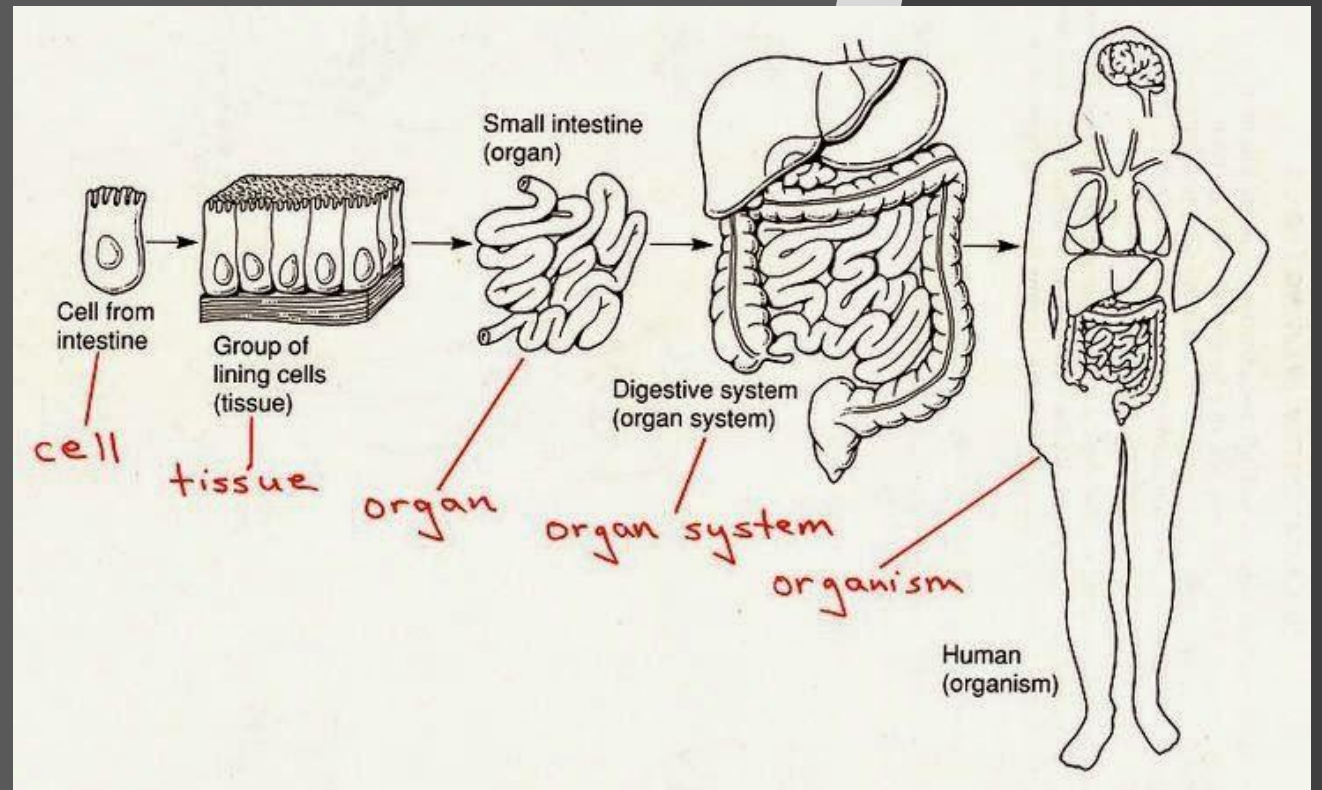


# Cell Review

# Cells... Again!!!

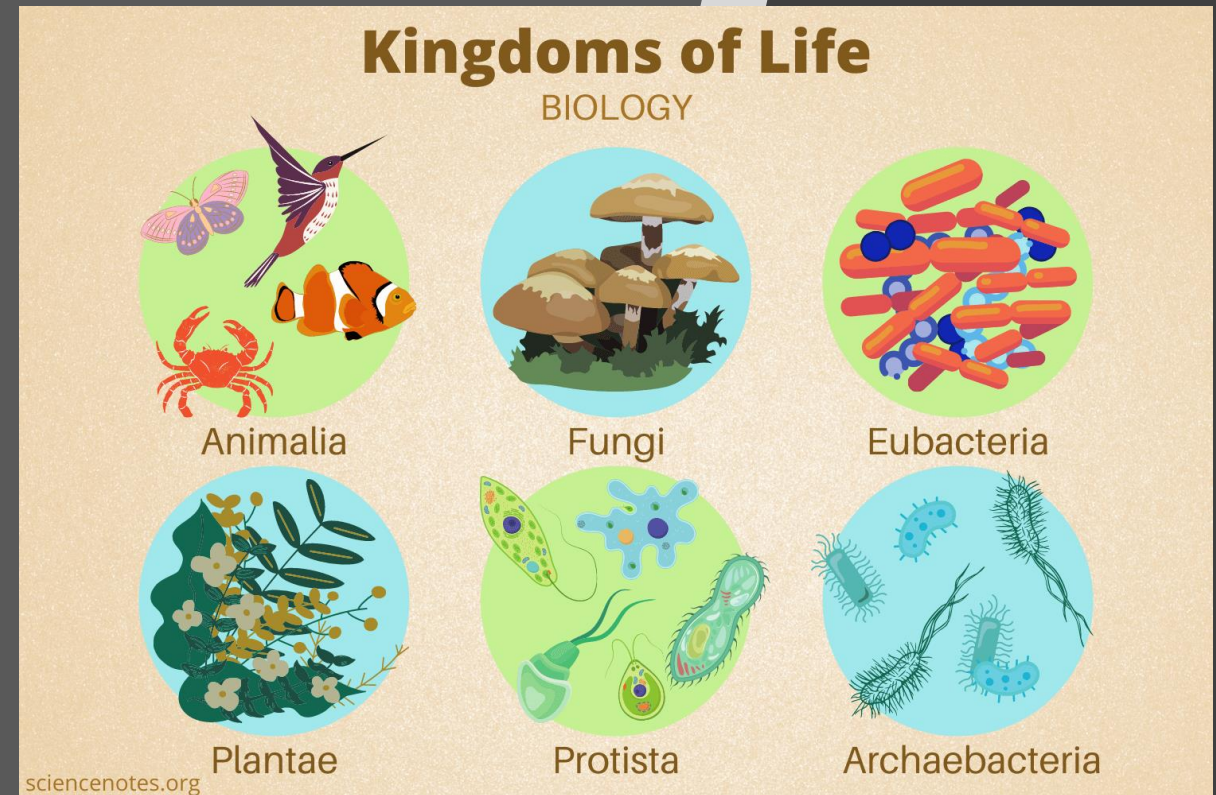
Organisms > Organ System > Organ > Tissue > Cell > Organelle > Molecule (protein) > Atom

- An organelle literally translates to “small organ”.
- They serve many roles in the cell such as energy processing, information centers, waste disposal, transportation, storage, and more!



