Topic 3: Cells and Cell Processes

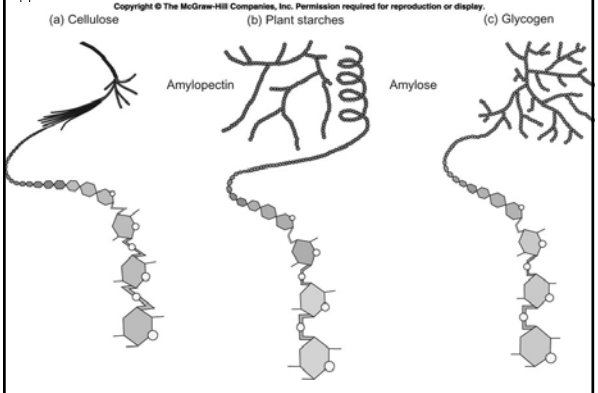
SCI141

Objectives

- Describe the structure and function of a cell.
- Describe the cell transport mechaisms.

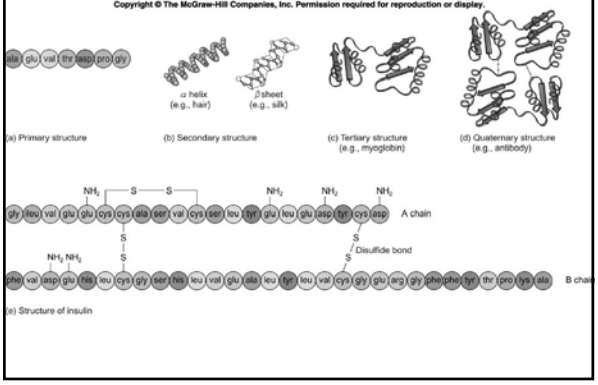
Building Blocks

- Carbohydrates (sugars)
  - Carbon
  - Hydrogen
  - Oxygen
  - Uses → Energy, Cell recognition



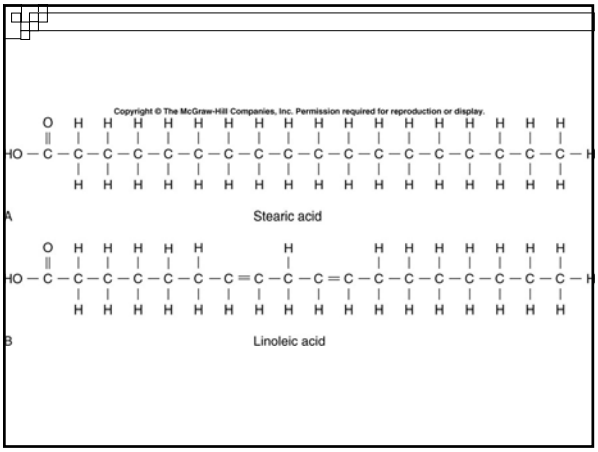
Building Blocks

- Proteins
  - Carbon
  - Hydrogen
  - Oxygen
  - Nitrogen
  - Sulfer
  - Uses: Structure, Enzymes, Hormones…



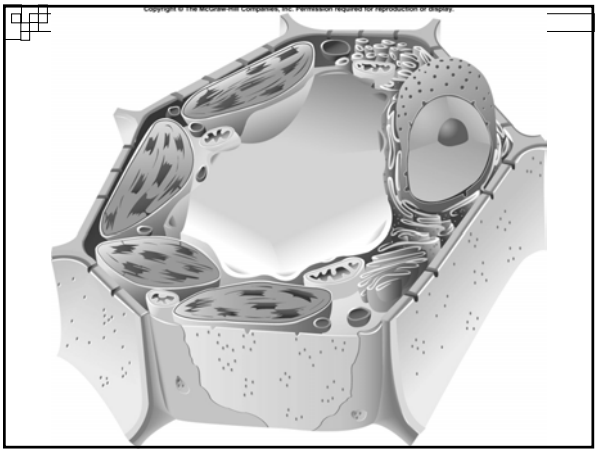
Building Blocks

- Lipids (fats)
  - Hydrogen
  - Carbon
  - Long Chains
  - Uses → Membranes, Fuel



