Warm-up: write the questions and answers

1. Describe how the cell membrane helps maintain homeostasis?
2. What is the purpose of carbohydrates on the cell membrane?
3. How is the cell membrane selectively permeable?
4. What is the function of a transport protein?

Warm-up: Answers

1. Describe how the cell membrane helps maintain homeostasis?
   - Controls what goes into and leaves the cell (i.e. controls the environment)
2. What is the purpose of carbohydrates on the cell membrane? Identifiers
3. How is the cell membrane selectively permeable? Only lets certain (small, uncharged) molecules in and out
4. What is the function of a transport protein?
   - Help large molecules get into or out of the cell

Exit Ticket from yesterday…

Movement Across a Cell Membrane

- Regulate movement of liquid on one side of the membrane to the liquid on the other side
- Substances naturally move from **higher to lower concentrations**

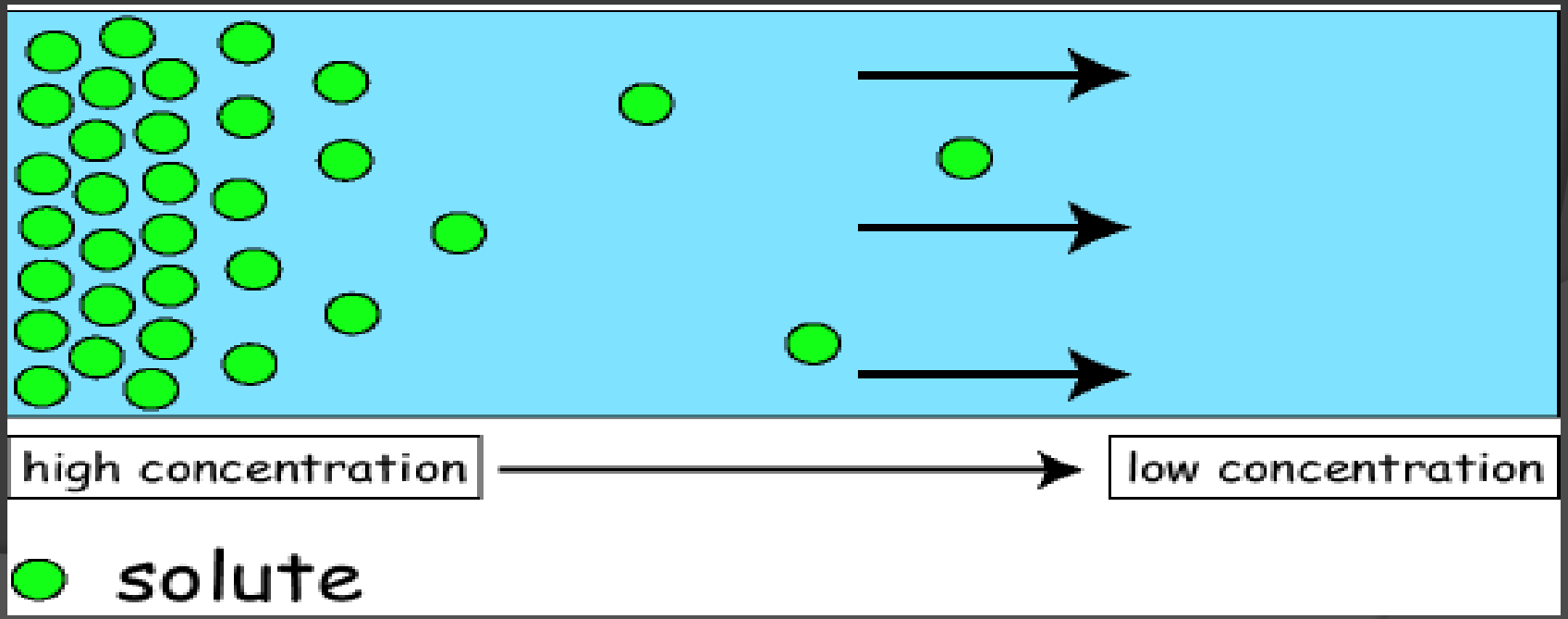
$$\textbf{Concentration} = \frac{\textbf{mass of solute (substance being dissolved)}}{\textbf{volume of solvent (substance doing the dissolving)}}$$