# Kingdoms of Biology

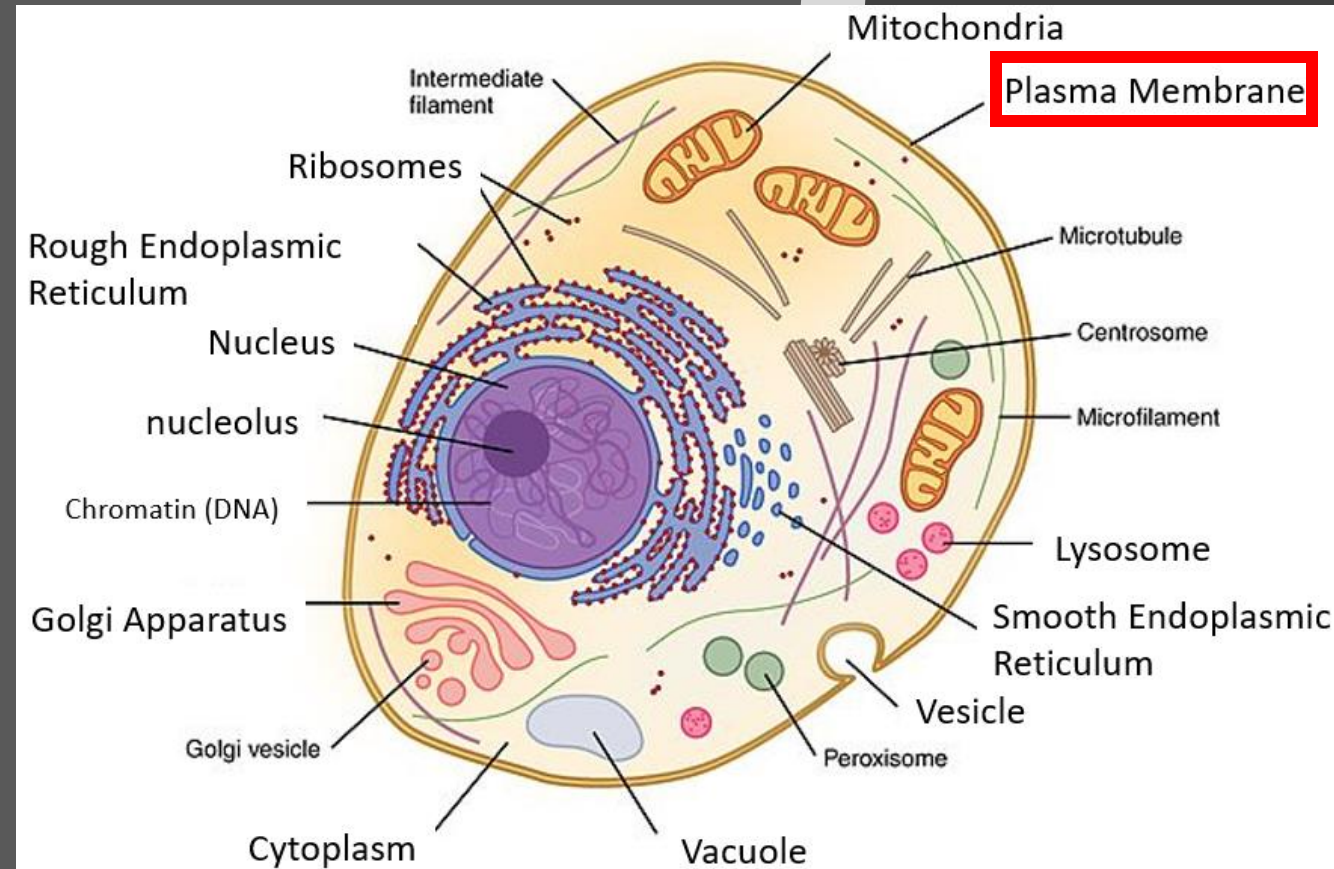
- There are 6 main kingdoms of life, each having unique qualities, such as different cells
- Each kingdom contains countless organisms that share similarities in their cell structures



# Animal Cell Organelles

## Plasma Membrane (Cell Membrane)

- The main membrane that encloses and protects the cell
  - Small molecules can pass through at will
  - Bigger molecules need special pores
- It can be flexible and can be used to surround and eat external molecules



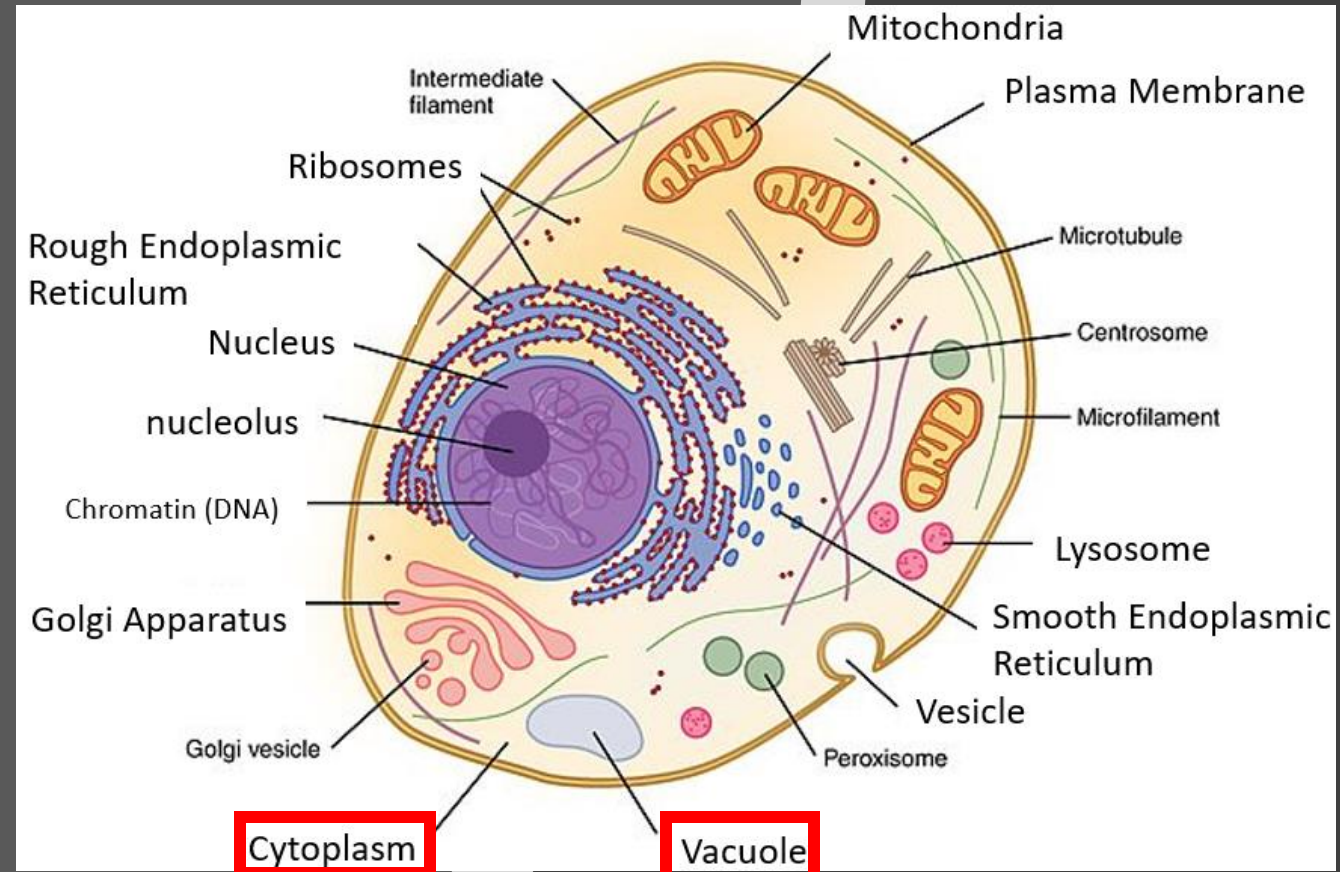
# Animal Cell Organelles

## Cytoplasm (NOT AN ORGANELLE)

- Gel-like fluid that fills a cell
- Is 80% water, but is thicker than water
- Surrounds the organelles and allows for many reactions to occur

