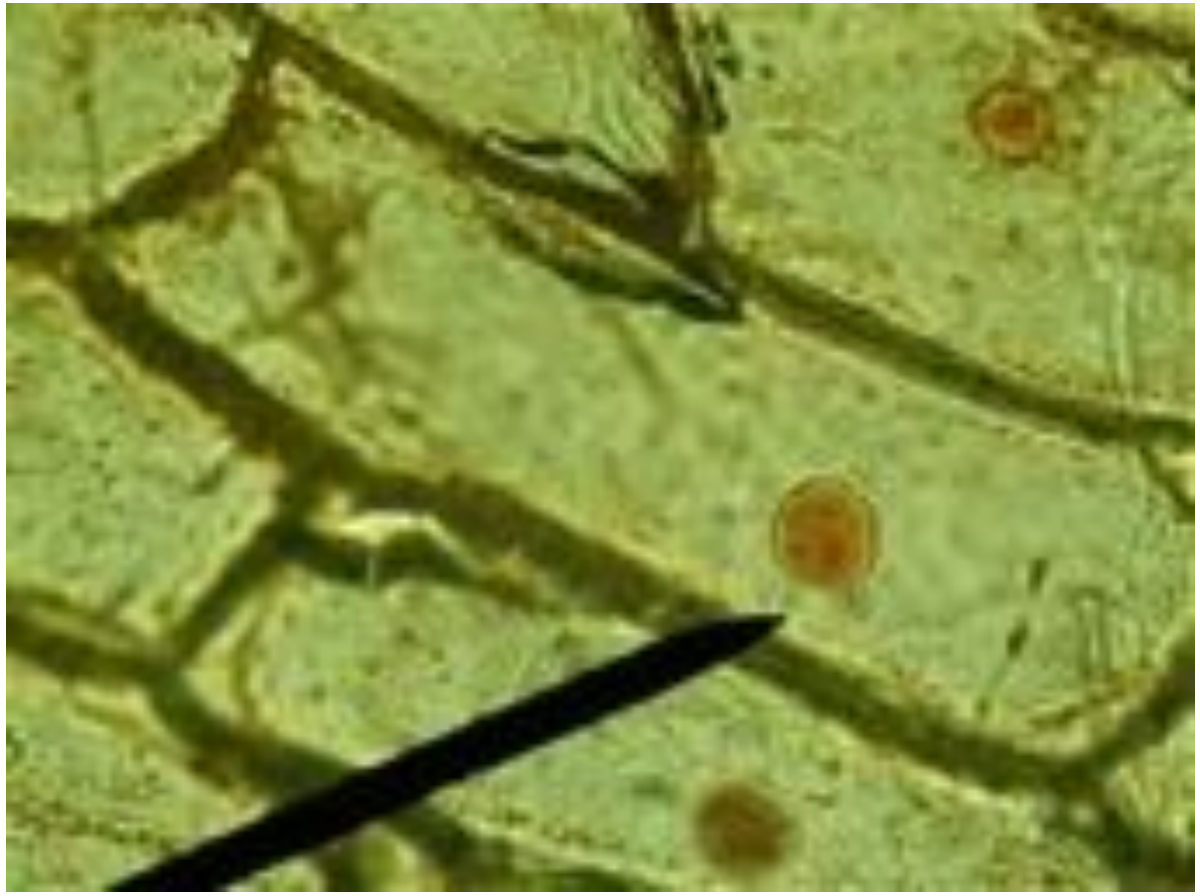
Unit 1: Life Processes

1.2 Cell Theory



Where does life come from?

- Up until ~1600s, most scientists thought that life developed **spontaneously** from non-living things.

Ex. Leaving a piece of meat alone for a couple of weeks develops maggots…

therefore, maggots developed spontaneously from the meat!

- The scientific process and proper experimentation allowed scientist to refute the idea of spontaneous generation.

- Over time, the **Cell Theory** was developed.

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It states that:

1. All living things are made up of one or more **cells**.
2. All living things come from **other** cells.
3. The cell is the **basic** unit of life.

