Cell Membranes and Transport

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Cell Transport

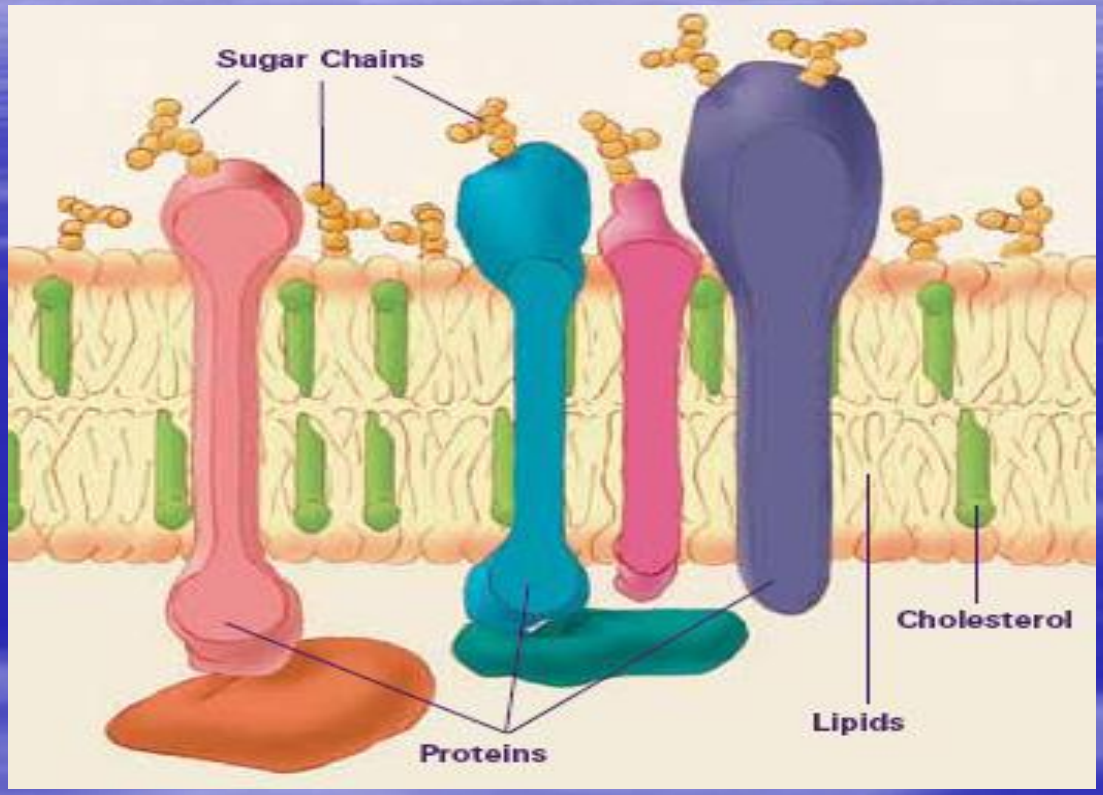


Image from:http://publications.nigms.nih.gov/insidethecell/chapter1.html

Metabolism requires the movement of materials across the cell membrane.

A. Passive Transport

- Does not require energy
- Molecules transfer from an area of high concentration to an area of low concentration = down the concentration gradient
- 3 types

1. Diffusion

- Movement of a substance (solute) from an area of **high concentration**

to an area of **low concentration**

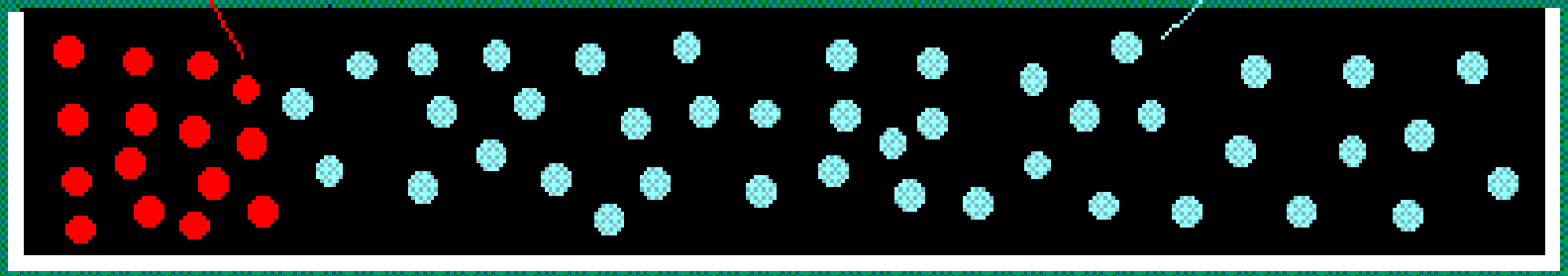
(down concentration gradient)

