

Cell Transport

Nimn निम्न (name in Hindi) _____

PART 1. ACTIVE TRANSPORT. Analyze the animation on [active transport](#) and answer the questions below.

1. Why is energy needed for active transport to happen? Answer using an “action” that is seen...
2. What type of membrane protein is performing the transport duties?
3. Take the quiz below on what you see in the animation.

1. Active transport requires...

- A) an enzyme on the surface of the cell.
- B) a channel on the surface of the cell.
- C) a carrier protein on the surface of the cell.
- D) a pore on the surface of the cell.
- E) a gate on the surface of the cell.

2. Active transport moves a solute...

- A) up its concentration gradient, that is, from a low concentration to a high one.
- B) up its concentration gradient, that is, from a high concentration to a low one.
- C) down its concentration gradient, that is, from a low concentration to a high one.
- D) down its concentration gradient, that is, from a high concentration to a low one.
- E) across its concentration gradient, that is, from a high concentration to a low one.

3. Active transport requires...

- A) energy in the form of ADP.
- B) energy in the form of ATP.
- C) energy in the form of glucose.
- D) energy in the form of fructose.
- E) little or no energy to function.

4. Once the solute molecule is in the binding site, a phosphate disengages from the binding molecule and the solute is released.

- A) True
- B) False

5. Active transport is able to move these substances without the expenditure of energy.

- A) True
- B) False

PART 2. SODIUM-POTASSIUM PUMP. Closely watch the animation of the most important form of active transport in the body, the [sodium-potassium pump](#) and answer the questions to follow. NOTE: the text for the animation is in the field just below the animation, answers can be gotten there.

4. Why does this process need ATP to occur?
5. Where are sodium and potassium in highest concentration? Provide an answer for each molecule. Watch the animation closely!

6. What is meant by a “[conformational change](#)” that you see mentioned in the video?

7. The sodium-potassium pump plays an important role in how axons work. What is an [axon](#)?

8. Take the quiz below on what you saw in the animation.

- 1** The sodium-potassium pump functions to pump
- A) sodium ions out of the cell and potassium ions into the cell.
 - B) sodium ions into the cell and potassium ions out of the cell.
 - C) sodium and potassium ions into the cell.
 - D) sodium and potassium ions out of the cell.
 - E) sodium and potassium ions in both directions across the cell membrane.
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- 2** What is the source of energy used to power the sodium-potassium pump?
- A) breakdown of ATP
 - B) formation of ATP
 - C) transport of ATP by the pump
 - D) breakdown of GTP
 - E) transport of GTP by the pump
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- 3** During one cycle, the sodium-potassium pump binds and moves.
- A) 1 Na⁺ and 2 K⁺.
 - B) 2 Na⁺ and 2 K⁺.
 - C) 2 Na⁺ and 3 K⁺.
 - D) 3 Na⁺ and 2 K⁺.
 - E) 3 Na⁺ and 3 K⁺.
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- 4** The sodium-potassium pump is a trans-membrane protein.
- A) True
 - B) False
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- 5** The binding and release of sodium or potassium ions are due to conformational changes in the protein.
- A) True
 - B) False

PART 3. FACILITATED DIFFUSION. Closely watch and analyze the animation on [facilitated diffusion](#) and answer the questions below.

9. What is the structure that helps molecules move across the membrane?

10. What are some of the types of molecules that are moved across the membrane using the structures from question 1? Are they polar or non-polar?

11. Why doesn't facilitated diffusion need any energy?

12. Take the quiz below on what you saw in the animation.

1 Facilitated diffusion requires

- A) enzymes.
 - B) carrier proteins.
 - C) lipid carriers.
 - D) carbohydrate carriers.
 - E) lipid or carbohydrate carriers.
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2 Facilitated diffusion occurs

- A) into the cell only.
 - B) out of the cell only.
 - C) in either direction depending on the temperature.
 - D) in either direction depending on the concentration gradient of the molecule.
 - E) in either direction depending on the size of the molecule.
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3 Facilitated diffusion is used to transport

- A) sugars and amino acids.
 - B) H₂O and O₂.
 - C) CO₂ and O₂.
 - D) CO₂ and H₂O.
 - E) sugars and H₂O.
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4 Unlike simple diffusion, facilitated diffusion requires energy expenditure by the cell.

- A) True
 - B) False
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5 Facilitated diffusion requires a specific transporter for a specific molecule.

- A) True
- B) False

PART 4. REFLECTION.

13. How is facilitated diffusion the same in cells as simple diffusion is in the air? Think concentration...

14. Use any one of the examples to help to say why cell membranes are called “semi-permeable”. What specific structure(s) make it semi-permeable?

15. Describe how you think the cells within an endocrine gland like the pancreas uses transport mechanisms like this. Use specific hormones in your example.