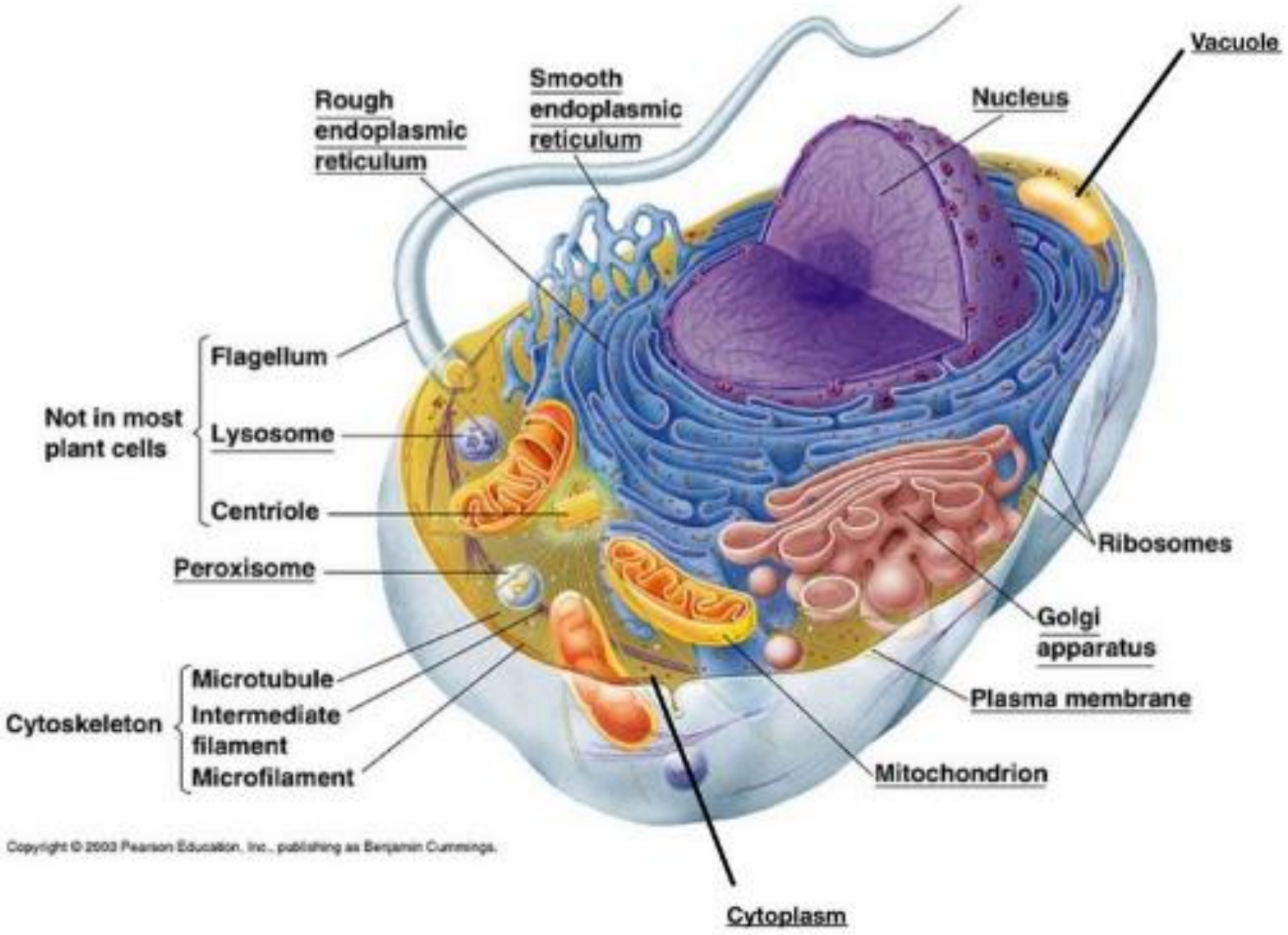
2nd Zoology Lab Animal Cell Structure

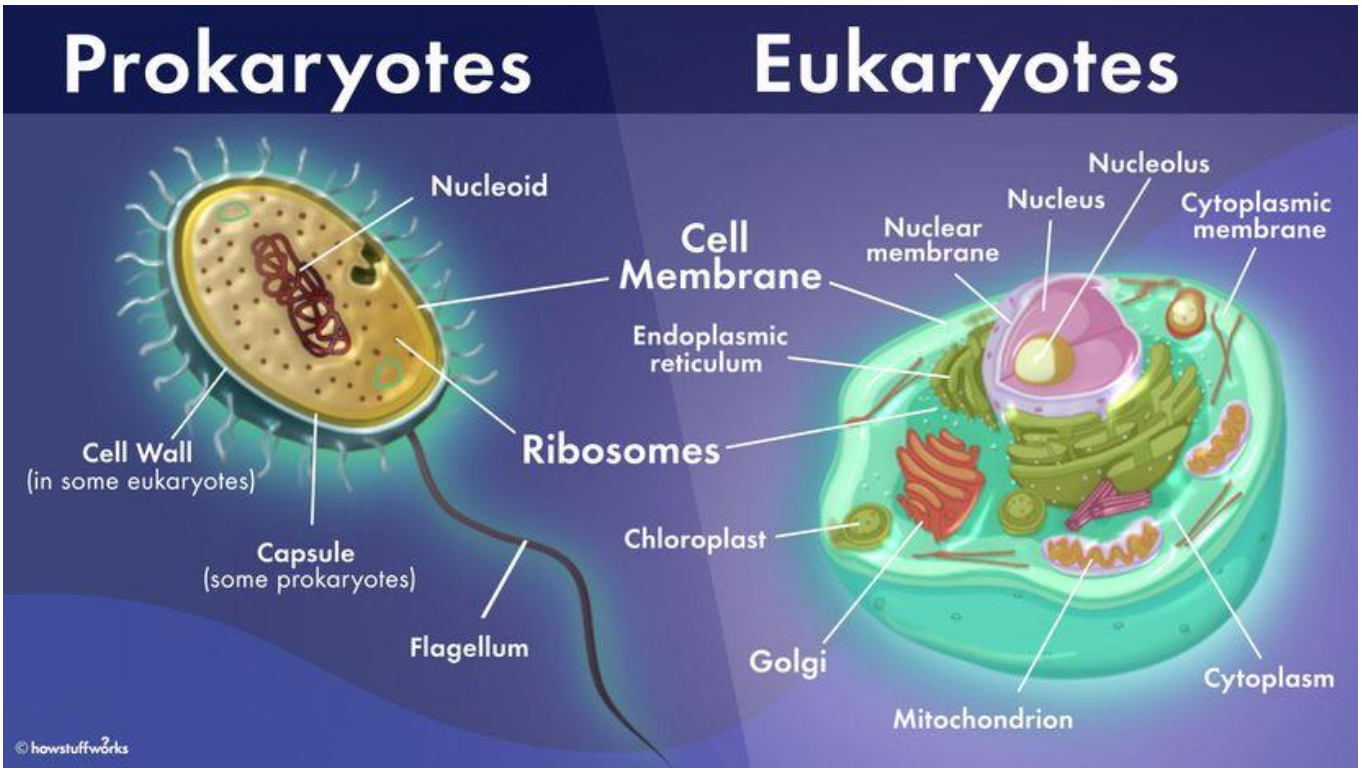
- **The Cell: is the smallest unit of the life. It is the fundamental structural and functional unit of all living organisms.**



