4 Cell membranes – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	**Write it 3 times** (English)		
cell membrane			
partially permeable			
phospholipids			
fluid mosaic model			
bilayer			
hydrophilic			
hydrophobic			
proteins			
channel proteins			
carrier proteins			
cholesterol			
fluidity			
glycoproteins			
cell signalling			
ligand			

English	Write it 3 times (English)		
hormone			
target cell			
receptor			

Recall

At IGCSE you learned that a **cell membrane** controls what enters and leaves a cell. Now we look at what it is built from and how it is arranged.

- The membrane is **partially permeable** – it lets some things through and blocks others.
- It is mostly made of **phospholipids** (Part 1 of the Biological molecules sheet).

Nothing here is harder than IGCSE – it just adds detail and the right words.

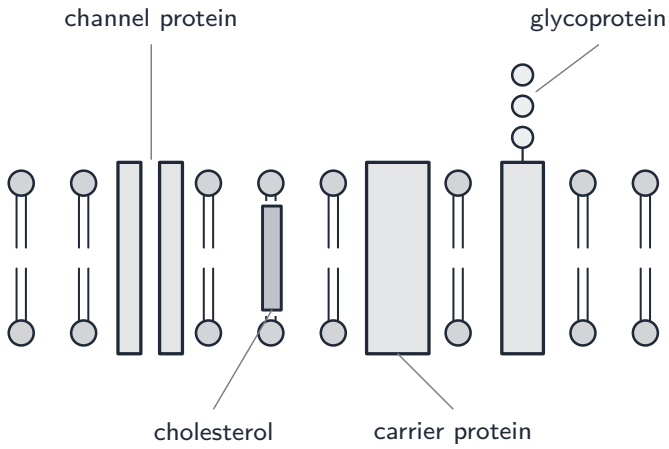
New ideas

Read these first, then do the Practice.

1 The fluid mosaic model

We describe the membrane with the **fluid mosaic model** . The phospholipids form a **bilayer** : **hydrophilic** heads face the water on each side, **hydrophobic** tails hide in the middle.

- "fluid" – the phospholipids slide past each other, so the membrane can bend.
- "mosaic" – many **proteins** are dotted through it, like tiles in a picture.



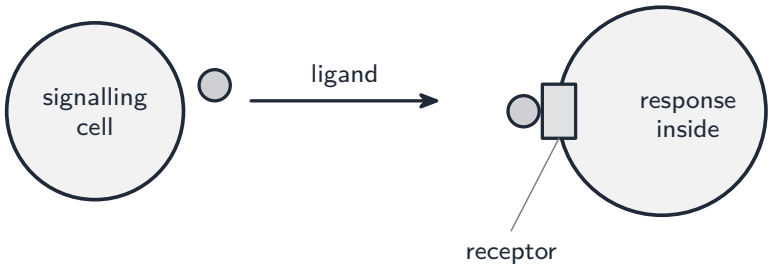
2 What floats in the membrane

Part	Role
channel proteins	water-filled pores that let ions pass
carrier proteins	carry specific molecules across
cholesterol	controls **fluidity** and adds strength
glycoproteins	carbohydrate chains for cell recognition

3 Cell signalling

Cells talk to each other by **cell signalling**:

1. a cell releases a signal chemical called a **ligand** (for example a **hormone**).
2. the ligand travels (often in the blood) to a **target cell**.
3. it binds a **receptor** of matching shape on the target cell, which triggers a response inside.



Worked example. The receptor shape fits one ligand only, so **only** cells with that receptor respond to the signal.

Watch out: the hydrophilic heads face the water on *both* sides and the hydrophobic tails hide *inside* – so charged or large molecules cannot cross the tails and must use proteins. A receptor fits *one* ligand shape, so only target cells respond.

Practice

Try these in order.

4.1 Name the model used to describe membrane structure. [1]

4.2 Explain why the model is described as (a) *fluid* and (b) a *mosaic*. [2]

4.3 State the role of (a) a channel protein, (b) cholesterol. [2]

4.4 In the bilayer, where are the hydrophobic tails found, and why? [2]

4.5 Put the stages of cell signalling in order: A the ligand binds a receptor, B a cell releases a ligand, C a response is triggered inside the target cell. [1]

4.6 A hormone travels in the blood but affects only some cells. Explain why. [2]

4.7 Challenge. Oxygen crosses the membrane straight through the bilayer, but glucose needs a transport protein. Explain why, using the structure of the bilayer. [2]