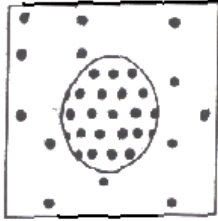


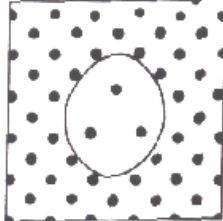
# Cellular Transport Review

## OSMOSIS

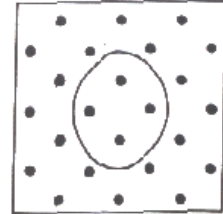
Label the pictures below ( isotonic, hypertonic, or hypotonic environments)



HYPO



HYPER



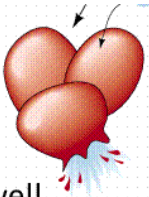
ISO

HYPER tonic means there is a **GREATER** concentration of solute molecules **OUTSIDE** the cell than inside.

HYPO tonic means there is a **LOWER** concentration of solute molecules **OUTSIDE** the cell than inside.

ISO tonic means there is the **SAME** concentration of solute molecules outside the cell as inside.

The pressure inside a plant cell caused by water pushing against the cell wall is called TURGOR pressure.



Cells swell and burst

The **SWELLING AND BURSTING** of animal cells when water enters is called CYTOLYSIS.

This happens when a cell is placed in a HYPO tonic solution.

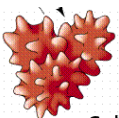
Placing plant cells in a **HYPOTONIC** solution causes the osmotic pressure to increase.



The **SHRINKING** of plant cells when water leaves so the cell membrane pulls away from the cell wall is called PLASMOLYSIS.

It happens when a plant cell is placed into HYPER tonic solution.

When water leaves a plant cell, the osmotic pressure will decrease.



Cells shrink and shrivel

The shrinking of **ANIMAL** cells that are placed in a **HYPERTONIC** solution is called PLASMOLYSIS.

Cells stay the same size when placed in an ISO tonic solution because the amount of water leaving the cell is the same and the amount of water entering.

\* \* \* \* \*

**MULTIPLE CHOICE:** Circle the answer(s) that best completes the sentence.

The substance that dissolves to make a solution is called the \_\_\_\_\_

- A. diffuser
- B. solvent
- C. solute
- D. concentrate

During diffusion molecules tend to move \_\_\_\_\_

- A. up the concentration gradient
- B. down the concentration gradient
- C. from an area of lower concentration to an area of higher concentration
- D. in a direction that doesn't depend on concentration

When the concentration of a solute is the same throughout a system, the system has reached \_\_\_\_\_.

- A. maximum concentration
- B. homeostasis
- C. osmotic pressure
- D. equilibrium

The diffusion of water across a selectively permeable membrane is called \_\_\_\_\_.

- A. active transport
- B. facilitated diffusion
- C. osmosis
- D. phagocytosis

Phagocytosis, pinocytosis, and exocytosis are all kinds of \_\_\_\_\_ transport.

- A. active
- B. passive

Glucose enters cells most rapidly by \_\_\_\_\_

- A. diffusion
- B. facilitated diffusion
- C. ion channels
- D. phagocytosis

Energy for active transport comes from a cell's \_\_\_\_\_.

- A. Golgi complex
- B. nucleus
- C. mitochondria
- D. lysosomes

\_\_\_\_\_ transport requires energy from ATP to move substances across membranes.

- A. Passive
- B. Active

A cell must expend energy to transport substances using \_\_\_\_\_.

- A. diffusion
- B. facilitated diffusion
- C. ion channels
- D. osmosis
- E. endocytosis

White blood cells engulf, digest, and destroy invading bacteria using \_\_\_\_\_.

- A. Facilitated diffusion
- B. pinocytosis
- C. phagocytosis
- D. osmosis

The carrier proteins that help in facilitated diffusion are \_\_\_\_\_ proteins.

- A. peripheral
- B. integral

All of the following are kinds of passive transport EXCEPT \_\_\_\_\_.

- A. diffusion
- B. facilitated diffusion
- C. osmosis
- D. phagocytosis
- E. ion channels

Endocytosis that brings in small dissolved molecules (solute) and fluids is called \_\_\_\_\_.

- A. pinocytosis
- B. phagocytosis
- C. facilitated diffusion
- D. osmosis

Golgi bodies use \_\_\_\_\_ to transport molecules out of cells.

- A. ion channels
- B. phagocytosis
- C. pinocytosis
- D. exocytosis

The pressure exerted by water moving during osmosis is called \_\_\_\_\_ pressure.

- A. tonic
- B. diffusion
- C. selectively permeable
- D. osmotic

Placing an animal cell in a hypotonic solution will cause water to \_\_\_\_\_.

