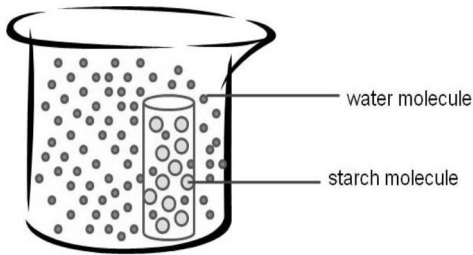


# Cellular Transport

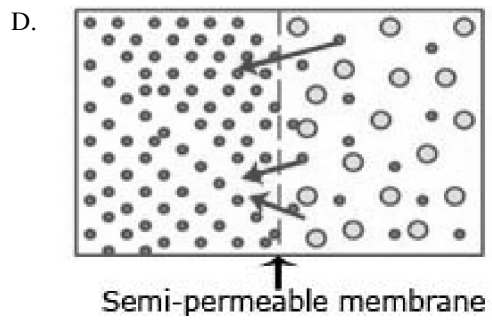
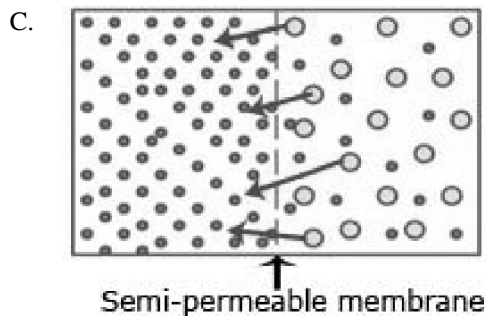
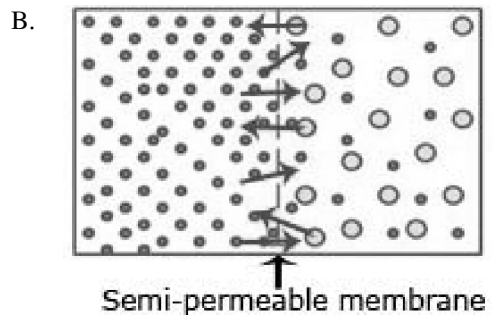
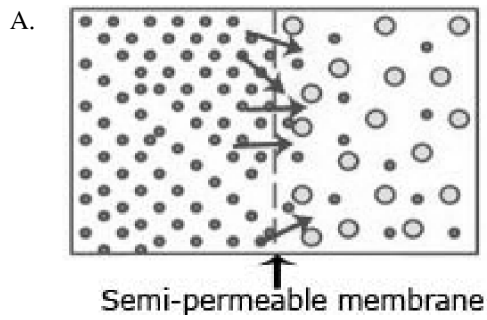
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1. A potato core was placed in a beaker of water as shown in the figure below.



Which diagram *best* represents the net movement of molecules?



2. The following question(s) is/are based on the following situation and data table.

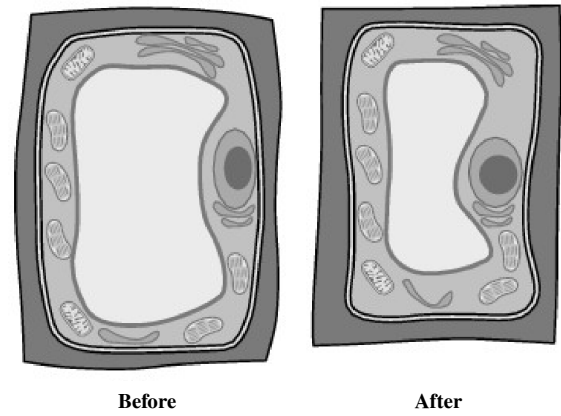
A laboratory technician places red blood cells into three different solutions. Observations are recorded each minute for five minutes.

Solution	Time				
	1 min.	2 min.	3 min.	4 min.	5 min.
Solution 1	No change	Cells are slightly larger.	Cells are much larger.	Cells are huge.	Cells are gone.
Solution 2	No change	No change	No change	No change	No change
Solution 3	No change	Cells are slightly smaller.	Cells are much smaller.	Cells look wilted.	Nothing that looks like a cell can be found.

