoid and cartilage (ECM in bones and joints);
- Describe how cell interactions with ECM components influences cell behaviour.

14. Muscle Physiology

- Describe Resting membrane potential
- Describe initiation of Action potential
- Be familiar with the microstructure of muscle
- Understand the mechanism of muscle contraction.

15. Muscles – the moving body

- Identify and describe the function of major muscle groups/compartments
- Identify the key stabilising structures of each major joint (shoulder, elbow, wrist, hip, knee, ankle)
- Identify major signs of common injuries radiologically
- Discuss the anatomical basis for basic physical examination of each of the major joints
- Identify the major features of the vertebral column and supporting structures

16. Nervous System

- Describe the major divisions of the nervous system with specific examples (CNS/PNS/ANS)
- Identify the major features of the brain and spinal cord
- Identify the major groups of peripheral nerves

- Describe the supporting tissues of the nervous system
- Describe the subdivisions of the nervous system (CNS, PNS, ANS).
- Briefly outline the physiological function of the different components of the nervous system (central, peripheral and autonomic).

17. Cardiac Output

- Describe the sequence of the cardiac cycle
- Describe how the heart initiates and conducts impulses
- Describe the events which lead to contraction of the heart muscle
- Identify the parts of the Electrocardiogram (ECG)

18. Respiratory physiology

- Describe the mechanics of breathing
- Understand the function of components of the respiratory system.
- Discuss how gas exchange occurs in the lung.
- Describe the cough reflex.

19. Control of peripheral vascular resistance

- Identify the structural features of arteries and veins
- Describe how blood pressure can be modulated at a local and central level
- Describe fluid transport between capillaries and tissues

20. Control of blood flow

- Describe the factors which control blood flow within vessels
- Appreciate the clinical significance of blood vessel radius
- Describe the mechanisms which encourage venous return

21. Cardio respiratory

- Describe the overall arrangement of the respiratory system (respiratory tract, "airways", lungs, bronchial tree)
- Describe the overall arrangement of the cardiovascular system (heart, major blood vessels throughout the body, and basic features of arteries, veins and arterioles)
- Understand the anatomical basis of the cardio-respiratory cycle (including ventilatory movements and its control) and its examination
- Identify major cardio respiratory features on a chest X-ray
- Describe the anatomy and histology of the respiratory tract
- Describe the defence mechanisms of the respiratory tract, including the cough reflex.
- Describe the risk factors for pulmonary embolism.
- Explain the signs and symptoms of pulmonary embolism.
- Describe the diagnosis and management of pulmonary embolism.
- Describe the mechanism of action of anti-coagulants.

22. Food and nutrition

- List sources of carbohydrates, fat and protein in typical western diet
- Describe carbohydrate protein and fat structure
- List essential amino acids and fatty acids and micronutrient
- Understand bioavailability

23. Digestion and absorption

- Describe the digestive secretions produced by specific parts or organs of the GI tract (salivary, gastric, pancreatic and liver secretions).
- Name the cell types responsible for producing these various secretions.
- List the digestive enzymes produced, their substrates, their products and the pH at which they are effective.
- Explain the need for emulsification of fats and describe the formation of micelles. Briefly describe the mechanisms by which the products of digestion (sugars, glucose and fatty acids) are absorbed.
- Outline what happens to carbohydrate and protein that is not digested in the GI tract.

24. The Gastrointestinal system

- Identify and describe the function of the major features of the oesophagus, stomach, SI, LI, rectum/anus
- Identify and describe the function of the major features of the liver, gall bladder, spleen, pancreas
- Identify the major circulatory structures of the abdomen
- Identify the key histological features of the stomach, intestines and liver
- Describe the organisation and the histology of the gastrointestinal
- Describe the digestion of carbohydrates, fats and proteins, name enzymes involved and products
- Describe 'normal eating behaviour'.
- Describe the clinical features of bulimia nervosa.
- Describe how a patient with bulimia would be managed.

25. Kidney physiology

- Give a brief account of the role of the kidneys in maintaining water and electrolyte homeostasis.
- List typical values for water and salt intake and excretion rates.
- List typical values for renal blood flow, glomerular filtration rate and minimum and maximum rates of urine production.
- List the component parts of a nephron (glomerulus, proximal convoluted tubule, loop, distal tubule and collecting duct) and give a brief account of the principle function of each component.
- List the major hormones regulating renal function and give examples of how they act.

