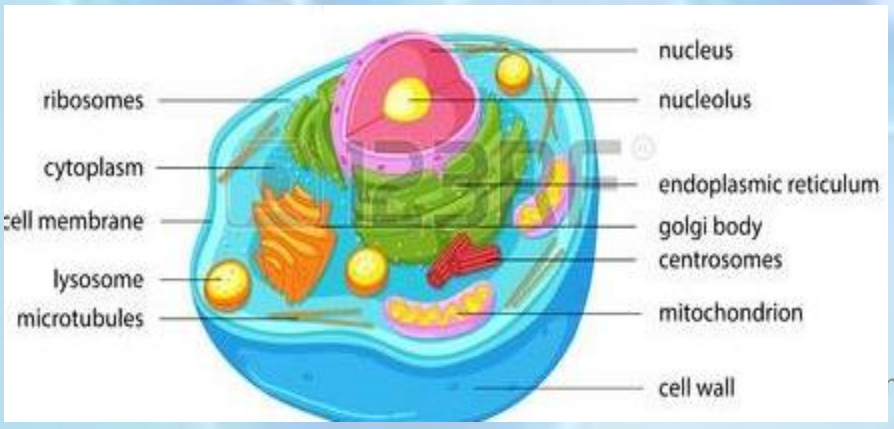
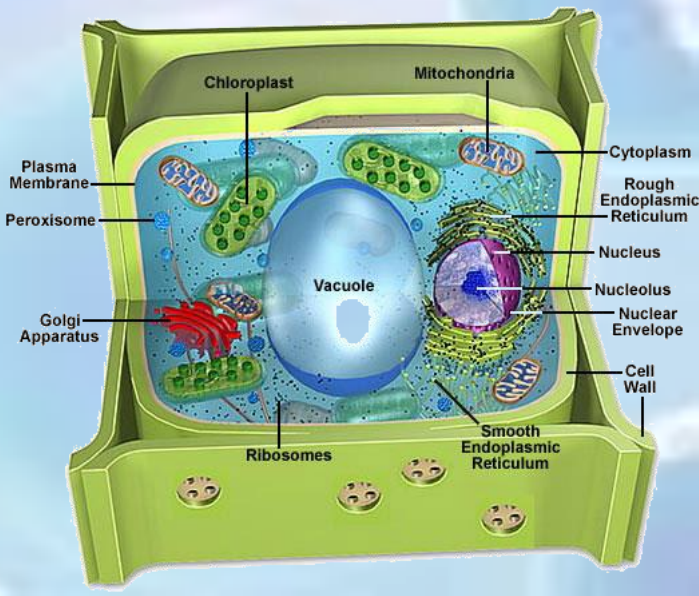
Organelles

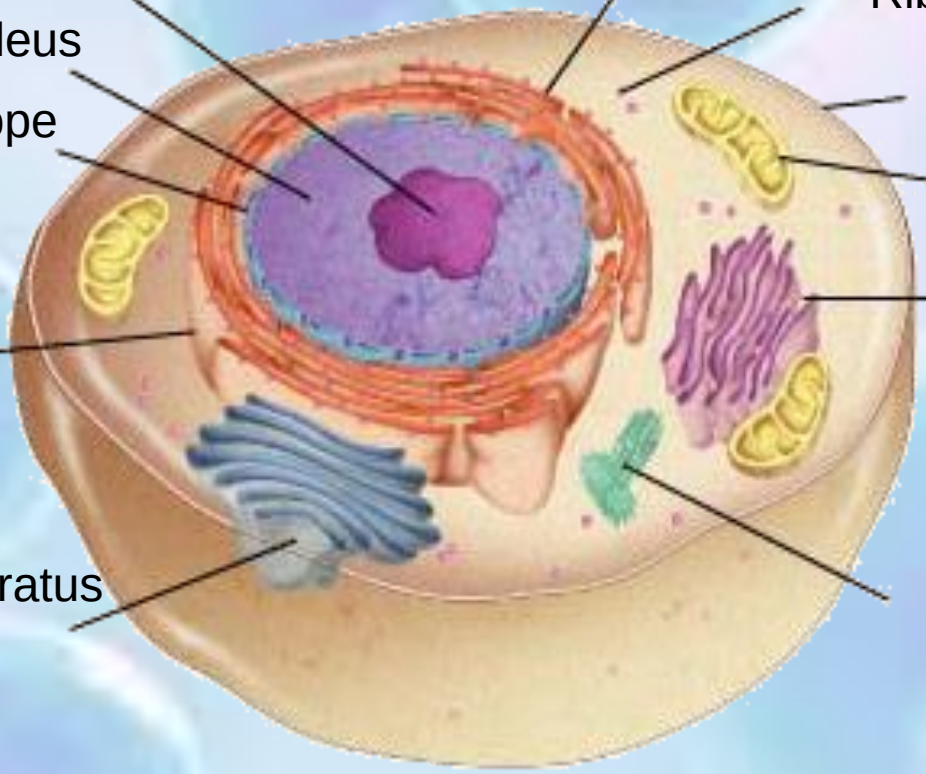
What are Organelles?

- Very **small** (Microscopic) parts of a cell.
- Each type of organelle performs a **specific function** for a cell
- Most organelles are found in the **cytoplasm.**

