

# Hall: Guyton and Hall Textbook of Medical Physiology, 12th Edition

## Chapter 02: The Cell and Its Functions

### Test Bank

Refer to the following list to answer questions 1-3:

- A. Nucleolus
- B. Nucleus
- C. Agranular endoplasmic reticulum
- D. Granular endoplasmic reticulum
- E. Golgi apparatus
- F. Endosomes
- G. Peroxisomes
- H. Lysosomes
- I. Cytosol

Identify the cellular location for each of the following steps involved in the synthesis and packaging of a secreted protein.

1. Initiation of translation.

ANS: I

2. Protein sorting and packaging.

ANS: E

3. Gene transcription.

ANS: B

4. Which of the following is true for both pinocytosis and phagocytosis?

- A. Involves the recruitment of actin filaments
- B. Occurs spontaneously and non-selectively
- C. Permits the uptake of bacterium into the cytosol
- D. Is only observed in macrophages and neutrophils
- E. Does not require ATP

ANS: A

5. The cell membrane is **LEAST** permeable to which of the following?

- A. Sodium
- B. Oxygen
- C. Ethanol

- D. Carbon Dioxide
- E. Water

ANS: A

6. The term “glycocalyx” refers to:
- A. The negatively charged carbohydrate chains that protrude into the cytosol from glycolipids and integral glycoproteins
  - B. The negatively charged carbohydrate layer on the outer cell surface
  - C. The layer of anions aligned on the cytosolic surface of the plasma membrane
  - D. The large glycogen stores found in “fast” muscles
  - E. A mechanism of cell-cell attachment

ANS: B

7. Proteins are sorted for their delivery to lysosomes, secretory vesicles and the plasma membrane in the:
- A. Golgi apparatus
  - B. smooth endoplasmic reticulum
  - C. nucleus
  - D. endocytotic vesicle

ANS: A

8. Ubiquinone, an electron acceptor in the electron transport chain (oxidative phosphorylation), is found in the:
- A. Inner mitochondrial membrane
  - B. Mitochondrial matrix
  - C. Outer mitochondrial membrane
  - D. Nucleus

ANS: A

9. The citric acid cycle or Krebs’ s cycle, takes place in the:
- A. Mitochondrial matrix
  - B. Inner mitochondrial membrane
  - C. Outer mitochondrial membrane
  - D. Inner mitochondrial space

ANS: A

10. Which of the following processes is NOT ATP-dependent?
- A. Ciliary movement
  - B. Positive chemotaxis
  - C. Movement of carbon dioxide across a lipid bilayer
  - D. Endocytosis

- E. Smooth muscle contraction

ANS: C

11. 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

12. Lipid synthesis occurs in the:
- A. Trans-Golgi network
  - B. Granular or “rough” endoplasmic reticulum
  - C. Agranular or “smooth” endoplasmic reticulum
  - D. Nucleus
  - E. Lysosome

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. The abnormal cleavage of mannose residues during the post-translational 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  $\alpha$ -mannosidase II. Based on your understanding of the processing of membrane proteins, you would predict this enzyme to be localized to the:
- A. Nucleus
  - B. Cytosol
  - C. Golgi apparatus
  - D. Lysosomes
  - E. Peroxisomes

ANS: C

15. 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

16. A pure phospholipid bilayer is most permeable to:
- A. Sodium
  - B. Calcium
  - C. Chloride
  - D. Water
  - E. Oxygen

ANS: E