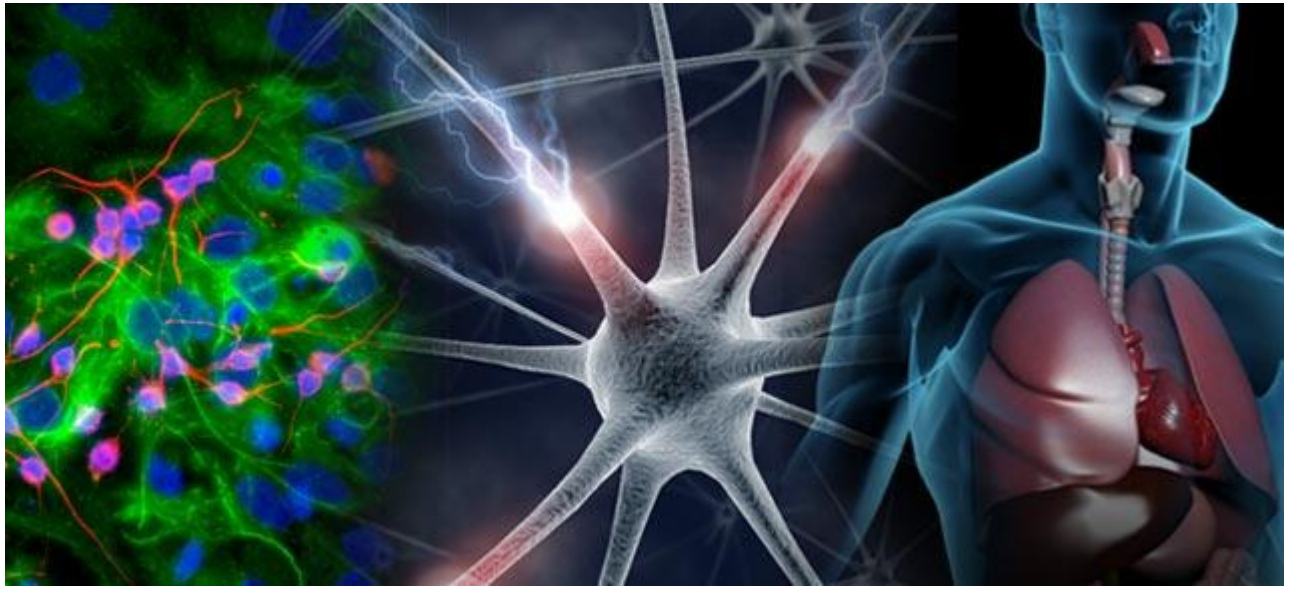
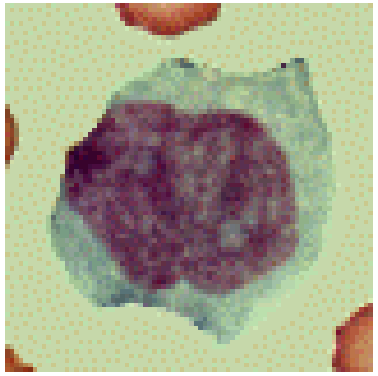
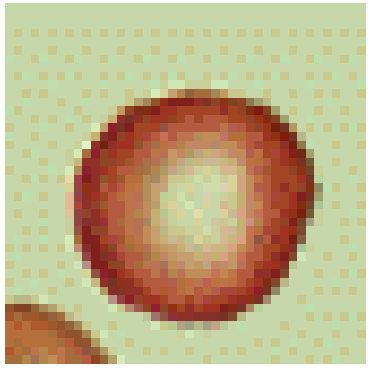
The Cell