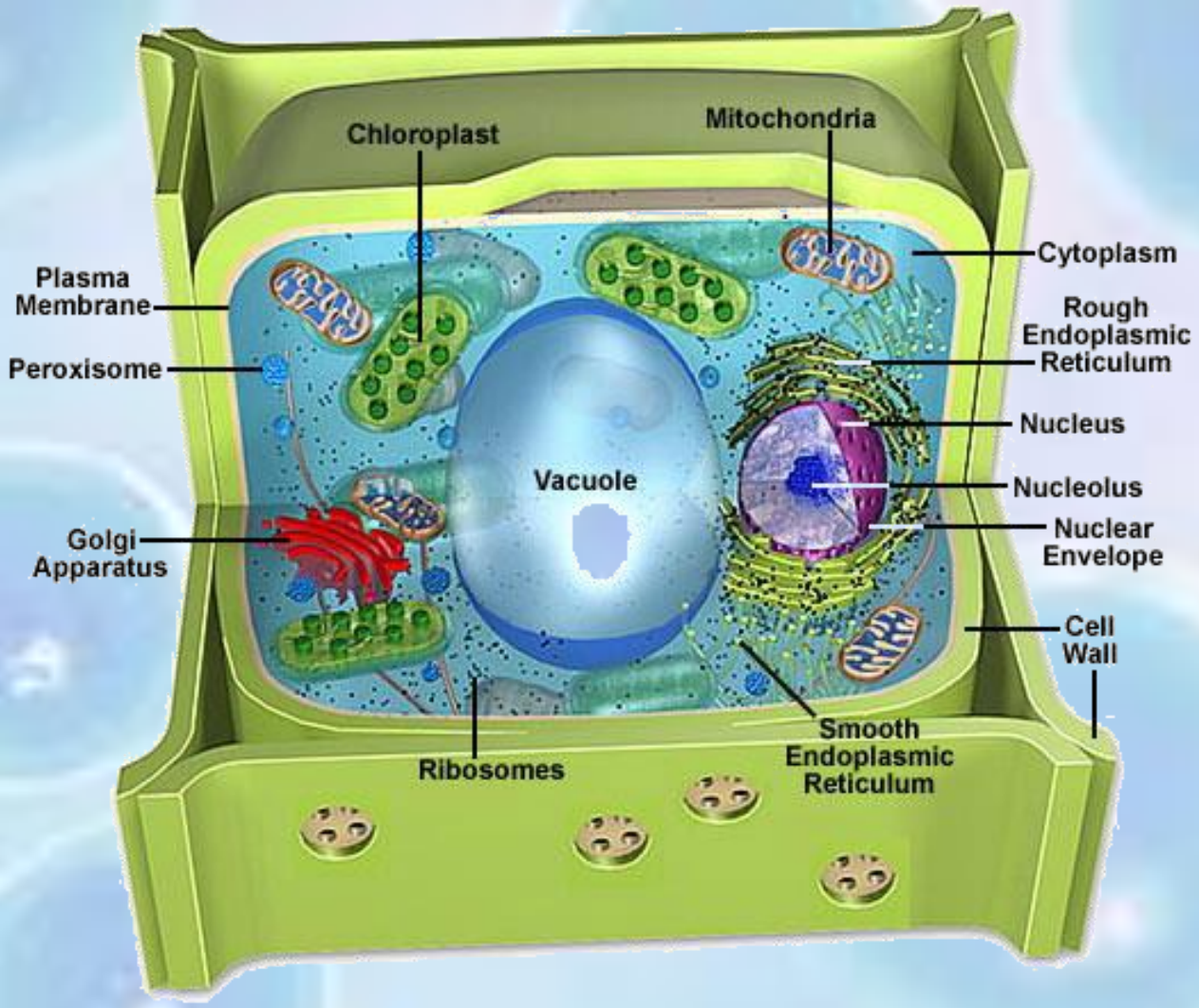




Animal Cell Organelles

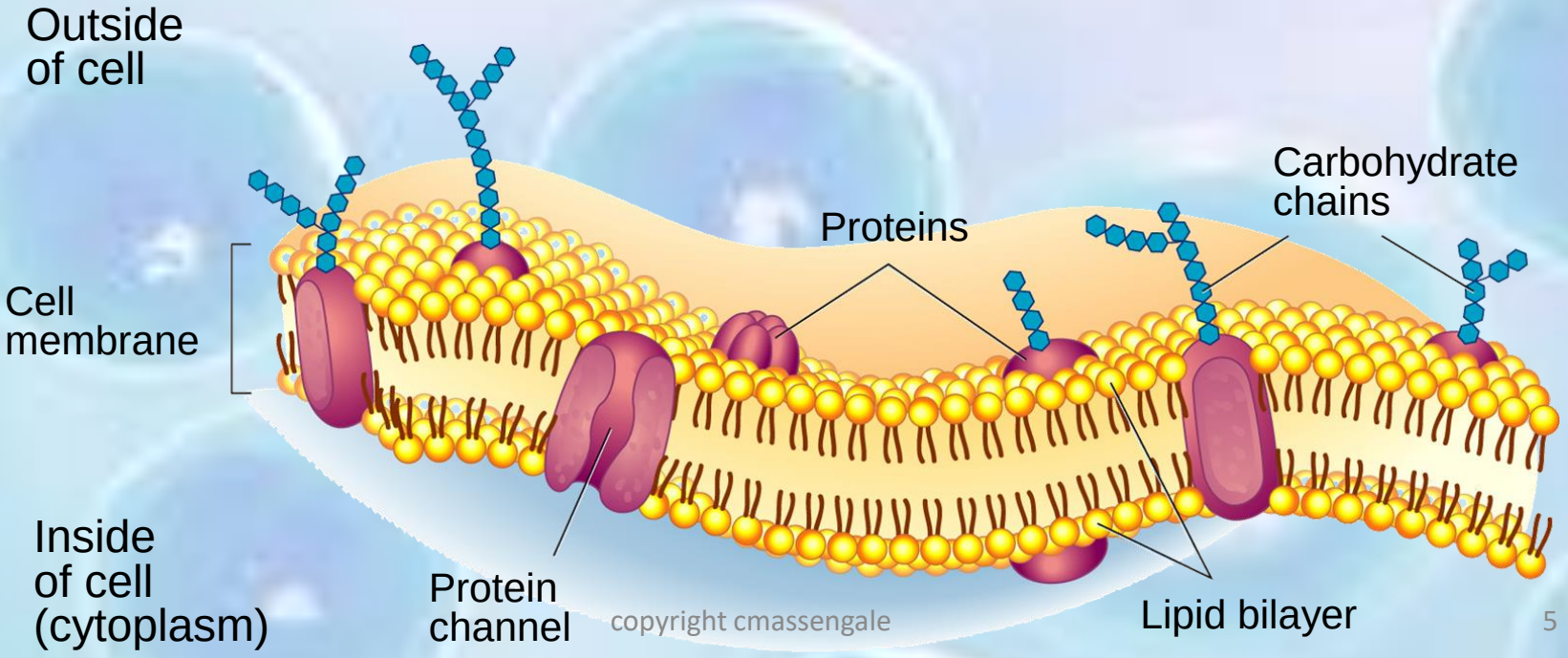


Plant Cell Organelles



Cell Membrane

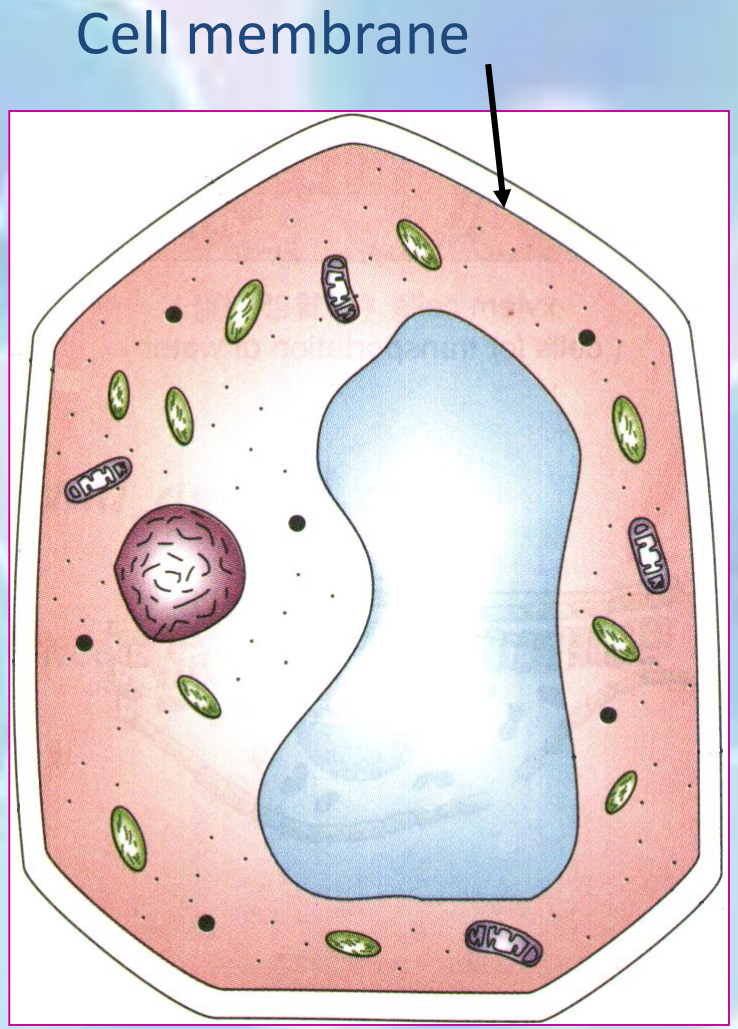
- **Composed of double layer of phospholipids (fats) and proteins**
- **Both plant and animal cells have cell membranes.**
- **The cell membrane controls what enters or leaves the cell**



