



USMLE PREPARATION COURSE OUTLINE

PURPOSE

The purpose of this course is to prepare students for the USMLE Step 1 exam following a comprehensive overview of major subjects of Biomedical Basic Sciences with a system approach and emphasizing the clinical relationships. At the same time students are going to be trained in the computer based exams.

OBJECTIVES

By the end of the course students should be able to understand the basic principles that control the human body organization and function as well as the mechanisms of diseases production

PROGRAM

General principles	80 hours
Musculoskeletal system	40 hours
Central and peripheral nervous system	48 hours
Hematopoietic and Lymphoreticular system	8 hours
Respiratory system	16 hours
Cardiovascular system	32 hours
Gastrointestinal system	32 hours
Renal (urinary) system	16 hours
Endocrine system	24 hours
Reproductive system	16 hours
Skin and connective tissue	8 hours

FACULTIES

Dr. Miguel Miyares Calás MD PhD.
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ASSESSMENTS

At the beginning of the course students will take a USMLE Step 1 like exam every week students will take a comprehensive exam about topics covered in the previous weeks. At the end of the course students will take another USMLE Step 1 like exam.



COURSE OUTLINE

General Principles: (80 hours)

Biochemistry and molecular biology

- Structure and function of proteins
 - Principles of protein structure and folding
 - Enzymes: kinetics, reaction mechanisms
 - Structural and regulatory proteins: ligand binding, self-assembly
 - Regulatory properties
- Gene expression: DNA structure, replication, and exchange
 - DNA structure: single- and double-stranded DNA, stabilizing forces, supercoiling
 - Analysis of DNA: sequencing, restriction analysis, PCR amplification, hybridization
 - DNA replication, mutation, repair, degradation, and inactivation
 - Gene structure and organization; chromosomes; centromere, telomere
 - Recombination, insertion sequences, transposons
 - Mechanisms of genetic exchange, including transformation, transduction, conjugation, crossover, recombination, linkage
 - Plasmids and bacteriophages
- Gene expression: transcription, including defects
 - Transcription of DNA into RNA, enzymatic reactions, RNA, RNA degradation
 - Regulation: cis-regulatory elements, transcription factors, enhancers, promoters, silencers, repressants, splicing
- Gene expression: translation, including defects
 - The genetic code
 - Structure and function of tRNA
 - Structure and function of ribosomes
 - Protein synthesis
 - Regulation of translation
 - Post-translational modifications, including phosphorylation, addition of CHO units
 - Protein degradation
- Energy metabolism, including metabolic sequences and regulation
 - Generation of energy from carbohydrates, fatty acids, and essential amino acids; glycolysis, pentose phosphate pathway, tricarboxylic acid cycle, ketogenesis, electron transport and oxidative phosphorylation, glycogenolysis
 - Storage of energy: gluconeogenesis, glycogenesis, fatty acid and triglyceride synthesis
 - Thermodynamics: free energy, chemical equilibria and group transfer potential, energetics of ATP and other high-energy compounds
- Metabolic pathways of small molecules and associated diseases
 - Biosynthesis and degradation of amino acids: homocystinuria, maple syrup urine disease
 - Biosynthesis and degradation of purine and pyrimidine nucleotides



- Biosynthesis and degradation of lipids. Dyslipidemias, carnitine deficiency
- Biosynthesis and degradation of porphyrins
- Galactosemia and other small sugar disorders
- Biosynthesis and degradation of alcohols and other small molecules
- Biosynthesis and degradation of other macromolecules and associated abnormalities, complex carbohydrates: lysosomal storage disease, glycoproteins, and proteoglycans: glycogen storage diseases

Biology of cells

- Structure and function of cell components: endoplasmic reticulum, Golgi complex, mitochondria, lysosome, peroxisome, endosome, centriole, microtubule, ribosome, polysome, plasma membrane, cytosol, cilia, nucleus, cytoskeleton
- Signal transduction: basic principles, receptors and channels, second messengers, signal transduction pathways
- Cell-cell and cell-matrix adhesion
- Cell motility
- Intracellular sorting: trafficking, endocytosis, exocytosis
- Cellular homeostasis: turnover, pH maintenance, proteasome, ions, soluble proteins
- Cell cycle: mitosis, meiosis, structure of spindle apparatus, cell cycle regulation
- Structure and function of basic tissue components: epithelial cells, connective tissue cells, muscle cells, nerve cells, and extracellular matrix
- Adaptive cell response to injury
- Intracellular accumulations: pigments, fats, proteins, carbohydrates, minerals, inclusions, vacuoles
- Mechanisms of injury and necrosis
- Apoptosis

