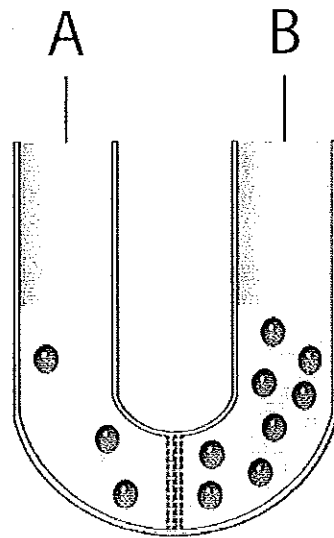


**Multiple Choice** - *Identify the letter of the choice that best completes the statement or answers the question.*

- 1. The phospholipid molecules of most membranes have...**
  - a. a hydrophobic head and a hydrophilic tail.
  - b. a hydrophobic head and a hydrophobic tail.
  - c. a hydrophobic head and two hydrophobic tails.
  - d. a hydrophilic head and two hydrophobic tails.
  - e. none of these
- 2. The relative impermeability of membranes to water-soluble molecules is a result of the...**
  - a. nonpolar nature of water molecules.
  - b. presence of large proteins that extend through both sides of membranes.
  - c. presence of inorganic salt crystals scattered through some membranes.
  - d. presence of cellulose and chemicals such as cutin, lignin, pectin, and suberin in the membranes.
  - e. presence of phospholipids in the lipid bilayer.
- 3. Which statement is NOT true?**
  - a. Membranes are often perforated by proteins that extend through both sides of the membrane.
  - b. Some membranes have proteins with channels or pores that allow for the passage of hydrophilic substances.
  - c. Hydrophilic substances have an easier time passing through membranes than hydrophobic substances do.
  - d. The current concept of a membrane can be best summarized by the fluid mosaic model.
  - e. The lipid bilayer serves as a hydrophobic barrier between two fluid regions.
- 4. Which of the following membrane proteins is responsible for binding hormones that can switch on a cell?**
  - a. recognition proteins
  - b. receptor proteins
  - c. transport proteins
  - d. adhesion proteins
  - e. channel proteins
- 5. Which of the following needs a transport protein to cross the cell membrane?**
  - a. water
  - b. carbon dioxide
  - c. glucose
  - d. oxygen
  - e. carbon dioxide and water
- 6. Which of the following is a passive process that requires a protein for movement of a solute across a membrane?**
  - a. active transport
  - b. endocytosis
  - c. bulk flow
  - d. facilitated diffusion
  - e. none of these

7. The rate of diffusion through a semipermeable membrane will be lowest when which of the following are true?
- Concentration gradients are steep.
  - Temperatures are low.
  - Solutes are small molecules.
- I only
  - II only
  - I and III
  - II and III
  - I, II, and III
8. Movement of a molecule against a concentration gradient is...
- simple diffusion.
  - facilitated diffusion.
  - osmosis.
  - active transport.
  - passive transport.
9. A single-celled freshwater organism, such as a protistan, is transferred to salt water. Which of the following is likely to happen?
- The cell bursts.
  - Salt is pumped out of the cell.
  - The cell shrinks.
  - Enzymes flow out of the cell.
  - all of these
10. Which statement is true?
- A cell placed in an isotonic solution will swell.
  - A cell placed in a hypotonic solution will swell.
  - A cell placed in a hypotonic solution will shrink.
  - A cell placed in a hypertonic solution will remain the same size.
  - A cell placed in a hypotonic solution will remain the same size.
11. If a plant cell is placed in a hypotonic solution the...
- entire cell will not swell or shrink.
  - entire cell will shrink.
  - turgor pressure will increase.
  - cell wall prevents the cell from exploding.
  - turgor pressure will increase but the cell wall prevents the cell from exploding.
12. White blood cells use \_\_\_\_\_ to consume foreign particles found in the blood.
- simple diffusion
  - bulk flow
  - osmosis
  - phagocytosis
  - facilitated diffusion



Use the diagram above to answer the following three items. Side A has a 3% sucrose solution and side B has a 10% sucrose solution. The membrane separating the two sides is permeable to water but impermeable to sucrose

13. Side A is \_\_\_\_\_ to side B.
- hypertonic
  - hypotonic
  - isotonic
  - either isotonic or hypertonic
  - either isotonic or hypotonic
14. Which of the following best describes the movement of water in this system?
- Water moves in both directions, but net movement is from A to B.
  - Water only moves from A to B.
  - Water moves in both directions, but net movement is from B to A.
  - Water only moves from B to A.
  - There is no net movement of water.
15. Which of the following best describes the movement of sucrose in this system?
- Sucrose moves in both directions, but net movement is from A to B.
  - Sucrose only moves from A to B.
  - Sucrose moves in both directions, but net movement is from B to A.
  - Sucrose only moves from B to A.
  - There is no net movement of sucrose.
16. Plasma membranes are selectively permeable. This means that...
- anything can pass into or out of a cell as long as the membrane is intact and the cell is healthy.
  - cholesterol cannot enter the cell.
  - glucose cannot enter the cell.
  - the plasma membrane allows some substances to enter or leave a cell more easily than others.
  - plasma membranes must be very thick.

