

## Membrane Transport Learning Outcomes

As a result of study the theory and related practical class on membrane transport you should:

1. Appreciate the significance of the plasma membrane for physiological systems.
2. Understand what is meant by the terms solvent, solute and aqueous solution as they relate to physiological systems.
3. Know the basic structural components of the plasma membrane and how these regulate the movement of materials between the extracellular and intracellular fluid compartments.
4. Be able to explain the fundamental difference between passive and active processes of membrane transport.
5. Understand what is meant by the term diffusion and how collisions between molecules and thermal energy are important to this physiological process.
6. Be able to explain what is meant by the term concentration gradient.
7. Understand how and why the following variables effect the rate of diffusion:
  - Molecular size
  - Distance
  - Concentration Gradient
  - Cell size
8. Understand the two major mechanisms by which solutes can traverse the plasma membrane by simple diffusion and be able to identify solutes that travel by each mechanism.
9. Be able to explain the difference between simple and facilitated diffusion and be able to identify substances that move across the membrane by each mechanism.
10. Describe an experiment that would allow you to determine whether a substance moved across the plasma membrane of a cell by simple or facilitated diffusion.
11. Appreciate the importance of passive process in terms energy-expenditure by the human body.
12. Be able to describe the key functional elements of active transport (solute pumping) and know some of the substances that are transported across the membrane by this mechanism.
13. Appreciate that solutes can move across the plasma membrane by more than one physiological process.
14. Understand the fundamental difference between exocytosis and endocytosis and the types of materials that are transported by each mechanism.
15. Appreciate that there are three types of endocytosis and be able to describe each as well as name substances that are transported by each.
16. Be able to explain what is meant by the term osmosis in physiological systems.
17. Explain why the plasma membrane of most cells is highly permeable to water despite consisting of a lipid bilayer with a hydrophobic core.
18. Appreciate the difference between the movement of water and solutes across the plasma membrane of cells.
19. Be able to explain why water moves across the plasma membrane of cells.
20. Understand the concepts of osmotic pressure, osmolarity and tonicity.
21. Be able to calculate the osmolarity of a number of simple solutions.
22. Understand the effect of isotonic, hypertonic and hypotonic solutions on cells.