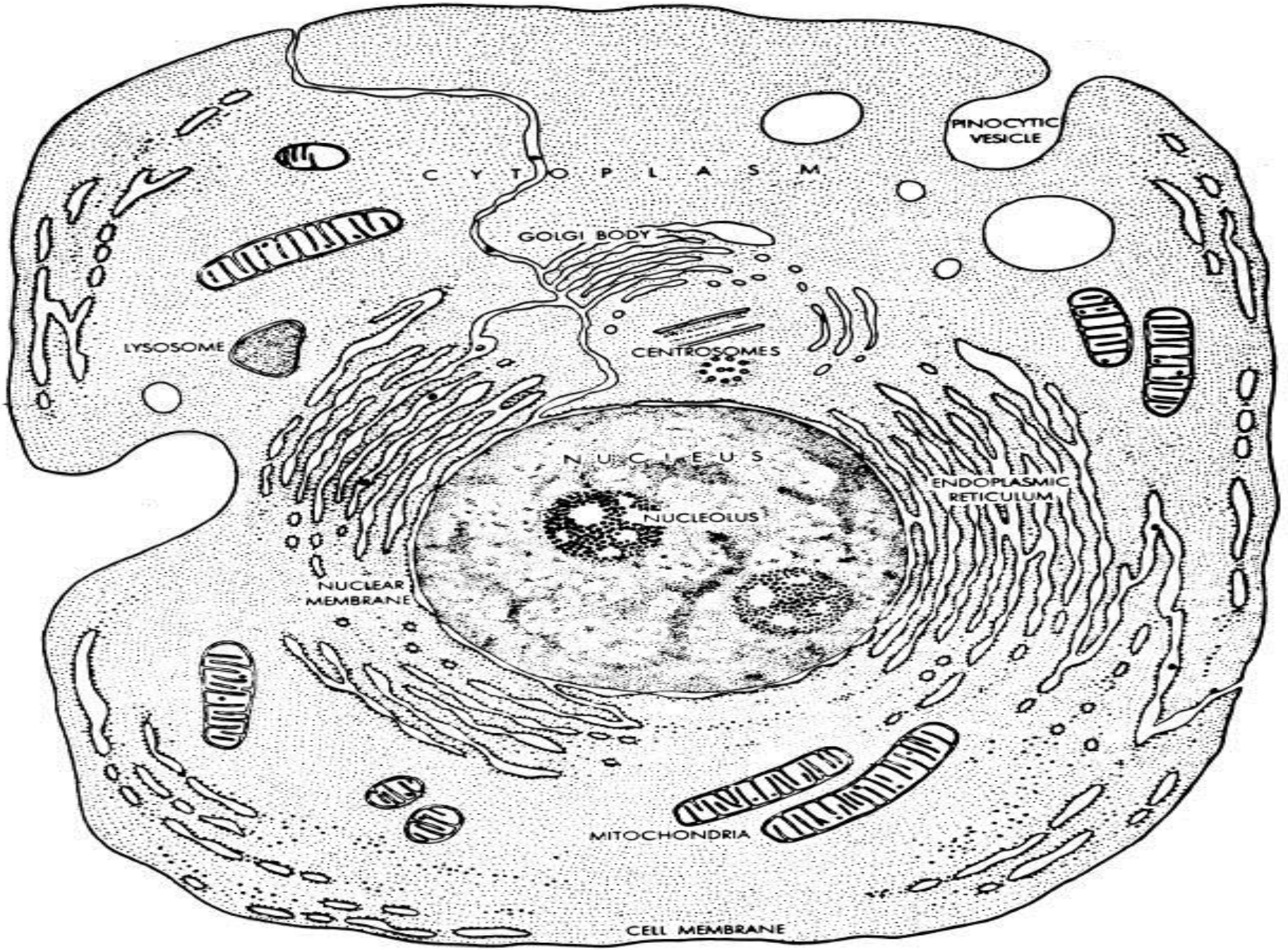
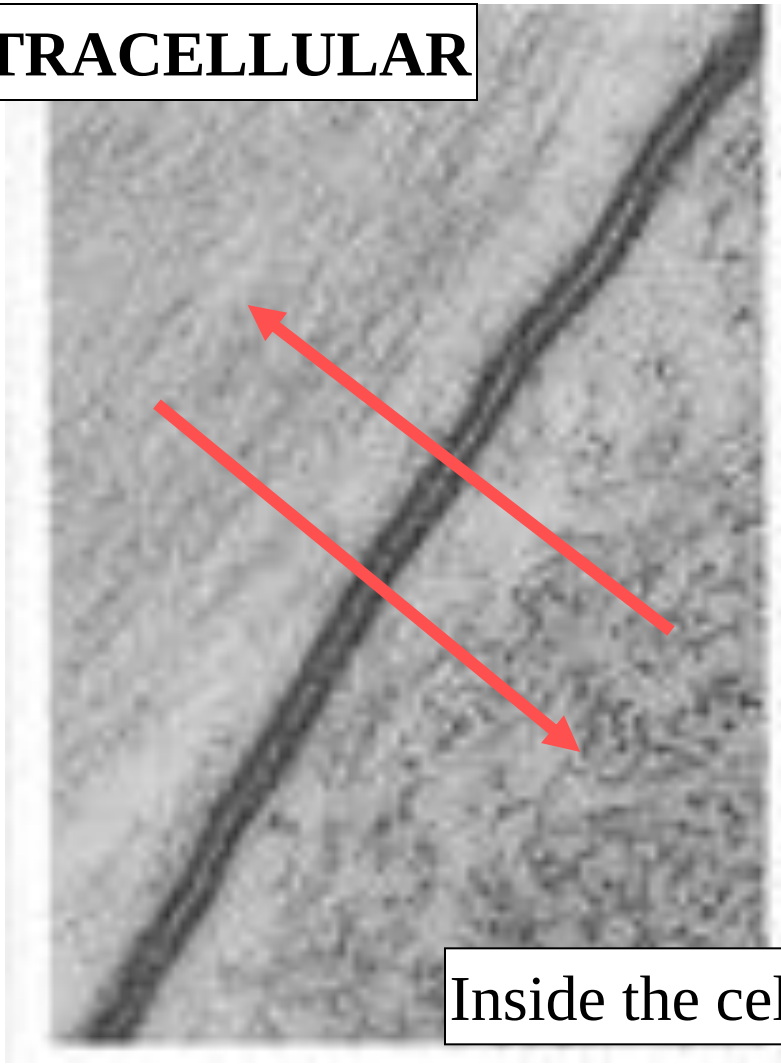
Membranes

