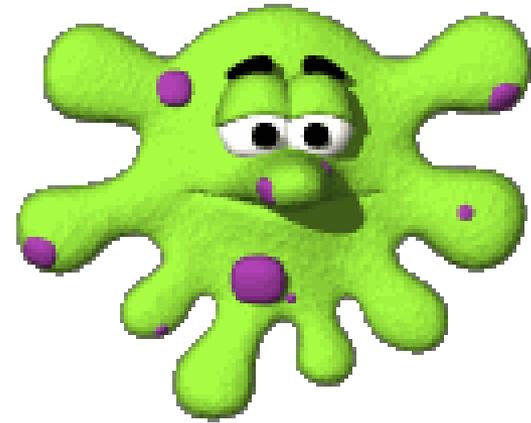
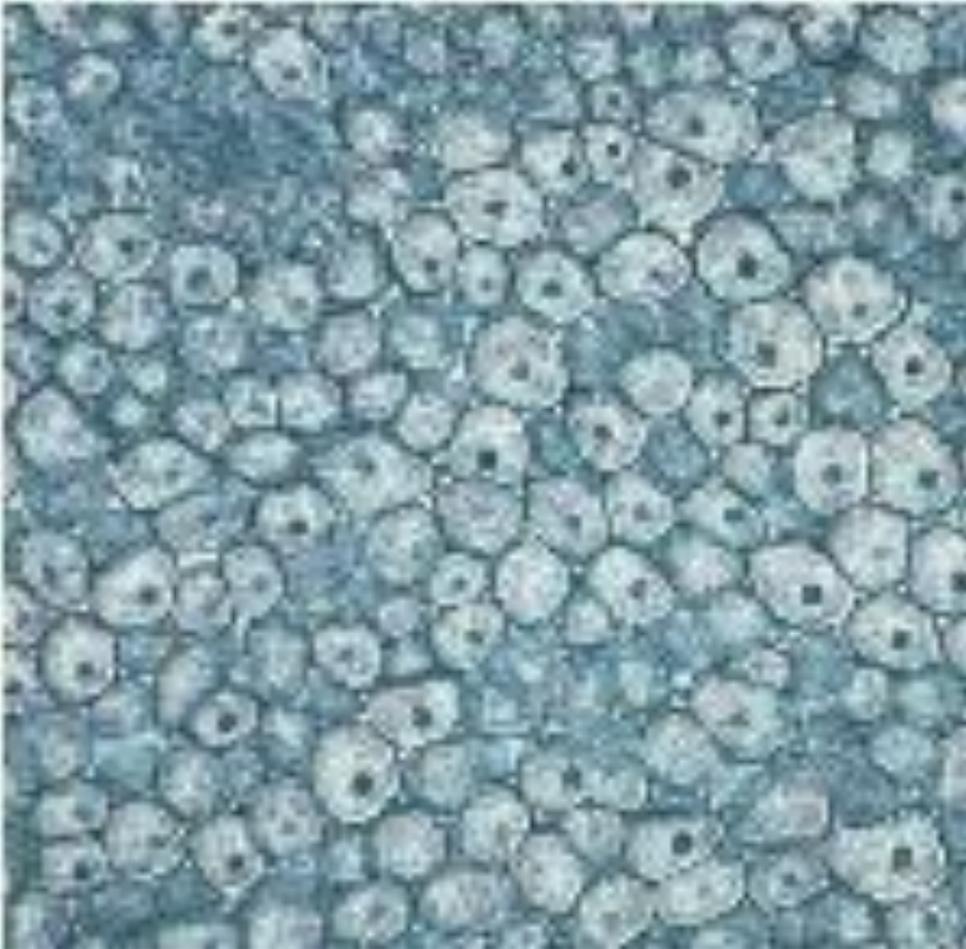


Cell Structure:

What cells are made of



Can you pick
out the cells
from this
picture?

Review of the cell theory

Microscope
was
developed
1610.

Anton van
Leeuwenhoek
saw living
things in pond
water. 1677

T. Schwann and M.
Schleiden concluded
that all living things
are composed of
cells. 1839

Robert Hooke
reported and
named cells in
cork. 1665

Robert Brown
Reported dark
spots in cells,
(nucleus). 1831

Rudolf Virchow
suggested that all
cells come from other
cells. 1855

Formulation of the Cell Theory

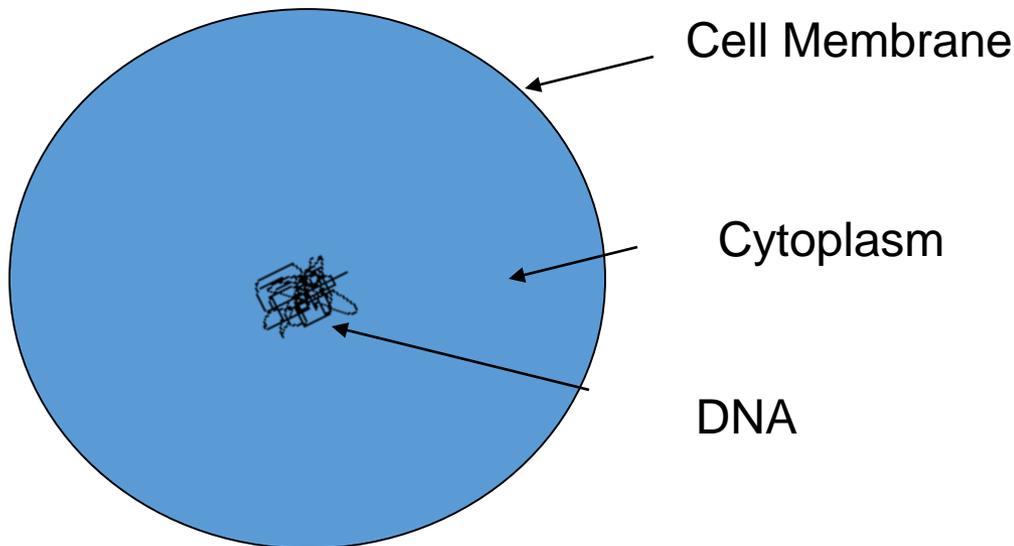


The Cell Theory

1. All organisms are composed of one or more cells.
2. The cell is the basic unit of organization of organisms.
3. All cells come from preexisting cells.

Common features of all cells

- They all have a cell membrane (this is what encloses a cell)
- They all have a cytoplasm (the interior fluid of all cells)
- They all have DNA in them



How DNA is held in a cell

- Some cells have their DNA free in the cytoplasm (prokaryotic)
- These kind of cells are the most primitive and simple
- Most cells have their DNA enclosed in a membrane. (eukaryotic)
- These are more advanced and complex cells.

