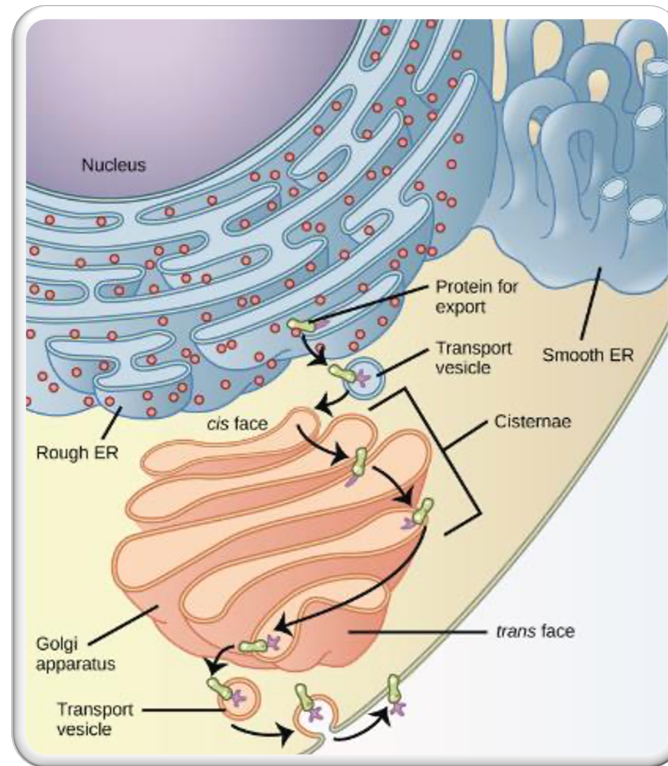


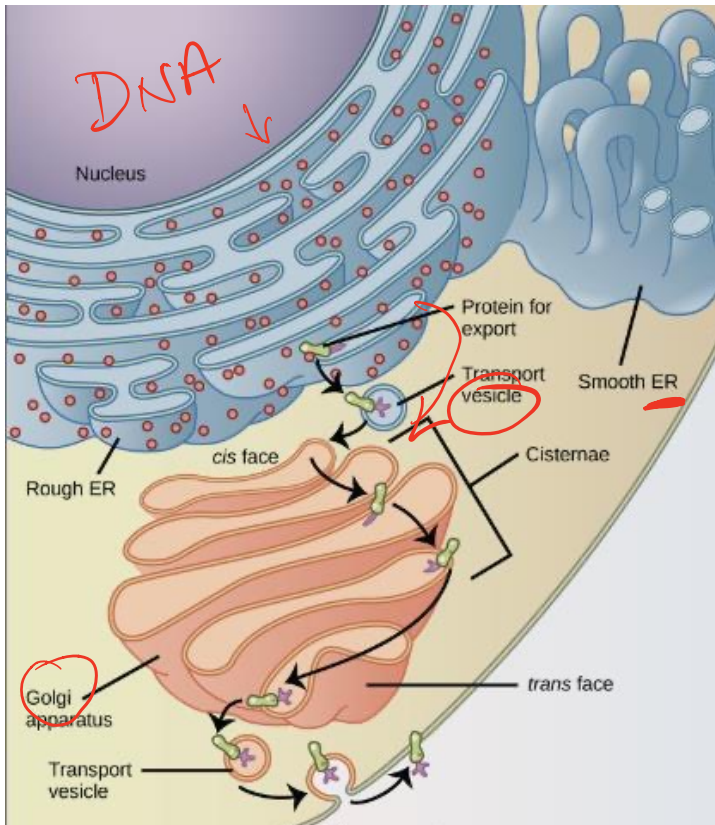
# UNIT 2: CELLULAR FOUNDATION

## Day 2

### Cell Anatomy and Function, pt. 2



# ENDOMEMBRANE SYSTEM



Group of membranes and organelles

Function is to modify, package, and transport lipids and proteins

- Nuclear envelope (not organelle)
- Lysosomes
- Vesicles
- Endoplasmic reticulum
- Golgi apparatus
- Plasma membrane

# NUCLEAR COMPONENTS

⇒ Boss' office

**Nucleus** – houses DNA (chromatin)

- **Nuclear envelope** – double membrane (phosp. bilayer)
- **Nucleolus** – assembly area of ribosomal components