Which of the following best explains what is causing the red blood cells in solution 1 to change size over the five-minute period?

- A. Solvent is entering the cells faster than it is leaving the cells.
- B. Solute is entering the cells faster than it is leaving the cells.
- C. The cells are making new protein.
- D. The cell's membranes are dissolving.

- 3.



The diagram shows a plant cell before and after it is placed in a solution. After the cell is placed in the solution, it changes shape.

Which table shows the initial concentration of solute in the cell and in the solution that would cause the cell to change shape as shown in the diagram?

- A.
 

Location	Solute Concentration
Inside cell	12%
Outside cell	12%
- B.
 

Location	Solute Concentration
Inside cell	3%
Outside cell	6%
- C.
 

Location	Solute Concentration
Inside cell	7%
Outside cell	5%
- D.
 

Location	Solute Concentration
Inside cell	0%
Outside cell	0%

4. A student wants to model the net movement of water into a cell using a semi-permeable bag, water, a large beaker and salt.

Which setup could he use to model the net movement of water *into* a cell?

- A. Place a bag containing a 20% salt solution into a beaker containing a 40% salt solution
- B. Place a bag containing a 30% salt solution into a beaker containing a 10% salt solution
- C. Place a bag containing a 30% salt solution into a beaker containing a 40% salt solution
- D. Place a bag containing a 10% salt solution into a beaker containing a 10% salt solution

5. An excess of hydrogen ions maintains the positive charge of the extracellular fluid surrounding plant cells. Plant cells use active transport to maintain this positive charge.

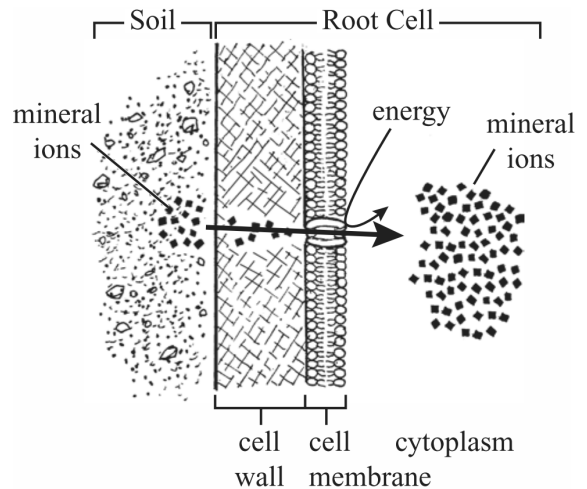
Why must cells use active transport to maintain a positive charge?

- A. ATP is required to move all charged particles.
- B. The concentration of hydrogen ions is lower inside the cell.
- C. The hydrogen ions are too large to move freely across the cell membrane.
- D. Passive transport can only be used to move particles with a negative charge.

6. Oxygen and carbon dioxide molecules pass freely through cell membranes. Which factor determines the direction most molecules will pass through the cell membrane?

- A. the ionic charge on the outer shell of the gas molecules
- B. the concentration of the gas molecules on each side of the membrane
- C. the strength of the covalent bonds holding the gas atoms in the molecules
- D. the size of the gas molecules