Human development and genetics

- Embryogenesis: programmed gene expression, tissue differentiation and morphogenesis, homeotic genes, and developmental regulation of gene expression
- Congenital abnormalities: principles, patterns of anomalies, dysmorphogenesis
- Principles of pedigree analysis, including inheritance patterns, occurrence and recurrence risk determination
- Population genetics: Hardy-Weinberg law, founder effects, mutation-selection equilibrium
- Genetic mechanisms: chromosomal abnormalities, mendelian inheritance, multifactorial diseases
- Clinical genetics, including genetic testing, prenatal diagnosis, newborn screening, genetic counseling/ethics, gene therapy



Biology of tissue response to disease

- Inflammation, including cells and mediators
 - Acute inflammation and mediator systems
 - Vascular response to injury, including mediators
 - Inflammatory cell recruitment, including adherence and cell migration, and phagocytosis
 - Bactericidal mechanisms and tissue injury
 - Clinical manifestations: pain, fever, leukocytosis, leukemoid reaction, and chills
 - Chronic inflammation
- Reparative processes
 - Wound healing, hemostasis, and repair: thrombosis, granulation tissue, angiogenesis, fibrosis, scar/keloid formation
 - Regenerative processes
- Neoplasia
 - Classification, histologic diagnosis
 - grading and staging of neoplasms
 - Cell biology, biochemistry, and molecular biology of neoplastic cells: transformation, oncogenes, altered cell differentiation, and proliferation
 - Hereditary neoplastic disorders
 - Invasion and metastasis
 - Tumor immunology
 - Paraneoplastic manifestations of cancer
 - Cancer epidemiology and prevention

Multisystem processes

- Nutrition
 - Generation, expenditure, and storage of energy at the whole-body level
 - Assessment of nutritional status across the life span, including calories, protein, essential
Nutrients, hypoalimentation
 - functions of nutrients, including essential, trans-fatty acids, cholesterol
 - Protein-calorie malnutrition
 - Vitamin deficiencies and/or toxicities
 - Mineral deficiencies and toxicities
 - Eating disorders: obesity, anorexia, bulimia, alternative diets and nutritional supplements
- Temperature regulation
- Adaptation to environmental extremes, including occupational exposures
 - Physical and associated disorders: temperature, radiation, burns, decreased atmospheric pressure, high-altitude sickness, increased water pressure
 - Chemical: gases, vapors, smoke inhalation, agricultural hazards, volatile organic solvents, heavy metals, principles of poisoning and therapy
- Fluid, electrolyte, and acid-base balance and disorders: dehydration, acidosis, alkalosis



Pharmacodynamic and pharmacokinetic processes

- General principles
 - Pharmacokinetics: absorption, distribution, metabolism, excretion, dosage intervals
 - Mechanisms of drug action, structure-activity relationships
 - Concentration- and dose-effect relationships: efficacy, potency, types of agonists and antagonists and their actions
 - Individual factors altering pharmacokinetics and pharmacodynamics: age, gender, disease, tolerance, compliance, body weight, metabolic proficiency, and pharmacogenetics
 - Drug side effects, overdosage, and toxicology
 - Drug interactions
 - Regulatory issues: drug development, approval, scheduling
- General properties of autacoids, including peptides and analogs, biogenic amines, prostanoids and their inhibitors, and smooth muscle/endothelial autacoids
- General principles of autonomic pharmacology
- General properties of antimicrobials, including mechanisms of action and resistance
- General properties of antineoplastic agents and immunosuppressants, including drug effects on rapidly dividing mammalian cells

