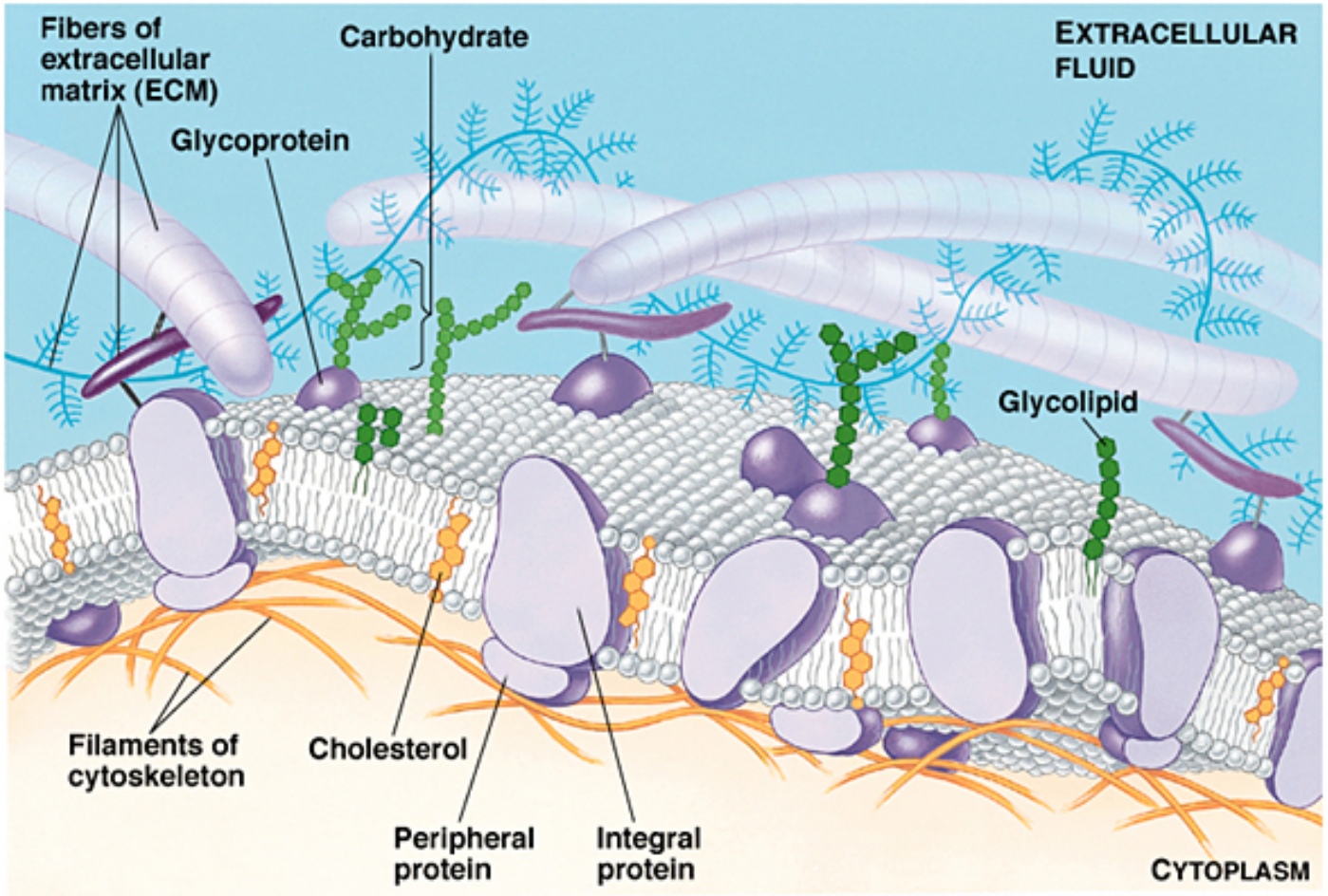
Lab 7
Biological Membranes and Diffusion

- Diffusion across a semi-permeable membrane
  - Demonstration of diffusion through a solid
- Effects of solution concentration on plant cells (red onion)
- Effect of solution concentration on animal cells (red blood cells)

- Cells constantly exchange materials with their surroundings
- All materials entering or leaving cells pass through the plasma membrane