17. Which one of the following is not a function of the plasma membrane? The plasma membrane...
- plays a role in signal transduction.
  - is involved in self-recognition.
  - forms a selective barrier around the cell.
  - has receptors for chemical messages.
  - is the control center of the cell.
18. Small, nonpolar, hydrophobic molecules such as fatty acids...
- easily pass through a membrane's lipid bilayer.
  - very slowly diffuse through a membrane's lipid bilayer.
  - require transport proteins to pass through a membrane's lipid bilayer.
  - usually enter the cell via endocytosis.
  - are actively transported across cell membranes.
19. Which one of the following substances would have the most trouble crossing a biological membrane by diffusing through the lipid bilayer?
- CO<sub>2</sub>
  - H<sub>2</sub>O
  - a small, nonpolar molecule such as butane C<sub>4</sub>H<sub>10</sub>
  - O<sub>2</sub>
  - Na<sup>+</sup>
20. When physicians perform an organ transplant, they choose a donor whose tissues match those of the recipient as closely as possible. Which of the following cell components are being matched?
- plasma membrane cholesterol
  - plasma membrane phospholipids
  - cell-surface carbohydrates
  - plasma membrane proteins
  - cytoskeletal elements
21. Most of the functions of a cell membrane are performed by...
- nucleotides.
  - glycolipids.
  - phospholipids.
  - proteins.
  - cholesterol.
22. Facilitated diffusion across a biological membrane requires \_\_\_\_\_ and moves a substance \_\_\_\_\_ its concentration gradient.
- energy and transport proteins . . . against
  - transport proteins . . . down
  - energy . . . down
  - energy and transport proteins . . . down
  - transport proteins . . . against

**23. Osmosis can be defined as...**

- a. active transport.
- b. the diffusion of water.
- c. the diffusion of nonpolar molecules.
- d. endocytosis.
- e. the diffusion of a solute.

**24. When two aqueous solutions that differ in solute concentration are placed on either side of a semipermeable membrane, and osmosis is allowed to take place, the water will...**

- a. exhibit a net movement to the side with higher water concentration.
- b. exhibit a net movement to the side with lower water concentration.
- c. exhibit an equal movement in both directions across the membrane.
- d. exhibit a net movement to the side with lower solute concentration.
- e. not cross the membrane.

**25. In lab, you use a special balloon that is permeable to water but not sucrose to make an "artificial cell." The balloon is filled with a solution of 20% sucrose and 80% water and is immersed in a beaker containing a solution of 40% sucrose and 60% water. Which of the following will occur?**

- a. Water will enter the balloon.
- b. Sucrose will enter the balloon.
- c. Water will leave the balloon.
- d. Sucrose will leave the balloon.
- e. None of the choices will occur.

**26. A cell that neither gains nor loses water when it is immersed in a solution is...**

- a. hypotonic to its environment.
- b. metabolically inactive.
- c. hypertonic to its environment.
- d. isotonic to its environment.
- e. dead.

**27. Some protozoans have special organelles called contractile vacuoles that continually eliminate excess water from the cell. The presence of these organelles tells you that the environment...**

- a. contains a higher concentration of solutes than the protozoan.
- b. is isotonic to the protozoan.
- c. is hypotonic to the protozoan.
- d. is hypertonic to the protozoan.
- e. None of the choices are correct.

**28. If placed in tap water, an animal cell will undergo lysis, whereas a plant cell will not. What accounts for this difference?**

- a. the relative impermeability of the plant cell membrane to water
- b. the relative inelasticity and strength of the plant cell wall
- c. the fact that plant cells are isotonic to tap water
- d. the relative impermeability of the plant cell wall to water
- e. expulsion of water by the plant cell's central vacuole

**29. Which of the following pieces of evidence would prove that a substance enters a cell by active rather than passive transport?**

- a. The substance enters the cell when its concentration is higher outside the cell than inside.
- b. The breakdown of ATP is needed for transport to occur.
- c. The substance is moved across the cell membrane by a carrier protein.
- d. All of the choices are correct.
- e. None of the choices are correct.

**30. Phagocytosis is to eating as pinocytosis is to...**

- a. drinking.
- b. lysis.
- c. osmosis.
- d. chewing.
- e. hydrolysis.

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