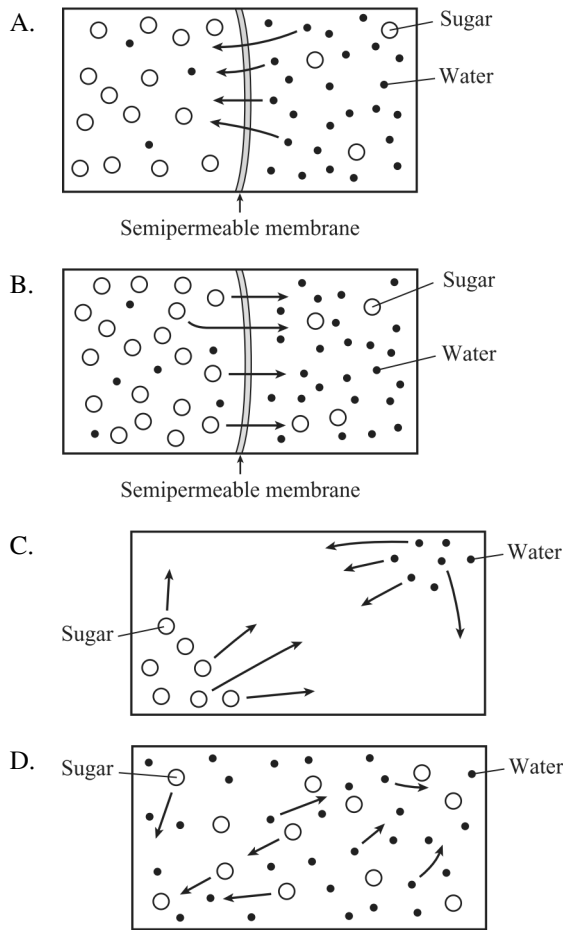
7. The diagram below illustrates how plant root cells take in mineral ions from the surrounding soil.



Which of the following processes is illustrated?

- A. active transport
- B. diffusion
- C. osmosis
- D. passive filtration

8. Which of the diagrams below *best* represents the net movement of molecules in osmosis?



9. The table below lists the concentrations of water inside and outside a cell under four different conditions.

Condition	Water Concentration in Cell	Water Concentration in Environment
1	90%	95%
2	90%	100%
3	95%	90%
4	95%	95%

Under which condition will the cell experience a net loss of water to its environment?

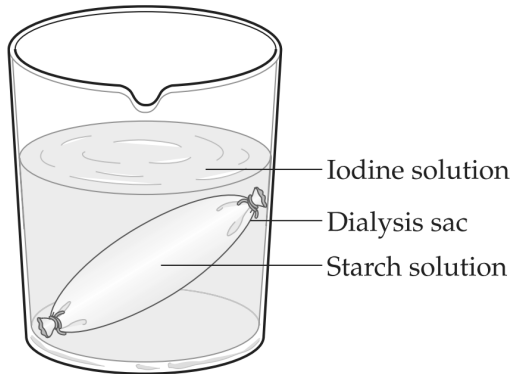
- A. Condition 1                      B. Condition 2  
 C. Condition 3                      D. Condition 4

10. Which of these is the process by which water moves across a selectively permeable membrane?

- A. osmosis                              B. transpiration  
 C. capillary action                      D. active transport

11. Use the information and the diagram below to answer the following question(s).

Starch turns blue-black in the presence of iodine solution. A selectively permeable dialysis sac containing a starch solution is placed into a beaker of iodine solution.

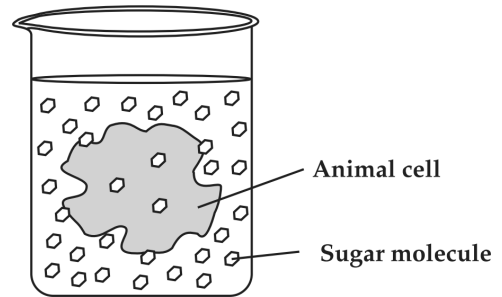


If the dialysis sac is permeable *only* to water and iodine, what will the solutions in the beaker and the sac look like after two hours?

- A. The iodine solution in the beaker will turn blue-black; the starch solution will not change.
  - B. The starch solution in the dialysis sac will turn blue-black; the iodine solution will not change.
  - C. Neither solution will turn blue-black.
  - D. Both solutions will turn blue-black.
12. Which of these processes is demonstrated by the experiment shown in the diagram?
- A. cellular respiration
  - B. active transport
  - C. endocytosis
  - D. diffusion

13. The diagram below shows an animal cell in a beaker containing a solution of sugar and water. The cell membrane is permeable only to water.

