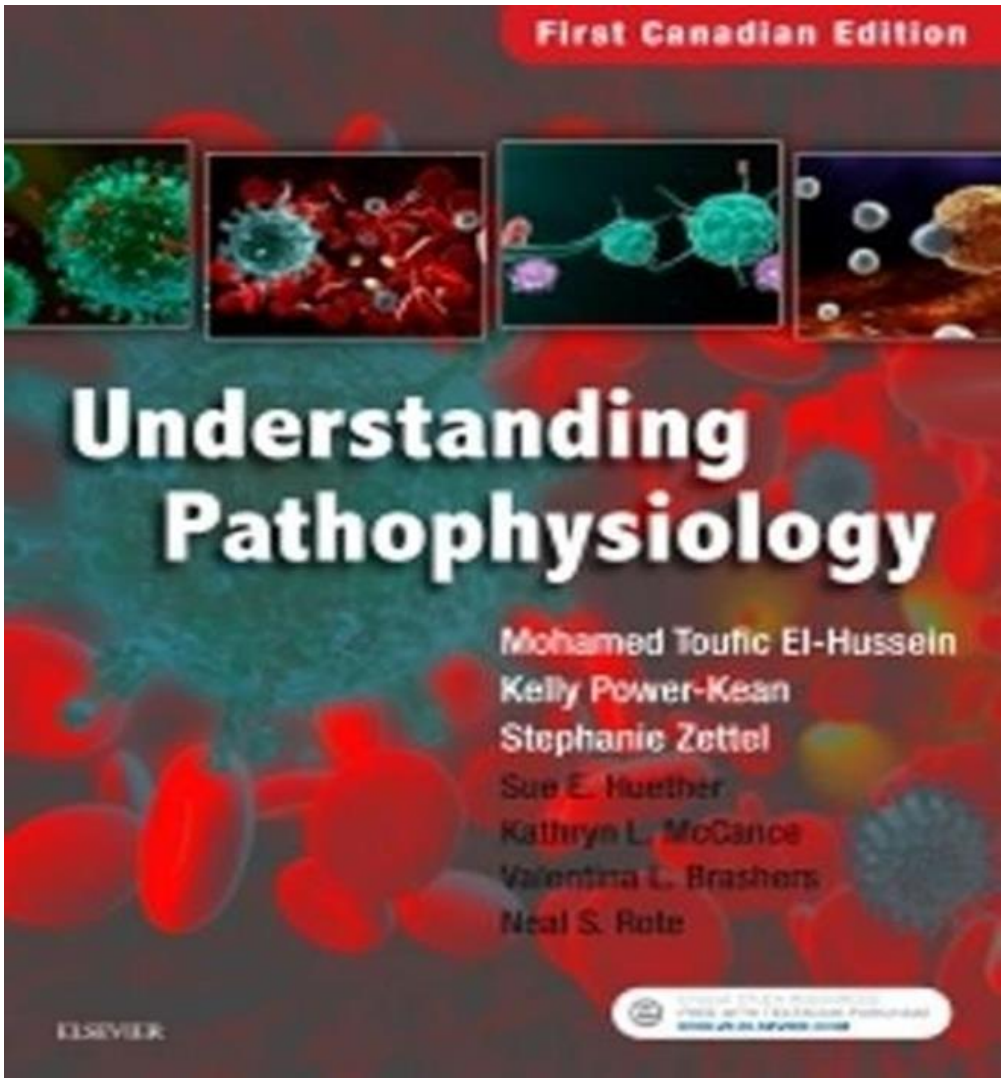
TEST BANK

UNDERSTANDING PATHOPHYSIOLOGY

1ST CANADIAN EDITION EL-HUSSEIN



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Test Bank for Understanding Pathophysiology 1st Canadian Edition El-Hussein

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Table of Contents

Unit 9: The Renal and Urologic Systems
29. Structure and Function of the Renal and Urologic Systems
30. Alterations of Renal and Urinary Tract Function
31. Alterations of Renal and Urinary Tract Function in Children
Unit 10: The Reproductive Systems
32. Structure and Function of the Reproductive Systems
33. Alterations of the Female Reproductive System
34. Alterations of the Male Reproductive System
Unit 11: The Digestive System
35. Structure and Function of the Digestive System
36. Alterations of Digestive Function
37. Alterations in Digestive Function in Children
Unit 12: The Musculoskeletal and Integumentary Systems
38. Structure and Function of the Musculoskeletal System
39. Alterations of Musculoskeletal Function
40. Alterations of Musculoskeletal Function in Children
41. Structure, Function, and Disorders of the Integument
42. Alterations of the Integument in Children

Chapter 01: Cellular Biology

MULTIPLE CHOICE

1. A student is observing a cell under the microscope. It is observed to have supercoiled DNA with histones. Which of the following would also be observed by the student?
   a. A single circular chromosome
   b. A nucleus
   c. Free-floating nuclear material
   d. No organelles

   ANS: B
   The cell described is a eukaryotic cell, so it has histones and a supercoiled DNA within its nucleus; thus, the nucleus should be observed. A single circular chromosome called a prokaryote contains free-floating nuclear material but has no organelles.

   REF: p. 2

2. A nurse is instructing the staff about cellular functions. Which cellular function is the nurse describing when an isolated cell absorbs oxygen and uses it to transform nutrients to energy?
   a. Metabolic absorption
   b. Communication
   c. Secretion
   d. Respiration

   ANS: D
   The cell's ability to absorb oxygen is referred to as respiration while its communication ability involves maintenance of a steady dynamic state, metabolic absorption provides nutrition, and secretion allows for the synthesizing of new substances.