Primitive Cells

Prokaryotic Cells

Advanced Cells

Eukaryotic Cells

DNA free in the cytoplasm

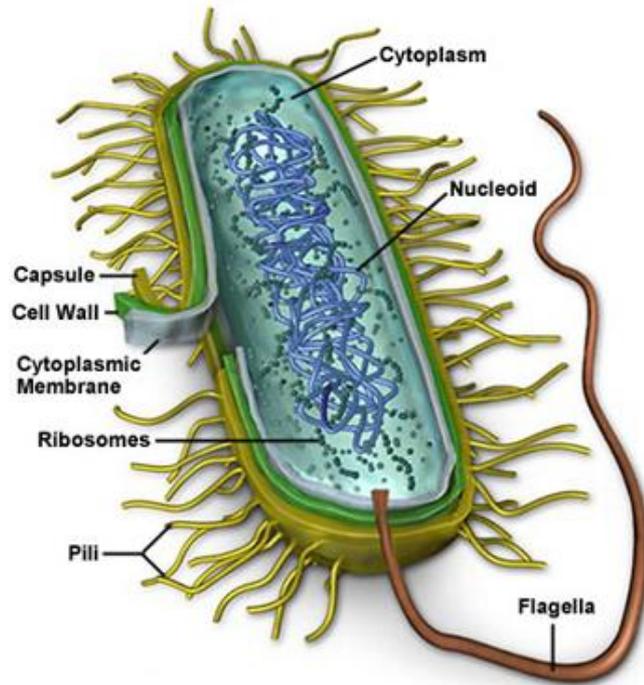
Cells are very small

Very few other structures

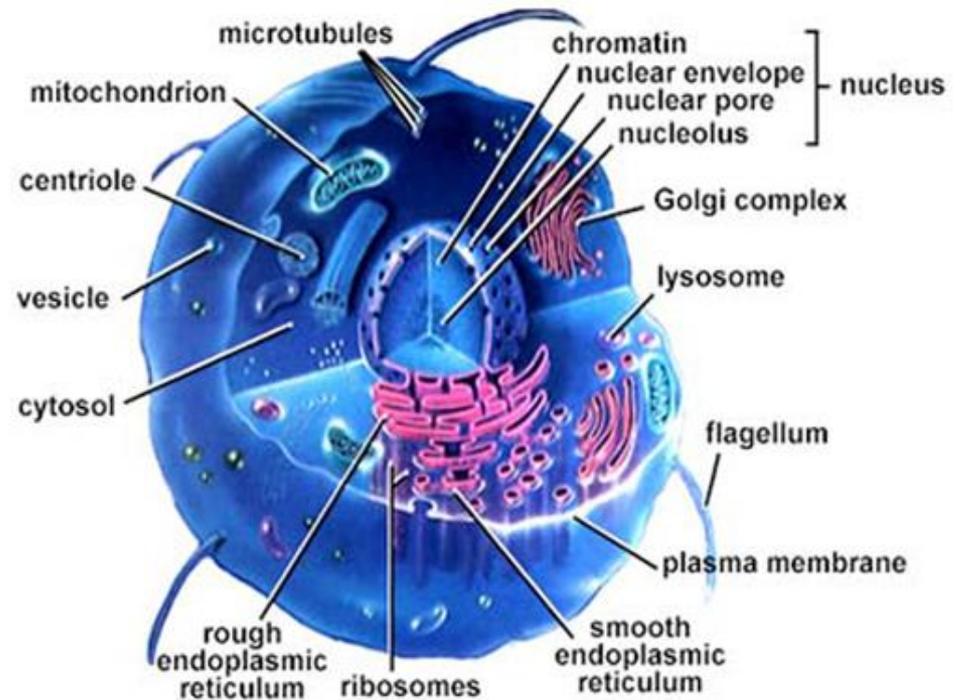
DNA inside the nucleus

Cells are larger

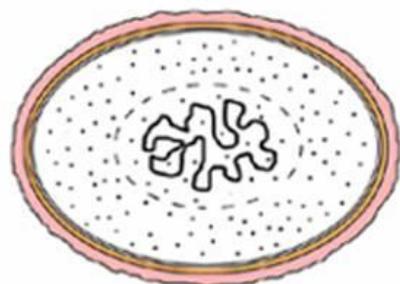
Many other structures



**prokaryotic cell
(bacteria)**



**eukaryotic cell
(protists, fungi, animals, plants)**



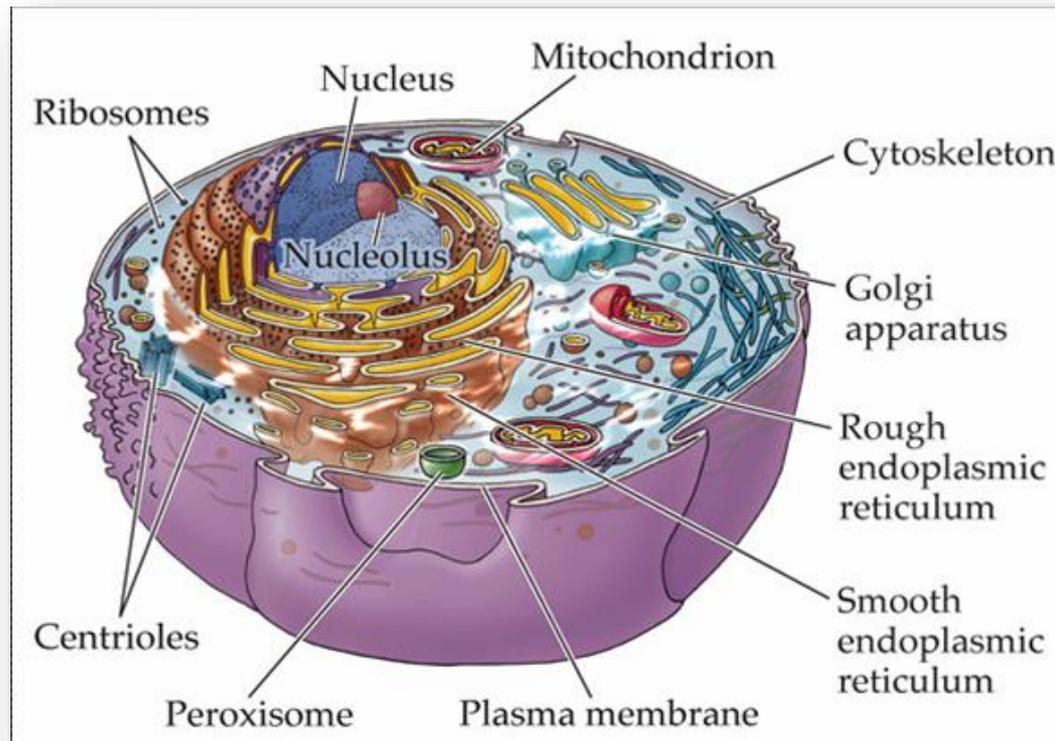
Prokaryotic Cell



Animal (Eukaryotic) Cell

An Organelle Is:

A minute structure within a plant or animal cell that has a particular job or function.



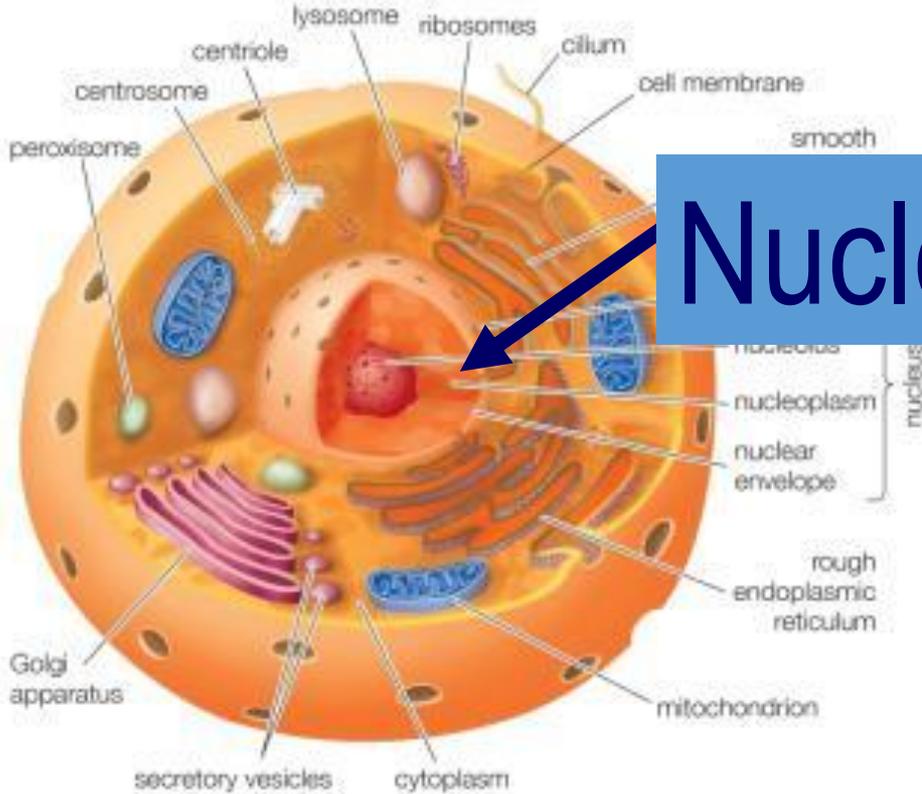
What are some functions of organelles in cells

1. Intake and storage of nutrients
2. Growth
3. Response to stimuli
4. Exchange of gases
5. Waste removal
6. Reproduction
7. Respiration or Photosynthesis

