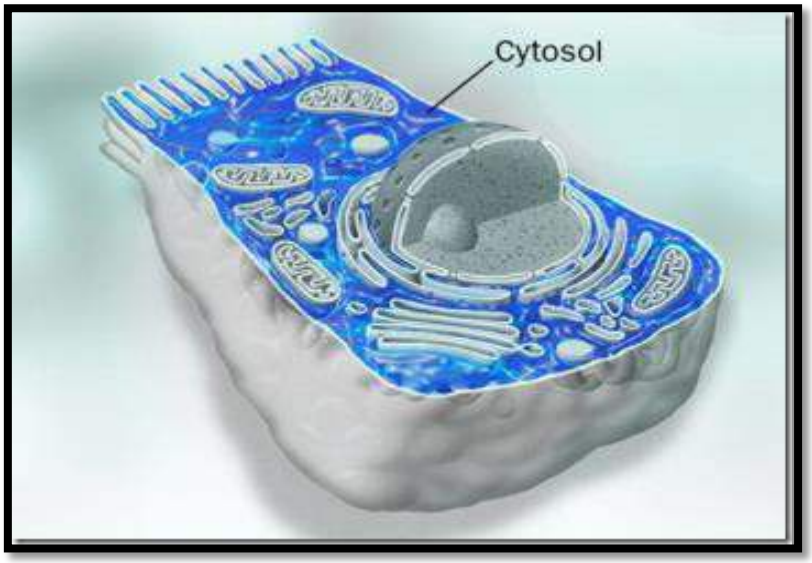
2- Cytoplasm is everything between the plasma membrane and the region of DNA. It is a thick, jelly like fluid consist from the **cytosol**, and various other components.

✸ **cytosol + organelles = cytoplasm**



Organelles of cytoplas

✸ **Nucleus:** is large organelle that encloses a eukaryotic cell DNA. The function of nucleus, it maintain the genetic material in the cell; produce the ribosome and other function.

Component of nucleus

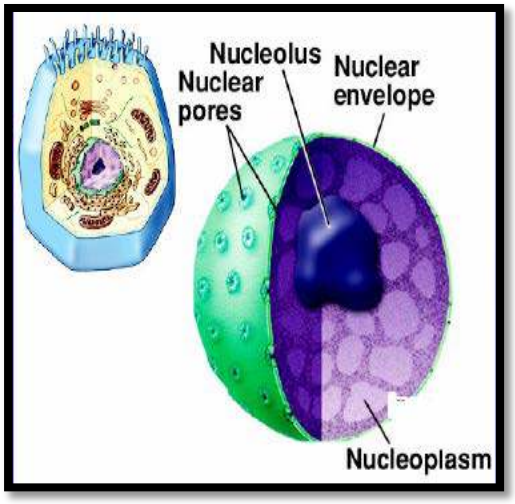
1- Nuclear envelope: A double membrane that separated the inside of the nucleus from the cytoplasm, it has many pore.

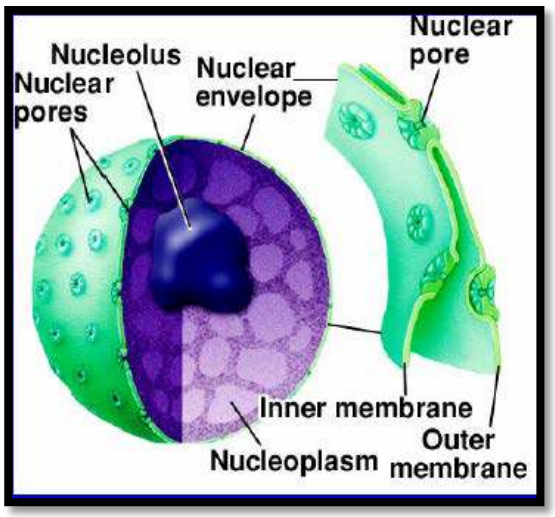
2- Nucleolus: A cluster of the RNA and protein used to assemble ribosomes from their subunit.