Metabolism

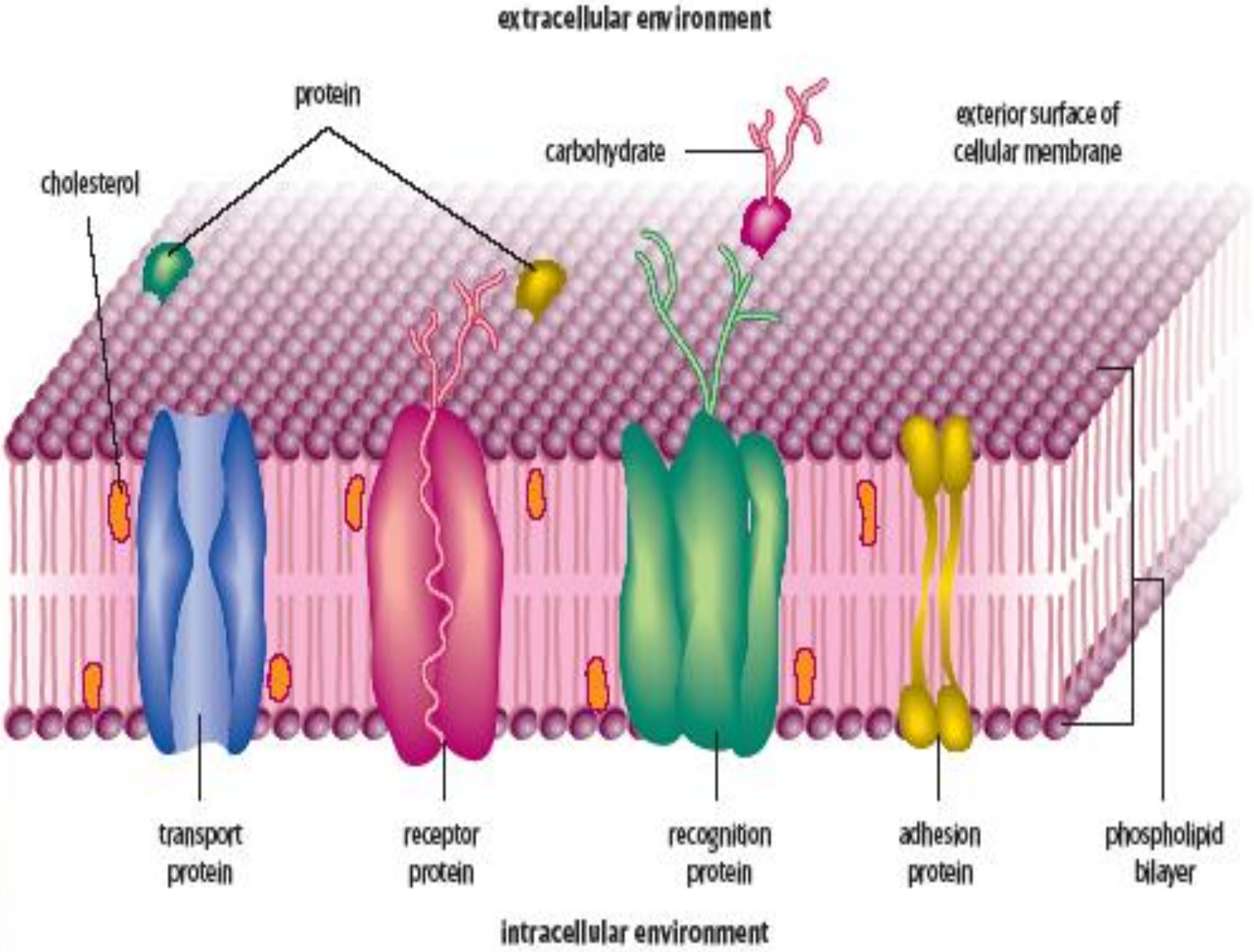
- Chemical reactions inside cells
- MUST happen for the cell to be alive
- Anabolic (building up) …… endergonic (phs)
- Catabolic (breaking down) ….. exergonic (resp)
- Reactants outside the cell **must** move in
- Products not used by the cell **must** move out