## Vacuole

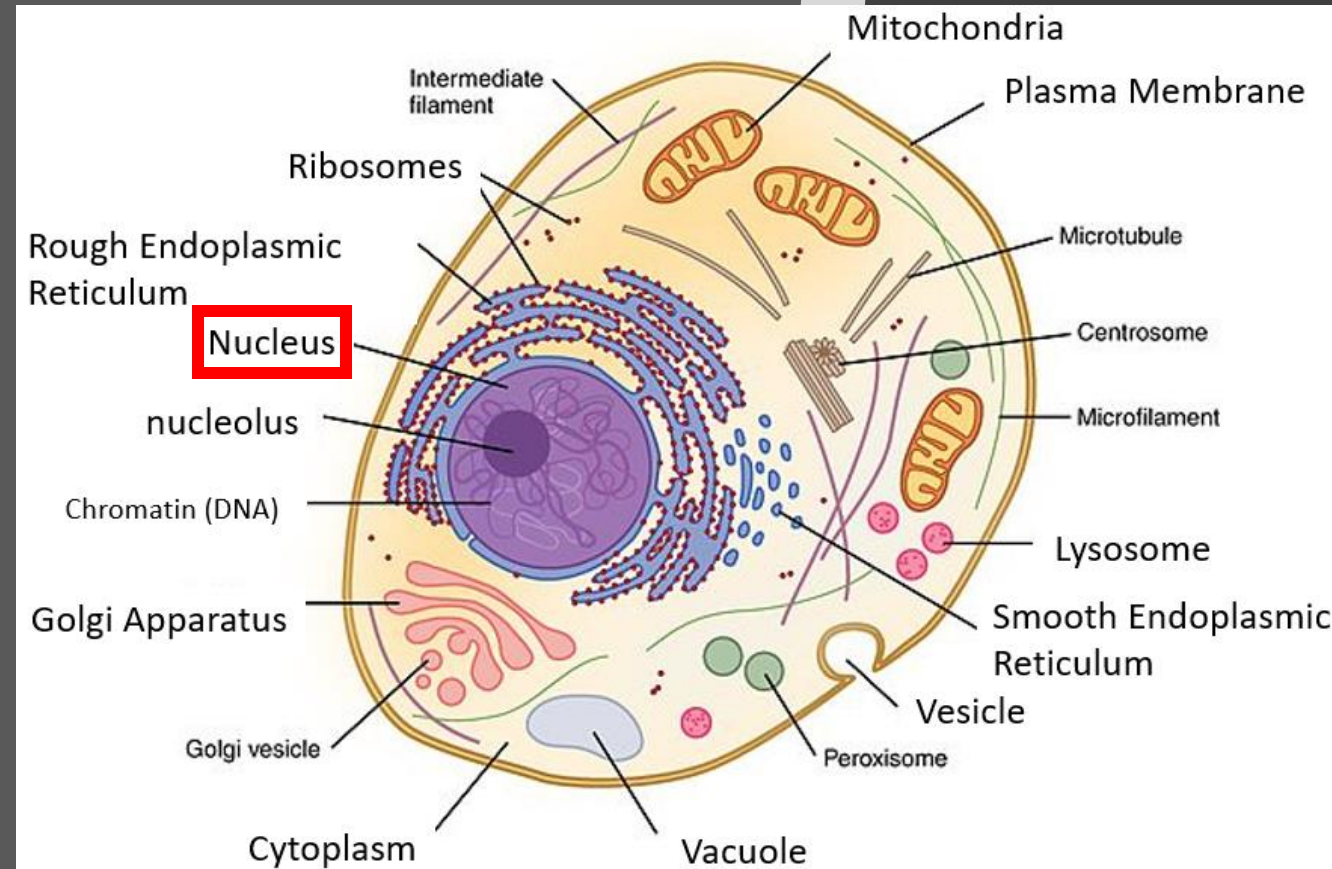
- Membrane surrounded sac
- Contains water, nutrients, and some proteins
- Functions as a storage for the cell



# Animal Cell Organelles

## Nucleus “the kernel”

- Usually located in the middle of the cell (not always)
- Has a nuclear membrane
  - **A membrane is a barrier the cell uses to keep separate**
- Contains DNA (the cell blueprints) and a nucleolus
  - DNA holds the instructions to make proteins that do everything in the cell
- Is the control center/decision maker for the cell
- Missing in red blood cells



