TEST BANK

Understanding Pathophysiology

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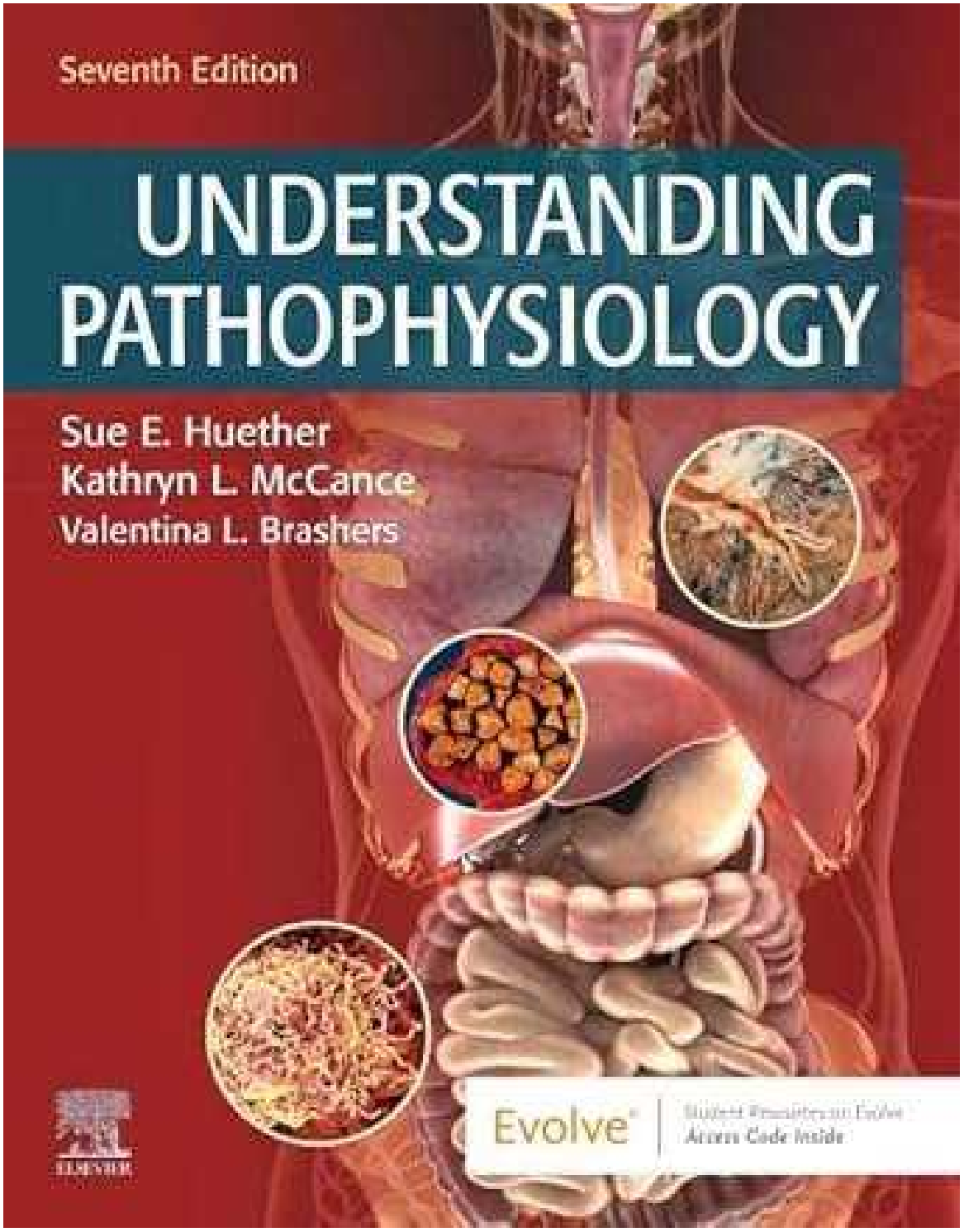
7th Edition



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Chapter 1. Cellular Biology
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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 is characteristic of prokaryotic cells, which do not have histones.

Free-floating nuclear material describes a prokaryotic cell, which would not have a distinct nucleus.

Eukaryotic cells have membrane bounded cellular components called organelles. No organelles describes a prokaryotic cell.

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 ability of the cell to absorb oxygen refers to the cells function of respiration.

The ability of the cell to function within a society of cells refers to its function of communication.