Cell Membrane in Animal and Plant Cells

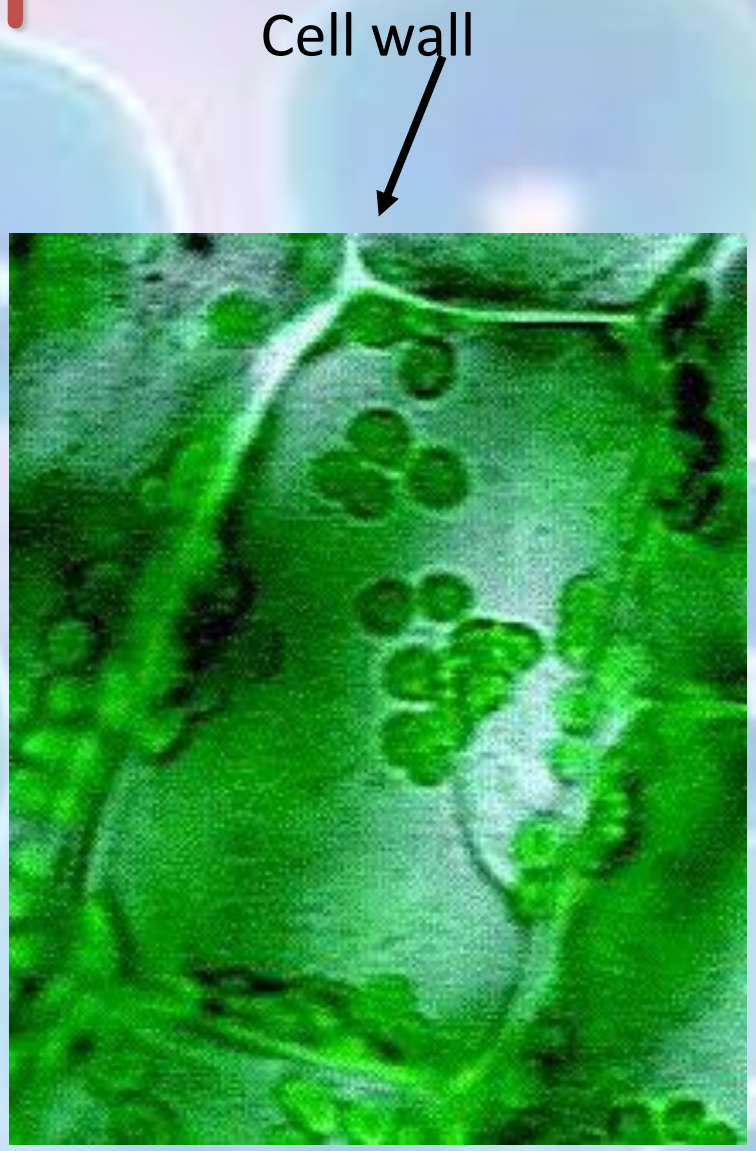
- In animal cells, the cell membrane is the outer-most layer of the cell.

- In plant cells, it lies immediately against the cell wall and pushes out against the cell wall to maintain cell shape



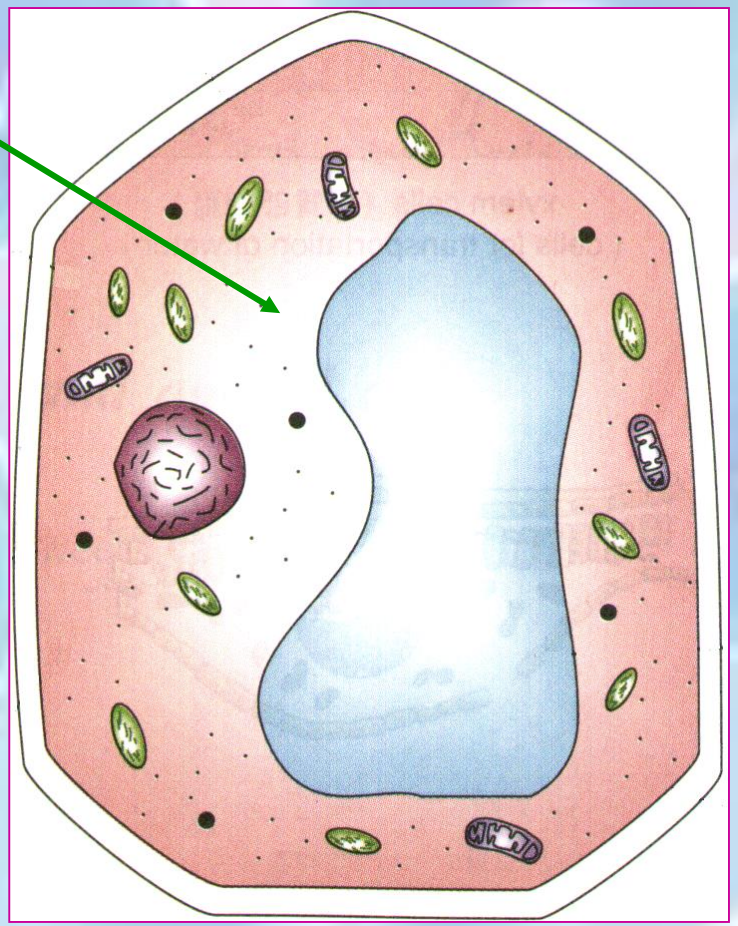
Cell Wall

- Found ONLY in plants, fungi, & bacteria. Animal Cells DO NOT have cell walls.
- Made of cellulose
- **Supports and protects cell**
- **Found outside of the cell membrane**



Cytoplasm of a Cell

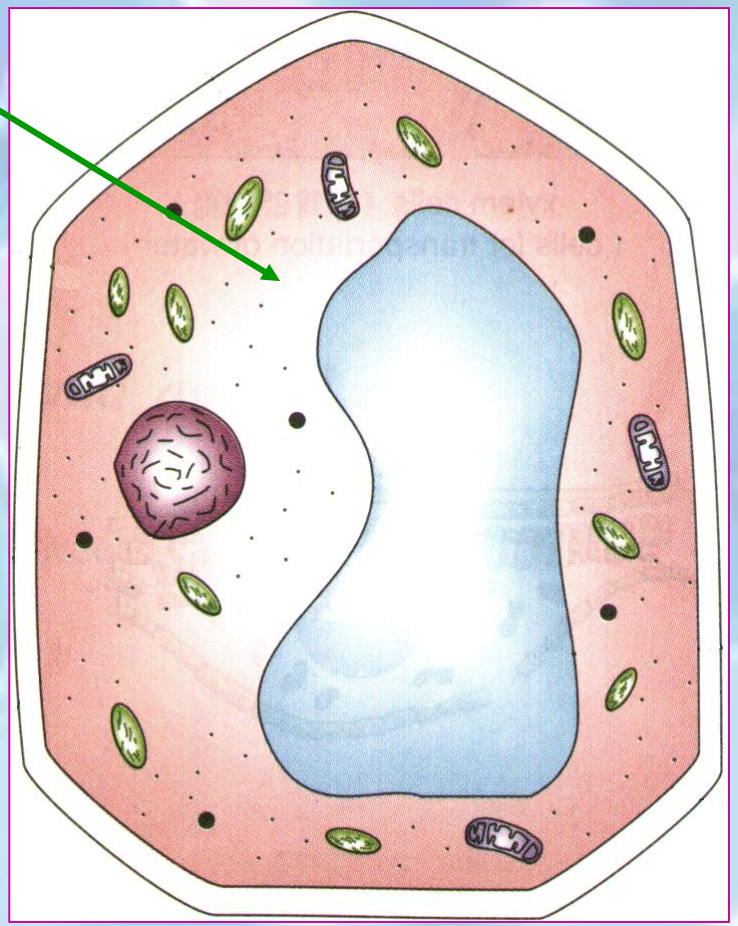
cytoplasm



- Jelly-like substance inside the cell membrane
- Provides an area for chemical reactions to take place