Diffusion

dye molecules

water molecules

at the outset:

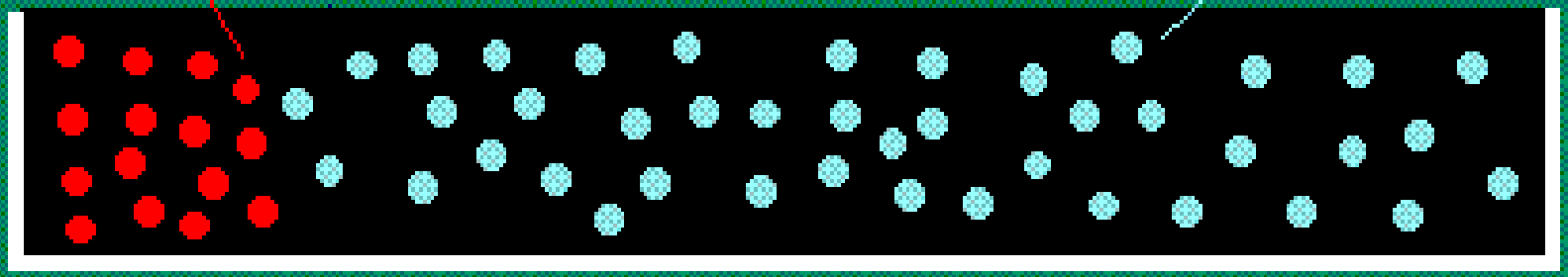


Diffusion

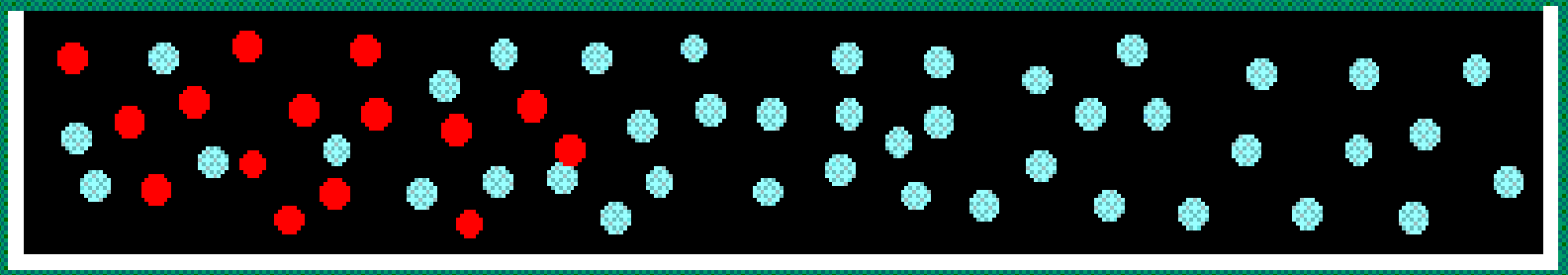
dye molecules

water molecules

at the outset:



later:

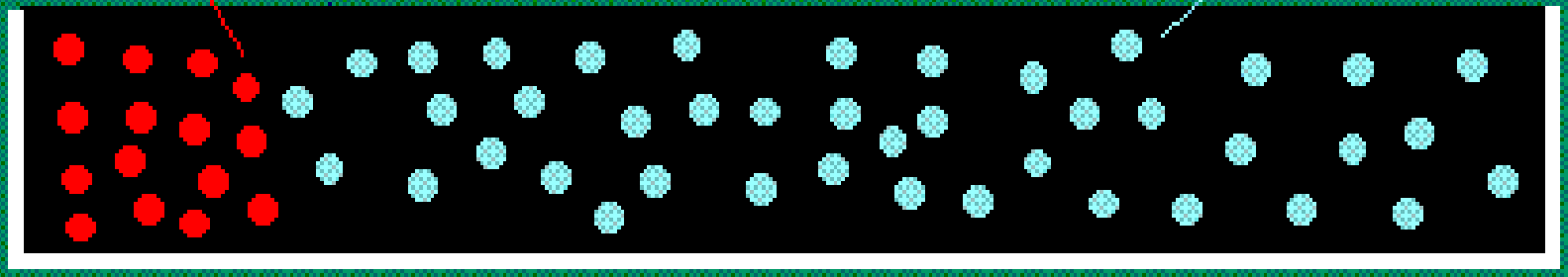


Diffusion

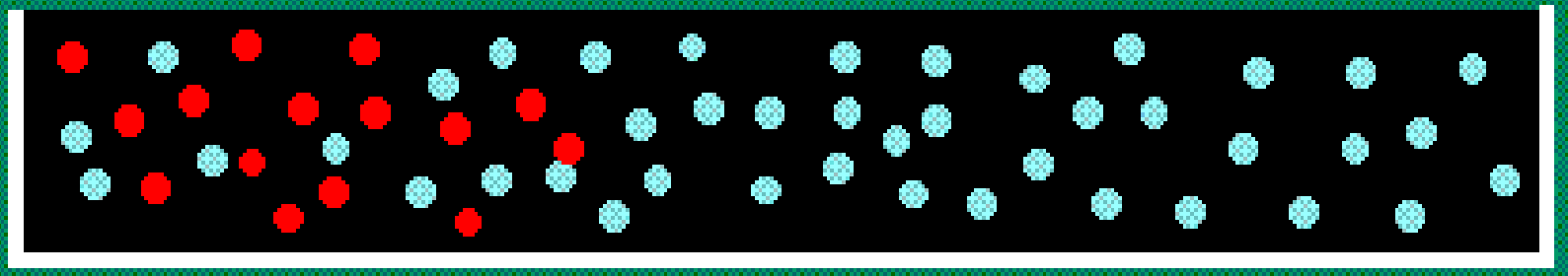
dye molecules

water molecules

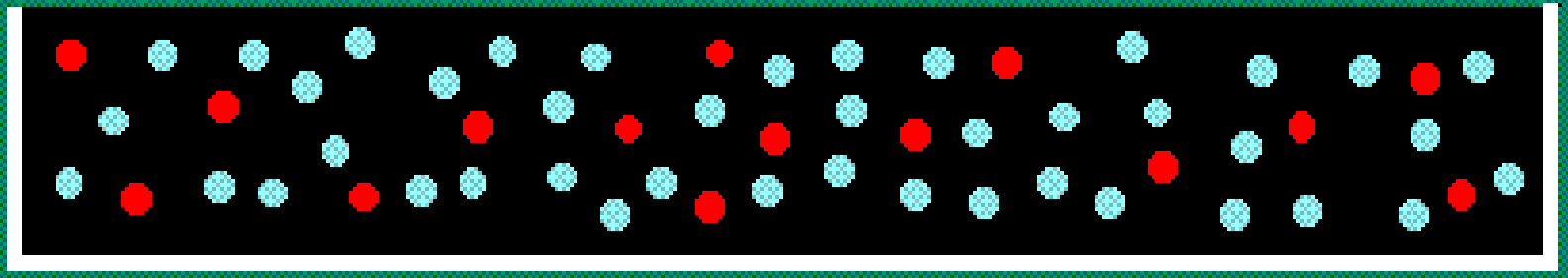
at the outset:



later:

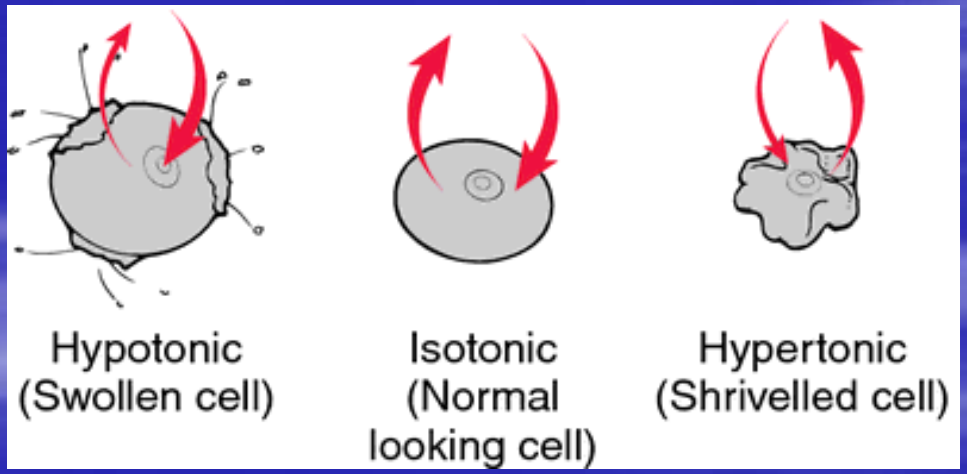


later still:



2. Osmosis

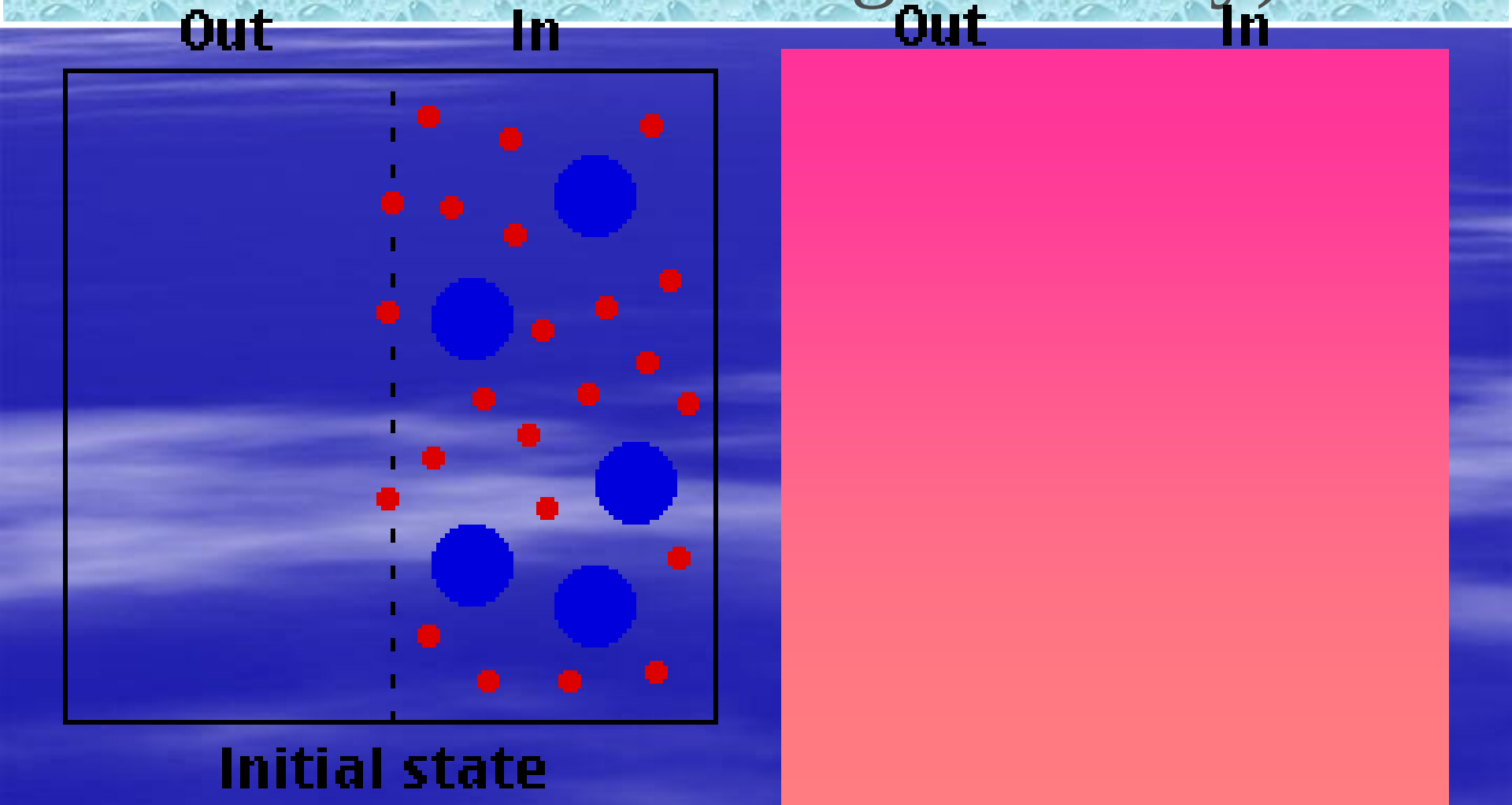
Movement of H2O across a Semi-permeable membrane