Microbial biology and infection

- Microbial classification and its basis
- Bacteria and bacterial diseases
 - Structure and composition
 - Metabolism, physiology, and regulation
 - Genetics
 - Nature and mechanisms of action of virulence factors
 - Pathophysiology of infection
 - Epidemiology and ecology
 - Principles of cultivation, assay, and laboratory diagnosis
- Viruses and viral diseases
 - Physical and chemical properties
 - Replication
 - Genetics
 - Principles of cultivation, assay, and laboratory diagnosis
 - Molecular basis of pathogenesis
 - Pathophysiology of infection
 - Latent and persistent infections
 - Epidemiology
 - Oncogenic viruses
- Fungi and fungal infections
 - Structure, physiology, cultivation, and laboratory diagnosis
 - Pathogenesis and epidemiology



- Parasites and parasitic diseases
 - Structure, physiology, and laboratory diagnosis
 - Pathogenesis and epidemiology
- Principles of sterilization and pure culture technique

Immune responses

- Production and function of granulocytes, natural killer cells, and macrophages
- Production and function of T lymphocytes, T-lymphocyte receptors
- Production and function of B lymphocytes and plasma cells; immunoglobulin and antibodies:
Structure and biologic properties
- Antigenicity and immunogenicity; antigen presentation; cell activation and regulation; tolerance and Clonal deletion
- Immunologic mediators: chemistry, function, molecular biology, classic and alternative complements pathways, cytokines, and chemokines
- Immunogenetics; MHC structure and function, class I, II molecules; erythrocyte antigens
- Immunizations: vaccines, protective immunity
- Alterations in immunologic function
 - T- or B-lymphocyte deficiencies: DiGeorge syndrome
 - Deficiencies of phagocytic cells
 - combined immunodeficiency disease
 - HIV infection/AIDS and other acquired disorders of immune responsiveness
 - Drug-induced alterations in immune responses, immunopharmacology
- Immunologically mediated disorders
 - Hypersensitivity types I–IV
 - Transplant and transplant rejection
 - Autoimmune disorders
 - Risks of transplantation, transfusion: graft-versus-host disease
 - Isoimmunization, hemolytic disease of the newborn
 - Immunopathogenesis
- Immunologic principles underlying diagnostic laboratory tests: ELISA, complement fixation, RIA, agglutination
- Innate immunity

Musculoskeletal System (40 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Cell/tissue structure and function
 - Biology of bones, joints, tendons, skeletal muscle
 - Exercise and physical conditioning



- Repair, regeneration, and changes associated with stage of life

Abnormal processes

- Infectious, inflammatory, and immunologic disorders
 - Infectious disorders: septic arthritis, Lyme disease, osteomyelitis
 - Inflammatory disorders: fibrositis, synovitis, tenosynovitis
 - Immunologic disorders: rheumatoid arthritis, ankylosing spondylitis, polymyositis, systemic lupus erythematosus, dermatomyositis, polymyalgia rheumatica
- Traumatic and mechanical disorders: fractures, sprains, strains, dislocations, repetitive motion injuries
- Neoplastic disorders: osteosarcoma, metastatic disease
- Metabolic, regulatory, and structural disorders: dwarfism, osteogenesis imperfecta, osteomalacia, Osteoporosis, osteodystrophy, gout, muscular dystrophy
- Vascular disorders: polyarteritis nodosa, bone infarcts
- Systemic disorders affecting the musculoskeletal system: diabetes mellitus
- Idiopathic disorders: Dupuytren contracture, scoliosis, Paget disease
- Degenerative disorders: disc disease, osteoarthritis

Principles of therapeutics

- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the musculoskeletal system
 - Nonsteroidal anti-inflammatory drugs and analgesics
 - Muscle relaxants
 - Antigout therapy: allopurinol, colchicine, uricosuric drugs
 - Immunosuppressive drugs: glucocorticoids, gold, cytotoxic agents
 - Drugs affecting bone mineralization: bisphosphonates, calcitonin, estrogen analogs
- Other therapeutic modalities: radiation, surgery, casts, rehabilitation

Central and Peripheral Nervous Systems (48 hours)