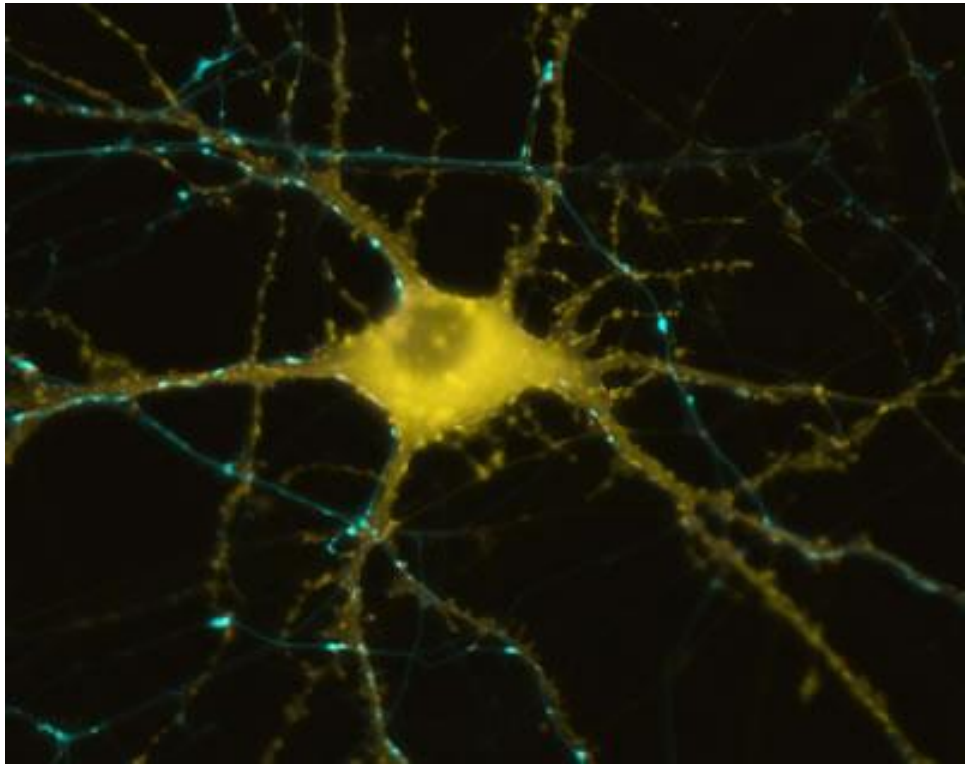
Cells are Diverse





Cells are the basic units of function in all living things

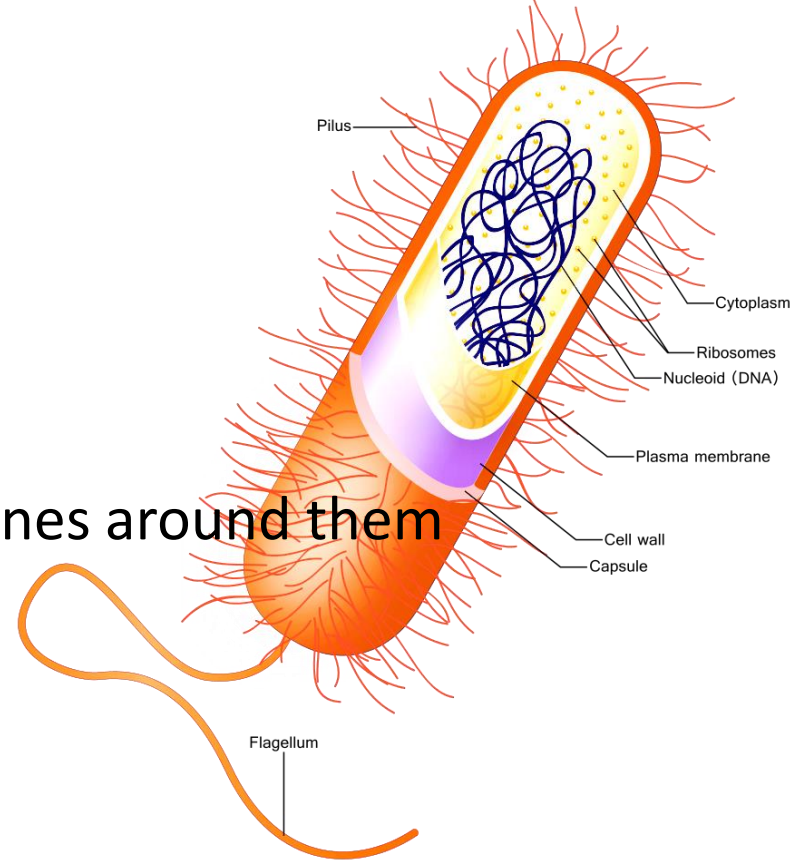
- Both in size, shape, and internal organization.
- Animal and plant cells have unique forms that allow each to take part in processes necessary for the cell and/or living organism to survive



Two main types of cells

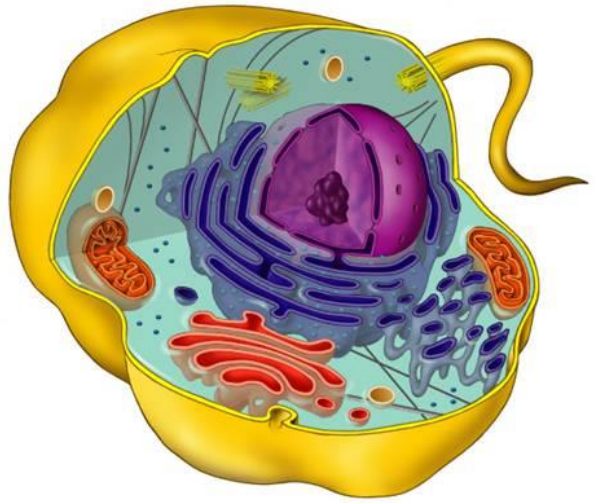
Prokaryotic cells

- Simple cells that do not have organelles with membranes around them
  - Example = bacteria



Eukaryotic cells

- More complex cells with organelles that have a membrane around them
- Examples = plants and animals

