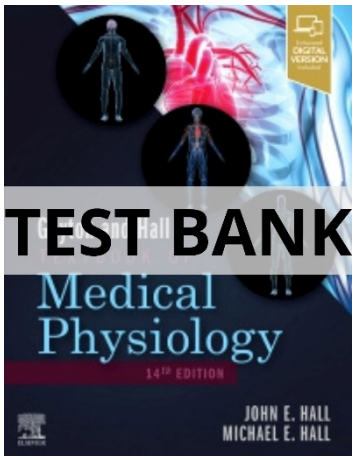
Chapter 01: Functional Organization of the Human Body and Control of the "Internal Environment"
Hall: Guyton and Hall Textbook of Medical Physiology, 14th Edition



MULTIPLE CHOICE

1. Which of the following statements about homeostasis is incorrect?
   a. It refers to the maintenance of a stable internal environment for the body.
   b. Homeostatic mechanisms do not operate in diseases.
   c. Homeostasis requires integrated actions of the cells, tissues, organs, and multiple nervous, hormonal, and local control systems.
   d. Homeostatic compensations that begin after a major environmental challenge may contribute to abnormalities of body function.

   ANS: B

2. What is the most abundant type of cell in the human body?
   a. Neuron
   b. Epithelial cell
   c. Red blood cell
   d. White blood cell
   e. Vascular smooth muscle cell
   f. Skeletal muscle cell

   ANS: C

3. The most abundant substance in the human body and the approximate percentage of that substance in the body is which of the following?
   a. Protein, 30%
   b. Protein, 60%
   c. Water, 30%
   d. Water, 60%
   e. Carbohydrate, 30%
   f. Carbohydrate, 60%

   ANS: D

4. If the feedback gain of a control system is − 2.0, this means that the system is
   a. a negative feedback system capable of correcting 1/2 of the initial disturbance to the system.
   b. a negative feedback system capable of correcting 2/3 of the initial disturbance to the system.
   c. a negative feedback system capable of correcting 3/4 of the initial disturbance to the system.
   d. a positive feedback system capable of correcting 1/2 of the initial disturbance to the system.
   e. a positive feedback system capable of correcting 2/3 of the initial disturbance to the system.

f. a positive feedback system capable of correcting 3/4 of the initial disturbance to the system.

ANS: B

5. Which of the following substances has the highest extracellular fluid to intracellular fluid concentration ratio for most mammalian cells?
   a. Sodium ions
   b. Potassium ions
   c. Carbon dioxide
   d. Glucose
   e. Protein

   ANS: A

6. Exchange of substances between the cardiovascular system and the interstitial fluid occurs mainly in which of the following?
   a. Arteries
   b. Arterioles
   c. Capillaries
   d. Venules
   e. Veins

   ANS: C

7. What is the approximate distance from the capillaries to most cells of the body?
   a. Less than 50 angstroms
   b. Less than 50 microns
   c. Less than 50 millimeters
   d. Less than 100 angstroms
   e. Less than 100 microns
   f. Less than 100 millimeters

   ANS: A

8. When a person is at rest, how much time is required for the blood in the circulation to traverse the entire circulatory circuit?
   a. 1 second
   b. 1 minute
   c. 3 minutes
   d. 4 minutes
   e. 5 minutes

   ANS: B

9. The type of control system that can sometimes cause instability and vicious cycles is called
   a. negative feedback.
   b. feed-forward control.
   c. positive feedback.
   d. adaptive feedback.
   e. delayed negative feedback.

   ANS: C

10. Which of the following is an example of positive feedback in the body?
    a. Return of blood pressure toward normal after a hemorrhage
    b. Generation of action potentials in nerves
    c. Increased respiration rate caused by accumulation of carbon dioxide in the blood
    d. Decreased sympathetic nervous system activity that occurs in response to increased blood pressure

    ANS: B

11. Which of the following is an example of a "feed-forward" control system?
    a. The arterial baroreceptor system
    b. The progressive nature of uterine contractions during childbirth
    c. Control of skeletal muscle movements by the brain
    d. Generation of an action potential

    ANS: C

12. Which of the following is an example of negative feedback?
    Example 1: Arterial baroreceptor control of blood pressure
    Example 2: Excitation of the respiratory center by increased blood carbon dioxide concentration
    Example 3: Hemorrhagic shock caused by severe blood loss
    a. Example 1 only
    b. Example 2 only
    c. Example 3 only
    d. Examples 1 and 2, but not 3
    e. Examples 1, 2, and 3

    ANS: D

Chapter 02: The Cell and Its Functions
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MULTIPLE CHOICE

1. The most abundant cell membrane lipids are
    a. sphingolipids.
    b. phospholipids.
    c. cholesterol.
    d. triglycerides.
    e. sterols.

    ANS: B

2. Organelles that neutralize drugs and toxins are
    a. nuclei.
    b. mitochondria.
    c. lysosomes.
    d. peroxisomes.
    e. endoplasmic reticulum.