More on Cytoplasm

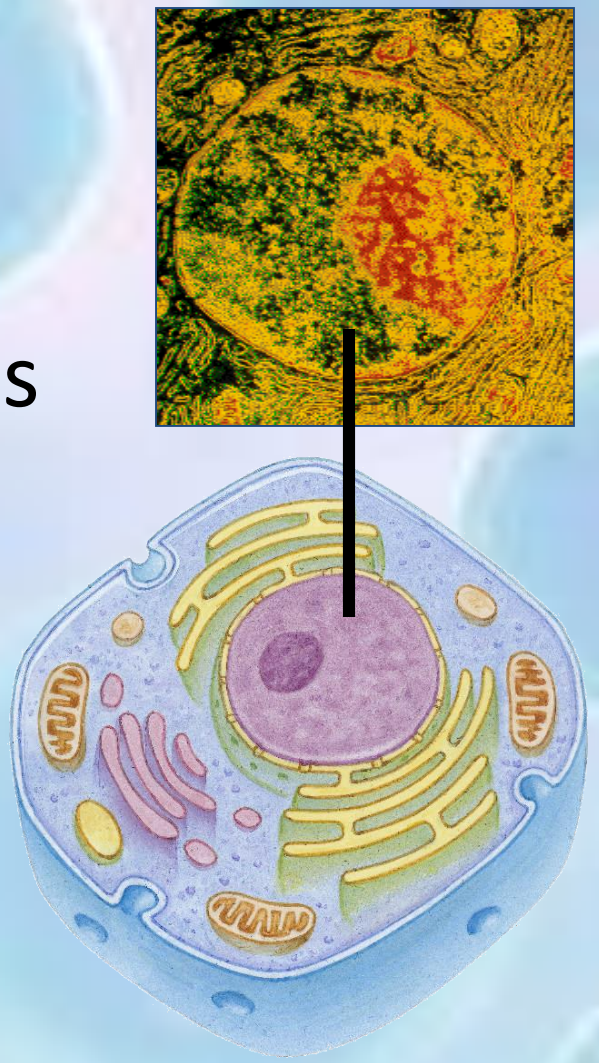
cytoplasm



- Contains other organelles and provides a space for them to carry out their specific jobs
- Found in ALL cells

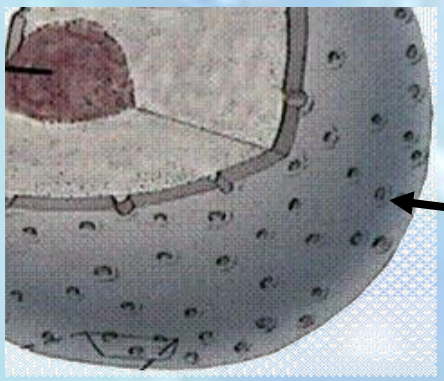
Nucleus-The Control Organelle

- The nucleus controls the activities of the cell.
- Contains the DNA for the organism in chromosomes
- Usually the largest organelle

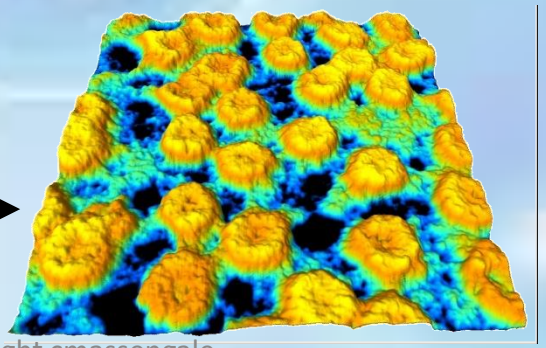


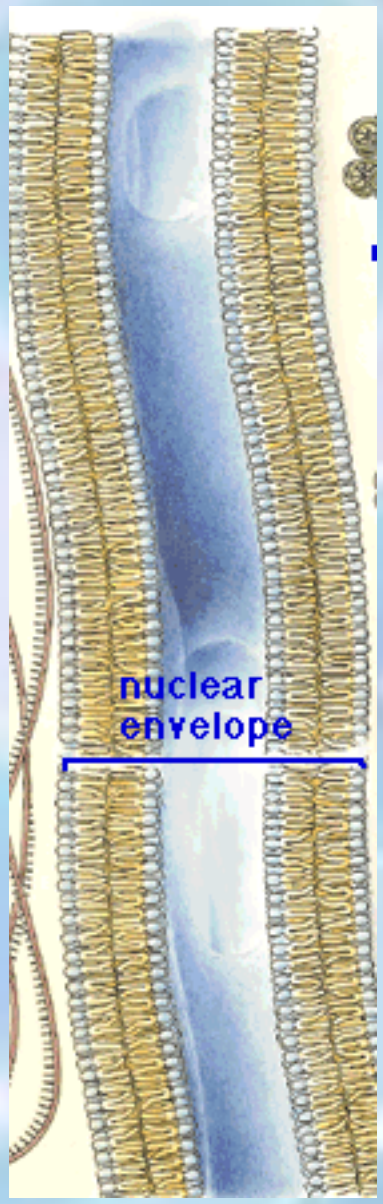
Nuclear Membrane

- The nucleus has it's own protective layer called the ***nuclear membrane***
- **This Double membrane surrounds the nucleus and contains nuclear pores that allow materials to enter & leave the nucleus**
- **Connected to the rough ER**



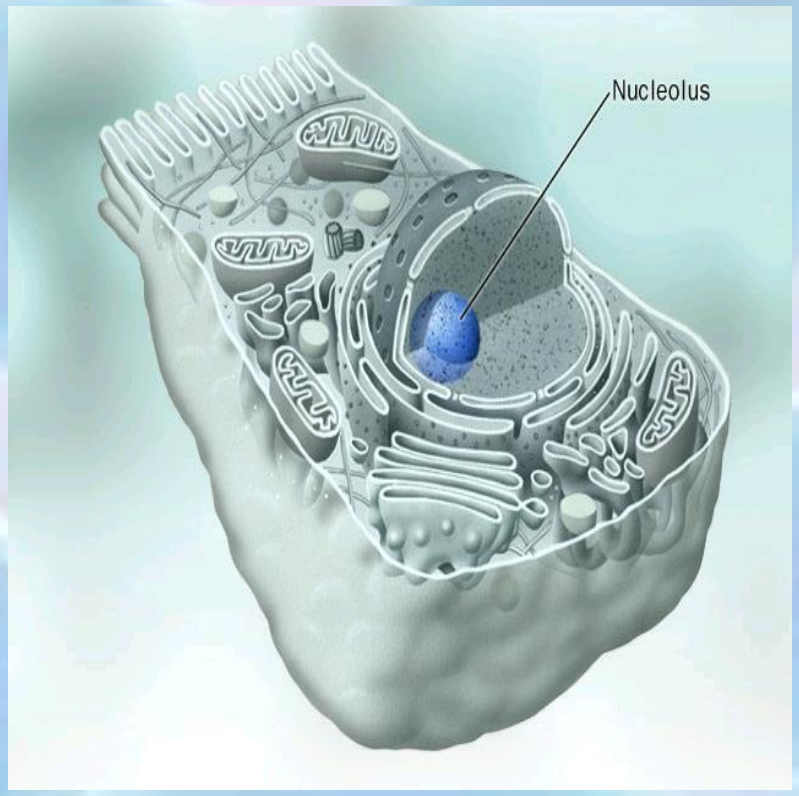
Nuclear pores

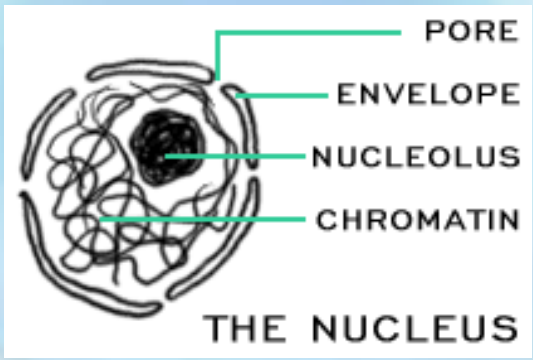




Nucleolus

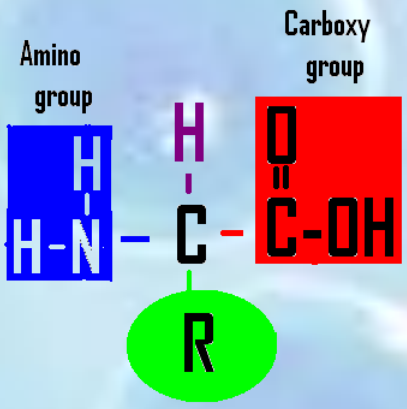
- Inside the nucleus is a special organelle called the ***nucleolus***.
- The nucleolus **makes ribosomes** which make proteins.