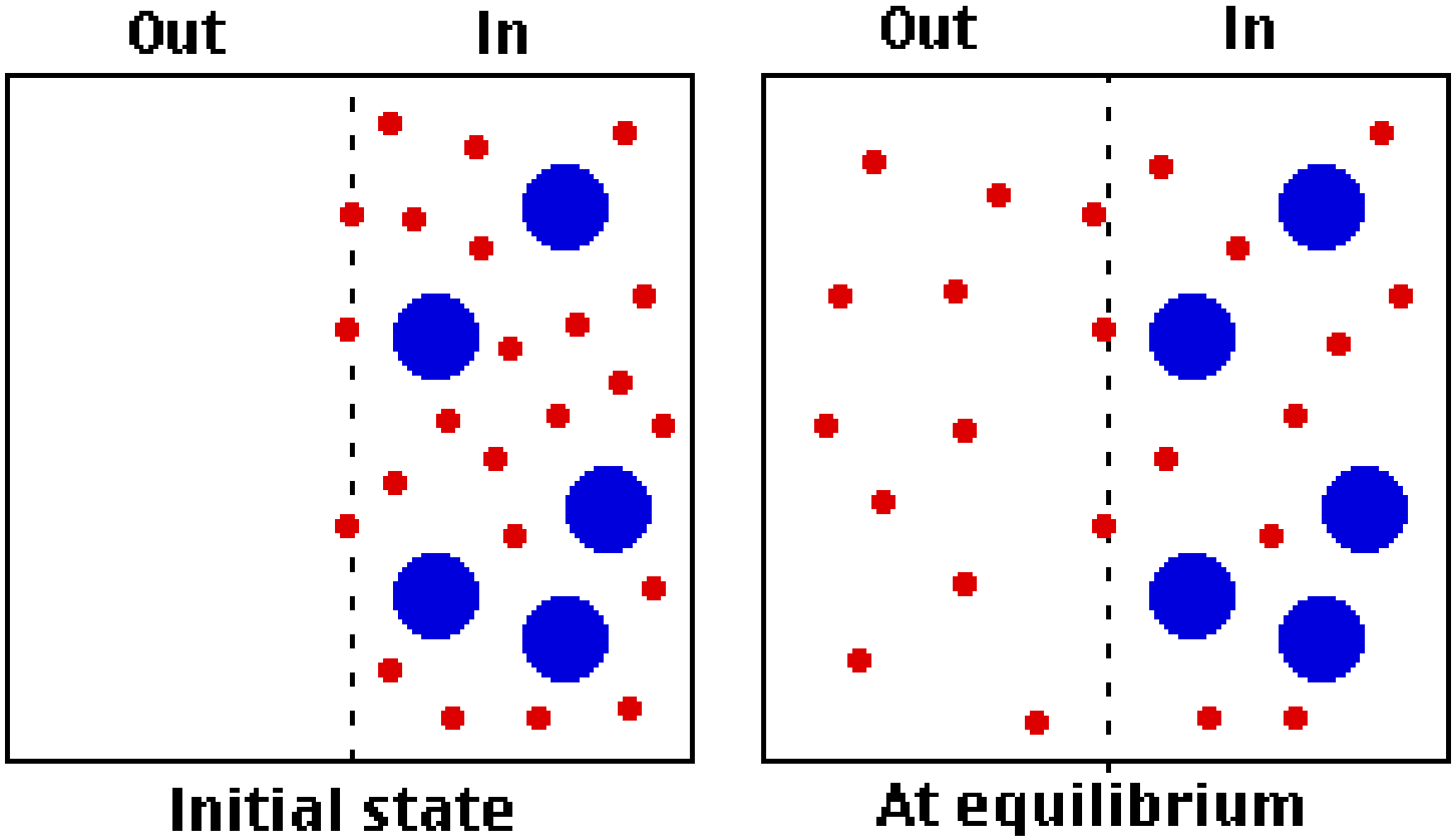
http://medical-dictionary.thefreedictionary.com/osmosis

