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Chapter 6.3, 6.4, 6.5

1. Distinguish between passive and active transport.
2. What does random molecular movement have to do with diffusion?
3. Define diffusion.
4. Osmosis is a particularly special type of diffusion. Why?
5. Distinguish between hypotonic, hypertonic, and isotonic environments.
6. True or False: a cell wall is necessary to generate turgor pressure. Explain.
7. Define facilitated diffusion.
8. Explain the role of membrane proteins in the facilitated diffusion of ions (like K+) and glucose.
9. Peter Agre and Rod McKinnon won a Nobel Prize for their discovery of aquaporins. What’s the big deal?
10. Identify the source of energy for active transport.
11. Explain the role of membrane proteins in active transport (uniporter, symporter, antiporter like the Na+/K+ pump).
12. Distinguish between exocytosis and endocytosis.
13. *Statement*: You need to be able to calculate surface area to volume ratios.
14. *Statement*: You need to understand why surface area to volume ratios are important in the context of diffusion, facilitated diffusion, and active transport as the primary modes of materials moving in and out of cells.

Chapter 35.1

1. *Statement*: Water potential defines which way water will move across a membrane by osmosis.
2. *Statement*: Water always moves across a selectively permeable membrane toward the region of lower (more negative) water potential.
3. What is the water potential equation?
4. What is solute potential?
5. What is pressure potential?
6. *Statement*: You need to be able to perform water potential calculations using the formula and explain which way water will move.

Chapter 5.4

1. Describe the structure of the plant cell wall.
2. Discuss some functions of the cell wall.
3. Describe the structure of extracellular matrix surrounding animal cells.
4. Discuss some functions of the extracellular matrix surrounding animal cells.

Chapter 45.1, 45.2, 45.3

1. Distinguish between the function of afferent neurons, efferent neurons and interneurons.
2. Explain the variation in nervous system complexity among animal species.
3. Diagram a neuron. Label the cell body, axon, dendrites, and myelin sheath.
4. Describe the structure and function of the myelin sheath.
5. Explain how the structure of a neuron allows for the detection, generation, transmission and integration of information.
6. What is a membrane potential and resting potential?
7. Signals are transmitted through action potentials. Explain the role of the sodium-potassium pump and voltage-gated channels in generating a membrane potential and action potentials. (**Important note**: Don’t get lost in all the details here! Just appreciate the role of these different membrane proteins are playing. Observe how they are using facilitated diffusion and active transport to generate nerve signals we call action potentials.)
8. Briefly describe the role of acetylcholine in the transmission of information at the neuromuscular junction.
9. What is a neurotransmitter?
10. Differentiate between excitatory (stimulatory) and inhibitory synapse responses.