3- Nucleoplasm: Fluid interior portion of the nucleus.

4- Chromatin: All the DNA molecules and their attached proteins.

5- Chromosomes: The individual DNA molecules and the attached proteins.





✸ The Endoplasmic Reticulum:

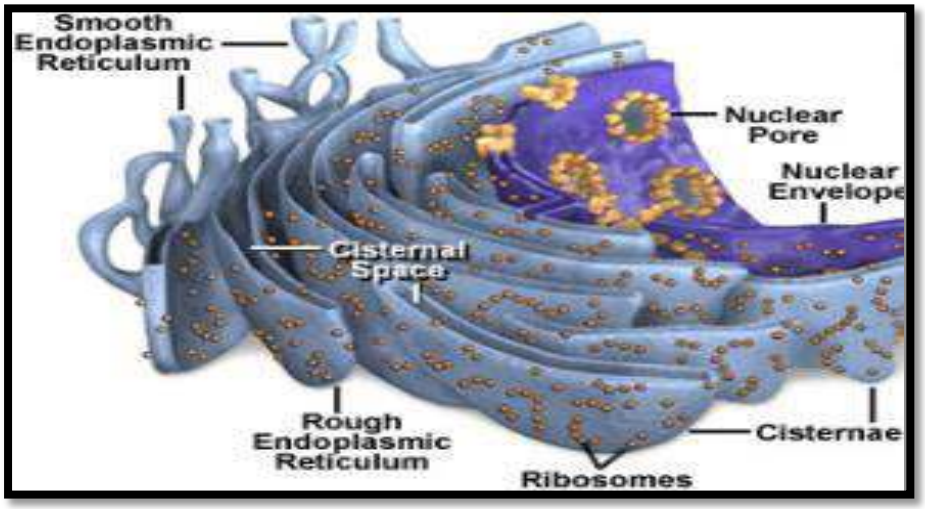
is a flattened channel that starts at the nuclear envelope and snakes through the cytoplasm.

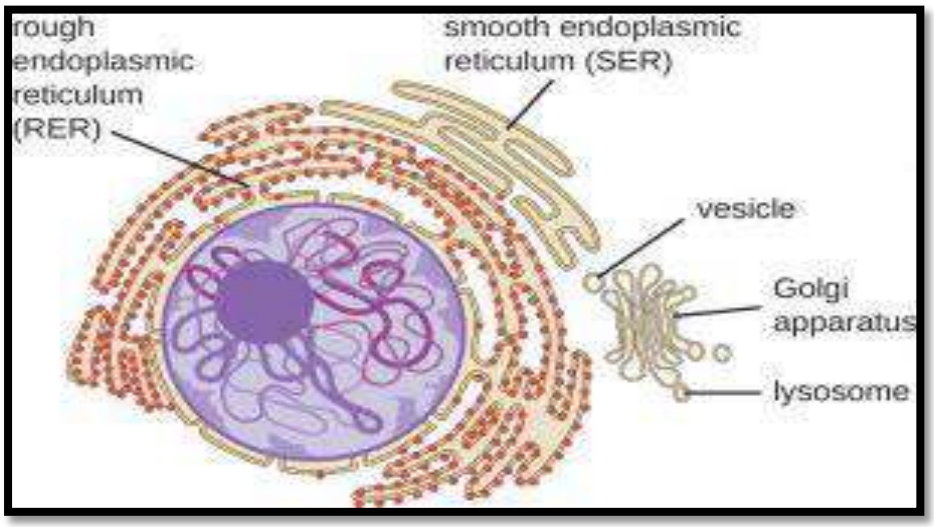
The functions are assembled of lipids and polypeptide chains are modified into final proteins.