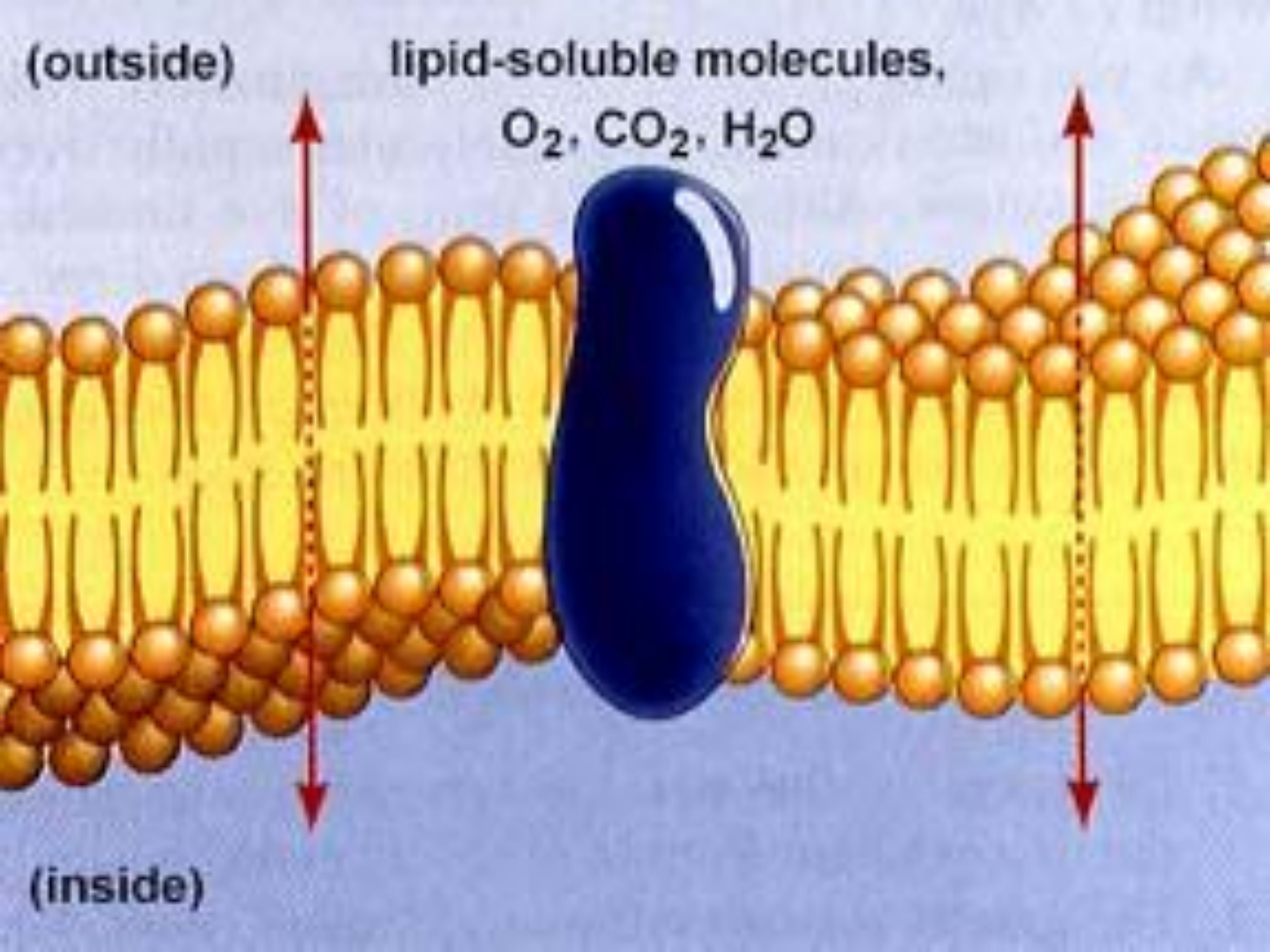

PINOCYTIC VESICLE
C Y T O P L A S M
GOLGI BODY
LYSOSOME
CENTROSOMES
N U C L E U S
NUCLEOLUS
ENDOPLASMIC RETICULUM
NUCLEAR MEMBRANE
MITOCHONDRIA
CELL MEMBRANE

Outside the cell.**EXTRACELLULAR**



Inside the cell.**INTRACELLULAR**


extracellular environment
protein
carbohydrate
exterior surface of cellular membrane
cholesterol
transport protein
receptor protein
recognition protein
adhesion protein
phospholipid bilayer
intracellular environment

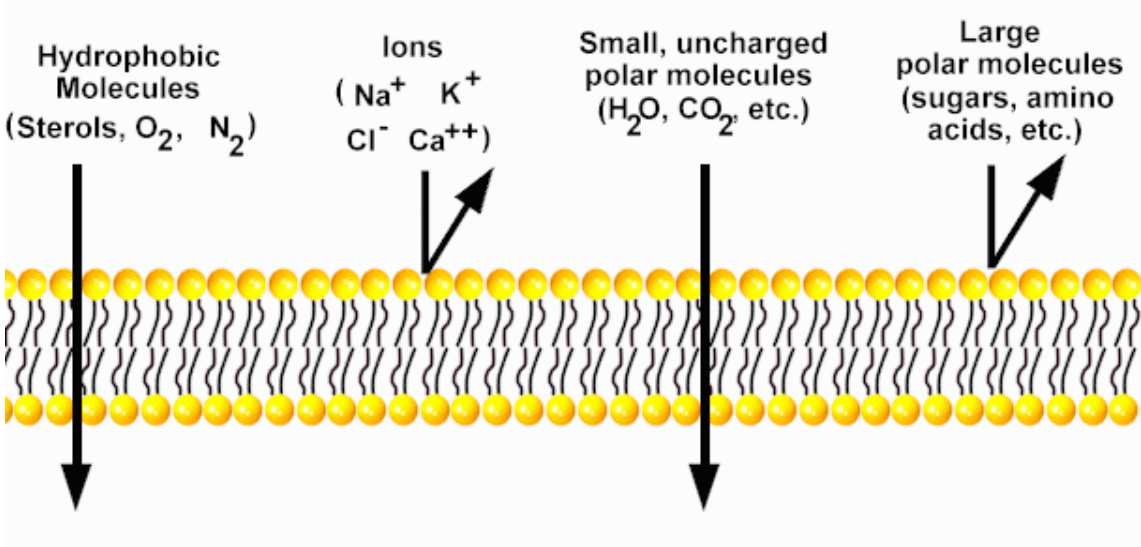

(outside)
lipid-soluble molecules,
O_2, CO_2, H_2O
(inside)

