Osmosis

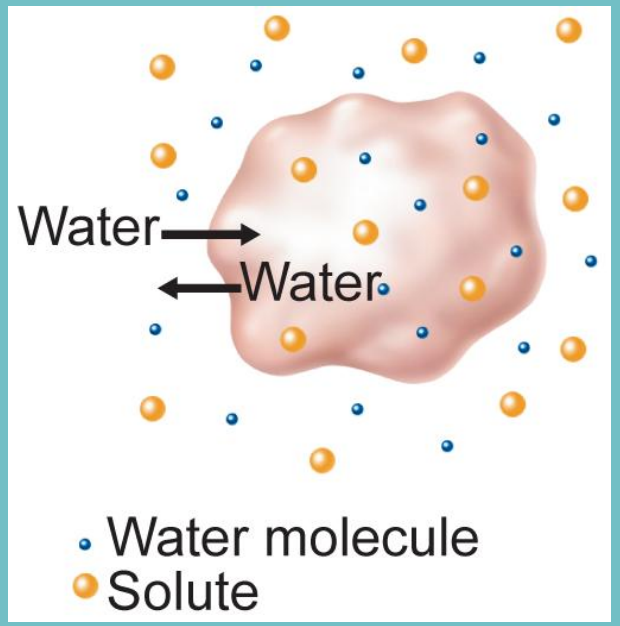
- Diffusion of water across a selectively permeable membrane

Three types of solutions influence how water and solutes move across a membrane.

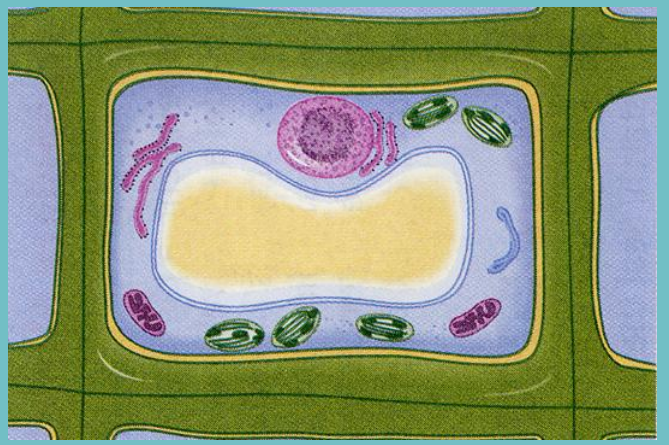
- Isotonic
- Hypotonic
- Hypertonic

Isotonic Solution

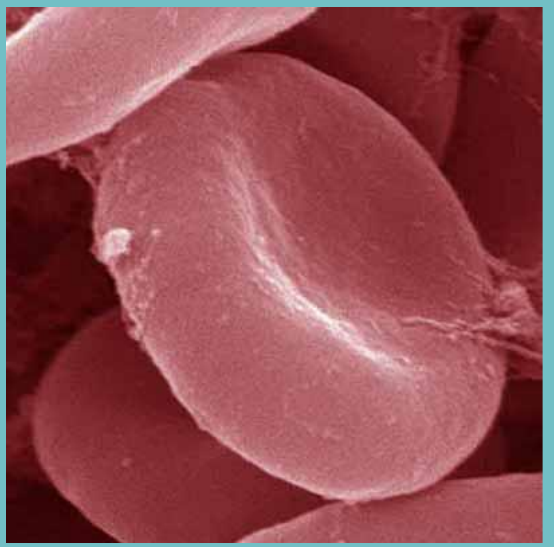
- The solutes in two different solutions are equal to each other.
- Water and dissolved substances (the solutes) diffuse into & out of the cell at the same rate.