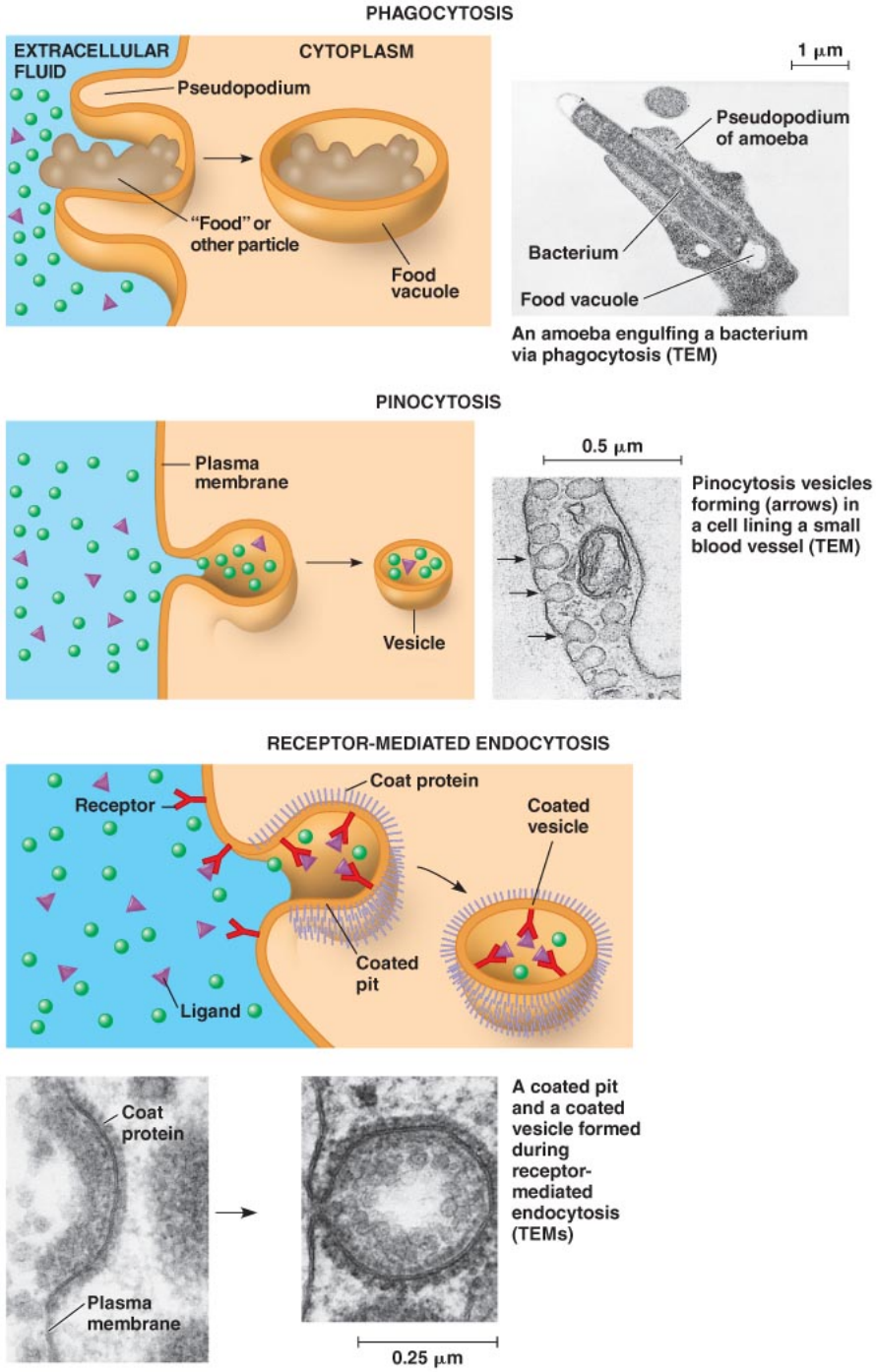
www.bio.miami.edu/dana/104/pmembrane.jpg

Bulk transport

- **Endocytosis & Exocytosis:** the process by which cells move large molecules across membranes
- Involves formation of vesicles or vacuoles
- Requires energy input on the part of the cell

