**Unit 3 Assignment**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score: \_\_\_\_\_\_/108

**Part 1: Multiple Choice (10 marks)**

1. Which of the following best describes the current model of a cell membrane?
   1. Cholesterol embedded between a double layer of protein molecules
   2. Protein molecules embedded in a double layer of phospholipid molecules
   3. Phospholipids embedded in a double layer of carbohydrate molecules
   4. A layer of phospholipids embedded in a double layer of glycogen
2. Which of the following is true about the phospholipids that make up the cell membrane?
   1. They are the main constituent of the plasma membrane
   2. Hydrophilic heads face each other in the inner part of the membrane
   3. Hydrophobic tails face the outside and inside of the cell
   4. All are correct
3. Why are donor cells sometimes rejected from a recipient’s body?
   1. The recipient’s body does not recognize the glycoproteins and glycolipids, so the immune system attacks the foreign cells
   2. The donated cells have a different cellular fingerprint than the cells of the recipient
   3. A donor’s cells may have different sugar chains
   4. All of the above may cause rejection
4. Which molecules account for a cell membrane’s flexible and fluid nature?
   1. Glycolipids
   2. Phospholipids
   3. Proteins
   4. Cellulose
5. What is the function of cholesterol in the plasma membrane?
   1. It acts as carrier channels to allow steroids into the cell
   2. It stiffens and controls fluidity in the membrane
   3. It acts a fingerprint for cell-to-cell recognition
   4. All of the above are correct
6. What process allows molecules to move into the cell without the use of any chemical energy?
   1. Endocytosis
   2. Pinocytosis
   3. Phagocytosis
   4. Facilitated transport
7. How is energy used during the process of exocytosis?
   1. To alter the membrane shape and allow the vesicle to merge with the cell membrane to force contents out of the cell
   2. To alter the membrane shape and allows the vesicle to merge with the cell membrane to force contents into the cell
   3. To change the structure of carrier proteins to allow molecules into the cell
   4. To change the structure of carrier proteins to allow molecules out of the cell
8. An example of this process is the absorption of small nutrient particles into the villi of the small intestine by “sipping”
   1. Exocytosis
   2. Pinocytosis
   3. Phagocytosis
   4. Endocytosis
9. When a macromolecule is completely surrounded, the membrane pinches together forming an intracellular vesicle inside the cytoplasm of the cell. This describes the process of:
   1. Exocytosis
   2. Endocytosis
   3. Active transport
   4. Facilitated transport
10. ~~Approximately how much of the cell’s energy is used for active transport?~~ 
    1. ~~10%~~
    2. ~~25%~~
    3. ~~40%~~
    4. ~~75%~~

**Part 2: Short Answer (21 marks)**

1. The cell’s plasma membrane is said to be semi-permeable. What does this mean? (1 mark)

A semi-permeable membrane is a membrane that only allows certain materials to pass through. Ex. A rain coat is permeable to water vs. a cell membrane that allows water through but not glucose

1. What is the Law of Diffusion? (2 marks)

Fick's diffusion law: passive diffusive flows from a high-concentration area to a low-concentration area proportional to the concentration gradient

1. Give an example of a gas diffusing through a gas (1 mark).

Gas fumes diffusing through the air in a garage.

1. Give an example of a liquid diffusing through a liquid (1 mark).

Syrup diffusing through carbonated water when making coke.

1. List at least four factors that affect the rate of diffusion (4 marks).

Temperature, [.], pressure/ volume, surface area, catalyst

1. Define osmosis (2 marks).

Osmosis is a process by which the molecules of a solvent pass from a solution of low concentration to a solution of high concentration through a semi-permeable membrane.

1. If you add salt to a cup of water, which would be the solvent and which would be the solute? (2 marks)

Water- solvent, salt- solute

1. What would happen if a semi-permeable bag containing a high concentration of a protein solution was placed in a beaker of water? Explain (2 marks).

The water would flood the protein bag because only water can pass through the semi-permeable membrane from a low-protein area to a high protein area.

1. Why does spraying roads with salt in the winter often cause the death of plants at the edge of the road? (2 marks)

Salt environment creates a hypertonic environment forcing water inside the plants to come rushing out of its cells to balance out the concentration gradient. This results in a hypotonic (flacid) cell= cell death.

1. What happens to an animal cell that is placed in a hypotonic environment? What is the term for this? (2 marks)

It becomes hypotonic and may die (water rushes out of the cell to balance the concentration gradient)

1. How do plants resist the adverse effects of too much turgor pressure? (2 marks)

Rigid cell wall

Part 3- fill in the diagram with the correct

A diagram of a cell membrane

Description automatically generated