Plant Cell

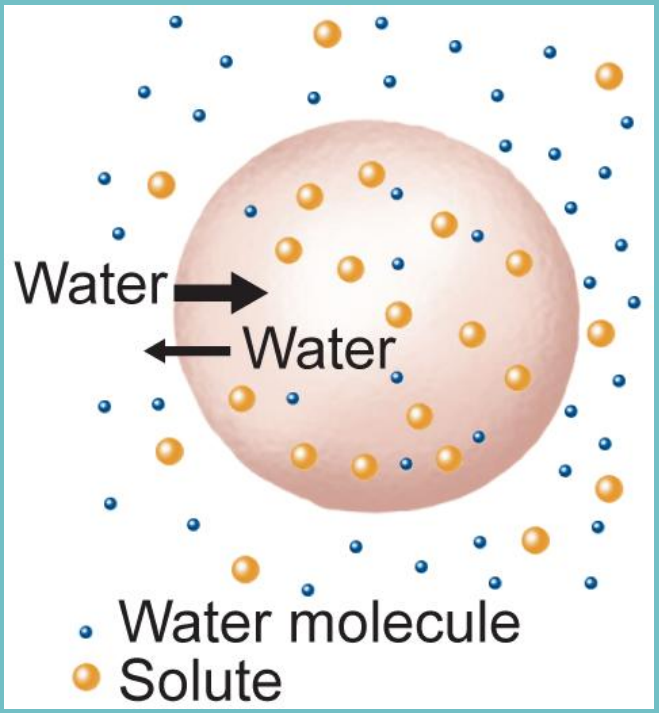


Blood Cell

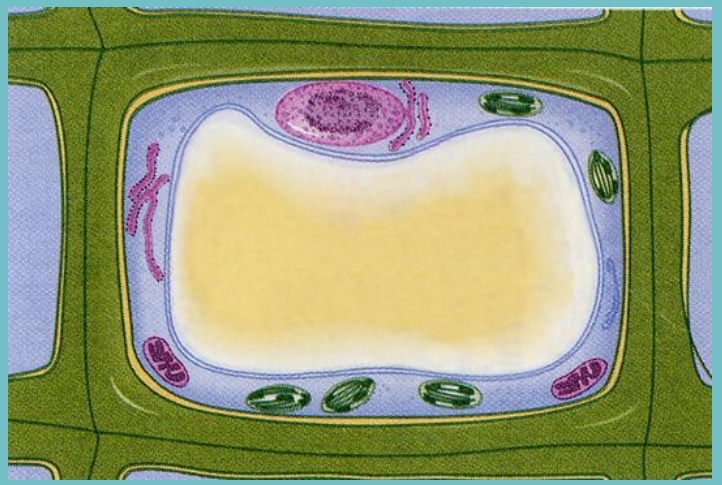


Hypotonic Solution

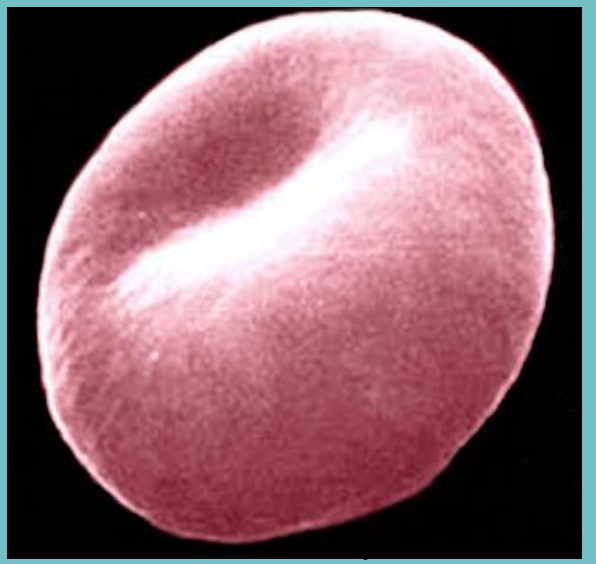
- Solute concentration is higher inside the cell.
- Water diffuses into the cell.