Normal processes

- embryonic development, fetal maturation, and perinatal changes, including neural tube derivatives, cerebral ventricles, neural crest derivatives
- Organ structure and function
 - Spinal cord, including gross anatomy, blood supply, and spinal reflexes
 - Brain stem, including cranial nerves and nuclei, reticular formation, anatomy, and blood supply
 - brain, including gross anatomy and blood supply; cognition, language, memory; hypothalamic function; limbic system and emotional behavior; circadian rhythms and sleep; control of eye movement
 - Sensory systems, including proprioception, pain, vision, hearing, balance, taste, and olfaction
 - Motor systems, including brain and spinal cord, basal ganglia and cerebellum



- Autonomic nervous system
- Peripheral nerve
- Cell/tissue structure and function
- Axonal transport
- Excitable properties of neurons, axons and dendrites, including channels
- Synthesis, storage, release, reuptake, and degradation of neurotransmitters and neuromodulators
- Pre- and postsynaptic receptor interactions, trophic and growth factors
- Brain metabolism
- Glia, myelin
- Brain homeostasis: blood-brain barrier; cerebrospinal fluid formation and flow; choroid plexus
- Repair, regeneration, and changes associated with stage of life

Abnormal processes

- Infectious, inflammatory, and immunologic disorders: meningitis, multiple sclerosis, myasthenia gravis, and disorders of the eye and ear
- Traumatic and mechanical disorders: subdural and epidural hematomas, cord compression, peripheral nerve injury
- Neoplastic disorders, including primary and metastatic
- Acquired metabolic and regulatory disorders: delirium
- Vascular disorders: cerebrovascular occlusion, venous sinus thrombosis, arterial aneurysms, hemorrhage
- Systemic disorders affecting the nervous system: lupus, diabetic neuropathy
- Idiopathic disorders affecting the nervous system
- Congenital disorders, including metabolic: neural tube defects, cerebral palsy, mental retardation, Down syndrome
- Degenerative disorders: peripheral neuropathy, Alzheimer dementia, Parkinson disease, Huntington disease, amyotrophic lateral sclerosis
- Paroxysmal disorders: epilepsy, headache, pain syndromes, and sleep disorders including narcolepsy, restless legs syndrome/periodic limb movement, circadian rhythm disorders, parasomnias
- Disorders of special senses: blindness, deafness

Principles of therapeutics

- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the nervous system
 - Anesthetics
 - Hypnotics
 - Psychopharmacologic agents: anxiolytics, antidepressants, antipsychotic agents, mood stabilizing agents
 - Anticonvulsants
 - Analgesics
 - Stimulants, amphetamines
 - Antiparkinsonian drugs
 - Skeletal muscle relaxants, botulinum toxin



- Neuromuscular junction blocking agents including postsynaptic
- Antiglaucoma drugs
- Drugs used to decrease intracranial pressure: mannitol, high-dose glucocorticoids
- Antimigraine agents
- Drugs affecting autonomic nervous system: anticholinesterases
- Other therapeutic modalities: radiation, CSF shunting, surgery

Hematopoietic and Lymphoreticular Systems (8 Hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Cell/tissue structure and function
- Production and function of erythrocytes, hemoglobin, O₂ and CO₂ transport, transport proteins
- Production and function of leukocytes and the lymphoreticular system
- Production and function of platelets
- Production and function of coagulation and fibrinolytic factors
- Repair, regeneration, and changes associated with stage of life

Abnormal processes

- Infectious, inflammatory, and immunologic disorders
- Infections of the blood, reticuloendothelial system, and lymphatics
- Allergic and anaphylactic reactions and other immunopathologic mechanisms
- acquired disorders of immune deficiency
- Autoimmunity and autoimmune diseases: Coombs positive hemolytic anemia, cryoglobulinemias, ITP
- Anemia of chronic disease
- Transfusion complications, transplant rejection
- Traumatic and mechanical injury: mechanical injury to erythrocytes, splenic rupture
- Neoplastic disorders: lymphoma, leukemia, multiple myeloma
- Metabolic and regulatory disorders, including acquired and congenital
- Anemias and cytopenias: iron deficiency anemia, hemoglobinopathies, hereditary Spherocytosis
- Cythemia
- Hemorrhagic and hemostatic disorders: coagulopathies, DIC
- bleeding secondary to platelet disorders: von Willebrand
- Vascular and endothelial disorders: effects and complications of splenectomy, hypersplenism, TTP, hemolytic uremic syndrome
- Systemic disorders affecting the hematopoietic and lymphoreticular system: nutritional deficiencies, systemic lupus erythematosus
- Idiopathic disorders



