

Exercise walk-through

2.3

Plasma Membrane

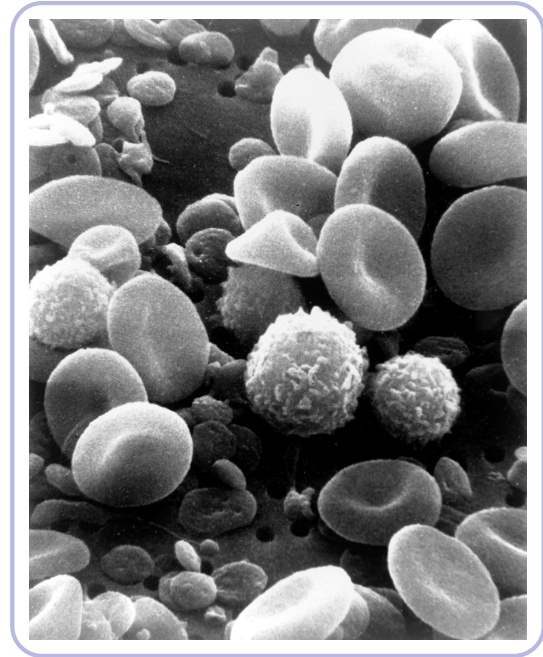
AP Biology

The fluid mosaic membrane

The **fluid mosaic model** : a
phospholipid bilayer
(hydrophilic heads out, hydrophobic tails in)
with drifting proteins.

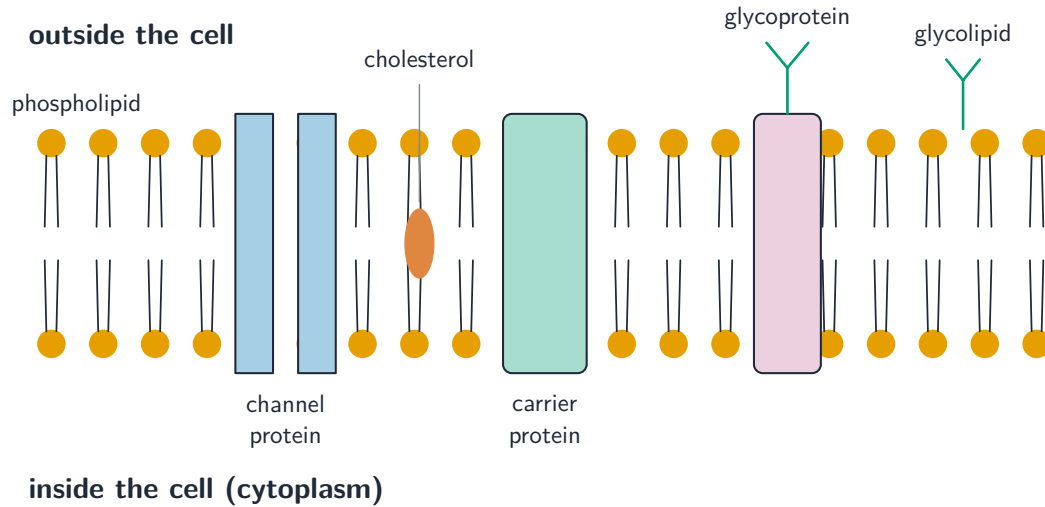
- **membrane proteins** – channels, pumps, receptors
- **cholesterol** – steadies the fluidity

Selectively permeable –
it maintains **homeostasis** .