Ribosomes =  
protein  
factory

Endoplasmic  
reticulum

Nucleolus

Chromatin

Nucleoplasm

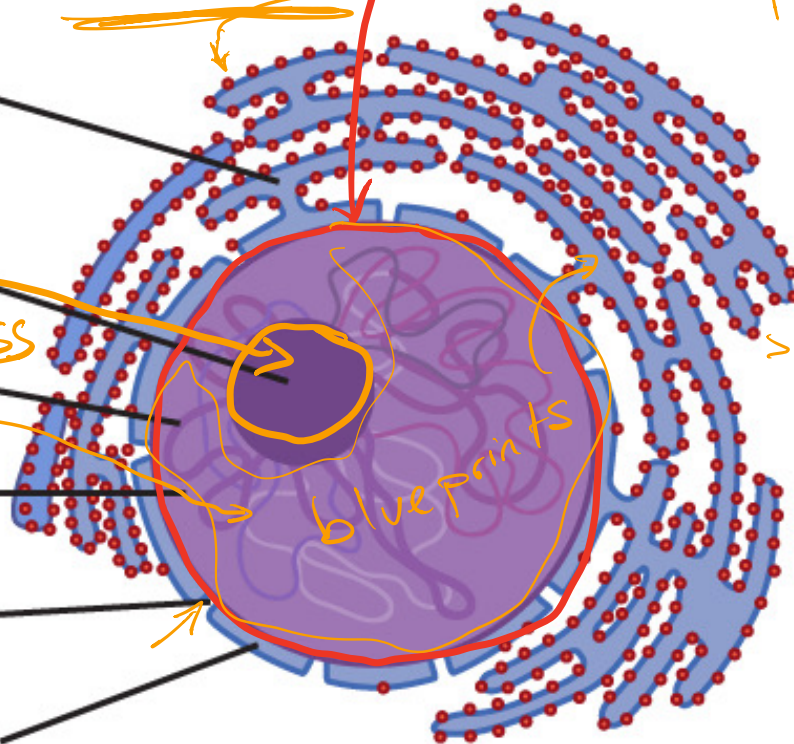
Nuclear pore

Nuclear envelope

DNA =  
code

= Boss

blueprints



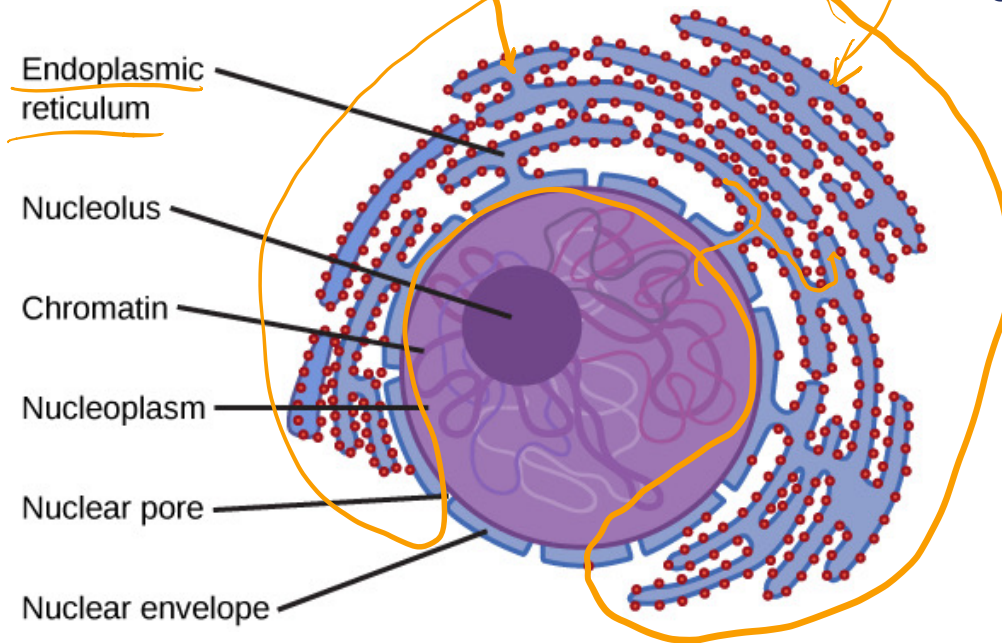
# ENDOPLASMIC RETICULUM (E.R.)