Hypotonic Isotonic Hypertonic

The plasma membrane is semi-permeable (only certain molecules can diffuse through it freely)



The plasma membrane is differentially permeable (only certain molecules can diffuse through it freely)

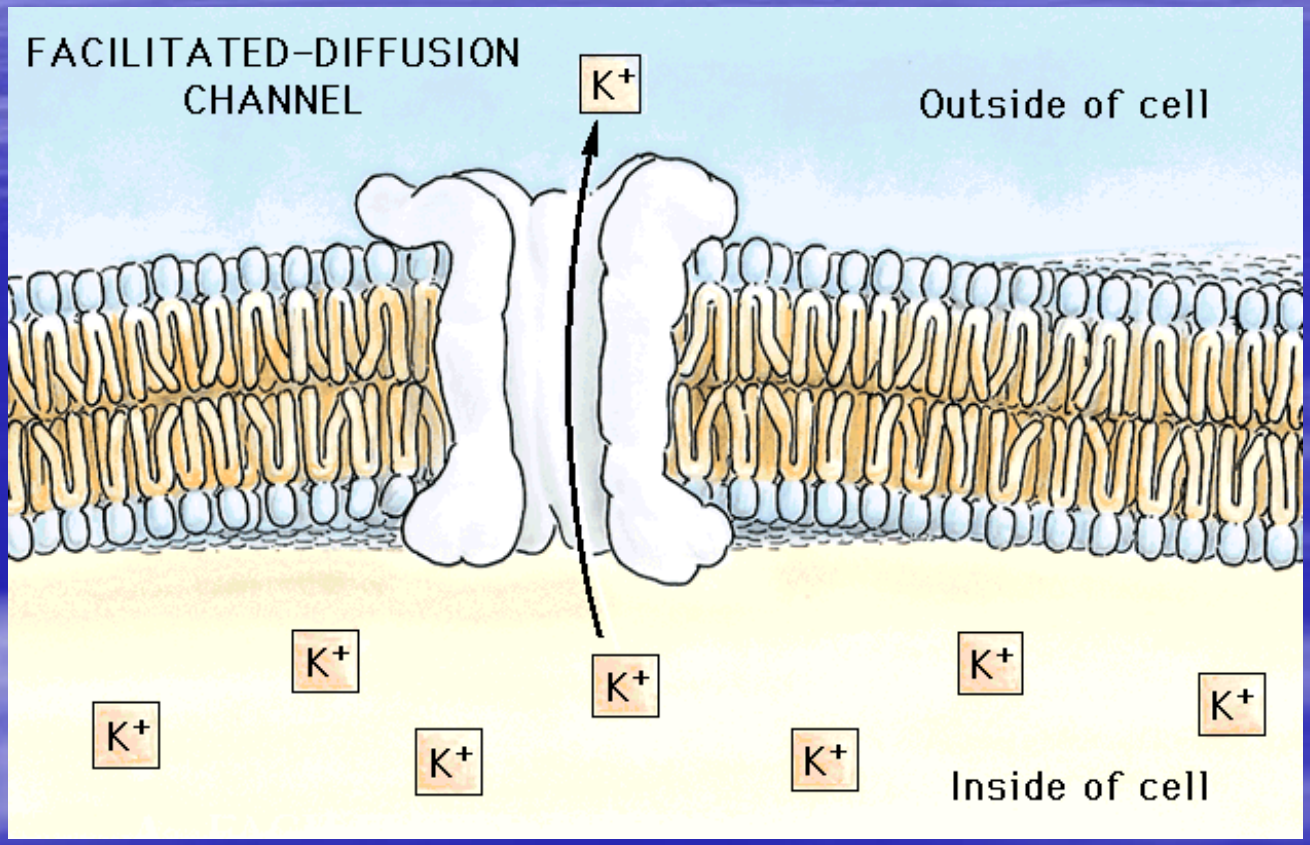


Cell membranes are semi-permeable.