Plant Cell

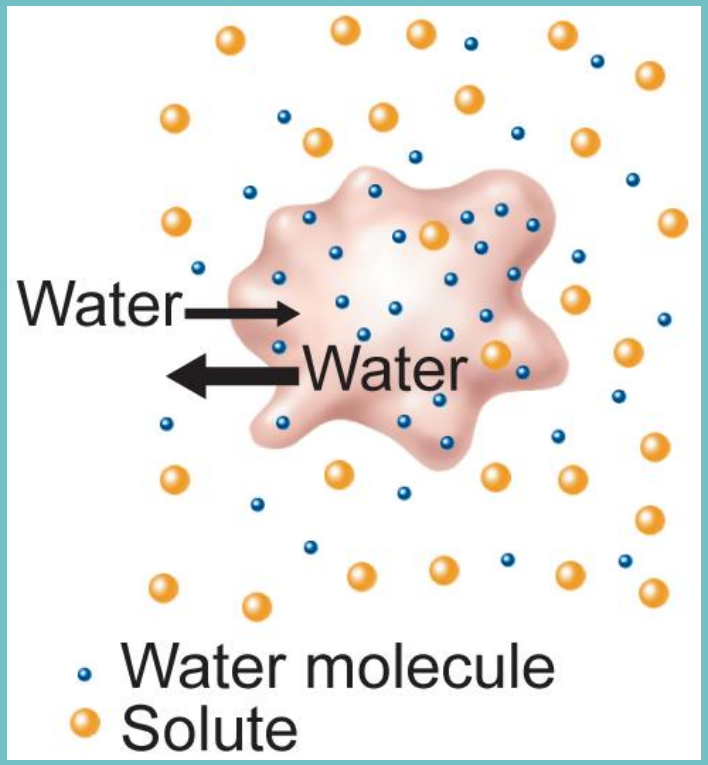


Blood Cell

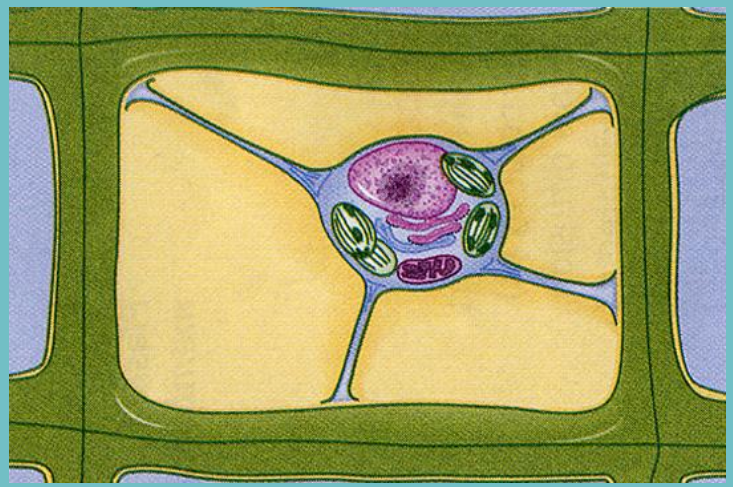


Hypertonic Solution

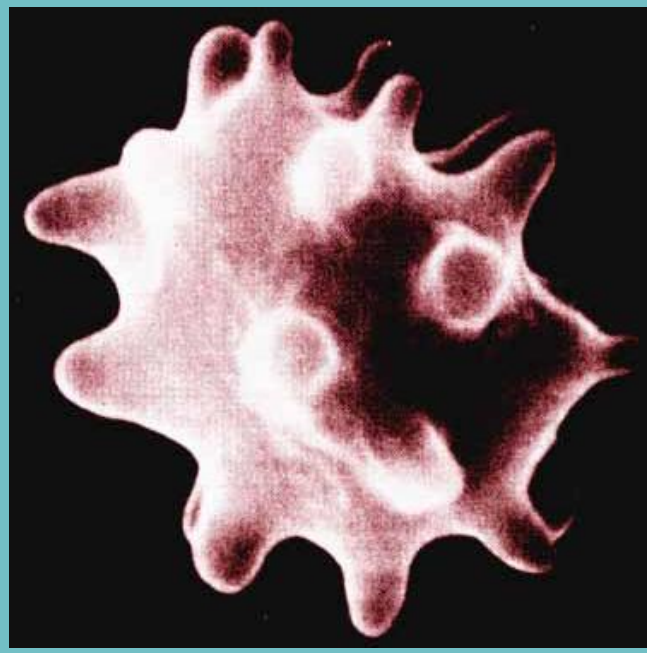
- Solute concentration is higher outside the cell.
- Water diffuses out of the cell.



Plant Cell



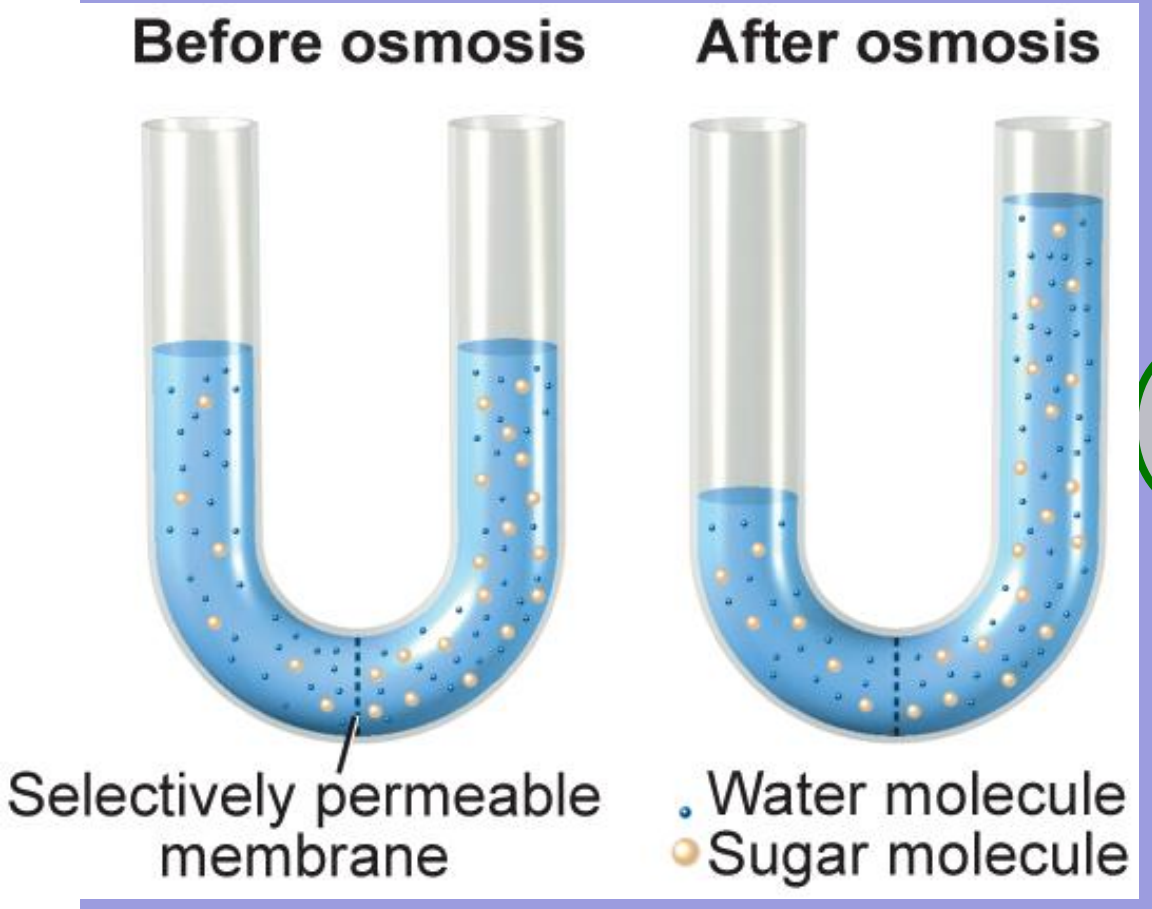
Blood Cell



Concepts In Motion

Isotonic Solutions
Hypotonic Solutions
Hypertonic Solutions

How does *osmosis* occur between the two solutions separated by the selectively permeable membrane?



A. Sugar moves to the left.

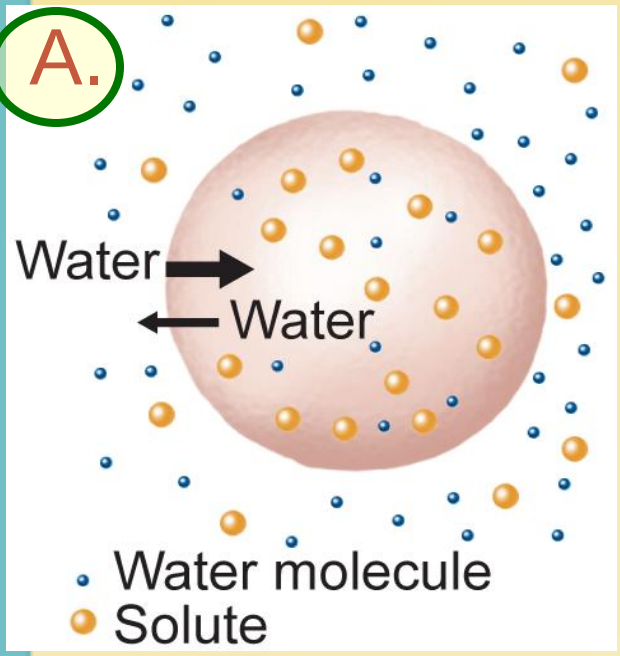
B. Sugar moves to the right.

