Cells: Notes

In this lesson…

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- Cell Specialization
- Animal Cells
- Plant Cells
- Mitosis/Meiosis
- Metabolism
- Active & Passive Transport
- Cellular Respiration
- Photosynthesis

Cells:

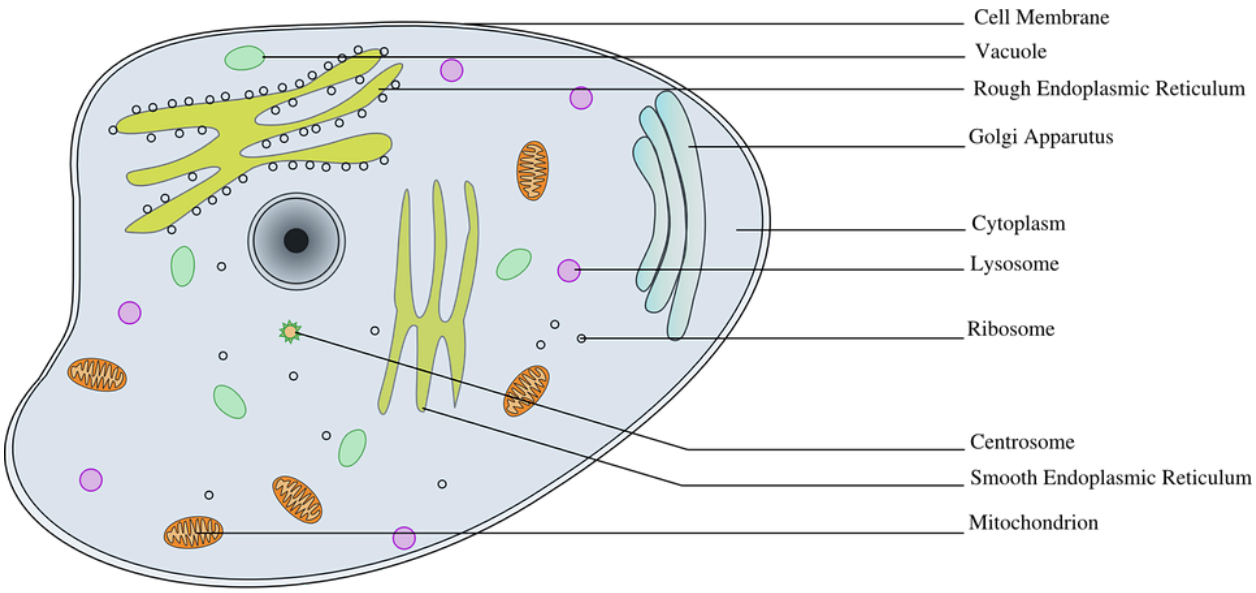
- The **basic unit of all known organisms**
- Structural, functional, and biological.
- **Smallest unit of life**
- "The building blocks of life"

Cell Specialization:

- In each part of the body there is a different type of cell
- There are **100 types of cells**, but these are the **11 most common**:
    - Stem cells (immune system)
    - Bone cells
    - Blood cells (there are red and white blood cells)
    - Muscle cells
    - Fat cells
    - Skin cells
    - Nerve cells (nervous system)
    - Endothelial cells (organs)
    - Sex cells (reproduction)
    - Pancreatic cells
    - Cancer cells

Animal Cells:

- Eukaryotic cell
- **Parts of this cell:**
    - Cell membrane
        - Controls what comes in and out of the cell
        - Outer Layer
    - Nucleus
        - Has a round shape
        - Surrounded by the organelles
        - Controls the cell's activities
    - Cytoplasm
        - Clear, gel-like fluid
        - Surrounds all organelles
    - Mitochondria
        - Bean shaped
        - Has inner membrane
        - Breaks down sugar molecules to create energy
    - Endoplasmic reticulum
        - Network of folded tubes or membranes
        - Carries proteins and other materials from one part of the cell to another
        - There is a smooth and a rough ER
    - Ribosomes
        - Small bodies floating free or attached to the rough ER
        - Produce proteins
    - Golgi bodies
        - Flattened sacs or tubes
        - Receives proteins or other materials from the ER, packages them, and redistributes them
    - Vacuoles
        - Fluid filled sacs
        - Storage area for cells
    - Lysosomes
        - Small, round structures
        - Use chemicals to break down large food molecules into smaller ones
        - breaks down old cells