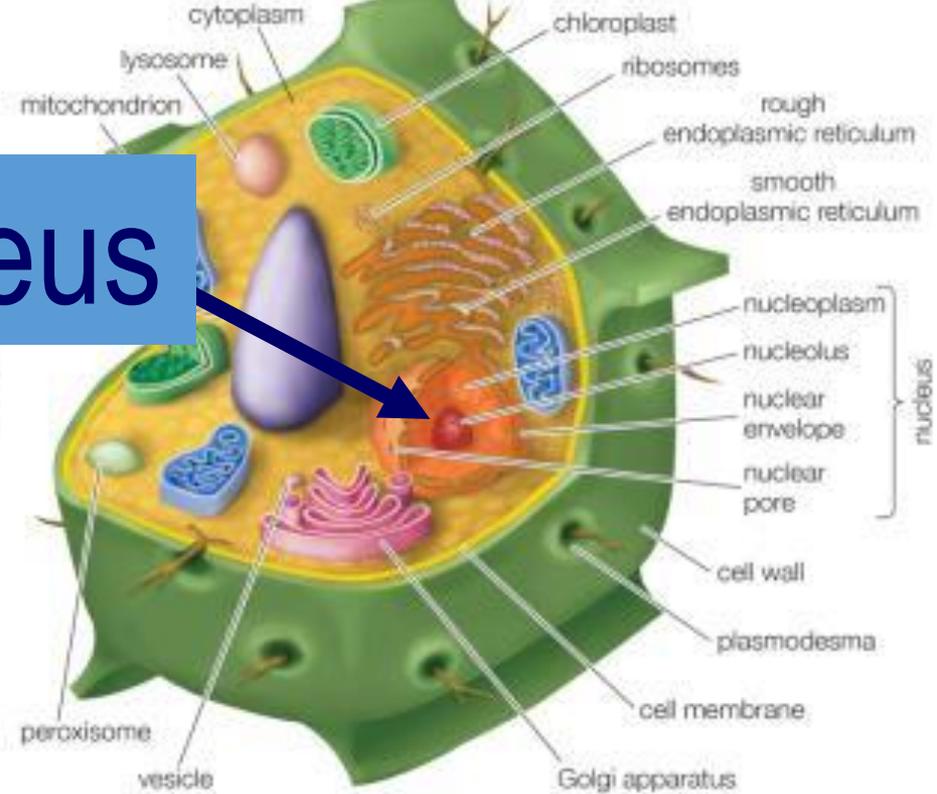
ANIMAL

PLANT

Animal cell



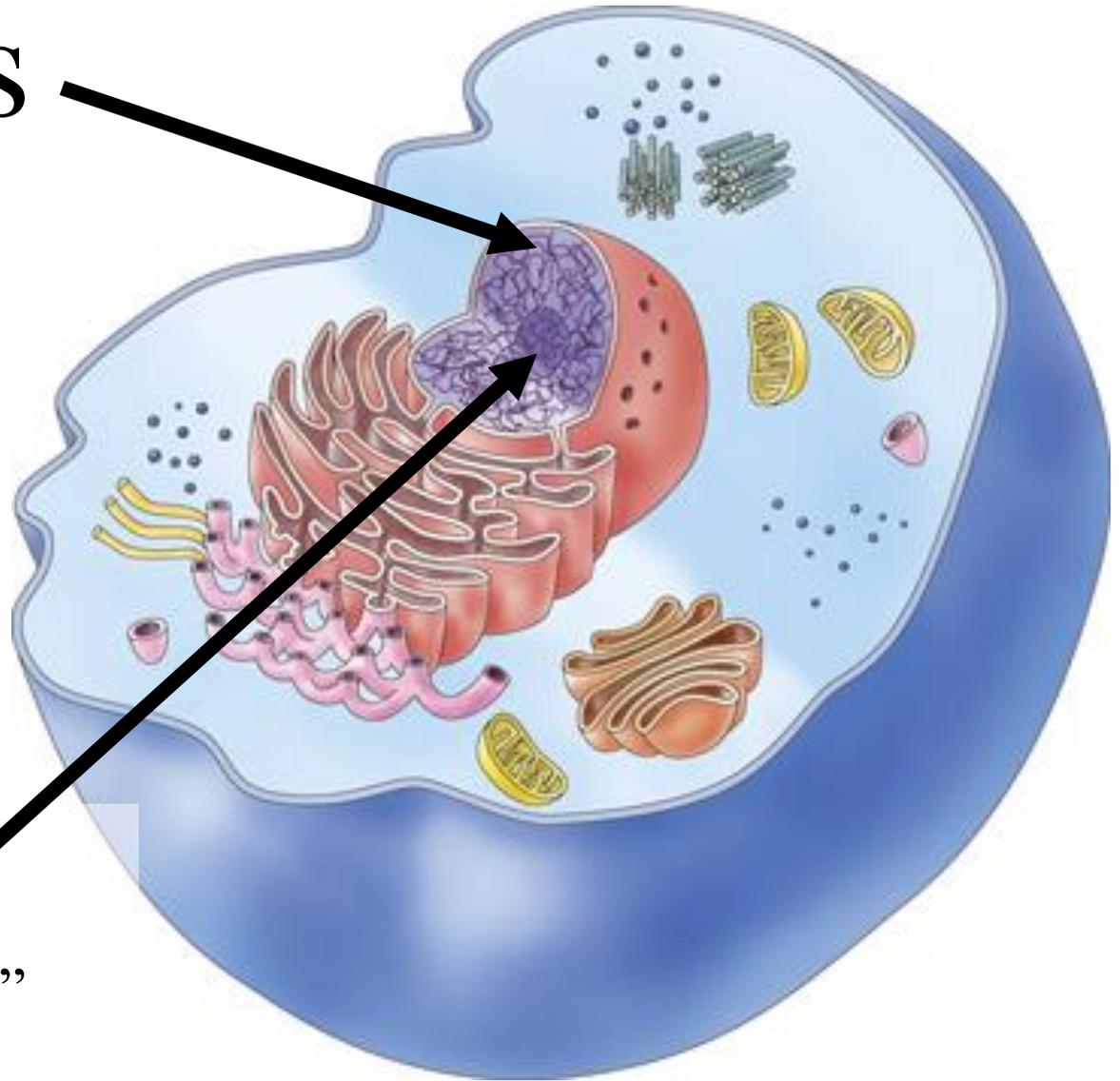
Plant cell



Nucleus

Where is the nucleus of each cell?

Nucleus

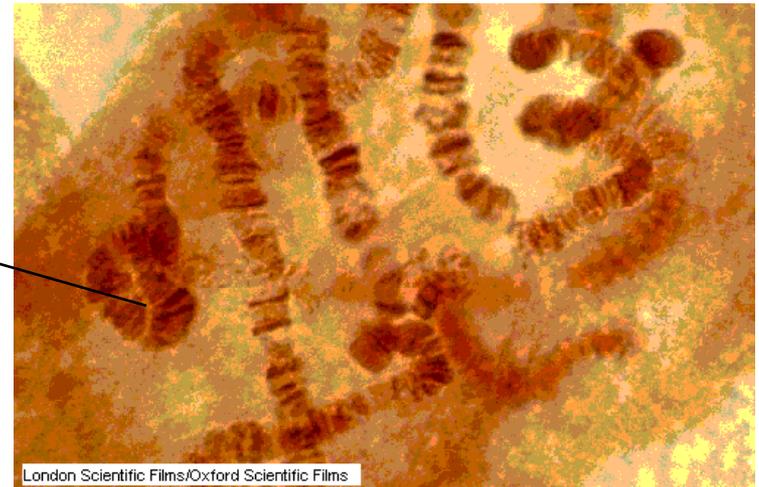
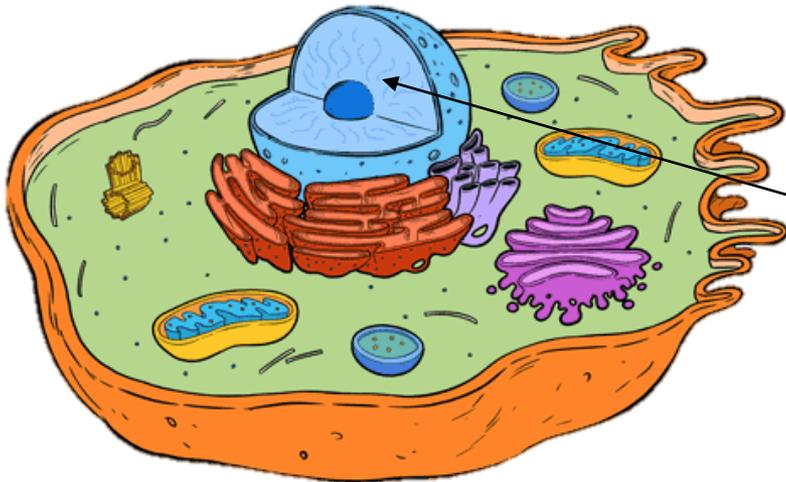


Nucleolus=
“little nucleus”

Control center for plant and animal cells:

Nucleus - control center for activities & reproduction, DNA & chromosomes housed here.

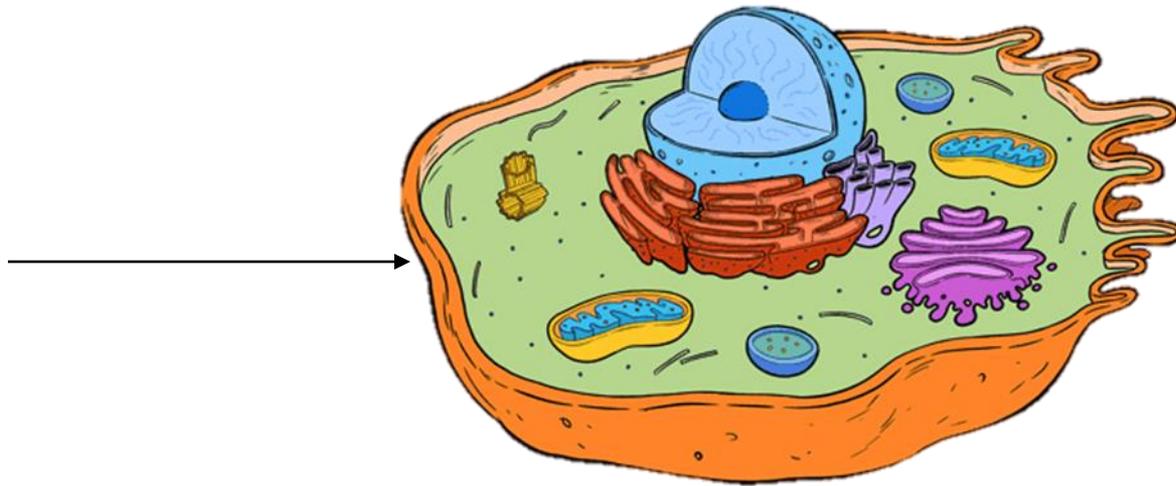
Chromosomes – long coiled threads of DNA with all the genes on them



Found in both Plant and Animal Cells

1. Cell Membrane:

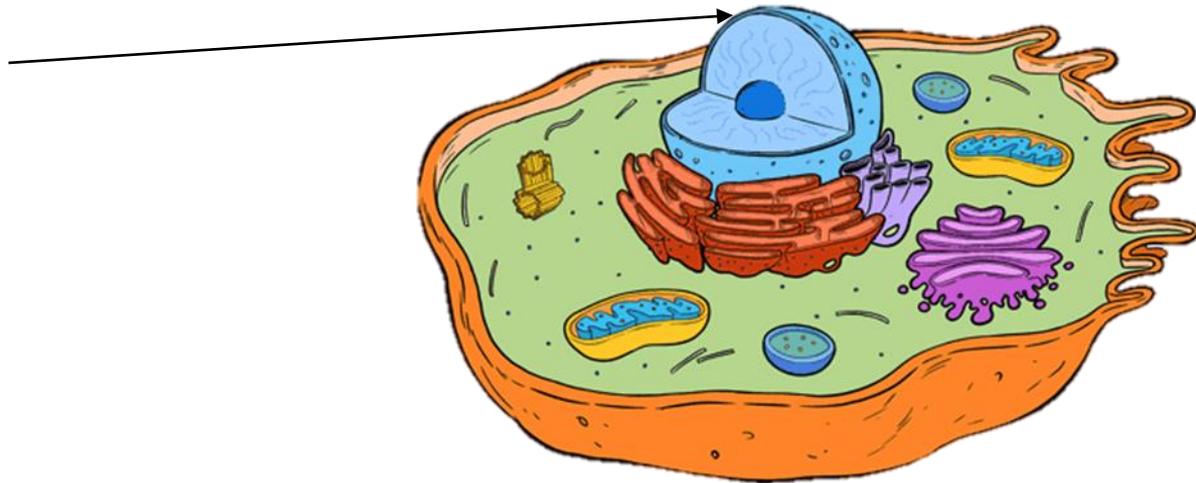
- controls what enters and leaves the cell
- outer boundary of the cell