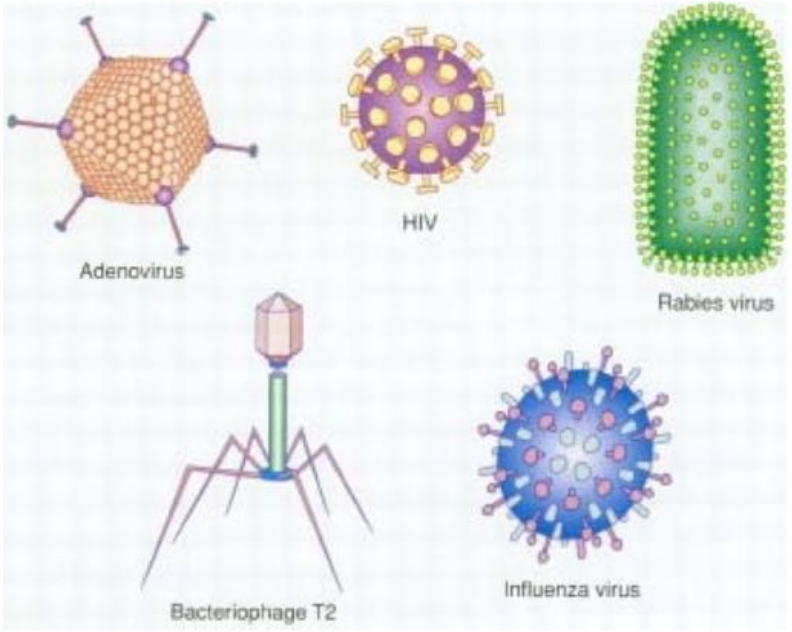
Why was the development of the cell theory important to the progress of science?

- Scientists finally had a way to describe what **LIFE** was!

What would have been the limitations of this "new science" when cells were discovered?

- Microscopes were not **powerful** enough to see the inner workings of the cell.

Viruses



- Viruses are extremely small – they can only be seen by **electron** microscopes
- They consist of a piece of **DNA**, covered by a protective **protein** coat.
- Viruses reproduce by injecting their DNA into a host **cell**, tricking it into manufacturing new **viruses**.
- The viruses **accumulate** in the cell preventing the cell from functioning properly (causing disease).

Would you consider a virus to be a living organism? Why or why not?

I. Cell Theory

1. All organisms are made up of one or more **cells**.

2. The cell is the **basic** unit of life.

3. Cells are **produced** from other cells.

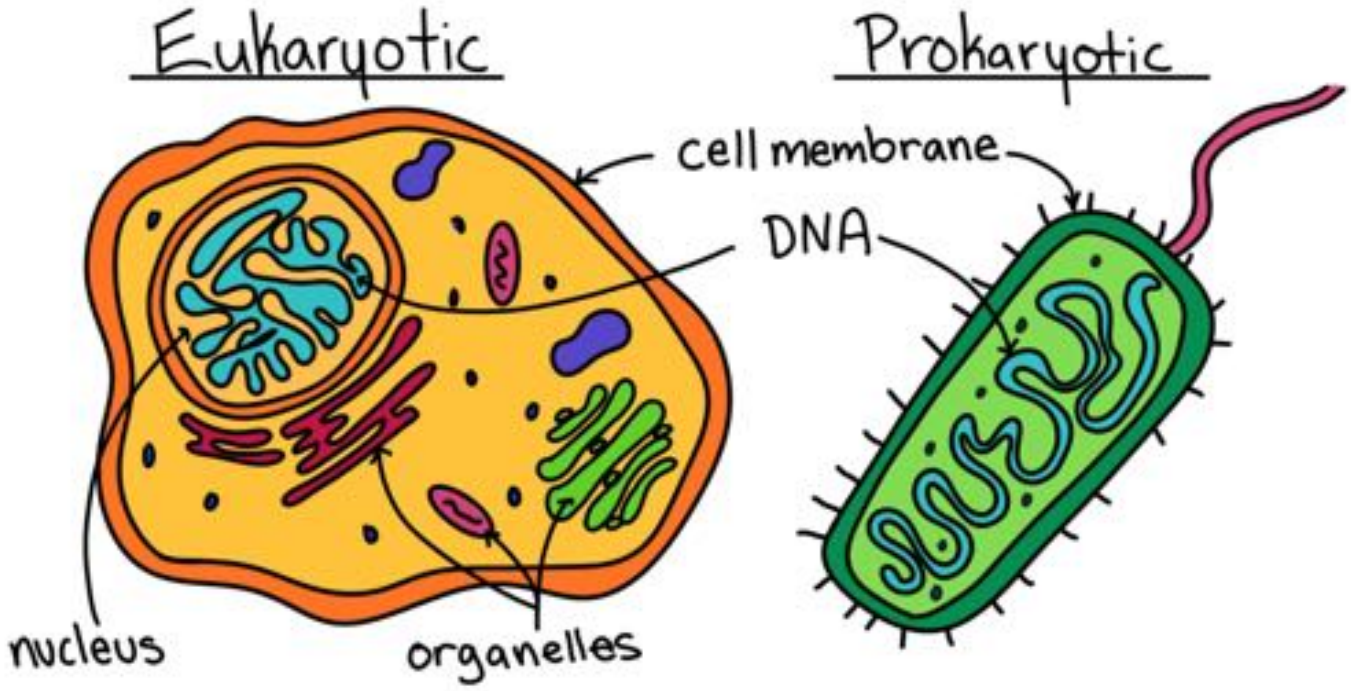
Unicellular: describes a **single**-celled living thing.