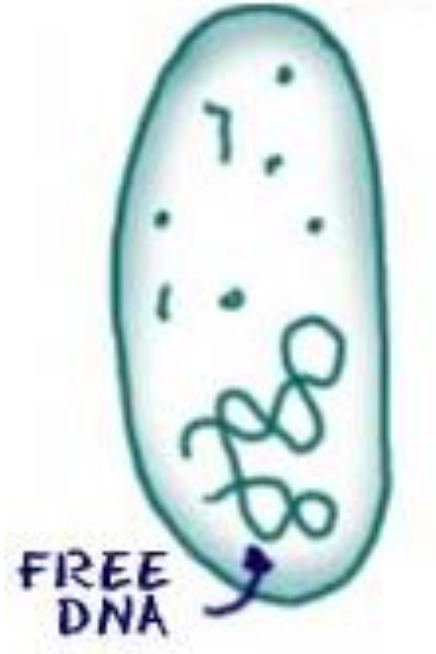


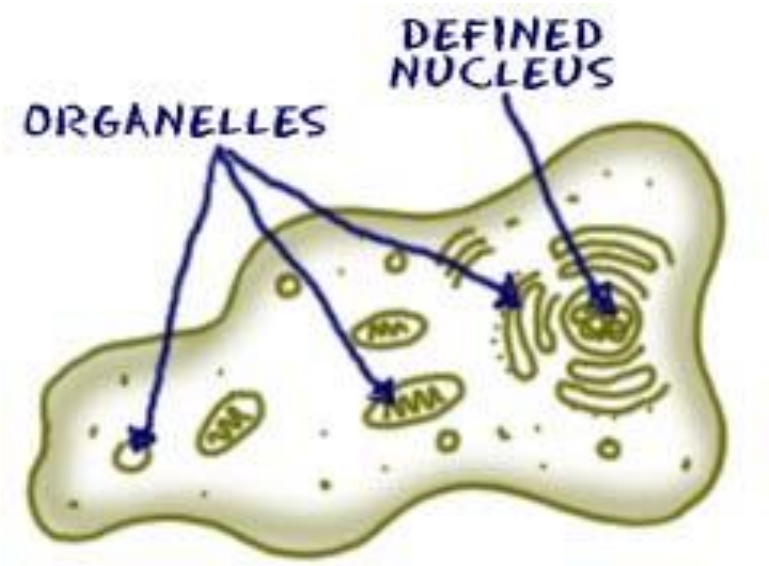
The Discovery of Cells

Prokaryotic

before

nucleus





Eukaryotic

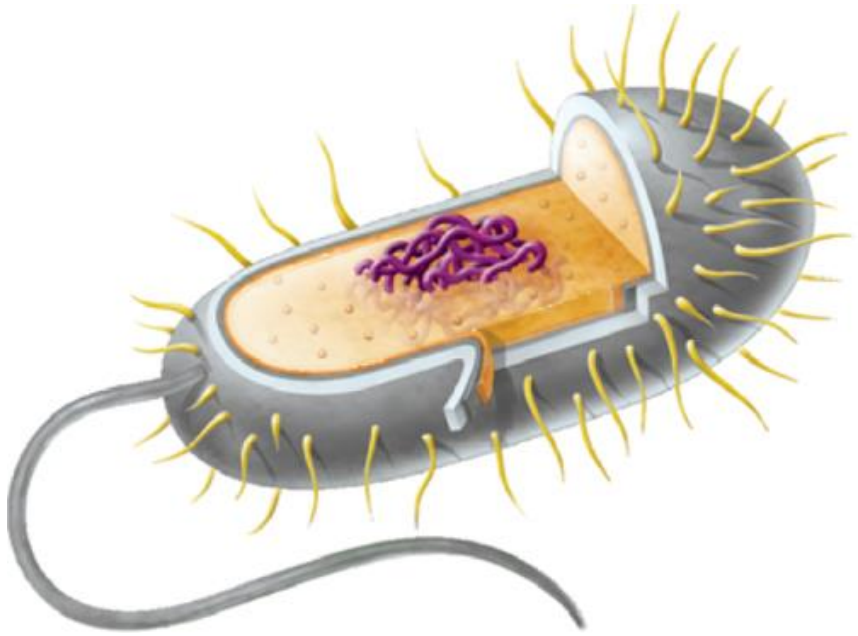
true

nucleus

Timeline

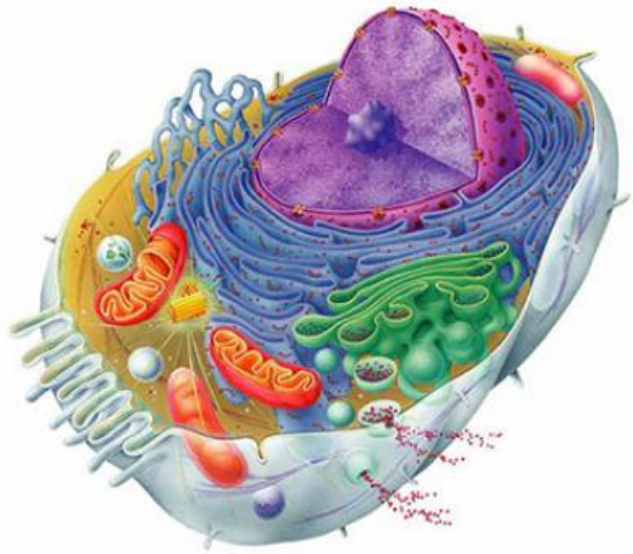
Prokaryotic Organisms:

- First appeared 3.5 billion years ago (BYA)
  - include bacteria

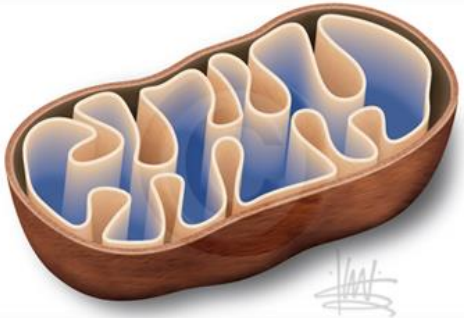


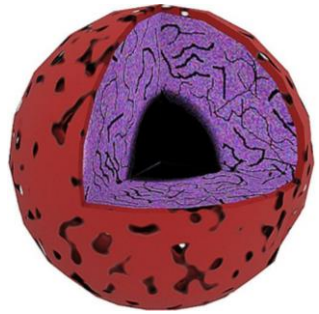
Eukaryotic Organisms:

- First appeared 2.0 BYA
- include fungi, plants and animals



What is inside a cell?

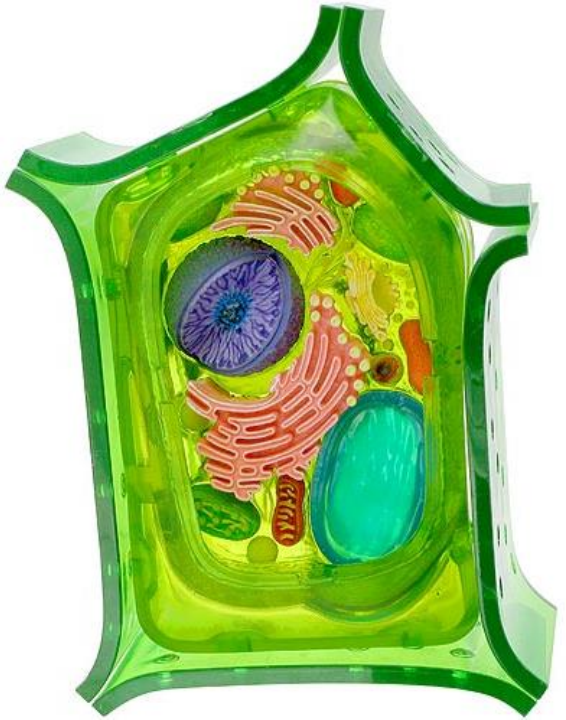


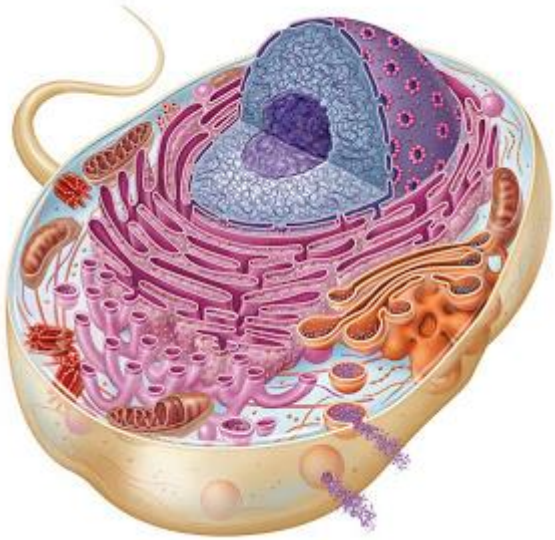


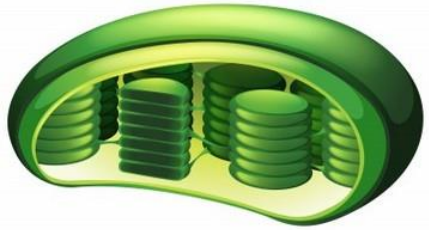
- All cells have **organelles**
  - **Organelles** are specialized structures inside a cell that perform specific functions/tasks that help the cell to survive

Typical Cell Structures:

- Cell membrane
- Nucleus
- Cytoplasm
- Mitochondria
- Vacuoles
- Cell wall
- Chloroplasts



