

Pathology Review Objectives

Cellular Biology

1. Identify and describe the eight major cellular functions: movement, conductivity, absorption, secretion, excretion, respiration, reproduction, and communication.
2. Identify and describe the three principal parts of a typical eukaryotic cell.
3. Describe the function of the nucleus and the cytoplasmic organelles
4. Describe the structure, composition, and function of the plasma membrane
5. Describe the two main processes associated with cellular metabolism and identify the processes as energy storing or energy yielding.
6. Describe the role of ATP in the transfer of energy to drive cellular processes.
7. Classify cellular transport mechanisms as active or passive.
8. List examples of the following transport mechanisms: diffusion, facilitated diffusion, phagocytosis, pinocytosis, active transport, osmosis, hydrostatic pressure, and filtration.
9. Contrast macromolecular transport by endocytosis and exocytosis.
10. Describe the mechanism which establishes and maintains the resting potential of a cell membrane.
11. List and describe the sequence of events involved in an action potential.
12. Describe the role of the Na^+/K^+ pump in generating an electrical and concentration gradient.
13. Identify and describe the phases of mitosis and cytokinesis.
14. Identify the purpose and function of growth factors.
15. Compare and contrast the three mechanisms that bind cells together: desmosomes, tight junctions, and gap junctions.
16. Describe the following primary modes of chemical signaling: hormonal, neurohormonal, paracrine, and autocrine.
17. Identify two mechanisms for tissue formation
18. Identify the location, appearance, and a major function of each of the following types of tissue: epithelial, connective, muscle, and nervous.

Altered Cellular and Tissue Biology

1. Identify and describe under which conditions the following cellular adaptations occur: atrophy, hypertrophy, hyperplasia, dysplasia, and metaplasia.
2. Identify and describe the mechanisms of cellular injury for the following causes: hypoxia, chemicals, free radicals, infectious agents, asphyxial injuries, immunological and inflammatory responses, genetic factors, nutritional imbalances, and physical trauma.
3. Describe the characteristics of the following intentional and unintentional injuries: blunt force injuries, sharp force injuries, and gunshot wounds.
4. Identify the cause and resulting manifestation of cellular damage due to the following cellular accumulations: water, lipids and carbohydrates, glycogen, proteins, pigments, calcium, and urate (uric acid).
5. Define necrosis and identify the five major types of cellular necrosis.
6. Identify and describe the mechanism and resulting damage of coagulative, liquifactive, caseous, fat, and gangrenous necrosis.
7. Compare and contrast cellular necrosis with apoptosis.
8. Describe the two general theories of aging and provide examples of the cellular changes supporting these theories.
9. Characterize somatic death and its manifestations

Chapter 3 – The Cellular Environment: Fluids and Electrolytes, Acids and Bases

1. Identify the fluid compartments of the body
2. Compare and contrast the effect of forces favoring or opposing the movement of water between body compartments including the following: capillary hydrostatic pressure, interstitial oncotic pressure, plasma oncotic pressure and the interstitial hydrostatic pressure.
3. Identify the direction of solvent movement given the concentrations of the intracellular and extracellular fluids.
4. Describe how the following events contribute to the development of edema: decreased capillary oncotic pressure, increased capillary permeability, increased capillary hydrostatic pressure, and lymph obstruction.
5. Define isotonic (isoosmotic), hypertonic (hyperosmotic), and hypotonic (hyposmotic) water and solute alterations.
6. Identify the terminology associated with the deficit or excess of the following electrolytes: sodium, potassium, calcium, phosphate, and magnesium.
7. Identify the major clinical manifestations of abnormal levels of sodium, potassium, calcium, phosphate, and magnesium.
8. Describe the role of pH, $p\text{CO}_2$, and HCO_3^- in evaluating acid-base imbalances.
9. Identify the stimulus and compensatory mechanisms for metabolic acidosis, respiratory acidosis, metabolic alkalosis, and respiratory acidosis.
10. Differentiate between metabolic acidosis, respiratory acidosis, metabolic alkalosis, and respiratory alkalosis given appropriate clinical testing data.
11. Describe what is meant by the “anion gap” and explain the significance of an abnormal anion gap in metabolic acidosis

Genes and Genetic Diseases

1. Define and give examples of the following genetic terms: progeny, chromosomes, gene, allele, gamete, homozygous, heterozygous, karyotype, genotype, phenotype, dominant traits, recessive traits, pedigree chart, penetrance, and expressivity,
2. List the cause and possible outcome for the following mutations: base pair substitution, frameshift substitution, spontaneous mutation, and mutational hotspots.
3. Define and give examples of the following chromosome terms: euploid, haploid, diploid, polyploidy, aneuploid, trisomy, monosomy, disjunction, and nondisjunction.
4. Describe the following deviations in normal chromosome structure: deletion, duplication, inversion, translocation and fragile sites.
5. Define and describe the following elements of inheritance: autosomal, sex-linked, carrier, dominant, and recessive.
6. Evaluate pedigree charts for the inheritance of genetic diseases.
7. Describe the genetic abnormalities and resulting clinical abnormalities associated with the following diseases: Down syndrome, Turner syndrome, Klinefelter syndrome, Cri du Chat syndrome, Huntington disease, cystic fibrosis, neurofibromatosis, hemophilia, and Duchenne muscular dystrophy.