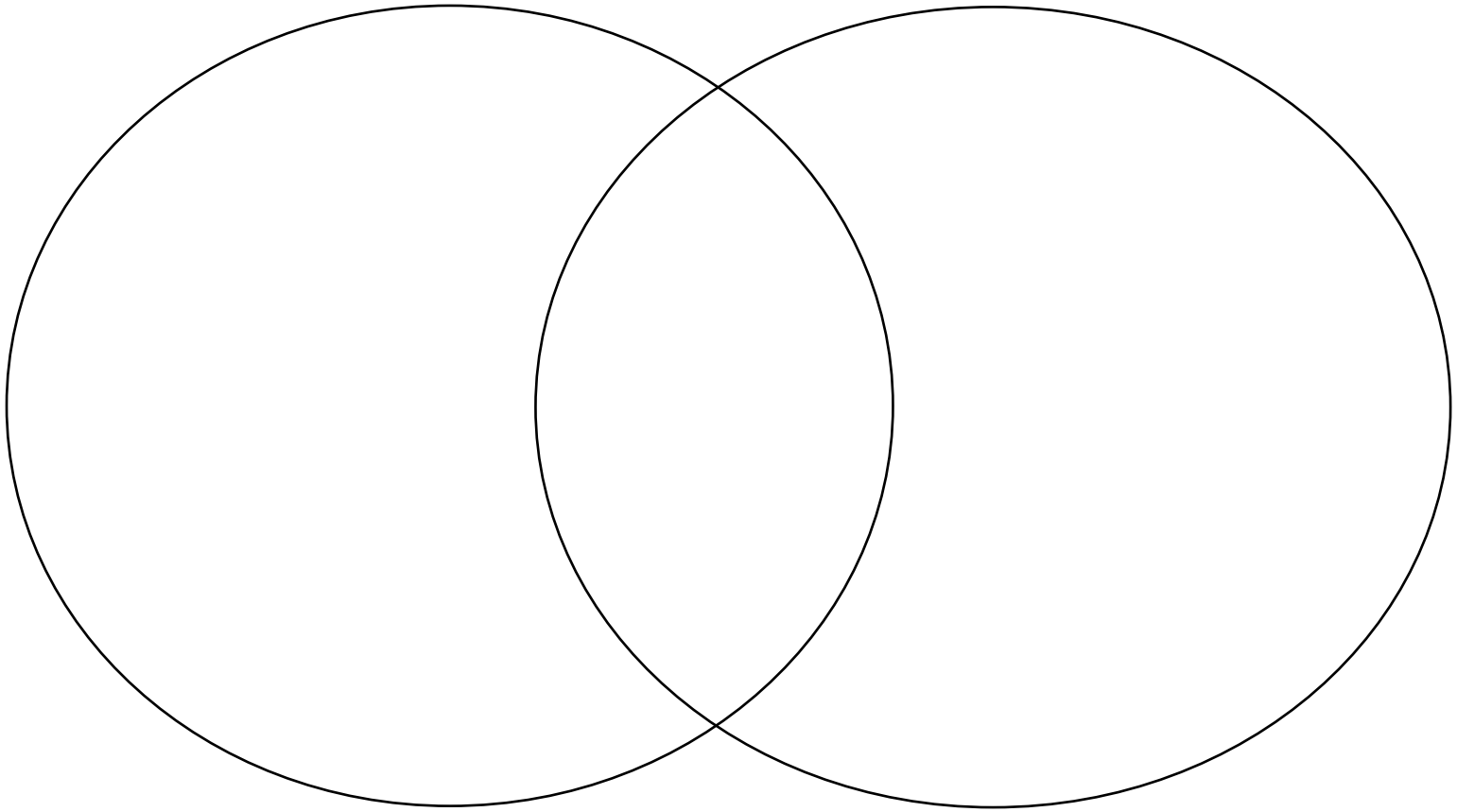
Multicellular: describes a living thing made up of **many** cells.



