



BAKER COLLEGE
STUDENT LEARNING OUTCOMES

BIO1220 Human Anatomy & Physiology II
3 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Analyze anabolic and catabolic metabolic pathways.
 - a. Describe the following:
 - i. Protein synthesis
 - ii. DNA Replication
 - iii. Glycolysis
 - iv. Citric Acid Cycle
 - v. Electron Transport Chain
2. Examine the physiology of the endocrine system.
 - a. Compare the mechanism of action of steroid and non-steroid hormones.
 - b. Describe the role of the hypothalamus and anterior pituitary gland in regulating the endocrine system.
 - c. Describe how insulin and glucagon work to maintain homeostasis of blood sugar.
 - d. Describe the role of the thyroid gland in regulating metabolic rate.
 - e. Describe the role of the adrenal gland during a sympathetic response.
3. Examine the physiology of the skeletal system.
 - a. Describe the homeostasis of bone tissue including the role of hormones, nutrients, and minerals.
 - b. Explain embryonic bone formation.
 - i. Endochondral ossification
 - ii. Intramembranous ossification
4. Examine the physiology of the muscular system.
 - a. Describe the major events that occur during muscle fiber contraction and relaxation.
 - i. Structure and function of the neuromuscular junction
 - ii. Excitation-contraction coupling
 - iii. Structure of the sarcomere
 - iv. Sliding filament model of contraction
 - v. Relaxation of a muscle fiber
 - b. Describe anaerobic vs. aerobic metabolism and its implications to muscle physiology
 - i. Oxygen debt and accumulation of lactic acid
 - ii. Role of creatine and its relationship to ATP
 - iii. Role of myoglobin
5. Examine the physiology of the nervous system.
 - a. Describe the events that lead to the generation of a nerve impulse.
 - i. Resting potential

- ii. Threshold potential
 - iii. Action potential
 - iv. Impulse conduction
 - v. Special senses
 - vi. Reflex arc physiology
 - b. Describe synaptic transmission.
 - i. Neurotransmitters and receptors
 - 1. Neurotransmitters: types and function
 - 2. Receptors: types, signaling
6. Describe the structure and function of blood.
- a. Describe the process of hematopoiesis and its hormonal regulation.
 - b. Describe the processes of hemostasis.
 - i. Initiation and maintenance of the vascular spasm.
 - ii. Platelet plug formation
 - iii. Initiation of the intrinsic clotting cascade
 - iv. Initiation of the extrinsic clotting cascade
 - v. Common steps in the clotting cascades
 - c. Describe the destruction of erythrocytes and recycling of hemoglobin.
7. Describe the physiology of the heart.
- a. Examine the cardiac conduction system and cardiac cycle.
 - i. Describe how the cardiac cycle is regulated by the conduction system.
 - ii. Correlate the events on an ECG with the activity of the conduction system.
 - iii. Explain how the heart sounds are produced and when they occur within the cardiac cycle.
 - iv. Explain the role of nervous and endocrine systems in regulating heart rate.
 - b. Explain the significance and regulation of cardiac output.
8. Describe the physiology of the vascular system.
- a. Explain the regulation of peripheral resistance.
 - i. Describe how the nervous system affects blood vessels.
 - ii. Describe how local tissue needs influence arterioles and the precapillary sphincters.
 - b. Explain how blood pressure homeostasis is maintained.
 - i. Describe how the nervous system affects blood vessels.
 - ii. Describe how local tissue needs influence arterioles and the precapillary.
 - c. Explain how the structure of capillaries allows for the exchange of materials between capillaries and body tissues.
 - i. Explain the concepts of hydrostatic and osmotic pressure.
 - ii. Explain filtration, osmosis, and diffusion.
 - d. Describe factors contributing to venous return.
 - e. Describe the adaptations to circulation found during fetal development, including the following:
 - i. ductus venosus
 - ii. ductus arteriosus
 - iii. foramen ovale