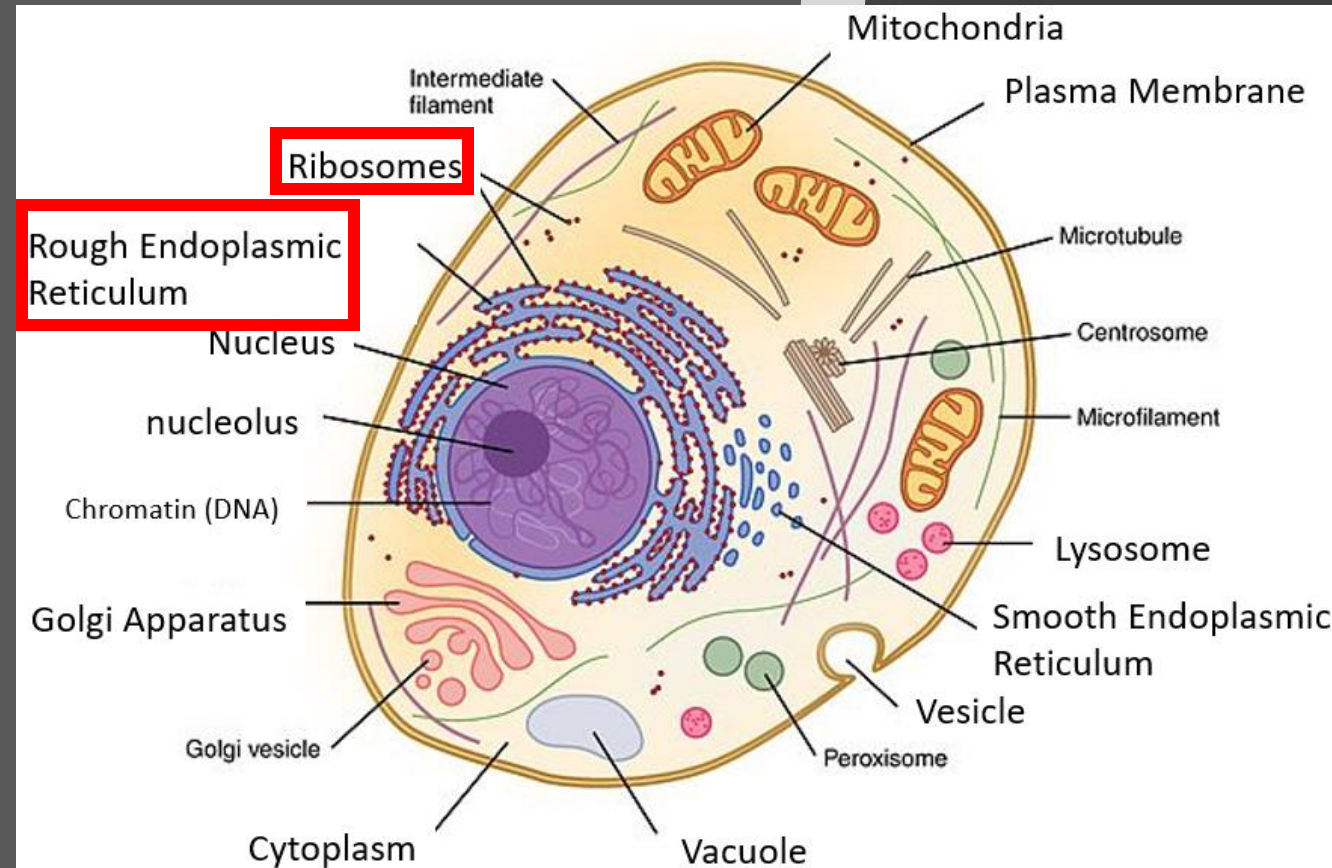
# Animal Cell Organelles

## Rough Endoplasmic Reticulum (RER)

- Membrane bound
- Attached to the nucleus
- Has ribosomes attached to its membrane
- Acts as the location where many proteins are made

## Ribosome (NOT AN ORGANELLE)

- Makes proteins
- Located on the RER and free-floating in the cytoplasm

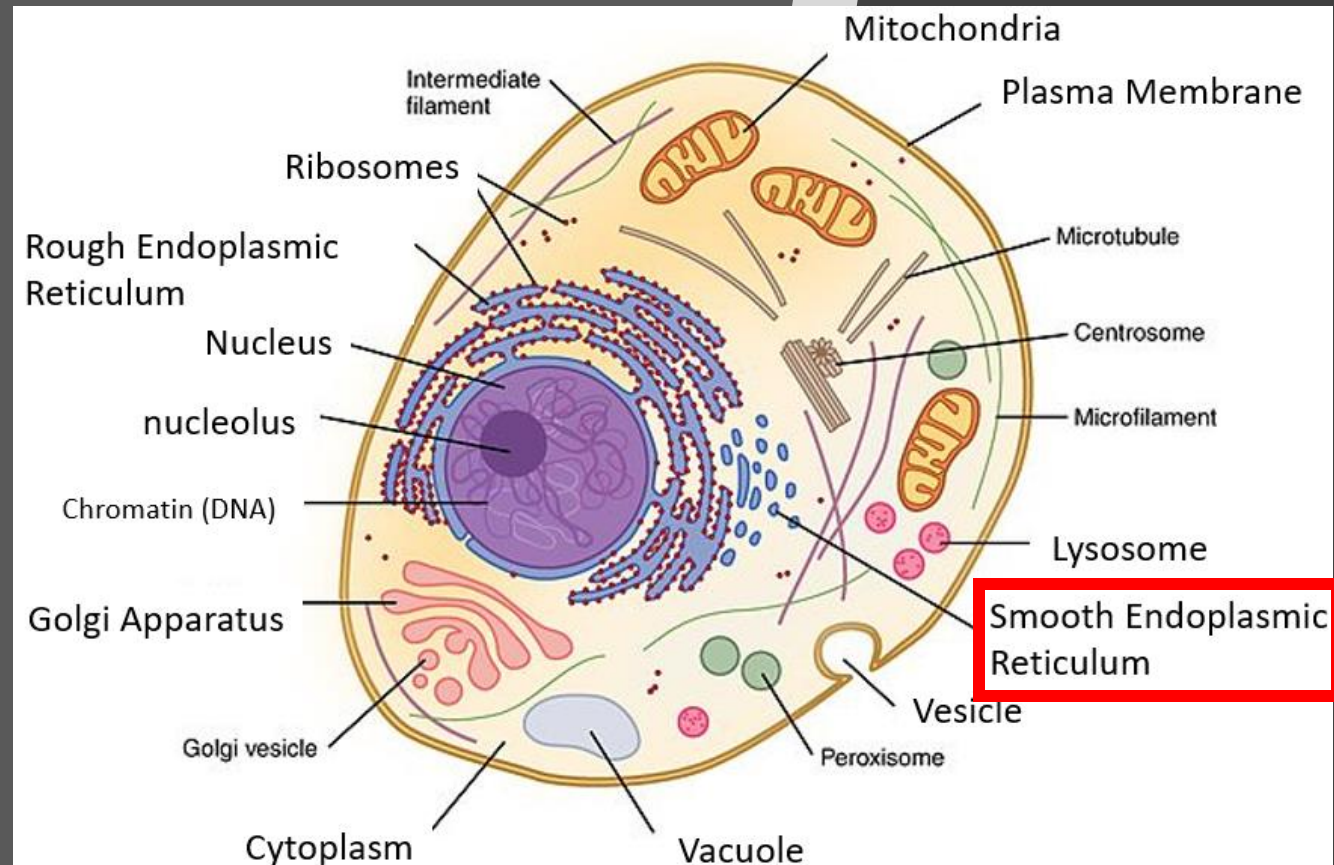


# Animal Cell Organelles



## Smooth Endoplasmic Reticulum (SER)

- Membrane bound
- Usually attached to the nucleus (not attached in picture)
- Has NO ribosomes
- Responsible for making oils and waxes and stores calcium