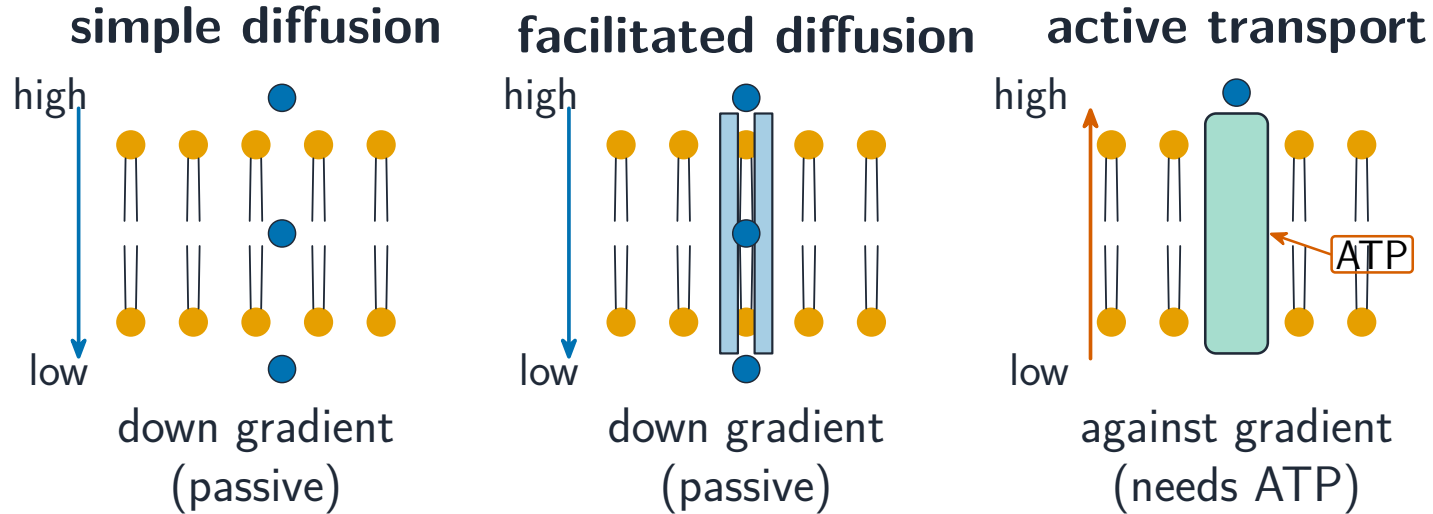
Rbc SEM

The fluid mosaic model of the cell membrane



The fluid mosaic model of the cell membrane

Three ways substances cross the membrane



Three ways substances cross the membrane

Compartmentalization Inside the Cell

Membranes create separate **compartments** so incompatible reactions can run at once and conditions (pH, ion levels) can be tuned locally.

This organization boosts efficiency – the internal membranes also add surface area for reactions.

The Origins of Cell Compartmentalization

The **endosymbiotic theory** explains mitochondria and chloroplasts: they arose when a larger cell engulfed free-living prokaryotes that then lived inside it.

The evidence – their own circular DNA, their own ribosomes, and double membranes – supports this shared evolutionary origin.

Exercises 2.1-2.3

2.1 What are the two main components of the membrane? [2]

2.2 Why is the model called “fluid”? [1]

2.3 State one function of membrane proteins. [1]

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2.1 What are the two main components of the membrane? [2]

2.1

- A phospholipid bilayer and embedded proteins
-

2.2 Why is the model called “fluid”? [1]

2.2

- The phospholipids and proteins can move sideways within the layer
-

2.3 State one function of membrane proteins. [1]

2.3

- Any one: transport (channel/carrier), receptor for signals, cell recognition

Exercise 3.1

3.1 In the fluid mosaic model, the membrane is described as a mosaic because it [1]

☐

A is completely rigid

B contains many different molecules scattered throughout

C has only phospholipids

D never moves

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3.1 B

- many different molecules scattered throughout

Exercise 3.2 (a)

3.2 A membrane must transport glucose into a cell.

(a) Explain why glucose cannot cross the bilayer directly.

[1]

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(a) Explain why glucose cannot cross the bilayer directly.

[1]

(a)

- Glucose is large and polar, so it cannot pass through the hydrophobic core

Exercise 3.2 (b)

3.2 A membrane must transport glucose into a cell.

(b) State what allows glucose to cross.

[2]

Exercise 3.2 (b)

3.2 A membrane must transport glucose into a cell.

(b) State what allows glucose to cross.

[2]

(b)

- A transport (carrier/channel) protein allows glucose across

Exercise 3.3

3.3 Explain the role of cholesterol in maintaining membrane fluidity across temperatures. [2]

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3.3

- Cholesterol keeps the membrane from becoming too fluid at high temperatures and too rigid at low temperatures, stabilizing fluidity