Roland-Story Biology Class

Chapter 4 Study Guide
Cells and Their Environment

Name _____

1. Develop a Venn diagram to compare and contrast (a) concentration gradient, (b) diffusion, and (c) equilibrium to one another.

2. Describe the importance of ion channels in passive transport.

3. Identify the role of carrier proteins in facilitated diffusion.

4. Define the following terms by their Greek origins: (a) hypertonic, (b) hypertonic, and (c) isotonic.

5. Describe the motion of odor causing molecules as they heat up.

6. Using the table on page 79, answer the following:

    a. Identify the ion that is more concentrated inside the cell than outside the cell.

    b. Identify those ions that are more concentrated outside the cell than inside the cell.

    c. Do the positive charges of calcium ions and sodium ions make these ions more likely to move into or out of the cell? Explain your answer.

    d. Which ions' electrical charges oppose the direction of movement that is caused by their concentrated gradient?

7. How does diffusion differ from equilibrium?

8. Describe how the diffusion of ions across a cell membrane differs from the diffusion of non-polar molecules across the cell membrane.

9. Explain how some substances cross the cell membrane by facilitated diffusion.

10. Predict what would happen to a cell that is placed in a hypertonic solution, and explain why this would happen.

11. Compare active transport with passive transport.

12. Describe the importance of the sodium-potassium pump.

13. Explain the difference between endocytosis and exocytosis.

14. Identify three ways that receptor proteins can change the activity of a cell.

15. Explain Figure 6 on page 83.

16. In regard to signal molecules, what happens when you exercise? (See figure 7, page 84).

17. Explain the changes of permeability from figure 8, page 84).

18. How do some medications work in the human body? (see Real Life, page 85)

19. How does the sodium-potassium pump help to prevent animal cells from bursting?

20. Compare two ways that the binding of a signal molecule to a receptor protein causes a change in the activity of the receiving cell.

21. During exercise, potassium ions accumulate in the fluid that surrounds muscle cells. Which cell membrane protein helps muscle cells counteract this tendency? Explain your answer.

22. Define the term homeostasis, and explain how the sodium-potassium pump contributes to homeostasis in an animal.

23. When a cell takes in a food particle by endocytosis, the vesicle that is formed may fuse with a lysosome. How would that help the cell digest the food particle?

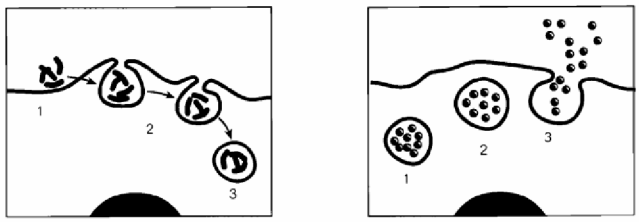
24. Which type of cells does HIV infect, and which of these does it destroy?

25. Explain why cooking dried pasta in boiling water makes the pasta soft?

26. Why do dissolved particles on one side of a membrane result in the diffusion of water across the membrane?

27. Why is it dangerous for humans to drink sea water?

a. Distinguish between facilitated diffusion and active transport.