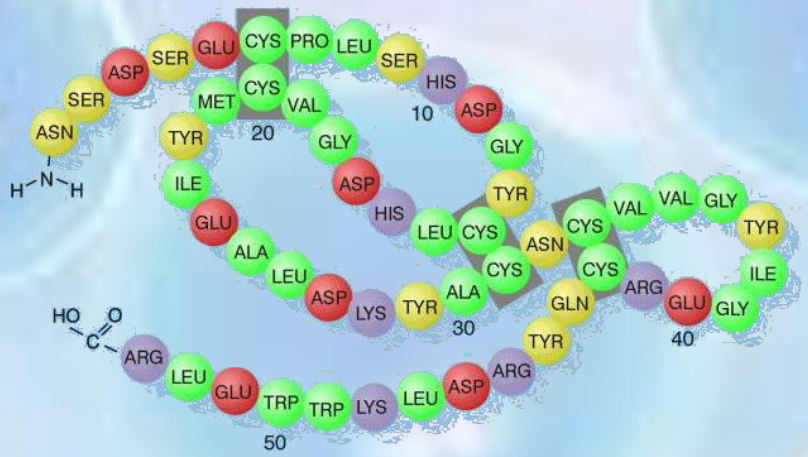




Ribosomes

- "Protein factories" for cell
- Join amino acids to make proteins in a process called protein synthesis





Ribosomes

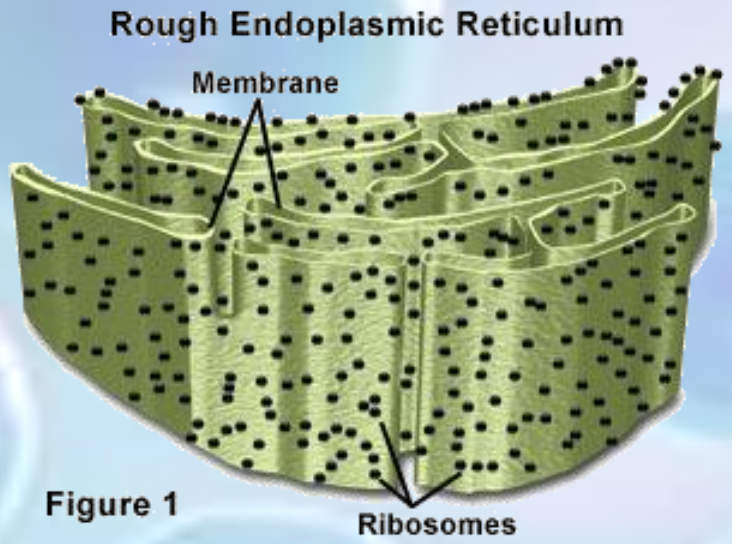
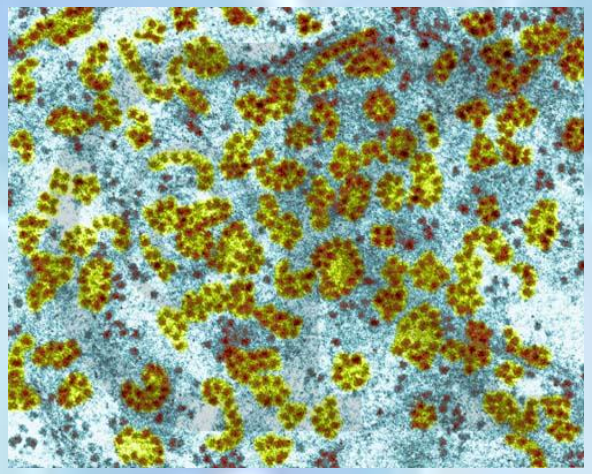


Figure 1

Can be attached to Rough ER

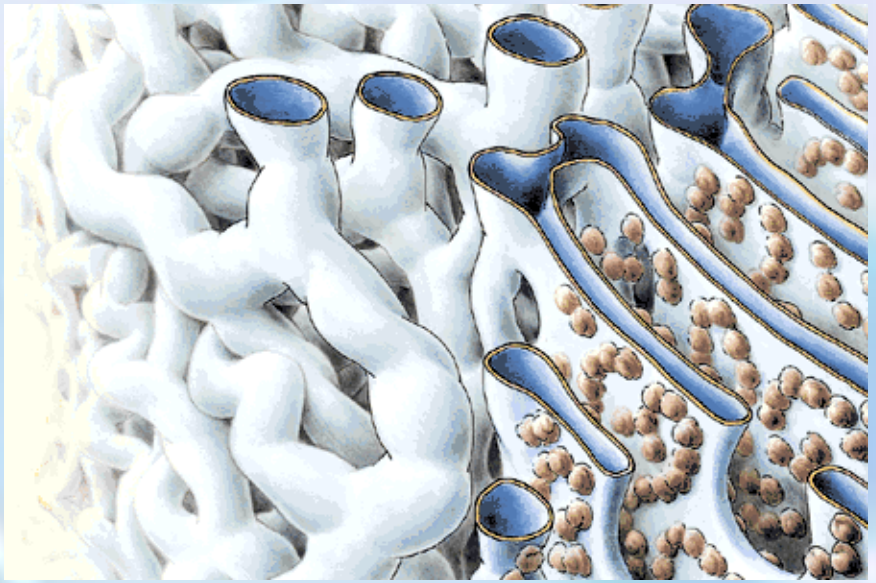
OR



Be free (unattached) in the cytoplasm

Endoplasmic Reticulum - ER

- Network of hollow tubules
- Connects to nuclear membrane & cell membrane
- Two types: Rough and Smooth



Two kinds of ER ---ROUGH & SMOOTH

Rough Endoplasmic Reticulum (Rough ER)