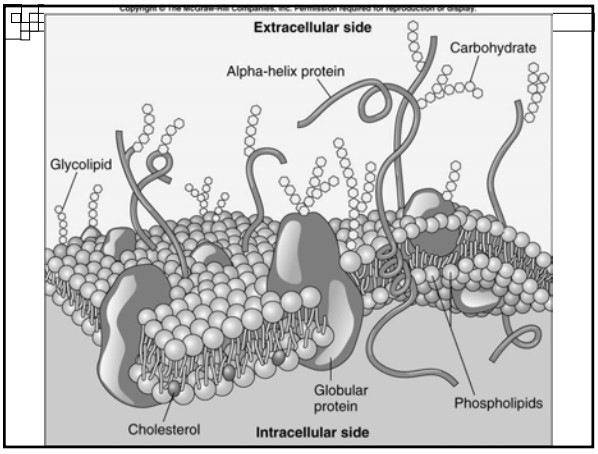
Building Blocks

- DNA



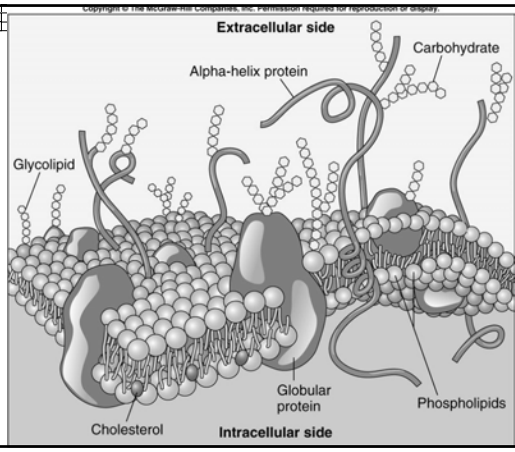
Cell Theory

- All organisms are made up of at least one cell.
- Unit of function.
- Organelles carry out individualized functions.



Membranes

- All cells have a membrane
  - Support and protection
  - Made of lipid bilayer
  - Hydrophobic tail
  - Hydrophilic head

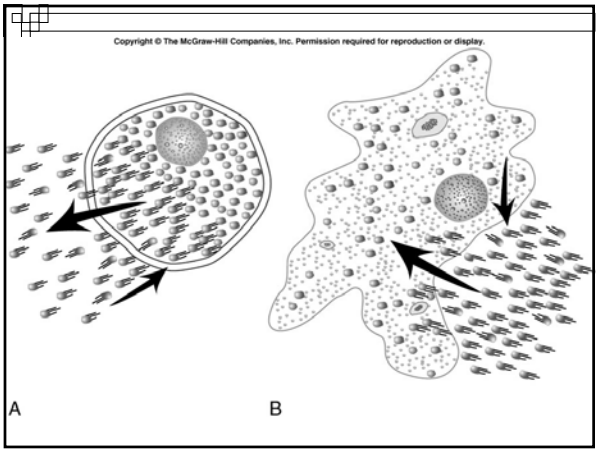


Membranes

- Proteins and CHO act as receptors and pathways through the membrane
- Because of bilayer, movement into and out of cells is restricted.
- How do things get into and out of cells

Movement

- Diffusion
  - Based on concentration
  - Things move from high to low concentrations
    - Requires no enrgy
  - Substance has to be able to cross the bilayer
    - Nothing large or charged

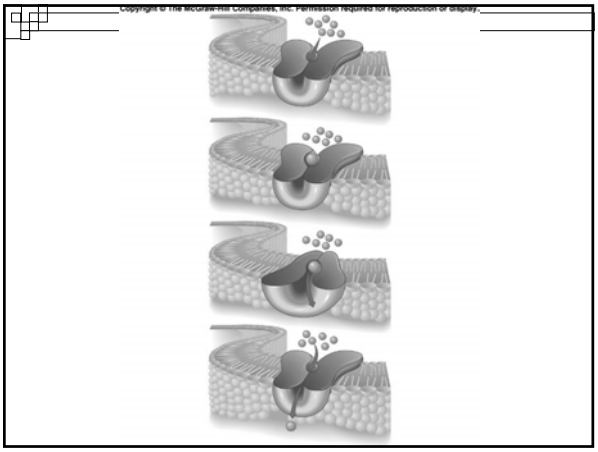


Movement

- Best example of diffusion
  - Osmosis
    - Water levels will try and balance out

