The Endocrine System (PART I) Hormone Overview

Overview
- Describe the major endocrine organs, list their main locations and functions.
- Indicate important differences between hormonal and neural controls of body functioning.
- Why are endocrine glands composed of epithelial tissue?
- Define hormone. Distinguish between hormones, paracrines and autocrines.
- What are the structural differences in hormones? How does this affect their behavior?
- Describe the two major mechanisms by which hormones bring about their effects on their target tissues.
- Describe target cell specificity.
- Describe the factors which affect half-life.
- Describe the interactions between two or more hormones.
- Describe how negative and positive feedback loops control hormone synthesis and release.

The Endocrine System (PART II) Individual Endocrine glands and their hormones

Overview
- Interactions between hypothalamus: anterior pituitary and posterior pituitary gland
- Discuss the structure of the posterior pituitary, and describe the effects of the two hormones it releases.
- List and describe the chief effects of anterior pituitary hormones.
- List and describe the hormones secreted from organ in the hormone chart.
- The target tissues and examples of target tissue response to each hormone.
- Mechanism that regulates hormone secretion by specific glands when examples are given.
- For selected hormones, the causes and consequences of hyper and/or hypo secretion.
- Disease conditions of interest that result from hyper and hypo secretions of hormones will be mentioned for selected endocrine glands.
The Cardiovascular System _ Blood I

Overview
- Describe the functions of blood.
- Describe the composition and physical characteristics of whole blood.
- Describe the composition and functions of plasma.
- Describe the three fluid compartments of the human body and their and contents.
- Discuss the structure, function and characteristics of erythrocytes.
- Describe the chemical composition of hemoglobin and the “Hemoglobin Bus”.
- Describe the production, regulation and requirements for erythropoiesis.
- Discuss the fate and destruction of erythrocytes.
- List the classes, structural characteristics, and functions of leukocytes.
- Describe hemostasis.
- Describe fibrinolysis.
- Describe clotting disorders.
- Describe the process of blood analysis.

The Cardiovascular System _ ABO/Rh Blood Typing

Overview
- Describe the process of inheritance.
- Define antigen.
- What are self-recognition proteins?
- Describe ABO and Rh blood groups.
- Describe ABO plasma anti-bodies.
- Describe Rh sensitivity and anti-bodies.
- Describe why blood recipients and donors must be cross matched.

The Cardiovascular System _ The Heart: anatomy and circulation

Overview
- Describe the size, shape, and location, and orientation of the heart in the thorax.
- Describe the coverings and membranes of the heart.
- Describe the structure and function of each of the three layers of the heart wall.
- Describe the structure and functions of the four heart chambers.
- Name each chamber and provide the name and general route of its associated great vessels.
- Describe the pathway of blood through the heart.
- Describe and diagram coronary circulation.
- Describe the problems and treatments of coronary circulation.
- Name the heart valves and describe their location, function, and mechanism of operation.
- Describe structure and possible problems associated with heart valves.
The Cardiovascular System _ The Heart II

Overview
- Describe the structural and functional properties of cardiac muscle, and explain how it differs from skeletal muscle.
- Describe microscopic anatomy and communication of heart cells.
- Compare and contrast heart cell and muscle fiber contraction.
- How do action potentials differ between cardiac cells and muscle fibers?
- Describe and diagram the auto rhythmic nature of the heart (trace the conduction pathway).
- Draw a diagram of a normal electrocardiogram tracing. Name the individual waves and intervals, and indicate what each represents. Name some abnormalities that can be detected on an ECG tracing.
- Describe the timing and events of the cardiac cycle (the mechanical events within the heart).
- Describe the formula for cardiac output. Name and explain the effects of various factors regulating stroke volume and heart rate.
- Explain the role of the autonomic nervous system in regulating cardiac output.

The Cardiovascular System _ Blood Vessels

Overview
- Describe the three layers that typically form the wall of a blood vessel, and state the function of each.
- Define vasoconstriction and vasodilation.
- Compare and contrast the structure and function of the three types of arteries.
- Describe the structure and function of a capillary bed (three types of capillaries).
- Describe the structure and function of veins, and explain how veins differ from arteries.
- Explain the importance of vascular anastomoses.

The Cardiovascular System _ Physiological Circulation

Overview
- Define blood flow, blood pressure, and resistance, and explain the relationship between these factors.
- Describe how blood pressure differs in the arteries, capillaries and veins.
- List and explain the factors that influence blood pressure on a short term basis (moment to moment).
- List and explain the factors that influence blood pressure on a long term basis through the kidneys (direct or indirect).
- Define hypotension. List several possible causes.
- Define hypertension. Describe its manifestations and consequences.
- Define circulatory shock. List several possible causes.
- Outline fluid capillary dynamics: fluid moving from the plasma compartment to the interstitial space and back.
The Lymphatic System

Overview
- List the functions of the lymphatic system.
- Describe the structure and distribution of lymphatic vessels.
- Describe the source of lymph fluid and mechanisms of transport.
- Describe the basic structure and cellular population of lymphoid tissue.
- Describe the general location, histological structure, and functions of lymph nodes.
- Describe the location and function of lymph organs.
- Define the MALT and lists its major components.

The Immune System

Overview
- Describe surface membrane barriers and their protective functions.
- Explain the importance of phagocytosis, natural killer cells, and fever in innate body defense.
- Flow chart the inflammatory response.
- Describe the inflammatory response in a detailed story.
- Define antigen and describe how antigens affect the adaptive defenses.
- Describe how the major histocompatibility complex codes for our specific immune genes.
- List the cells of the adaptive immune system. Describe their functions.
- Compare and contrast active and passive immunity.
- Describe the mechanisms of vaccination.
- List and describe homeostatic imbalances of the immune system.