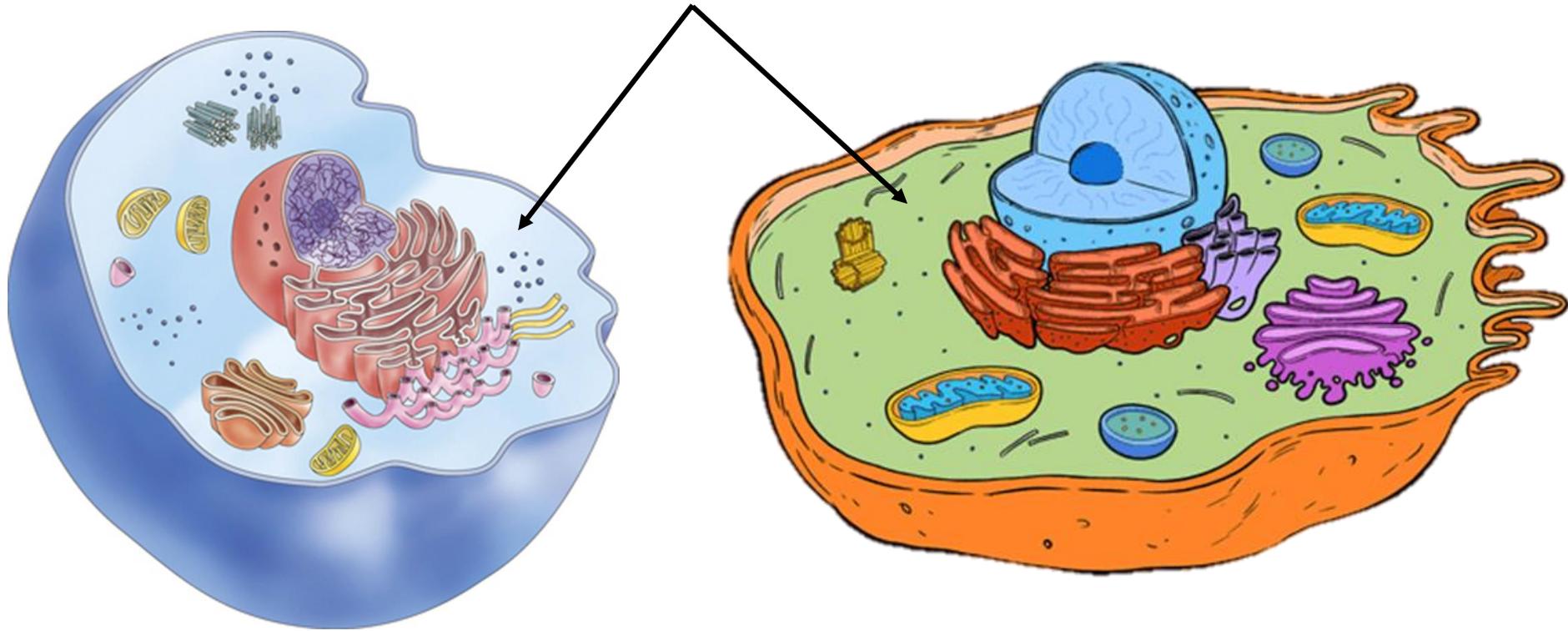


Found in both Plant and Animal Cells

2. Nuclear envelope :

- protects and controls what goes in and out of the nucleus
- Contains the chromosomes (DNA)



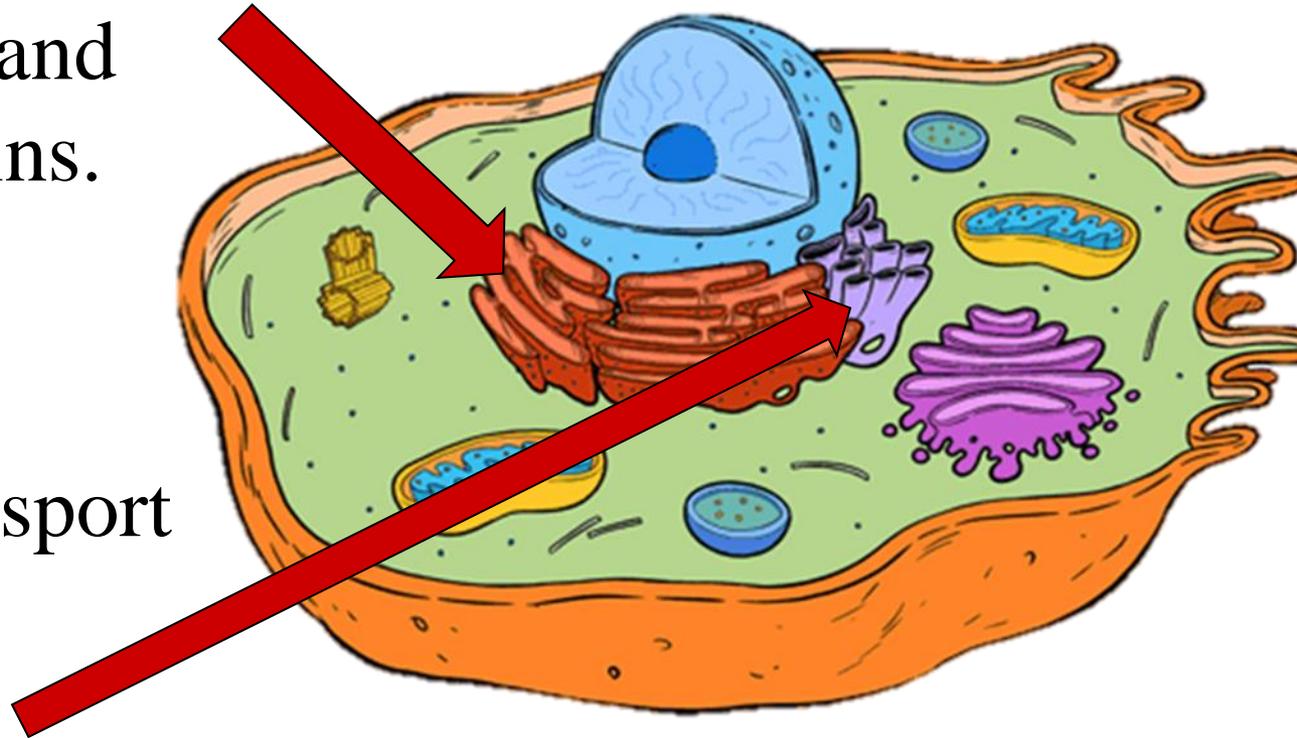


3. Cytoplasm: Area between nucleus and cell membrane that is the “jelly” between the cells organelles.

4. ER = Endoplasmic Reticulum:

Two types of ER:

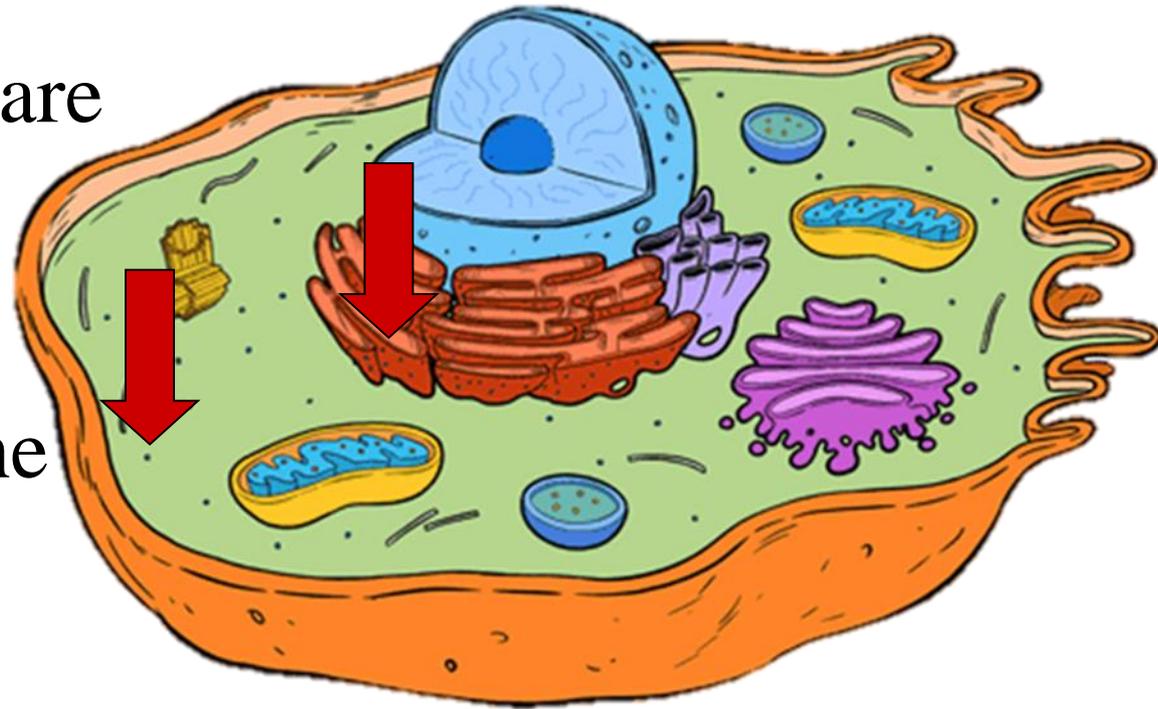
- Rough ER - specializes in the production and transport of proteins.
- Smooth ER - specializes in the production & transport of lipids and carbohydrates.