Classification of cells

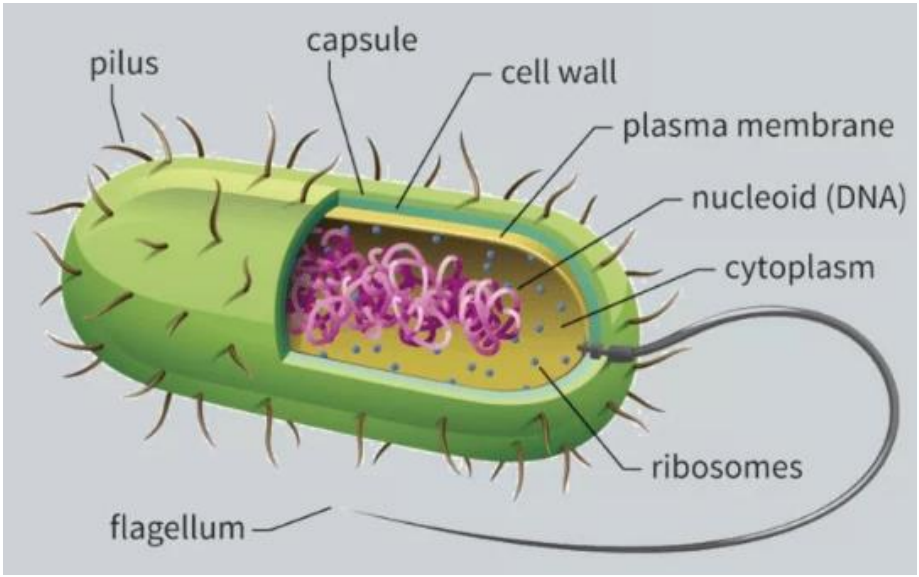
There are two major types of cells:

- **Prokaryotic cells.**
- **Eukaryotic cells.**



Prokaryotic Cells

- **Do not have a nuclear envelop.**
- **The nuclear material consists of a single chromosome and lies in the cytoplasm in the nuclear region is called nucleoid.**
- **Organelles are much smaller than eukaryotic cells.**
- **Example: Bacteria**