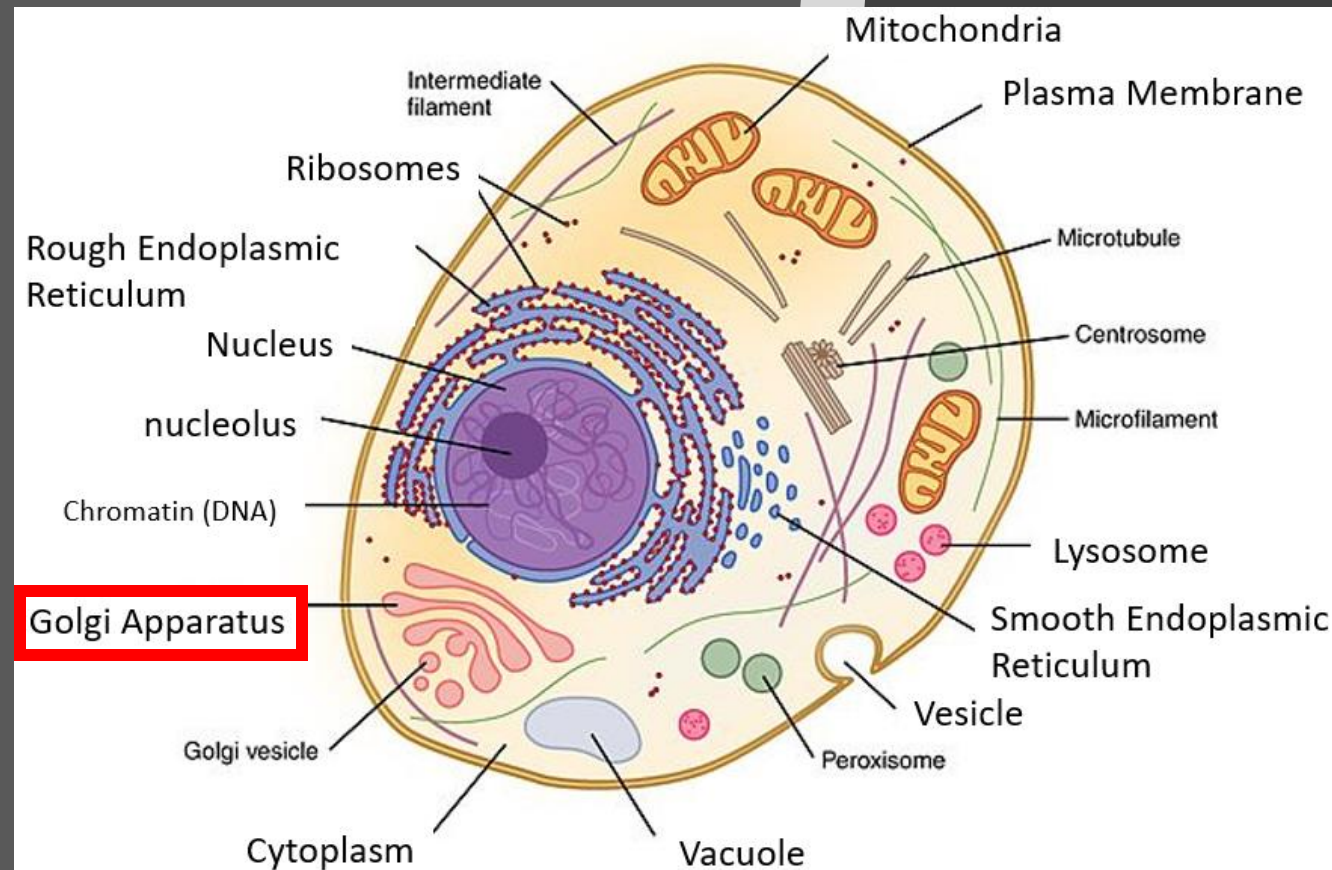




# Animal Cell Organelles

## Golgi Apparatus (Golgi body)

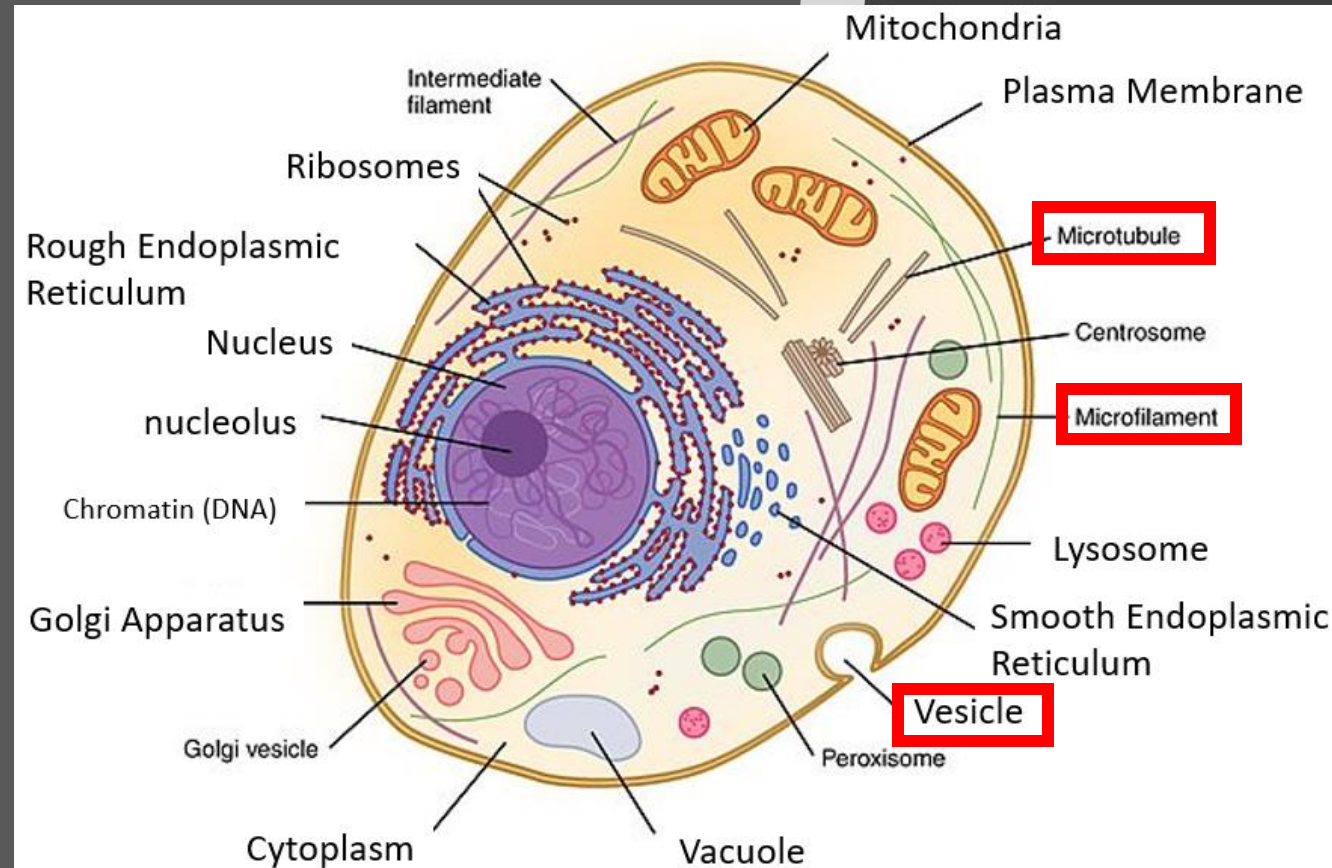
- Membrane bound
- Receives proteins in vesicles from the Rough ER
- Modifies proteins in various ways (can add sugars to them)
- Sends Proteins to needed places in the cell (cell membrane, mitochondria, nucleus...)