26. Screening programmes

- Criteria required to be met before a screening programme is introduced.
- Why the cervical screening programme fulfils these criteria
- Component parts of the Cervical Screening Programme in Scotland
- Aetiology of Cervical Cancer, particularly in relation to HPV

- Describe the abnormalities that may be detected in a cervical smear test, and their significance.
- Discuss the process and criteria for screening programmes.
- Actions required following a cervical smear
- HPV vaccination
- Other HPV testing scenarios: test of cure, triage and primary HPV testing
- Reasons why PSA screening is not recommended as a national screening program

27. Urodynamics

- Give typical values for the range of urine production rates and bladder capacity.
- Draw a simple diagram to show the structure of bladder, urethra and sphincters and their sensory and motor innervation.
- Draw a diagram to show typical pressure/volume relationships for a normal bladder as it fills to normal capacity.
- Give a brief account of normal voiding.

28. The Urogenital system

- Define the urogenital system
- Understand difference between urinary and reproductive systems
 - Where are they separate, and where combined?
 - Differences between male and female
- basic structure and function of: kidney, ureter, urinary bladder, urethra, gonads
- Describe the anatomy of the (lower) urinary tract.
- Describe how urination (micturation) is regulated at a physiological level.
- Describe the pathophysiology of benign prostatic hyperplasia.
- Explain the relevance of testing for prostate specific antigen (PSA).

29. Hearing Physiology

- Understand some of the physical properties of sound in a real environment.
- Explain how sound vibrations are transmitted to the hair cells in the cochlea, overcoming the so-called 'impedance mismatch'
- Describe the way in which vibrations are turned into neural impulses and the critical differences between inner and outer hair cells.
- Explain how the frequency of sounds is represented in the central auditory system

First aid and the MD team

30. First Aid

- discuss the general management of an incident and the life saving priorities (A,B,Cs);
- describe types of wounds and their first aid management
- Describe the ABC(DE) approach to assessing the patient.

31. The Multidisciplinary team

- Describe the triage system and the role of the triage nurse.
- Describe the structure of a GP consultation.
- Describe the role of 'the rapid response team'/paramedics.
- Outline the role of the general practitioner in health provision
- Describe the role of a police surgeon/forensic physician
- Appreciate the importance of audit in clinical practice, and how information technology can be used to support this

Ethics

32. Ethics

- Differentiate the ethics of being a doctor from other definitions of ethics
- Recognise the ethical context of everyday medical practice
- Interpret common ethical ideas in medicine
- Summarise the obligation for consent in the doctor-patient relationship.
- Describe the concept of capacity to give or to refuse consent for medical treatment; and the right of the patient to refuse treatment.

Pharmacology

33. Pharmacokinetics

- Define pharmacokinetics and pharmacodynamics
- Define the main pharmacokinetic variables (bioavailability, clearance, half-life, steady state)
- Describe different routes of drug administration
- Aware of the different types of drugs used in medicine
- Aware of examples of therapeutic targets.
- Aware of receptor agonism and antagonism.
- Aware of examples of unusual pharmacokinetic / pharmacodynamic relationships

34. Pharmacodynamics

- Be able to define linear and non-linear kinetics
- Be aware of the main cytochrome P450 enzymes involved in drug metabolism
- Be aware of important enzyme inducers/inhibitors and their importance in drug interactions.

Immunology

35. Immunology

- Describe the difference between innate and adaptive immunity;
- List the key components (tissues and cells) involved in the innate immune response;

- Describe the role of cellular and humoral components in both the acute and chronic inflammatory response;
- Appreciate the benefits and potential dangers of acute and chronic inflammatory responses;
- Describe how innate cells recognise pathogens to initiate a response.
- Describe the anatomy of the immune system;
- Appreciate the link between innate and adaptive responses;
- Describe the cell mediated immune response (T cell);
- Describe the humoral immune response (B cell/antibody)

36. Viruses

- To understand the molecular nature of viruses
- To appreciate a range of viruses infecting humans
- To be able to describe in simple terms the replication cycle of a virus
- To understand virus genetic diversity and how this underpins virus evolution and virus epidemics/pandemics.