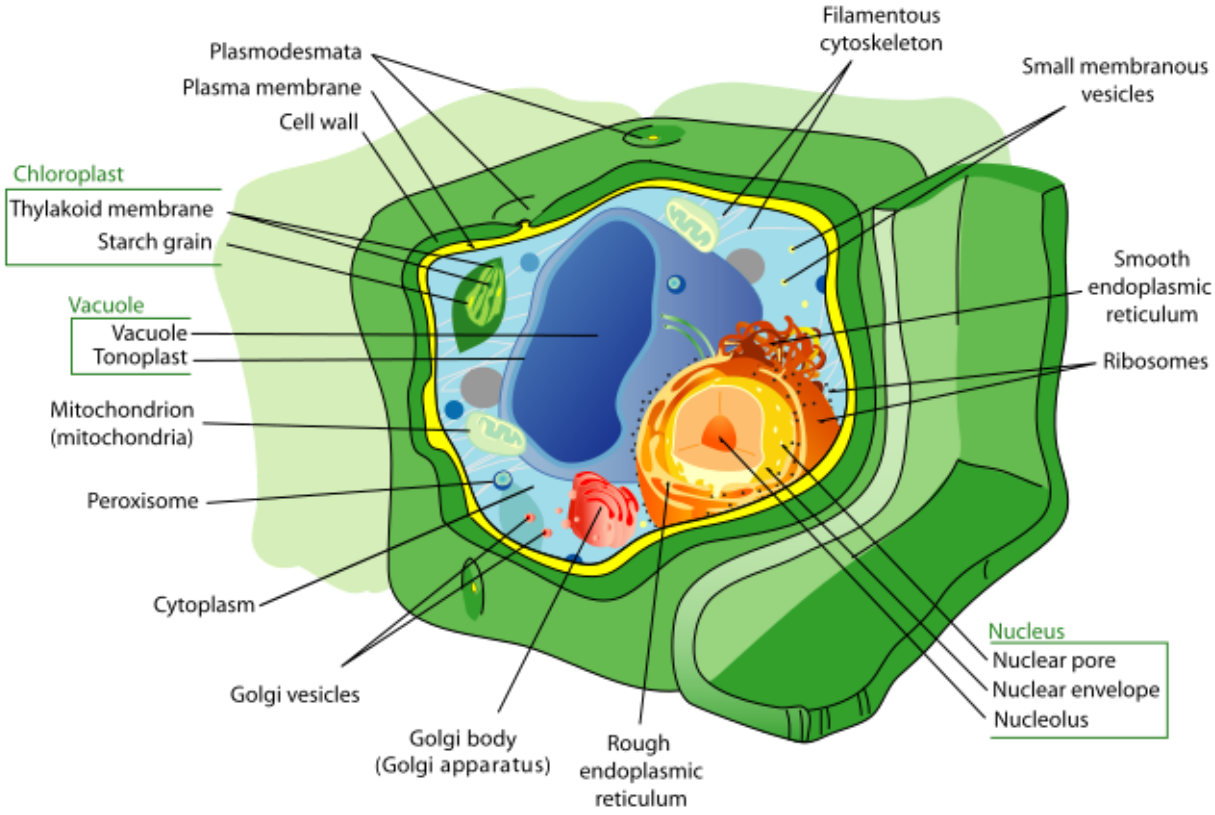
Cross Section of an Animal Cell

Animal Cell (derived from Free SVG)

Plant Cells:

- Eukaryotic cell
- **Parts of this cell:**
    - Cell wall
        - Outer layer
        - Rigid, strong, stiff
        - Non-living
        - Protects and supports the cell
    - Cell membrane
        - Controls what comes in and out of the cell
        - Outer Layer
    - Nucleus
        - Has a round shape
        - Surrounded by the organelles
        - Controls the cell's activities
    - Cytoplasm
        - Clear, gel-like fluid
        - Surrounds all organelles
    - Mitochondria
        - Bean shaped
        - Has inner membrane
        - Breaks down sugar molecules to create energy
    - Endoplasmic reticulum
        - Network of folded tubes or membranes
        - Carries proteins and other materials from one part of the cell to another
        - There is a smooth and a rough ER
    - Ribosomes
        - Small bodies floating free or attached to the rough ER
        - Produce proteins
    - Golgi bodies
        - Flattened sacs or tubes
        - Receives proteins or other materials from the ER, packages them, and redistributes them
    - Vacuoles
        - Fluid filled sacs
        - Storage area for cells
    - Chloroplasts
        - Green oval structures

- Usually containing chlorophyll
- Allow photosynthesis to occur



Plant cell (derived from wikipedia)

Mitosis/Meiosis:

Mitosis

Prophase: Chromatin begins condensing into chromosomes. The chromatids are joined together by a centromere.