# Animal Cell Organelles

## Vesicle (not an organelle)

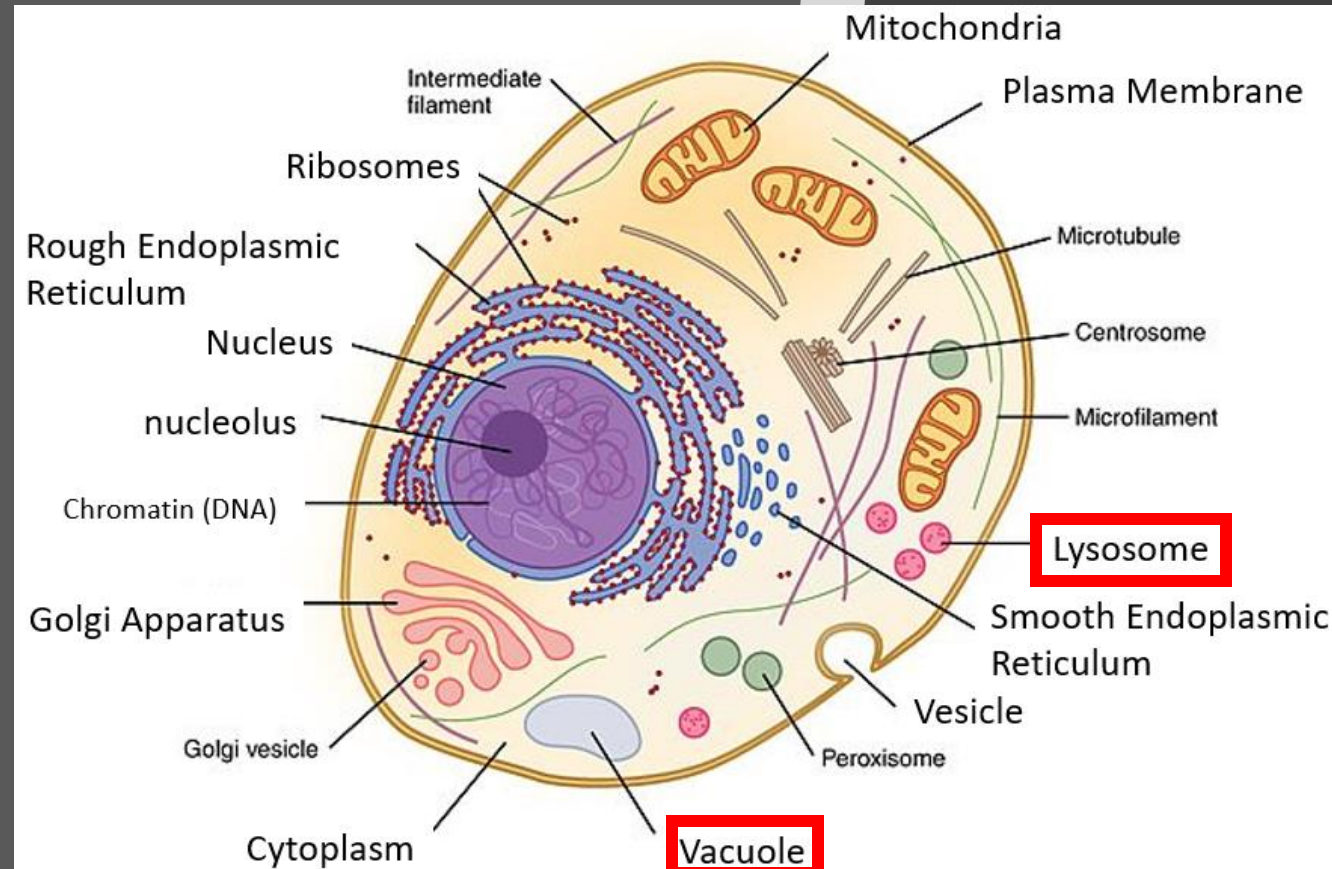
- Transport “pod” for the cell
- Transports proteins and other material around the cell using the cytoskeleton, a transportation network
- Vesicles mainly form at the endoplasmic reticulum, golgi body and plasma membrane



# Animal Cell Organelles

## Lysosome

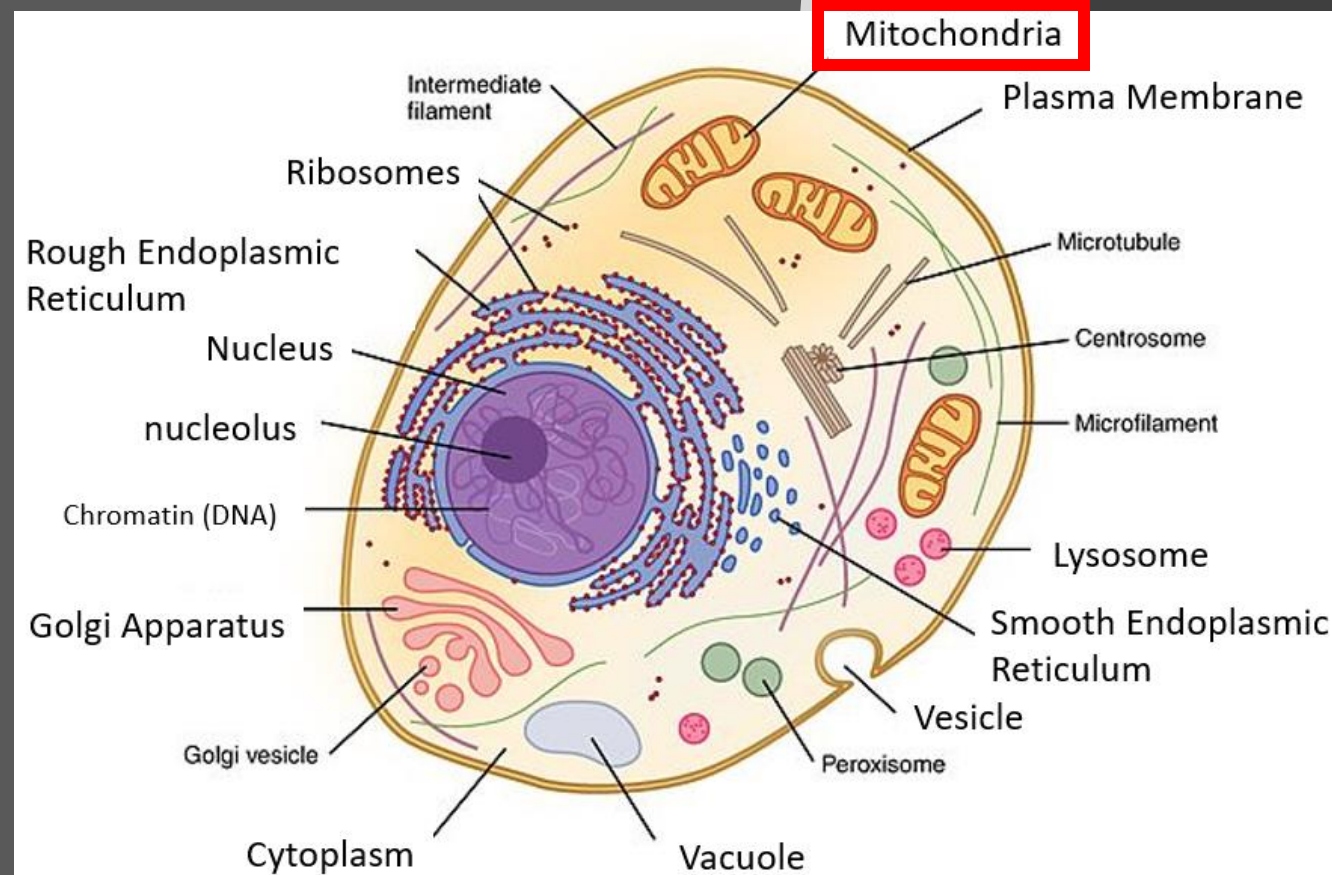
- A vesicle that has acidified
- Breaks down (degrades) proteins, molecules, and even viruses
- The resulting material can be used to create new molecules
- Vacuole
- Membrane surrounded sac
- Contains water, nutrients, and some proteins
- Functions as a storage for the cell