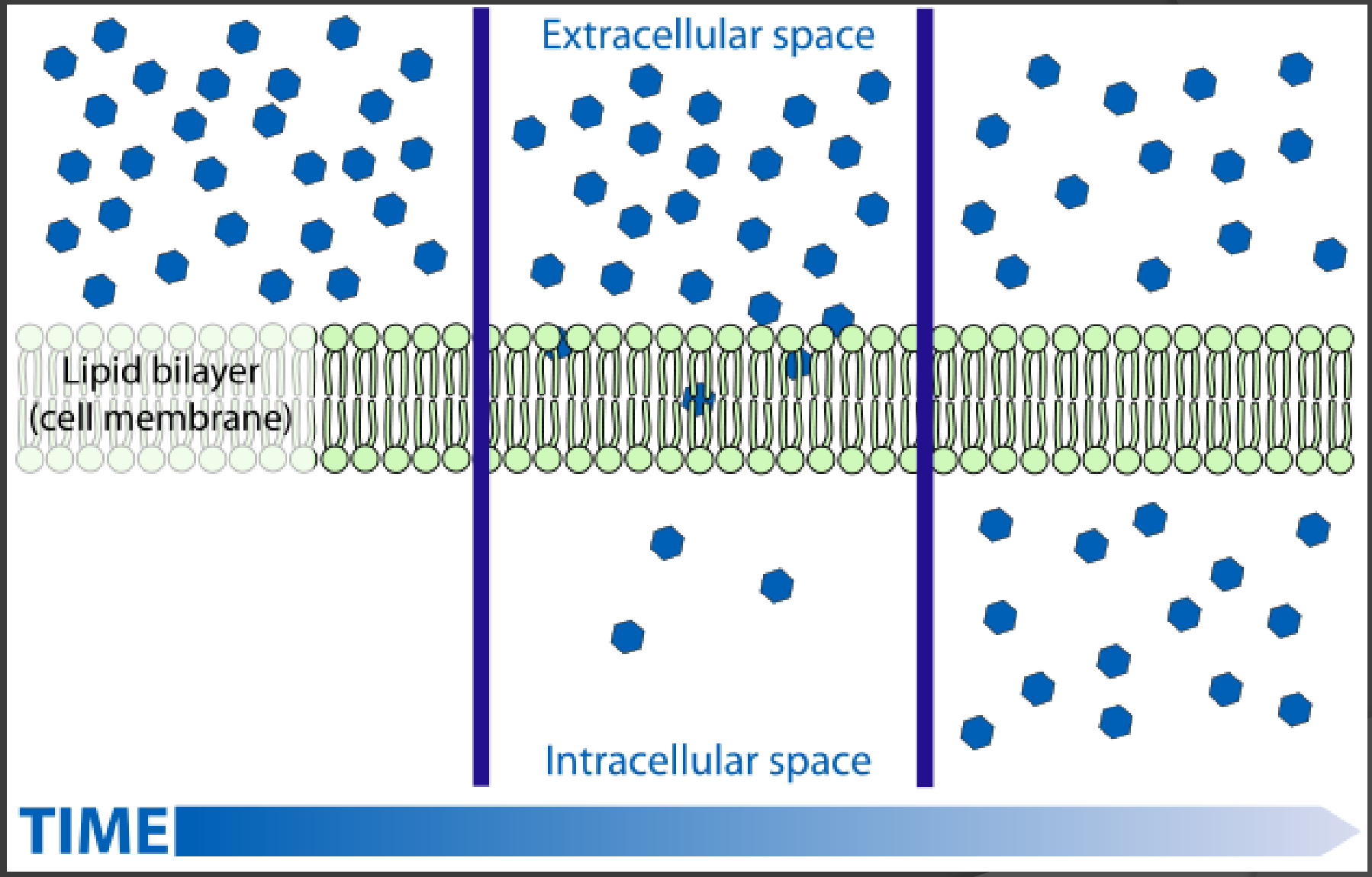
Two Types of Movement:

Passive Transport	Active Transport
Does NOT require energy (ATP)	Requires energy (ATP)
Types: 1. Simple Diffusion 2. Osmosis - water 3. Facilitated Diffusion – uses protein channel	Types: 1. Pumps 2. Endocytosis 3. Exocytosis
Moves from **HIGH** to **LOW** concentrations (with/along/down concentration gradient)	Moves from **LOW** to **HIGH** concentrations (against concentration gradient)

Passive Transport: Diffusion

- Particles move constantly, collide, and spread out randomly
- Move from areas of HIGHER concentration to areas of LOWER concentration

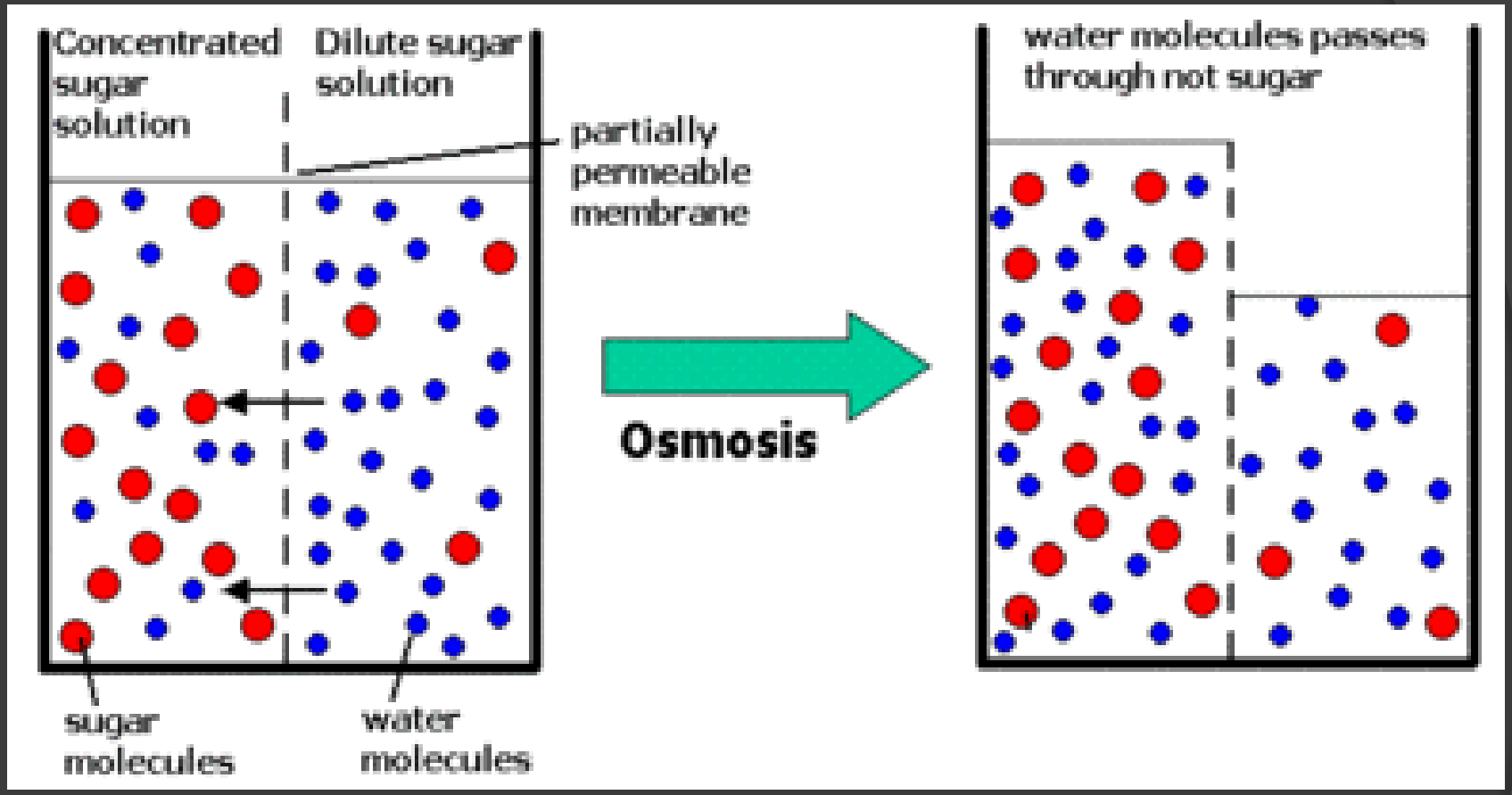




EQUILIBRIUM

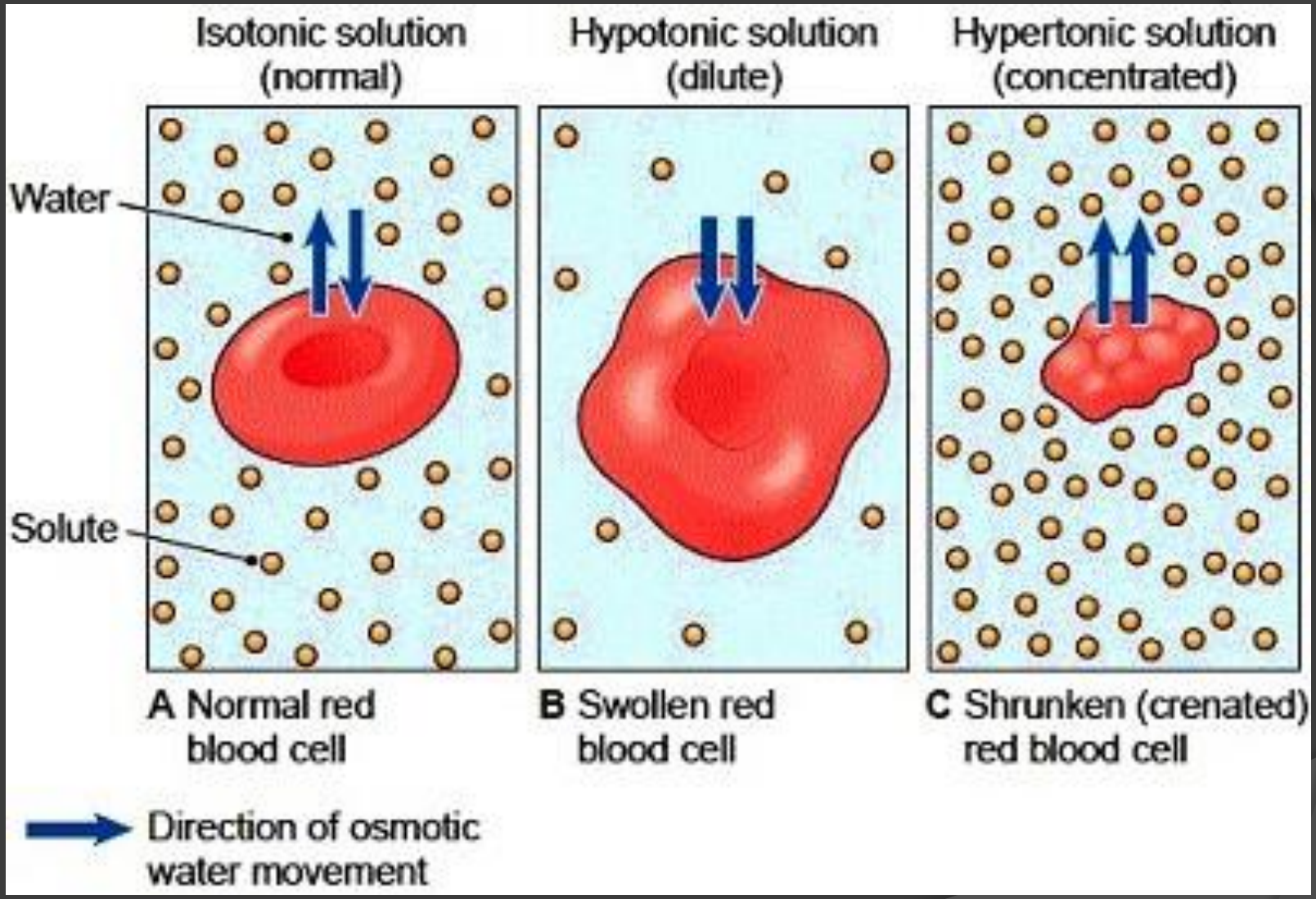
Passive Transport: Osmosis

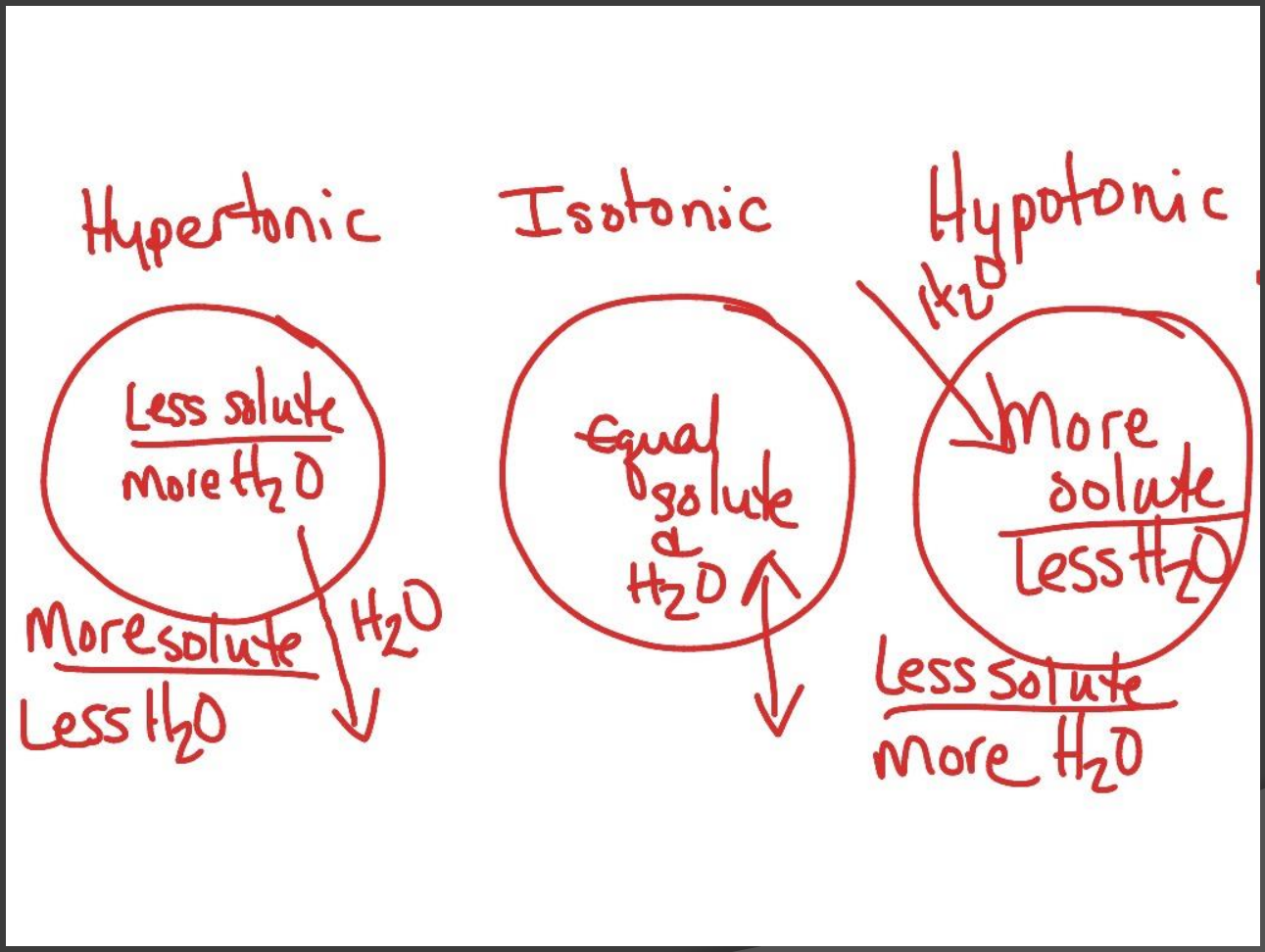
- Diffusion of water across a selectively permeable membrane
- Remember – water passes freely across the membrane