**ER** – Tubules that modify proteins and synthesize lipids = machines location

- **Lumen** (cisternal space) = hollow portion

**Rough ER** – ribosomes attach/detach to synthesize proteins glycogen

**Smooth ER** – few or no ribosomes; synthesizes carbs, lipids, steroid hormones, detoxification, alcohol metabolism, calcium storage

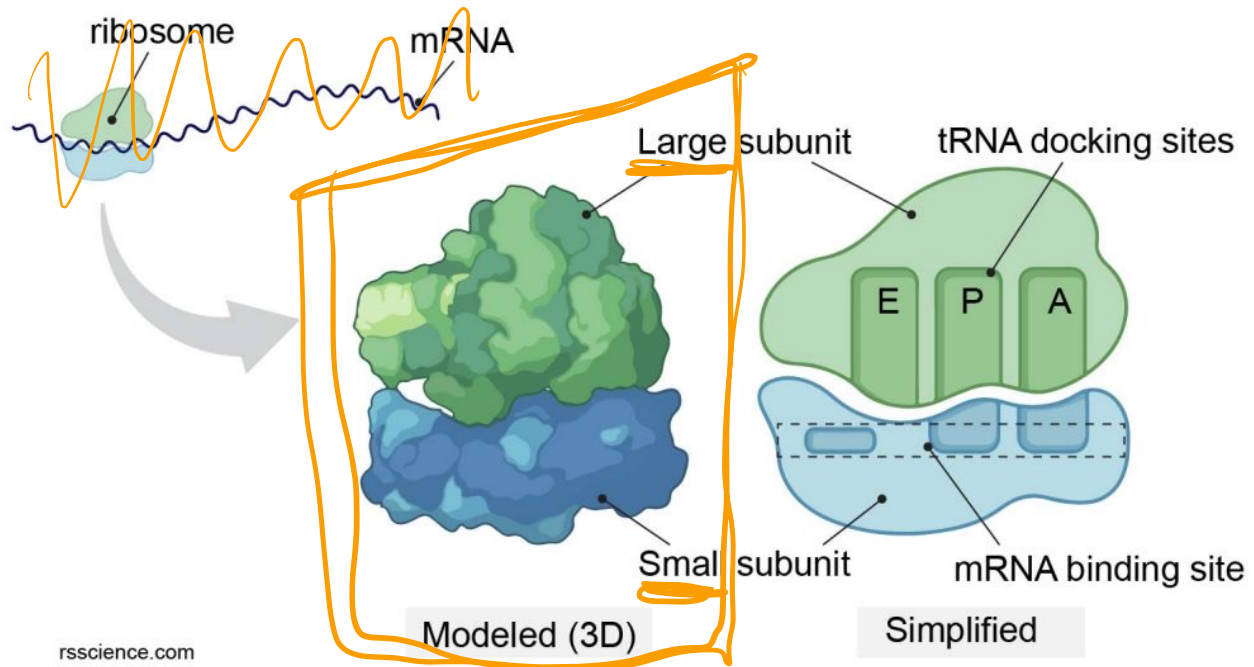


# RIBOSOMES *are proteins/enzymes*

Responsible for protein synthesis

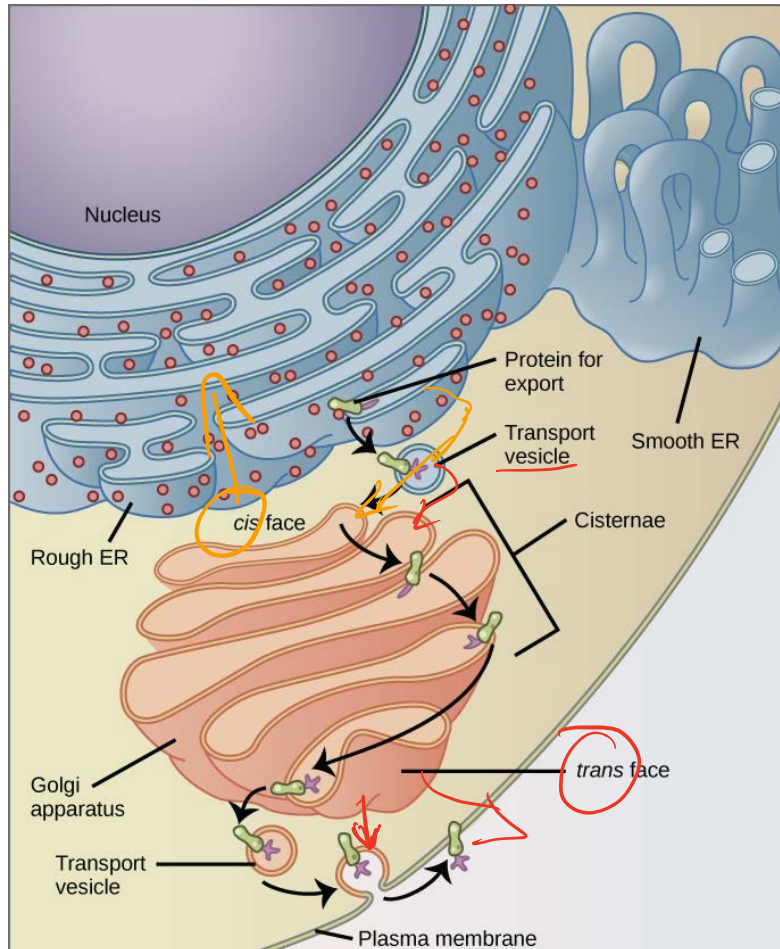
Can be free floating or attached to ER or plasma membrane

