The Animal Cell

Animal cell: is the basic unit of structure and function in an organism.

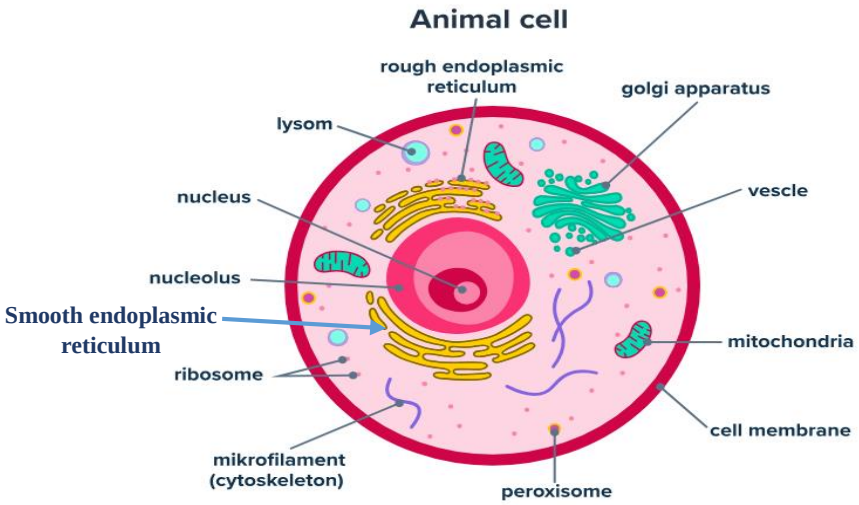
Cell theory: the classical cell theory was proposed by **Theodor Schwann** in 1839. There are three parts to this theory:

The first part states ⟹ that all organisms are made of cells.

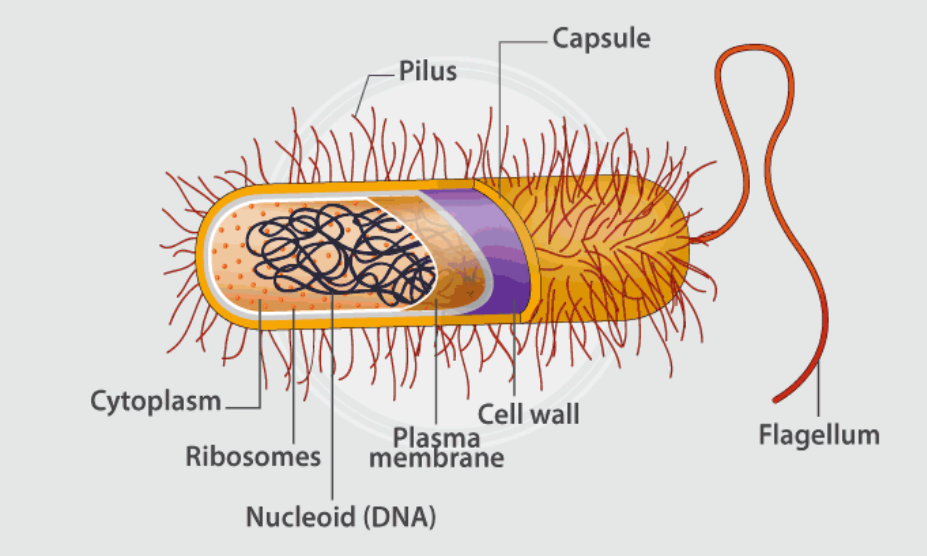
The second part states ⟹ that cells are the basic units of life.

States that every living organism is composed of cells and every cell in an organism is produced by another cell.

The main parts of the cell (cell structure):



Eukaryotic Cell



Prokaryotic Cell

Living &non-living components in cell

A- Living component:

1- **Cell membrane:** This membrane surrounds the parts of a cell and controls the movement of material into and out of a cell.

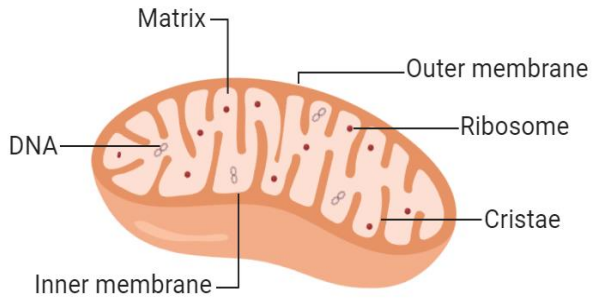
2- **Nuclei:** the membrane-bound nucleus contains the bulk of the cellular DNA in multiple chromosomes. Transcription of this DNA processing of the RNA occurs here. Nucleoli are contained within the nucleus.