The ability of the cell to take in nutrients refers to the cells function of metabolic absorption.

The ability of the cell to synthesize new substances and secrete these elsewhere refers to the cells function of secretion.

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

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.

The mitochondria is the site of cellular respiration.

The ribosomes are involved in manufacturing of proteins within the cell.

The nucleus contains the nucleolus, and it is the nucleolus that contains genetic material.

4. The fluid mosaic model for biologic membranes describes membrane behavior. According to this model, which of the following float singly or as aggregates in the fluid lipid bilayer?

a. Peripheral membrane proteins
b. Integral membrane proteins

c. Glycoproteins
d. Cell adhesion molecules

ANS: B

Integral membrane proteins float freely in the fluid lipid bilayer.

Peripheral membrane proteins are not embedded in the layer, but reside at the surface.

Glycoproteins act as cell surface markers.

Cell adhesion molecules are on the outside of the membrane and allow cells to hook together.

5. Which of the following can bind to plasma membrane receptors?

a. Oxygen
b. Ribosomes
c. Amphipathic lipids
d. Ligands

ANS: D

Ligands are specific molecules that can bind with receptors on the cell membrane.

Oxygen moves by diffusion; it does not bind to receptors.

Ribosomes make proteins and are not involved in binding.

Amphipathic lipids are a portion of the cell membrane.

6. A nurse is reviewing a report from a patient with metastatic cancer. What finding would support the diagnosis of metastatic cancer? Alterations in extracellular matrix that include:

a. Decreased fibronectin
b. Increased collagen
c. Decreased elastin

d. Increased glycoproteins

ANS: A

Reduced amounts of fibronectin are found in some types of cancerous cells, allowing cancer cells to travel, or metastasize.

Collagen provides strength, and its breakdown is associated with osteoarthritis, not cancer.

Elastin is found in the lungs and allows tissues to stretch; it is not associated with cancerous cells.

Decreased, not increased, glycoproteins are associated with cancerous cells.

7. Which form of cell communication is used to relate to other cells in direct physical contact?

a. Cell junction
b. Gap junction
c. Desmosomes
d. Tight junctions

ANS: A

Cell junctions hold cells together and permit molecules to pass from cell to cell.

Gap junctions allow communication from the inside of one cell to the inside of another.

Desmosomes are not involved in communication, but allow cells to hold together.

Tight junctions are barriers that prevent movement of some substances and leakages of others.

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.

When cells produce signals that they themselves respond to, autocrine signaling is used.

Neurohormonal signaling involves secretion of hormones into the bloodstream by neurosecretory hormones.

Hormonal signaling involves specialized endocrine cells that secrete hormone chemicals released by one set of cells that travel through the tissue through the bloodstream to produce a response in other sets of cells.

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.

Solutes are small particles that pass through the cell membrane.

A receptor is a site on the cell wall that allows transport into the cell.

Ribosomes are located inside the cell and are not related to the work of enzymes.

10. An athlete runs a marathon, after which his muscles feel fatigued and unable to contract. The athlete asks the nurse why this happened. How should the nurse respond? A deficiency in _____can cause impaired muscle contraction.

a. GTP
b. AMP
c. ATP
d. GMP

ANS: C

The cell uses ATP for muscle contraction. when it is deficient, impaired muscle contraction results.

GTP is involved in cell signaling, not muscle contraction.

AMP is not involved in muscle contraction.

GMP is not involved in muscle contraction.

11. Which phase of catabolism produces the most ATP?

a. Digestion
b. Glycolysis
c. Oxidation
d. Citric acid cycle

ANS: D

Most of the ATP is generated during the citric acid cycle.

Larger molecules are broken down into smaller units during digestion; no ATP is produced during this cycle.

During glycolysis, two molecules of ATP are produced from each glucose molecule, but the most ATP is produced during the citric acid cycle.

Oxidation is part of the glycolysis process and ATP is produced, but more ATP is produced during the citric acid cycle.

12. A nurse is teaching the staff about the three phases of cellular catabolism. Which of the following should the nurse include?

a. Digestion, glycolysis and 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

Digestion, glycolysis and oxidation, and the citric acid cycle are the three phases of cellular catabolism.

Diffusion, osmosis, and mediated transport are parts of the movement of fluids in and out of cells.

The S, G, and M phases are phases of cellular division, not catabolism.

Metabolic absorption, respiration, and excretion are functions of the cell.

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