Phagocytosis: large particles

Pinocytosis: small particles



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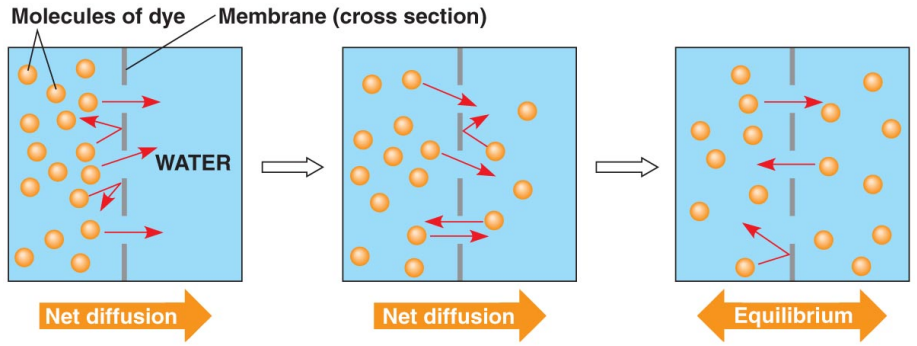
PASSIVE MECHANISMS

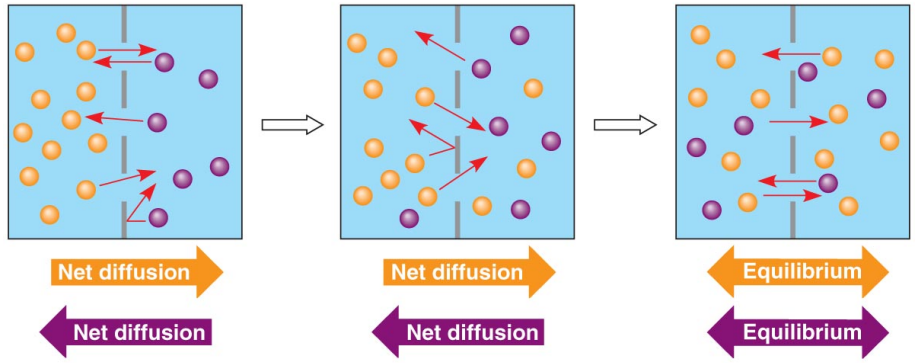
Require no energy input on the part of the cell

- **Diffusion:** movement of molecules or ions from an area of high concentration to an area of low concentration

- **Osmosis:** diffusion of water across a semi-permeable membrane.



(a) Diffusion of one solute



(b) Diffusion of two solutes

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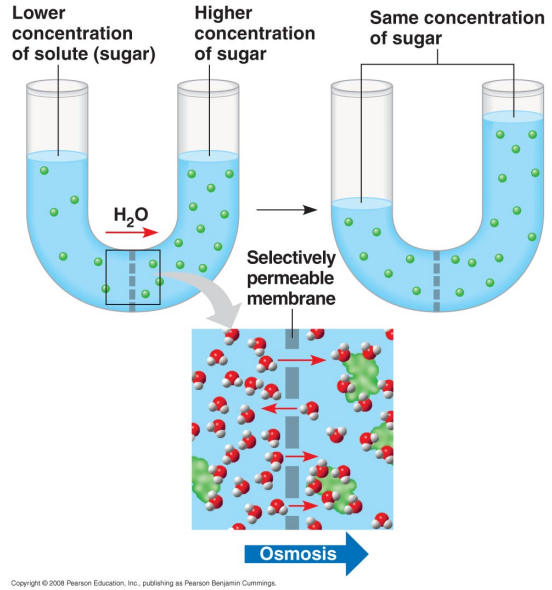