Principles of therapeutics

- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the hematopoietic system
 - Blood and blood products
 - Treatment of anemia, drugs stimulating erythrocyte production: erythropoietin
 - Drugs stimulating leukocyte production: G-CSF, GM-CSF
 - Anticoagulants, thrombolytic drugs
 - Antiplatelet drugs
 - Antimicrobials: antimalarials, anti-HIV
 - Antineoplastic and immunosuppressive drugs
 - Drugs used to treat acquired disorders of immune responsiveness
- Other therapeutic modalities: splenectomy, chelating agents, radiation therapy for lymphomas, plasmapheresis

Respiratory System (16 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
 - Airways, including mechanics and regulation of breathing
 - Lung parenchyma, including ventilation, perfusion, gas exchange
 - Pleura
 - Nasopharynx and sinuses
- Cell/tissue structure and function, including surfactant formation, alveolar structure
- Repair, regeneration, and changes associated with stage of life
- Pulmonary defense mechanisms and normal flora

Abnormal processes

- Infectious, inflammatory, and immunologic disorders
 - Infectious diseases
 - Infectious diseases of the upper respiratory tract: sinusitis, pharyngitis
 - Acute infectious diseases of the lower respiratory tract and pleura and their complications: pneumonia, bronchiectasis, abscess, empyema
 - Chronic infectious diseases of the lower respiratory tract: Mycobacterium, endemic fungal infections, Nocardia/Actinomyces
 - Immunologic disorders
 - Allergic and hypersensitivity disorders: asthma
 - Autoimmune disorders: Wegener granulomatosis, Goodpasture syndrome
 - Inflammatory disorders
 - Pneumoconioses
 - Acute and chronic alveolar injury: acute respiratory distress syndrome, chlorine gas/smoke inhalation
 - Obstructive pulmonary disease



- Restrictive pulmonary disease: sarcoidosis, idiopathic fibrosis
- Traumatic and mechanical disorders: foreign body aspiration, pneumothorax, atelectasis, sleep apnea
- Neoplastic disorders: polyps, bronchogenic carcinoma, carcinoid tumors, bronchial adenoma, mesothelioma, metastatic tumors
- Metabolic, regulatory, and structural disorders: hypoventilation, disorders of gas exchange, ventilation-perfusion imbalance, neonatal respiratory distress syndrome
- Vascular and circulatory disorders: thromboembolic disease, pulmonary hypertension, pulmonary edema, pleural effusion
- Systemic disorders affecting the respiratory system

Principles of therapeutics

- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the respiratory system: decongestants, cough suppressants, expectorants, mucolytics; bronchodilator drugs; antiinflammatory and cytotoxic drugs; antimicrobial agents; antineoplastic agents
- Other therapeutic modalities: oxygen therapy, nasal CPAP, mechanical ventilation, physical therapy, surgical procedures, including transplantation

Cardiovascular System (32 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
 - Chambers, valves
 - Cardiac cycle, mechanics, heart sounds, cardiac conduction
 - Hemodynamic, including systemic, pulmonary, coronary, and blood volume
 - Circulation in specific vascular beds
- Cell/tissue structure and function
 - Heart muscle, metabolism, oxygen consumption, biochemistry, and secretory function: atrial natriuretic peptide
 - Endothelium and secretory function, vascular smooth muscle, microcirculation, and lymph flow
 - Mechanisms of atherosclerosis
 - Neural and hormonal regulation of the heart, blood vessels, and blood volume, including responses to change in posture, exercise, and tissue metabolism
- Repair, regeneration, and changes associated with stage of life

Abnormal processes

- Infectious, inflammatory, and immunologic disorders
 - Infectious disorders: endocarditis, myocarditis, pericarditis
 - Inflammatory and immunologic disorders: acute rheumatic fever, systemic lupus erythematosus, vasculitis, temporal arteritis
- Traumatic and mechanical disorders: tamponade, valvular disease, obstructive cardiomyopathy