## Structure of Ribosomes





# (Body) GOLGI APPARATUS = UPS



Sorting, tagging, packaging, and distribution of lipids and proteins

Vesicles fuse with receiving face

Modifications take place

Molecular tags indicate final destination

Packaged in vesicles that bud from releasing face

Lots of Golgi in cells that secrete  
*Endocrine*

# LYSOSOMES

- Soma = body

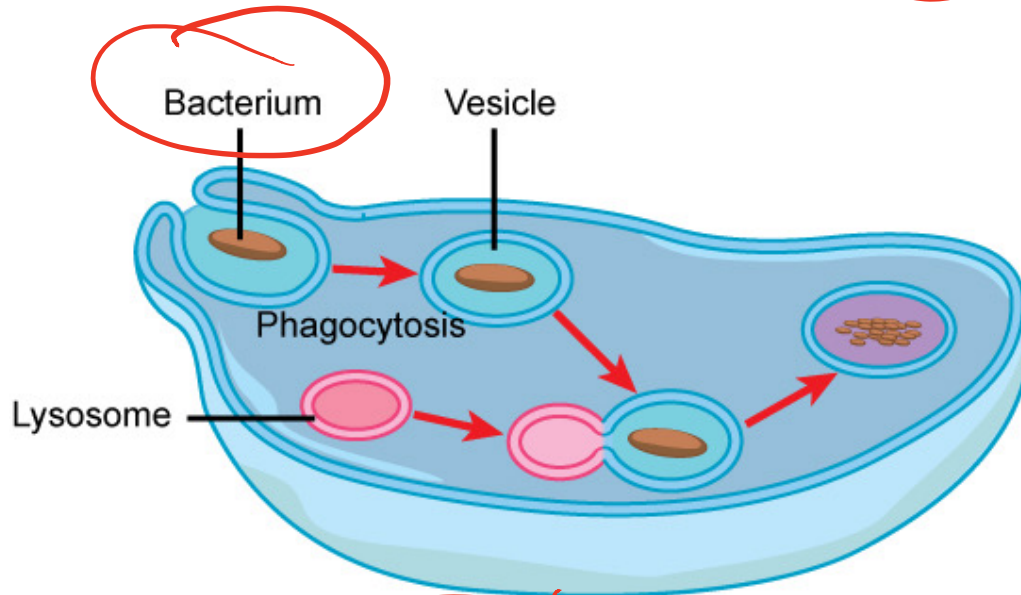
Lyse = break down

Contain enzymes that breakdown macromolecules or worn-out organelles

Enzymatic functions require low pH

Hydrolytic enzymes used to destroy pathogens

Hydrolysis



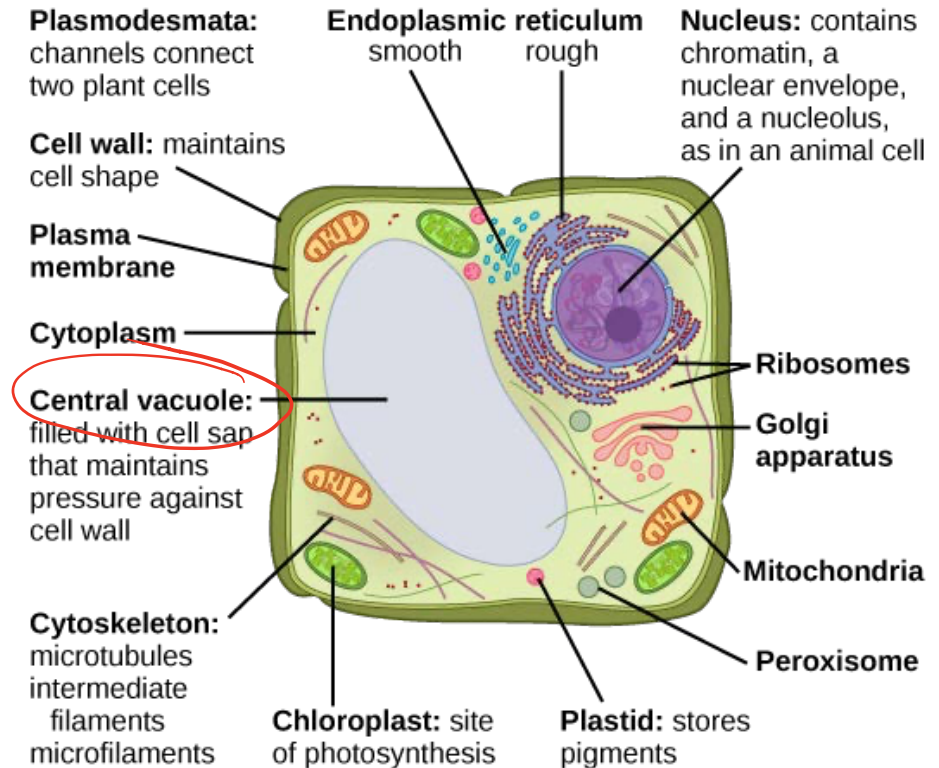
Macrophage

Big eat

# VESICLES, AND VACUOLES

**Vacuoles** are larger and don't fuse with other membranes - storage

**Vesicles** fuse – transport



(b)