- Two main types of cells:
  - **Prokaryotic** Cells
  - **Eukaryotic** Cells



Venn Diagram:



Organelle Structure and Function (Eukaryotic Cells)

- **Organelles**: smaller structures within cells that carry on life functions.

- The organelles inside the cell serve many functions together including…

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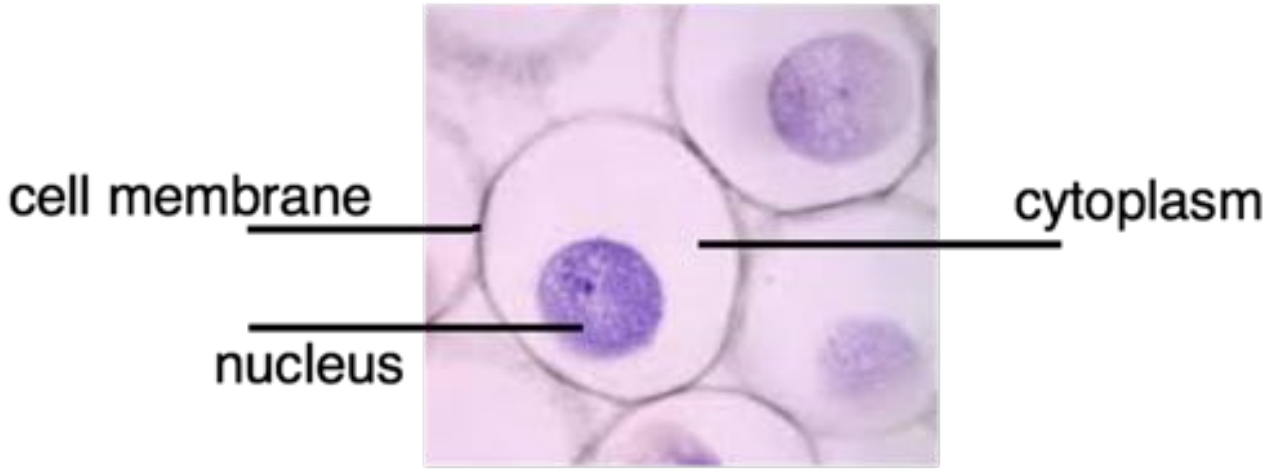
1. Providing **structure** and **form**
2. Forming a **barrier** between the cell and the environment.
3. Building and **repairing** cells
4. **Synthesizing** materials
5. Storing and releasing **energy**
6. Getting rid of **waste** material
7. **Multiplying** in number

Most cells share similar characteristics. It is these characteristics that we are going to learn about.

