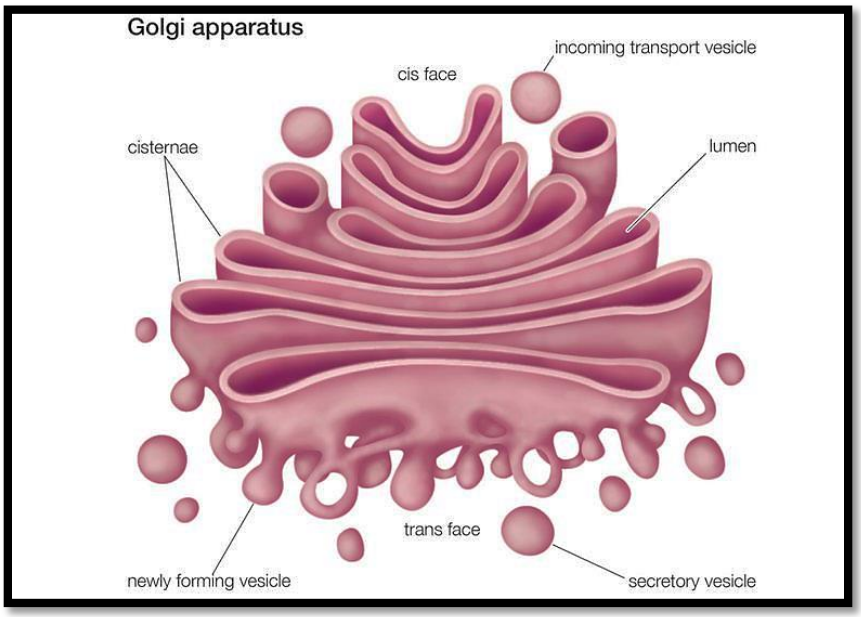
Animal cell structure

6 – Golgi apparatus:

- The Golgi apparatus, sometimes called the Golgi complex or Golgi body, is responsible for manufacturing, warehousing, and shipping certain cellular products, particularly those from the **endoplasmic reticulum** (ER).

- Depending on the type of cell, there can be just a few complexes or there can be hundreds. Cells that specialize in secreting various substances typically have a high number of Golgi.

- A Golgi apparatus is composed of flat sacs known as cisternae. The sacs are stacked in a bent, semicircular shape. Each stacked grouping has a membrane that separates its insides from the cell's cytoplasm.



- Golgi membrane protein interactions are responsible for its unique shape. These interactions generate the force that shapes this organelle.

- Molecules synthesized in the ER exit via special transport vehicles, which carry their contents to the Golgi apparatus. Once the molecules reach to the Golgi, vesicles are formed to "ship" materials to other sites.

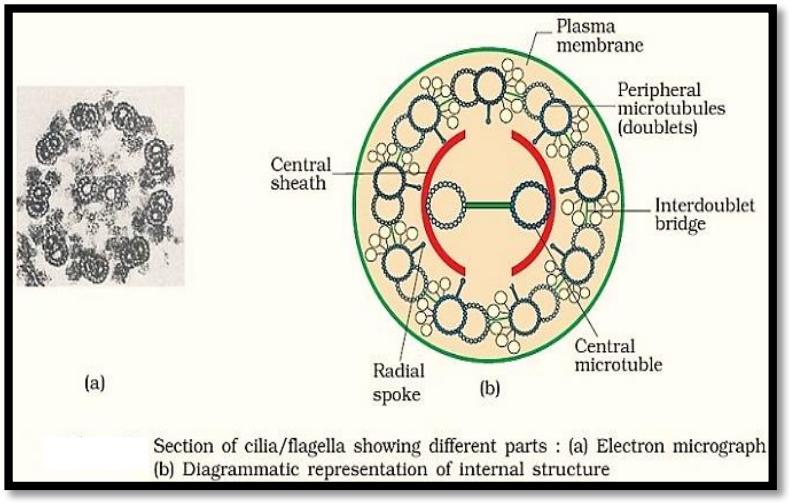
7 – Cilia and Flagella:

- Both cells contain structures known as cilia and flagella. These extensions from the cell surface aid in cell movement.