Genes, Environment, and Common Diseases

1. Define and apply the following terms used to analyze relationships between disease and populations: incidence rate, prevalence rate, risk factor, relative risk, proband, polygenic, multifactorial, liability distribution, threshold of liability, recurrence risk, empiric risk, concordant, discordant, and congenital.
2. Describe and apply the terms liability distribution and threshold of liability as they relate to the threshold model of multifactorial disease.
3. Identify the recurrence risks of a disease for the following scenarios: more than one family member is affected, the expression of the disease in the proband is more severe, the proband is of the less commonly affected sex, and the disease is manifest in more remotely related relatives.
4. Compare and contrast the terms nature and nurture as they apply to genes and environment.
5. Describe the use of twin and adoptive studies in the analysis of multifactorial diseases.
6. Identify and describe the familial tendencies and contributing environmental factors in the following diseases: coronary artery disease (CAD), hypercholesterolemia, hypertension, colorectal cancer, diabetes, breast cancer, and obesity.
7. Identify and describe the following complex multifactorial diseases: Alzheimer disease, alcoholism, schizophrenia, bipolar disorder

Biology of Cancer

1. Define neoplasia or cancer.
2. Cite the method for naming and classifying tumors; provide examples.
3. Identify and describe cell surface changes that occur in cancerous cells: glycolipids and glycoproteins, altered membranes, proteases, and cellular connections.
4. Describe the significance of the following intercellular changes that occur in cancer cells: cytoskeleton, density-dependent inhibition of growth, autocrine stimulation, nuclear, and cellular protein changes.
5. Describe the advantages and limitations of tumor cell markers; cite marker examples that suggest the existence of cancer.
6. Define the role the following play in the development of neoplasms or cancer: environmental agents, retrovirus insertion, oncogenes, tumor-suppressor gene inactivation, and poor body defense mechanisms.
7. Describe the initiation-promotion-progression theory of carcinogenesis.
8. Characterize common carcinogens as chemical or physical.
9. Identify and describe the pathogenesis of oncogenic viruses; cite examples.
10. Identify and describe the pathogenesis of the bacterium *H. pylori*.
11. Describe the tumor surveillance theory as a defense against cancer; identify tumor antigens.
12. Indicate the limitations of immune surveillance as a defense against cancer.

Tumor Invasion and Metastasis

1. Identify and describe factors encouraging local spread of cancerous cells.
2. Describe the role of the following in the proposed sequence of events for tumor cell invasions of the extracellular matrix: tumor cell attachment to the basement membrane, degradation of the matrix, and locomotion into the matrix.
3. Describe the main avenues for metastatic spread: direct tumor extension, lymphatic spread, and hematogenous spread.
4. Describe the process of angiogenesis.
5. Describe the role of the p53 gene in the metastatic spread of cells.
6. Identify factors that may determine organ tropism.
7. Describe the common clinical manifestations of cancer: anemia, infection, paraneoplastic syndromes, cachexia, fatigue, and pain.
8. Compare the modalities for the treatment of cancer: chemotherapy, surgery, radiation, and immunotherapy.

Cancer in Children

1. Compare childhood neoplasms to adult cancers: environmental vs. genetic influences, cure success rate, common cancers, incidence rates, and response to treatment.

Structure and Function of the Hematologic System

1. Identify and describe the constituents of whole blood: formed elements (WBCs, RBCs, platelets), plasma proteins, and solutes (electrolytes, gases, nutrients, and waste products).
2. Identify the structural characteristics, normal values, and function of red blood cells.
3. Describe the following laboratory tests for red blood cells: hematocrit, hemoglobin, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC).
4. Identify the structural characteristics, normal values, and functions of the various types of white blood cells (leukocytes): neutrophils, basophils, eosinophils, lymphocytes, monocytes, and macrophages.
5. Identify common clinical disorders causing an increase in each type of white cell.
6. Identify and describe the primary and secondary lymphoid organs and the mononuclear phagocyte system (MPS).
7. Describe and identify the effects of colony-stimulating factors.
8. Describe the process of hematopoiesis.
9. Describe the sequence of events in hemostasis.
10. Describe specific substances that activate the intrinsic and extrinsic pathways of the coagulation system.
11. Describe the role of the fibrinolytic system.
12. Describe the types of information that can be obtained from a bone marrow biopsy, a complete blood count, a white blood cell differential, a bleeding time, a protime (PT), an activated partial thromboplastin time (APTT), and a reticulocyte count.
13. Describe changes that occur within the hematologic system with aging.

Alterations of Erythrocyte Function

1. Define anemia.
2. Classify the anemias in one of the following groups: macrocytic-normochromic, microcytic-hypochromic, and normocytic-normochromic.
3. Describe the common clinical manifestations of anemia.
4. Describe the pathophysiology and any unique clinical manifestations of the following anemias: iron deficiency, pernicious anemia, folic acid deficiency, sideroblastic anemia, aplastic anemia, hemorrhagic anemia, hemolytic anemia, and anemia of chronic disease.
5. Describe the types, causes, manifestations, and treatment of polycythemia.

Alterations of Leukocyte, Lymphoid, and Hemostatic Function

1. Describe terms and causes associated with high or low leukocyte counts: granulocytosis (neutrophilia), neutropenia, granulocytopenia, eosinophilia, eosinopenia, basophilia, basopenia, monocytosis, monocytopenia, lymphocytosis, and lymphocytopenia.
2. Describe the pathogenesis of infectious mononucleosis.
3. Classify, contrast, and describe the manifestations of leukemia: acute lymphoblastic leukemia (ALL), chronic lymphocytic leukemia (CLL), acute myeloblastic leukemia (AML), chronic myelocytic leukemia (CML).
4. Describe the pathophysiology and manifestations of multiple myeloma.
5. Compare and contrast Hodgkin disease to non-Hodgkin lymphoma.
6. Describe the clinical manifestations of thrombocytopenia.
7. Describe the etiology of thrombocythemia.
8. Describe the potential causes of abnormal platelet function.
9. Identify the causes and clinical manifestations of coagulation disorders: hemophilia A (factor VIII), von Willebrand disease, vitamin K deficiency, and excessive utilization of clotting factors.
10. Describe the pathophysiology and manifestations of disseminated intravascular coagulation (DIC).