37. Tuberculosis

- To understand and recall the nature of the human immune response to tuberculosis
- To understand what a granuloma is
- To understand what is meant by a Th1 versus a Th2 response.
- To appreciate the role of cytokines in immunity to TB
- To understand the principles of the T spot test in detecting latent TB infection

38. Influenza

- To understand the role of antibodies and cytotoxic T cells in protecting against viral infections
- To understand the principles of vaccination against infectious diseases
- To appreciate the role of inflammation in promoting immune responses and the role of adjuvants
- To appreciate the need for immunisation against influenza and those at risk and hence targeted for immunization

39. HIV/AIDS

- Outline the clinical features of HIV disease in relation to the effects on the immune system.
- Understand what is meant by an opportunist pathogen and their relation to the CD4 count in HIV infection
- Understand how HIV enters, infects and destroys CD4 lymphocytes
- Discuss the principles of treatment of HIV

40. Hypersensitivity type 1

- Define anaphylaxis and related terms.
- Outline the immunological basis for Type 1 Hypersensitivity.
- Describe the clinical features of Type I allergic reactions including anaphylactic shock.
- Discuss tests used to diagnose Type I allergic reactions
- Outline the factors involved in management of Type I allergies discuss problems of peanut allergies

41. Rheumatoid arthritis

- The structure of the normal synovial joint and the pathologic changes in rheumatoid arthritis.
- The basics of aetiopathogenesis of RA and the effect of this on other organ systems and co-morbidity
- Diagnostic tests in RA
- Drug Treatment of RA including DMARDs and Biologics
- The role of the MDT and psychosocial aspects of RA

Patient Safety and Care

42. Patient and personal safety

- Describe the steps to be taken to minimise the risk of individuals acquiring infections during the course of care or treatment
- Describe the standard precautions that must be taken with all patients at all times regardless of their known infection status, and the additional precautions that need to be taken with some patients
- Outline the safe management of healthcare waste

Health in Communities

43. Health determinants and health inequalities

- Discuss the concepts of health, illness and disease
- Discuss how these concepts relate to well-being.
- Explore the factors influencing health and explain how health inequalities arise.
- Identify differences in determinants of health in Castlehouse and Millnock and explain their impact on health
- Describe “inequalities in health” means and make some recommendations for tackling them
- Discuss the concept of “illness behaviour”, including the triggers that result in consultation.
- Outline strategies used to assess the health of populations and define incidence and prevalence.
- Explore the concept of a ‘model’ and why it is important
- Discuss the major determinants of health

44. Stress

- Outline the physiological basis of stress and briefly describe its effects on individuals.

45. Depression

- Define depression and outline its main clinical and epidemiological features.
- Discuss the aetiological theories and risk factors for depression.
- Discuss the options available for managing depression

46. Obesity

- Briefly describe how the body stores fat
- Discuss the definition of overweight and obesity
- Briefly explore the factors governing the development of obesity in individuals
- Outline the impact of obesity on the individual
- Describe and explain current trends in the prevalence of obesity
- Suggest strategies for dealing with the obesity epidemic
- Epidemiology of obesity
- What are the medical consequences?
- Mechanisms to metabolic disease – “ectopic fat”
- Why is weight loss a difficult process and what can be done about obesity?

47. Fatigue and energy

- Define ‘energy’ and discuss the energy needs of the organism
- Outline the central role of Acetyl CoA in metabolism
- Review the general features of the mitochondrion
- Discuss the roles of ATP, cofactors and co-enzymes in energy metabolism
- Outline the key features of the Krebs Cycle and Oxidative Phosphorylation
- Describe the range of possible reasons for the presentation of fatigue
- Discuss the GP’s approach to symptoms like fatigue

48. Drugs and neurotransmitters

- Define the term ‘drug’ and discuss therapeutic use of drugs
- Discuss the concept of drug misuse/abuse
- What are neurotransmitters, how do they work and how are they controlled?
- Identify and group the most commonly misused drugs; briefly discuss their mechanisms of action and their effects
- Describe the effect of drugs on society as a whole

49. Addiction

- Outline the consequences (physical, psychological and social) of alcohol consumption
- Summarise concepts that may be used to explain the natural history of addiction (experimentation, habituation, deterioration or cessation)
- Outline some of the reasons why some sections of society seem to be more vulnerable to addiction, and seem to be unable to help themselves
- Examine his or her own attitudes to addicts and addictions
- To describe the possible aetiologies of problematic alcohol and drug use
- To understand the social and psychological impacts of problem alcohol and drug use
- To describe the concept of recovery from problematic alcohol and drug use from the perspectives of the individual and the family