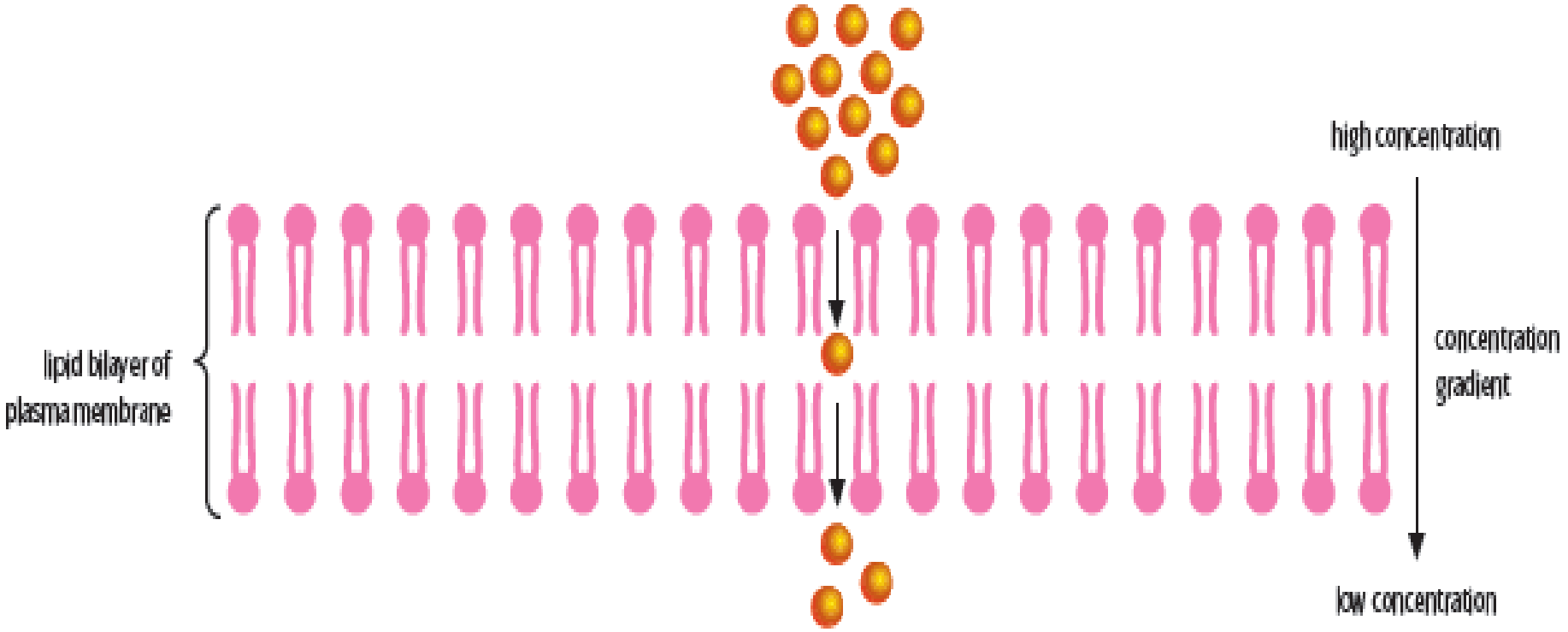
Movement Across Membranes

- Diffusion
- Osmosis
- Facilitated diffusion
- Active transport
- Endocytosis
- Exocytosis

The importance of Diffusion

- Movement of chemicals from a high to low concentration
- Diffusion fast and effective across microscopic distance
- Virtually all living processes involve diffusion
- Cell membranes control diffusion and allow for life chemical reactions to take place
- Diffusion lets tissues do job and permits organ systems to function
- Examples:
  - Oxygen in circulatory system
  - Food in digestive system
  - Calcium in muscular function
  - Nerve impulses

