

4 Cell membranes – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)
cell membrane	细胞膜	_____
partially permeable	半透	_____
phospholipids	磷脂	_____
fluid mosaic model	流动镶嵌模型	_____
bilayer	双层	_____
hydrophilic	亲水	_____
hydrophobic	疏水	_____
proteins	蛋白质	_____
channel proteins	通道蛋白	_____
carrier proteins	载体蛋白	_____
cholesterol	胆固醇	_____
fluidity	流动性	_____
glycoproteins	糖蛋白	_____
cell signalling	细胞信号传递	_____
ligand	配体	_____

English	中文	Write it 3 times (English)
hormone	激素	_____
target cell	靶细胞	_____
receptor	受体	_____

Recall

At IGCSE you learned that a **cell membrane** 细胞膜 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** 半透 — it lets some things through and blocks others.
- It is mostly made of **phospholipids** 磷脂 (Part 1 of the Biological molecules sheet).

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

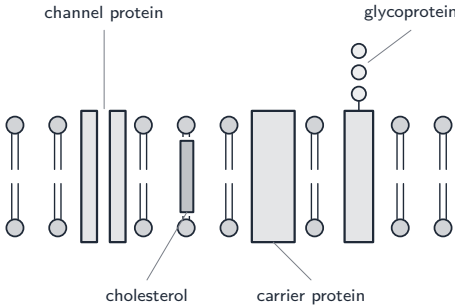
New ideas

Read these first, then do the Practice.

■ 1 The fluid mosaic model

We describe the membrane with the **fluid mosaic model** 流动镶嵌模型. The phospholipids form a **bilayer** 双层: **hydrophilic** 亲水 heads face the water on each side, **hydrophobic** 疏水 tails hide in the middle.

- “fluid” — the phospholipids slide past each other, so the membrane can bend.
- “mosaic” — many **proteins** 蛋白质 are dotted through it, like tiles in a picture.



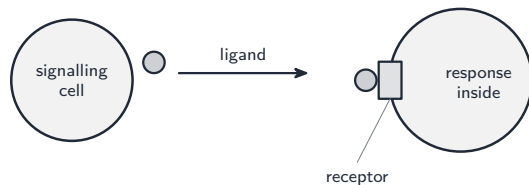
■ 2 What floats in the membrane

Part	Role
channel proteins 通道蛋白	water-filled pores that let ions pass
carrier proteins 载体蛋白	carry specific molecules across
cholesterol 胆固醇	controls fluidity 流动性 and adds strength
glycoproteins 糖蛋白	carbohydrate chains for cell recognition

■ 3 Cell signalling

Cells talk to each other by **cell signalling** 细胞信号传递:

1. a cell releases a signal chemical called a **ligand** 配体 (for example a **hormone** 激素).
2. the ligand travels (often in the blood) to a **target cell** 靶细胞.
3. it binds a **receptor** 受体 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]