# MITOCHONDRIA

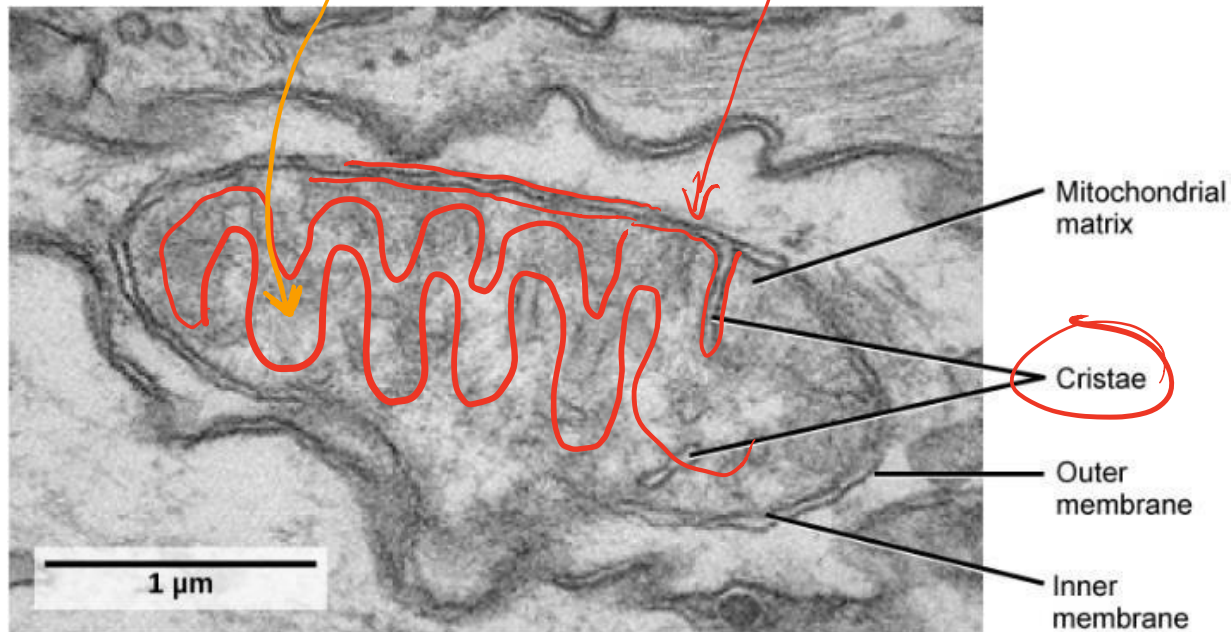
2  
↳ 0.5 μm

Responsible for making **adenosine triphosphate** (ATP), the cell's main energy-carrying molecule

Double membraned, own ribosome and DNA

**Cristae** - inner folds

**Mitochondrial matrix** inside cristae



# PEROXISOME

Small, round organelles enclosed by single membranes

Oxidation reactions that break down fatty acids and amino acids

Detoxify many poisons