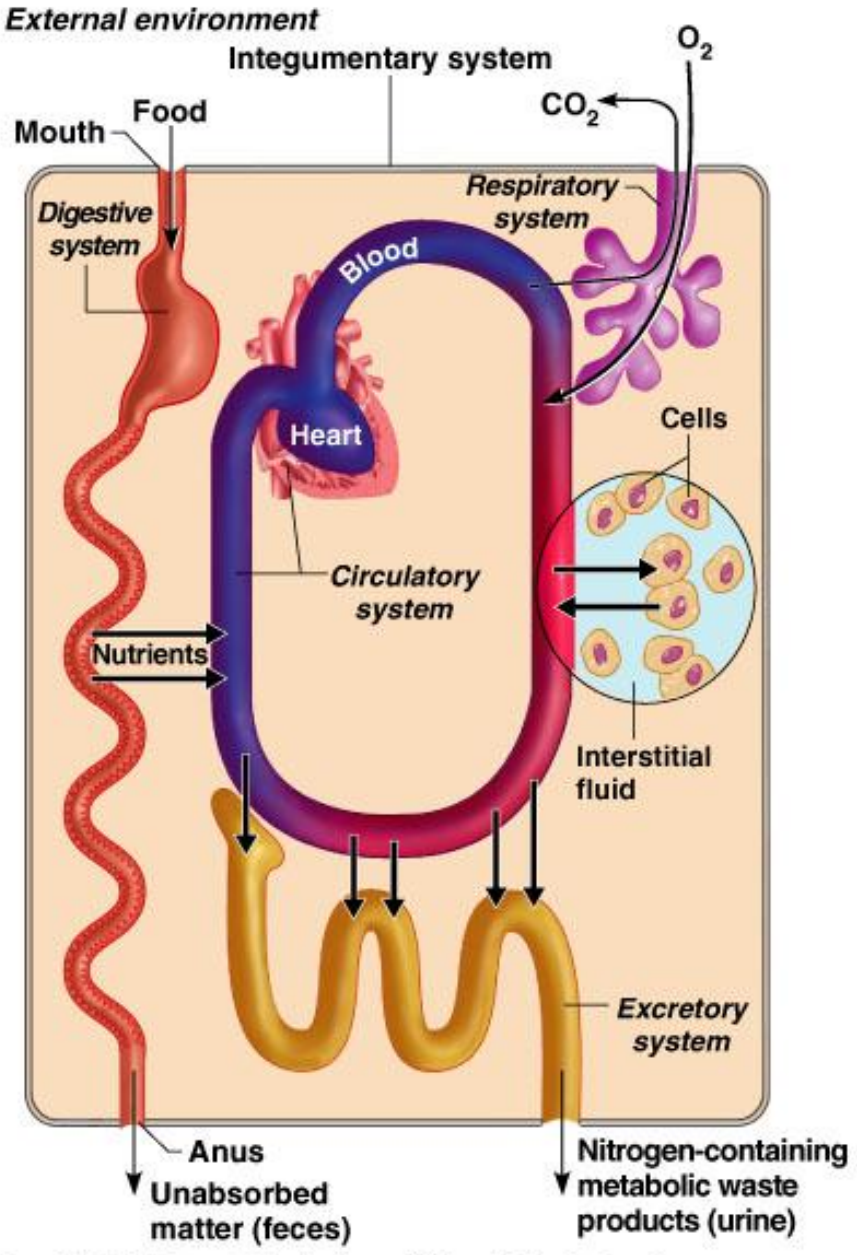



high concentration
lipid bilayer of plasma membrane
concentration gradient
low concentration