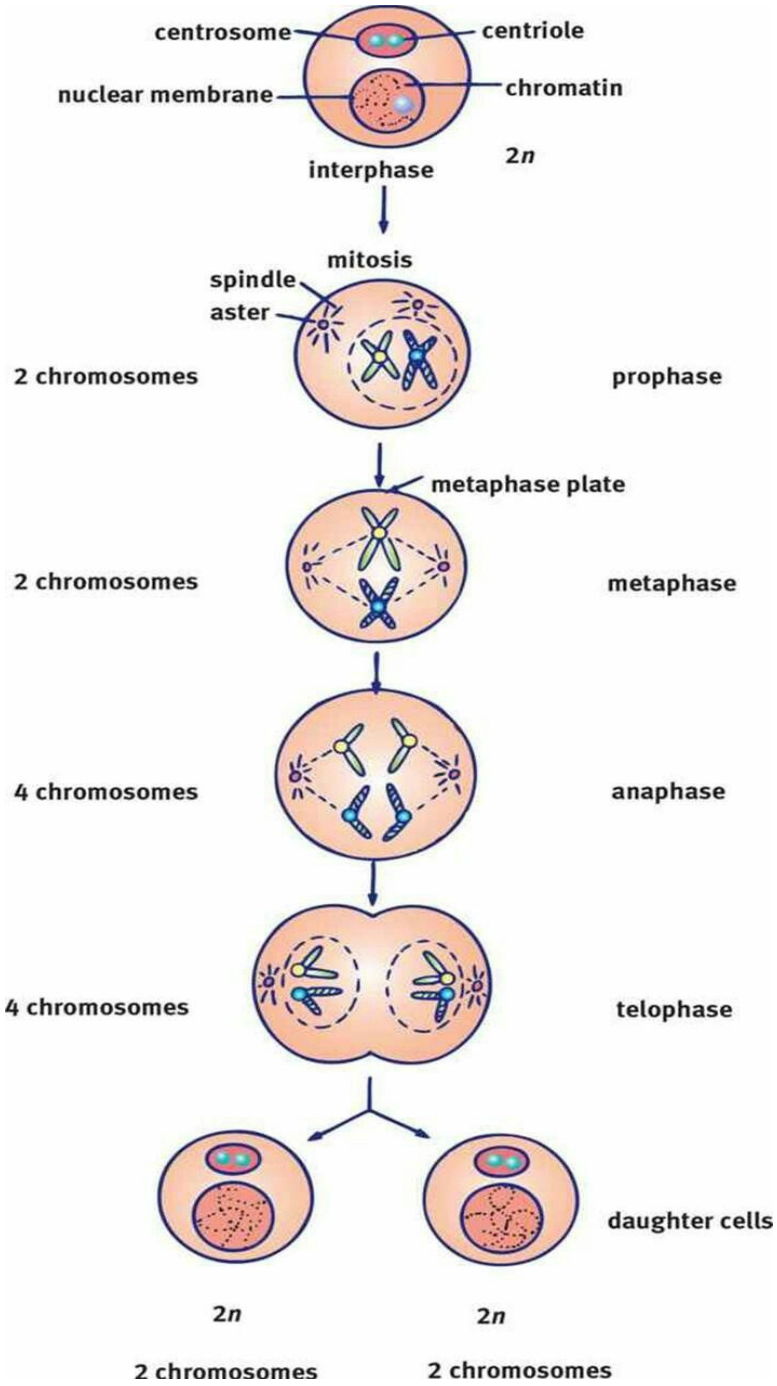
Metaphase: the chromosomes line up in the middle of the cell.

Anaphase: chromosomes break at the centromere and sister chromatids move to opposite ends of the cell.

Telophase: A nuclear membrane forms and chromosomes begin to unwind and separate.

Cytokinesis: The cytoplasm divides and forms two new cells.

Meiosis is the same thing, but it just **happens one more time**, resulting in **four daughter cells** instead of two.



Mitosis (derived from wikimedia commons)

Metabolism:

- Metabolism is chemical reactions in organisms that maintains life
- There are three types
    - Carbo types
        - people who have weak appetites and a high tolerance for sweets
        - Weight problems
        - Depend on caffeine
    - Protein types
        - Very hungry
        - Crave unhealthy food
        - Tend towards fatigue, anxiety, and nervousness
        - Feel lethargic
    - Mixed types
        - Average appetites
        - Craving for sweet and starchy food
        - Little trouble with weight control

Active & Passive Transport:

Active transport:

- Active transport describes the moving of materials through the cell membrane
- 3 types
    - Sodium-Potassium Pump
        - Cell membrane uses ATP (energy) to transport sodium and potassium ions in and out of the cell
    - Endocytosis
        - Cells take in large particles and deposit them into the cell
        - Ex: taking in glucose
    - Exocytosis
        - Deposits materials from inside the cell on the outside

Passive transport

- Transporting materials without using energy
- Ex: Osmosis: moves water through a cell's membrane

Cellular Respiration:

- Metabolic reactions and processes that take place to convert chemical energy from oxygen molecules or nutrients into ATP (Adenosine Triphosphate)
- Releases waste products

Photosynthesis:

- Plants and other organisms use light energy from the sun and convert it into chemical energy that is used to fuel the organism.
- Carbon dioxide goes in, oxygen comes out.