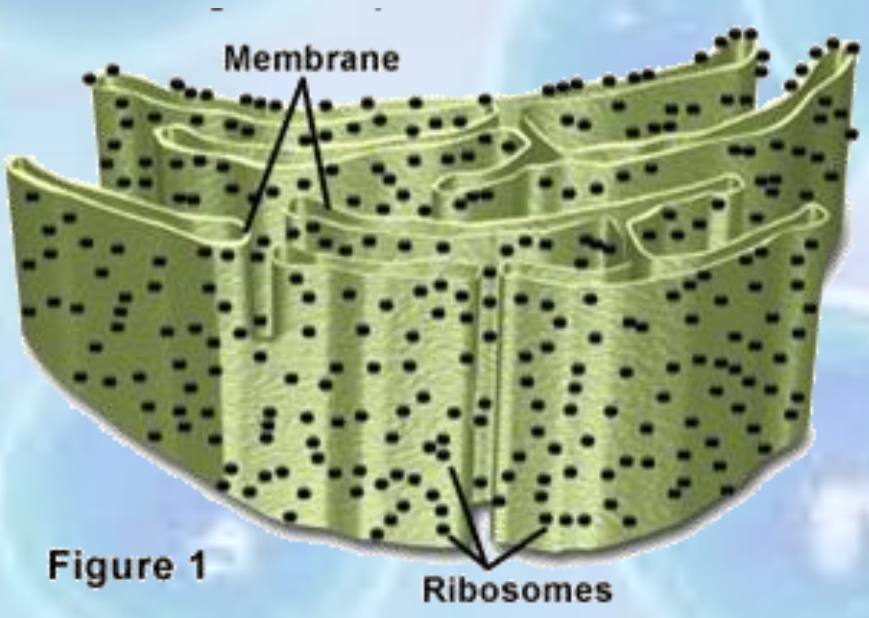
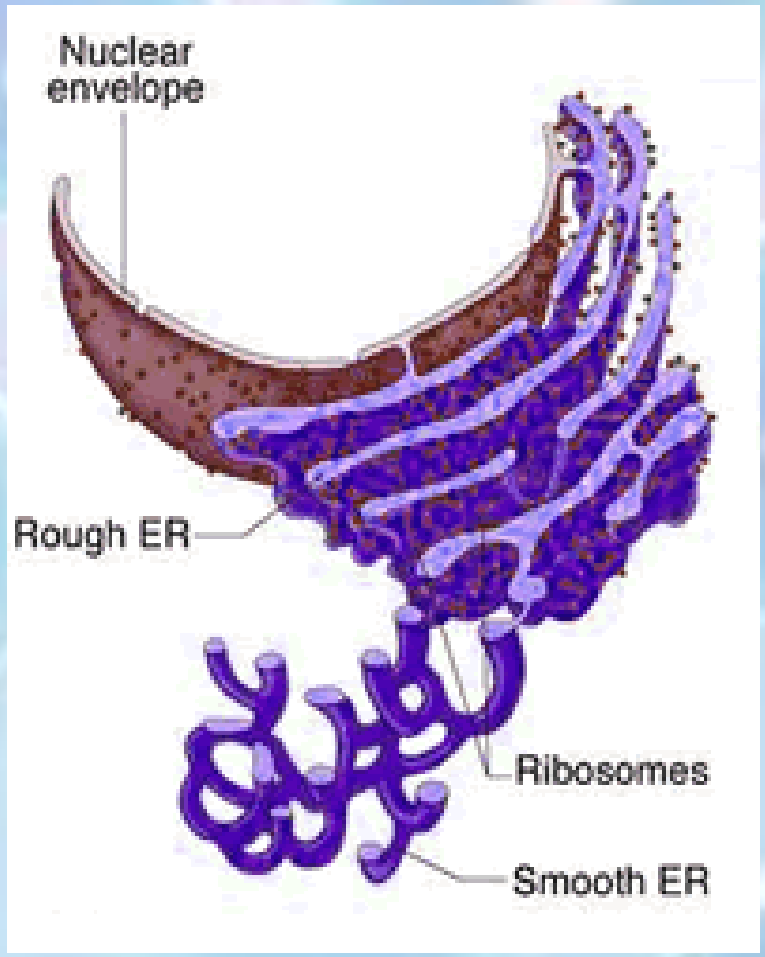


Figure 1

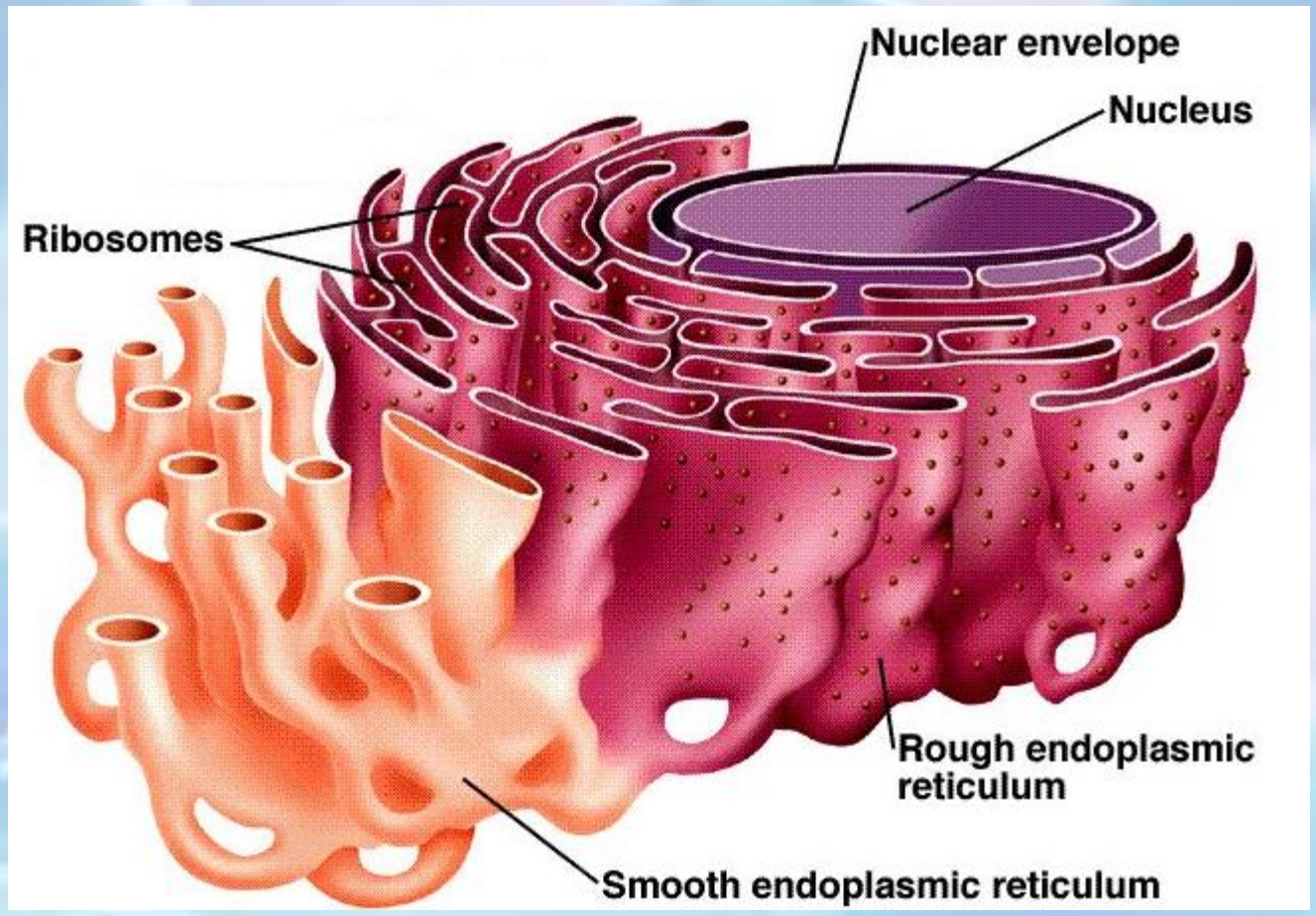
- Has **ribosomes** on its surface.
- As ribosomes exit the nucleolus, they travel enter the Rough ER before being transported to other parts of the cell or body.