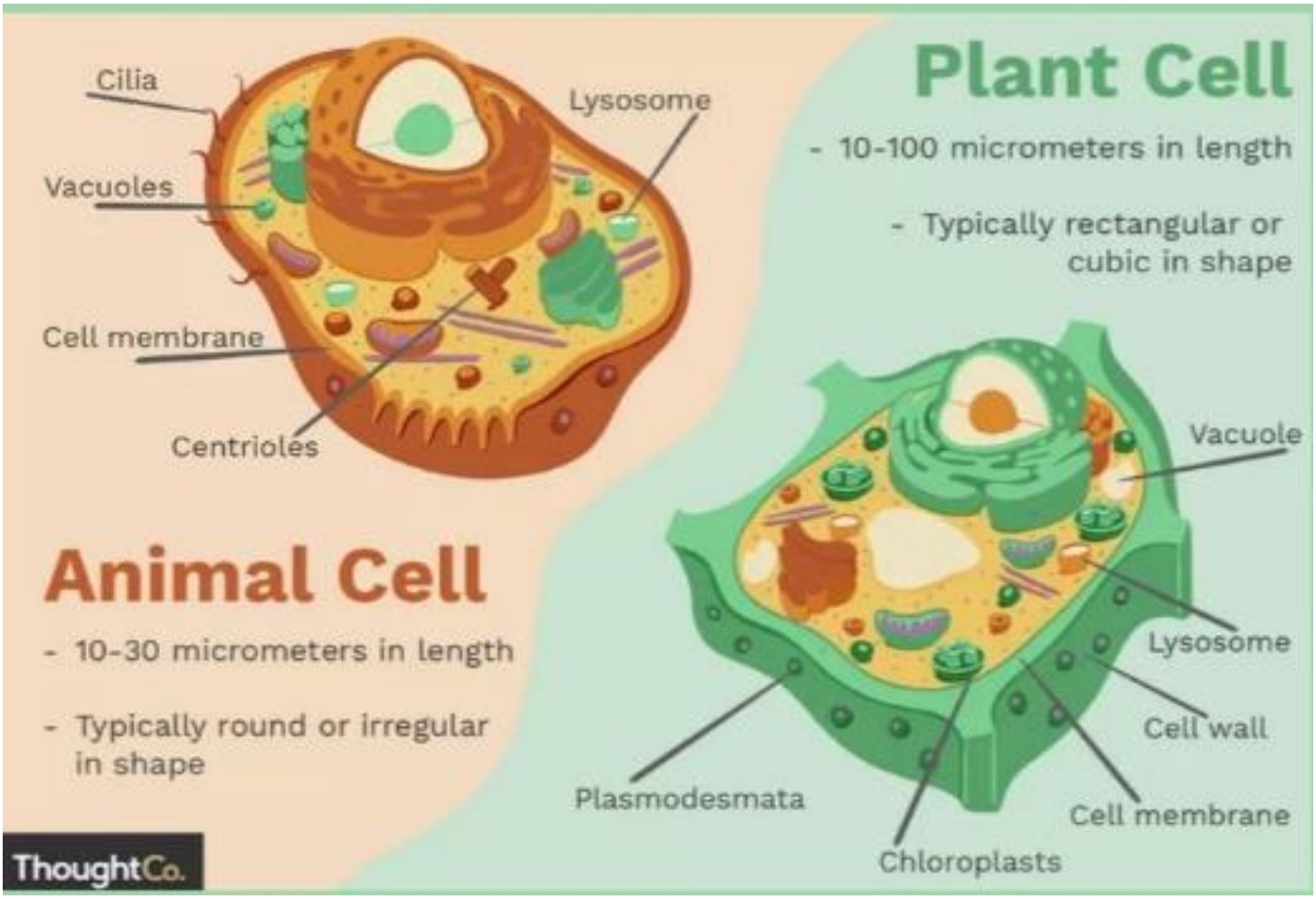


Eukaryotic Cells

- More structurally complex and larger than prokaryotic cells.
- Have a membrane bound nucleus and organelles.
- Example: Animal & Plant cells.

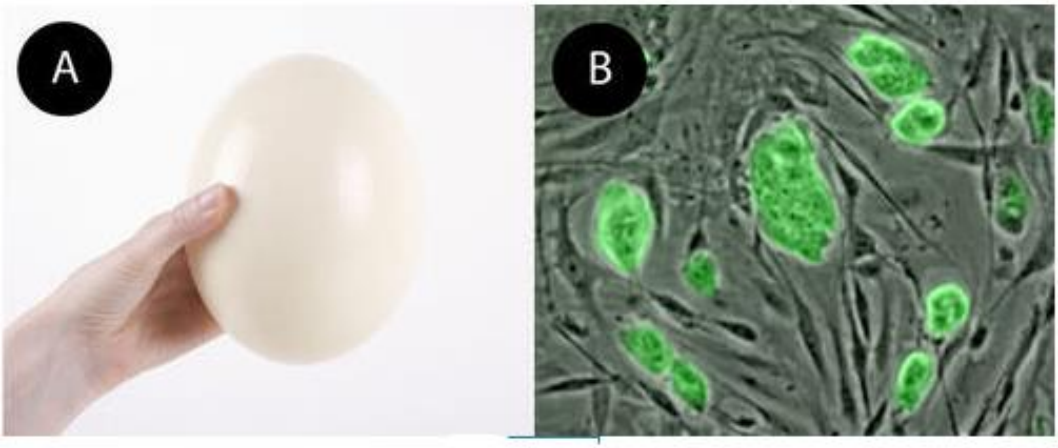
Animal cell ver. Plant cell

- Animal cells are similar to plant cells.
- Animal cells are generally smaller than plant cells.
- Animal cells contain structures not found in plant cell.
- Plant cells also contains structures not found in an animal cell.



Cell sizes

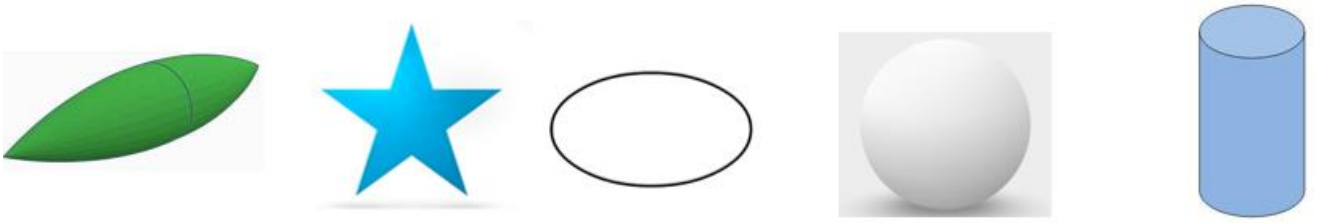
- **Cells have different sizes.**
- **Some cells are visible to the naked eye (such as bird's eggs) but most cells are microscopic and cannot be seen by the naked eye.**



Ostrich eggs (A) can weigh as much as 1.5 kg and be 13 cm in diameter, whereas each of the mouse cells (B) shown at right are each about 10 µm in diameter, much smaller than the period at the end of this sentence.