Alteration of Hematologic Function in Children

1. Compare and contrast the two major causes of hemolytic disease of the newborn, ABO and Rh incompatibility.
2. Describe the inheritance pattern, disease process, and clinical manifestations of sickle cell disease.
3. Describe the inheritance pattern and clinical manifestations of the thalassemias.

Immunity

1. Characterize antigens, immunocytes, and immunity.
2. Define and describe the terms alloantigen, autoantigen, heterophile antigen, and antigen determinants.
3. Define active, passive, artificial and innate immunities.
4. Compare and contrast cellular and humoral immunity.
5. Describe the major histocompatibility complex (MHC).
6. Distinguish among the HLA complex, the ABO system, and the Rh system.
7. Describe the role of the B cell in humoral immunity.
8. Describe the role of the T cell in cell-mediated immunity.
9. Identify the structure and an important role of each of the five classes of immunoglobulins: IgG, IgM, IgE, IgA, and IgD.
10. Compare and contrast the titer and the class of immunoglobulin in the primary and secondary immune response.
11. Characterize the use of monoclonal antibodies in medical testing.
12. Describe the secretory immune system.
13. Characterize the cellular interactions within the immune response: actions of antigen-presenting cells, T_h cells, T_c cells, T_s cells, B cells, plasma cells, and memory cells.
14. Describe the actions of cytokines within the immune response.
15. Compare fetal and neonatal immune function with immune function in the elderly.

Inflammation

1. Define inflammation and contrast it with immunity.
2. Indicate the causes of mast cell degranulation and the effects of the released preformed biomechanical mediators: histamine, neutrophil chemotactic factor, and eosinophil chemotactic factor of anaphylaxis.
3. Identify and state the effects of the synthetic products of the mast cell: leukotrienes, prostaglandins, and platelet activating factor.
4. Identify and describe the plasma protein systems and their interactions in inflammation: complement system, coagulation system, and kinin system.
5. Identify triggers for the classical and alternative complement pathways.
6. Identify a role for neutrophils, monocytes, macrophages, and eosinophils in the inflammatory process.
7. State and describe the roles of the following cytokines: lymphokines, interferon, and interleukin.
8. Describe the process of phagocytosis and phagocyte migration.
9. Identify and describe the local and systemic signs of acute inflammation.
10. Characterize chronic inflammation and contrast it with acute inflammation.
11. Define and differentiate between the resolution and repair processes; identify the adverse factors that affect resolution.
12. Compare pediatric and aging self-defense mechanisms.

Infection, and Alterations in Immunity and Inflammation

1. Define allergy, autoimmunity, and alloimmunity.
2. Compare and contrast the four hypersensitivities (I, II, III, and IV).
3. Describe the likely causes of autoimmune disease: exposure to a previously sequestered antigen, development of a neoantigen (tumor antigen), complications of an infectious disease, and alteration of suppressor T cells.
4. Describe the pathophysiology of Systemic Lupus Erythematosus (SLE): clinical signs and symptoms, complications, and laboratory testing.
5. Characterize alloimmune graft rejection and categorize a graft rejection as hyperacute, acute, or chronic based on the immune response.
6. Describe the relationships between humans and infectious agents: symbiosis, commensalism, mutualism, and parasitism.
7. Describe the mechanisms of infection and cellular injury by bacteria, viruses, and fungi.
8. Characterize examples of congenital or primary immunodeficiencies: DiGeorge syndrome, Bruton agammaglobulinemia syndrome, Wiskott-Aldrich syndrome, and selective IgA deficiency.
9. Describe the reasons a patient may develop graft-versus-host (GVH) disease.
10. Cite examples of acquired or secondary immune deficiencies.
11. Describe the immune deficiency disorder, AIDS: signs, symptoms, pathophysiology, and laboratory testing.
12. Describe some therapies for immune deficiencies: gamma globulin administration, fresh-frozen plasma administration, bone marrow transplants, and gene therapy.

Pain, Temperature Regulation, Sleep, and Sensory Function

1. Compare the four theories of pain: specificity theory, intensity theory, pattern theory, and gate-control theory.
2. Identify the actions of the following chemicals that modulate pain: lymphokines, endorphins, prostaglandins, bradykinins, and histamine.
3. Differentiate between acute and chronic pain.
4. Differentiate between the following pain responses: somatic pain, visceral pain, referred pain, phantom pain, neuralgias, hyperesthesias, myofascial pain syndromes, hemangiosarcoma, and low back pain.
5. Describe the alterations that occur in fever, hyperthermia (heat cramps, heat exhaustion, heat stroke, and malignant hyperthermia), and hypothermia.
6. Describe the following sleep disorders: insomnia, sleep disordered breathing, disorders of sleep-wake schedule, and dysfunctions of sleep stages (somnambulism, night terrors, and enuresis).
7. Identify and describe the following common diseases, their etiology and manifestations that are associated with vision: blepharitis, conjunctivitis, keratitis, strabismus, amblyopia, scotoma, cataract, papilledema, dark adaptation, glaucoma, presbyopia, myopia, hyperopia, astigmatism.
8. Identify and describe the following common diseases, their etiology and manifestations that are associated with hearing: conductive hearing loss, sensorineural hearing loss, and acute otitis media.
9. Identify and describe the following common diseases, their etiology and manifestations that are associated with smell: hyposmia, anosmia, and olfactory hallucinations.
10. Identify and describe the following common diseases, their etiology and manifestations that are associated with taste: hypogeusia, parageusia, and ageusia.
11. Identify and describe the following common diseases, their etiology and manifestations that are associated with proprioception: proprioceptive dysfunction, vestibular nystagmus, vertigo, Ménière disease, and peripheral neuropathies.