- Neoplastic disorders
 - metabolic and regulatory disorders: dysrhythmias, systolic and diastolic dysfunction, low- and high-output heart failure, cor pulmonale, systemic hypertension, ischemic heart disease, myocardial infarction, systemic hypotension, and shock
 - Vascular disorders: aneurysms, occlusions, varicosities, atherosclerosis
 - Systemic diseases affecting the cardiovascular system: amyloidosis, aortic dissection with Marfan syndrome, scleroderma
 - Congenital disorders of the heart and central vessels
- Principles of therapeutics
- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the cardiovascular system
 - Coronary and peripheral vasodilators
 - Antiarrhythmic drugs
 - Antihypertensive drugs
 - Measures used to combat hypotension and shock
 - Drugs affecting cholesterol and lipid metabolism
 - Drugs affecting blood coagulation, thrombolytic agents
 - Inotropic agents and treatment of heart failure
 - Immunosuppressive and antimicrobial drugs
 - Drugs to treat peripheral arterial disease
 - Other therapeutic modalities: pacemakers, angioplasty, valves, grafts, other surgical procedures

Gastrointestinal System (32 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function, including alimentary canal, liver and biliary system, salivary glands and exocrine pancreas, motility, and digestion and absorption
- Cell/tissue structure and function
 - Endocrine and neural regulatory functions, including GI hormones
 - Salivary, gastrointestinal, pancreatic, hepatic secretory products, including enzymes, proteins, bile salts, and processes
 - Synthetic and metabolic functions of hepatocytes
- Repair, regeneration, and changes associated with stage of life
- Gastrointestinal defense mechanisms and normal flora

Abnormal processes

- Infectious, inflammatory, and immunologic disorders
 - Infectious disorders: peritonitis, hepatitis, gingivostomatitis, peptic ulcer, gastritis, Esophagitis, traveler's diarrhea, food poisoning
 - Inflammatory disorders: cholecystitis, pancreatitis
 - Immunologic disorders: Crohn disease, ulcerative colitis



- Traumatic and mechanical disorders
 - Malocclusion
 - Hiatus hernia
 - Obstruction: volvulus, intussusception, esophageal atresia, annular pancreas, postsurgical obstruction
 - Perforation of hollow viscus and blunt trauma
 - Inguinal, femoral, and abdominal wall hernias
 - Esophageal and intestinal diverticula: Meckel diverticulum
 - Neoplastic disorders, including benign and malignant
 - Metabolic and regulatory disorders: motility disorders, malabsorption, hepatic failure, cholelithiasis
 - Vascular disorders: portal hypertension, esophageal varices, hemorrhoids, anal fissure, ischemia, angiodysplasia, thromboses, vasculitis
 - Systemic disorders affecting the gastrointestinal system
- Principles of therapeutics
- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the gastrointestinal system
 - Treatment and prophylaxis of peptic ulcer disease and gastroesophageal reflux: antacids, antisecretory drugs, mucosal protective agents, antibiotics
 - Drugs to alter gastrointestinal motility: cathartics, antidiarrheal drugs, antiemetic drugs, prokinetic drugs
 - Fluid replacement: oral rehydration
 - Pancreatic replacement therapy and treatment of pancreatitis
 - Drugs for treatment of hepatic failure: lactulose and biliary disease: drugs to dissolve gallstones
 - Anti-inflammatory, immunosuppressive, antineoplastic, and antimicrobial drugs
 - Other therapeutic modalities: surgical procedures, stents, feeding tubes

Renal/urinary System (16 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
 - Kidneys, ureters, bladder, urethra
 - Glomerular filtration and hemodynamic
 - Tubular reabsorption and secretion, including transport processes and proteins
 - Urinary concentration and dilution
 - Renal mechanisms in acid-base balance
 - Renal mechanisms in body fluid homeostasis
 - Micturition
- Cell/tissue structure and function, including renal metabolism and oxygen consumption, hormones produced by or acting on the kidney
- Repair, regeneration, and changes associated with stage of life