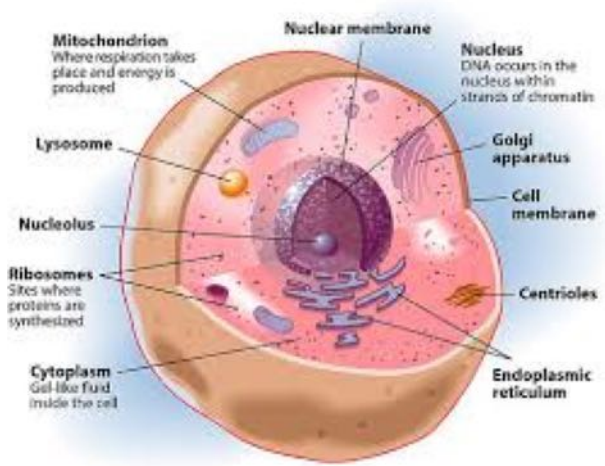
II. Cell Structures

Three Major Cell Parts



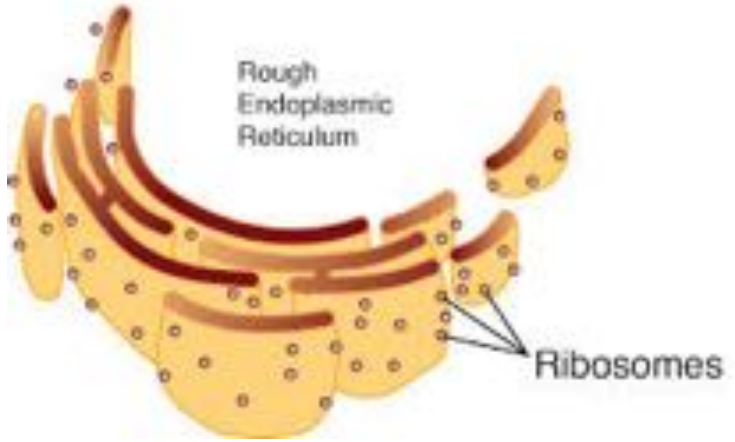
- **Cell Membrane** – thin flexible structure that **surrounds** the cell. Regulates what **enters** and **exits** the cell.
- **Nucleus** - "**brain**" of the cell. Controls functions of the cell. Contains genetic information – Deoxyribonucleic acid (**DNA**)
- **Cytoplasm** – jelly-like **fluid** in which organelles are found. This is where many chemical **reactions** take place within the cell.

Other Major Organelles:

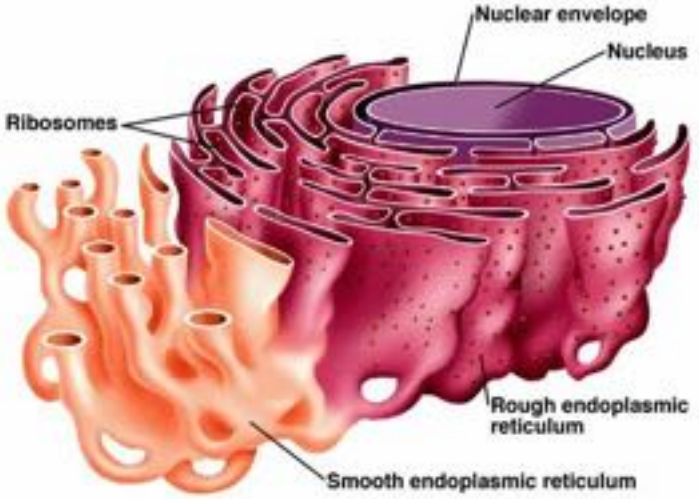


- **Mitochondrion** – converts the energy **stored** in food into usable energy for the cell (the "**powerhouse**") **- cellular respiration**

- **Ribosome** – manufacture **proteins**, the building blocks for structures in the cell.

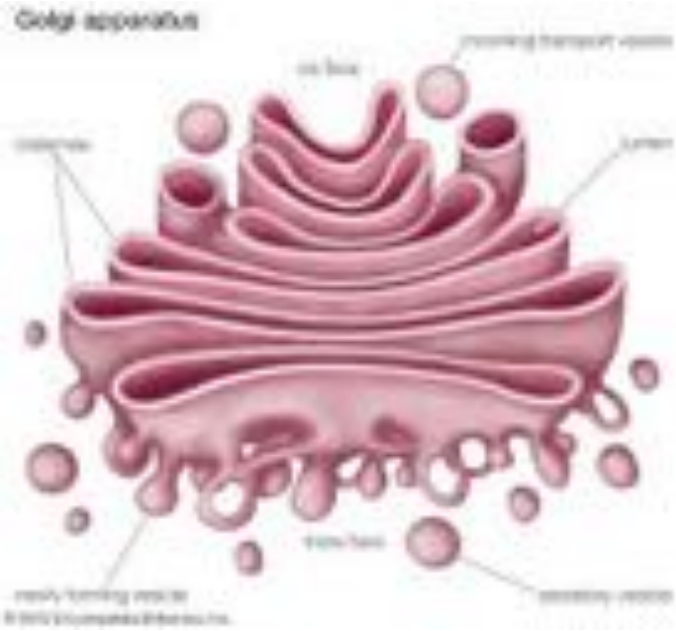


- **Endoplasmic reticulum** – network of flattened tubes that **transport** proteins within the cell.

