

Diffusion



(b) Diffusion of two solutes

© 2016 Pearson Education, Inc.



External environments can be <u>hypotonic</u>, <u>isotonic</u> or <u>hypertonic</u> to internal environments of cell



© 2016 Pearson Education, Inc



- 1. Which chamber has a lower water potential?
- 2. Which chamber has a lower solute potential?
- 3. In which direction will osmosis occur?
- 4. If one chamber has a Ψ of -2000 kPa, and the other -1000 kPa, which is the chamber that has the higher Ψ ?



Aquaporin: channel protein that allows

passage of H_2O



Glucose Transport Protein (carrier protein)

acilitated Diffusion







- Pump Na⁺ out, K⁺ into cell
- Nerve transmission

<u>**Cotransport</u>**: membrane protein enables "downhill" diffusion of one solute to drive "uphill" transport of other</u>

H ---- L gives off energy

Eg. sucrose-H⁺ cotransporter (sugar-loading in plants)



Passive vs. Active Transport

NN

- Little or no Energy
- High \rightarrow low concentrations
- DOWN the concentration gradient
- eg. diffusion, osmosis, facilitated diffusion (w/

transport protein)



- Requires Energy (ATP)
- Low \rightarrow high concentrations
- AGAINST the
 - concentration gradient
- eg. pumps, exo/ endocytosis





Osmoregulation

- Control solute & water balance
- **Contractile vacuole**: "bilge pump" forces out fresh water as it enters by osmosis
- Eg. paramecium caudatum freshwater protist



Bulk Transport

• Transport of proteins, polysaccharides, large molecules



Endocytosis: take in macromolecules and particulate matter, form new vesicles from plasma membrane cytosis: vesicles fuse with plasma membrane, secrete contents out of cell



© 2016 Pearson Education, Inc.

Cell Signaling

Animal cells communicate by:

- Direct contact (gap junctions)
- Secreting local regulators (growth factors, neurotransmitters)
- Long distance (hormones)