✸***Rough* ER** (RER) is attached the membrane with ribosomes .the function of RER modified polypeptide chains that have a built

✸***Smooth* ER** (SER) has no ribosomes and curves through the cytoplasm like flat connecting pipes which assemble most lipids inside these pipes**.**

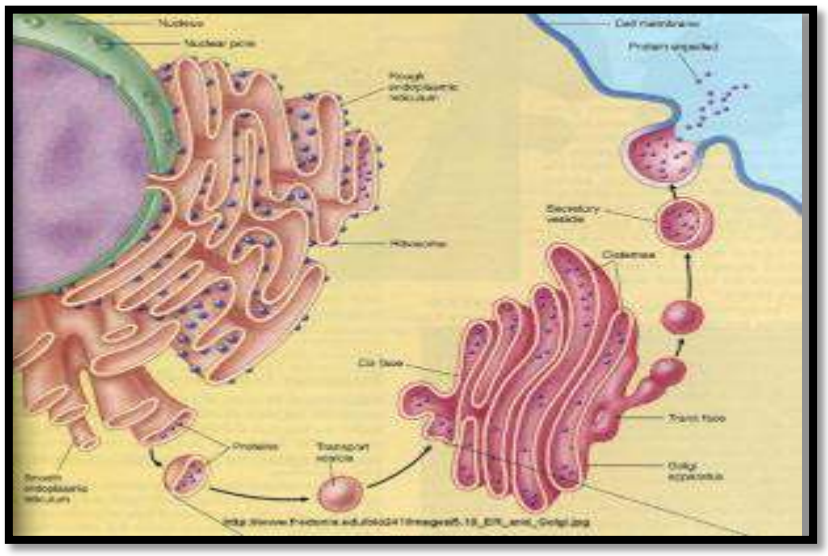
❖ **Ribosome** is a platform for building **a cell's proteins**





✸ **Golgi apparatus**

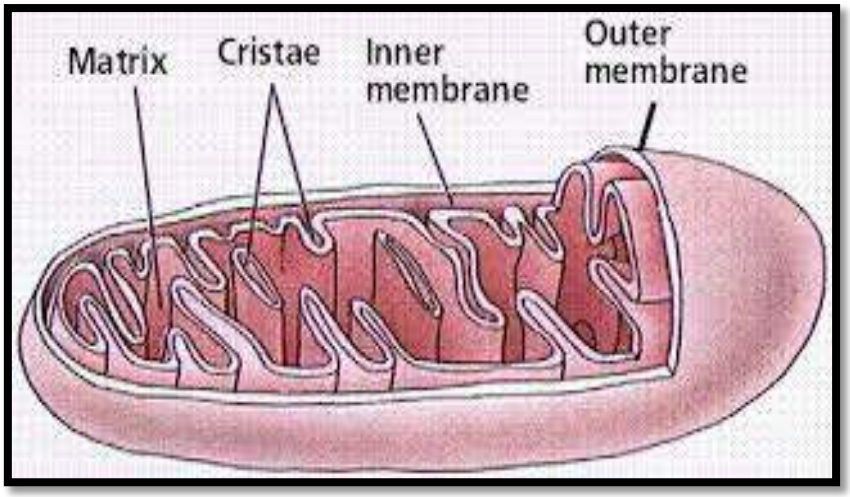
Golgi apparatus, also called Golgi complex or Golgi body, membrane-bound organelle of eukaryotic cells that is made up of a series of flattened, stacked pouches called cisternae. The Golgi apparatus is responsible for transporting, modifying, and packaging proteins and lipids into vesicles for delivery to targeted destinations. It is located in the cytoplasm next to the endoplasmic reticulum and near the cell nucleus.