Concepts of Neurologic Dysfunction

1. Define the following terms that describe various levels of consciousness: confusion, lethargy, obtundation, stupor, and coma.
2. Identify sites and causes for alterations of arousal: structural (supratentorial, infratentorial, extracerebral, and intracerebral), metabolic, and psychogenic.
3. Summarize the changes in levels of consciousness, pupillary response, muscle tone and respiratory activity as the cerebrum/diencephalon is affected through the medulla.
4. Distinguish between brain death and cerebral death.
5. Define seizure and cite conditions associated with seizure disorders.
6. Differentiate between partial and generalized seizures: simple partial, complex partial, tonic-clonic (grand mal), and absence (petit mal) seizures.
7. Define the following descriptive terms of cognitive deficits: selective attention, anterograde memory, remote memory deficit, concept formation deficit, vigilance deficit, reasoning deficit, and executive function deficit.
8. Define the following terms used to describe specific cognition disorders: agnosia, dysphasia, aphasia, acute confusional states, and dementias.
9. Describe Alzheimer disease.
10. Characterize cerebral hemodynamics and stages of increased intracranial pressure; describe herniation syndrome.
11. Describe the pathogenesis of cerebral edema: cerebral, vasogenic, cytotoxic, ischemic, and interstitial.
12. Define common terms that describe alterations in motor functions: hypotonia, hypertonia, spasticity, rigidity, hyperkinesias, dyskinesia, hypokinesia, hemiparesis, diplegia, paraplegia, quadriplegia, spinal shock, amyotrophies, palsies, akinesia, bradykinesia, dystonia, decorticate posture, decerebrate posture, spastic gait, scissors gait, cerebellar gait, and basal ganglion gait.

Alterations of Neurologic Function and Alterations of Neurologic Function in Children

1. Differentiate between focal and diffuse brain injury.
2. Define and describe the following types of brain injuries: coup, contracoup, extradural hematomas, subdural hematomas, intracerebral hematomas, mild and classical cerebral concussions, and mild, moderate and severe diffuse axonal injuries.
3. Discuss the pathogenesis and manifestations of spinal cord injuries.
4. Define and describe autonomic hyperreflexia.
5. Compare and contrast the types of cerebrovascular accidents (CVA): thrombotic stroke, transient ischemic attack (TIA), stroke-in-evolution, completed stroke, embolic stroke, and hemorrhagic stroke.
6. Describe the intracranial aneurysms: saccular aneurysms, fusiform aneurysms (giant), mycotic aneurysms, and traumatic aneurysms.
7. Describe the different types of chronic recurring headaches: migraine headaches, cluster headaches, chronic paroxysmal hemicrania, and tension headaches.
8. Describe the pathophysiology, manifestations, and treatment of CNS tumors.
9. Compare meningitis to encephalitis.
10. Differentiate between bacterial and aseptic (viral) meningitis.
11. Identify the neurologic complications of AIDS.
12. Describe the degenerative diseases of Parkinson, Huntington, multiple sclerosis, and amyotrophic lateral sclerosis (ALS).
13. Describe the peripheral nervous system disorders: Guillian Barré syndrome and Myasthenia gravis.

Alterations of Neurologic Function in Children

1. Compare and contrast the pathophysiology of the encephalopathic process of cerebral palsy, phenylketonuria, and Reye syndrome.

Alterations of Hormonal Regulation

1. Identify and describe common causes of hypersecretion and hyposecretion of hormones: absence of normal feedback mechanisms, ectopic (non-glandular) sources for hormones, glandular neoplasms, inadequate hormone precursors, degraded or inactivated hormones, receptor disorders, intracellular disorders, autoimmune disorders, surgery, and ischemia.
2. Distinguish between syndrome of inappropriate ADH (SIADH) and diabetes insipidus.
3. Describe the disorders of the anterior pituitary: Sheehan syndrome, dwarfism, gigantism, panhypopituitarism, and acromegaly.
4. Characterize the manifestations of hypothyroidism and hyperthyroidism: basal metabolic rate, sympathetic response, weight, temperature tolerance, GI function, cardiovascular function, respiratory function, muscle tone and reflexes, general appearance, and general behavior.
5. Describe the disorders of hyperthyroidism: Graves disease, diffuse toxic goiter, and thyrotoxic crisis.
6. Describe the disorders of hypothyroidism: acute thyroiditis, subacute thyroiditis, Hashimoto disease (autoimmune thyroiditis), congenital hypothyroidism (cretinism), myxedema, and myxedema coma.
7. Distinguish between primary and secondary hyperparathyroidism and hypoparathyroidism.
8. Describe the similarities and differences between insulin-dependent (type 1) and non-insulin-dependent (type 2) diabetes mellitus.
9. Identify and describe the acute complications of diabetes mellitus: hypoglycemia (insulin shock), diabetic ketoacidosis (DKA), and hyperosmolar hyperglycemic, and nonketotic syndrome (HHNKS).
10. Describe the chronic complications of diabetes mellitus: diabetic neuropathies, microvascular diseases, macrovascular diseases, and infections.
11. Describe the etiology, pathogenesis, and manifestations of hyperfunction and hypofunction of the adrenal cortex: Cushing syndrome, Cushing disease, Conn disease (primary hyperaldosteronism), secondary hyperaldosteronism, feminization, virilization, and Addison disease.
12. Describe adrenal medulla hyperfunction

Stress and Disease

1. Describe Selye's historic general adaptation syndrome and cite its stages.
2. Identify current concepts that modify Selye's work. Define homeostasis and cite examples.
3. Define stress, identify stressors, and characterize the stress response.
4. Summarize the major interactions of the nervous, endocrine, and immune systems in the stress response.
5. Distinguish between ineffective and effective ways of coping with stress.
6. Cite examples of stress-related diseases.