Smooth Endoplasmic Reticulum

- ***Smooth ER*** **lacks ribosomes on its surface**
- **Is attached to the ends of rough ER and the nuclear membrane**
- **Makes cell products that are USED INSIDE the cell such as lipids (fat).**



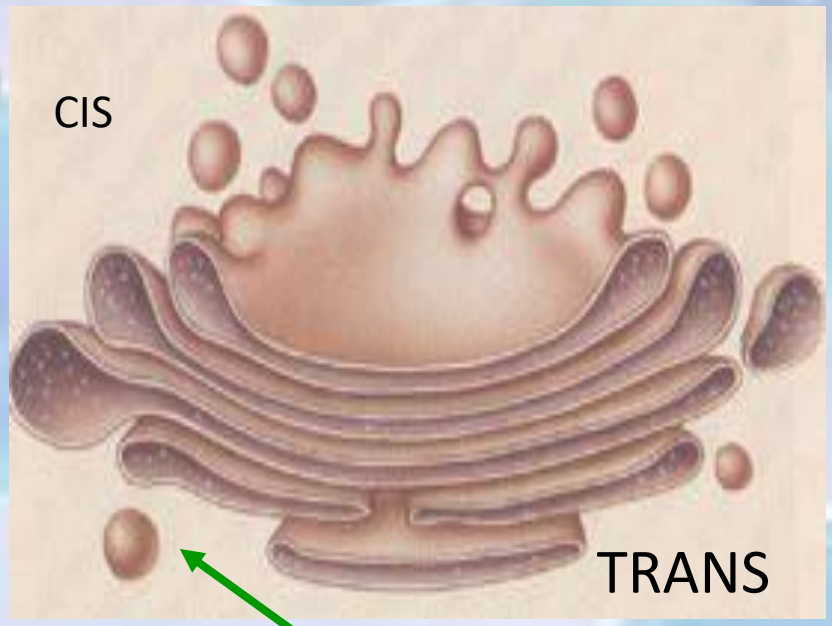
Endomembrane System



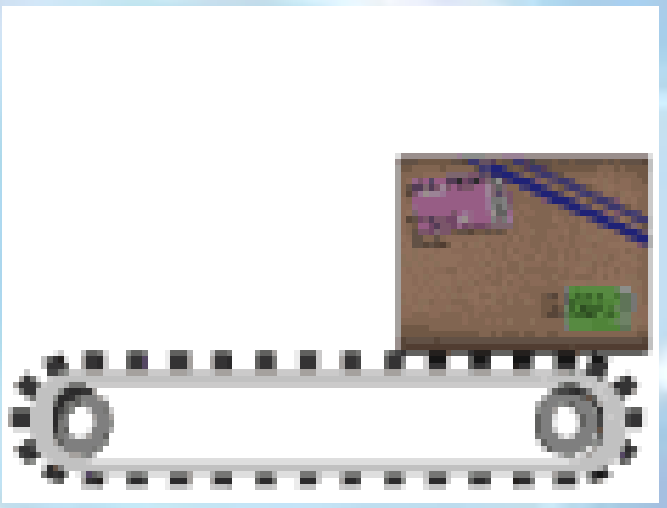
Includes nuclear membrane connected to ER connected to cell membrane (transport)

Golgi Bodies (Complex/apparatus)

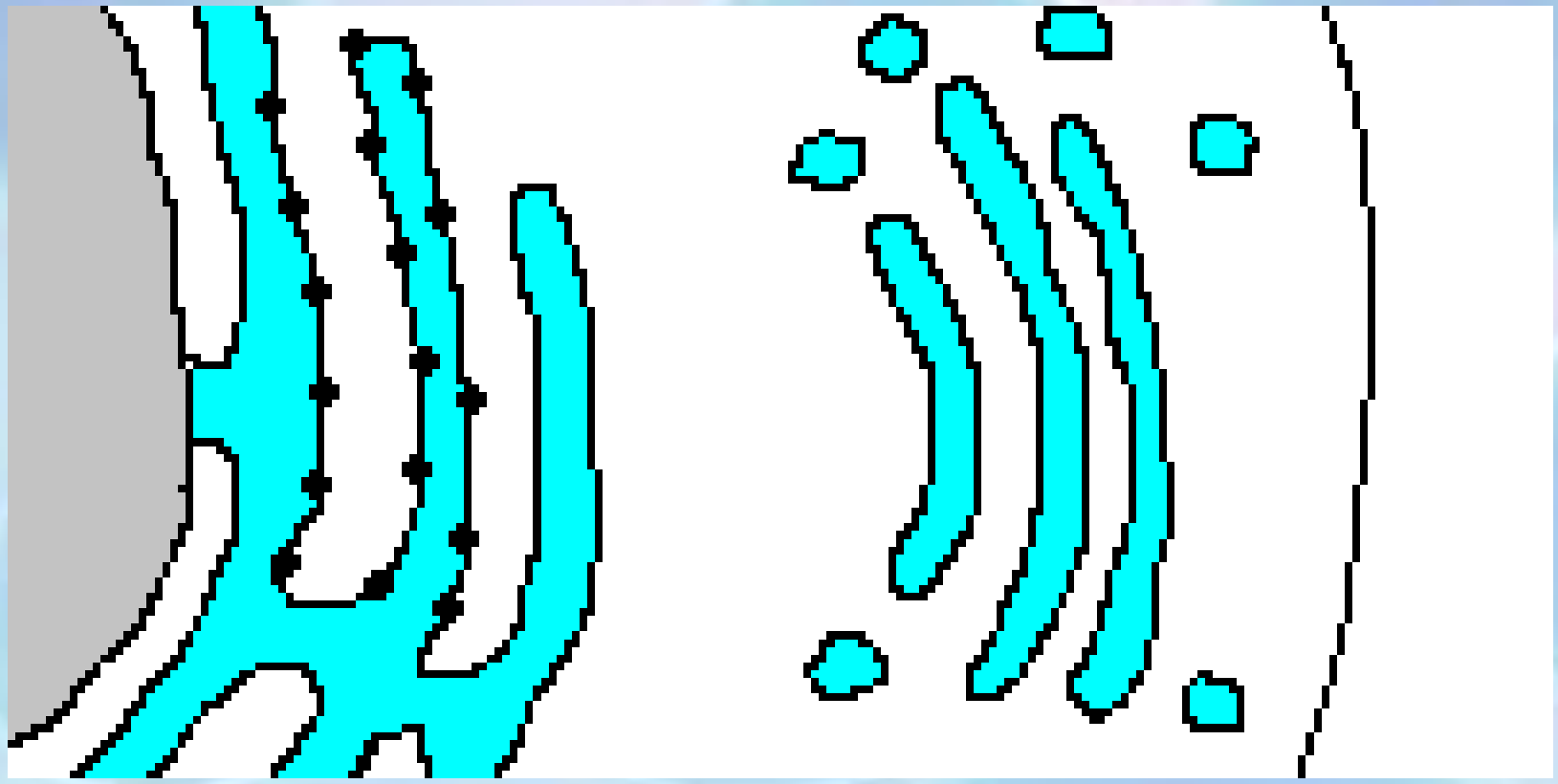
- Look like Stacks of **flattened sacs or pancakes.**
- Have a receiving side (**cis face**) and shipping side (**trans face**).
- **Proteins** made by ribosomes enter the Golgi body to be modified, & packaged for storage OR transport out of cell
- When molecules exit the Golgi Body, they are wrapped in a protective coating for safe travel in or outside of the cell.