C. Water moves to the left.

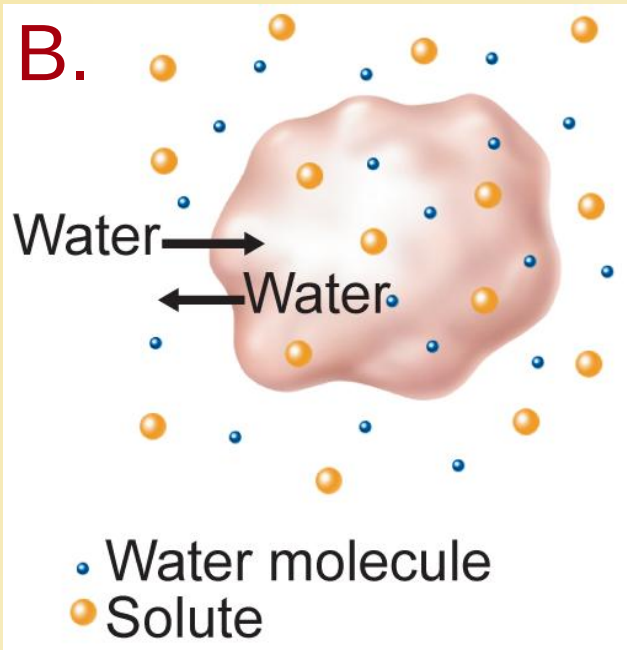
D. Water moves to the right.

Which diagram shows a cell in a hypotonic solution?

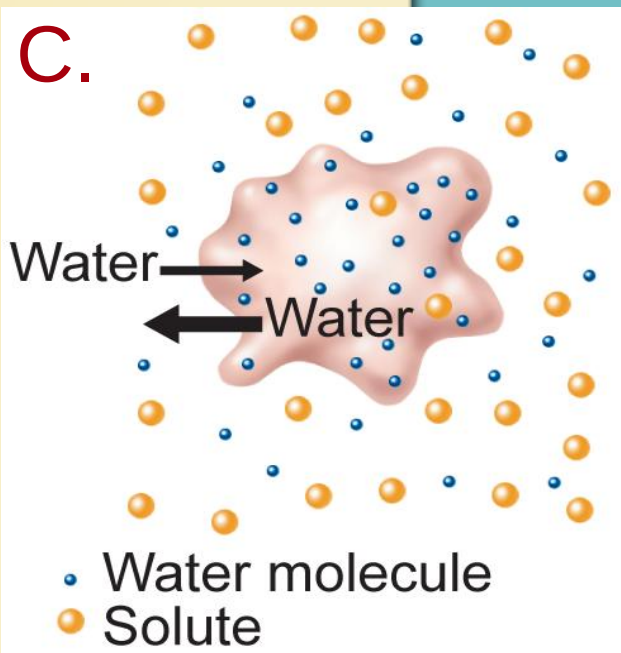
A.



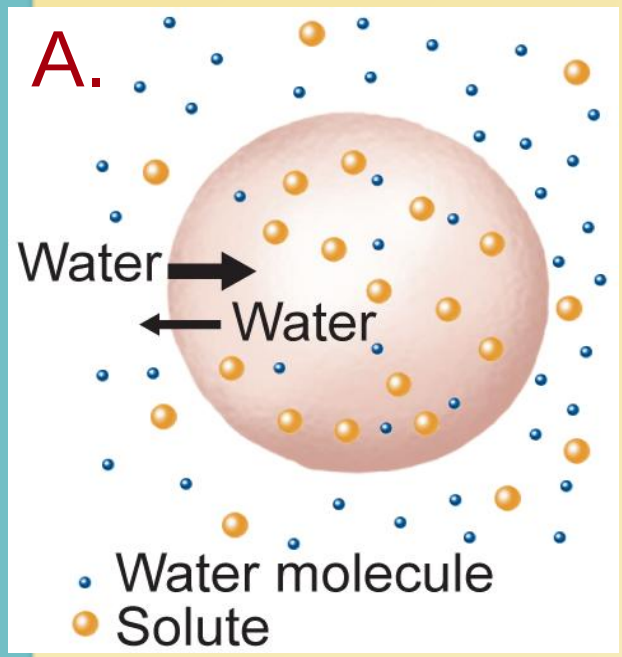
B.

