CELLULAR TRANSPORT

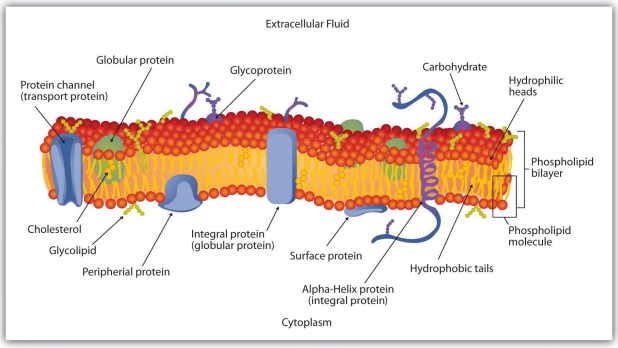
Ch. 5

What will we learn?

In this video we will cover cellular transport. We will learn to differentiate between active and passive transport, and understand how different solutions will affect both animal and plant cells.

What is the structure of the plasma membrane?

- plasma membrane properties
  - selective permeability = some substances are allowed to cross easier than others
  - membrane is made of phospholipids
  - phospholipid = amphipathic = hydrophillic + hydrophobic region
  - lipid bilayer
  - cell membrane is arranged in a fluid mosaic model
  - "mosaic" of different proteins
  - proteins help transport particles through the membrane



What is passive transport?

Passive Transport = no energy needed

- DIFFUSION
  - the movement of molecules till equilibrium is reached
  - move from areas of high contrentaion to low concentration
  - down concentration gradient
  - concentration gradient = a region along which the density of chemical substances increases or decreases
    - SIMPLFIED : concentration of "stuff" in a particular area
  - this is called passive transport bc the cell doesn't need to use any energy
- OSMOSIS
  - diffusion of WATER molecules across the membrane till equilibrium is reached
  - water moves from areas of high to low concentration (in terms of water)

What are the 3 types of solutes?

- if there is higher concentration of solute in the surrounding solution, water will leave the cell (vice versa)
- 3 types of solutions
  - isotonic (relative)
    - concentration of dissolved substances is EQUAL to concentration outside the cell
    - outside = inside
    - result on cell : stable
  - hypertonic (relative)
    - hyper = more
    - concentration of non-penetrating solutes is greater = less water concentration outside the cell
    - cell will lose water –> shrivel –> die
  - hypotonic (relative)
    - concentration of solutes is less = more water outside
    - water will enter the cell
    - cell –> swell –> LYSE = burst

What is another form of passive transport?

- facilaited diffusion
  - passive transport with the help of transport proteins

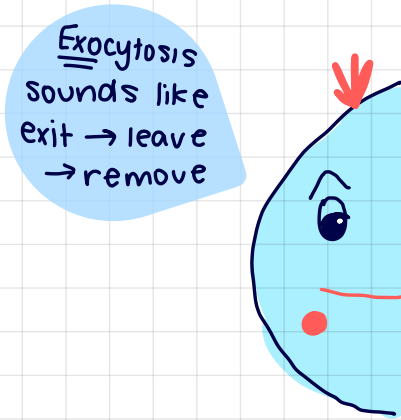
What is the difference between active & passive?

ACTIVE TRANSPORT = energy needed
- energy is needed to move solutes AGAINST the concentration gradient
- LOW to HIGH concentration
- needs energy –> ATP –> energy molecule
- ATP = base + sugar + 3 phosphates
  energy stored in phosphate bonds –> bonds are broken –> energy is released

- Active Transport is for large molecules
- smaller molecules pass through using diffusion

- ENDOCYTOSIS (taking in)
  - process of taking material INTO the cell via enfolding the cell membrane –> creates vesicle within cytoplasm
- 3 types of endocytosis
  - phagocytosis (Cell eating) = extension of membrane to engulf particle & bring into cell
  - pinocytosis (cell drinking)
  - receptor mediated

EXOCYTOSIS (removing)
- opposite of endocytosis
- process of removing large molecules from cell
- vesicle membrane fuses with cell membrane & forces contents out



HOMEOSTASIS
- maintains homeostasis by regulating the intake and removal of particles

summary

active transport

- needs energy
- large molecules
- low to high

- endocytosis = take in
  - phagocytosis (cell eating)
  - pinocytosis (cell drinking)
  - receptor mediated

- exocytosis = removal using membrane fusion

passive transport

- no energy
- high to low
- diffusion = movement of particles till equilibrium is reached

- osmosis = diffusion of water molecules

- facilitated diffusion = passive + transport proteins