$H_2O_2$   $H_2O$

5  
++  
^

✓

😊

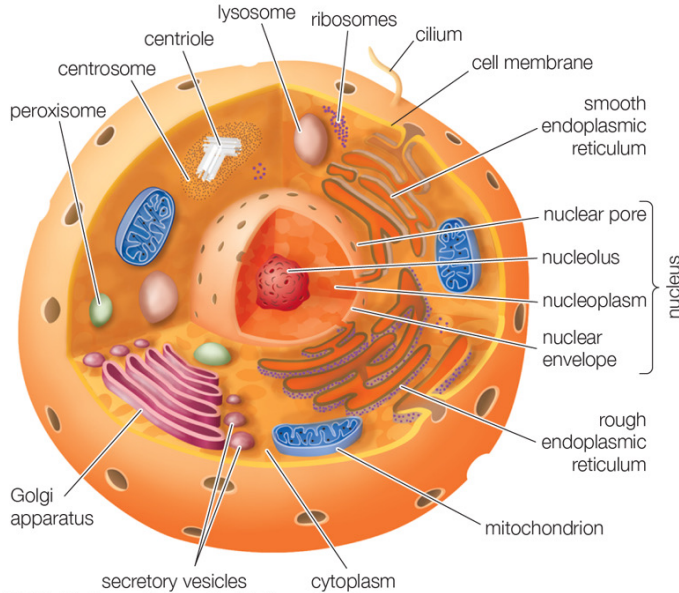
O<sub>2</sub> H<sup>+</sup> oxidizes ^

✓

😊

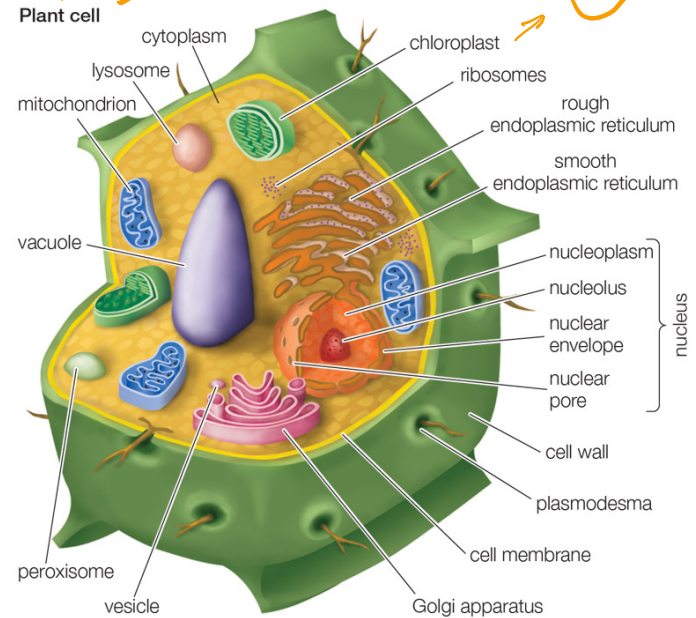
Typical animal cell and plant cell

Animal cell



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Plant cell



LeO  
Loss of electron is  
oxidation

says

Redox

Ger

Gain of electron is  
reduction

# ANIMAL VS PLANT CELLS

Animal cells have:

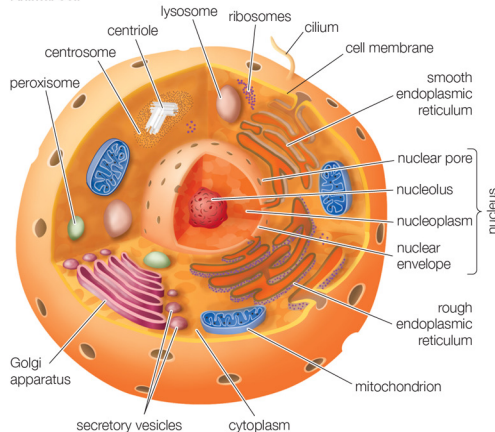
- Centrioles
- Centrosomes
- Lysosomes

Plant cells have:

- Cell wall
- Chloroplasts,
- Plasmodesmata
- Plastids

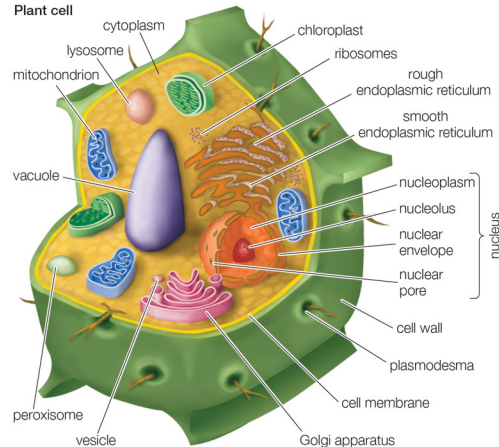
Typical animal cell and plant cell

Animal cell



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Plant cell

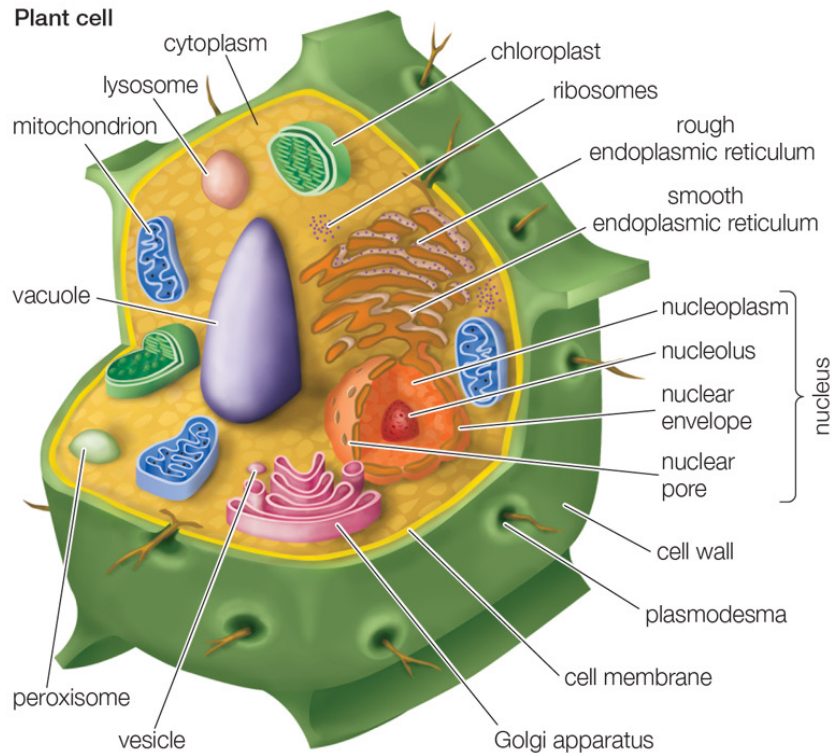
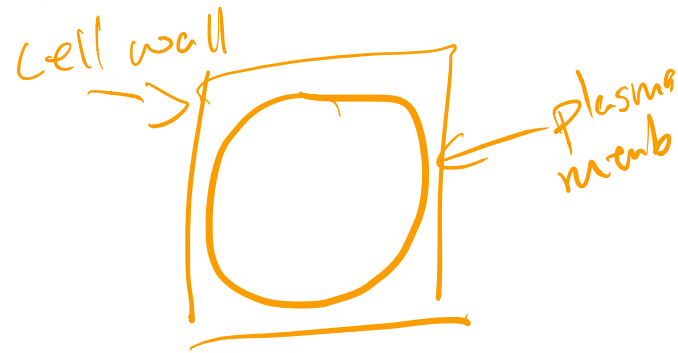