**ANIMAL CELL IN SUGAR AND WATER SOLUTION**



Which statement describes the relationship between the animal cell and the contents of the beaker?

- A. There is a higher concentration of water inside the cell than outside the cell.
  - B. There is a higher concentration of sugar inside the cell than outside the cell.
  - C. There is an equal concentration of water inside the cell as outside the cell.
  - D. There is an equal concentration of sugar inside the cell as outside the cell.
14. What will happen if an animal cell that has a solute concentration of 1% is placed in a 5% saltwater solution?
- A. It will shrink because there is less water outside of the cell than there is on the inside.
  - B. It will burst because there is more water on the outside of the cell than there is on the inside.
  - C. It will burst because there is more water on the inside of the cell than there is on the outside.
  - D. It will remain the same size because there is an equal amount of water on the inside and outside of the cell.

15. Which of the following substances can *most* easily travel into and out of the cell?

- A. Sodium ions
- B. Potassium ions
- C. Water
- D. Glucose

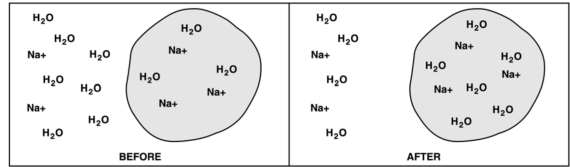
16. Which of the following would a cell *most* likely use to move materials by active transport?

- A. A channel protein
- B. A marker protein
- C. A phospholipid molecule
- D. A transfer RNA molecule

17. The diffusion of a substance into or out of a cell requires—

- A. a concentration gradient.
- B. an active transport system.
- C. a carrier molecule.
- D. a functioning mitochondrion.

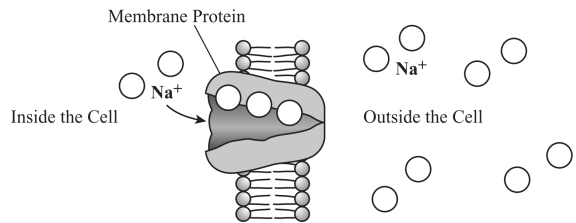
18.



The diagram is showing the process of—

- A. osmosis.
- B. active transport.
- C. phagocytosis.
- D. exocytosis.

19. The binding of sodium ions ( $\text{Na}^+$ ) to a membrane protein is one of the first steps in initiation of the sodium-potassium pump that moves these ions across the membrane. The picture shows this initial step in the process.

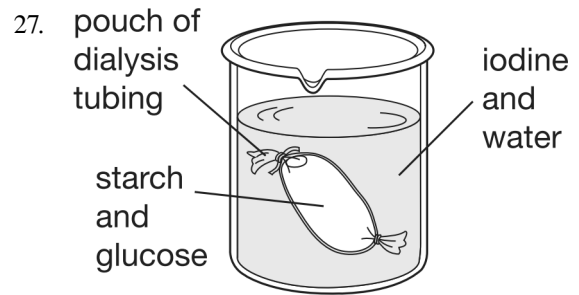


How does the protein get the energy needed to continue the process of moving the  $\text{Na}^+$  across the cell membrane?

- A. Mitochondria will attach to the protein and provide the energy to push the  $\text{Na}^+$  through the protein.
- B. Energy from ADP is released and a channel in the membrane protein permanently opens, resulting in the passage of the  $\text{Na}^+$ .
- C. Energy produced from the difference in solute concentration on both sides of the membrane pulls the  $\text{Na}^+$  through the protein.
- D. ATP attaches to the protein and releases a phosphate, making energy available to change the shape of the protein and allowing the passage of the  $\text{Na}^+$ .