5. Ribosomes- the smallest organelle

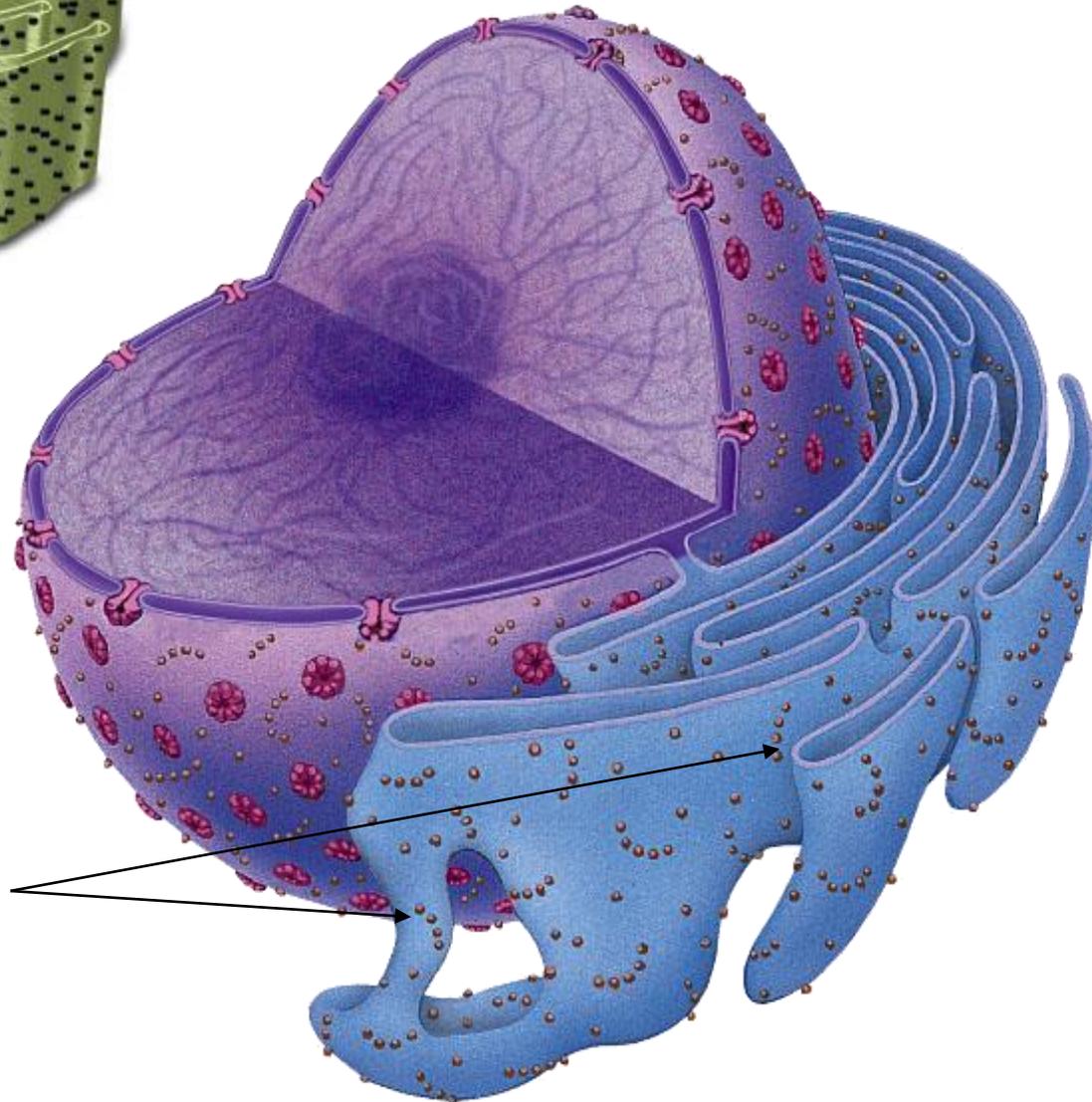
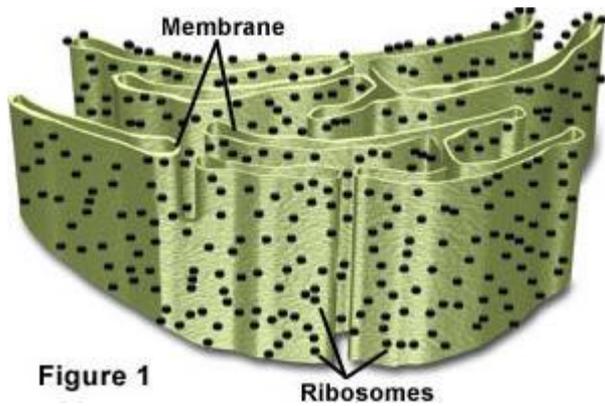
Two locations of ribosomes

- Attached ribosomes are attached to ER thus “rough” ER
- Ribosomes free in the cytoplasm thus free ribosomes.



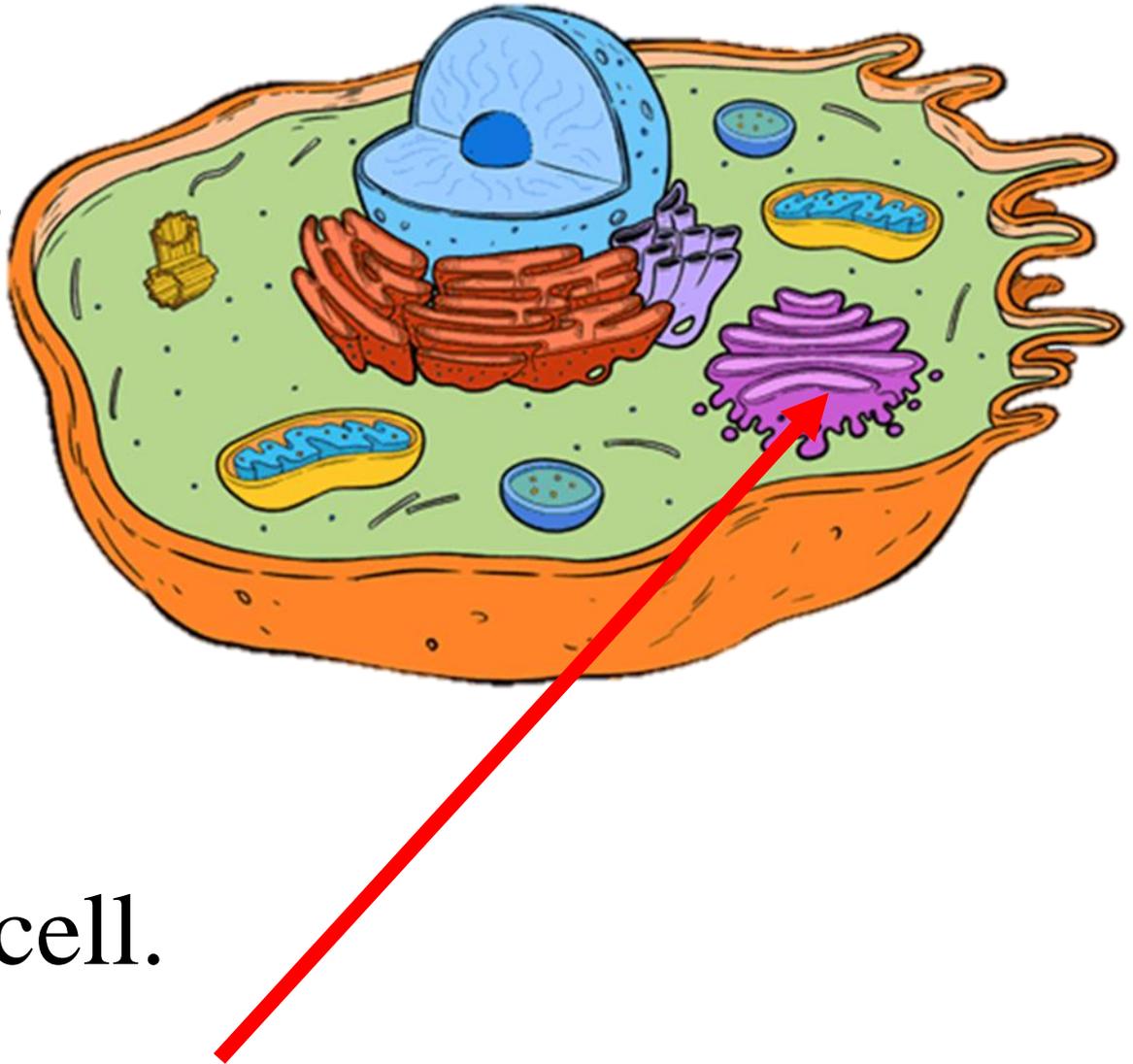
- **all ribosomes make proteins
(protein synthesis)**

Ribosomes: Site of Protein Synthesis



6. Golgi Bodies (aka Golgi Apparatus):

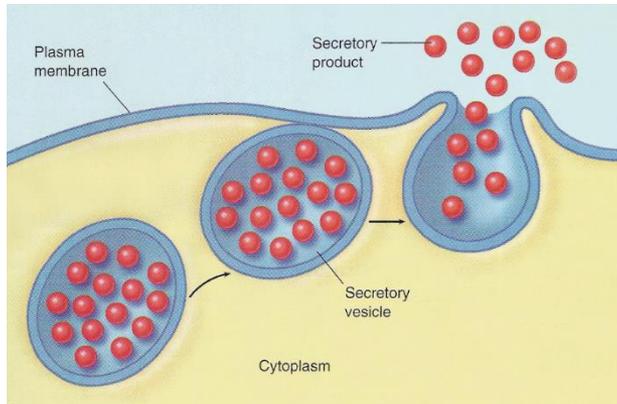
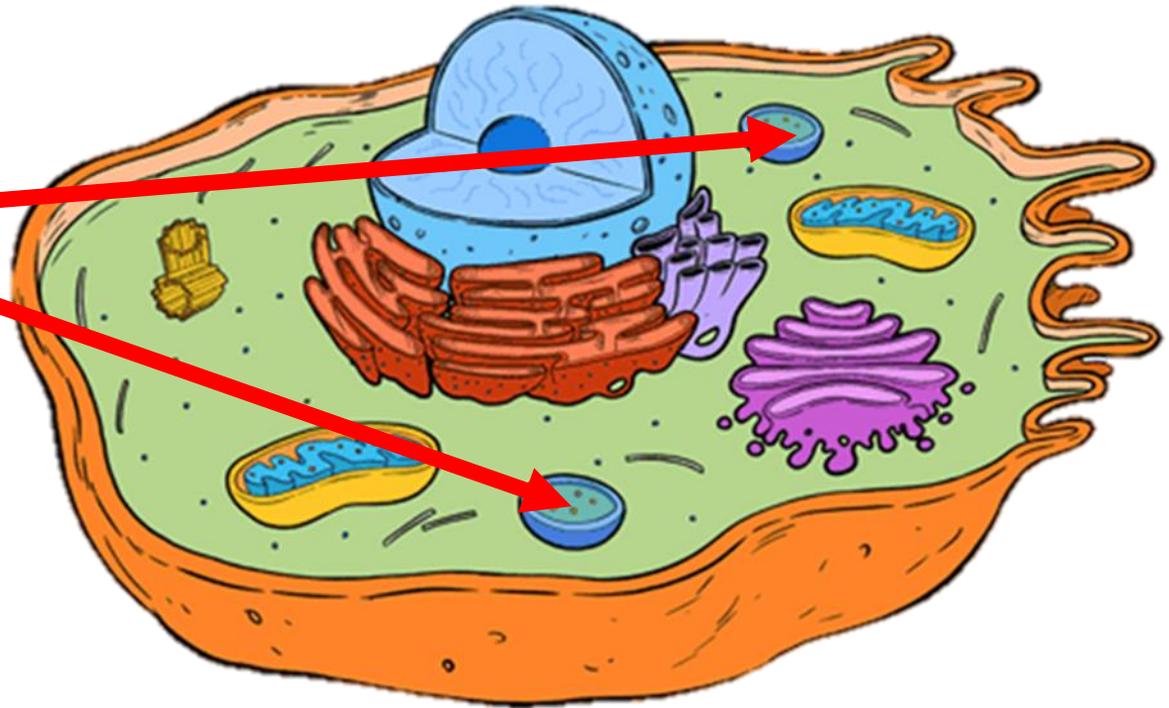
- Where cell products such as enzymes and antibodies are modified and packaged in vesicles for export from the cell.