Abnormal processes

- Infectious, inflammatory, and immunologic disorders
 - Infectious disorders
 - Upper urinary tract: pyelonephritis, papillary necrosis
 - Lower urinary tract: cystitis, urethritis
 - Inflammatory and immunologic disorders
 - Glomerular disorders: glomerulonephritis, nephrotic syndrome, and IgA nephropathy
 - Tubular interstitial disease: interstitial nephritis
 - Traumatic and mechanical disorders: obstructive uropathy
 - Neoplastic disorders, including primary: renal, urinary bladder and collecting system and metastases
 - Metabolic and regulatory disorders
 - Renal failure, acute and chronic: acute tubular necrosis
 - Tubular and collecting duct disorders: Fanconi syndrome, renal tubular acidosis, nephrogenic diabetes insipidus, polycystic kidney disease
 - Renal calculi
 - Vascular disorders: renal artery stenosis
 - Systemic diseases affecting the renal system: diabetes mellitus, hepatitis, amyloidosis, systemic lupus erythematosus, Wegener granulomatosis
- Principles of therapeutics
- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the renal and urinary system
 - Diuretics, antidiuretic drugs
 - Drugs and fluids used to treat volume, electrolyte, and acid-base disorders
 - Drugs used to enhance renal perfusion: dopamine
 - Anti-inflammatory, antimicrobial, immunosuppressive, and antineoplastic drugs
 - Drugs used to treat lower urinary tract system: incontinence, bladder function, benign prostatic hyperplasia
 - Other therapeutic modalities: dialysis, renal transplantation

Endocrine System (24 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
 - Hypothalamus, posterior and anterior pituitary gland
 - Thyroid gland
 - Parathyroid glands
 - Adrenal cortex, adrenal medulla
 - Pancreatic islets
 - Ovary and testis
 - Adipose tissue



- Cell/tissue structure and function, including hormone synthesis, secretion, action, and metabolism
 - Peptide hormones
 - Steroid hormones, including vitamin D
 - Thyroid hormones
 - Catecholamine hormones
 - Renin-angiotensin system
- Repair, regeneration, and changes associated with stage of life

Abnormal processes

- Infectious, inflammatory, and immunologic disorders: subacute thyroiditis, Graves's disease, sarcoidosis
- Traumatic and mechanical disorders
- Neoplastic disorders: pituitary, thyroid, parathyroid, adrenal cortex, pancreatic islets, neural crest, pheochromocytoma
- Metabolic and regulatory processes: diabetes mellitus, pituitary, hypothalamus, thyroid, parathyroid, pancreatic islet disorders, adrenal disorders
- Vascular disorders: pituitary apoplexy
- Systemic disorders affecting the endocrine system
- Idiopathic disorders: hirsutism

Principles of therapeutics

- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the endocrine system
 - Hormones and hormone analogs
 - Stimulators of hormone production: sulfonylureas
 - Inhibitors of hormone production: thiouracils
 - Hormone antagonists
 - Potentiators of hormone action: thiazolidinediones
 - Antiobesity agents
- Other therapeutic modalities: surgery, radiation

Reproductive System (16 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
 - Female structure, including breast
 - Female function: menstrual cycle, puberty, menopause
 - Male structure
 - Male function: spermatogenesis, puberty
 - Intercourse, orgasm
 - Pregnancy, including ovulation, fertilization, implantation, labor and delivery, the puerperium, lactation, gestational uterus, placenta



- Cell/tissue structure and function, including hypothalamic-pituitary-gonadal axis, sex steroids, and gestational hormones
- Reproductive system defense mechanisms and normal flora