    ANS: D

3. Use the terms in the following list to identify the cellular location for the steps involved in the synthesis and packaging of a secreted protein.
   "Initiation of translation"
   a. Nucleolus
   b. Nucleus
   c. Agranular endoplasmic reticulum
   d. Granular endoplasmic reticulum
   e. Golgi apparatus
   f. Endosomes
   g. Peroxisomes
   h. Cytosol

   ANS: H

4. Use the terms in the following list to identify the cellular location for the steps involved in the synthesis and packaging of a secreted protein.
   "Protein sorting and packaging"
   a. Nucleolus
   b. Nucleus
   c. Agranular endoplasmic reticulum
   d. Granular endoplasmic reticulum
   e. Golgi apparatus
   f. Endosomes
   g. Peroxisomes
   h. Lysosomes

   ANS: E

5. Use the terms in the following list to identify the cellular location for the steps involved in the synthesis and packaging of a secreted protein.
   "Gene transcription"
   a. Nucleolus
   b. Nucleus
   c. Agranular endoplasmic reticulum
   d. Granular endoplasmic reticulum
   e. Golgi apparatus
   f. Endosomes
   g. Peroxisomes
   h. Lysosomes

   ANS: B

6. Which of the following is true for both pinocytosis and phagocytosis?
   a. Involves recruitment of actin filaments
   b. Occurs spontaneously and nonselectively
   c. Permits uptake of bacterium into cytosol
   d. Is only observed in macrophages and neutrophils
   e. Does not require adenosine triphosphate

   ANS: A

7. The cell membrane is *least* permeable to which of the following substances?
   a. Sodium

b. Oxygen
c. Ethanol
d. Carbon dioxide
e. Water

ANS: A

8. Which of the following best describes the glycocalyx of a cell?
a. Negatively charged carbohydrate chains that protrude into cytosol
b. Negatively charged carbohydrate layer on cell surface
c. Layer of anions aligned on the cytosolic surface of plasma membrane
d. Large glycogen stores found in "fast" muscles
e. A mechanism of cell-cell attachment

ANS: B

9. Proteins are sorted for their delivery to lysosomes, secretory vesicles, and the plasma membrane in which of the following?
a. Golgi apparatus
b. Smooth endoplasmic reticulum
c. Nucleus
d. Endocytotic vesicle

ANS: A

10. The citric acid cycle (Krebs cycle) takes place in which of the following?
a. Mitochondrial matrix
b. Inner mitochondrial membrane
c. Outer mitochondrial membrane
d. Inner mitochondrial space

ANS: A

11. All the following processes depend on adenosine triphosphate **except** which of the following?
a. Ciliary movement
b. Positive chemotaxis
c. Movement of oxygen across lipid bilayer
d. Endocytosis
e. Smooth muscle contraction

ANS: C

12. Worn-out organelles are transferred to lysosomes by which of the following?
a. Granular endoplasmic reticulum
b. Agranular endoplasmic reticulum
c. Autophagosomes
d. Golgi apparatus
e. Mitochondria

ANS: C

13. This cytoskeletal element plays a role in certain forms of cell movement and is an essential component of the mitotic spindle _____.
a. Phospholipids

b. Glycocalyx
c. F-actin
d. Microtubules
e. Clathrin

ANS: D

14. A pure phospholipid bilayer is most permeable to which of the following?
a. Sodium
b. Calcium
c. Chloride
d. Water
e. Oxygen

ANS: E

15. Lipid synthesis occurs in which of the following locations?
a. Trans-Golgi network
b. Granular, or "rough," endoplasmic reticulum
c. Agranular, or "smooth," endoplasmic reticulum
d. Nucleus
e. Lysosome

ANS: C

16. The abnormal cleavage of mannose residues during the posttranslational processing of glycoproteins has been shown to result in the development of a lupus-like autoimmune disease in mice. The abnormal cleavage is due to a mutation of the enzyme α-mannosidase II. Based on your understanding of the processing of membrane proteins, you would predict this enzyme to be localized to which of the following?
a. Nucleus
b. Cytosol
c. Golgi apparatus
d. Lysosomes
e. Peroxisomes

ANS: C

17. The observation that abnormal cleavage of mannose residues from glycoproteins causes an autoimmune disease in mice is most consistent with the role of which of the following structures in the normal immune response?
a. Cytoskeleton
b. Glycocalyx
c. Peroxisomes
d. Lysosomes
e. Microtubules

ANS: B

18. Which of the following substances in most likely to represent the highest percent of cell mass in a typical cell of the body?
a. Carbohydrates
b. Ions

c. Lipids
d. Proteins
e. Water

ANS: E

19. Cholesterol in the cell membrane most likely serves which of the following functions?
a. Increases membrane permeability
b. Increases membrane turnover
c. Decreases membrane fluidity
d. Decreases membrane stability

ANS: C

20. Protein molecules are most likely to be actively folded and cross-linked in which of the following structures?
a. Granular endoplasmic reticulum
b. Lysosome
c. Ribosome
d. Golgi apparatus
e. Secretory granule

ANS: A

Chapter 03: Genetic Control of Protein Synthesis, Cell Function, and Cell Reproduction
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MULTIPLE CHOICE

1. The first stage of mitosis is called
a. anaphase.
b. prometaphase.
c. metaphase.
d. prophase.
e. telophase.

ANS: D

2. The region of repetitive nucleotide sequences located at each end of a chromatid is called
a. Okazaki fragment.
b. lagging strand.
c. replication fork.
d. telomere.
e. centriole.

ANS: D

3. Which of the following statements about cell differentiation is correct?
a. Differentiation results from selective loss of different genes from cells.
b. Differentiation results from selective activation of telomerase in different cells.
c. Differentiation results mainly from mutations of genes.
d. Differentiation results from selective repression of different gene promoters.