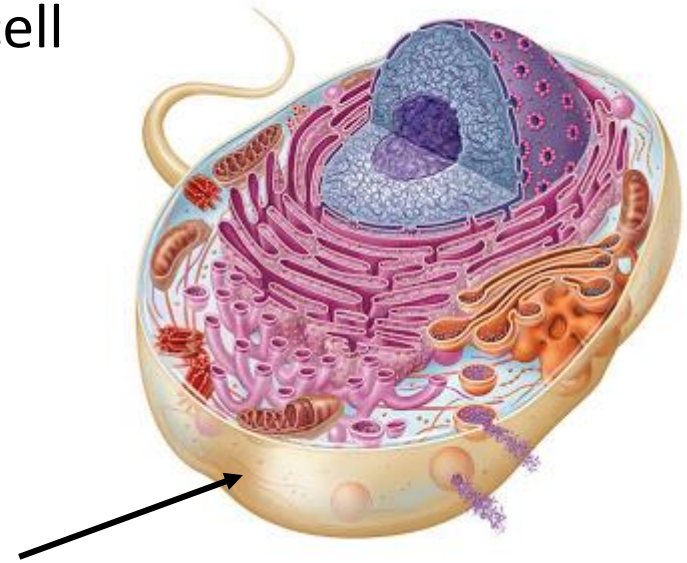




Cell Organelles

Cell Membrane

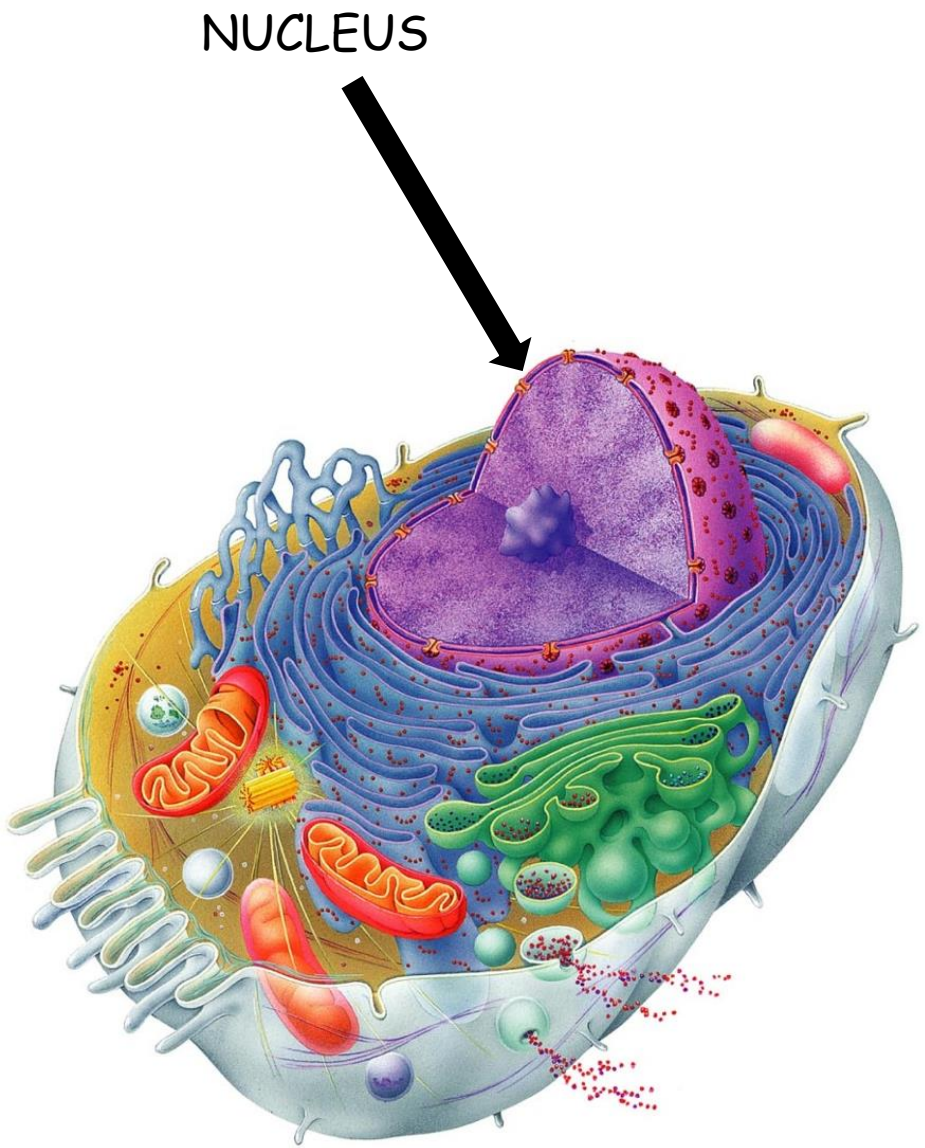
- Found in both plant and animal cells
- Like a skin that surrounds the whole cell
- Keeps the inside of the cell separate from what is outside of it
- Surrounds and protects the contents of the cell
- Controls the movement of materials in and out of the cell