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PASSIVE MECHANISMS…

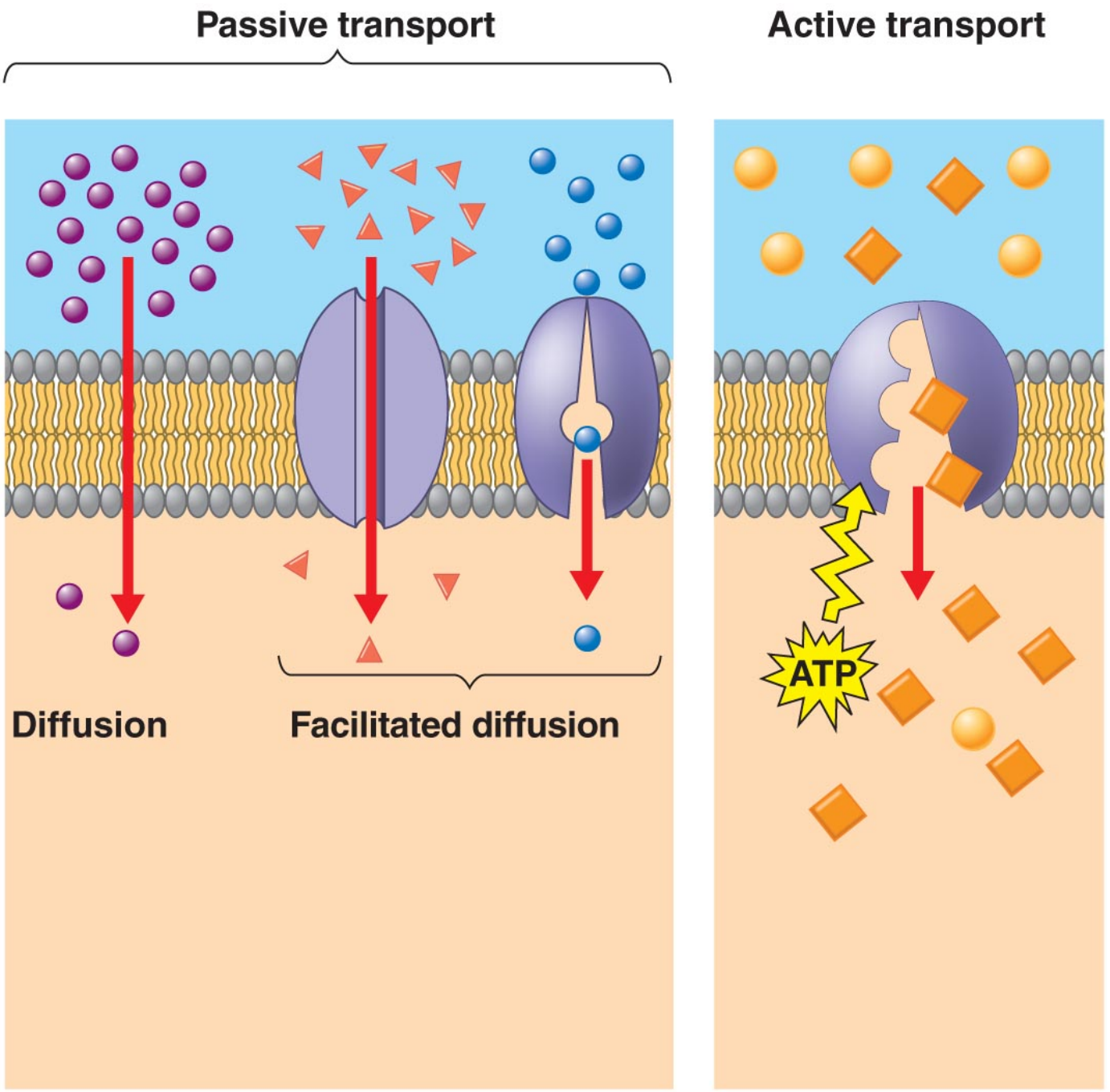
- **Facilitated transport (carrier-facilitated diffusion)** molecules can diffuse into or out of the cell but only if accompanied by a carrier molecule.

ACTIVE MECHANISM

Requires an energy input on the part of the cell

- **Active transport**

  Materials are moved or pumped against the concentration gradient, that is, from an area of low concentration to an area of higher concentration.