Concentrated sugar solution
Dilute sugar solution
partially permeable membrane
Osmosis
water molecules passes through not sugar
sugar molecules
water molecules

Effects of Osmosis on a Cell

- Isotonic – concentration of solutes is the same inside and outside of the cell
- Hypertonic – solution has a higher solute concentration than in the cell
- Hypotonic – solution has a lower solute concentration than in the cell

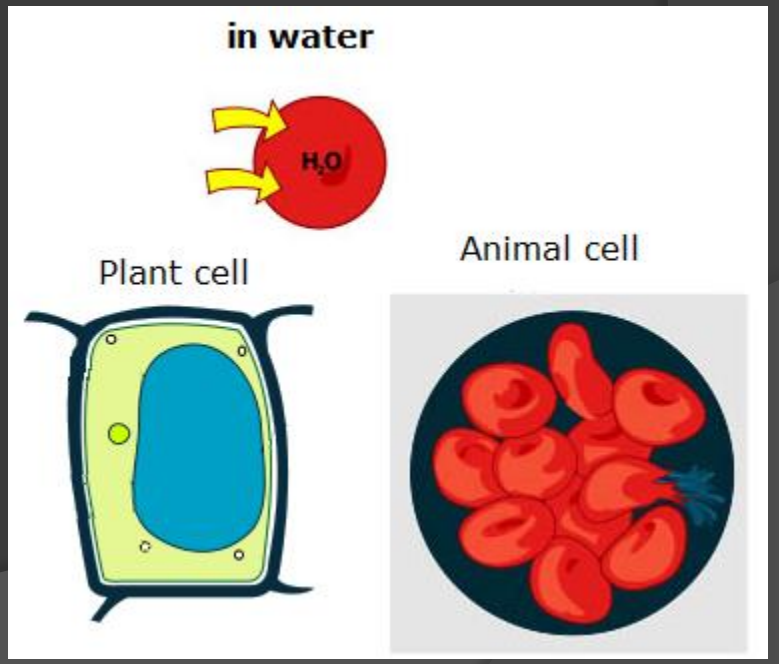

Isotonic solution
(normal)
Hypotonic solution
(dilute)
Hypertonic solution
(concentrated)
Water
Solute
A Normal red blood cell
B Swollen red blood cell
C Shrunken (crenated) red blood cell
Direction of osmotic water movement