Cell Organelles

Nucleus

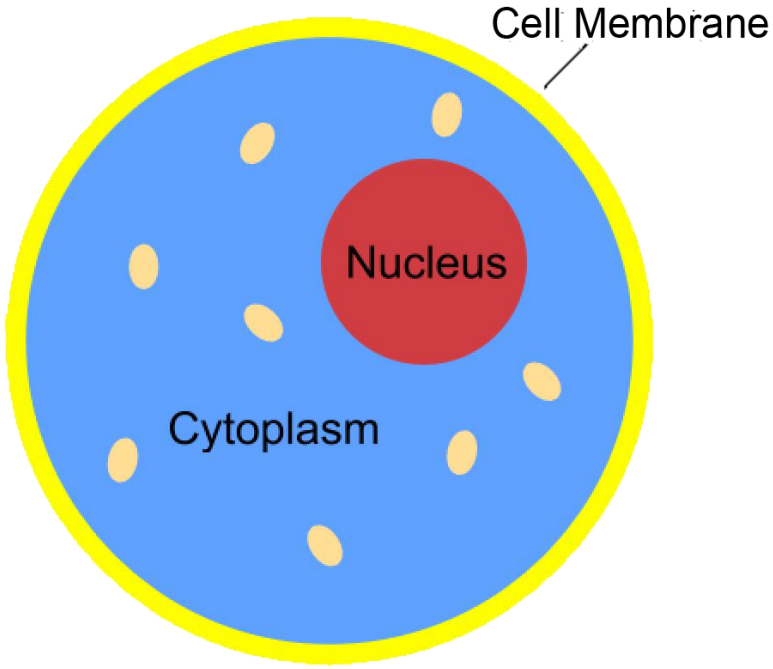
- Found in both plant and animal cells
- Large round structure and is often visible
- Contains the chromosomes (contains DNA)
- The "control centre" of the cell's activities



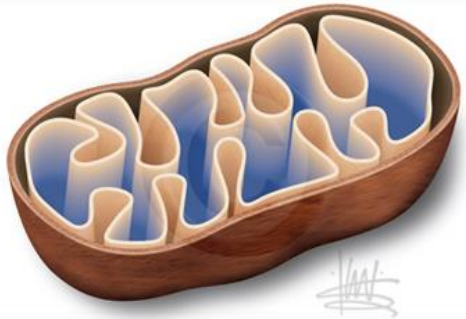
Cell Organelles

Cytoplasm

- Found in both plant and animal cells
- Clear, jelly-like fluid that holds the organelles of the cell in place
- Helps to move materials like food to different parts of the cell