- A. move into the cell
- B. move out of the cell

When molecules move DOWN the concentration gradient it means they are moving from \_\_\_\_\_

- A. an area of low concentration to an area of higher concentration
- B. an area of high concentration to an area of lower concentration

Gases like oxygen and carbon dioxide move across cell membranes using \_\_\_\_\_

- A. endocytosis
- B. ion channels
- C. diffusion
- D. facilitated diffusion

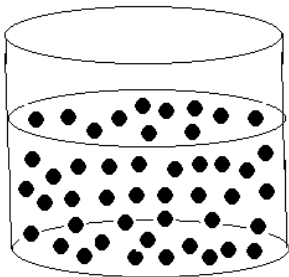
\* \* \* \* \*

### Complete the transport terms.

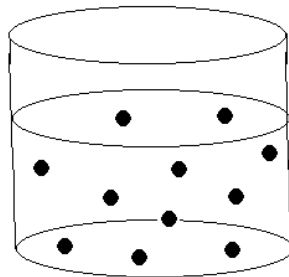
1. Active transport requires ENERGY to move molecules across membranes.
2. ATP is the molecule that provides the energy for active transport.
3. Golgi bodies use EXOCYTOSIS to release molecules outside the cell.
4. DIFFUSION moves oxygen and carbon dioxide molecules from a high concentration to a low concentration across membranes.
5. The cell organelles that burns glucose and provides ATP for active transport are the MITOCHONDRIA.
6. Water moves across membranes by OSMOSIS.
7. A small membrane sac used to transport substances during exocytosis & endocytosis = VESICLE
8. Kind of endocytosis that takes in small dissolved molecules (solute) or fluids = PINOCYTOSIS
9. PASSIVE transport does NOT REQUIRE energy.
10. During FACILITATED diffusion carrier proteins grab glucose molecules, change shape, and flip to the other side of the membrane, like a revolving door.
11. A CARRIER protein is an integral membrane protein that helps move molecules across a cell membrane.
12. A cell placed in an ISOTONIC solution neither swells or shrinks because the concentration of molecules outside the cell is the same as inside.
13. A solution in which there is a HIGHER concentration of molecules OUTSIDE the cell than inside = HYPERTONIC.
14. A CONCENTRATION GRADIENT forms whenever there is a difference in concentration between one place and another.
15. Pinocytosis, phagocytosis, and Na<sup>+</sup>-K<sup>+</sup> pumps are all kinds of ACTIVE transport because they use energy to move substances across membranes.
16. A solution in which the concentration of molecules outside the cell is LOWER than inside = HYPOTONIC.
17. A SODIUM- POTASSIUM PUMP uses ATP to move three Na<sup>+</sup> ions out of a cell while it moves two K<sup>+</sup> ions in.
18. Pinocytosis & phagocytosis are both kinds of ENDOCYTOSIS.

19. When molecules move from high to low along a concentration gradient we say they are moving "DOWN" the gradient.
20. OSMOTIC pressure is caused by water inside a plant cell pushing against the cell wall.
21. The shrinking of a plant cell membrane away from the cell wall when placed in a hypertonic solution is called PLASMOLYSIS.
22. White blood cells use PHAGOCYTOSIS to engulf and destroy bacteria that the glycoproteins recognize as "not self".
23. The swelling and bursting of animal cells when placed in a hypotonic solution is called CYTOLYSIS.
24. Proteins (like carrier proteins) that stick INTO the cell membrane either part way or all the way through are called INTEGRAL proteins.
25.  $Ca^{++}$ ,  $H^{+}$ ,  $Na^{+}$ , and  $K^{+}$  move across membranes by going through passageways called ION CHANNELS.

LOOK AT THE DIAGRAMS. The black dots represent solute molecules dissolved in water



A

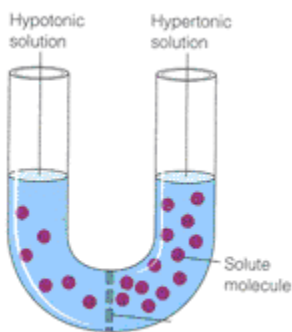


B

In which beaker is the concentration of solute the greater?

**A** or B

\* \* \* \* \*



If the solute (dots) in this diagram is unable to pass through the dividing membrane, what will happen?

- A. the water level will rise on the right side of the tube
- B. the water level will rise on the left side of the tube
- C. the water level will stay equal on the two sides

\* \* \* \* \*

<b>COMPARE/CONTRAST the kinds of transport</b>	<b>Active (ATP) or Passive (KINETIC ENERGY)</b>	<i>What does it use to help: Membrane proteins? Vesicles? Needs no help (phospholipids)?</i>	<b>Example of substance(s) that use this kind of transport in cells</b>
<b>DIFFUSION</b>	<b>P</b>	<b>No help</b>	<b>O<sub>2</sub>/CO<sub>2</sub></b>
<b>FACILITATED DIFFUSION</b>	<b>P</b>	<b>Membrane protein</b>	<b>Amino Acids Glucose</b>
<b>OSMOSIS</b>	<b>P</b>	<b>Membrane protein (Aquaporin)</b>	<b>Water</b>
<b>FACILITATED DIFFUSION (ION CHANNELS)</b>	<b>P</b>	<b>Membrane Protein</b>	<b>Cl<sup>-</sup>, Mg<sup>2+</sup></b>
<b>SODIUM-POTASSIUM (NA<sup>+</sup> -K<sup>+</sup>) PUMP (ANIMALS)</b>	<b>A</b>	<b>Membrane Protein</b>	<b>Na<sup>+</sup>/K<sup>+</sup></b>
<b>ENDOCYTOSIS (PHAGOCYTOSIS)</b>	<b>A</b>	<b>Vesicle</b>	<b>Bacteria</b>
<b>ENDOCYTOSIS (PINOCYTOSIS)</b>	<b>A</b>	<b>Vesicle</b>	<b>Sugars and Proteins</b>
<b>EXOCYTOSIS</b>	<b>A</b>	<b>Vesicle</b>	<b>Proteins</b>

Modified from: [http://brookings.k12.sd.us/biology/other\\_units.htm](http://brookings.k12.sd.us/biology/other_units.htm)