# Animal Cell Organelles

## Mitochondria

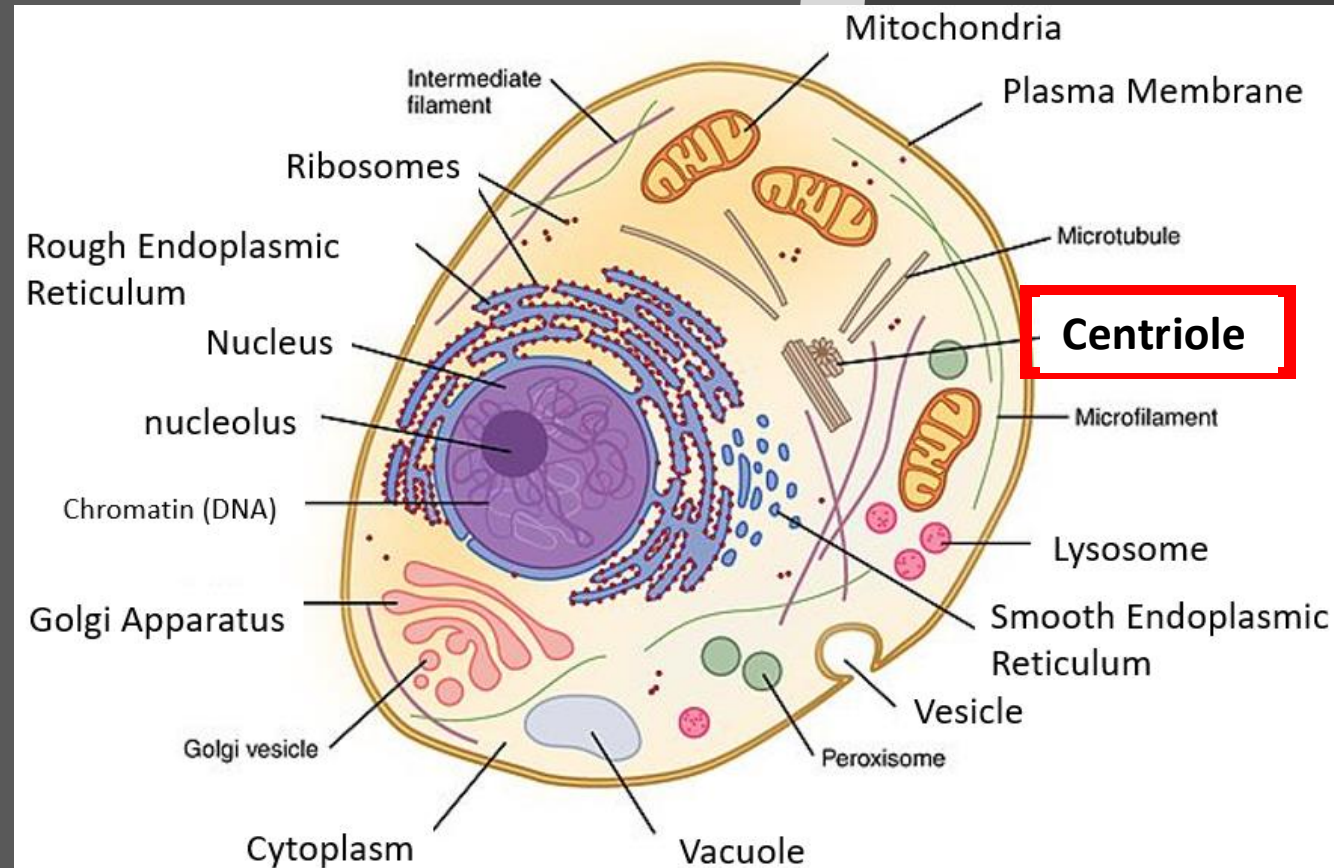
- Membrane bound
- Uses sugars to create energy for the cell using cellular respiration
- Was likely once a free-living bacteria, but was engulfed by a cell and joined with it
- Has its own DNA



# NEW!!! CENTRIOLE

## Centriole

- Used when the cell wants to divide and create new cells.
- The Centriole can create something called the mitotic spindle fibers. These fibers separate chromosomes into each new cell.
- We will come back to this one.

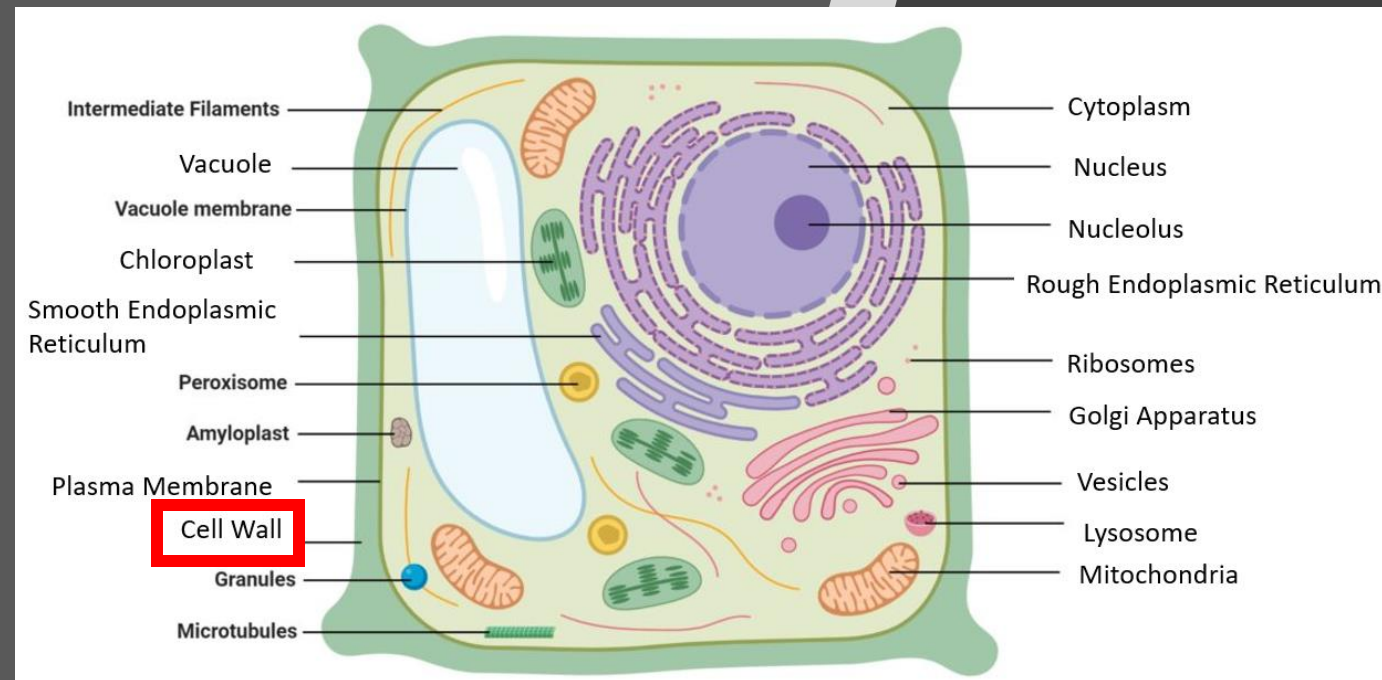


# Special Plant Cell Organelles

Plants have all animal cell organelles and the following:

## Cell Wall

- Located around the plasma membrane of a plant cell
- A tough but rigid structure that provides support and protection

