The Cell Membrane

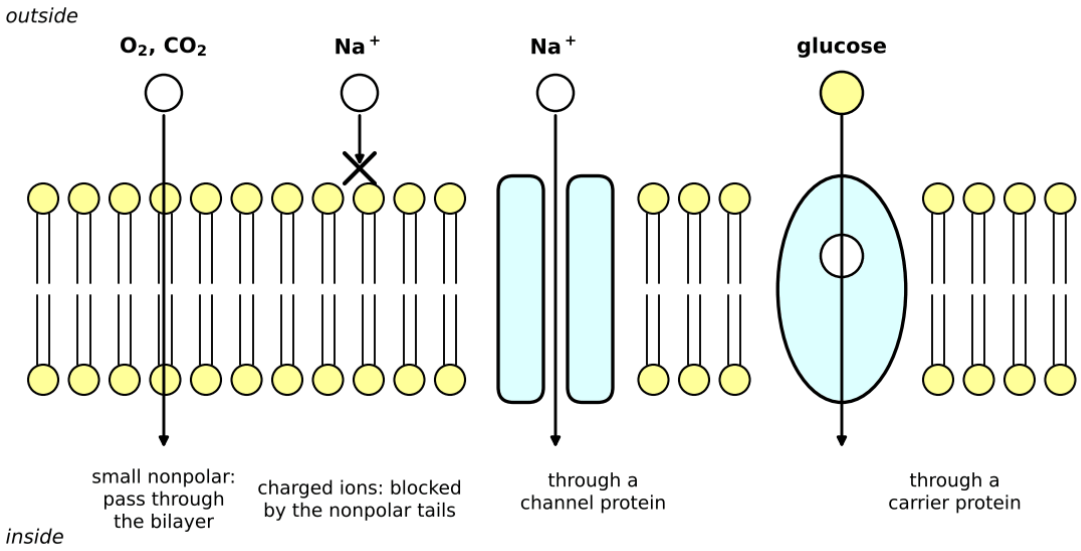
Essential Question

How does the cell membrane control what enters and leaves?

The Cell Membrane

A Selective Barrier

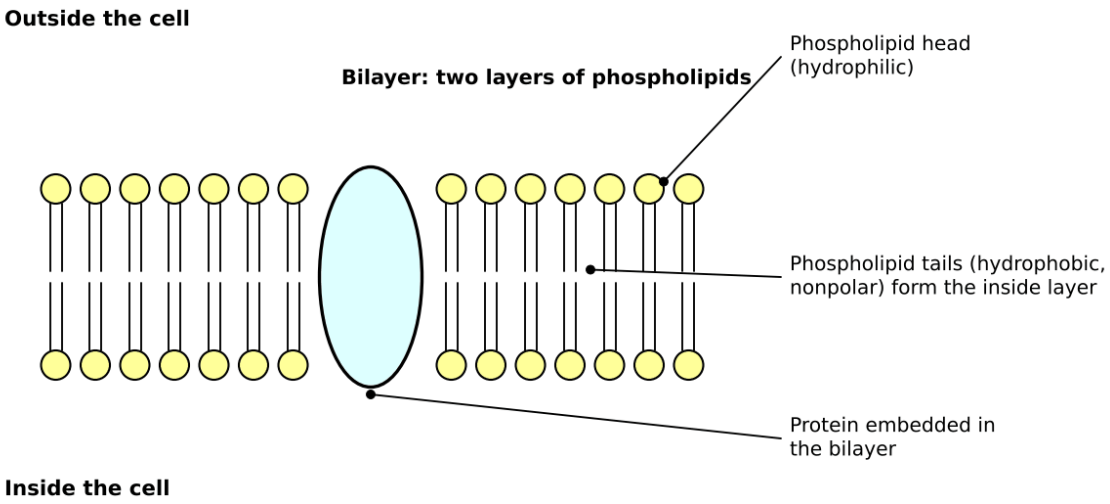
- The membrane is selectively permeable
- Small nonpolar molecules cross easily
- Charged ions and large polar molecules need proteins
- Water crosses slowly through the lipids



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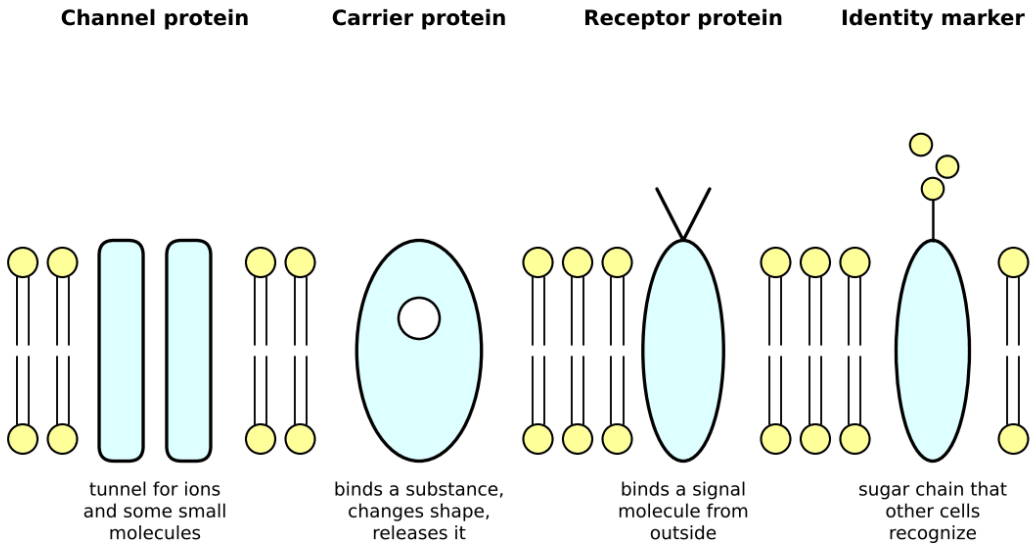
The Fluid Mosaic