50. COPD

- Explain the normal relationship between ventilation (exchange of air between lungs and environment) and perfusion (gas exchange with circulation)
- Define COPD and distinguish between chronic bronchitis and emphysema
- Describe the pattern of these diseases in the community (their epidemiology)
- Describe the appropriate investigations in the management of COPD

51. Asthma

- Discuss in broad terms the likely causes of asthma
- Speculate on a) the rise in incidence of asthma; b) its underdiagnosis
- Describe what happens to the lungs during the development of reversible obstructive lung disease (asthma)
- Compare and contrast COPD and asthma in terms of morbidity and mortality, causes, clinical features, effects on respiratory physiology, potential approaches to management
- Discuss factors influencing patient adherence/compliance.

52. CHD

- Outline the blood supply to the heart
- Describe the pathological changes which are found in CHD
- Define 'angina', outline its clinical features and discuss possible outcomes
- Describe the impact of CHD on the UK/Scottish population
- Identify and explain trends in CHD mortality and morbidity
- Identify the risk factors for coronary heart disease and show how their effect can be reduced

53. Angina

- Describe methods for assessing heart function including clinical examination, and cardiac imaging (in particular echocardiography)
- Explain the production, character and distribution of cardiac chest pain
- Describe the normal electrocardiogram (ECG) and outline the relationship between it and the cardiac cycle (P wave, QRS complex, T wave and atrial depolarisation, ventricular depolarisation, ventricular repolarisation)
- Describe the investigations (in particular the exercise test) and treatment for angina pectoris with emphasis on pharmacology

54. Reproduction and pregnancy

- Describe the anatomy and physiology of the male and female reproductive systems
- Describe the events of sexual intercourse to the stage of conception.
- Outline the process of fertilisation
- Describe the changes associated with physical and emotional sexual maturation
- Explain how social patterns, peer groups and teenage culture influence behaviours such as sexual activity
- Describe the procedure of pregnancy testing and the basis of the test

55. Contraception

- Describe what contraceptive methods are available
- Discuss factors influencing teenage use of contraceptives
- Describe sexually transmitted infections and review the basic tenets of “safer sex”
- Discuss the essential features of the relationship between doctor and patient with reference to confidentiality and other key issues

56. Delirium and dementia

- Review the anatomy and main functions of the brain (at all relevant levels of the hierarchy)
- Construct a simple differential diagnosis for confusion/delirium
- Describe the main pathological processes thought to be responsible for dementia
- Outline the effects of dementia on the patient’s behaviour
- Outline the epidemiology of dementia and discuss how it fits in to the general pattern of old age
- Outline any treatments available for dementia
- Differentiate the roles of family, doctor and society in the management of confusion and dementia

57. Caring

- Discuss what is meant by Community Care, and what problems might be encountered in delivery
- Consider the implications of caring for the elderly in the coming decades
- Discuss the impact of caring on carers
- Analyse the advantages and disadvantages of admitting an elderly person to a care home

58. CHD and health prevention

- Review the evidence that links cholesterol, blood pressure and smoking and the risk of CHD
- Outline the therapeutic interventions that can be delivered through primary care to lower these risks
- Outline the wider behavioural changes needed to lower these risks
- Debate the degree to which these interventions can be successful without wider societal change
- Outline the main influences throughout the life course which improve health and not just prevent disease
- Explore the links between the narrower high risk prevention strategies and broader population strategies
- Suggest what might be done practically in the community

59. Lung Cancer

- Outline the pathological classification of lung cancer
- Describe the possible symptoms and signs in a patient suffering from lung cancer
- Describe the relevant investigations in the diagnosis or exclusion of lung cancer
- Understand how common lung cancer is in the community
- Define the causal relationship between smoking and lung cancer and appreciate the importance of smoking cessation in the prevention of lung cancer
- Describe the strategies available to help patients with smoking cessation
- Discuss the difficulties facing the carer of a patient with cancer