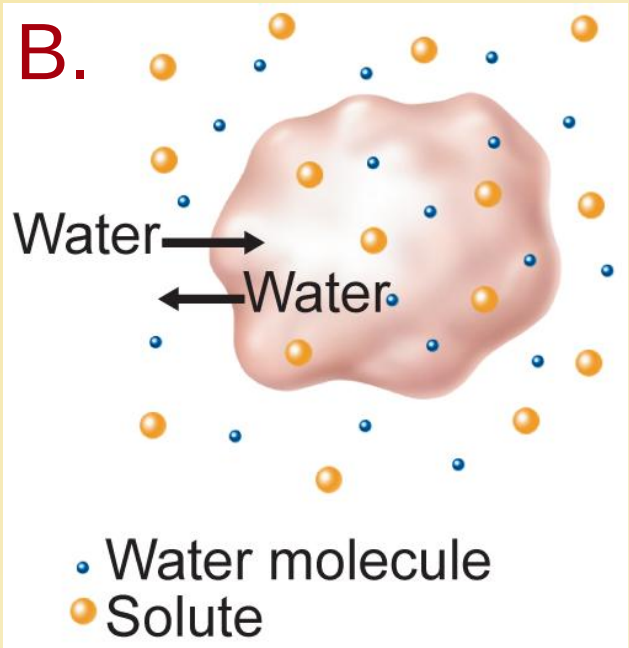


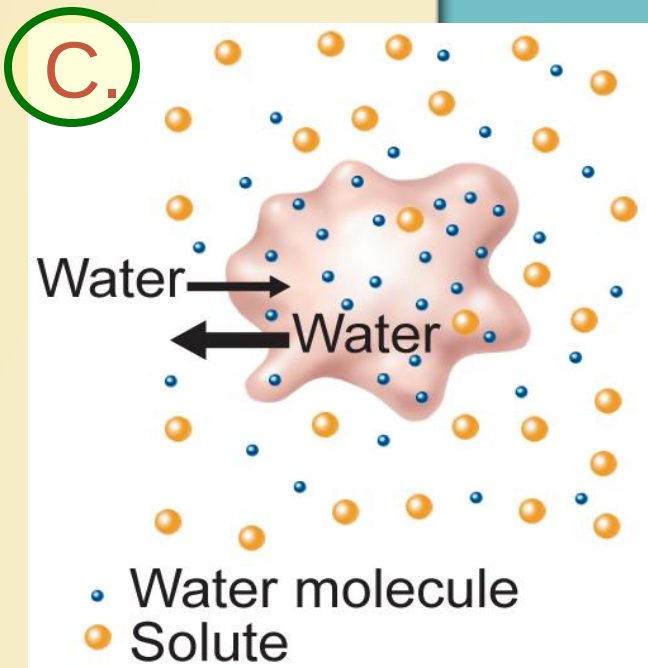
C.



Which diagram shows a cell in a hypertonic solution?

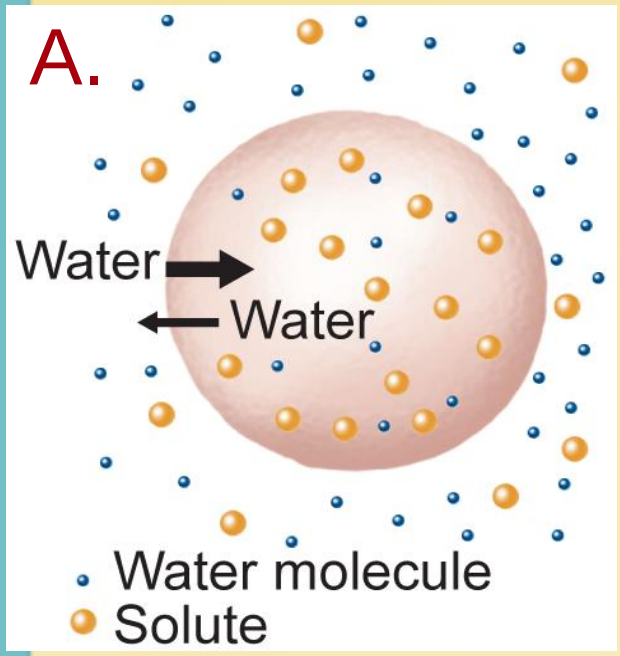




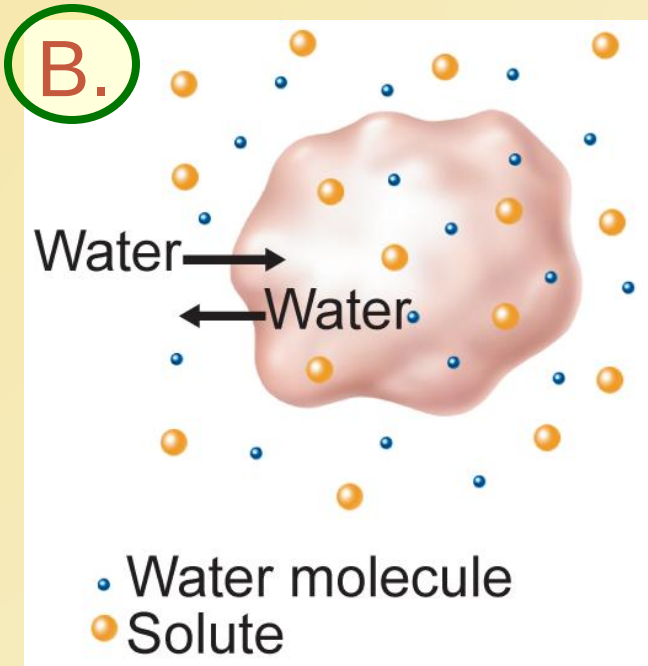


Which diagram shows a cell in an isotonic solution?