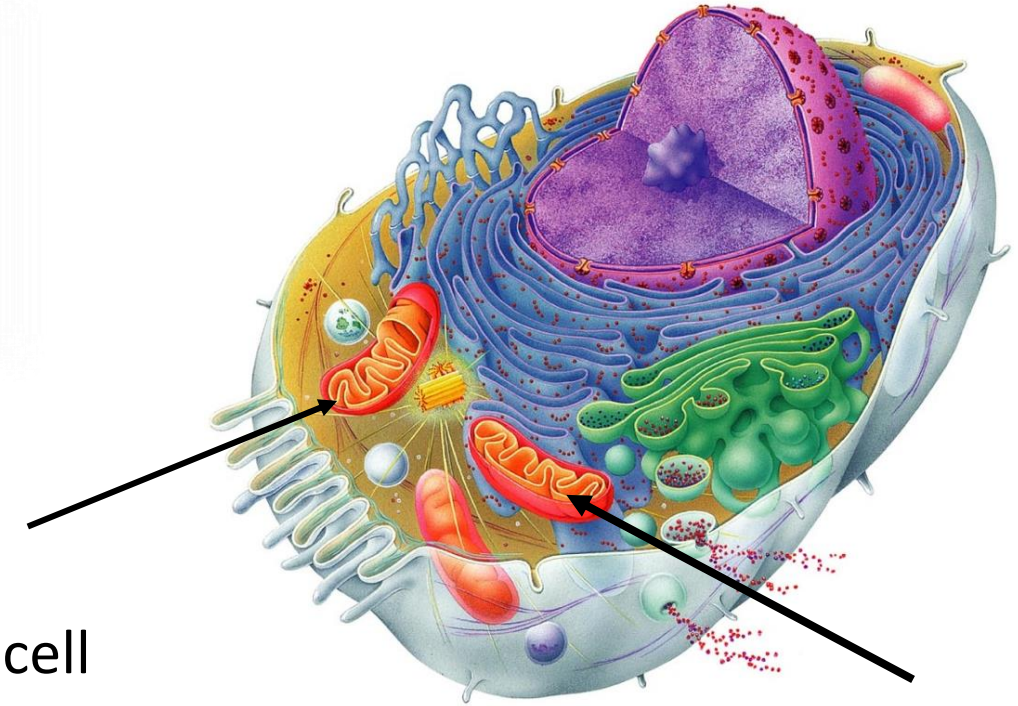


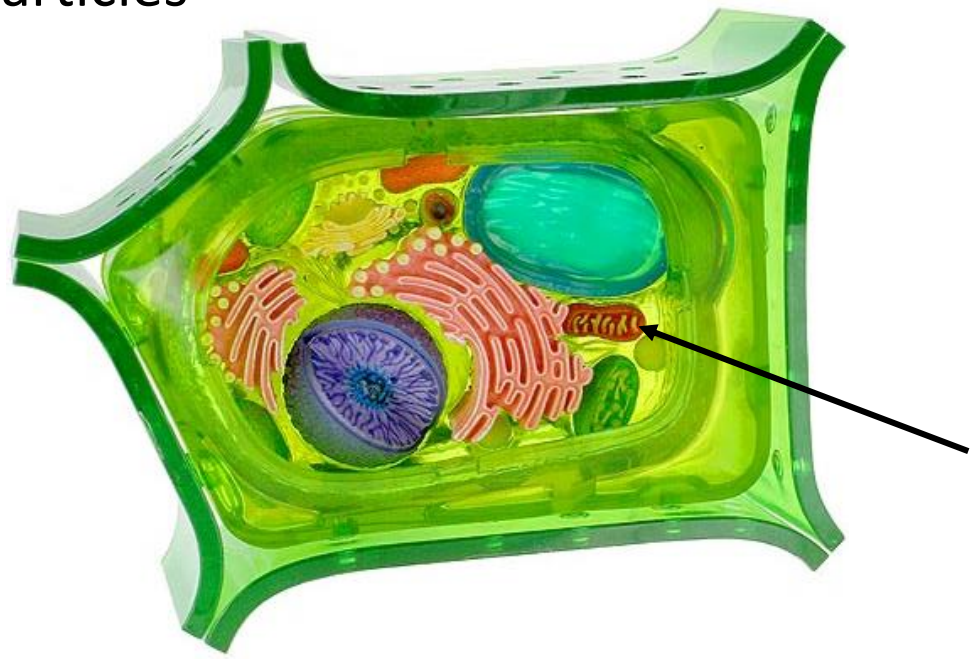
Cell Organelles



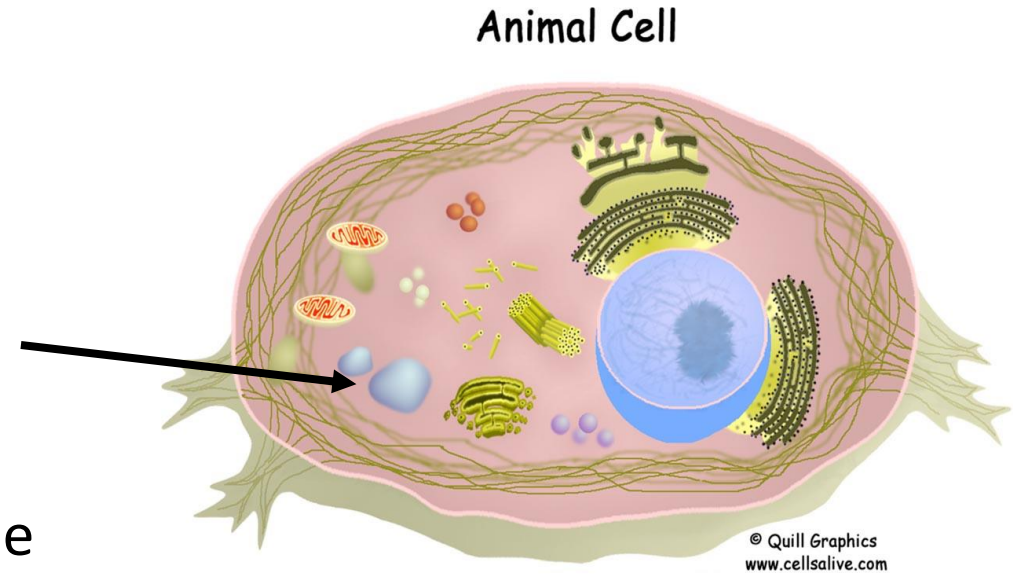
Mitochondria

- Found in both plant and animal cells
- Oval, bean-shaped structures
- They are the energy or “powerhouse” of the cell
- Produces energy by breaking down food particles