60. Stroke

- Define stroke and describe its main pathological features
- Briefly describe the blood supply to the brain and show how it relates to the clinical features of stroke
- Compare and contrast the underlying pathological findings in stroke and dementia
- List the options available for the immediate and longer term management of stroke patients
- Outline the functions of the members of the rehabilitation team
- Justify the practice of detection and continued monitoring of high blood pressure

Homeostasis

61. Cholesterol and fat metabolism

- describe the types of lipid in our diet and explain why some types of fatty acids are essential.
- explain the processes involved in the digestion and absorption of lipid and how the various types of lipid molecule enter the bloodstream.
- describe the processes involved in storing fat in, and releasing it from, the cells of adipose tissue and explain how these processes are controlled by hormones
- explain how, and in which tissues, fatty acids are used as an energy source
- list the classes of lipoprotein, explain the broad structural differences between them and outline the functions of each in the body.
- summarise the roles of cholesterol in body functions and explain what controls the amount of cholesterol in the bloodstream.
- identify medication available to help reduce cholesterol and explain the mechanism(s) involved and current ideas of how blood cholesterol might be reduced

62. Glucose homeostasis

- List the characteristics of type I Diabetes and explain how it is diagnosed.
- Describe the structure of the pancreas and the functions of different cell types.
- Describe the synthesis and processing of insulin in B cells of Islets of Langerhans.
- Outline the mechanism by which blood glucose concentration provides a signal for release of insulin.
- Describe the changes in blood insulin produced by a healthy pancreas in response to normal eating patterns and compare these with the changes when a diabetic patient injects insulin.
- Describe the effects of insulin on relevant tissues (short-term and long-term effects) and how these effects are achieved.
- explain how glucose homeostasis is maintained through hormonal controls and outline how hypoglycaemia could be treated
- Explain the different responsibilities of a patient for self-management and of the General Practice staff and Diabetes Clinic staff for supervision of diabetic care.
- Examine the ethical and legal responsibilities and the impact of these on the life-style of patients with type I diabetes.

63. Glucose Transporters

- Understand the difference between active and passive transport
- Understand the structure and function of a glucose transporter
- Have an appreciation of the kind of information that can be gleaned from kinetics
- Be able to explain why multiple transporter isoforms are expressed in a tissue-specific manner
- Understand how insulin stimulates glucose transport in peripheral tissues
- Appreciate the importance of model organisms in medical research

64. Carbohydrate Metabolism

- Describe the types of carbohydrate in the diet
- Describe the processes involved in the digestion and absorption of different types of dietary carbohydrates including disaccharides.
- Describe the different routes through which glucose can be metabolised.
- Explain the different reasons why some tissues are more dependent on glucose than others.
- Describe how blood glucose concentration is controlled in a healthy individual immediately after a meal, between meals and after a prolonged period without food.
- Outline the processes through which glucose is converted to glycogen and vice versa and explain how these processes are controlled and how they respond to signals generated by relevant hormones in different tissue types.
- define the term 'glycaemic index' and explain the factors that determine the time-scale of glycaemic response

65. Regulating Fat

- Describe the key intermediates and regulated enzymes of triglyceride synthesis and lipolysis in adipose tissue
- Describe the role and regulation of HMG-CoA reductase in cholesterol synthesis
- Describe the structure and function of different classes of lipoproteins
- Describe the relationship between cholesterol, lipoproteins and cardiovascular disease
- Explain the requirement for essential fatty acids
- Describe the mechanism of action of the statin cholesterol-lowering drugs

66. Water and electrolyte homeostasis

- Describe the characteristic metabolic changes in uncontrolled or poorly-controlled type I (insulin-dependent) diabetes.
- Explain the metabolic basis for the need for insulin even when there is no food intake.
- Explain why, how and in what tissues ketone bodies are normally produced, how and where they are metabolised and what changes you would expect in untreated diabetes.
- Describe the general structure of the kidney and of a single nephron.
- describe the contributions of the kidney in maintaining glucose and hydrogen ion homeostasis and non-renal mechanisms that regulate plasma pH
- Outline the simple measures that would be used to treat the dehydration and acidosis seen in this patient.

67. Cause of diabetes

- Understand what insulin is, how it was discovered, and what it does
- Understand the pathophysiology, epidemiology and treatment of Type 1 and 2 Diabetes
- Be familiar with microvascular complications associated with Type 1 diabetes and how best to avoid them.