7. Vesicles

- small “bubbles” that move material around the cell

Vesicles

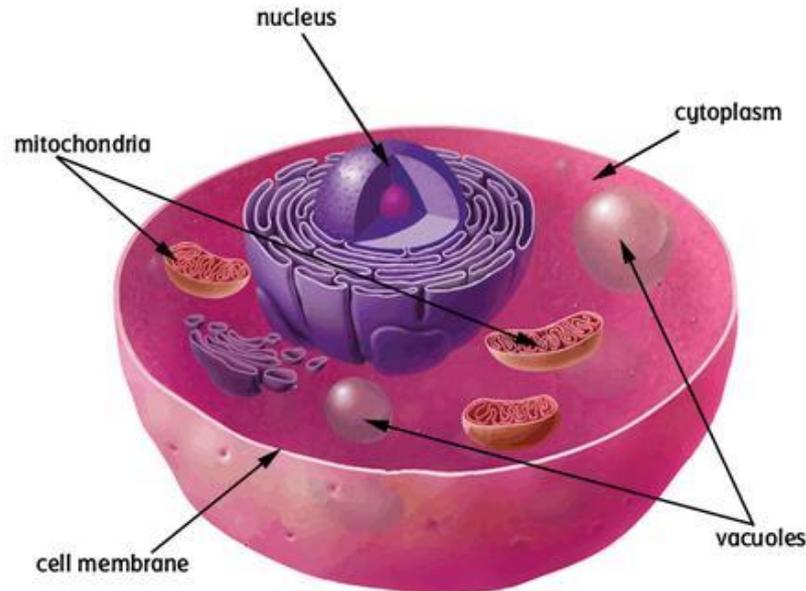


8. Vacuoles

Large vesicles for storage for food and water

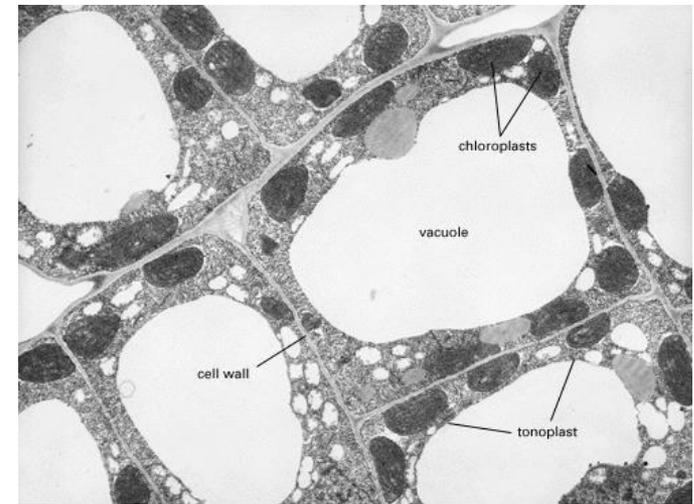
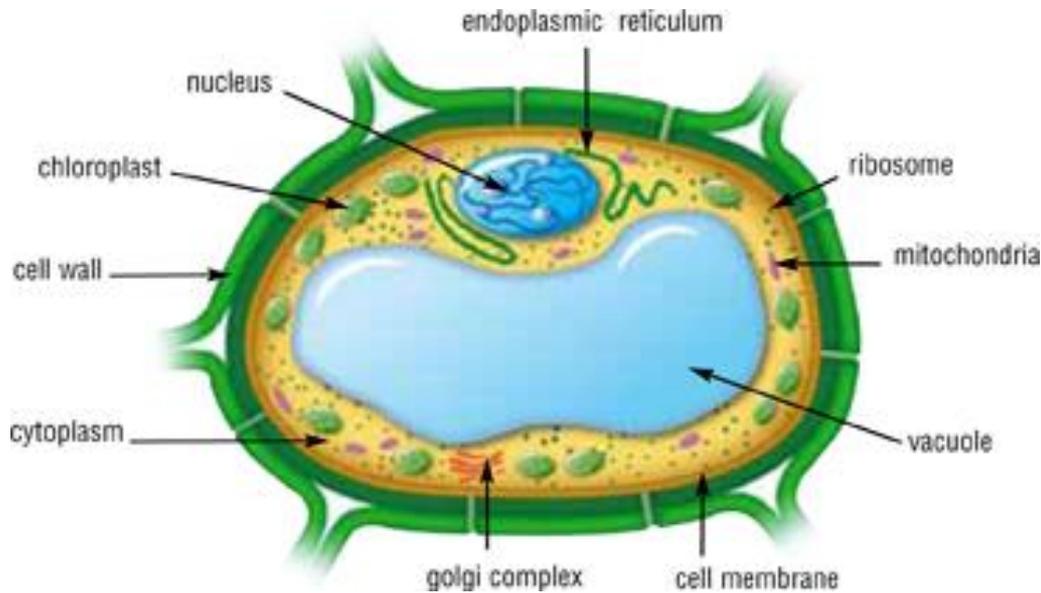
8a. Vacuoles – (Animal)

- small “bubbles” surrounded by membrane
- store material around the cell



8b. Vacuoles -Plant

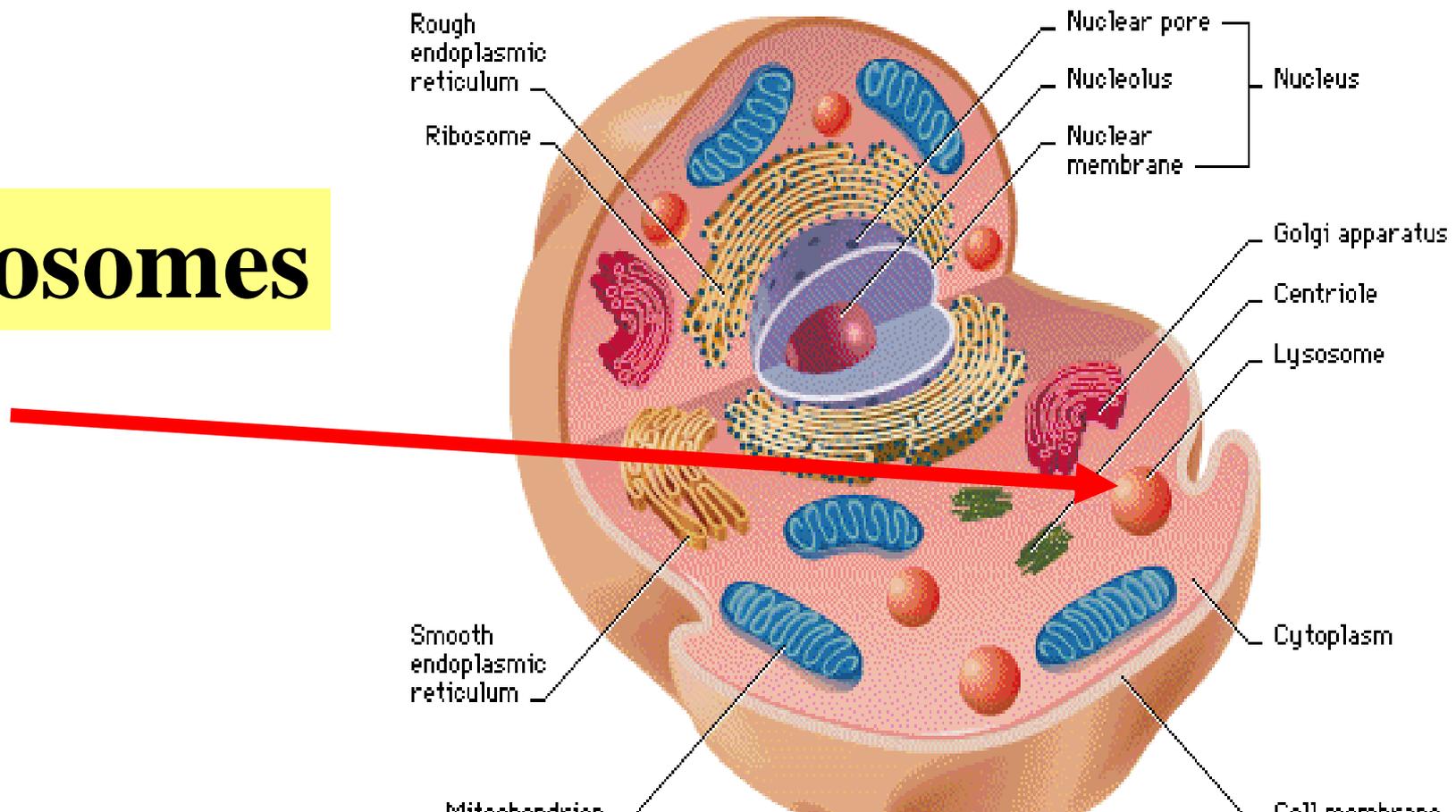
- Usually 1 (or 2) large sacs
- storage of food and water, helps support plant