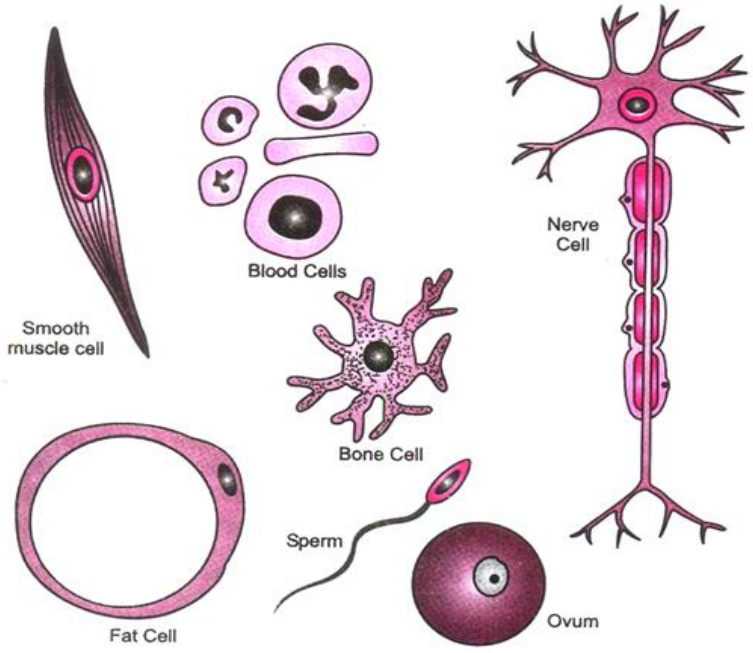
Cell shapes

- **Cells have different shapes (e.g. spindle, aster, oval, spherical, and cylindrical).**



spindle | star or aster | oval | spherical | cylindrical

- **Some cells change their shape (e.g. amoebae, macrophage) others have typical shape (e.g. sperm cell, epithelial cells).**
- **The shapes of cells have evolved to help them carry out their specific function in the body.**



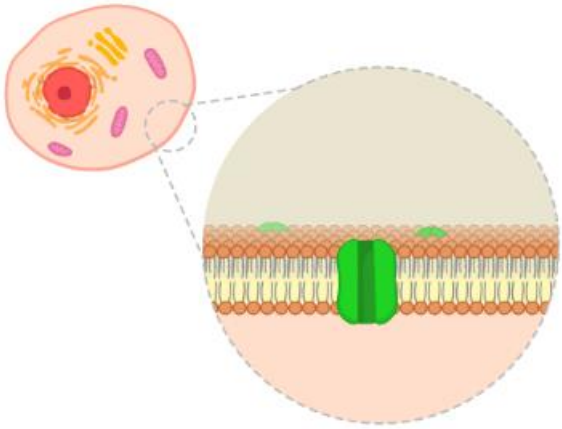
VARIOUS CELLS FROM THE HUMAN BODY

Animal cell

- It is surrounded by a cell membrane.
- DNA (chromosome) is housed within the nucleus.
- The cytoplasm contains specialized organelles, each of which is surrounded by a membrane and carry out the various functions.
- Animal cells contain structures such as centrioles, lysosomes, cilia and flagella that are not found in plant cells.

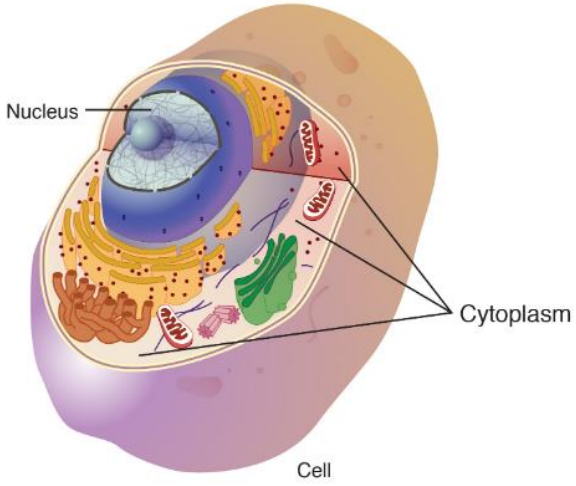
The structure and organelles of cells

- Cell membrane: All living cells have a cell membrane that separates the inner cell content from outside.
- It allows transportation of substances between the cell and surrounding.