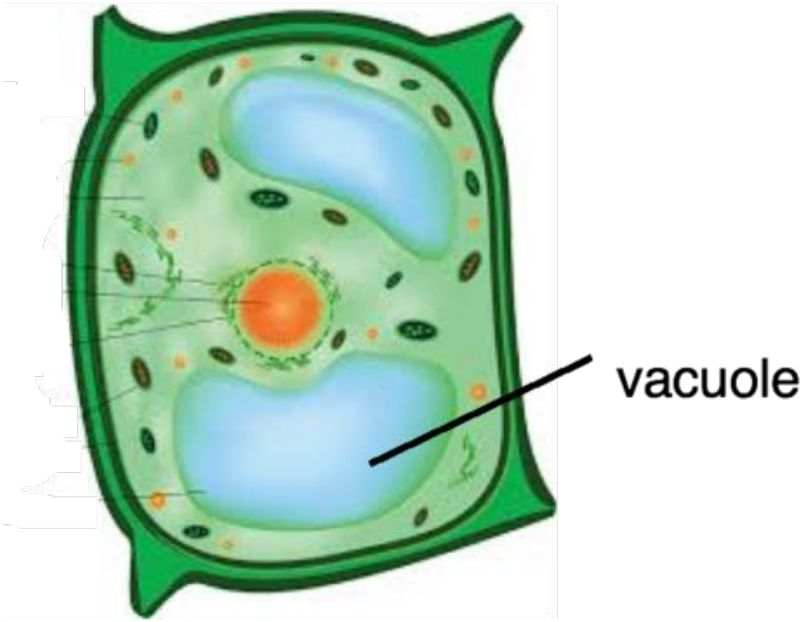


- **Golgi Apparatus** – sorts and packages proteins in membrane-wrapped structures called **vesicles**.

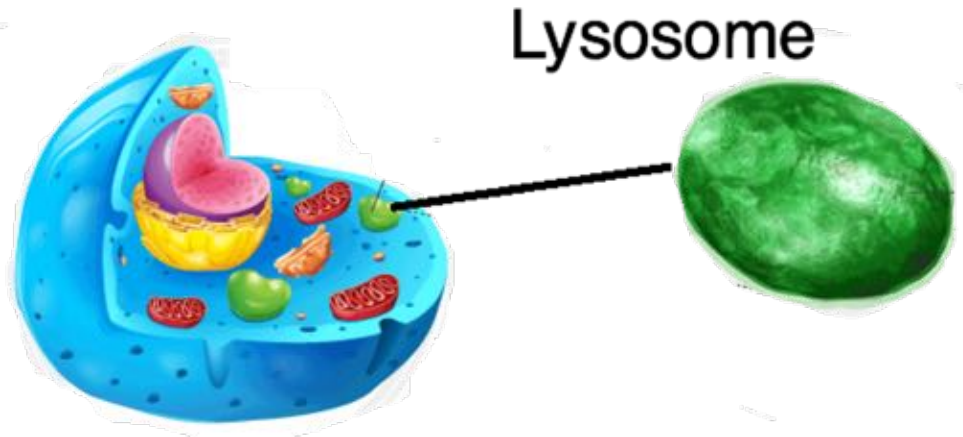
- **Vesicles -** small packages carrying **proteins**, **nutrients** and **water** into, out of, and around the cell.