Alterations of Cardiovascular Function and Alterations of Cardiovascular Function in Children

1. Distinguish between arteriosclerosis and atherosclerosis; describe the development and consequences of atheromatous plaque.
2. Distinguish between primary, secondary, complicated, and malignant hypertension.
3. Define and identify the causes of orthostatic or postural hypertension.
4. Define aneurysm and list the types.
5. Distinguish between a thrombus and an embolus.
6. Describe and distinguish between the arterial and venous occlusive diseases: thromboangiitis obliterans (Buerger disease), Raynaud phenomenon, Raynaud disease, varicose veins, venous thrombi, and superior vena cava syndrome.
7. Characterize coronary artery disease (CAD); distinguish between myocardial ischemia and myocardial infarction, and list complications of each.
8. Characterize the conditions associated with pericardial disease: acute pericarditis, constrictive pericarditis, and pericardial effusion.
9. Compare the cardiomyopathies: dilated, hypertrophied, and restrictive.
10. Identify the causes and manifestations of valvular dysfunction: aortic stenosis, mitral stenosis, aortic regurgitation, mitral regurgitation, tricuspid regurgitation, and mitral valve prolapse syndrome.
11. Distinguish between rheumatic heart disease and infective endocarditis.
12. Compare the pathophysiology, manifestations, and treatment of right (cor pulmonale) and left (congestive) side heart failure.
13. Characterize dysrhythmias of the heart.

Alterations of Cardiovascular Function in Children

- Describe the congenital heart defects contributing to an increased pulmonary blood flow: patent ductus arteriosus, atrial septal defect (ASD), ventricular septal defect (VSD), and atrioventricular canal defect.

Alterations of Pulmonary Function and Alterations of Pulmonary Function in Children

1. Define the terms used in describing the signs and symptoms of pulmonary disease: dyspnea, orthopnea, paroxysmal nocturnal dyspnea, hyperpnea, Cheyne-Stokes respirations, hypoventilation, hyperventilation, hypercapnia, hypocapnia, coughing, hemoptysis, cyanosis, pain, clubbing, and sputum.
2. Characterize the following lung conditions that are caused by pulmonary disease or injury: pulmonary edema, aspiration, atelectasis, bronchiectasis, bronchiolitis, bronchiolitis obliterans, pneumothorax, pleural effusion, empyema, pleurisy, abscess, fibrosis, chest wall restriction, flail chest, toxic gas exposure, pneumoconiosis, and allergic alveolitis.
3. Interrelate the pathogenic factors in adult respiratory distress syndrome.
4. Compare and contrast the obstructive pulmonary diseases: asthma, emphysema, and chronic bronchitis.
5. Define pneumonia and describe its causes, manifestations, and treatment.
6. Describe the pathogenesis of tuberculosis.
7. Compare and contrast pulmonary embolism, pulmonary hypertension, and cor pulmonale.
8. Describe laryngeal cancer.
9. Describe the four major histologic types of lung cancer.

Alterations of Pulmonary Function in Children

1. Characterize croup and epiglottitis.
2. Describe the pathophysiologic processes involved in respiratory distress syndrome of the newborn.
3. Describe bronchopulmonary dysplasia.
4. Describe the pulmonary pathophysiology associated with cystic fibrosis.
5. Identify the most common etiologic agent of bronchiolitis; describe the pathophysiology and the unusual clinical course of the disease.

Alterations of Renal and Urinary Tract Function and Alterations of Renal and Urinary Tract Function in Children

1. Describe the pathophysiology of renal stones.
2. Characterize neurogenic bladder.
3. Describe renal and bladder tumors.
4. Compare and contrast the signs, symptoms, and etiology of cystitis versus pyelonephritis.
5. Describe the types of glomerulonephritis, its features, manifestations, and treatment.
6. Identify and explain the key features of nephrotic syndrome.
7. Define and identify the common etiologies acute renal failure: prerenal, intrarenal, and post-renal disease.
8. Describe the outcome of chronic renal failure.

Alterations of Renal and Urinary Tract Function in Children

1. Define hypospadias and epispadias
2. Describe the etiology, clinical signs and symptoms, and pathophysiology of hemolytic uremic syndrome (HUS).
3. Identify the structural cause of vesicoureteral reflux, and explain the potential effects on renal function.

Alterations of Digestive Function and Alterations of Digestive Function in Children

1. Define and describe the following terms used in identifying the signs and symptoms of gastrointestinal dysfunction: anorexia, vomiting, nausea, retching, constipation, diarrhea, referred pain, hematemesis, melena, occult bleeding, and abdominal pain.
2. Compare and contrast the various disorders of digestive motility: dysphagia, gastroesophageal reflux, hiatal hernia, pyloric obstruction, and intestinal obstruction.
3. Describe the pathogenesis of acute and chronic gastritis.
4. Define peptic ulcer disease, and compare duodenal, gastric, and stress ulcers.
5. Define malabsorption syndrome and maldigestion; characterize pancreatic, lactase, and bile salt deficiencies.
6. Compare ulcerative colitis and Crohn disease.
7. Distinguish between diverticular disease and appendicitis.
8. Characterize the disorders of nutrition: obesity, bulimia, anorexia nervosa, and starvation.
9. Categorize and describe the complications of liver dysfunction: prehepatic, hepatic, and posthepatic.
10. Compare the viral hepatitis types.
11. Describe hepatic cirrhosis and the various types: alcoholic, biliary, and postnecrotic.
12. Compare cholelithiasis to cholecystitis.
13. Describe the pathogenesis of pancreatitis.