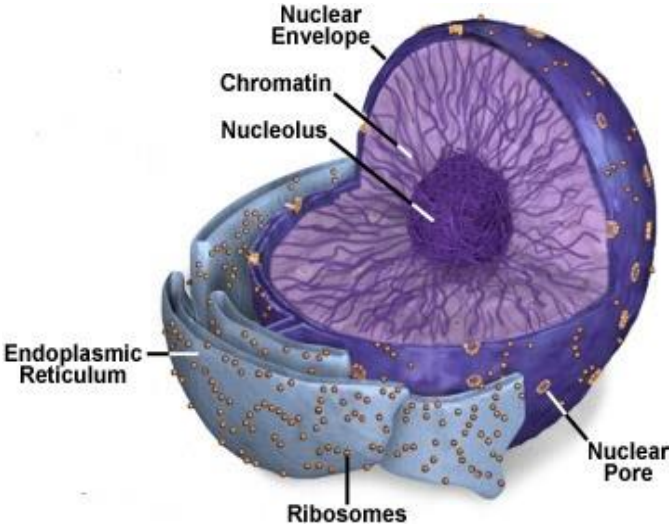
Cytoplasm

- Animal cell is divided into two parts, nucleus and cytoplasm.
- Cytoplasm is the space that occupies maximum part of the cell and where the cell organelles are present.
- It Filled with a material that is similar to the consistency of jelly.
- The cytoplasm's function in a cell is to support the internal parts.



Nucleus

- It is the control center for all types of animal cells.
- It houses the genetic material (the chromosomes).
- The nucleolus is located at the near center of the nucleus.

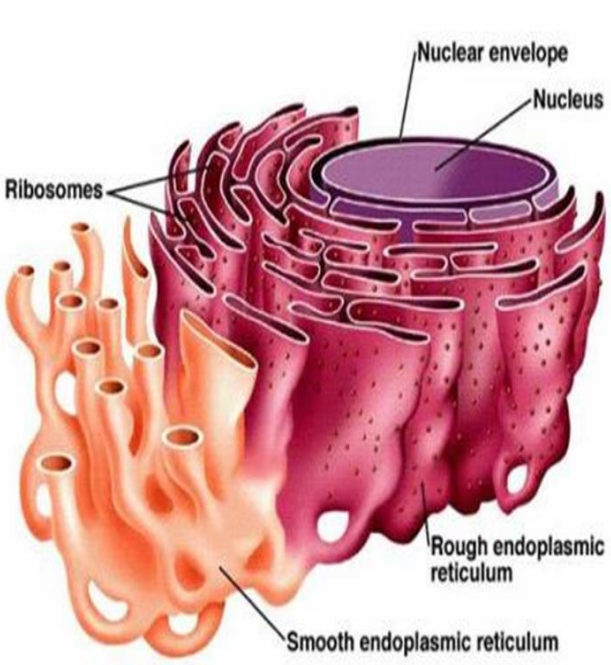


Ribosomes

- All living cells contain ribosomes.
- They are tiny organelles which present freely in the cytoplasm or attached to the endoplasmic reticulum.
- Function is production of protein.

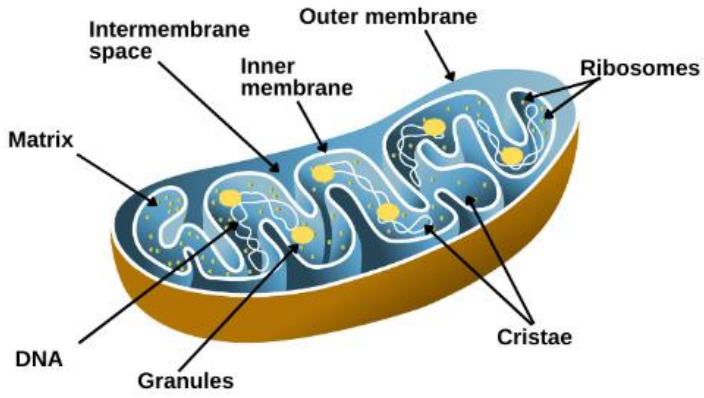
Endoplasmic Reticulum (ER)

- It is a network of sacs.
- It manufactures, processes, and transports chemical compounds for use inside and outside of the cell.
- There are rough ER and smooth ER.
- Rough ER bearing ribosomes and helping in protein synthesis.