Body Systems and Diffusion

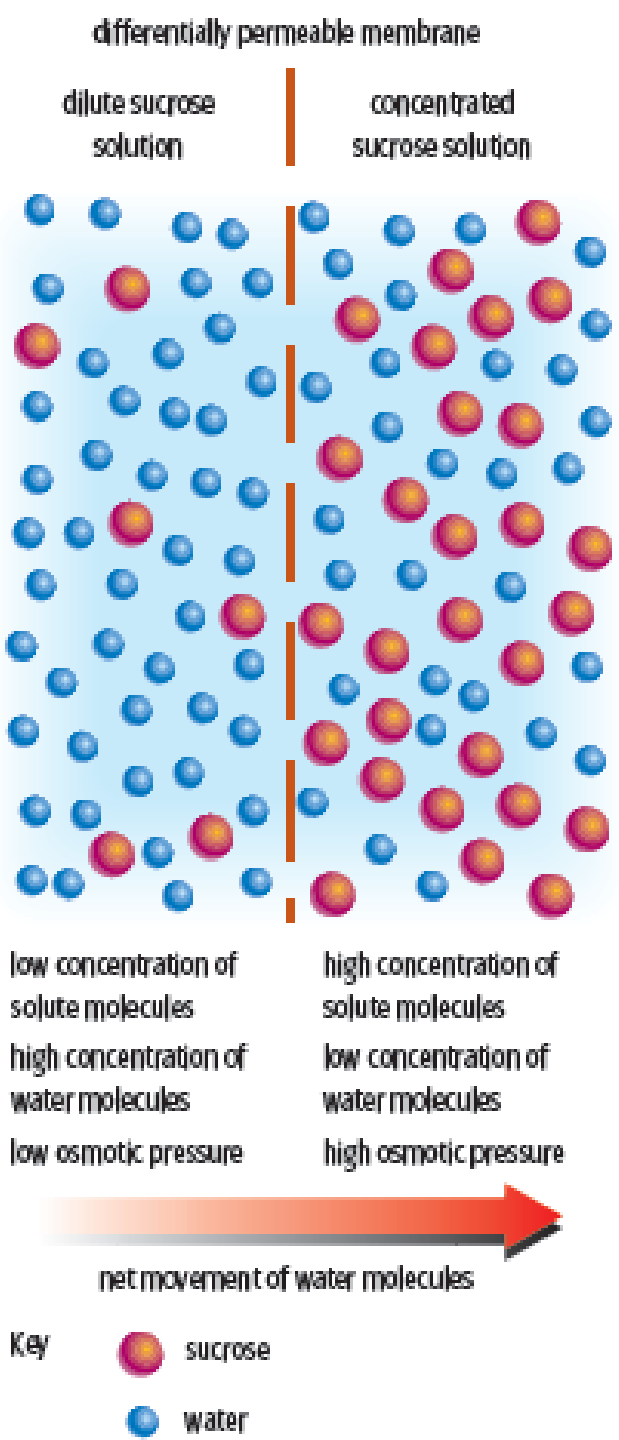
<u>Understand path through body of:</u>

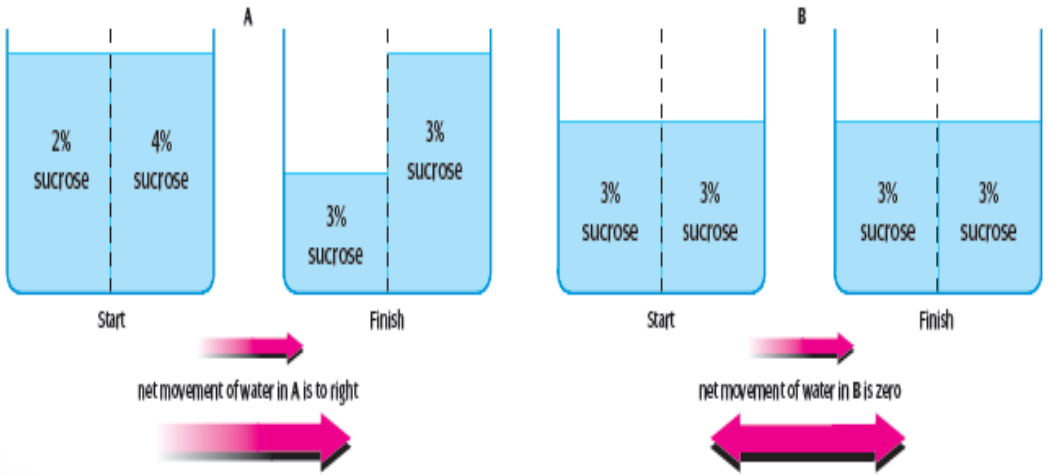
- Food/Nutrients (glucose)
- Oxygen
- Carbon Dioxide
- Nitrogen

