



Cell Organelles & Structures

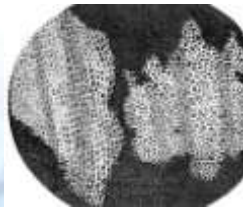
Little Girl Lost

- ✦ [Through the virtual cell](#) – video
- ✦ [Faces of Mitochondrial Disease - The Swinns](#)



Cell Theory

- ✦ Cells – basic unit of living things
- ✦ Robert Hooke
 - 1665
 - Observed cork cells (bark of trees)

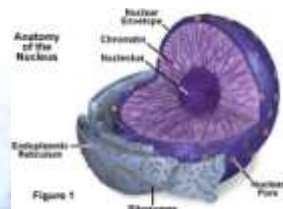


Cell Theory

1. All organisms are composed of one or more cells.
2. The cell is the basic unit of structure and organization of organisms.
3. All cells come from pre-existing cells.

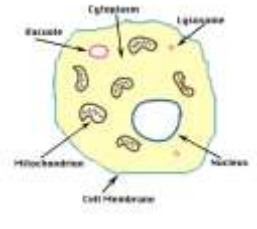
Nucleus

- ✦ Function
 - houses DNA
 - controls all cellular activities via DNA
- ✦ Structure
 - Double membrane= nuclear envelope
 - Nuclear pores= allows RNA out of the nucleus



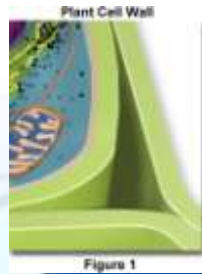
Cytoplasm

- ✦ Function
 - cushions organelles
 - dissolves molecules (e.g. sugars)
- ✦ Structure
 - gel-like material
 - Everything between cell membrane and nucleus



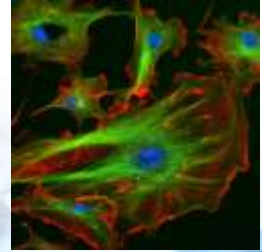
Cell Wall

- Function
 - cell shape
 - protection
- Structure
 - outside of cell membrane
 - plant cell walls → cellulose
 - Fungi cell walls → chitin



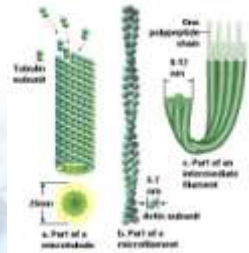
Cytoskeleton

- Internal framework
 - Cell shape
- Supports other organelles
- Helps intracellular transport
- Cell movement



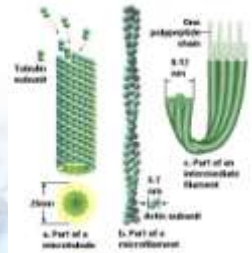
Cytoskeleton

- Microfilaments
 - Smallest
 - Cell motility
 - Cell shape



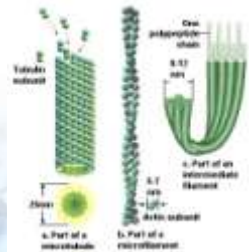
Cytoskeleton

- Intermediate filaments
 - Strong, stable, rope-like
 - Provide strength against pulling



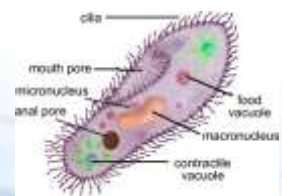
Cytoskeleton

- Microtubules
 - Tubulin
 - Overall cell shape
 - Organelle distribution
 - Cell division



Cilia

- Function
 - Locomotion
 - movement of fluids across cell
- Structure
 - Membrane wrapped microtubules
 - Short (many)



Flagellum

- Function
 - Cell movement (locomotion)



- Structure
 - Membrane wrapped microtubules
 - long (one or two)

Centrioles

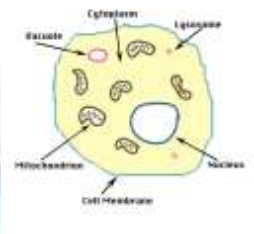
- Function
 - helps in animal cell reproduction



- Structure
 - protein tubes

Cell Membrane

- Function
 - controls what goes in/out of cell



- Structure
 - Single membrane layer →
 - two layers of phospholipids with proteins, carbohydrates, cholesterol

Ribosomes

- Function
 - synthesizes (makes) proteins (enzymes)



- Structure
 - Tiny
 - lots of them
 - NOT MEMBRANE-BOUND

Mitochondria

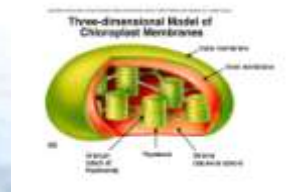
- Function
 - Powerhouse: makes ATP
 - site of cellular respiration



- Structure
 - Double-membrane
 - Folded inner membrane
 - Ribosomes + DNA

Chloroplast

- Function
 - photosynthesis



- Structure
 - double-membrane
 - stacked inner membrane
 - Chlorophyll
 - Ribosomes + DNA

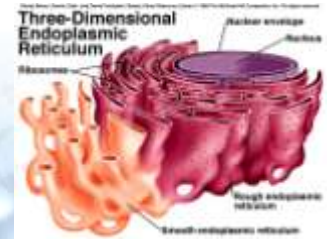
Vacuole

- Function
 - storage (water, wastes, nutrients)
- Structure
 - membrane sac



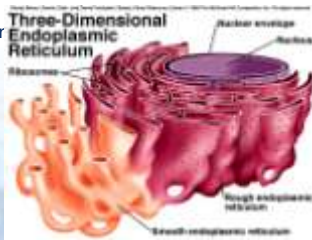
Smooth Endoplasmic Reticulum (ER)

- Function
 - synthesis of lipids
 - storage of calcium
- Structure
 - single membrane
 - tube-like
 - highly folded



Rough Endoplasmic Reticulum (ER)

- Function
 - protein packaging for modification
- Structure
 - single membrane
 - Ribosomes
 - tube-like
 - highly folded



Golgi apparatus

- Function
 - protein and hormone processing and packaging
- Structure
 - single membrane
 - flattened sacs



Lysosome

- Function
 - Digestion (breaks down molecules and old organelles)
- Structure
 - membrane sac with digestive enzymes