Mitochondria

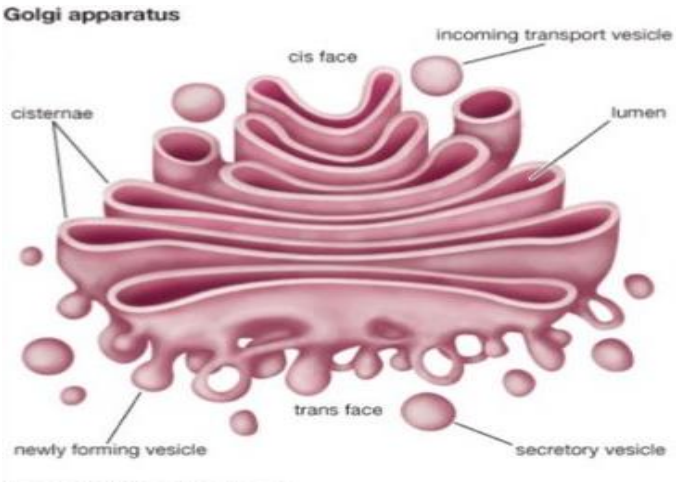
- Are oblong shaped organelles.
- Found in the cytoplasm of every eukaryotic cell.
- They are the main powerhouse of the cell, converting oxygen and nutrients into energy sources.



Structure of Mitochondria

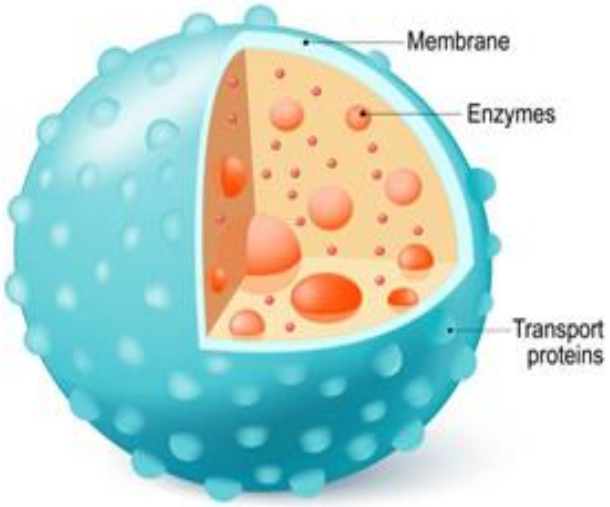
Golgi Apparatus

- It is an organelle that has a sac-like structure.
- Function is to pack cellular substances, which are then transported out of the cell with the help of vacuoles.



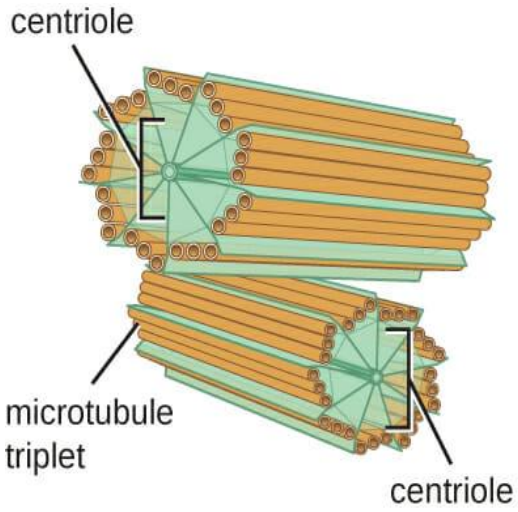
Lysosomes

- Are tiny, spherical, sac-like structures scattered all over the cytoplasm.
- Contain digestive enzymes.
- They help in digesting wastes and throwing them out of the cell.