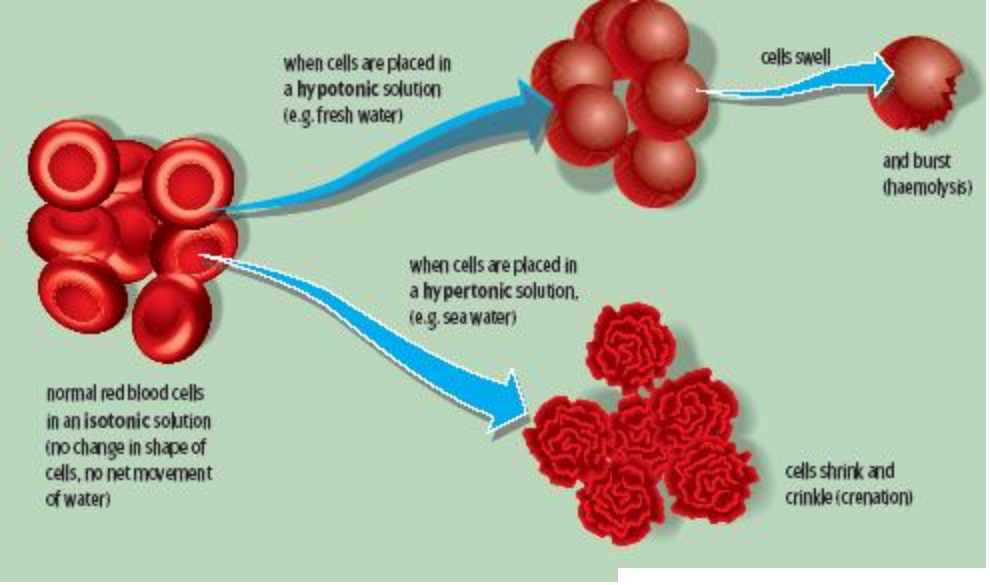


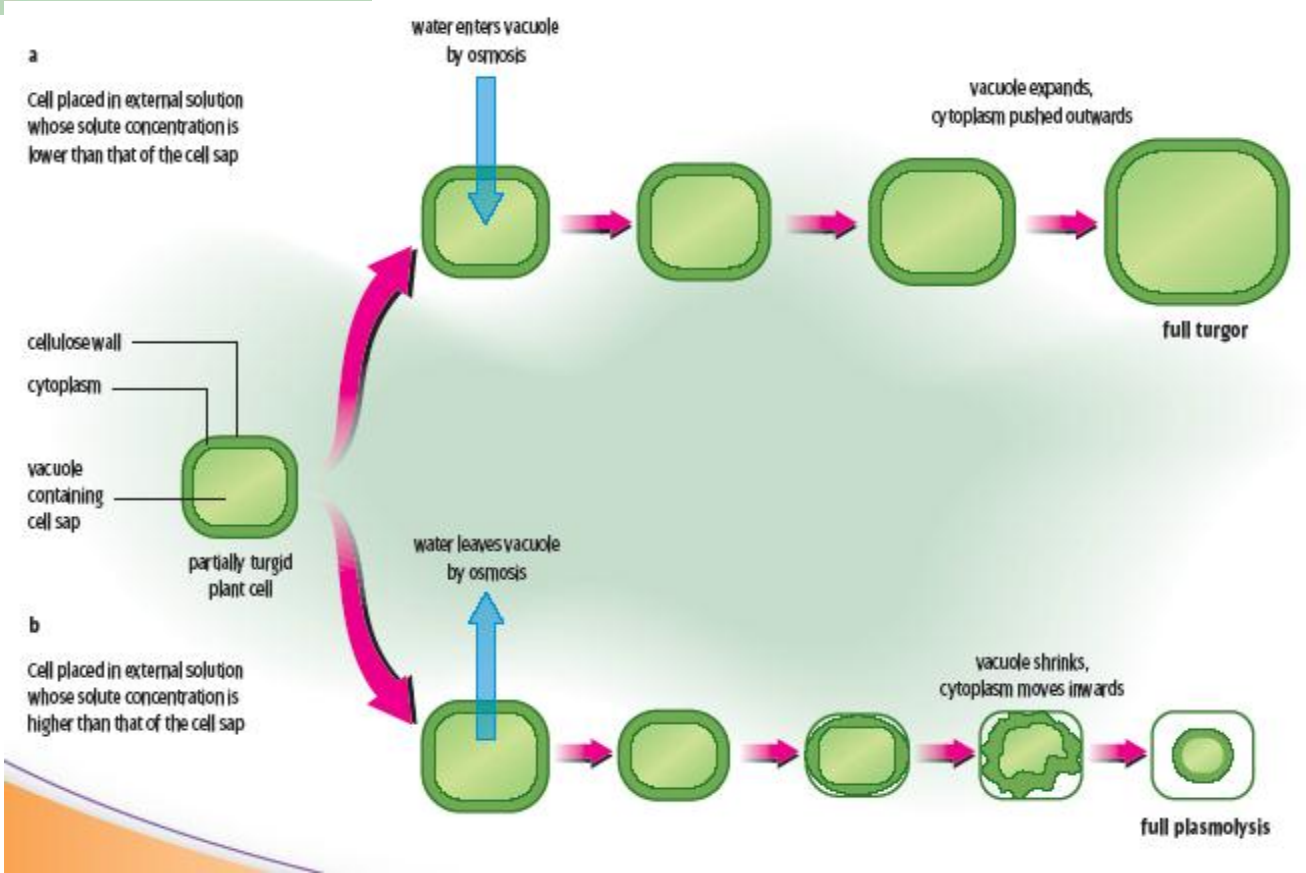
Osmosis

- Movement of water
- Across a semi permeable membrane
- From a low solute concentration
- To a high solute concentration