   REF: p. 2

3. A eukaryotic cell is undergoing DNA replication. In which region of the cell would most of the genetic information be contained?
   a. Mitochondria
   b. Ribosome
   c. Nucleolus
   d. Nucleus Cytoplasm

   ANS: C
   The region of the cell that contains genetic material, including a large amount of ribonucleic acid, most of the DNA, and DNA-binding proteins, is the nucleolus, which is located within the cell's nucleus. Mitochondria is associated with cellular respiration, while ribosomes are involved with protein manufacturing. Cytoplasm is a fluid filling that is a component of the cell.

   REF: p. 2

4. Which of the following can remove proteins attached to the cell's bilayer by dissolving the layer itself?
   a. Peripheral membrane proteins
   b. Integral membrane proteins
   c. Glycoproteins
   d. Cell adhesion molecules

   ANS: B
   Proteins directly attached to the membrane bilayer can be removed by the action of integral membrane proteins that dissolve the bilayer. Peripheral membrane proteins reside at the surface while cell adhesion molecules are on the outside of the membrane. Glycoprotein marks cells and does not float.

   REF: p. 7

5. Which of the following can bind to plasma membrane receptors?
   a. Oxygen
   b. Ribosomes
   c. Amphipathic lipids
   d. Ligands

   ANS: D
   Ligands are the only specific molecules that can bind with receptors on the cell membrane.

   REF: p. 9

6. A nurse is reviewing a report from a patient with metastatic cancer. What alternation in the extracellular matrix would support the diagnosis of metastatic cancer?
   a. Decreased fibronectin
   b. Increased collagen
   c. Decreased elastin
   d. Increased glycoproteins

   ANS: A
   Only a reduced amount of fibronectin is found in some types of cancerous cells, allowing them to travel or metastasize.

   REF: p. 10

7. Which form of cell communication is used to relate to other cells in direct physical contact?
   a. Cell junction
   b. Gap junction
   c. Desmosome
   d. Tight junction

   ANS: A
   Cell junctions hold cells together and permit molecules to pass from cell to cell.
   Gap junctions allow for cellular communication between cells. Neither desmosomes nor tight junctions are associated with cellular communication.

   REF: p. 11

8. Pancreatic beta cells secrete insulin, which inhibits secretion of glucagon from neighboring alpha cells. This action is an example of which of the following signaling types?
   a. Paracrine
   b. Autocrine
   c. Neurohormonal
   d. Hormonal

   ANS: A
   Paracrine signaling involves the release of local chemical mediators that are quickly taken up, destroyed, or immobilized, as in the case of insulin and the inhibition of the secretion of glucagon. None of the other options involve signaling that is associated with a local chemical mediator like insulin.

   REF: p. 12

9. In cellular metabolism, each enzyme has a high affinity for a:
   a. solute.
   b. substrate.
   c. receptor.
   d. ribosome.

   ANS: B
   Each enzyme has a high affinity for a substrate, a specific substance converted to a product of the reaction. Cellular metabolism is not dependent on an attraction between an enzyme and any of the remaining options.

   REF: p. 16

10. An athlete runs a marathon, after which his muscles feel fatigued and unable to contract. The athlete asks the nurse why this happened. The nurse's response is based on the knowledge that the problem is result of a deficiency of:
    a. GTP
    b. AMP
    c. ATP
    d. GMP

    ANS: C
    When ATP is deficient, impaired muscle contraction results. None of the other options are involved in muscle contraction.

    REF: p. 16

11. Which phase of catabolism produces the most ATP?
    a. Digestion
    b. Glycolysis
    c. Oxidation
    d. Citric acid cycle

    ANS: D
    While some ATP is produced during the oxidation and glycolysis phases, most of the ATP is generated during the citric acid cycle. Digestion does not produce any ATP.

REF: p. 16

12. A nurse is teaching the staff about the phases of cellular catabolism. Which phases should the nurse include?
    a. Digestion, glycolysis, oxidation, and the citric acid cycle
    b. Diffusion, osmosis, and mediated transport
    c. S phase, G phase, and M phase
    d. Metabolic absorption, respiration, and excretion

    ANS: A
    Only digestion, glycolysis, oxidation, and the citric acid cycle are the phases of cellular catabolism.

    REF: p. 16

13. A runner has depleted all the oxygen available for muscle energy. Which of the following will facilitate his continued muscle performance?
    a. Electron-transport chain
    b. Aerobic glycolysis
    c. Anaerobic glycolysis
    d. Oxidative phosphorylation

    ANS: C
    When no oxygen is available, anaerobic glycolysis occurs. The electron-transport chain is part of the citric acid cycle. Aerobic glycolysis involves the presence of oxygen. Oxidative phosphorylation is the mechanism by which the energy produced from carbohydrates, fats, and proteins is transferred to ATP. It is not part of muscle performance.

    REF: p. 16

14. A faculty member asks a student to identify the appropriate term for the movement of a solute from an area of greater to lesser concentration. Which answer indicates the nursing student understood the teaching?
    a. Osmosis
    b. Diffusion
    c. Hydrostatic pressure
    d. Active transport

    ANS: B
    Diffusion is the movement of a solute molecule from an area of greater solute concentration to an area of lesser solute concentration through a permeable membrane. Osmosis is the movement of water across a semipermeable membrane from a region of higher water concentration to one of lower concentration. Hydrostatic pressure is the force of fluid against a cell membrane. In active transport, molecules move up a concentration gradient.

    REF: p. 19

15. Which description accurately describes electrolytes?
    a. Small lipid-soluble molecules
    b. Large protein molecules
    c. Micronutrients used to produce ATP