

# Cell Membrane And Transport Worksheet Questions and Answers PDF

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## Part 1: Foundational Knowledge

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**What is the primary structural component of the cell membrane?**

*Hint: Think about the main building blocks of the membrane.*

- A) Proteins
- B) Carbohydrates
- C) Phospholipids ✓
- D) Nucleic acids

■ The primary structural component of the cell membrane is phospholipids.

**Which of the following are functions of membrane proteins? (Select all that apply)**

*Hint: Consider the roles proteins play in cellular processes.*

- A) Energy storage
- B) Transport of molecules ✓
- C) Signal transduction ✓
- D) DNA replication

■ Membrane proteins are involved in transport, signaling, and other functions.

**Explain the role of cholesterol in the cell membrane.**

*Hint: Think about how cholesterol affects membrane fluidity.*

**Cholesterol helps to stabilize the membrane's fluidity and structure.**

**List two types of passive transport mechanisms and briefly describe each.**

*Hint: Consider how substances move across membranes without energy.*

1. 1. Diffusion

The movement of molecules from an area of higher concentration to an area of lower concentration.

2. 2. Osmosis

The diffusion of water across a selectively permeable membrane.

Examples include diffusion and osmosis, both of which do not require energy.

**Which part of the phospholipid bilayer is hydrophobic?**

*Hint: Consider the properties of the phospholipid structure.*

- A) The head
- B) The tail ✓
- C) Both head and tail
- D) Neither head nor tail

The tail of the phospholipid bilayer is hydrophobic.

## Part 2: Understanding Concepts

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**How does facilitated diffusion differ from simple diffusion?**

*Hint: Think about the mechanisms involved in each process.*

- A) It requires energy.
- B) It moves substances against the concentration gradient.
- C) It involves transport proteins. ✓
- D) It only occurs in plant cells.

Facilitated diffusion involves transport proteins, while simple diffusion does not.

**Which factors can affect the rate of diffusion across a cell membrane? (Select all that apply)**

*Hint: Consider the physical and chemical properties that influence diffusion.*

- A) Temperature ✓
- B) Membrane surface area ✓
- C) Concentration gradient ✓
- D) Presence of enzymes

Factors include temperature, membrane surface area, and concentration gradient.

**Describe how the structure of the cell membrane contributes to its function as a selective barrier.**

*Hint: Think about the arrangement of molecules in the membrane.*

The phospholipid bilayer and embedded proteins create a selective barrier that regulates what enters and exits the cell.

## Part 3: Applying Knowledge

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**A cell is placed in a hypertonic solution. What is likely to happen to the cell?**

*Hint: Consider the effects of solute concentration on cell volume.*

- A) It will swell.
- B) It will shrink. ✓
- C) It will remain the same.
- D) It will burst.

█ The cell will likely shrink due to water moving out of it.

**In which scenarios would active transport be necessary? (Select all that apply)**

*Hint: Think about situations where substances move against their concentration gradient.*

- A) Moving glucose into a cell where it is in higher concentration inside. ✓
- B) Expelling sodium ions from a cell. ✓
- C) Diffusion of oxygen into a cell.
- D) Absorption of water by plant roots.

█ Active transport is necessary when moving substances against their concentration gradient.

**Provide an example of a real-world application of cell membrane transport in medicine or technology.**

*Hint: Consider how transport mechanisms are utilized in treatments or devices.*

█ Examples include drug delivery systems that utilize membrane transport mechanisms.

## Part 4: Analyzing Relationships

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**Which of the following best explains why the cell membrane is described as a "fluid mosaic model"?**

*Hint: Consider the arrangement and movement of molecules in the membrane.*

- A) It is made of a single type of molecule.
- B) Its components are rigid and immobile.
- C) It is composed of various molecules that move freely. ✓
- D) It is impermeable to all substances.

The fluid mosaic model describes the cell membrane as composed of various molecules that move freely.

**Analyze the effects of temperature on membrane fluidity. Which statements are true? (Select all that apply)**

*Hint: Think about how temperature changes can impact the properties of the membrane.*

- A) Higher temperatures increase fluidity. ✓
- B) Lower temperatures decrease fluidity. ✓
- C) Cholesterol prevents drastic changes in fluidity. ✓
- D) Membrane fluidity is unaffected by temperature.

Higher temperatures increase fluidity, while lower temperatures decrease it.

**Discuss how the failure of membrane transport mechanisms can lead to disease. Provide an example.**

*Hint: Consider diseases that are linked to transport issues.*

Failure of transport mechanisms can lead to diseases such as cystic fibrosis, where chloride ion transport is disrupted.

## Part 5: Synthesis and Reflection

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**Which strategy would be most effective in designing a drug that targets a specific membrane protein?**

Hint: Think about how drugs interact with proteins.

- A) Increase the drug's size to prevent it from entering the cell.
- B) **Modify the drug to mimic the protein's natural ligand. ✓**
- C) Ensure the drug is hydrophobic to pass through the membrane easily.
- D) Use a drug that binds to all proteins indiscriminately.

█ Modifying the drug to mimic the protein's natural ligand would be most effective.

**Evaluate the potential consequences of a malfunction in sodium-potassium pump. Which outcomes are possible? (Select all that apply)**

Hint: Consider the role of the sodium-potassium pump in cellular function.

- A) **Disruption of cellular ion balance ✓**
- B) **Altered cell volume ✓**
- C) Increased cellular energy efficiency
- D) **Impaired nerve impulse transmission ✓**

█ Malfunction can lead to disruption of ion balance, altered cell volume, and impaired nerve impulse transmission.

**Design an experiment to test the effects of a new drug on cell membrane permeability. Describe your approach and expected outcomes.**

Hint: Consider the methods you would use to measure permeability.

█ **An experiment could involve measuring the uptake of a dye or substance in cells treated with the drug compared to control cells.**