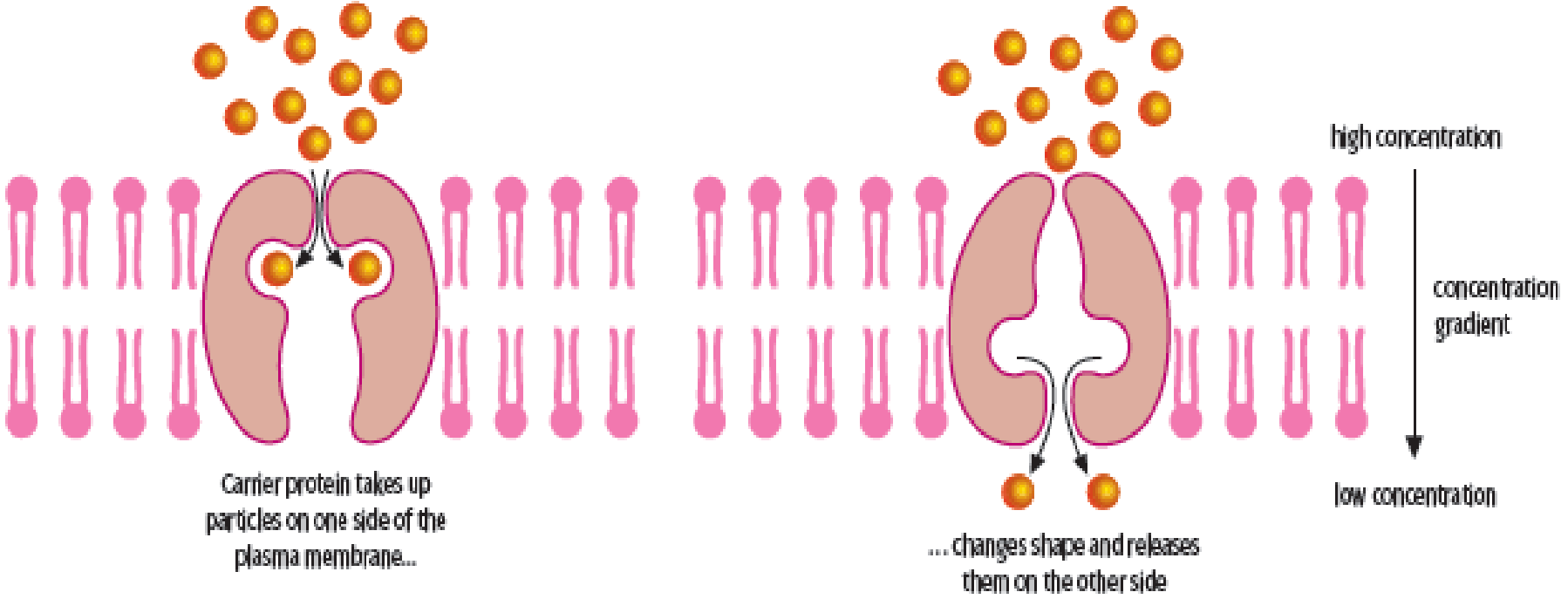




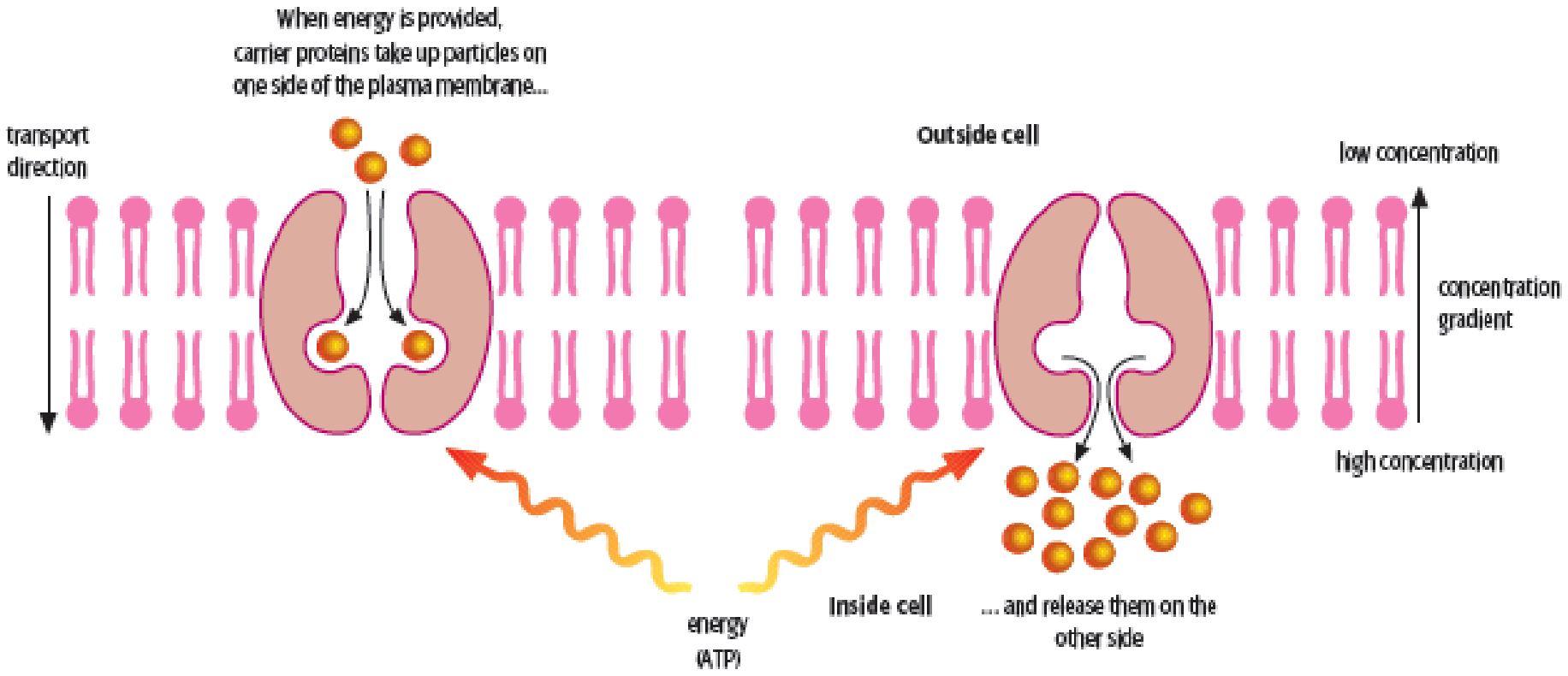

when cells are placed in a hypotonic solution (e.g. fresh water)
cells swell
and burst (haemolysis)
when cells are placed in a hypertonic solution, (e.g. sea water)
normal red blood cells in an isotonic solution (no change in shape of cells, no net movement of water)
cells shrink and crinkle (crenation)

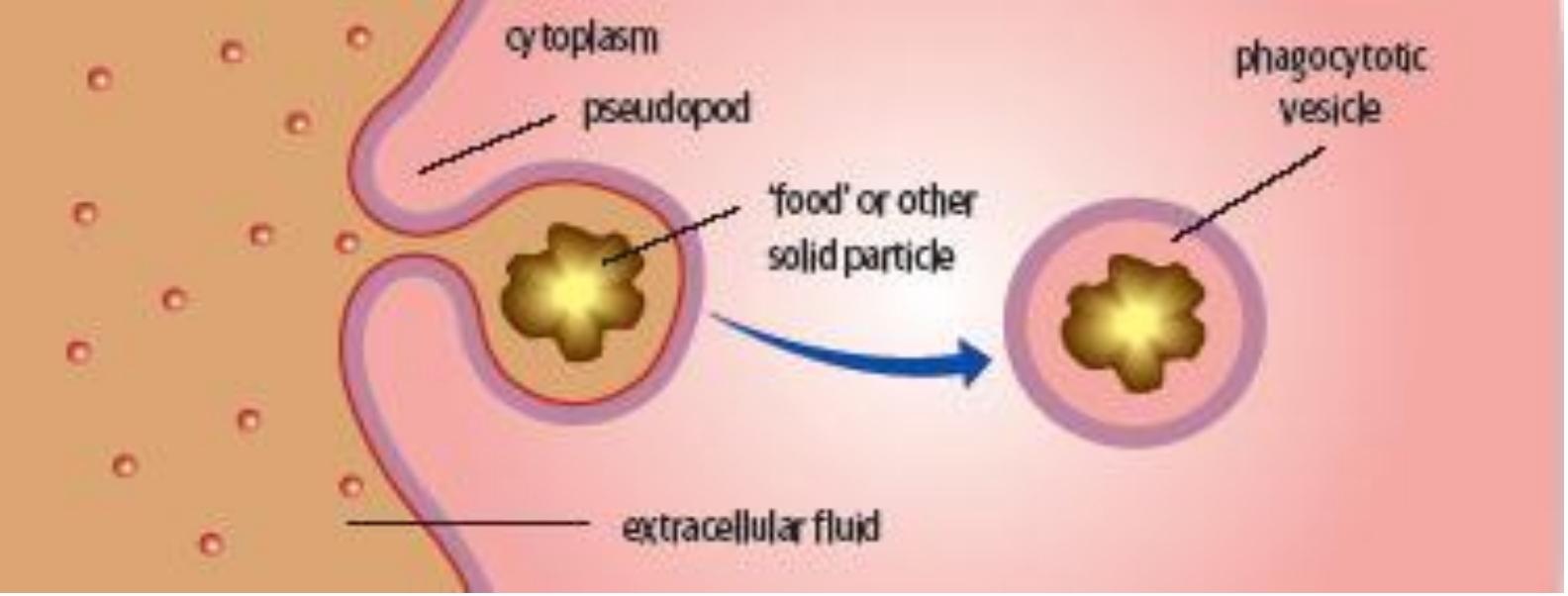

a
Cell placed in external solution whose solute concentration is lower than that of the cell sap
water enters vacuole by osmosis
vacuole expands, cytoplasm pushed outwards
full turgor
cellulose wall
cytoplasm
vacuole containing cell sap
partially turgid plant cell
b
Cell placed in external solution whose solute concentration is higher than that of the cell sap
water leaves vacuole by osmosis
vacuole shrinks, cytoplasm moves inwards
full plasmolysis

Facilitated Diffusion



Active transport





Endocytosis (into) and exocytosis (out of)