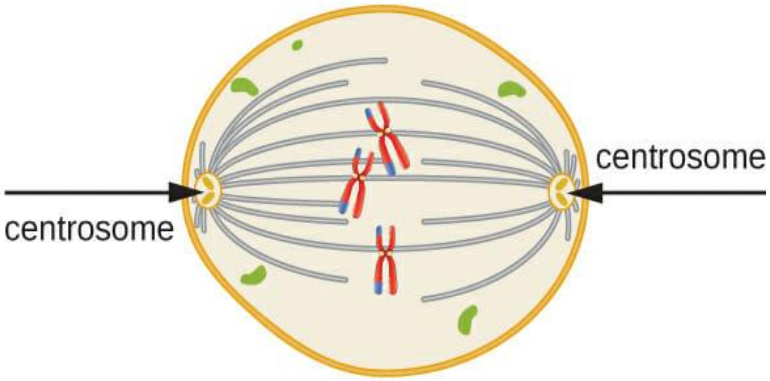


Centrioles

- Present only in an animal cell.
- They are cylindrical organelles, made up of nine bundles of microtubules.
- Play a role in orientation of cells during cell division.



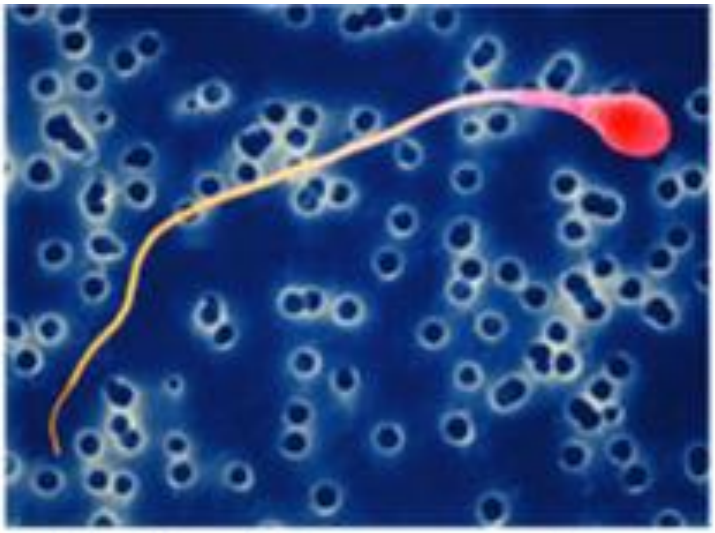
(a)



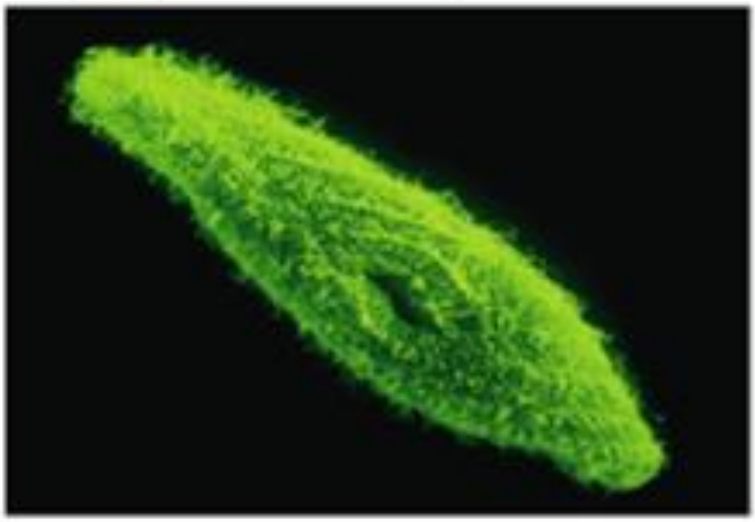
(b)

Cilia and Flagella

- **Structurally, they are hair-like and present in the cell membrane.**
- **For single-celled eukaryotes, cilia and flagella are essential for the locomotion of individual organisms.**



(a) Flagellum of a human sperm cell



(b) Cilia on a protist