Alterations of Digestive Function in Children

1. Describe the pathophysiology and treatment of cleft lip and palate.
2. Describe the structural defects of esophageal atresia and tracheoesophageal fistula.
3. Describe the structural defect and pathophysiology associated with pyloric stenosis.
4. Describe meconium ileus.

Alterations of Musculoskeletal Function and Alterations of Musculoskeletal Function in Children

1. Compare the types of fractures: comminuted, open, oblique, spiral, transverse, impacted, pathologic, greenstick, and stress.
2. Describe the causes, manifestations, and treatment of fractures.
3. Define the following terms associated with skeletal system stress: dislocation, subluxation, strain, sprain, avulsion, tendonitis, bursitis, epicondylitis, muscle strain, myositis ossificans, and myoglobinuria.
4. Differentiate between osteoporosis, osteomalacia/rickets, Paget disease, and osteomyelitis.
5. Characterize the common types of bone tumors: osteosarcoma, chondrosarcoma, fibrosarcoma, giant cell tumors, and myelomas.
6. Characterize the following inflammatory joints diseases: rheumatoid arthritis, ankylosing spondylitis, and gout.
7. Compare osteoarthritis to rheumatoid arthritis.
8. Describe examples of secondary muscular dysfunction: contracture, stress-induced muscle tension, fibromyalgia syndrome, and disuse atrophy.

Alterations of Musculoskeletal Function in Children

1. Describe the pathophysiology and common clinical features related to osteogenesis imperfecta.
2. Describe the pathophysiology, evaluation, and treatment of Legg-Calve-Perthes disease.
3. Characterize rhabdomyosarcoma of childhood

Structure, Function, and Disorders of the Integument, Shock, Multiple Organ Dysfunction Syndrome, and Burns in Adults

1. Distinguish among the various flat skin lesions: macule, patch, petechiae, purpura, telangiectasia, and papule.
2. Distinguish among the various elevated skin lesions: papule, plaque, nodule, wheal, vesicle, bulla, pustule, comedone, scale, crust, lichenification, cyst, tumor, and scar.
3. Describe keloids.
4. Identify stimuli for pruritis.
5. Identify the cause and lesions of inflammatory and papulosquamous disorders of the skin: allergic contact dermatitis, irritant contact dermatitis, atopic dermatitis, stasis, dermatitis, and seborrheic dermatitis.
6. Contrast the vesiculobullous disorders of pemphigus, and erythema multiforme.
7. Identify the causes and lesions of the following cutaneous infections: folliculitis, furuncle, carbuncle, cellulitis, erysipelas, impetigo, herpes simplex type 1, herpes simplex type 2, Herpes varicella zoster virus, warts, and genital warts.
8. Identify the location of the following cutaneous fungal infections: Tinea capitis, Tinea pedis, Tinea corporis, Tinea cruris, and candidiasis.
9. Contrast vasculitis, urticaria, and scleroderma.

Shock, Multiple Organ Dysfunction Syndrome, and Burns in Adults

1. Illustrate the impaired cellular metabolism that occurs in shock.
2. Classify and describe the following different types of shock: cardiogenic, hypovolemic, neurogenic, anaphylactic, and septic.
3. Describe the pathophysiology of the sequence of events in multiple organ dysfunction syndrome.
4. Classify burns according to the extent of injury.
5. Characterize the cardiovascular and cellular response to burn injury.

Alterations of Reproductive Function and Sexually Transmitted Diseases

1. Distinguish between the causes of delayed puberty and precocious puberty.
2. Distinguish between various menstrual disorders and their hormonal alterations and causes: primary dysmenorrhea, primary amenorrhea, secondary amenorrhea, dysfunctional uterine bleeding, polycystic ovary syndrome, and premenstrual syndrome.
3. Describe pelvic inflammatory disease.
4. Define and cite the causes of vaginitis, cervicitis, vulvitis, and bartholinitis.
5. Describe the following pelvic relaxation disorders: cystocele, urethrocele, rectocele, enterocele, and uterine prolapse.
6. Characterize the following benign growth and proliferative conditions of the female reproductive system: ovarian cyst, endometrial polyps, and endometriosis.
7. Characterize the malignant tumors of the female reproductive system: endometrial cancer, ovarian cancer, cervical, vaginal, and vulvar cancer
8. Define the following terms used to discuss female sexual dysfunction: sexual anorexia, vaginismus, anorgasmia, dyspareunia, and infertility.
9. Define and cite causes of the following common disorders of the male reproductive system: urethritis, urethral stricture, phimosis, paraphimosis, Peyronie disease, balanitis, penile cancer, varicocele, hydrocele, spermatocele, cryptorchidism, testicular torsion, orchitis, testicular cancer, and epididymitis.
10. Describe and distinguish between benign prostatic hyperplasia, prostatitis, and prostatic cancer.
11. Differentiate between benign and malignant female breast disease.

Sexually Transmitted Diseases

- Characterize the bacterial STDs: infectious agents, manifestations, and complications.
 - a. gonorrhea
 - b. syphilis
 - c. chlamydia
 - d. HIV
 - e. Gardnerella vaginitis

Pathophysiology General Review

Chapter 1

1. Identify and describe under which conditions the following cellular adaptations occur: atrophy, hypertrophy, hyperplasia, dysplasia and metaplasia.
2. Identify and describe the mechanisms of cellular injury for the following causes: hypoxia, chemicals, free radicals, infectious agents, asphyxial injuries, immunological and inflammatory responses, genetic factors, nutritional imbalances, and physical trauma.
3. Define necrosis and identify the five major types of cellular necrosis. Identify and describe the mechanism and resulting damage of coagulative, liquefactive, caseous, fat, and gangrenous necrosis.