9. Lysosomes

- special vesicles that Contains digestive enzymes that breaks down large molecules

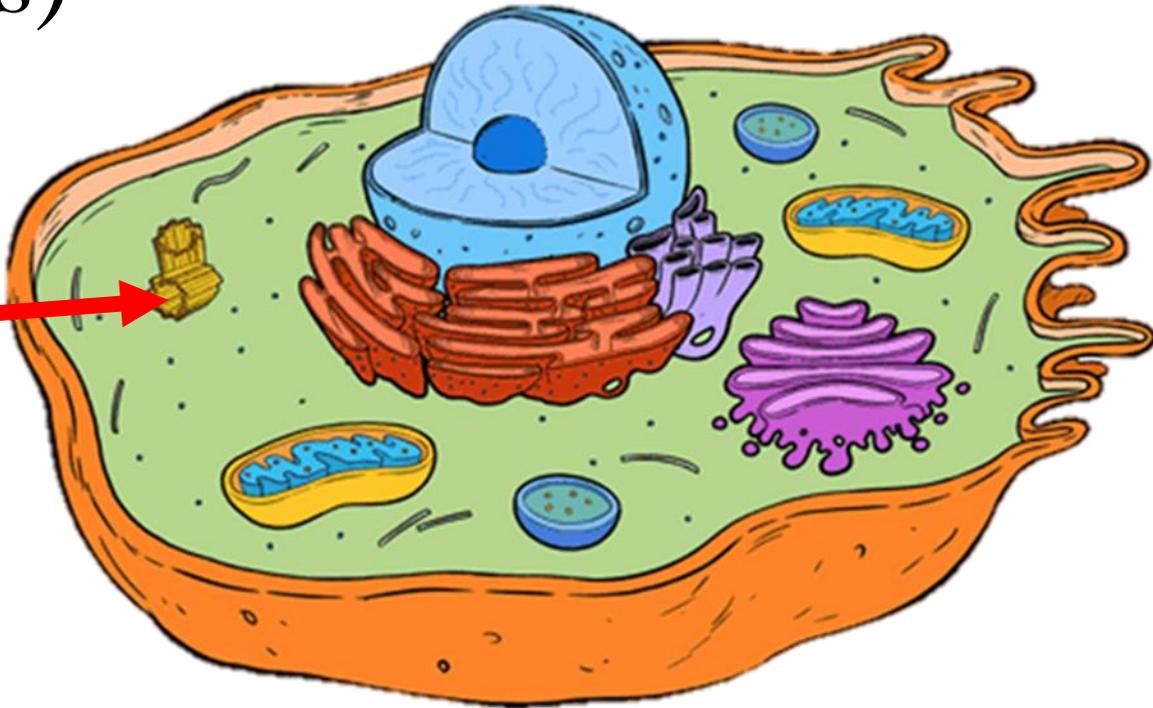
Lysosomes



10. Centrioles

- Just outside the nucleus and **only visible in animal cells** not plant cells.
- Makes the spindle fibers during cell division (Mitosis)

Centrioles

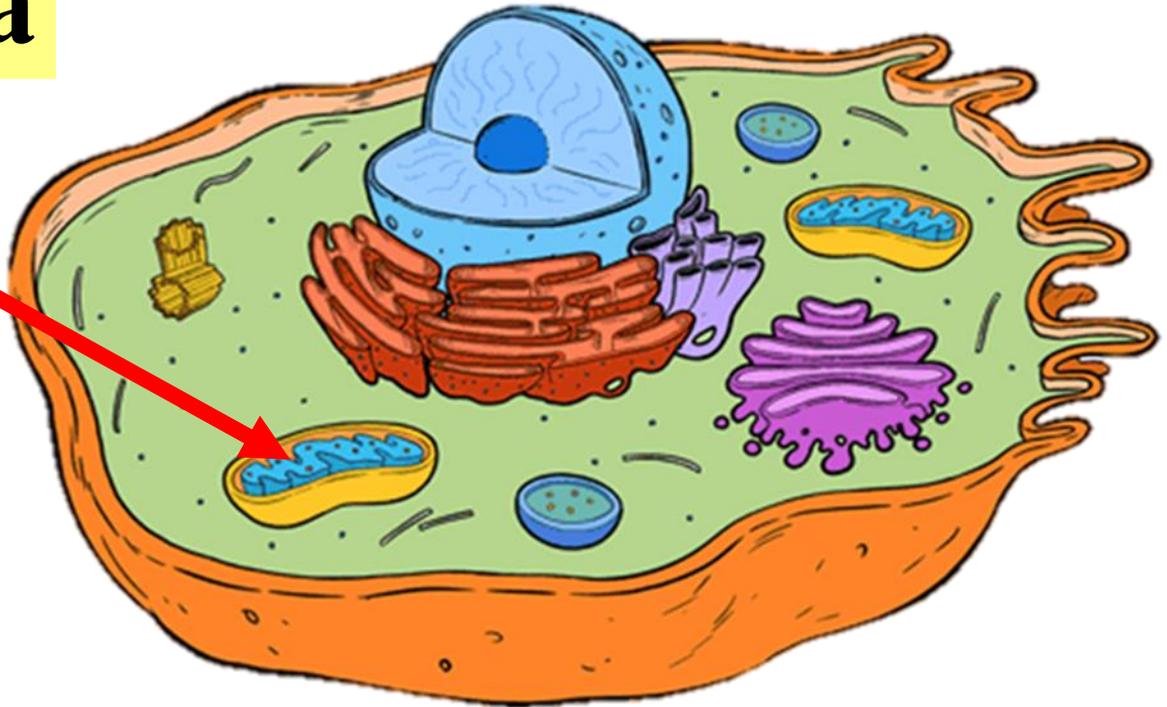


11. Mitochondria

- Power house of the cell that breaks down sugar to form energy

Mitochondria

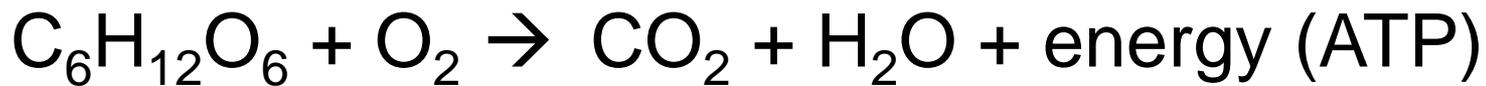
How many
in this cell?



Respiration

- Mitochondria provide both plant and animal cells with energy by converting sugar (glucose) to energy

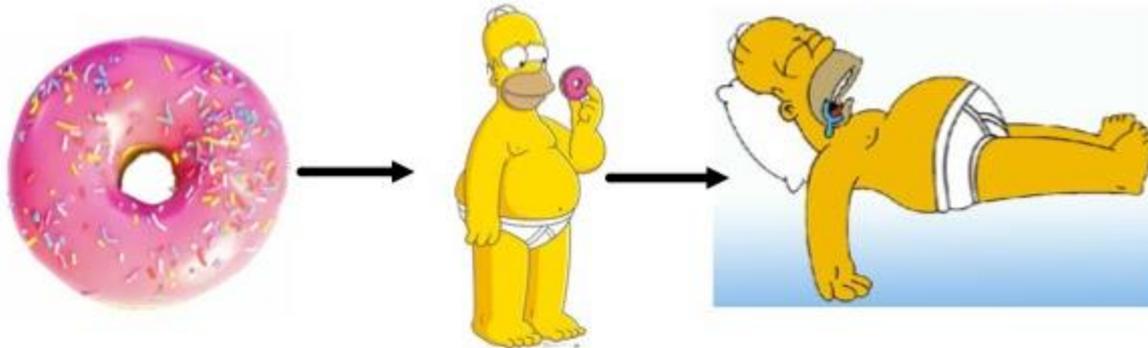
Glucose + Oxygen → carbon dioxide + water + energy



- Cellular respiration: carbohydrates release energy in consumers
- $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O + \text{energy}$
- The energy released is used for growth, repair and other life processes.

Cellular Respiration

The process in which sugars (glucose) are converted into usable energy (ATP).