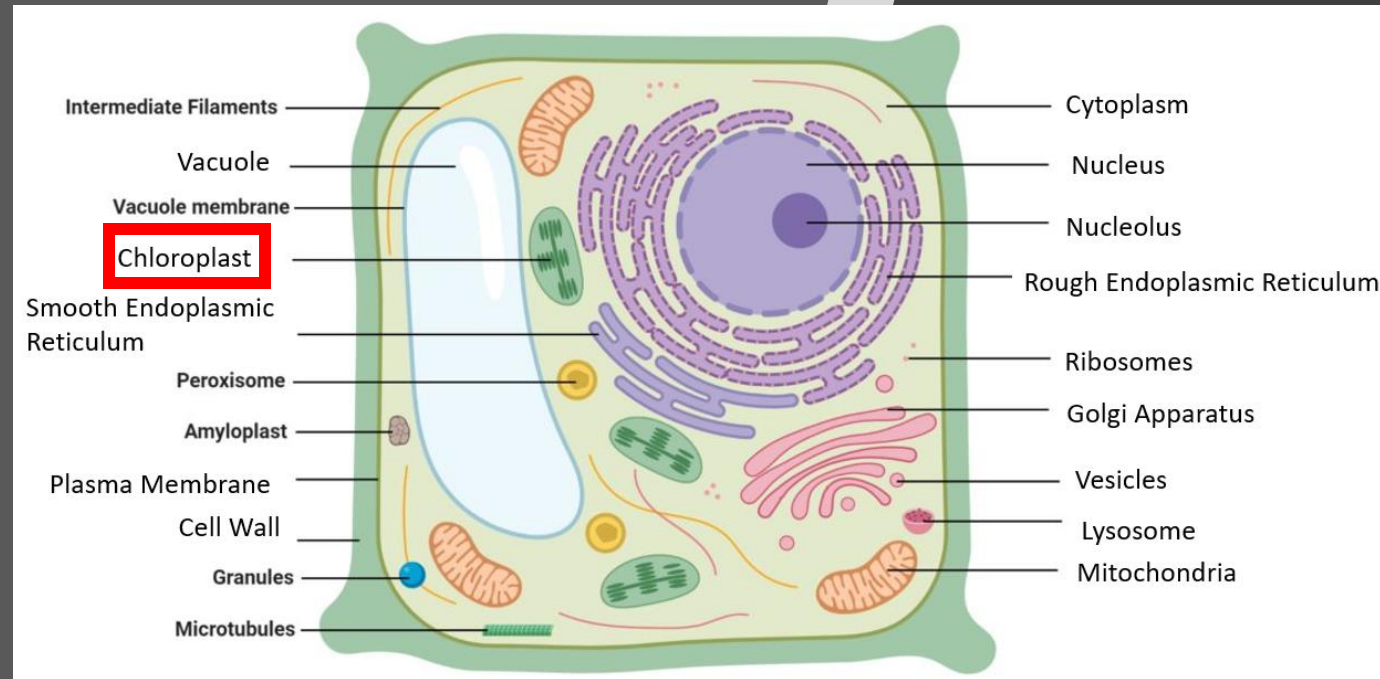


# Special Plant Cell Organelles

Plants have all animal cell organelles and the following:

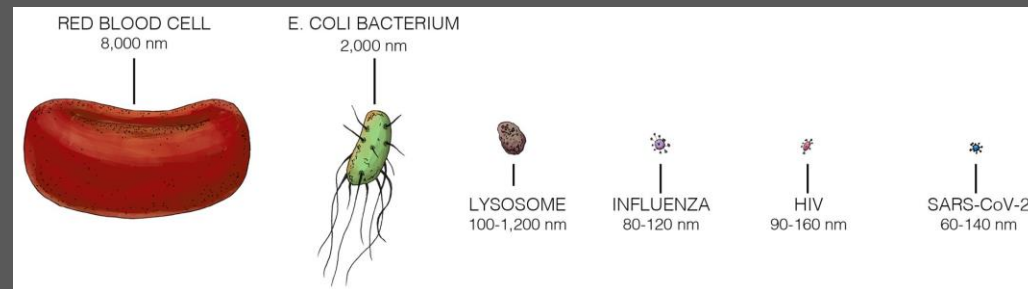
## Chloroplast

- Membrane bound organelle in plant cells
- Contains stacks of chlorophyll which contain a green pigment
- Chlorophyll stacks carry out photosynthesis to use sunlight, carbon dioxide and water to create sugars and oxygen



# Eukaryotic Vs Prokaryotic

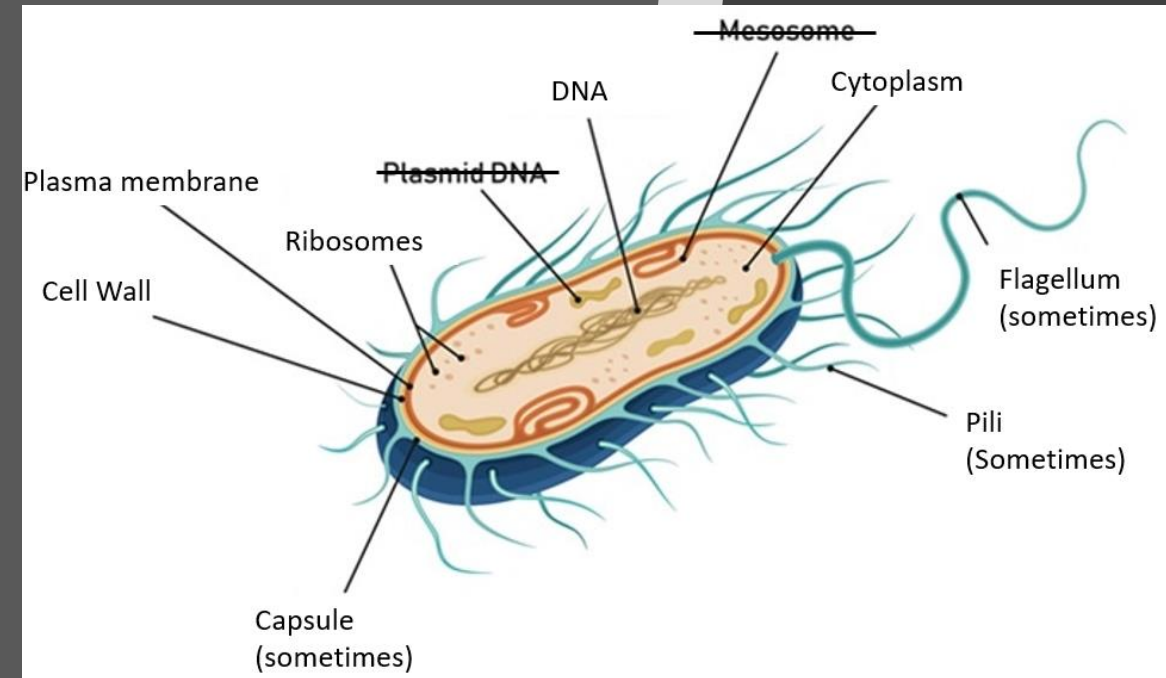
- Eukaryotic cells (Eu = Well/Good. Karyon = Nut/Kernel)
  - Complex
  - Have more organelles than simple Prokaryotic cells
  - **Have a nucleus**
  - Usually bigger
  - Include Plant, Animal, Protists, and Fungi
- Prokaryotic cells (Pro = Before. Karyon = Nut/Kernel)
  - Simple
  - Have fewer organelles, but a few special organelles
  - Less organization
  - **No nucleus**
  - Typically smaller
  - Include eubacteria and Archaeobacteria





# Prokaryotic Cell

- Missing Features:
  - Nucleus
  - SER
  - RER
  - Golgi Apparatus
  - Mitochondria
- Extra features:
  - Capsule – extra layer of defence
  - Flagellum – Tail like structure to propel the cell
  - Pili – small hair like structure that serve many purposes



# Cell Theory

- Cell Theory:
  1. All living organisms are composed of one or more cells.
  2. The cell is the basic unit of structure and organization in organisms.
  3. Cells arise from pre-existing cells.