# PLANT CELLS: CELL WALL

External to plasma membrane

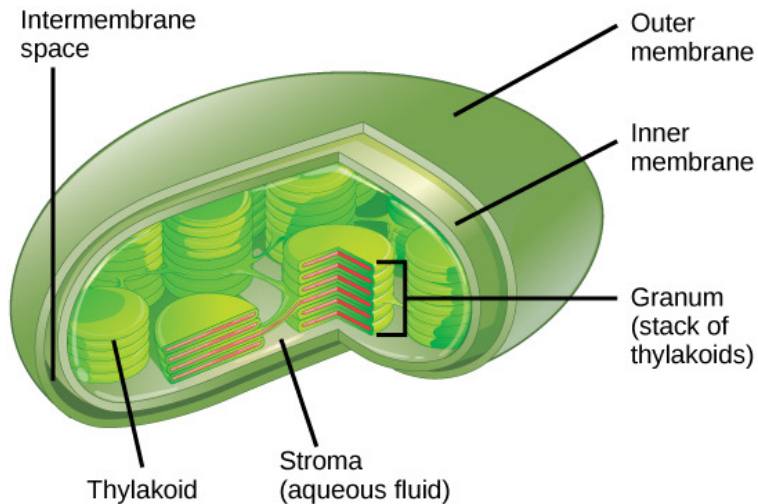
Rigid covering, structural support and shape

Made of cellulose ("fiber")





# PLANT CELLS: CHLOROPLASTS



In plants and algae

Function in photosynthesis

Have own DNA and ribosomes

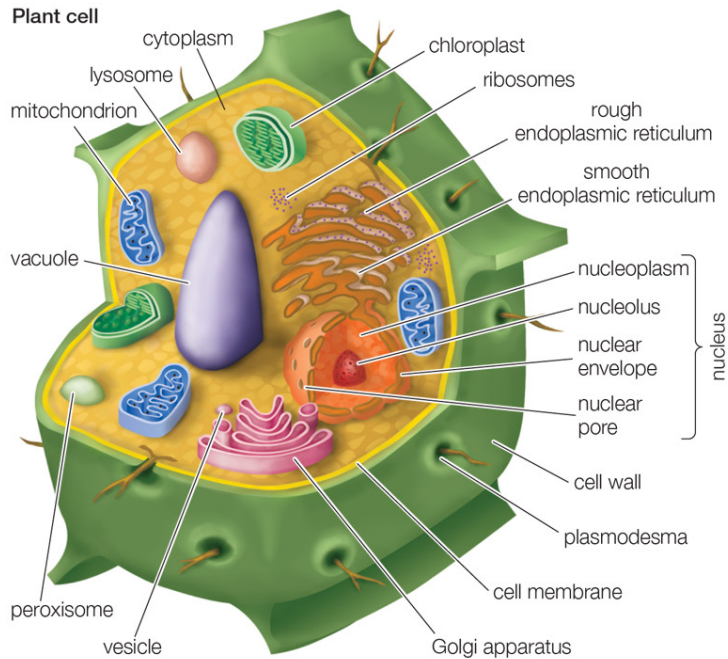
**Thylakoids** – interconnected, stacked, fluid-filled sacs

- **Stack** = granum

**Stroma** – fluid around grana

**Chlorophyll** – green pigment

# PLANT CELLS: CENTRAL VACUOLE



Provides turgor pressure in plants (structure)

Stores proteins in seed cells



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