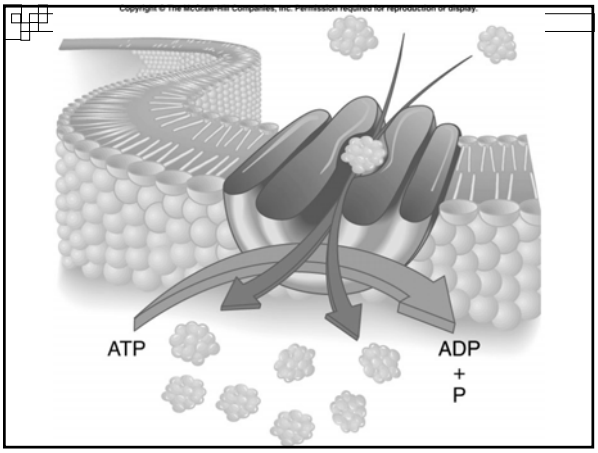
Movement

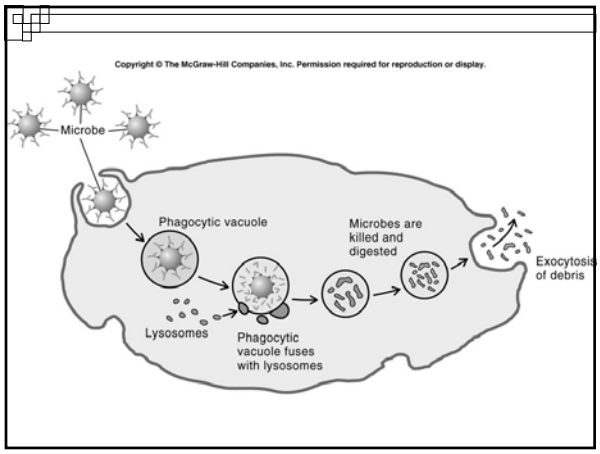
- What is something wants to diffuse but can't (too big or charged)
- Passive transport
  - Requires transport protein

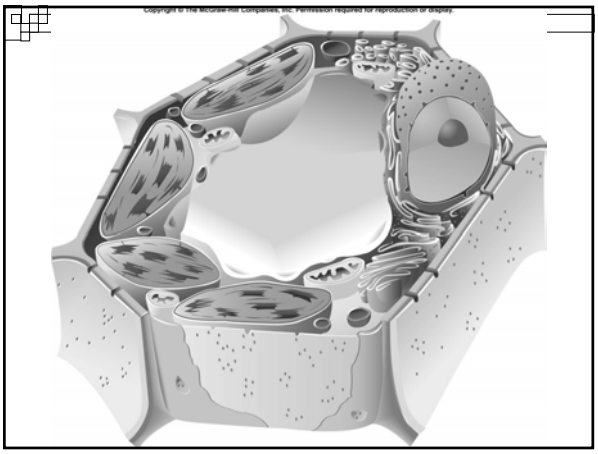


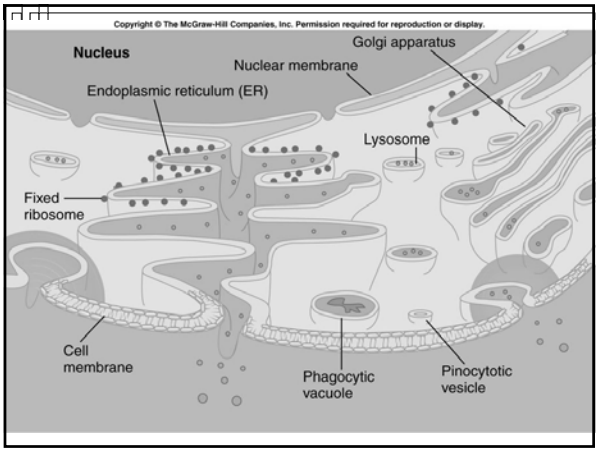
Movement

- Sometimes we want to move something from low to high concentration
- Active Transport
  - Requires transport protein & energy