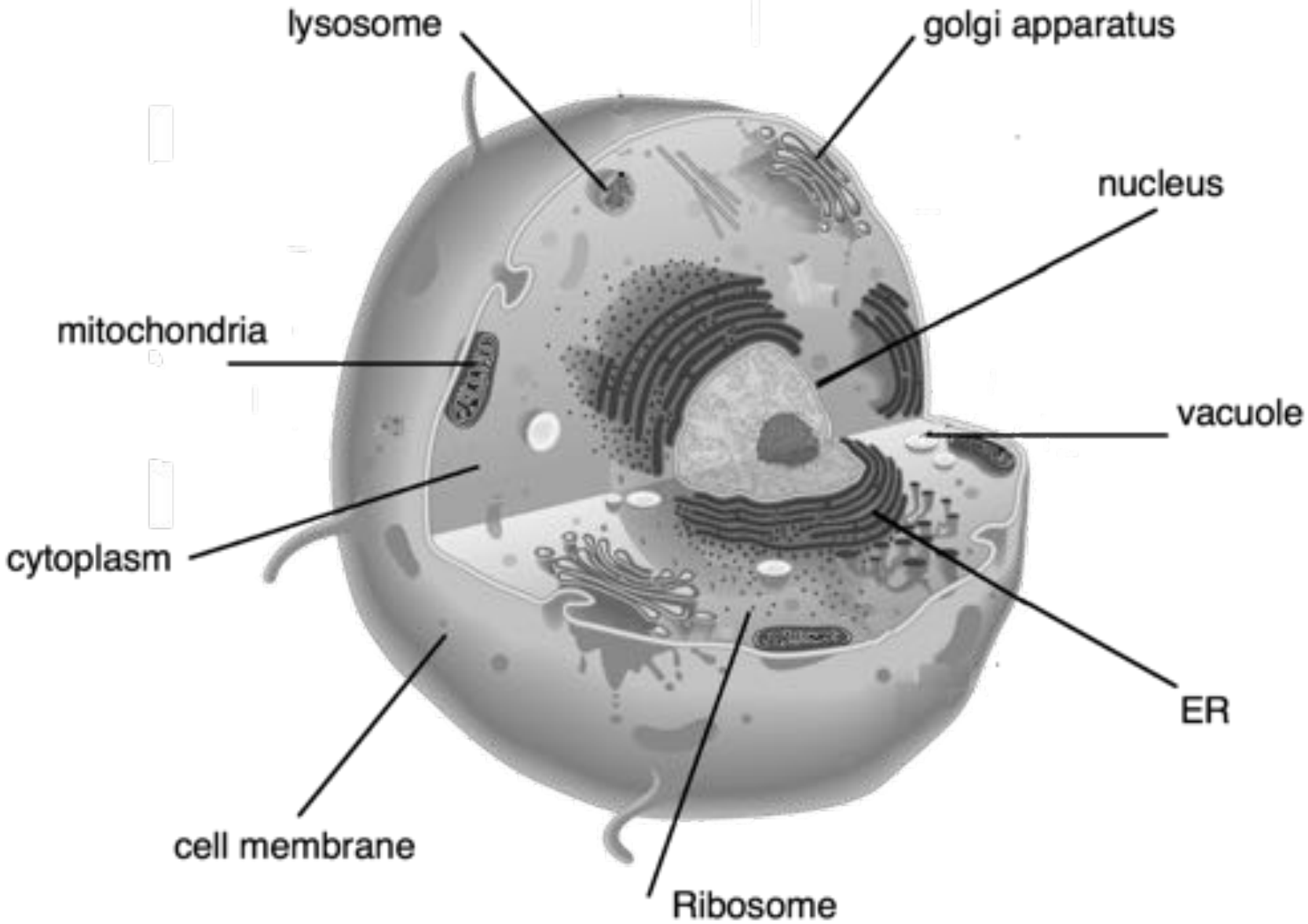


- **Vacuole** – temporary **storage** areas; assist in regulating **water** (usually bigger in **plant** cells)



- **Lysosomes** – contain **digestive** chemicals that break down food particles, cell wastes, and worn-out cell parts.