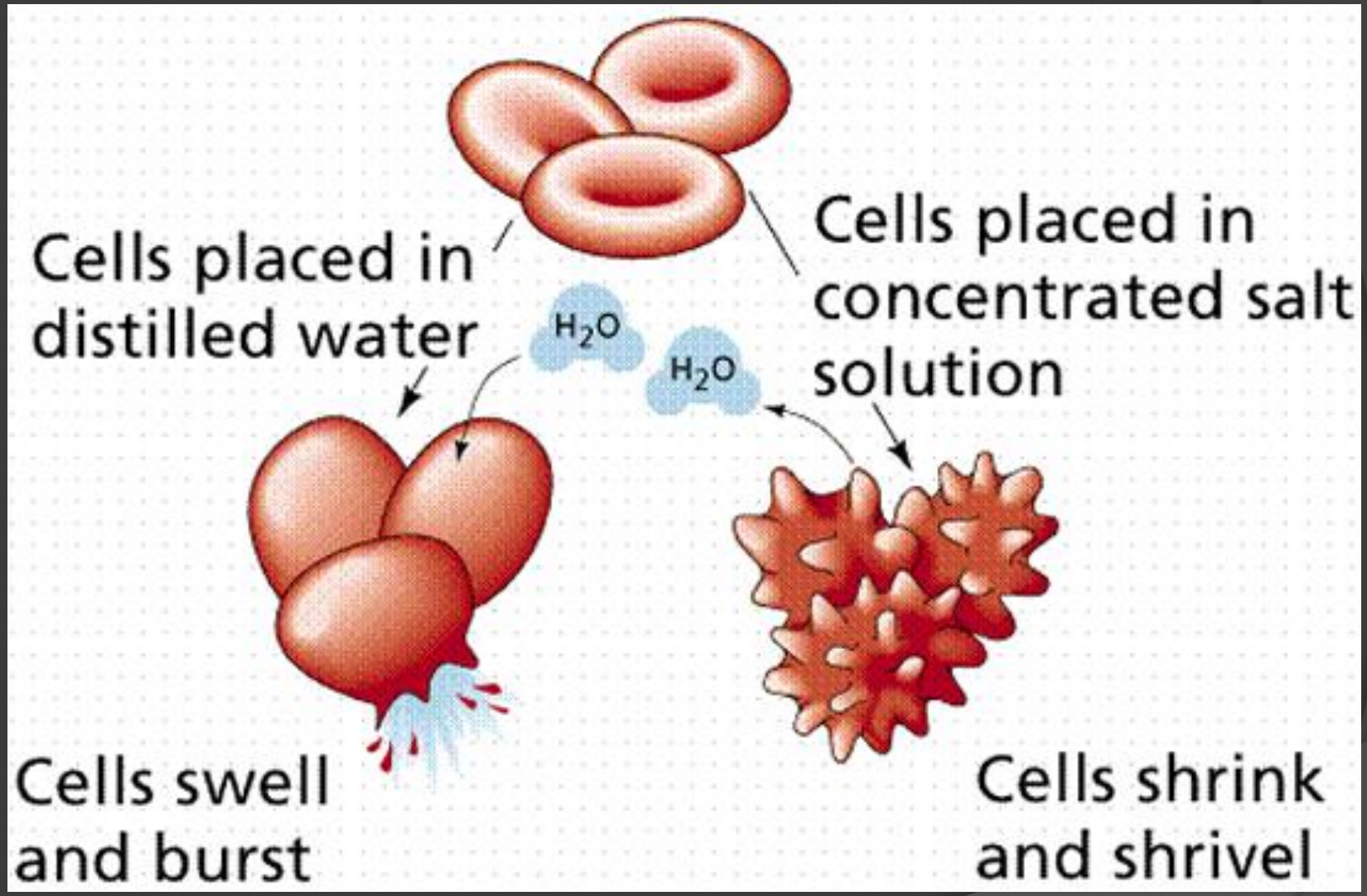

Hypertonic
Less solute
more H_2O
More solute
Less H_2O
H_2O
Isotonic
Equal solute & H_2O
Hypotonic
H_2O
More solute
Less H_2O
Less solute
More H_2O