Chapter 2

4. Describe how the following events contribute to the development of edema: decreased capillary oncotic pressure, increased capillary permeability, increased capillary hydrostatic pressure, and lymph obstruction.
5. Identify the major clinical manifestations of abnormal levels of sodium, potassium, calcium, phosphate, and magnesium.
6. Describe the role of pH, pCO₂ and HCO₃ in evaluating acid-base imbalances.
7. Identify the stimulus and compensatory mechanisms for metabolic acidosis, respiratory acidosis, metabolic alkalosis, and respiratory alkalosis.
8. Differentiate between metabolic acidosis, respiratory acidosis, metabolic alkalosis, and respiratory alkalosis given appropriate clinical testing data.

Chapter 3

9. Define and describe the following elements of inheritance: autosomal, sex-linked, carrier, dominant, and recessive.
10. Evaluate pedigree charts for the inheritance of genetic diseases.
11. Describe the genetic abnormalities and resulting clinical abnormalities associated with the following diseases: Down syndrome, Turner syndrome, Klinefelter syndrome, Cri du Chat syndrome, Huntington disease, cystic fibrosis, neurofibromatosis, hemophilia A and Duchenne muscular dystrophy.

Chapter 4

12. Describe and apply the terms liability distribution and threshold of liability as they relate to the threshold model of multifactorial disease.
13. Describe the use of twin and adoptive studies in the analysis of multifactorial diseases.

Chapter 5

14. Cite the method for naming and classifying tumors; provide examples
15. Describe the initiation-promotion-progression theory of carcinogenesis.
16. Indicate the limitations of immune surveillance as a defense against cancer.

Chapter 11

17. Identify and describe factors encouraging local spread of cancerous cells.
18. Describe the role of the following in the proposed sequence of events for tumor cell invasions of the extracellular matrix; tumor cell attachment to the basement membrane, degradation of the matrix, and locomotion into the matrix.
19. Describe the common clinical manifestations of cancer: anemia, infection, paraneoplastic syndromes, cachexia, fatigue, and pain.

Chapter 6

20. Compare childhood neoplasms to adult cancers: environmental vs. genetic influences, cure success rate, common cancers, incidence rates, and response to treatment.

Chapter 7

21. Define anemia.
22. Classify the anemias in one of the following groups: macrocytic-normochromic, microcytic-hypochromic and normocytic-normochromic
23. Describe the pathophysiology and any unique clinical manifestations of the following anemias: iron deficiency, pernicious anemia, folic acid deficiency, sideroblastic anemia, aplastic anemia, hemorrhagic anemia, hemolytic anemia, and anemia of chronic disease.

Chapter 8

24. Classify, contrast, and describe the manifestations of leukemia: acute lymphoblastic leukemia (ALL), chronic lymphocytic leukemia (CLL), acute myeloblastic leukemia (AML), chronic myelocytic leukemia (CML).
25. Describe the pathophysiology and manifestations of multiple myeloma.
26. Compare and contrast Hodgkin disease to non-Hodgkin lymphoma.
27. Identify the causes and clinical manifestation of coagulation disorders: hemophilia A (factor VIII), von Willebrand disease, vitamin K deficiency, and excessive utilization of clotting factors
28. Describe the pathophysiology and manifestation of disseminated intravascular coagulation (DIC).

Chapter 9

29. Compare and contrast the two major causes of hemolytic disease of the newborn, ABO and Rh incompatibility.
30. Describe the inheritance pattern, disease, process, and clinical manifestations of sickle cell disease.

Chapter 10

31. Define active, passive, artificial, and innate immunities.
32. Characterize the cellular interactions within the immune response: actions of antigen-presenting cells, Th cells, Tc cells, Ts cells, B cells, plasma cells, and memory cells.

Chapter 11

33. Define inflammation and contrast it with immunity.

Chapter 8

34. Compare and contrast the four hypersensitivities (I, II, III, and IV).

35. Describe the immune deficiency disorder, AIDS: signs, symptoms, pathophysiology, and laboratory testing.

Chapter 12

36. Differentiate between acute and chronic pain.

37. Differentiate between the following pain responses: somatic pain, visceral pain, referred pain, phantom pain, neuralgias, hyperesthesias, myofascial pain syndromes, hemangnosia and low back pain.

Chapter 13

38. Define the following terms that describe various levels of consciousness: confusion, lethargy, obtundation, stupor, and coma.

39. Define seizure and cite conditions associated with seizure disorders.

40. Characterize cerebral hemodynamics and stages of increased intracranial pressure; describe herniation syndrome.

Chapter 14

41. Define and describe the following types of brain injuries: coup, contracoup, extradural hematomas, subdural hematomas, intracerebral hematomas, mild and classical cerebral concussions, and mild, moderate, and severe diffuse axonal injuries.

42. Compare and contrast the types of cerebrovascular accidents (CVA): thrombotic stroke, transient ischemic attack (TIA), stroke-in-evolution, completed stroke, embolic stroke, and hemorrhagic stroke.

43. Differentiate between bacterial and aseptic (viral) meningitis.

Chapter 15

44. Characterize the manifestations of hypothyroidism and hyperthyroidism: basal metabolic rate, sympathetic response, weight, temperature tolerance, GI functions, cardiovascular function, respiratory function, muscle tone and reflexes, general appearance, and general behavior.

45. Describe the similarities and differences between insulin-dependent (type I) and non-insulin-dependent (type II) diabetes mellitus.

