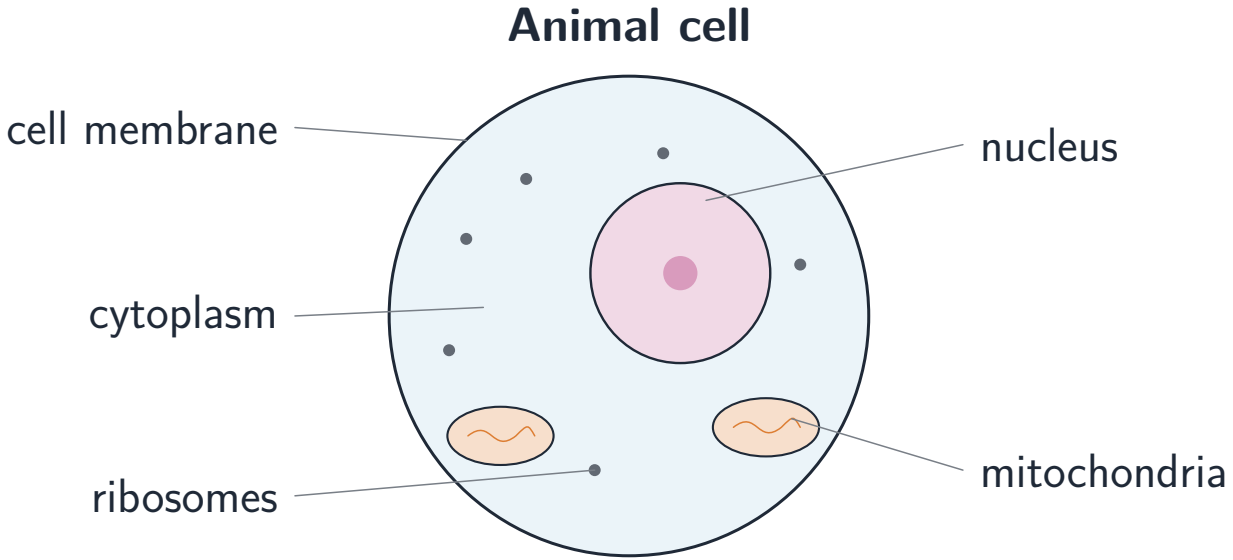
Exercise walk-through

2.9
Cell Compartmentalization

AP Biology

An animal cell and its organelles



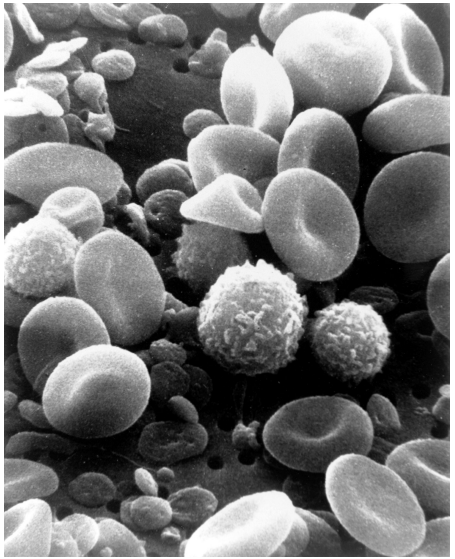
Membrane-bound organelles (nucleus, mitochondria, ER, Golgi) mark it as eukaryotic; unlike a plant cell it has no cell wall, no chloroplasts and no large central vacuole.

