CHAPTER 7
MEMBRANE STUCTURE AND FUNCTION

Learning objectives

Membrane Structure

1. Explain the meaning of the statement that phospholipids and most other membrane constituents (e.g., proteins) are amphipathic molecules.
2. Explain how the fluid mosaic model of membrane structure explains each experimental finding:
    a. Actual membranes adhere more strongly to water than do artificial membranes composed only of phospholipids.
    b. Membranes with different functions may differ in type and number of membrane proteins.
    c. Membrane proteins are not very water-soluble.
    d. EMs of freeze-fracture membrane preparations show protein particles interspersed in a smooth matrix.
3. Describe the fluidity of the components of a cell membrane and explain how membrane fluidity is influenced by temperature and membrane composition.
4. Explain how cholesterol resists changes in membrane fluidity as temperatures change.
5. Distinguish between peripheral and integral membrane proteins.
6. List six major functions of membrane proteins.
7. Explain the role of membrane carbohydrates in cell-cell recognition.

Traffic across Membranes

8. Explain how hydrophobic molecules cross cell membranes.
9. Distinguish between channel proteins and carrier proteins.
10. Explain how aquaporins facilitate the passage of water through membranes.
11. Define diffusion. Explain why diffusion is a passive and spontaneous process.
12. Explain why a concentration gradient of a substance across a membrane represents potential energy.
13. Distinguish between solutions that are hypertonic, hypotonic, and isotonic to cell contents.
14. Define osmosis and predict the direction of water movement based on differences in solute concentrations.
15. Describe how living cells with and without cell walls regulate water balance.
16. Explain how transport proteins facilitate diffusion.
17. Distinguish between osmosis, facilitated diffusion, and active transport.
18. Describe the two forces that combine to produce an electrochemical gradient.
19. Explain how an electrogenic pump creates voltage across a membrane. Name two electrogenic pumps.
20. Describe the process of cotransport.
21. Explain how large molecules are transported across a cell membrane.
22. Distinguish between exocytosis and receptor-mediated endocytosis.