- Phospholipids form a double layer (bilayer)
- Heads are hydrophilic and face the water
- Tails are hydrophobic and face each other
- Proteins are embedded in the bilayer



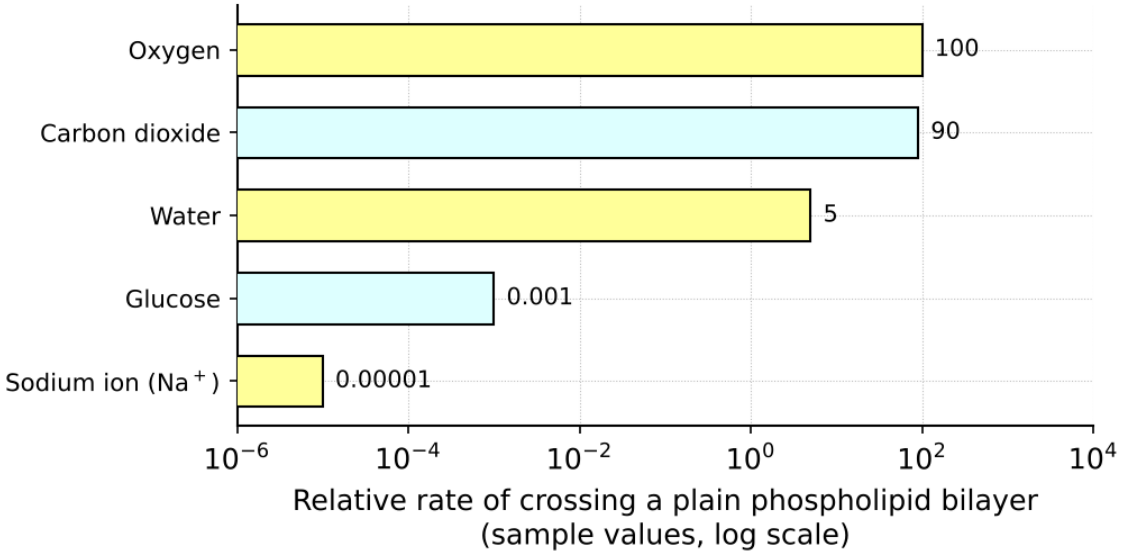
Membrane Proteins

- Channel proteins form tunnels for ions
- Carrier proteins bind and move a substance
- Receptor proteins bind signal molecules
- Marker proteins identify the cell



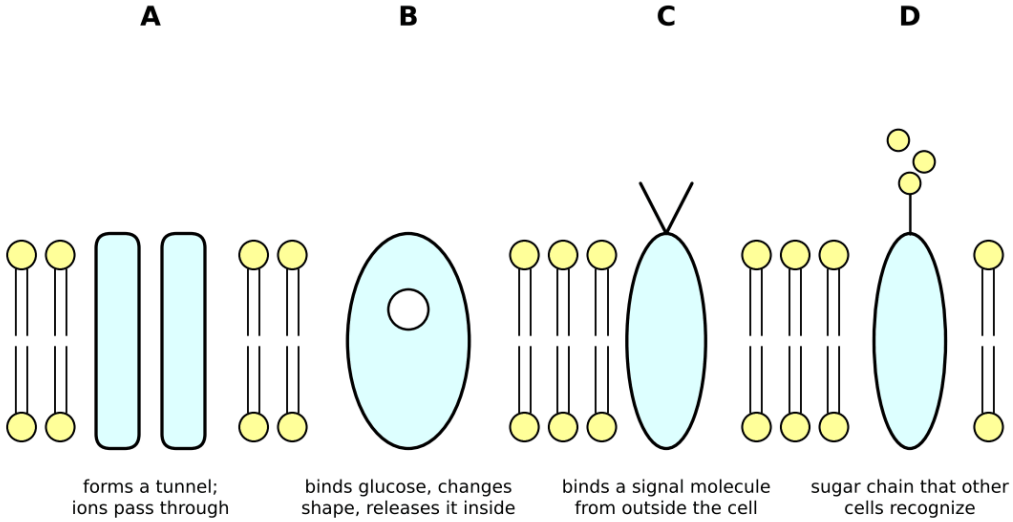
Keeping Conditions Steady

- Nonpolar molecules cross much faster than polar ones
- Charged ions cross a plain bilayer hardly at all
- Proteins let the cell control the rest
- Control of entry and exit helps keep inside conditions steady