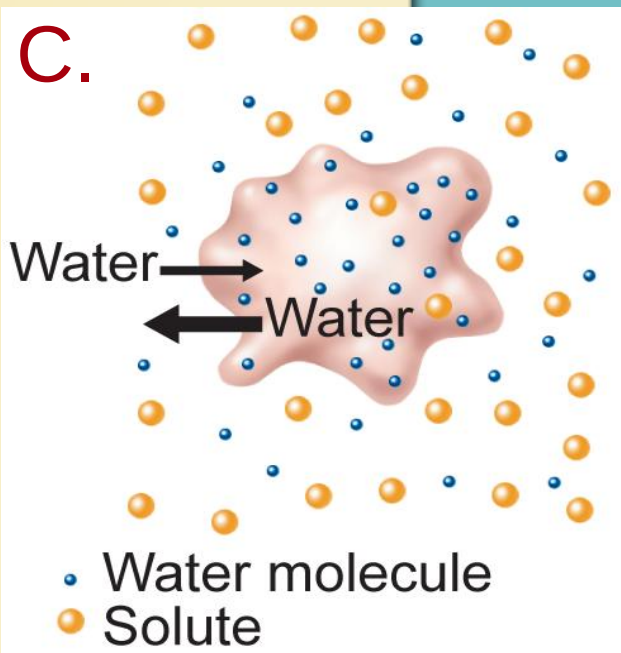
A.



B.

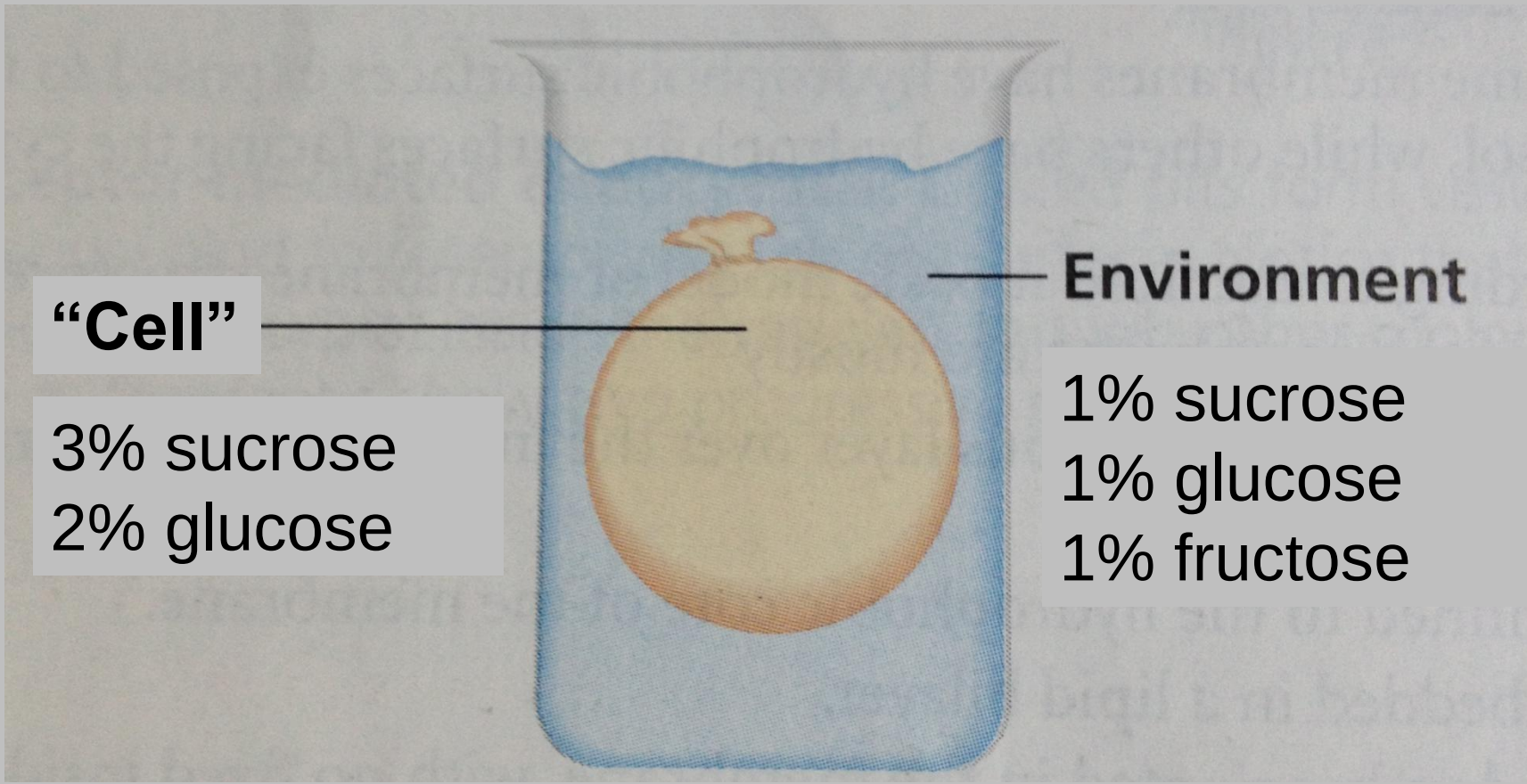


C.