20. When red blood cells are placed in distilled water, the cells swell as water molecules enter them. By what process do water molecules move into the cells?
- A. Facilitated diffusion    B. Active transport  
C. Endocytosis                D. Osmosis
21. Which of the following functions is controlled by the cell membrane?
- A. Excreting waste  
B. Replicating DNA  
C. Producing energy  
D. Assembling proteins
22. How is the cell membrane important to the process of osmosis?
- A. It allows water to move into the cell.  
B. It allows all materials from the outside environment to move into the cell.  
C. It traps water and nutrients that would otherwise be unable to move into the cell.  
D. It collects nutrients from water in the outside environment and moves them into the cell.
23. Placing wilted lettuce in cold water will make it crisp again. Which statement *best* describes what happens to restore the lettuce to its original condition?
- A. Water left the lettuce cells by diffusion.  
B. Water entered the cells of the lettuce by osmosis.  
C. Osmosis caused salts to enter the lettuce cells.  
D. Salts in the leaf caused water to leave the cells.
24. Which cell process will move substances against a concentration gradient?
- A. diffusion                      B. facilitated diffusion  
C. osmosis                        D. active transport
25. Which is an example of osmosis?
- A. potassium ions moving in and out of an animal cell  
B. carbon dioxide moving into the leaf cells of a plant  
C. oxygen moving into the bloodstream from the lungs  
D. water moving into the root cells of a plant

26. What is the function of the selectively permeable plasma membrane?
- A. to store chemical and heat energy inside the cell
  - B. to control the movement of substances into and out of the cell
  - C. to control the movement of red blood cells



**Initial Conditions**

Inside Dialysis Tubing	Inside Beaker
starch	iodine
glucose	water
solution is colorless	solution is brown

**Final Conditions**

Inside Dialysis Tubing	Inside Beaker
starch	iodine
glucose	water
iodine	solution is brown
solution is blue/black	

Students use a pouch of dialysis tubing to model a cell membrane. A starch and glucose solution is placed inside the pouch, and the pouch is placed into a beaker that contains iodine and water. An advantage of using the dialysis tubing to represent a cell membrane is that it is

- A. permeable to all substances.
- B. impermeable to all substances.
- C. permeable to iodine and impermeable to starch.
- D. impermeable to iodine and permeable to starch.



28. Molecules can cross cell membranes from areas of low concentration to areas of high concentration by binding with carrier proteins. What is this process called?
- A. osmosis                      B. endocytosis  
C. active transport            D. facilitated diffusion

Cellular Transport 4/13/2019

- |            |       |         |   |
|------------|-------|---------|---|
| 1.         |       | 20.     |   |
| Answer:    | A     | Answer: | D |
| 2.         |       | 21.     |   |
| Answer:    |       | Answer: | A |
| 3.         |       | 22.     |   |
| Answer:    | B     | Answer: | A |
| 4.         |       | 23.     |   |
| Answer:    | B     | Answer: | B |
| 5.         |       | 24.     |   |
| Answer:    | B     | Answer: | D |
| 6.         |       | 25.     |   |
| Answer:    | B     | Answer: | D |
| 7.         |       | 26.     |   |
| Answer:    | A     | Answer: | B |
| 8.         |       | 27.     |   |
| Answer:    | A     | Answer: | C |
| Objective: | B.04B | 28.     |   |
| 9.         |       | Answer: | C |
| Answer:    | C     |         |   |
| 10.        |       |         |   |
| Answer:    | A     |         |   |
| 11.        |       |         |   |
| Answer:    | B     |         |   |
| 12.        |       |         |   |
| Answer:    | D     |         |   |
| 13.        |       |         |   |
| Answer:    | A     |         |   |
| 14.        |       |         |   |
| Answer:    | A     |         |   |
| 15.        |       |         |   |
| Answer:    | C     |         |   |
| 16.        |       |         |   |
| Answer:    | A     |         |   |
| 17.        |       |         |   |
| Answer:    | A     |         |   |
| 18.        |       |         |   |
| Answer:    | A     |         |   |
| 19.        |       |         |   |
| Answer:    | D     |         |   |