<u>Just like a fence:</u>

Some particles can pass right through.

Some particles are kept on one side or the other.

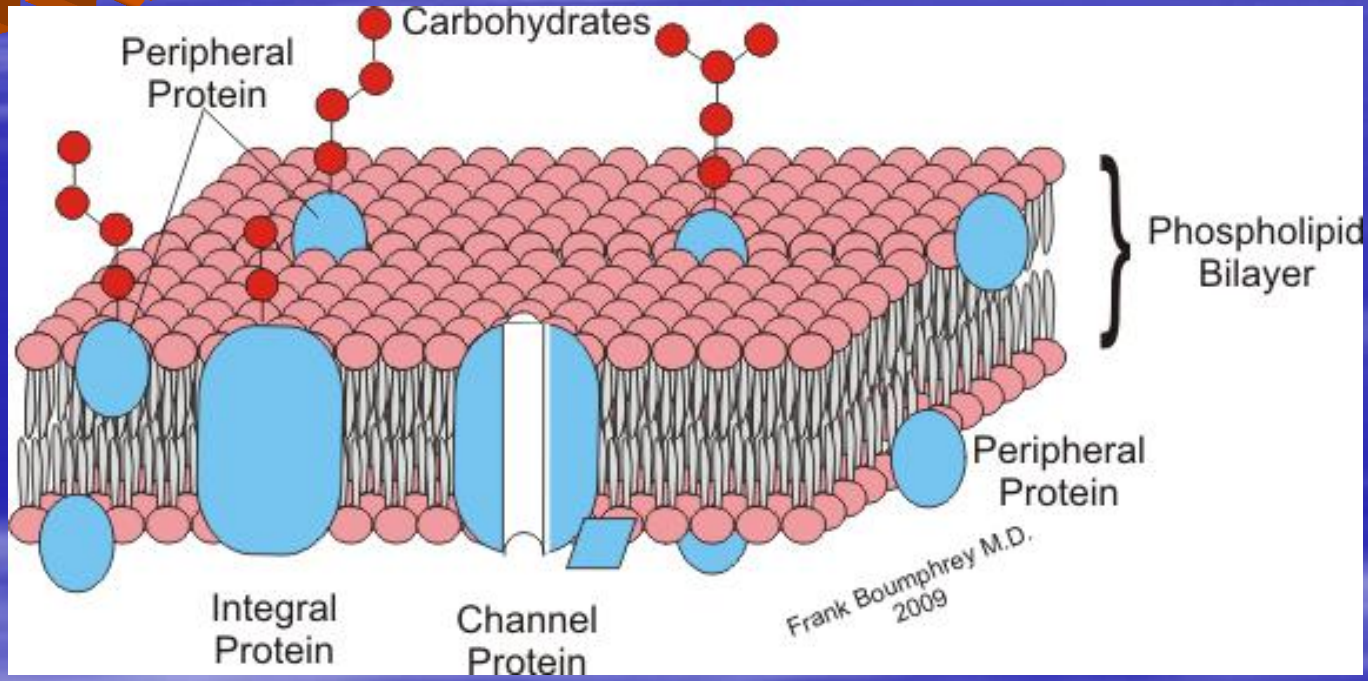


One can see how an Ion can just pass through due to its size. Can other nanoparticles pass as well?

Some molecules have an attraction to the membrane

- Some molecules such as other lipid based polymers have an attraction for cell membranes. The bond between them is a Hydrogen bond
- Other molecules use “helpers” to get by
  - Mercury uses Chloride
  - Metals use *MILIBS*, to attach to membrane
  - *Plastic nanoparticles help carry in other pollutants*

3. Facilitated Diffusion



Source: http://en.wikibooks.org/wiki/Medical_Physiology/Cellular_Physiology/Cell_structure_and_Function Creative Commons Attribution-ShareAlike License

Molecules that can't go through the lipid bilayer must pass through proteins

Cell Membranes are made of:

- Phospholipids (links in the fence)

- Proteins (gates in the fence)