

Biology 12 - 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 solution	
hypertonic solution	
hypotonic solution	
plasmolysis	
turgor pressure	
facilitated transport	
crenation	
active transport	
endocytosis	
phagocytosis	
pinocytosis	
exocytosis	
glycolipid	
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 be hypertonic? _____
 - b. What concentration would be hypotonic? _____
4.
 - a) What happens to an animal cell in a hypotonic solution? _____
 - b) What happens to an animal cell in a hypertonic solution? _____
5. Turgor pressure is best exemplified by placing a plant cell in a _____ solution.
6. Give an example:
 - a. of diffusion in the body _____
 - b. of facilitated transport _____
 - c. of active transport _____
7. List 3 ways in which active transport differs from the process of diffusion across a cell membrane.

i.
ii.
iii.

8. List 2 ways in which facilitated transport differs from active transport.

i.
ii.

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

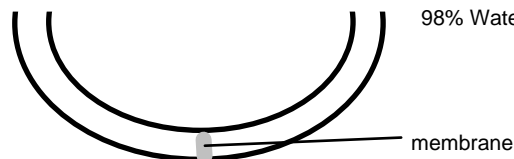
Pairs		Answer
a. 80% water, 20% starch	b. 90% water, 10% starch	
a. 5 g NaCl, 50 g water	b. 5 g NaCl, 25 g water	
85% solvent, 15% solute	75% solvent, 25% solute	

10. Consider this diagram.

- a) Will the concentration of water stay the same on side A or become greater or less with time? _____
- b) Will the concentration of protein on side A stay the same or become greater or less with time? _____
- c) Glucose will cross the membrane in which direction? _____

Side A
20% Protein
4% Glucose
75% water

Side B
2% Glucose
98% Water



- d) On which side will the hydrostatic pressure increase? _____
- 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 _____
12. A scientist notes that of three monosaccharides -- glucose, mannose, and galactose -- glucose enters cells much faster than the other two. What process is at work? _____

13. 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	

14. 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
15. Which of these does not require an expenditure of energy? a) diffusion b) osmosis c) facilitated transport d) none of these require energy
16. 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
17. Cell drinking is synonymous with a) cell eating b) endocytosis c) phagocytosis d) pinocytosis
18. If a cell uses active transport to take in salts, then osmosis will follow and water will enter the cell a) true b) false
19. Which of the following substances would be taken into a cell by phagocytosis? a) dissolved gases b) proteins c) simple sugars d) steroid lipids
20. An animal cell will always take in water when placed in a) hypertonic solution b) hypotonic solution c) isotonic solution d) osmotic solution

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

- 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.
- 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.
- 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?