

15 What are the main roles of glycolipids in cell surface membranes?

- 1 to help cells to attach to each other to form tissues
- 2 to act as antigens for cell-to-cell recognition
- 3 to increase fluidity for the cell surface membrane

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

17 What can increase the fluidity of the cell surface membrane at low temperatures?

- 1 double bonds between carbon atoms in the fatty acid chains
- 2 cholesterol
- 3 fatty acids having shorter chains

A 1, 2 and 3 **B** 1 and 3 only **C** 1 only **D** 2 and 3 only

18 Which statements about the proteins and glycoproteins in cell surface membranes are correct?

- 1 They can allow cells to bond together to form tissues.
- 2 They can recognise messenger molecules like hormones.
- 3 They can be antigens and allow cell-to-cell recognition.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

14 Which statement about phospholipids in the bilayer of a cell surface membrane is correct?

- A** The non-polar phosphate heads face outwards and the polar fatty acid tails face inwards.
- B** The polar phosphate heads face outwards and the non-polar fatty acid tails face inwards.
- C** The non-polar fatty acid tails face outwards and the polar phosphate heads face inwards.
- D** The polar fatty acid tails face outwards and the non-polar phosphate heads face inwards.

- 18** Proteins in the cell surface membranes of human cells and mouse cells were labelled with fluorescent dyes. The human cells were labelled with a red dye and the mouse cells were labelled with a green dye.

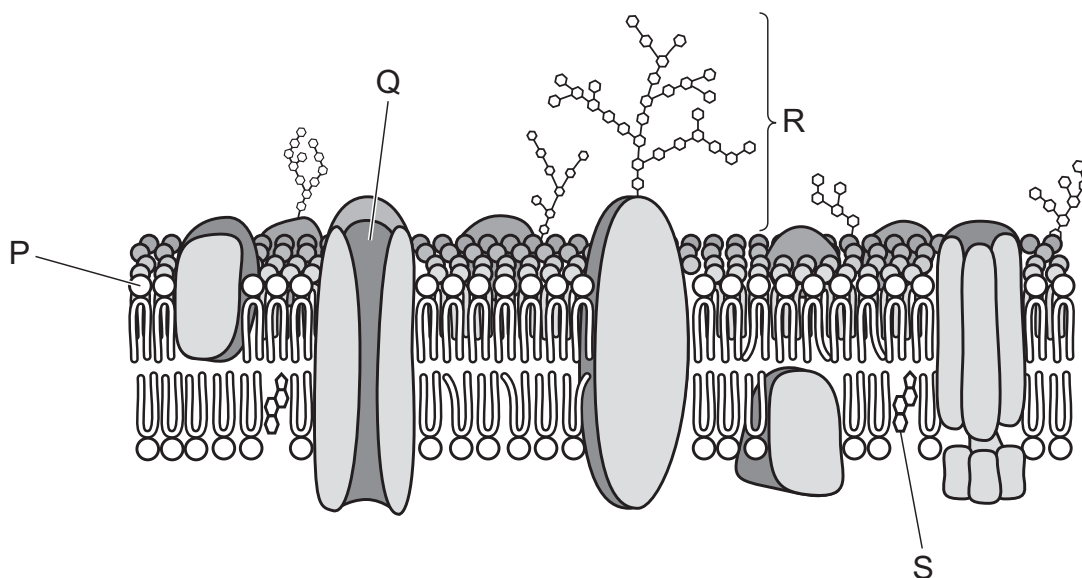
A human cell and a mouse cell were then fused to form a hybrid cell.

At first, the different dyes remained separate. After 40 minutes, the two dyes were evenly distributed in the hybrid cell surface membrane.

What explains this observation?

- A** All protein molecules in the cell surface membrane are fixed to structures within the cell, but phospholipid molecules move freely between them.
- B** Groups of protein and phospholipid molecules in the cell surface membrane are attached to each other and move together.
- C** Only protein molecules in the outer layer of the cell surface membrane can move freely between phospholipid molecules.
- D** Protein molecules in the outer layer of the cell surface membrane and those which span the bilayer can move freely between phospholipid molecules.

- 16** The diagram shows a section through a cell surface membrane.



What is a correct role for a labelled molecule?

- A** P is involved in controlling membrane stability.
- B** Q is involved in active transport.
- C** R is involved in cell signalling.
- D** S is involved in diffusion of ions.

- 1 Fig. 1.1 shows a diagram of the fluid mosaic model of the structure of the cell surface membrane.

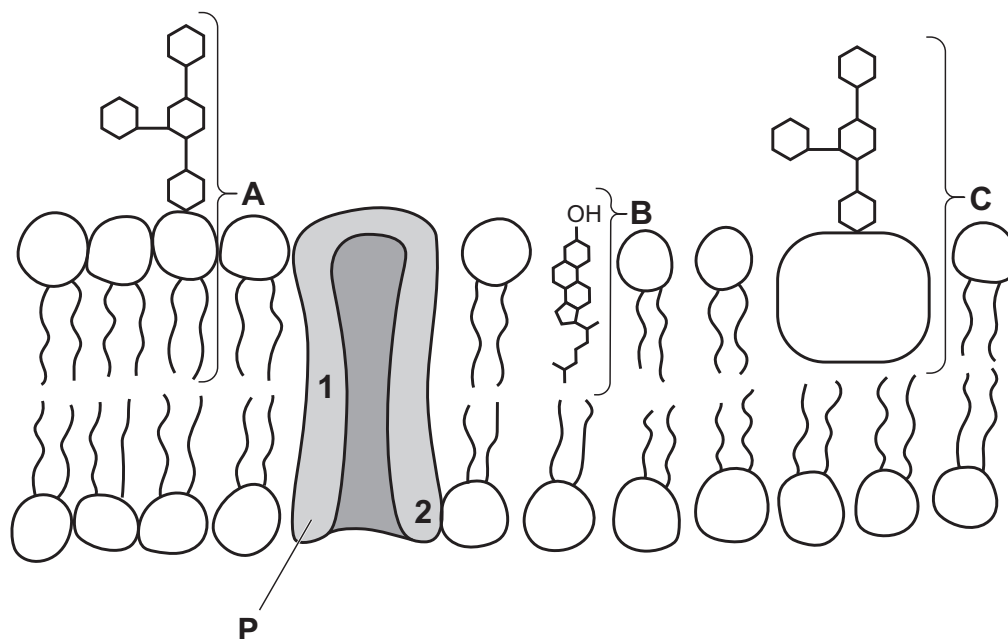


Fig. 1.1

- (a) Name the structures labelled **A**, **B** and **C** in Fig. 1.1.

A

B

C

[3]

- (b) Draw an arrow on Fig. 1.1 to show the movement of a molecule across the membrane into the cell by facilitated diffusion. [2]

- (c) Explain how the fluidity of the membrane would change if the proportion of unsaturated fatty acids in the phospholipid bilayer increased.

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[3]

(d) The R-groups of amino acids give them different properties.

Suggest how the properties of the R-groups of the amino acids at position **1** of **P** may differ from the R-groups of the amino acids at position **2**.

[1]

[Total: 9]