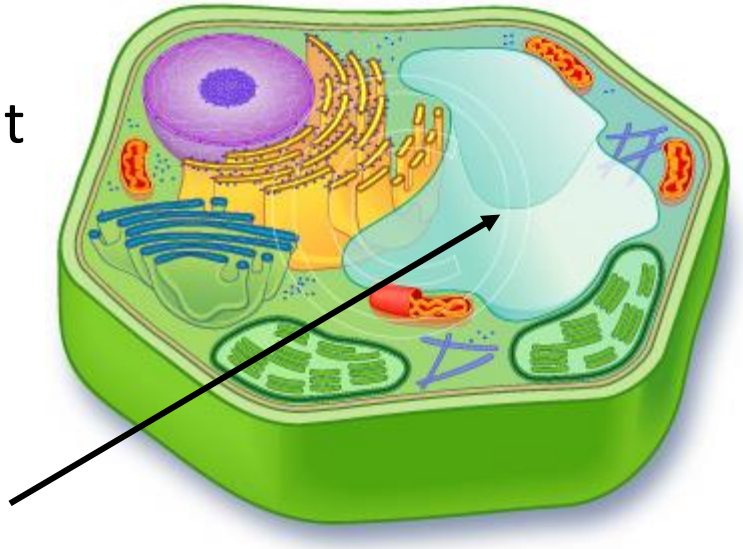


Cell Organelles



Vacuoles

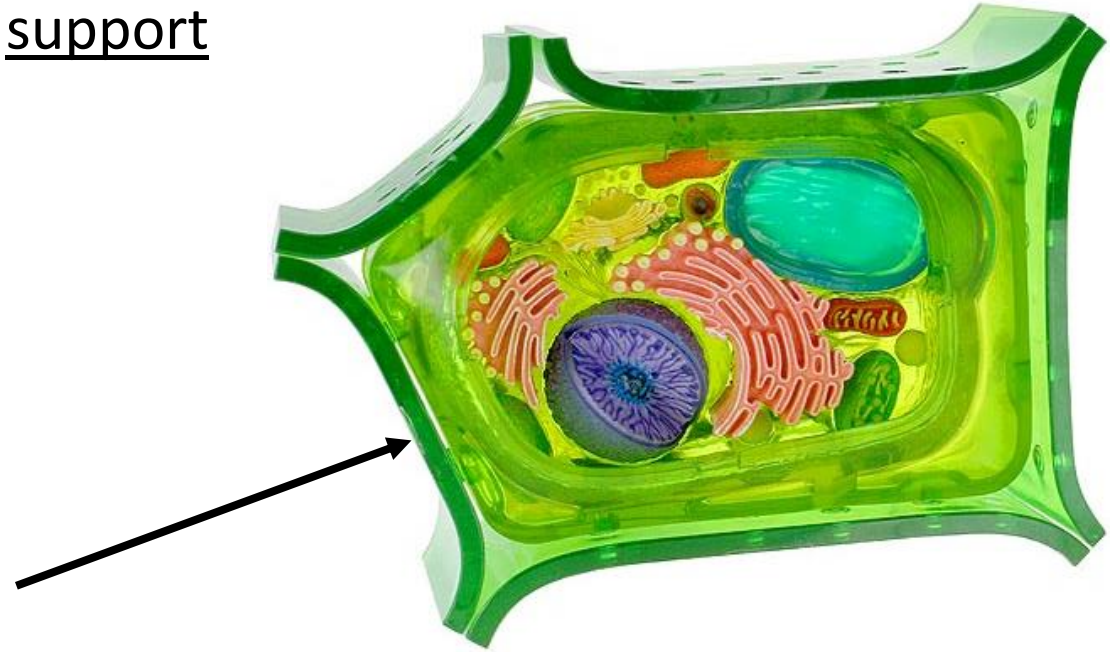
- Found in both plant and animal cells
  - Plant cells usually have one large vacuole
  - Animal cells have many small vacuoles
- Balloon-like spaces in the **cytoplasm**
- Store materials that cannot be used right away
- Store waste for a short time until the cell can get rid of it



Cell Organelles

Cell wall

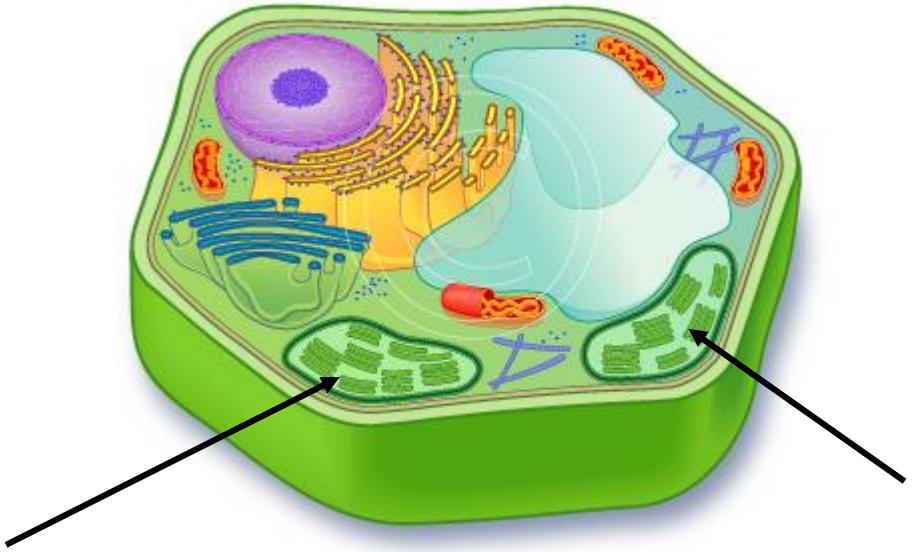
- Found only in plant cells
- Tough, rigid structure that gives plant cells their box-like shape
- Surrounds the cell membrane of plant cells
- Gives plant cells protection and support
- Made of mostly cellulose
    - We cannot digest cellulose



Cell Organelles

Chloroplasts

- Found only in plant cells
- Green coloured structures that contain <u>chlorophyll</u>
- Trap the Sun's light energy and change it to <u>chemical energy</u> for use by the cell → <u>photosynthesis</u>



Cell Organelles Summary

	PLANT	ANIMAL
Cell membrane		
Nucleus		
Cytoplasm		
Mitochondria		
Vacuoles	 Large and usually only 1	 Small and many
Cell wall		
chloroplasts		

Animal Cell

Plant Cell