- Be familiar with the importance of cardiovascular risk factor management in the management of diabetes.
- Be familiar with the main diabetic emergencies seen in clinical practice.
- Be familiar with novel therapies for diabetes management including incretin-based therapies and insulin pumps.

68. Capillary homeostasis

- Describe the structure of capillaries - including the cellular structure of endothelial cells and the extracellular components of capillary structure - the basal lamina.
- Explain the principles of capillary exchange.
- Describe the role of capillaries in haemostasis and their contribution to other regulatory processes.
- Describe the capillary changes that occur in diabetes.
- List the causes of, and describe the nature of, capillary damage that leads to haemorrhage or exudation.
- List the tissues/organs where function is known to be at risk from capillary damage in uncontrolled diabetes and explain the broad consequences for the patient's health.

69. Type 2 Diabetes

- describe the characteristic features of type II diabetes and understand its impact on NHS resources
- describe the structure of arteries and their related function
- outline the molecular and cellular changes leading to the deposition of atheromatous plaque and describe the interactions between endothelial cells and platelets and their role in the development of atheroma
- Explain the potential value of antioxidants in terms of protection against molecular or tissue damage by free radicals and the arguments about the antioxidant role of vitamins
- Explain what effects persistent hyperglycaemia can have on molecules and tissues of the body and how long-term patterns of blood glucose can be monitored.
- Explain the responsibilities of patients with type II diabetes for self-management.
- Discuss how circulatory and neuropathic changes affect the feet in diabetes, and explain how these are managed.
- Describe the main classes of drugs used to treat type II diabetes.
- Explain the role of diabetes registers in management of diabetes in the community, and in tracing defaulters from care.

70. Vascular structure and hypertension

- Describe the structure of the blood vessel wall
- Discuss the concept of sympathetic co-transmission
- Describe the process of transmitter release
- Outline the hypertension-induced structural alterations that occur in small arteries.
- Discuss the importance of the vascular adventitia and myo-endothelial junctions.

71. Hypertension

- describe how the heart works including its electrical and mechanical properties, structure and functions of the cardiac chambers, heart valves and major blood vessels
- explain the possible origins of a heart murmur including valve stenosis or regurgitation, and how a murmur would be assessed, including clinical examination and cardiac imaging
- describe arterial blood pressure, the haemodynamic factors on which it is dependent- cardiac output, vascular resistance and intravascular volume- and how it is controlled

- define hypertension and describe the rationale for treatment, the mechanisms of anti-hypertensive therapy and the side-effects of drug therapy

72. Drugs affecting blood pressure

- Describe the major risk factors for the development of hypertension
- Understand the role of neuronal, hormonal and renal systems in controlling blood pressure
- Describe the major classes of drugs used to treat hypertension
- Describe the NICE guidelines for drug treatment of hypertension and how they relate to age and ethnicity

73. Heart failure

- describe the symptoms and signs of the syndrome of heart failure and explain them with respect to the pathophysiological mechanisms
- describe the cardiac compensatory mechanisms in the failing heart including hypertrophy, dilatation and increased filling pressure
- describe the responses of the peripheral vasculature, both arterial and venous, in heart failure in order to understand the concepts of “pre-load” and “after-load”
- describe the neuroendocrine changes in heart failure
- explain the benefits and mechanisms of actions of drug treatment of heart failure, in particular diuretics, vasodilators, inotropic agents, ACE inhibitors and β -blockers
- To define the syndrome of heart failure, and to describe why it occurs
- To describe the haemodynamic changes that occur in heart failure, in particular the compensatory mechanisms by which the body maintains normal cardiac output
- To describe other compensatory mechanisms, in particular neuro-hormonal activation, involving the autonomic nervous system and the Renin-Angiotensin-Aldosterone system
- To understand how compensatory mechanisms initially improve the situation but eventually make it worse, contributing to the signs and symptoms of heart failure
- To describe the basis for drug treatment in heart failure, and to consider the commonly used therapies

74. Acid-base balance and respiratory failure

- revise the pathophysiology of smoking-related lung disease
- revise the normal homeostatic mechanisms involved in the control of ventilation to maintain normal blood gases
- explain how chronic lung disease results in changes in ventilatory control, with hypoxia and hypercapnia
- describe the acid-base compensatory mechanisms that occur in respiratory acidosis