

APOLLO

Membranes and membrane transport

HL

Biology

First assessment 2025

10 questions | questions

14. The table shows concentrations of potassium ions and sodium ions maintained inside and outside human cells.

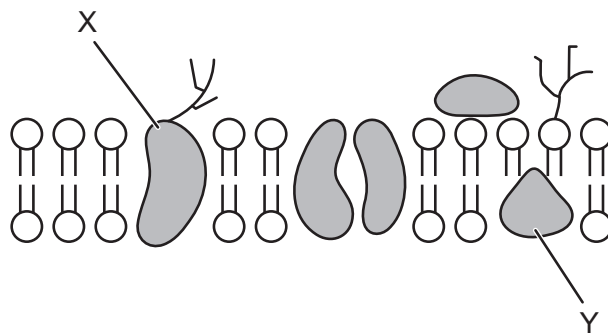
Ions	Concentration of ions / $10^{-3} \text{ mol dm}^{-3}$	
	Intracellular	Extracellular
Potassium	135	4
Sodium	10	145

What explains these concentrations?

- A. Active transport using a protein pump
- B. Facilitated diffusion using a vesicle
- C. Simple diffusion using a protein channel
- D. Osmosis using an aquaporin

- 15.** What is the role of clathrin molecules in the formation of vesicles?
- A. Facilitate transport of sodium and potassium ions
 - B. Bind together to help the membrane become indented
 - C. Adhere to the phospholipid bilayer to increase fluidity
 - D. Create a concentration gradient for uptake of substances into vesicles

14. The diagram shows a portion of fluid mosaic membrane.



What are the membrane structures X and Y?

	X	Y
A.	glycoprotein	integral protein
B.	integral protein	peripheral protein
C.	channel protein	integral protein
D.	glycoprotein	peripheral protein

Section B

Answer **two** questions. Up to one additional mark is available for the construction of your answers for each question. Answers must be written within the answer boxes provided.

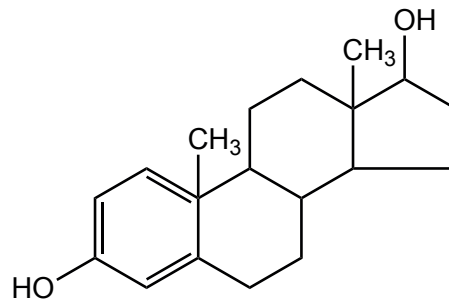
9. The structure of membranes allows them to carry out many functions in cells.
- (a) Discuss the use of membranes for compartmentalization in eukaryotic cells. [4]
 - (b) Describe the methods that are used to move substances into and out of cells. [7]
 - (c) Explain the role of membranes in the depolarization and repolarization of axons. [4]

4. Which molecule is paired with the component of the cell membrane that allows it to pass through the membrane?

	Molecule	Component of the cell membrane
A.	insulin	aquaporin
B.	glycogen	channel protein
C.	oestradiol	phospholipid bilayer
D.	carbon dioxide	pump protein

- 14.** Which type of protein uses energy from ATP to transfer particles across membranes against a concentration gradient?
- A. Glycoprotein
 - B. Pump protein
 - C. Aquaporin
 - D. Channel protein

4. Oestradiol is a steroid hormone.



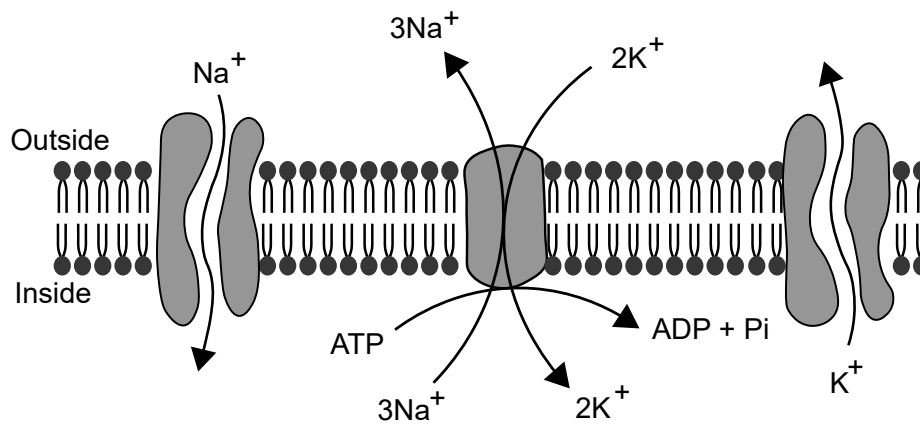
How does oestradiol cross plasma membranes?

- A. It can move between phospholipids because it is non-polar.
- B. It can pass either between phospholipids or through channel proteins because it is amphipathic.
- C. It can only pass through hydrophilic pores as its polar ends can form H bonds.
- D. It must pass through channel proteins due to its large size.

15. Which changes would take place in the plasma membrane composition to maintain fluidity at very low temperatures?

	Unsaturated fatty acids	Saturated fatty acids	Proteins
A.	increase	increase	decrease
B.	no change	increase	decrease
C.	increase	decrease	no change
D.	decrease	no change	increase

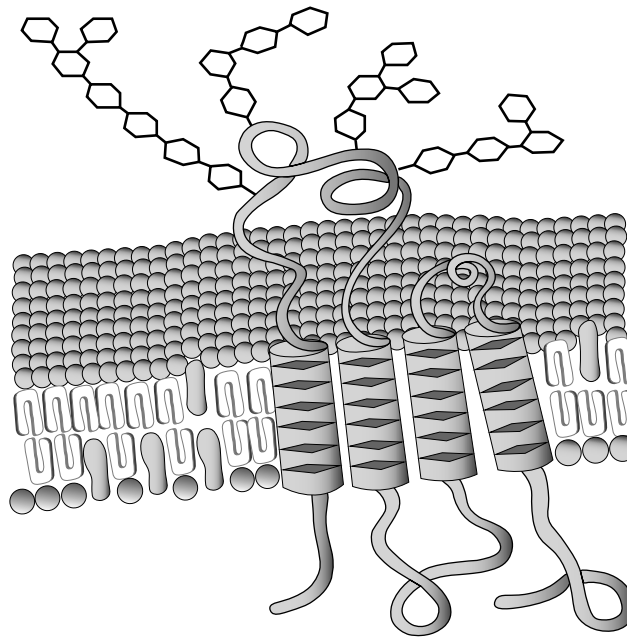
15. The diagram shows the movement of ions that can occur across the membrane of a neuron.



From the diagram, what can be deduced about the movement of sodium ions?

- A. They are actively pumped out and some re-enter by facilitated diffusion.
- B. They are actively pumped out and some re-enter by simple diffusion.
- C. They diffuse out of the cell along with potassium ions.
- D. There is a net movement of sodium ions into the cell.

17. The image shows a glycoprotein embedded in the phospholipid bilayer of a cell membrane.



Which feature of this glycoprotein can be deduced from the image?

- A. It is a peripheral protein that allows attachment to neighbouring cells.
- B. It is a channel protein that provides hydrophilic channels for carbohydrate transport.
- C. It is an integral protein that may be involved in cell recognition.
- D. It is a transport protein that increases the permeability of the membrane to glucose.