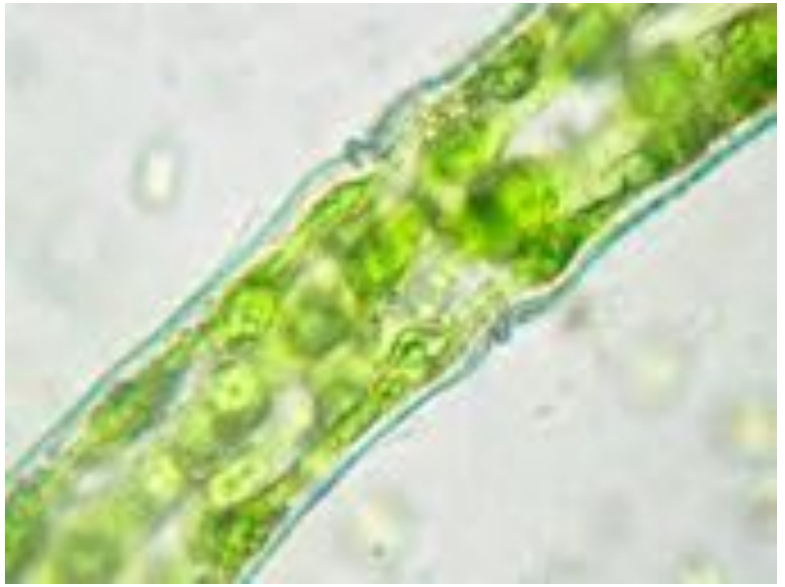


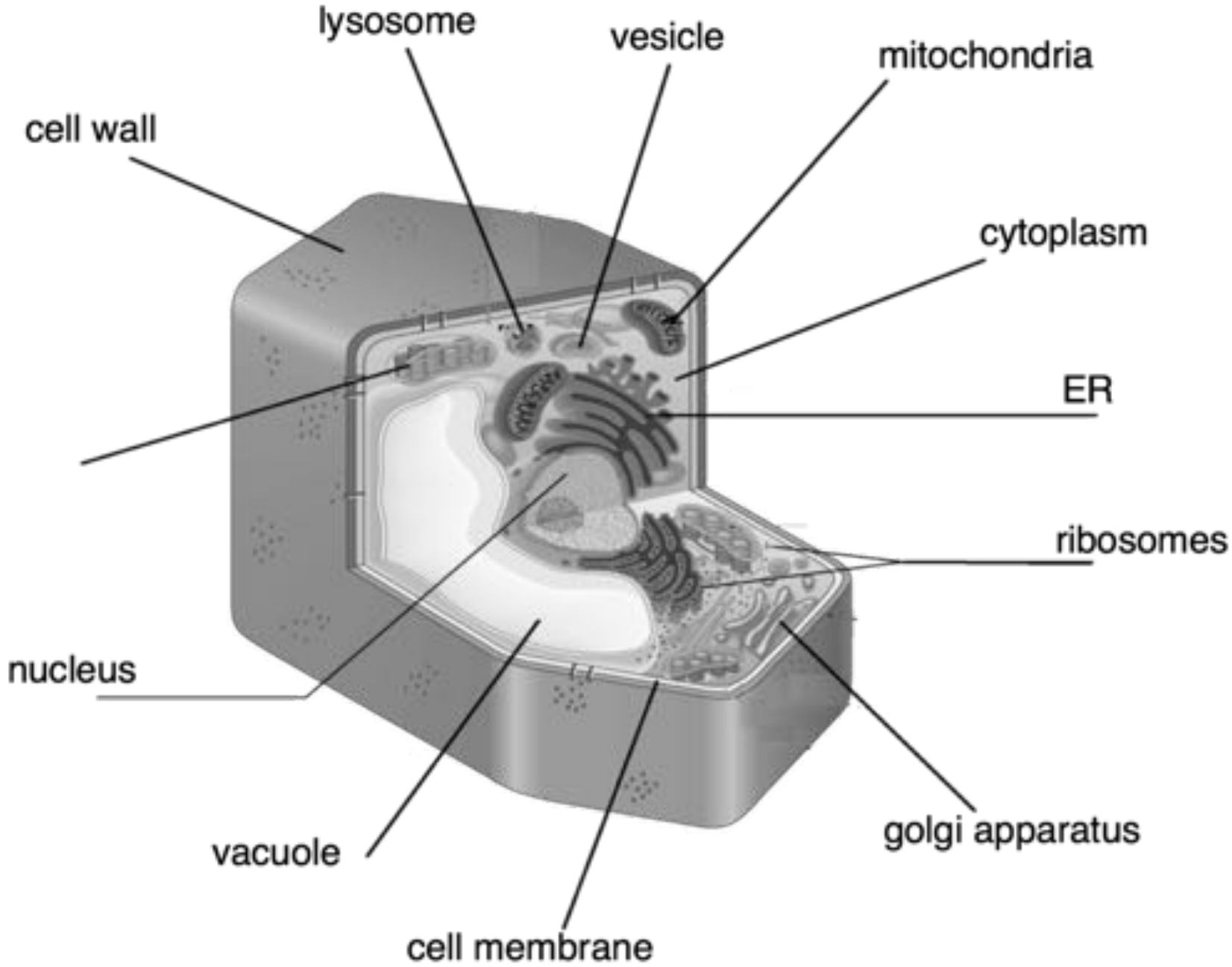

lysosome
golgi apparatus
nucleus
mitochondria
vacuole
cytoplasm
ER
cell membrane
Ribosome

Additional Plant Cell Structures

- **Cell Wall -** rigid outer wall that provides **protection**, **support** and **shape**. Contains pores to allow substances to pass.

- **Chloroplast** - captures **light** to synthesize food energy. Contains green pigment **chlorophyll**.




lysosome
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