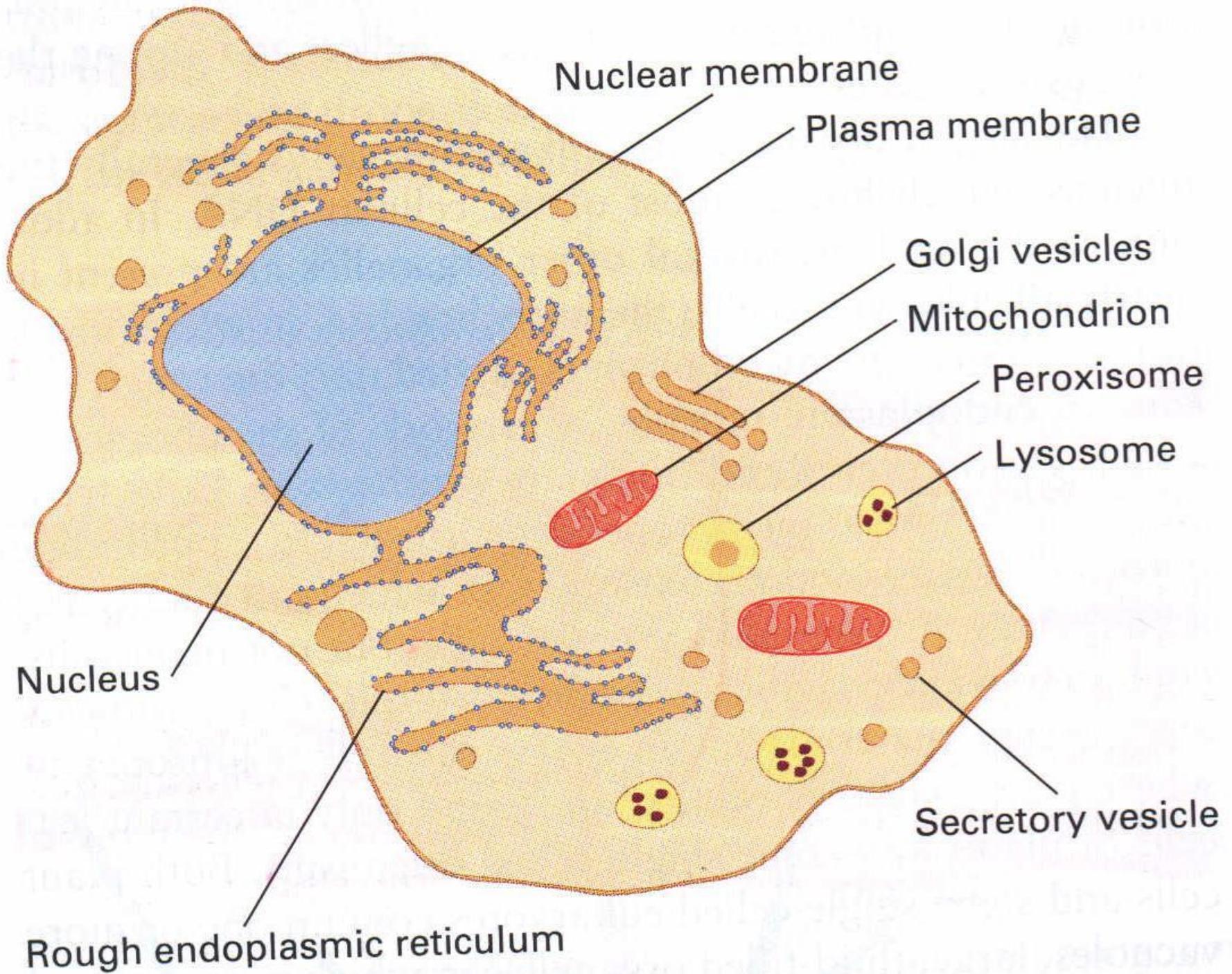


Sugar + Oxygen \rightarrow Carbon Dioxide + Water + Energy





Photo Researchers, Inc.



FOUND ONLY IN PLANT CELLS

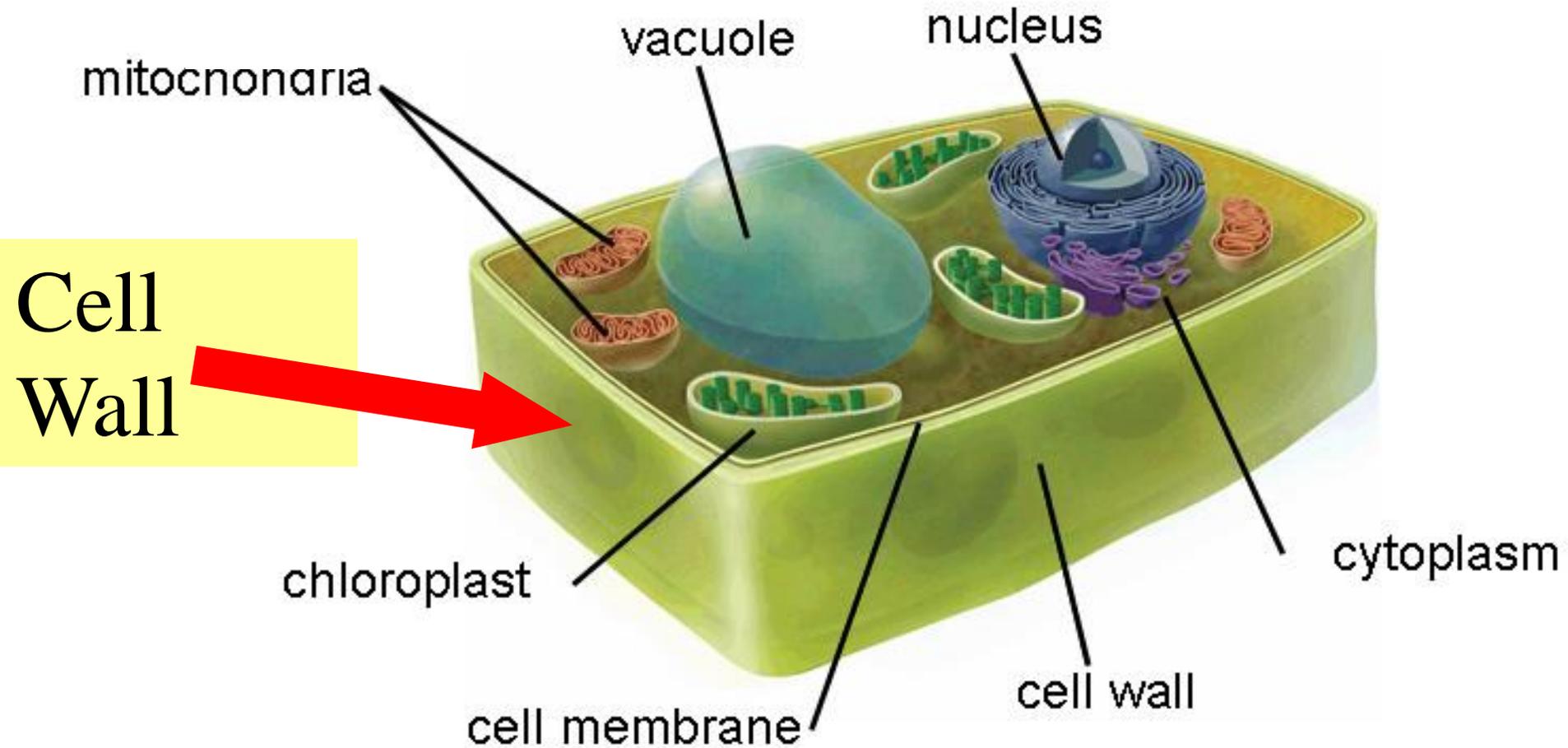


- These structures are in ***plant cells*** only
- Not found in ***animal cells***



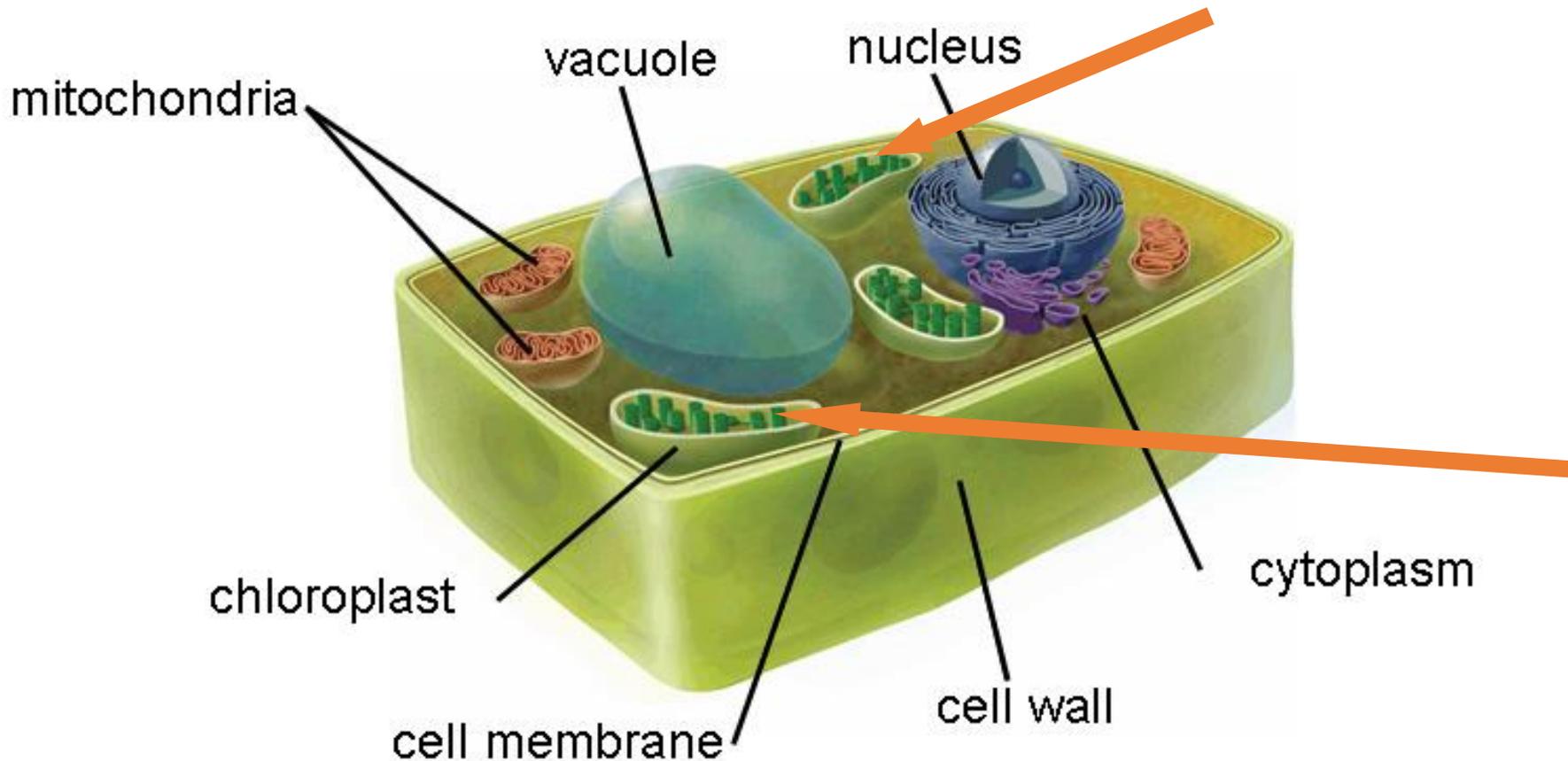
12. Cell Wall

Rigid outer layer, helps support cell Porous to allow material in and out



13. Chloroplasts

Contains green pigment called chlorophyll
Site of photosynthesis



Photosynthesis

- Photosynthesis occurs in the chloroplasts of plants
- It's purpose is to convert light energy and carbon dioxide to food

Carbon dioxide + water + energy →



glucose + oxygen

**It's the opposite
of respiration!!**