(Nuclear membrane)—**function:** Controls cell activities.

3- **Cytoplasm:** Its substance between the cell membrane and the nucleus, which contains cytosol and organelles, makes up most of the mass of many cells.
Function: produces a variety of cell materials.

4- **Mitochondria:** are rod-shaped in the cytoplasm. They are essential for the cell to continue to survive. Energy is derived from cellular respiration, also known as aerobic respiration.

Function: Release energy & it is called (the powerhouse of the cell)

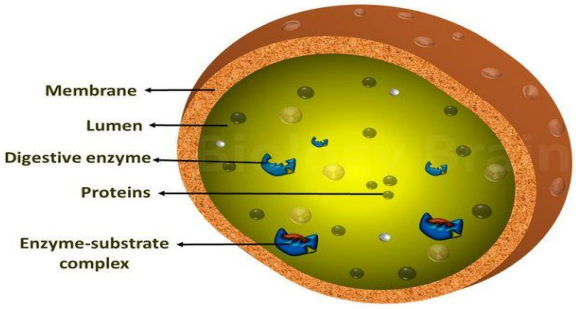


5- **Ribosomes:** These are tiny- particles, so small. They can see only with an electron microscope.

Function: it is the site of protein synthesis because it consists of RNA and protein.

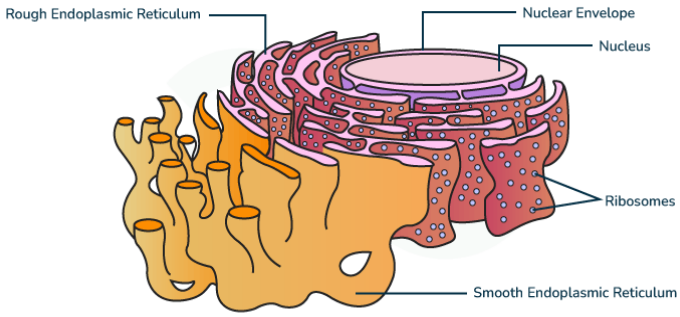


6- **Lysosome:** round organelles surrounded by a membrane and containing digestive enzymes.



7- **Endoplasmic reticulum:** the **smooth endoplasmic reticulum** is a cytoplasmic membrane system where many of the reactions of lipid biosynthesis and xenobiotic metabolism are carried out. The **rough endoplasmic reticulum** has attached ribosomes engaged in synthesizing membrane-targeted and secreted proteins. These proteins are transported to the Golgi complex in vesicles for further processing and storage.

Function: Moves materials within cells.



B- Non-living component

Vacuoles: a liquid-filled sphere surrounded by a membrane.

Function: stores water &dissolved materials.

❖ **Note:** You can see these types of structures in **Amoeba** or **Paramecium**

Organisms are divided according to the number of cells:

1- **Unicellular Organisms:** Some organisms are single cells called unicellular e.x. **Bacteria**, **Amoeba**, and **Euglena**.
2- **Multicellular Organisms:** Some organisms have many cells and are called multicellular, e.g., **Animal** and **plant** tissue.

We can divide the organisms into:

1- **Eukaryotic**
2- **Prokaryotic**

- What are the differences between Prokaryotic and Eukaryotic?

	Prokaryotes	Eukaryotes
Type of Cell	Always unicellular	Unicellular and multi-cellular
Cell size	0.2 μm – 2.0 μm in diameter	10 μm – 100 μm in diameter
Cell wall	Usually present: chemically complex	When present, chemically simple
Nucleus	Absent. Instead, they have a nucleoid region in the cell	Present
DNA arrangement	Circular	Linear
Mitochondria	Absent	Present
Cytoplasm	Present, but cell organelles are absent	Present, cell organelles present
Endoplasmic reticulum	Absent	Present
Plasmids	Present	Very rarely found in eukaryotes
Ribosome	Small ribosomes	Large ribosomes
Lysosome	Absent	Present
Cell division	Binary fission	Mitosis
Flagella	The flagella are smaller in size	The flagella are larger
Reproduction	Asexual	Both Asexual and Sexual
Example	Bacteria and Archaea	Plant and Animal cell