- Cilia and flagella are protrusions from some cells that aid in cellular locomotion. They also help to move substances around cells and direct the flow of substances along tracts.

- If the protrusions are short and numerous they are termed cilia. If they are longer and less numerous (usually only one or two) they are termed flagella.

- Typically, cilia and flagella have a core composed of microtubules connected to the **plasma membrane** arranged in what is known as a 9 + 2 pattern.



Section of cilia/flagella showing different parts : (a) Electron micrograph (b) Diagrammatic representation of internal structure

* Plant cell structure:

- Plant cells are the basic unit of life in organisms of the kingdom Plantae. They are eukaryotic cells, which have a true nucleus along with specialized structures called organelles that carry out different functions.

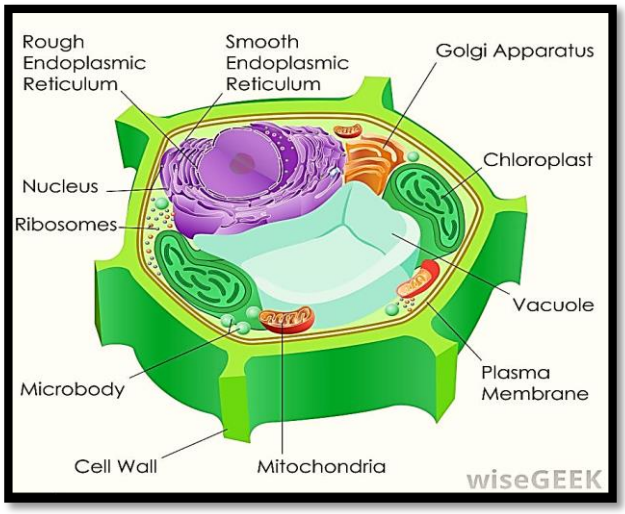
- Plant cell are differentiated from the animal cell by their **cell walls**, **chloroplasts** and **central vacuole**.

- Plant cells are the basic building block of plant life, and they carry out all of the functions necessary for survival. **Photosynthesis**, the making of food from light energy, carbon dioxide, and water, occurs in the chloroplasts of the cell. The energy molecule adenosine triphosphate (**ATP**) is produced through **cellular respiration** in the mitochondria.

- The plant cell has many different parts , each part of the cell has a specialized function and these structures are called organelles:

1- Cell Wall:

- The cell wall is a tough layer found on the outside of the plant cell that gives it strength and maintains high turgidity.
- In plants, the cell wall contains mainly cellulose, along with other molecules like hemicellulose, pectin, and lignin.



- Plant cells have a **primary cell wall**, which is a flexible layer formed on the outside of a growing plant cell, and a **secondary cell wall**, a tough, thick layer formed inside the primary plant cell wall when the cell is mature.

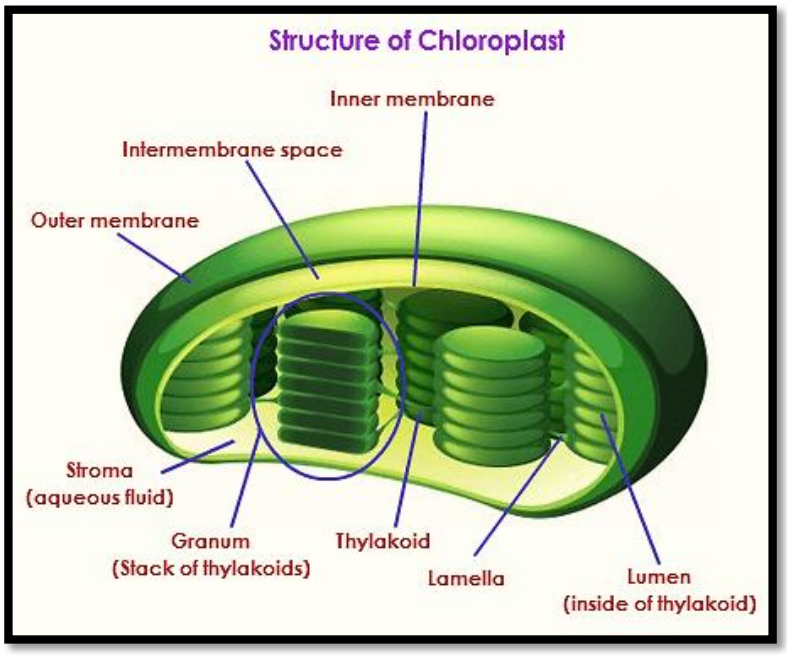
2 – Chloroplasts:

- ✓ Chloroplasts are found only in plant and algae cells. These organelles carry out the process of photosynthesis, which turns water, carbon dioxide, and light energy into nutrients.

- ✓ They are oval-shaped and have two membranes: an outer membrane, which forms the external surface of the chloroplast, and an inner membrane that lies just beneath.

- ✓ Chloroplasts themselves contain many flattened disks called thylakoids, and these have a high concentration of **chlorophyll** and **carotenoids**, which capture light energy.

- ✓ The molecule chlorophyll also gives plants their green color. Thylakoids are stacked on top of one another in vascular plants in stacks called **granum** .



3 – Vacuoles:

- Plant cells are unique in that they have a large central vacuole. A vacuole is a small sphere of membrane within the cell that can contain fluid, ions, and other molecules. Vacuoles are basically large vesicles.

- Plant cells characteristically have a large vacuole that can take up anywhere from 30-80 percent of the cell.

- The central vacuole of a plant cell helps maintain its turgor pressure, which is the pressure of the contents of the cell pushing against the cell wall. A plant thrives best when its cells have high turgidity, and this occurs when the central vacuole is full of water.

Other Organelles:

- ☒ Plant cells have many other organelles that are essentially the same as organelles in other types of eukaryotic cells, such as animal cells. The **nucleus** contains a cell's deoxyribonucleic acid (DNA), its genetic material.

- ☒ The nucleus also regulates the growth and division of the cell.

- ☒ Proteins are synthesized in **ribosomes**, modified in the **endoplasmic reticulum**, and folded, sorted, and packaged into vesicles in the **Golgi apparatus**.

- ☒ **Mitochondria** are also found in plant cells. They produce ATP through cellular respiration.

- ☒ **Cytosol** is the liquid contained within cells. It is mostly made of water, and also contains ions like potassium, proteins, and small molecules.

- ☒ The **cell membrane**, a double phospholipid layer, surrounds the entire cell.

Comparison between Animal and Plant cell

plant and animal cells have several differences and similarities. For example, animal cells do not have a cell wall or chloroplasts but plant cells do. Animal cells are round and irregular in shape while plant cells have fixed, rectangular shapes.

	Typical animal cell	Typical Plant cell
Organelles	Nucleus	Nucleus
	• Nucleolus (within nucleus)	• Nucleolus (within nucleus)
	• Rough ER	• Rough ER
	• Smooth ER	• Smooth ER
	• 80S Ribosomes	• 80S Ribosomes
	• Cytoskeleton	• Cytoskeleton
	• Golgi apparatus	• Golgi apparatus
	• Cytoplasm	• Cytoplasm
	• Mitochondria	• Mitochondrion
	• Vesicles	• Vesicles
	• Vacuoles One or more small vacuoles (much smaller than plant cells).	• Vacuole One, large central vacuole taking up 90% of cell volume.
	• Lysosomes occur in cytoplasm.	Lysosomes usually not obvious.
	• Centrioles Present in all animal cells	• Centrioles Only present in lower plant forms.
		• Chloroplast and other plastids
Additional structures	• Flagellae • Plasma membrane	•Cellulose cell wall •Plasmodesmata