The Respiratory System _ Gross Anatomy

Overview
- Describe the 4 major parts of respiration.
- Describe the locations, structures, and functions of the upper respiratory system.
- Describe the locations, structures, and functions of the lower respiratory system.
- Distinguish between conducting and respiratory zone structures in the lower respiratory system.
- Describe the makeup of the respiratory membrane, and relate structure to function.
- Describe the gross structure of the lungs and pleurae.
- List and describe possible medical conditions associated with the respiratory zone.
The Respiratory System _ Respiratory Physiology

Overview

- Relate Boyle’s Law to events of inspiration and expiration.
- Explain the relative roles of the respiratory muscles and lung elasticity in producing the volume changes that cause air to flow into and out of the lungs.
- State Daulton’s law of partial pressures.
- Relate Daulton’s law of partial pressures to gases moving in and out of the lungs.
- Describe how oxygen is transported in the blood.
- Describe carbon dioxide transport in the blood.
- Draw the pathway of gas transport in the blood.
- List and describe modifications of the respirations.
- List and describe homeostatic imbalances of the respiratory system.

The Digestive System

Overview

- Describe the functions of the digestive system, and differentiate between organs of the alimentary canal and accessory digestive organs.
- List and define the major processes occurring during digestive system activity.
- Describe the location and function of the peritoneum.
- Define retroperitoneal and name the retroperitoneal organs of the digestive system.
- Define splanchnic circulation and indicate the importance of the hepatic portal system.
- Describe the tissue composition and general function of each of the four layers of the alimentary canal.
- Describe stimuli and controls of digestive activity.
- Describe the basic functions of the mouth and its associated organs.
- Describe the anatomy and basic functions of the pharynx and esophagus.
- Describe stomach structure and digestive function.
- Name the cell types responsible for secreting the various components of gastric juice and indicate the importance of each component in stomach activity.
- Describe the anatomy of the liver, pancreas, and gallbladder.
- State the roles of bile and pancreatic juice in digestion.
- Describe how bile and pancreatic juice secretion into the small intestine are regulated.
- Describe the anatomy and functions of the small intestine.
- Describe the anatomy and functions of the large intestine.
- Describe topics of digestive interest.
- Describe special topics of interest (liver)
Nutrition & Metabolism

Overview
- Define nutrient.
- Differentiate between essential and non-essential nutrients.
- Distinguish between the 4 major macromolecules.
- What kind of nutrients and how much are in the food we eat each day?
- What are these nutrients used for (why do we need them)?
- What happens if we over-consume or under-consume recommended amounts?
- Diagram how we convert each polymer into its appropriate monomer and the processes and cells used for final absorption.
- Differentiate between LDL and HDL in the body. Explain the uses for each.
- Describe the role of vitamins & minerals in the body.
- Describe cellular metabolism. Why do we need to produce and use ATP?
- Describe energy balance and body temperature regulation.

The Urinary System

Overview
- Describe the physiological functions of the urinary system.
- Describe and draw the macro anatomy of the kidney.
- Describe and draw the micro anatomy of the kidney.
- Describe the anatomy and function of the nephron.
- Describe glomerular filtrate.
- Describe tubular reabsorption.
- Describe tubular secretion.
- Trace the possible routes of filtrate beginning in the renal artery.
- Describe the mechanisms underlying water and solute reabsorption from the renal tubules into the peritubular capillaries.
- Describe the importance of tubular secretion and list several substances that are secreted.
- Explain how dilute and concentrated urine are formed.
- List several abnormal urine components and condition responsible.
The Reproductive System_Male

Overview
- Describe the structure and function of the testes, and explain the importance of their location in the scrotum.
- Describe the location, structure, and function of the penis.
- Compare and contrast the roles of each part of the male reproductive duct system.
- Compare the roles of the seminal glands and the prostate.
- Discuss the sources and functions of semen.
- Describe the phases of the male sexual response.
- Define meiosis. Compare and contrast it to mitosis.
- Discuss the physiological effects of testosterone on male reproductive anatomy.

The Reproductive System_Female

Overview
- Describe the location, structure, support structures, and function of the ovaries.
- Describe the location, structure, and function of each organ in the female reproductive duct system.
- Describe the anatomy of the female external genitalia.
- Discuss the structure and function of the mammary glands.
- Describe the risks of breast cancer.
- Describe the regulation of the ovarian and uterine cycles.
- Describe the physiological effects of estrogen and progesterone.
Fluid, Electrolyte and Acid Base Balance _ Part I

Overview

- List the factors that determine body water content and describe the effect of each factor.
- Contrast the overall osmotic effects of electrolytes and nonelectrolytes.
- Indicate the relative fluid volume and solute composition of the fluid compartments of the body.
- Describe the mechanisms which regulate water intake.
- Discuss the imbalances of water balance.
- Indicate routes of electrolyte entry and loss from the body.
- Describe the importance of sodium in the body’s fluid and electrolyte balance.
- Describe mechanisms involved in regulating sodium balance, blood volume, and blood pressure.
- Explain how potassium, calcium, and anion balances in plasma are regulated.

Fluid, Electrolyte and Acid Base Balance _ Part II

Overview

- Define acid and base
- List important sources of acids in the body.
- List the three major chemical buffer systems of the body.
- Describe the influences of the respiratory system on acid-base balance.
- Describe the role the kidneys play in acid-base balance.
- Discuss the causes and consequences of acid-base imbalance.
- Compare and contrast the roles that sodium and calcium play in the body.