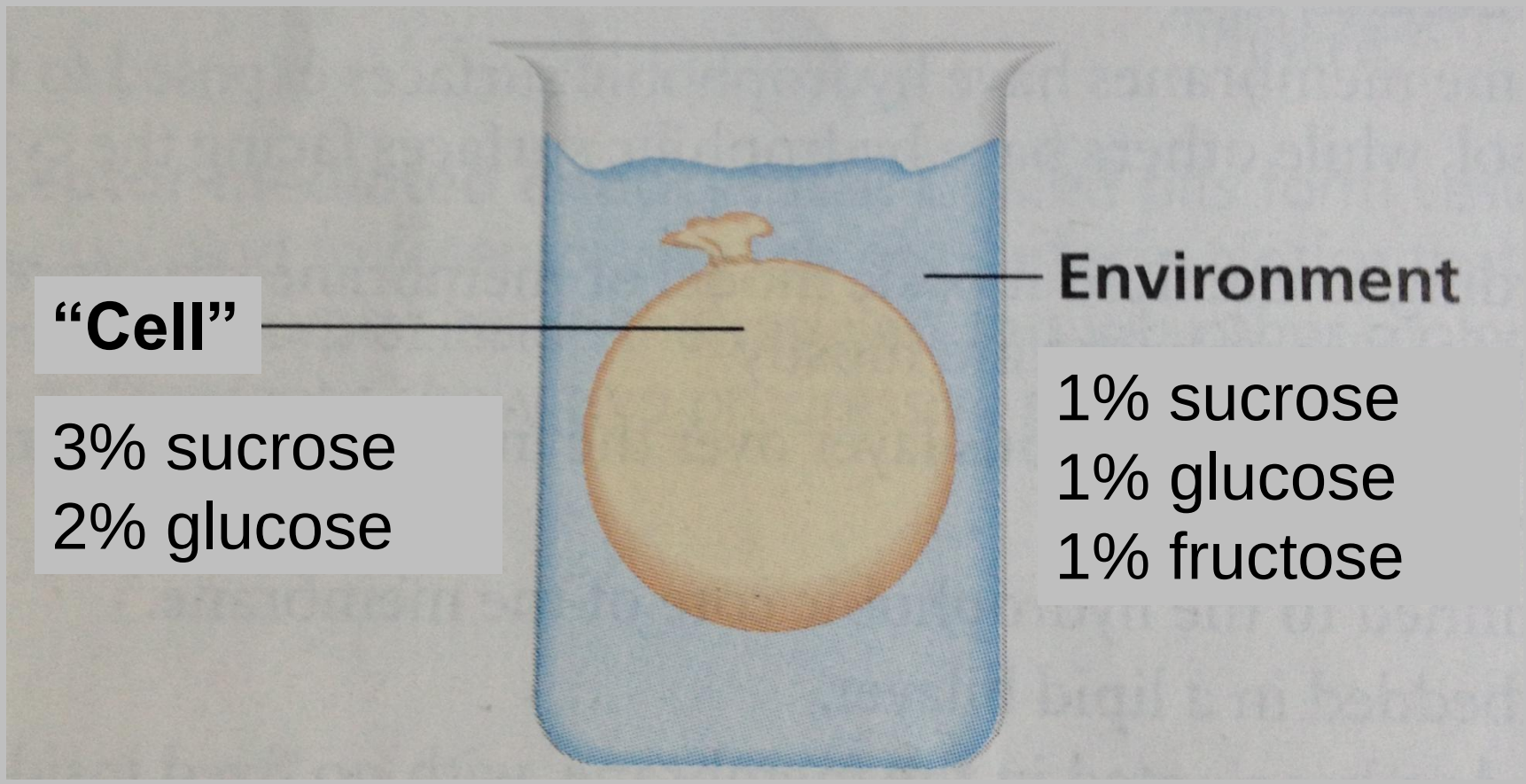
Which solute will move into the "cell"? **fructose**