Abnormal processes

- Infectious, inflammatory, and immunologic disorders: toxic shock syndrome, breast abscess, orchitis, sexually transmitted diseases, autoimmune hypogonadism, and cystic mastitis
- Traumatic and mechanical disorders: female incontinence, prolapse, cystocele, torsion of testis, varicocele, circumcision, phimosis
- Neoplastic disorders: female reproductive, male reproductive, breast [including fibrocystic changes], trophoblastic disease
- Metabolic and regulatory processes
 - Female: anovulation, infertility, polycystic ovaries, endometriosis, orgasmic dysfunction, delayed and premature puberty, menopausal syndrome
 - Male: infertility, impotence, gynecomastia, delayed and premature puberty, benign prostatic hyperplasia
- Systemic disorders affecting reproductive function: obesity, myotonic dystrophy, cirrhosis, renal failure
- Disorders relating to pregnancy, the puerperium, and the postpartum period
 - Obstetric problems: ectopic pregnancy, third-trimester bleeding
 - Complications affecting other organ systems: eclampsia, gestational diabetes, thyroid disorders
 - Disorders associated with the puerperium: postpartum hemorrhage, sepsis, depression
 - Antepartum, intrapartum, postpartum disorders of the fetus: prematurity, postmaturity, cord compression, macrosomia

Principles of therapeutics

- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the reproductive system and management of normal reproductive function
 - Female reproductive tract
 - Fertility drugs
 - Oral contraception, other methods of contraception: condoms
 - Estrogen, progestogen replacement, treatment of menopause
 - Stimulants and inhibitors of labor
 - Estrogen and progesterone antagonists
 - Stimulators and inhibitors of lactation
 - Male reproductive tract
 - Fertility drugs
 - Androgen replacement and antagonists
 - Gonadotropin-releasing hormone and gonadotropin replacement
 - Abortifacients
 - Antimicrobials
 - Antineoplastic



- Restoration of potency
- Other therapeutic modalities affecting the reproductive system: tampons

Skin and Related Connective Tissue (8 hours)

Normal processes

- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Cell/tissue structure and function, including barrier functions, thermal regulation, eccrine function
- Repair, regeneration, and changes associated with stage of life or ethnicity: senile purpura, male pattern baldness, and postmenopausal hair changes
- Skin defense mechanisms and normal flora

Abnormal processes

- Infectious, inflammatory, and immunologic disorders
 - Bacterial infections: acne, cellulitis, carbuncle, abscess, necrotizing fasciitis, gangrene
 - Viral infections: herpes infections, chickenpox, rubella, measles, roseola, verrucae
 - Fungal infections, including mycoses, dermatophytosis: tinea
 - Parasitic infections: scabies, lice
 - Immune and autoimmune disorders: discoid lupus erythematosus, scleroderma, dermatomyositis, alopecia, psoriasis, urticaria, allergic dermatosis
 - Traumatic and mechanical disorders: thermal injury, decubitus ulcers, effects of ultraviolet light and radiation
 - Neoplastic disorders
 - Keratinocytes: seborrheic keratosis, actinic keratosis, basal cell carcinoma, squamous cell carcinoma, and ichthyosis
 - Melanocytes: nevi, melanoma
 - Vascular neoplasms: hemangiomas, Kaposi sarcoma
 - Other: T-cell lymphoma, skin appendage tumors
 - Metabolic, regulatory, and structural disorders: vitamin deficiencies, hypervitaminosis, hyperhidrosis
 - Vascular disorders: vasculitis, Raynaud disease
 - Systemic disorders affecting the skin: Ehlers-Danlos syndrome, Marfan syndrome
- Principles of therapeutics
- Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the skin and connective tissue, including anti-inflammatory agents: corticosteroids, antihistamines, emollients, sunscreen, retinoids, antimicrobial agents, cytotoxic and immunologic therapy: methotrexate, PUVA, keratinolytics
 - Other therapeutic modalities: laser, tattoo removal, cryotherapy



BOOKS

High-Yield Lung
High-Yield Brain and Behavior
High-Yield Systems: Gastrointestinal Tract
High-Yield Heart
High-Yield Kidney
High-Yield Endocrine Organs
High-Yield Hematologic and Immune Systems
High-Yield Comprehensive USMLE Step I review
Lippincott's Illustrated Reviews Biochemistry
Medical Genetics for the Modern Clinician

MODALITIES

Compact (10 weeks)

Daily live lectures from Monday to Friday
Live Tutorials on Saturdays
Online tutorials by appointment

Intensive (20 weeks)

Lectures 2 nights per week and Saturday all day
Live and online tutorials by appointment

Extended (40 weeks)

Lectures on Saturdays all day
Live and online tutorials by appointment