Transport vesicle



Golgi Animation



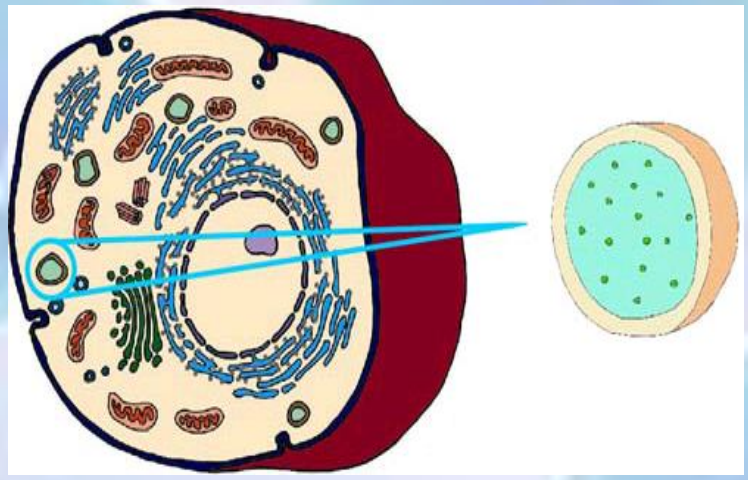
Materials are transported from Rough ER to Golgi to the cell membrane by VESICLES

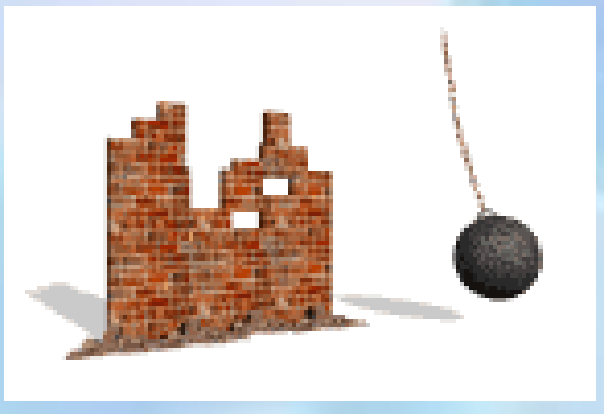
Mitochondrion (plural = mitochondria)

- Rod shaped "Powerhouse" of the cell
- Generates Adenosine Tri-Phosphate (ATP), an enzyme that allows cells to burn glucose (sugar) for energy.
- This process is called CELLULAR RESPIRATION
- More active cells like muscle cells have MORE mitochondria
- Both plants & animal cells have mitochondria

Lysosomes

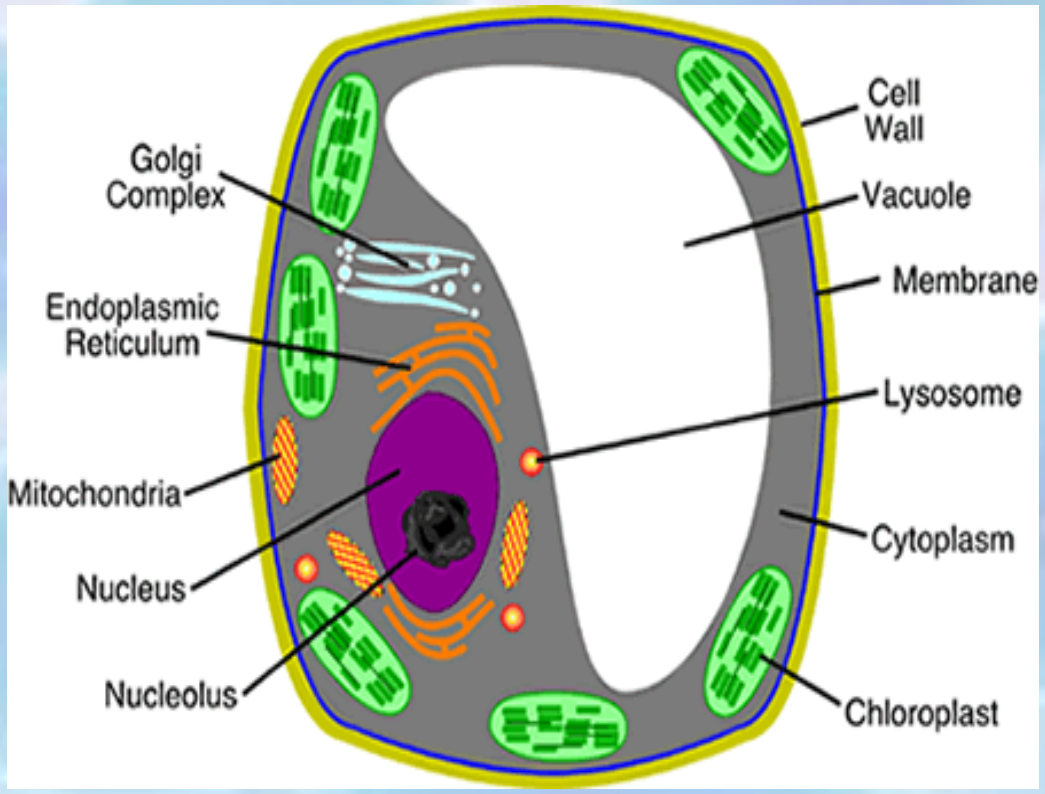
- Contain **enzymes** that break down **food, bacteria,** and **worn out cell parts**
- When lysosomes Burst open, they **release enzymes** that **get rid of waste.**





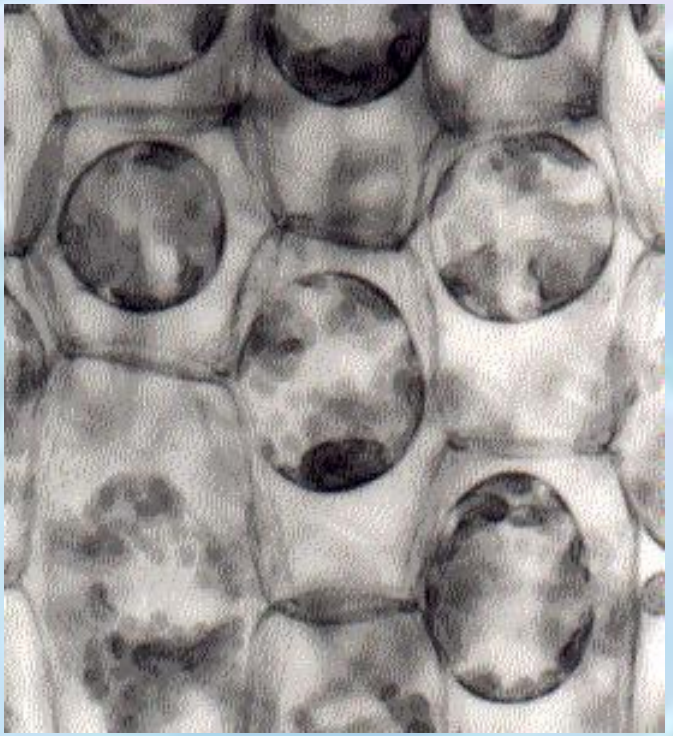
Vacuoles

- **Fluid filled** sacks for **storage**
- ***Animal*** cells have multiple, small vacuoles.
- ***Plant*** cells have one **large Central Vacuole.**

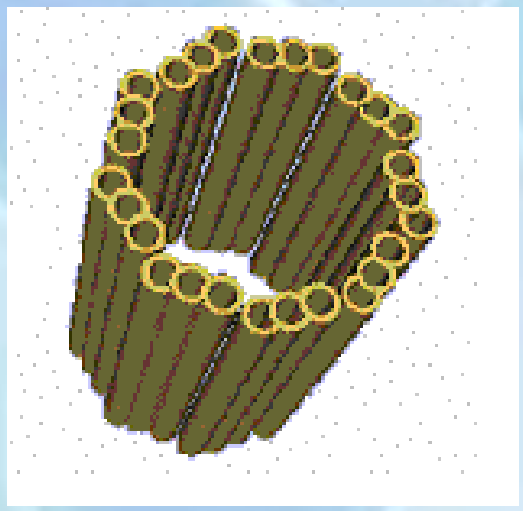


Vacuoles

- **In addition to water, vacuoles store many materials including sugars, proteins, minerals, lipids, wastes, salts, and enzymes**



Centrioles



- Found only in **animal** cells
- **Paired** structures near nucleus that look like a bundle of **tubes**
- During **cell division, centrioles help to pull chromosome pairs apart** to opposite ends of the cell

Chloroplasts

- Contains enzymes & pigments (chlorophyll)for Photosynthesis (food making process)
- Use energy from sunlight to make own food (glucose)
- Found only in plant cells (makes them green)