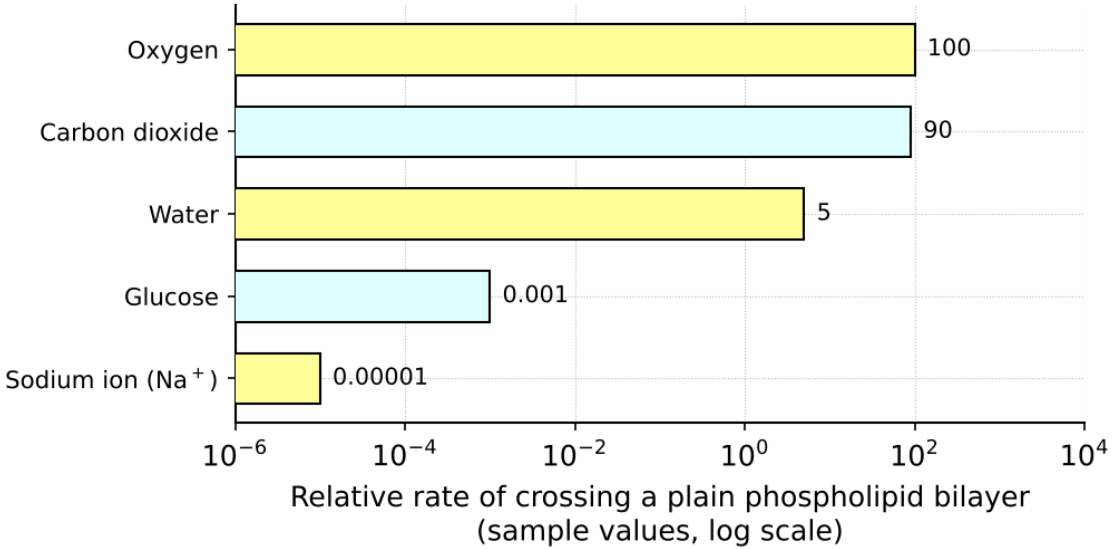
Example: Name the Membrane Proteins

The diagram shows four proteins in a cell membrane, with a clue about each one. Name each protein: channel, carrier, receptor, or identity marker.



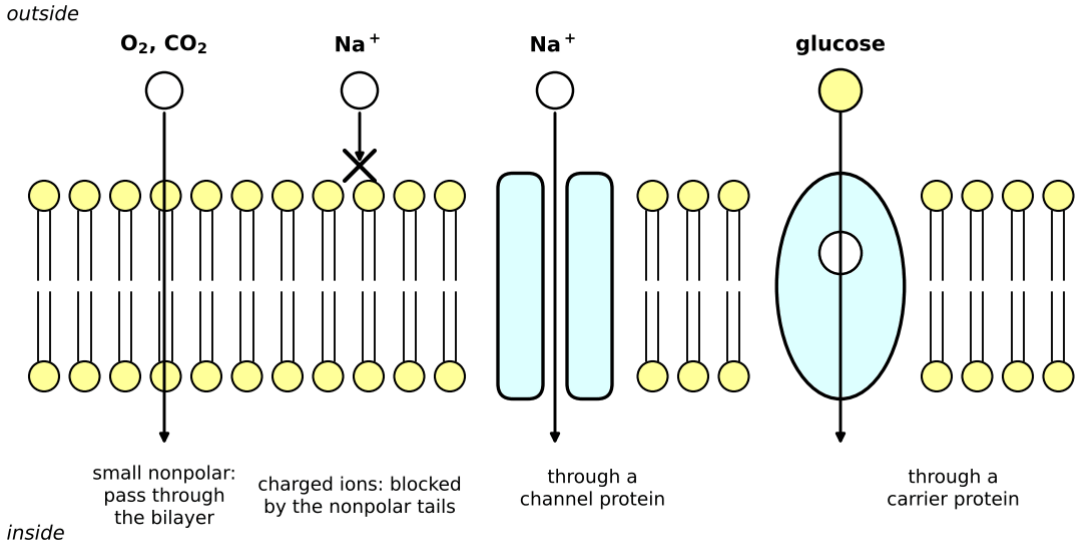
Example: Which Substances Cross Easily?

The graph shows the relative rate at which substances cross a plain phospholipid bilayer (sample values, log scale). Write a claim, evidence, and reasoning about which kinds of substances cross easily.



Example: Predict How Each Substance Crosses

A cell is placed in a solution that contains oxygen, glucose, and sodium ions. Use the model to predict how each substance can cross the membrane.



The Cell Membrane

Big Ideas

- The membrane is selectively permeable
- Phospholipids form a bilayer with hydrophobic tails inside
- Small nonpolar molecules cross; ions and polar molecules need proteins
- Channel, carrier, receptor, and marker proteins do special jobs