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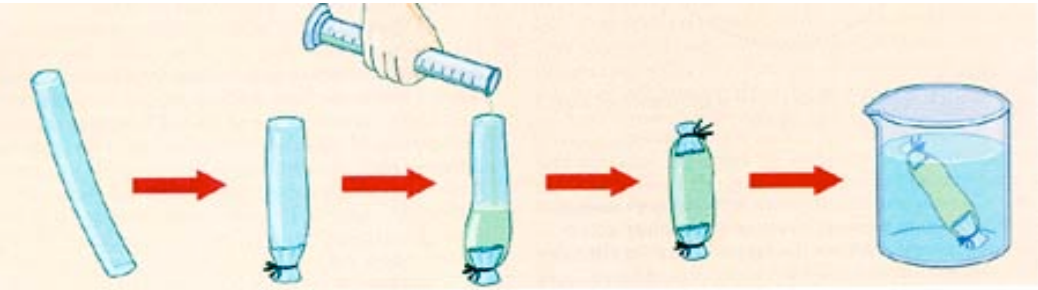
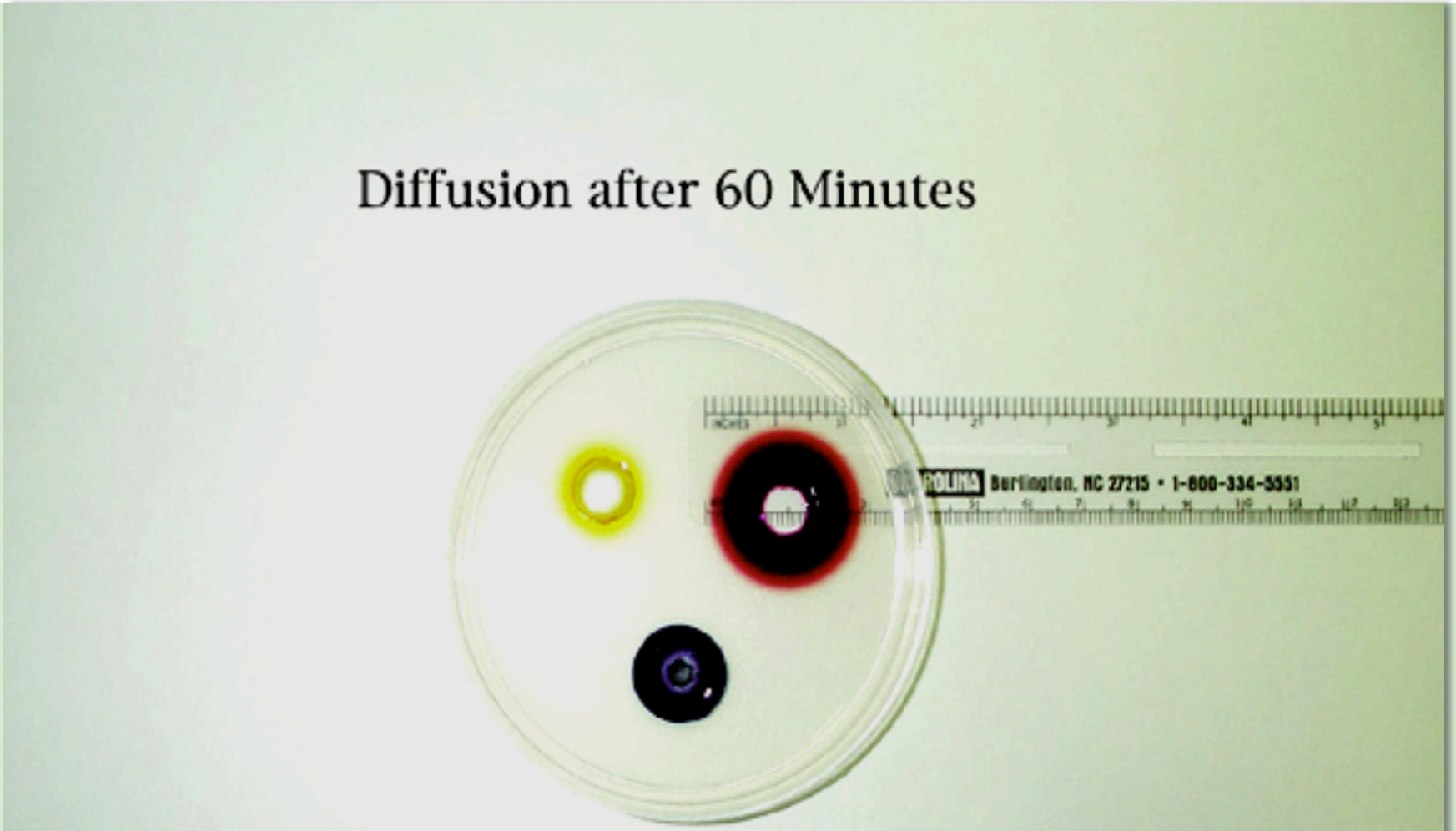
Diffusion across a semi-permeable membrane

- Set up the artificial cell and leave for 1 hour



- Test **inside solution** and **outside solution** for presence of molecules and ions.
- After an hour, redo tests using contents of “cell” and the solution in the beaker.