The fluid mosaic membrane

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

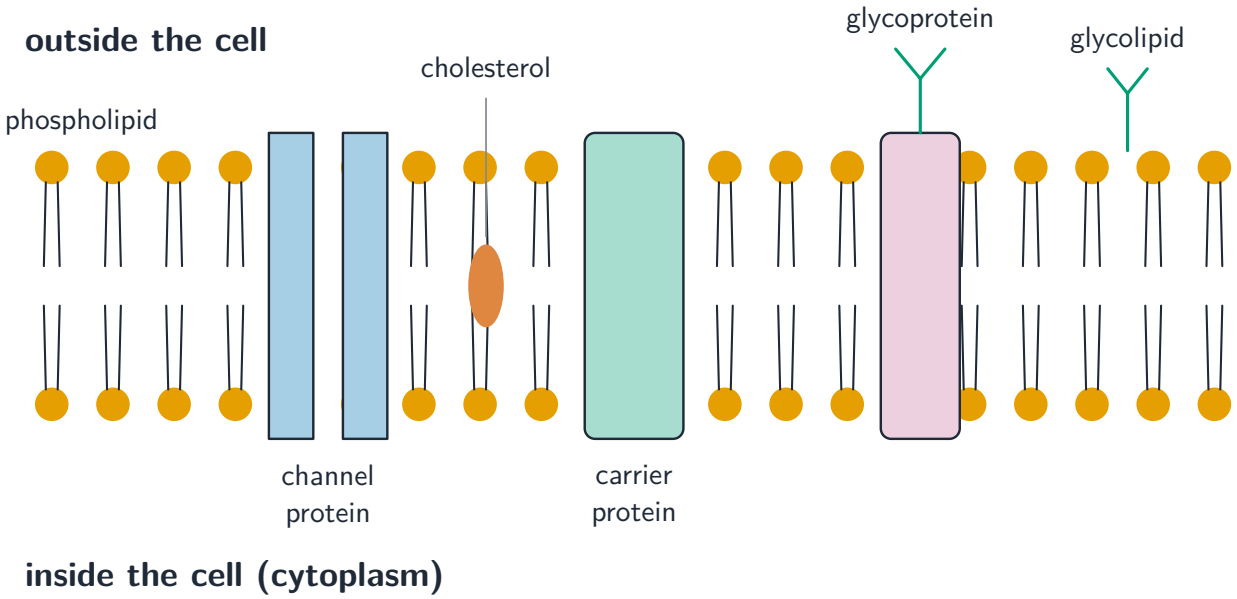
- **membrane proteins** – channels, pumps, receptors
- **cholesterol** – steadies the fluidity

Selectively permeable – it maintains **homeostasis** .



Red blood cells bend through capillaries because the membrane is fluid

The fluid mosaic model of the cell membrane



Phospholipids drift sideways and proteins float among them; cholesterol keeps the membrane's fluidity steady across temperatures.

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Exercises 2.1·2.3

2.1 What creates separate compartments in a eukaryotic cell? [1]

2.2 State one advantage of compartmentalization. [1]

2.3 Why is it useful for a lysosome to be enclosed by a membrane? [1]

Exercises 2.1–2.3

2.1 What creates separate compartments in a eukaryotic cell? [1]

2.1

- Membrane-bound organelles

2.2 State one advantage of compartmentalization. [1]

2.2

- Any one: separate conditions, greater efficiency, protection/containment of harmful reactions

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2.3 Why is it useful for a lysosome to be enclosed by a membrane? [1]

2.3

- So its digestive enzymes and acid are contained and do not damage the rest of the cell

Exercise 3.1

3.1 Compartmentalization allows a cell to [1]

- [ ] **A** carry out only one reaction at a time
- [ ] **B** maintain different conditions in different regions
- [ ] **C** avoid using membranes
- [ ] **D** remove its DNA

Exercise 3.1

3.1 Compartmentalization allows a cell to [1]

- [ ] **A** carry out only one reaction at a time
- [ ] **B** maintain different conditions in different regions
- [ ] **C** avoid using membranes
- [ ] **D** remove its DNA

3.1 B

- maintain different conditions in different regions

Exercise 3.2 (a)

3.2 A lysosome contains digestive enzymes and has an acidic interior.

(a) Explain why enclosing these in a membrane is important. [2]

Exercise 3.2 (a)

3.2 A lysosome contains digestive enzymes and has an acidic interior.

(a) Explain why enclosing these in a membrane is important. [2]

(a)

- The membrane keeps the enzymes and acid contained, protecting the cytoplasm from being digested

Exercise 3.2 (b)

3.2 A lysosome contains digestive enzymes and has an acidic interior.

(b) State one other advantage of keeping reactions in a compartment. [1]

Exercise 3.2 (b)

3.2 A lysosome contains digestive enzymes and has an acidic interior.

(b) State one other advantage of keeping reactions in a compartment. [1]

(b)

- Reactants and enzymes are concentrated together, raising efficiency (or: different reactions can occur at once)

Exercise 3.3

3.3 Explain how compartmentalization increases the efficiency of a metabolic reaction. [2]

Exercise 3.3

3.3 Explain how compartmentalization increases the efficiency of a metabolic reaction. [2]

3.3

- Concentrating the enzymes and substrates in one small compartment increases the chance they meet and react, speeding the reaction