

1/14/15

## CELL

### I. BASIC CELL COMPOSITION

A. **Plasma membrane = Cell membrane** – surrounds cell and gives it form

1. **Structure:** 2 layers of phospholipids with proteins scattered throughout
  - a. **Proteins:** in membrane or “float” on surface
  - b. **Glycoproteins:** proteins with carbohydrate (sugars) attached
  
2. It is **selectively permeable**. Determined primarily by size, charge, and solubility of molecule. Regulates movement of material in/out of cell
  
3. **Functions**
  - a. **Passive Transport (no energy)**
    - i. **Diffusion:** Some SMALL materials may diffuse/pass through the cell membrane  
→ where molecules move from a higher concentration to a lower concentration
  
  - b. Active Transport (energy required) LARGE particles must be transported actively:  
**TWO TYPES:**
    - i. **Exocytosis:** process by which cellular materials EXIT the cell
      - materials packaged within vesicles (small sacs)
      - vesicles fuse w/cell membrane and release contents outside of cell

- ii. **Endocytosis:** process by which materials are brought INTO the cell. (3 types)
  - Phagocytosis: “cell eating”; ingestion of large particles
  
  - Pinocytosis: “cell drinking” ingestion of fluid and small particles
  
  - Receptor-mediated endocytosis: substances bind to receptors where the membrane is indented= coated pit, and a clathrin (special protein)-coated vesicle is formed
  
  - Endocytosis-exocytosis animation

- 4. **Specializations of plasma membrane:**
  - a. microvilli: nonmotile, help increase surface area
  
  - b. cilia: motile, move substances over the surface of stationary cells.
  
  - c. flagellum: motile, whip-like structure that moves cells

## B. Cytoplasmic Organelles

- 1. **Mitochondrion**
  - a. Makes ATP (adenosine triphosphate, energy molecule)
- 2. **Ribosomes** - involved in protein synthesis  
→(synthesis=production)
  - a. two kinds:
    - 1. free ribosomes: makes proteins for the cell
    - 2. ribosomes attached to ER: make proteins for export

3. **Endoplasmic Reticulum (ER)** - a network of tubules used to transport & synthesize (produce) materials
  - a. **Rough ER** - has ribosomes on walls. Transports and modifies proteins made by the ribosomes
  - b. **Smooth ER** – no ribosomes attached to it
    - synthesizes lipids, mainly steroids
    - detoxify drugs and alcohol (breaks it down so its not harmful)
  
4. **Golgi Apparatus**: several C-shaped sacs near the nucleus
  - a. packages material for secretion
  
  - b. forms lysosomes
  
5. **Lysosomes** - contain digestive enzymes
  - a. enzymatically breaks down internalized material and old organelles

→ "garbage men" of the cell

→ autolysis?
  
6. **Centrioles** – needed for cell division

**C. Nucleus**

1. **Nuclear Envelope (Nuclear Membrane)**: It has **nuclear pores** and is selectively permeable
2. **Nucleolus** – contains protein and RNA
  
3. **Chromatin** - coiled mass of DNA (1/2) wrapped around proteins (1/2)