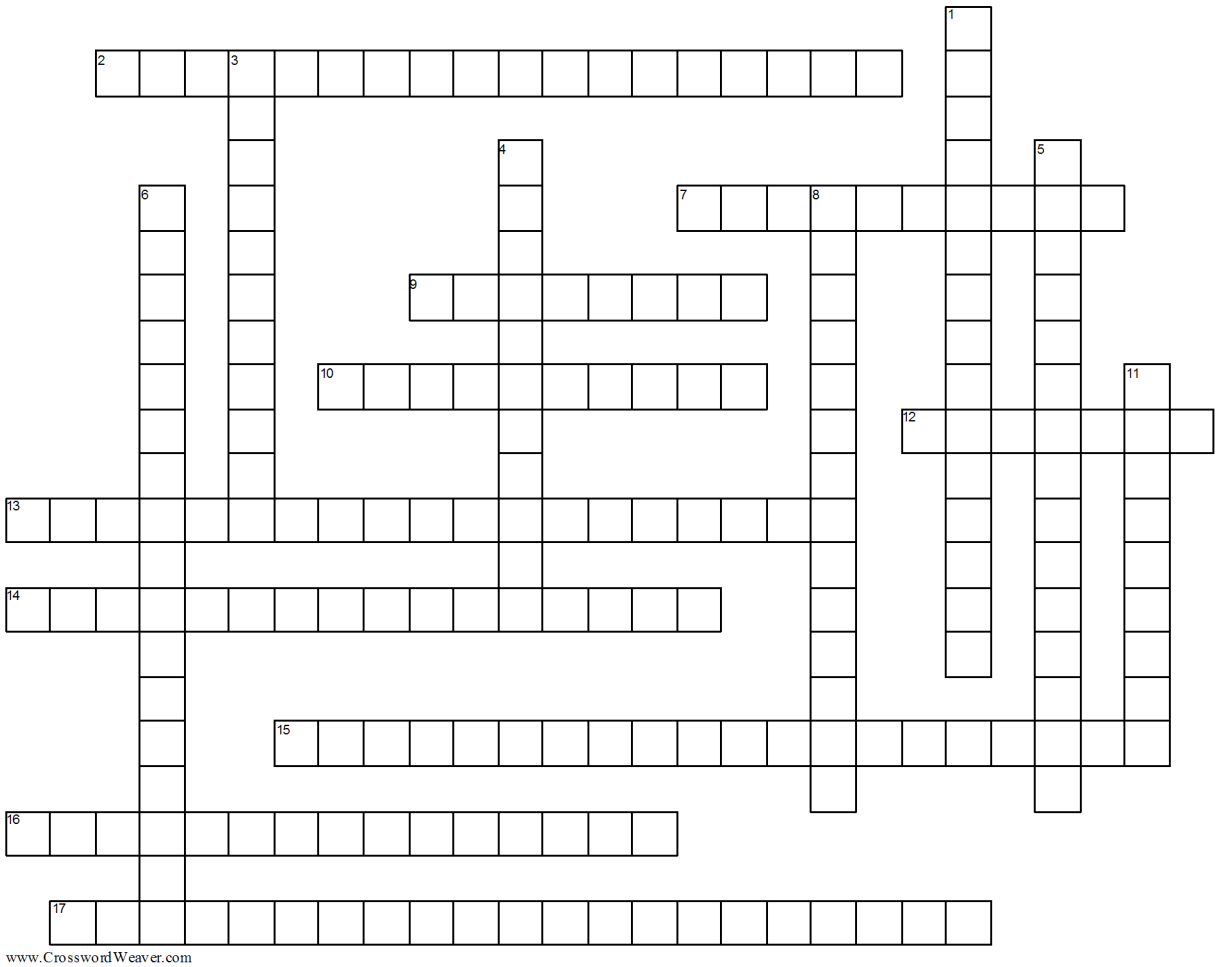


A **B**

28. Refer to the illustration above. Identify and explain the processes taking place in figure A and figure B.

29. Describe three ways in which the binding of a signal molecule to a receptor protein can change the functioning of a cell.

30. Crossword puzzle of vocabulary words:



Clues on the next page.

ACROSS

2 this is the process of water moving out of cells. a solution that causes the cells to shrink because of osmosis.
7 this is a transport protein with a polar pore through which ions can pass
9 When the concentration of dissolved particles outside a cell is equal to the concentration of dissolved particles inside the cell, the cell solution is?
10 this helps the cell rid itself of wastes.
12 is a type of passive transport
13 this requires energy to move ions across the cell membrane.
14 this is movement across a cell membrane that does not require energy from the cell
15 this is when carrier proteins are used to transport specific substances down their concentration gradient
16 is when energy is required to move a substance across a cell membrane
17 this is the difference in the concentration of a substance across space.

DOWN

1 this is a method of cellular signaling, whereby a diffusable signaling molecule is rapidly generated/released which can then go on to activate effector proteins within the cell to exert a cellular response.
3 this is the condition when the concentration of a substance is equal throughout the space.
4 this is a process where cells absorb material from the outside by engulfing it with their cell membrane
5 these may cause the formation of a second messenger molecule inside a cell
6 this is the process of water moving into cells due to the solution causing a cell to swell due to osmosis
8 these are proteins that transport a specific substance or group of substances through intracellular compartments or in extracellular fluids (e.g. in the blood) or else across the cell membrane.
11 is the movement of a substance from an area of high concentration to an area of lower concentration.