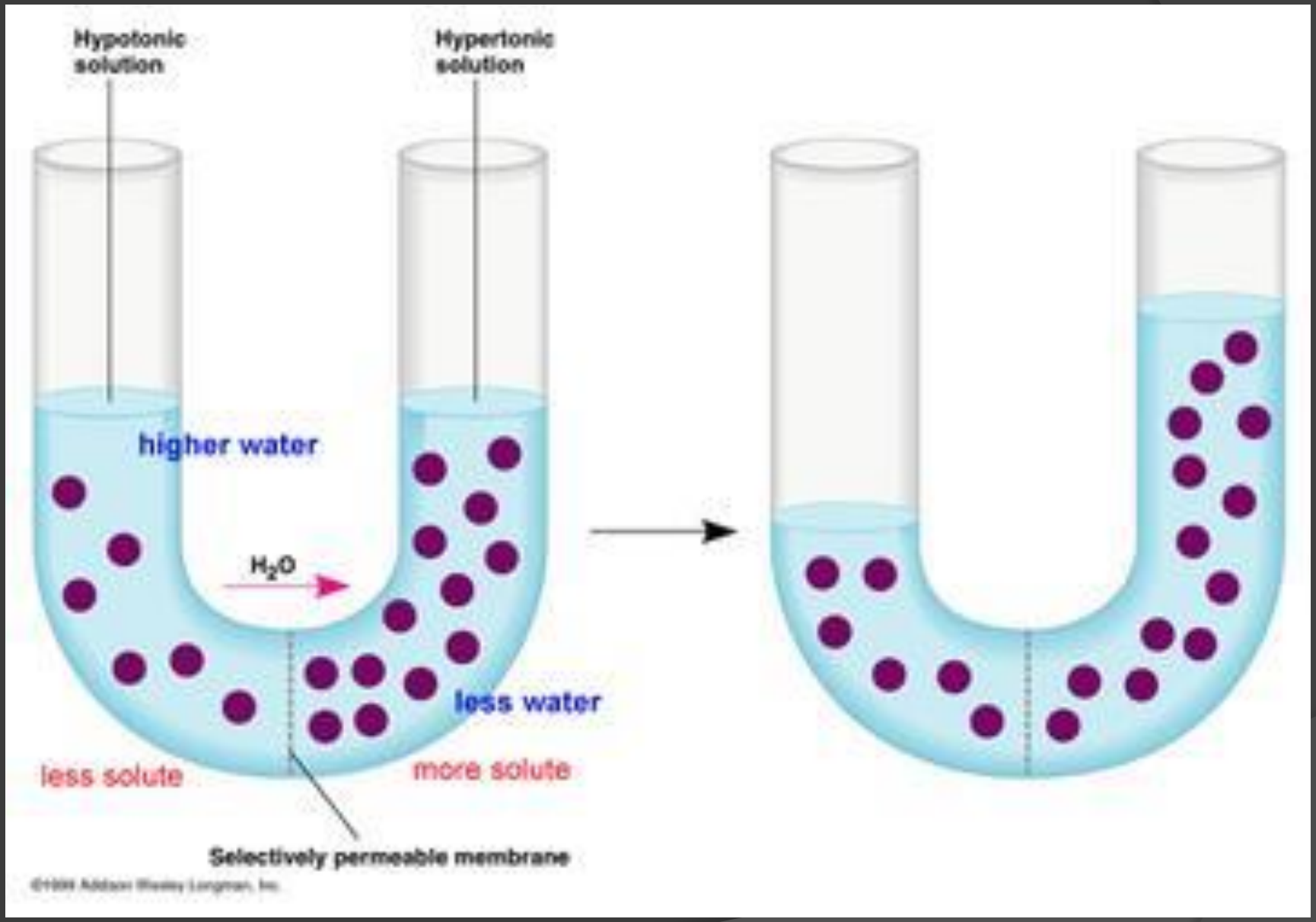
Osmotic Pressure

- Must balance intake and loss of water in order to survive
- Osmosis exerts pressure on hypertonic side of membrane
  - Cell is filled with salts, sugars, proteins
    - So, will be hypotonic to fresh water

  = net movement of water into a cell




Cells placed in distilled water
Cells placed in concentrated salt solution
H_2O
H_2O
Cells swell and burst
Cells shrink and shrivel


Hypotonic solution
Hypertonic solution
higher water
H_2O
less water
less solute
more solute
Selectively permeable membrane

Cell Membrane Poster

- With a partner
- Must include:
  - Title
  - Lipids, surface proteins, transport proteins, and carbs (all in the correct location)
  - Function of cell membrane
  - Function of each part of the membrane
  - Your names!