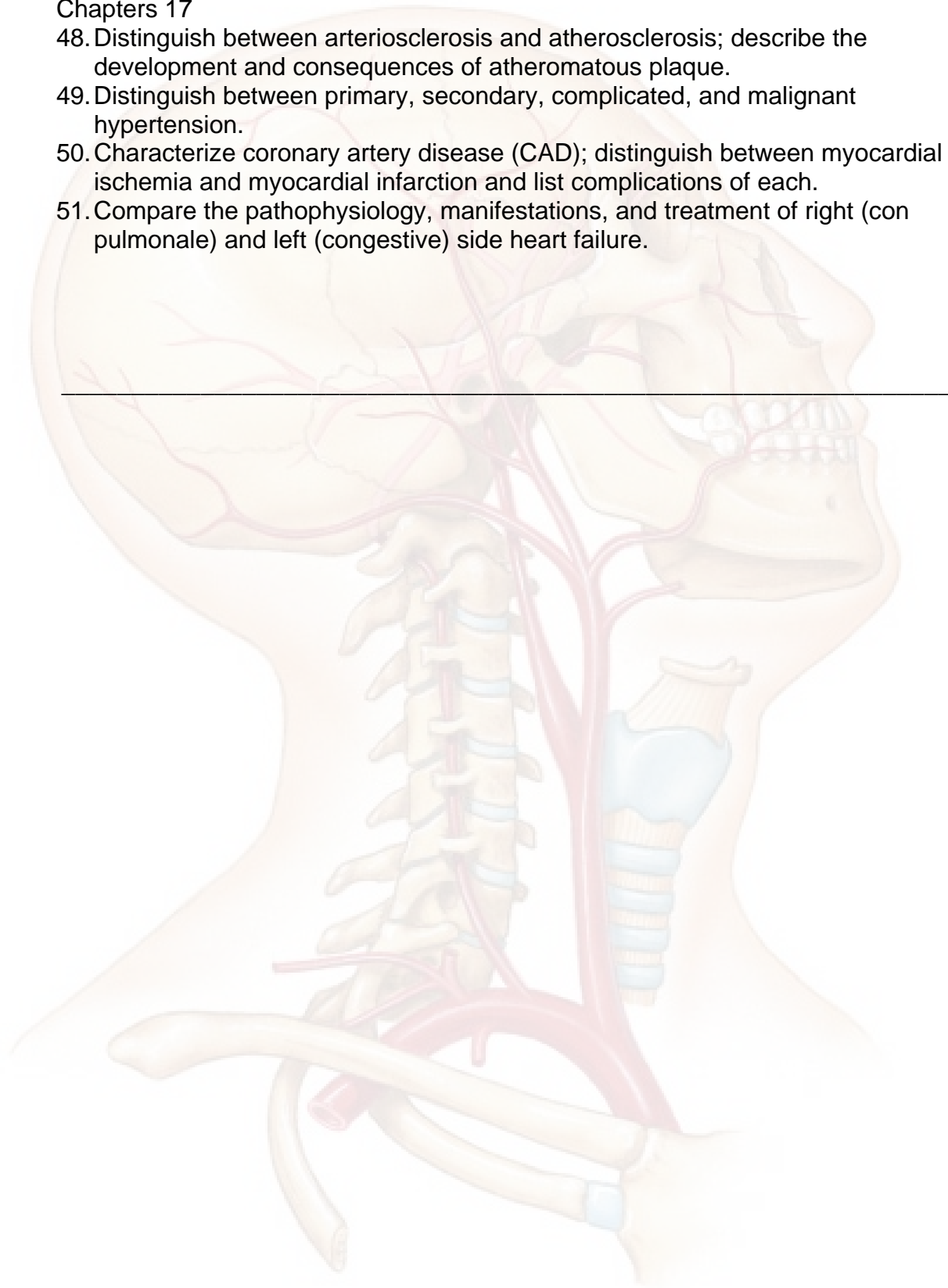
46. Describe the chronic complications of diabetes mellitus: diabetic neuropathies, microvascular diseases, macrovascular diseases, and infections.

Chapter 16

47. Define stress, identify stressors, and characterize the stress response.

Chapters 17

48. Distinguish between arteriosclerosis and atherosclerosis; describe the development and consequences of atheromatous plaque.
 49. Distinguish between primary, secondary, complicated, and malignant hypertension.
 50. Characterize coronary artery disease (CAD); distinguish between myocardial ischemia and myocardial infarction and list complications of each.
 51. Compare the pathophysiology, manifestations, and treatment of right (con pulmonale) and left (congestive) side heart failure.
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Chapters 18

52. Define the terms used in describing the signs and symptoms of pulmonary disease: dyspnea, orthopnea, paroxysmal nocturnal dyspnea, hyperpnea, Cheyne-Stokes respirations, hypoventilation, hyperventilation, hypercapnia, hypocapnia, coughing, hemoptysis, cyanosis, pain, clubbing, and sputum.
53. Characterize the following lung conditions that are caused by pulmonary disease or injury: pulmonary edema, aspiration, atelectasis, bronchiectasis, bronchiolitis, bronchiolitis obliterans, pneumothorax, pleural effusion, empyema, pleurisy, abscess, fibrosis, chest wall restriction, flail chest, toxic gas exposure, pneumoconiosis, and allergic alveolitis.
54. Define pneumonia and describe its causes, manifestations, and treatment.
55. Describe the pathogenesis of tuberculosis.

Chapters 19

56. Compare and contrast the signs, symptoms, and etiology of cystitis versus & 6 pyelonephritis.
57. Describe the types of glomerulonephritis, its features, manifestations, and treatment.
58. Identify and explain the key features of nephrotic syndrome.

Chapter 20

59. Compare and contrast the various disorders of digestive motility: dysphagia, gastroesophageal reflux, hiatal hernia, pyloric obstruction, and intestinal obstruction.
60. Compare ulcerative colitis and Crohn disease.
61. Compare the viral hepatitis types.
62. Describe hepatic cirrhosis compare and the various types of cirrhosis: alcoholic, biliary, and postnecrotic.
63. Compare cholelithiasis to cholecystitis.