Which solute will move out of the "cell"? **glucose**

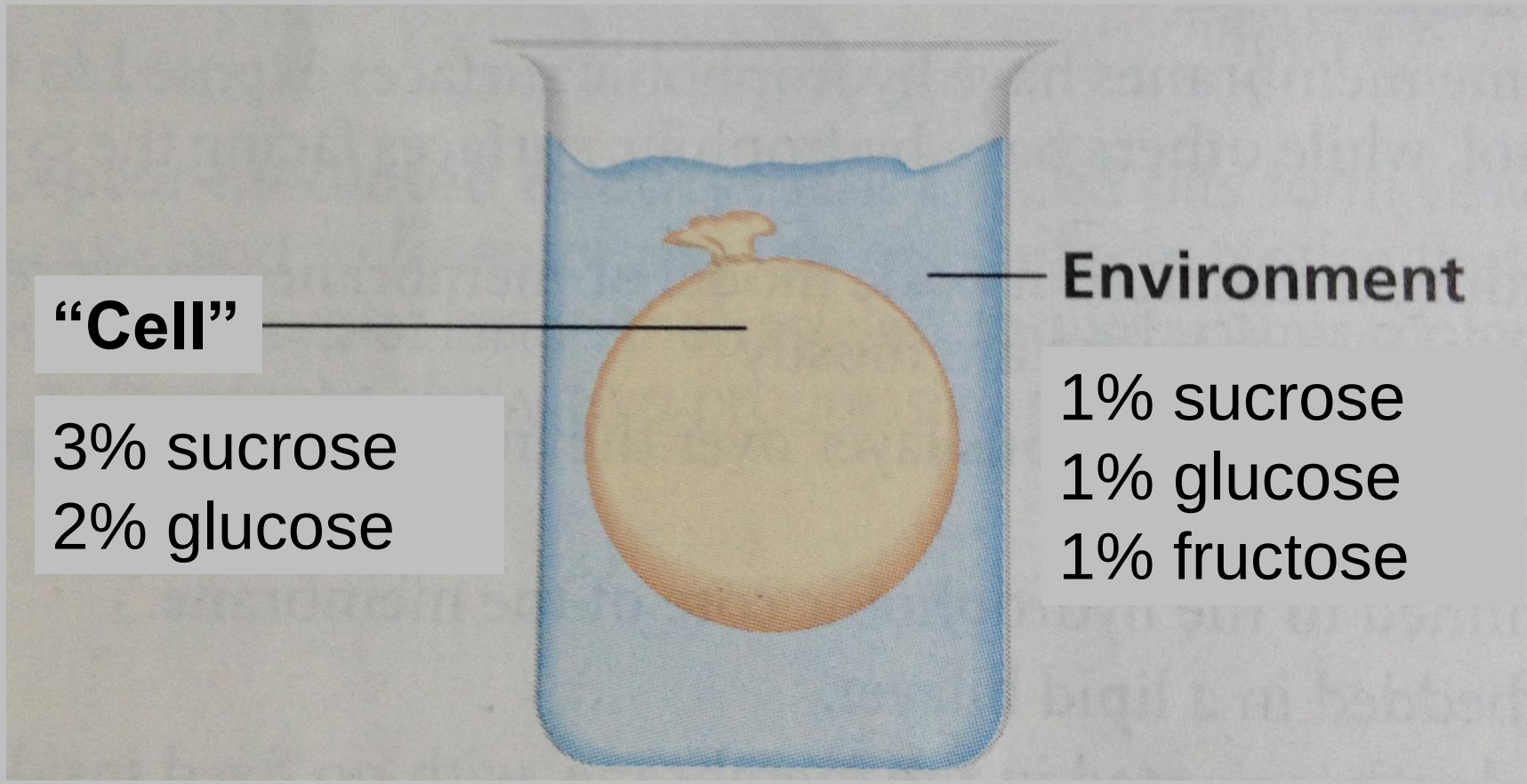


NOTE: The membrane is <u>not</u> permeable to big molecules.

In which direction will there be a net movement of water molecules? **Into the cell**

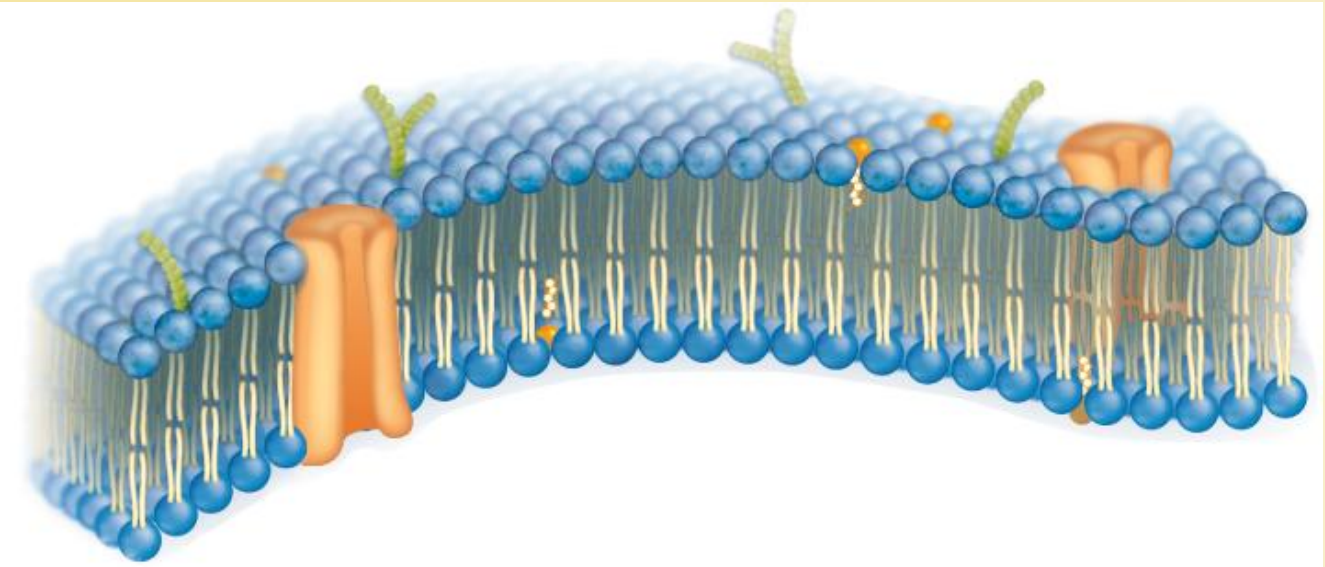


Which solution (the cell contents or the environment) is hypertonic to the other? **Cell contents**



NOTE: The membrane is <u>not</u> permeable to big molecules.

Identify the structure represented by this image.



Answer: plasma membrane and phospholipid bilayer

Chapter Assessment Questions

CheckPoint

_____ is the net movement of particles from an area where there are many particles of the substance to an area where there are fewer particles of the substance.

A. Diffusion
B. Endocytosis
C. Exocytosis
D. Equilibrium

Standardized Test Practice

CheckPoint

What part of the plasma membrane makes it difficult for water-soluble substances to move freely into and out of the cell?

A. membrane proteins

B. transport proteins

C. the nonpolar tails in the middle of the plasma membrane

D. the polar heads facing the inside and outside of the cell

Standardized Test Practice

CheckPoint

Why are the carrier proteins that move substances across a plasma membrane from a region of higher concentration to a region of lower concentration called pumps?

Standardized Test Practice

CheckPoint

A. They require energy to move substances against a concentration gradient.

B. They open and close to allow substances to diffuse across the plasma membrane.

C. They help with the osmosis of water through the plasma membrane.

D. They pump water into the cell, causing the pressure within the cell to increase.

Animation

Concepts In MOtion

- Plasma Membrane
- Visualizing Plant and Animal Cell Structures
- Diffusion, Channel Proteins, and Carrier Proteins
- Isotonic, Hypotonic, and Hypertonic Solutions
- Sodium-Potassium Pump