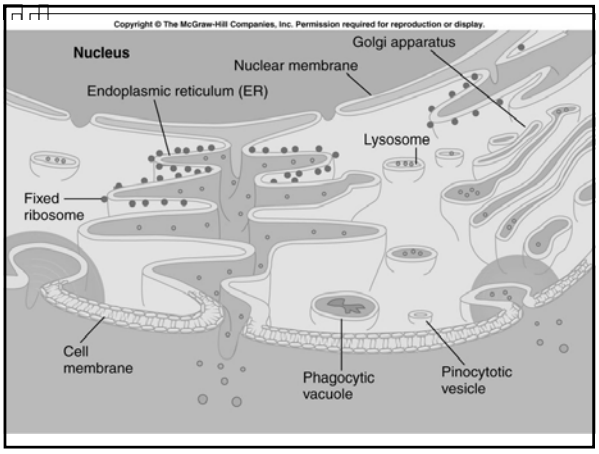






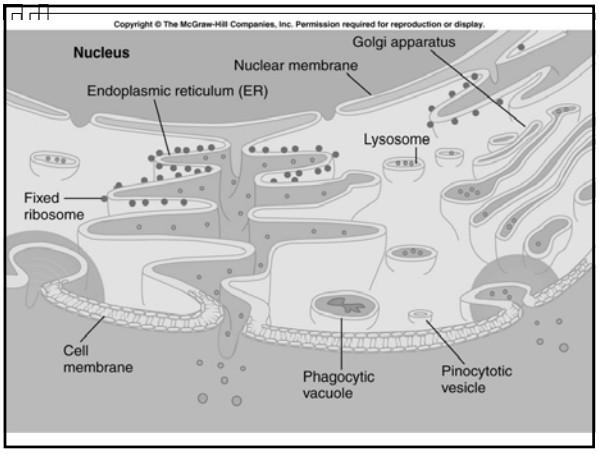
Nucleus

- Membrane bound
- Contains mainly DNA, many enzymes
- Function: Control most of the functions of the cell by creating proteins
- Analogy



Endoplasmic Reticulum

- Membrane bound space around the nucleus
- Function: Site of protein formation
- Analogy

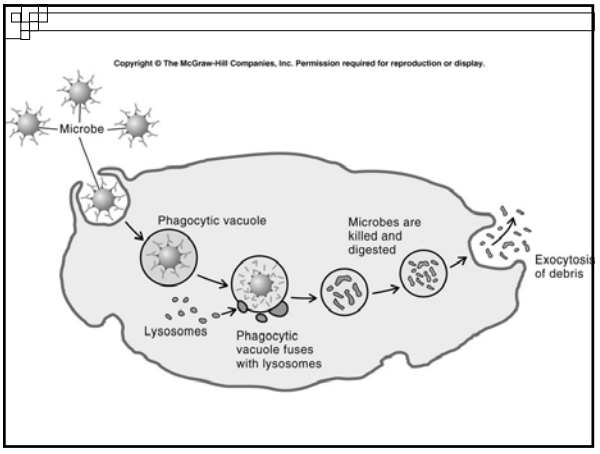


Golgi Body

- Membrane bound organelle closer to cell membrane
- Function: Packages proteins
- Analogy

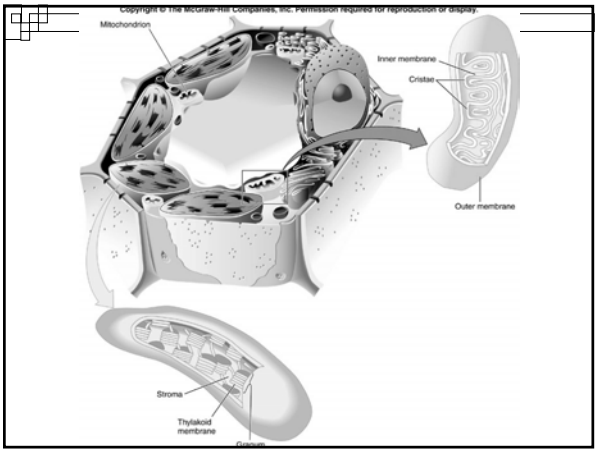
Lysosomes

- A cell's recycling plant
  - Help decompose dying cells
  - Selectively destroys unneeded cells
  - Digest large molecules
  - Destroy microorganisms



Other Organelles

- Metabolic Organelles
- Mitochondria
- Chloroplast



Mitochondria

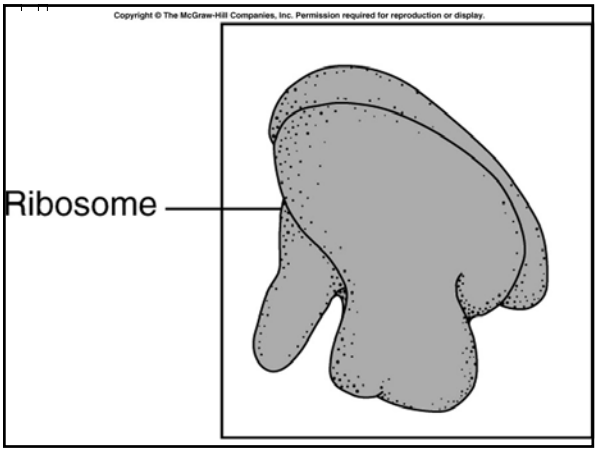
- Bean shaped
- Double membrane bound
- Site of aerobic respiration
- Almost all cells have mitochondria or something like it