9. Explain the physiology of the immune system.
 - a. Describe the factors that contribute to innate immunity.
 - b. Describe the development of T lymphocytes and B lymphocytes.
 - c. Describe the factors that contribute to adaptive immunity.
 - i. Describe the roles of antigen presenting cells and T cells in a cell mediated immunity.
 - ii. Describe the roles of antigen presenting cells, helper T cells and B cells in humoral (anti-body mediated) immunity.
 - iii. Describe classes of immunoglobulins and their functions.
 - iv. Differentiate between primary and secondary immune responses.
 - d. Differentiate between active and passive immunity.
10. Describe the physiology of the digestive system.
 - a. Describe the processes of mechanical and chemical digestion of the following macromolecules.
 - i. Carbohydrates
 - ii. Lipids
 - iii. Proteins
 - iv. nucleic acids
 - b. Describe the coordination of digestion.
 - i. Explain how the autonomic nervous system affects the activity of the digestive system.
 - ii. Describe the hormones and major secretions that are released by the digestive system.
 - c. Describe the mechanism of motility throughout the G.I. tract.
 - i. Swallowing
 - ii. Peristalsis
 - iii. Segmentation
 - iv. Mass movements
 - v. Defecation
 - d. Explain how the following are absorbed:
 - i. Monosaccharides
 - ii. glycerol and fatty acids
 - iii. amino acids
 - iv. water
 - v. electrolytes
11. Describe the physiology of the respiratory system.
 - a. Describe the process of pulmonary ventilation.
 - i. Describe the process of inhalation.
 - ii. Describe the process of exhalation.
 - b. Explain how the respiratory system maintains homeostasis of oxygen, carbon dioxide, and pH.
 - i. Describe the function of peripheral and central chemoreceptors.
 - ii. Describe the location and role of respiratory control centers.
 - c. Describe the exchange of gases at the respiratory membrane.
 - d. Describe how the blood transports oxygen and carbon dioxide.

- e. Describe the exchange of gases between the blood and body tissues.
 - 12. Describe the physiology of the urinary system.
 - a. Describe the role of the nephron in the production of urine
 - b. Describe the neuronal and hormonal regulation of the urinary formation.
 - c. Describe micturition.
 - 13. Describe the process of fluid, electrolyte, and potential hydrogen (pH) regulation.
 - a. Describe mechanisms of water balance
 - b. Describe the various fluid compartments of the body.
 - c. Explain how homeostasis of electrolytes is maintained.
 - d. Describe how homeostasis of pH is maintained.
 - i. Explain the role of chemical buffers.
 - ii. Explain the role of physiological buffers.
 - 14. Explore the processes of meiosis.
 - a. Differentiate between oogenesis and spermatogenesis.
 - b. Describe the phases in the first and second meiotic divisions.
 - c. Describe crossing-over during meiosis.
 - d. Describe simple inheritance
 - 15. Describe the physiology of the male reproductive system.
 - a. Describe how hormones influence the male reproductive system and secondary sexual characteristics.
 - b. Describe the male sexual response including erection, orgasm, and ejaculation
 - c. Describe pregnancy, growth and development.
 - d. Describe hypothalamic control of male sex hormones.
 - 16. Describe the physiology of the female reproductive system.
 - a. Describe how hormones influence the female reproductive system and secondary sexual characteristics.
 - b. Describe the stages of the female reproductive cycle and explain how they are regulated by hormones.
 - c. Describe milk production and explain how it is regulated by hormones.
 - d. Describe the female sexual response including erection, lubrication, and orgasm.
 - 17. Describe the physiology of pregnancy:
 - a. Describe gestational development of the fetus.
 - i. Explain the stages of fetal development.
 - ii. Explain the hormonal regulation of pregnancy.
 - b. Describe the parturition process.
 - c. Describe lactation as it pertains to infant nutritional needs.
 - i. Explain breast development after the onset of pregnancy.
 - ii. Explain the hormonal feedback for production and let down of milk.
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These SLOs are not approved for experiential credit.

Effective: Fall 2019