Name: Block: Date:

**Biology - Cell Membrane & Transport – REVIEW WORKSHEET**

⇒ **Part A**: Definitions: Define the following terms, **IN YOUR OWN WORDS, IN AS FEW WORDS AS CLARITY ALLOWS**.

|  |  |
| --- | --- |
| cell membrane |  |
| diffusion |  |
| concentration gradient |  |
| solute |  |
| solvent |  |
| Osmotic pressure |  |
| Isotonic |  |
| Hypertonic |  |
| Hypotonic |  |
| plasmolysis |  |
| turgor pressure |  |
| facilitated transport |  |
| crenation |  |
| active transport |  |
| endocytosis |  |
| phagocytosis |  |
| pinocytosis |  |
| exocytosis |  |
|  |  |
| Fluid Mosaic Model |  |

**Part B - Short Answers**

1. Diffusion is the movement of molecules from the area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_concentration to the area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_concentration.
2. Osmosis is the movement of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_across a selectively permeable membrane.
3. A cell is isotonic to a solution of 0.01% sugar.

a. What concentration would by hypertonic?

b. What concentration would be hypotonic?

1. a) What happens to an animal cell in a hypotonic solution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What happens to an animal cell in a hypertonic solution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Turgor pressure is best exemplified by placing a plant cell in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_solution.
2. Give an example:

a. of diffusion in the body b. of facilitated transport c. of active transport

1. List 2 ways in which active transport differs from the process of diffusion across a cell membrane.
2. List 1 way in which facilitated transport differs from active transport.

9. Within each of the three pairs, choose the more concentrated solution:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pairs** | |  | **Answer** |  |
| a. 80% water, 20% starch | b. 90% water, 10% starch |  | | |
| a. 5 g NaCl, 50 g water | b. 5 g NaCl, 25 g water |  | | |
| 85% solvent, 15% solute | 75% solvent, 25% solute |  | | |

10. Consider this diagram.

1. a)  Will the concentration of water stay the

same on side A or become greater or

less with time? \_\_\_\_\_\_\_\_\_\_\_

1. b)  Will the concentration of protein on side

A stay the same or become greater or

less with time? \_\_\_\_\_\_\_\_\_\_

1. c)  Glucose will cross the membrane in

Side A 20% Protein 4% Glucose

75% water

Side B 2% Glucose

98% Water

membrane

which direction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. d)  On which side will the hydrostatic pressure increase? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. e)  What will happen to the level of the solution on each side? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. Red blood cells neither gain nor lose water when put into 0.9% NaCl.

a) What term would you use to describe the tonicity of 0.9% NaCl for Red blood cells? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b) Are the solutions below hypertonic or hypotonic to red blood cells?

i) 15% NaCl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ii) 0.001% NaCl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A scientist notes that of three monosaccharides -- glucose, fructoe, and galactose -- glucose enters cells

much faster than the other two. What process is at work? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Answer true or false:

|  |
| --- |
| a. If a plant cell is placed in salt solution, the central vacuole will shrink |
| b. If a red blood cell is placed in distilled water, it will shrink |
| c. If a plant cell is placed in distilled water, the cell membrane will move away from the cell wall |
| d. If a red blood cell is placed in a salt solution, salt will enter the cells, giving them a strange appearance |
| e. Crenation is to plasmolysis as hemolysis is to turgor pressure |

1. A small lipid molecule passes easily through the cell membrane. Which of these statements is the most likely explanation? a) a protein carrier must be at work b) the cell membrane is partly composed of lipid molecules c) the cell is expending energy to do this d) phagocytosis has enclosed this molecule in a vacuole
2. Which of these does not require an expenditure of energy? a) diffusion b) osmosis c) facilitated transport d) none of these require energy
3. The thyroid gland contains a high concentration of iodine. This is an example of a) passive transport b) active transport c) facilitated transport d) endocytosis
4. Cell drinking is synonymous with a) cell eating b) endocytosis c) phagocytosis d) pinocytosis
5. If a cell uses active transport to take in salts, then osmosis will follow and water will enter the cell a) true b)

false

1. Which of the following substances would be taken into a cell by phagocytosis?

a) dissolved gases b) proteins c) simple sugars d) steroid lipids

1. An animal cell will always take in water when placed in a a) hypertonic solution

b) hypotonic solution c) isotonic solution d) osmotic solution

⇒ **ANSWER THE FOLLOWING QUESTIONS ON A SEPARATE SHEET OF PAPER**

1. Draw a diagram of the **three main ways** by which small molecules can enter cells. As an aid in distinguishing the three mechanisms, indicate the number of molecules on either side of the membrane.

1. An experiment is designed to study the mechanism of sucrose uptake by plant cells. Cells are immersed in a sucrose solution, and the pH of this surrounding solution is monitored with a pH meter. The measurements show that sucrose uptake by the plant cells raises the pH of the surrounding solution. The magnitude of the pH change is proportional to the starting concentration of sucrose in the extracellular solution. A metabolic poison that blocks the ability of the cells to regenerate ATP also inhibits the pH change in the surrounding solution. Explain these results.
2. If our cells and body fluids are hypertonic to the water of a swimming pool, then why do we not swell and pop when we go for a swim? (research this question)