Molecule/ ion	**Reagent**
Protein	Biuret
Starch	Iodine
Chloride ion	Silver nitrate
Sulfate ion	Barium chloride

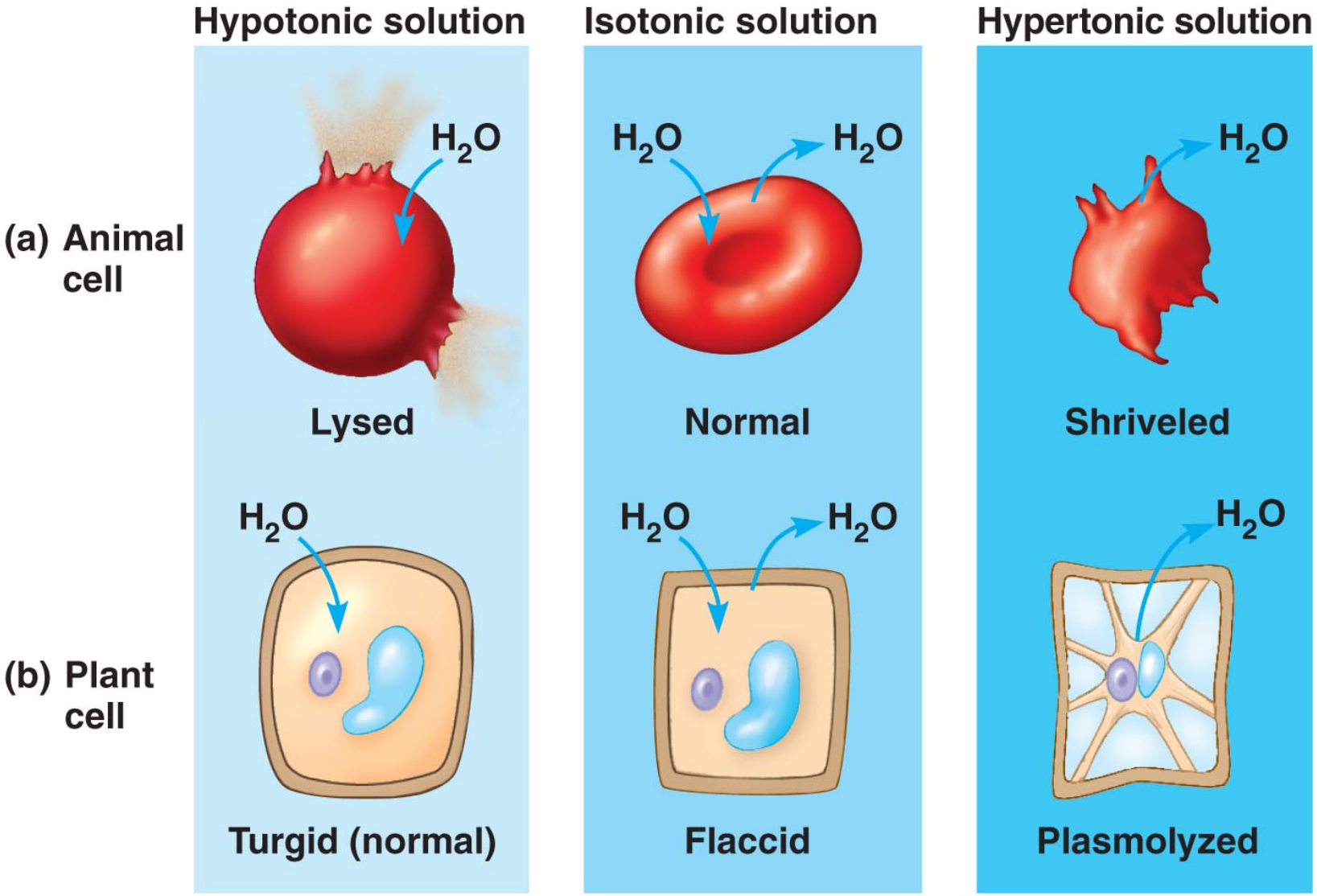


Diffusion through a solid

- Observe demonstration
- Answer questions in manual
- Know how to calculate diffusion rate

Effects of Tonicity on Cells

Hypertonic	solution **outside** cell has **higher concentration** of solute than inside cell	Water leaves the cell
Isotonic	concentration of solute **same** both inside and outside cell	No net water loss or gain
Hypotonic	concentration of solute is **higher inside** cell than outside; outside is more dilute	Water enters the cell



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Are animal cells as resilient in changing tonicities?

Know why or why not.

Today's Activities:

- Drawing of one red onion cell as it appears in a hypertonic solution

Next week:

- Enzyme assignment is due
- Submit the one page handout of your Powerpoint assignment (*at the start of workshop*)