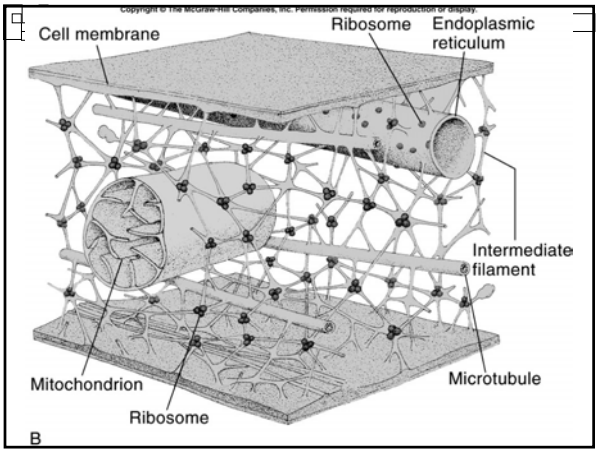
Chloroplast

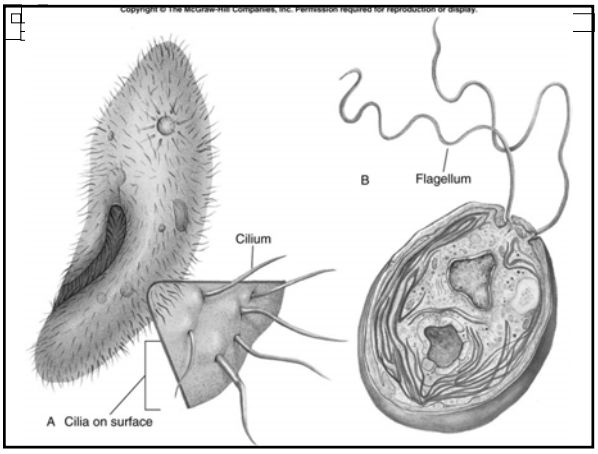
- Green discs
- Double membrane bound
- Green pigment allows the harvesting of energy in light.
- Only found in plants or plant like organisms

Ribosome

- No membrane
- Helps create proteins

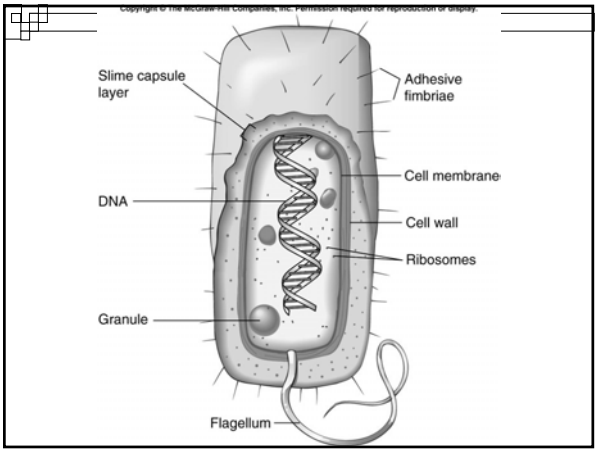






Major cell types

- Prokaryote
  - No nucleus
  - Mainly bacteria
  - Many have cell walls

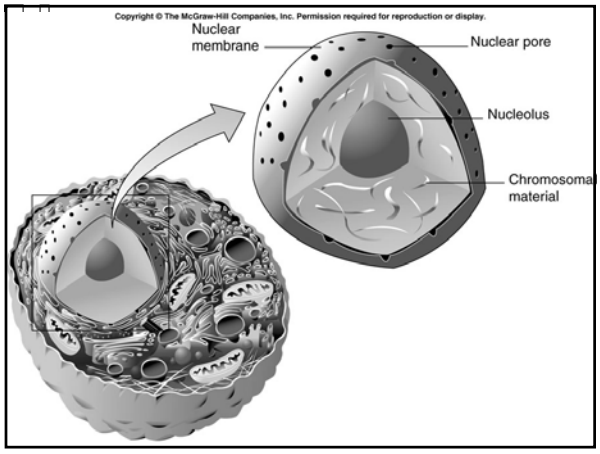


Major Cell Types

- Eukaryotes
  - True nuclei
  - Animal & Plant cells

Animal Cells

- Eukaryotes
  - Have all of the organelles except chloroplast



Plant Cells

- Eukaryotes
  - All Organelles
  - Cell Wall