✸ Mitochondrion

- ✸ Smaller than chloroplast
- ✸ Contain ribosomes and their own DNA
- ✸ Surrounded by a double membrane
  - Inner membrane surrounds the **matrix** and is convoluted (folds) to form **cristae.**
  - Matrix – Inner semifluid containing respiratory enzymes
- ✸ Involved in cellular respiration

✸ Produce most of ATP utilized by the cell



✸ **Lysosome**

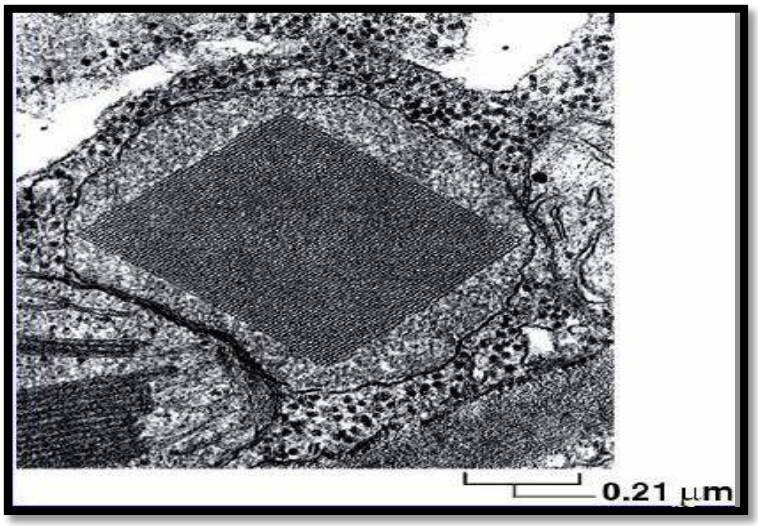
Lysosome specialized organelle for intracellular digestion. It contains of enzymes that speed the breakdown of proteins, complex sugars, nucleic acids, and some lipids. Lysosomes may even digest whole cells or cell parts.

✸ **Microbodies**: Peroxisome and Glyoxisome

vesicles that form through growth and division within the cytoplasm

Glyoxisomes are found in plants - contain enzymes that convert fats into carbohydrates

Peroxisomes - used for removing reactive compounds from the cytoplasm - create H_2O_2 as a byproduct and degrade it with the enzyme catalase



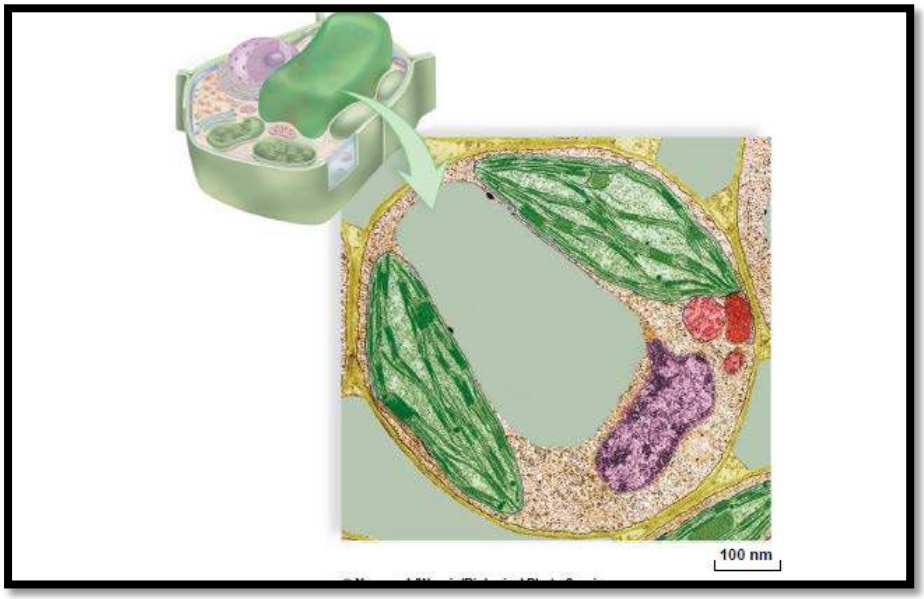
✸ Vacuoles

Membranous sacs that are larger than vesicles

- Store materials that occur in excess
- Others very specialized (contractile vacuole)

Functions in:

- Storage of water, nutrients, pigments, and waste products
- Development of turgor pressure
- Some functions performed by lysosomes in other eukaryotes



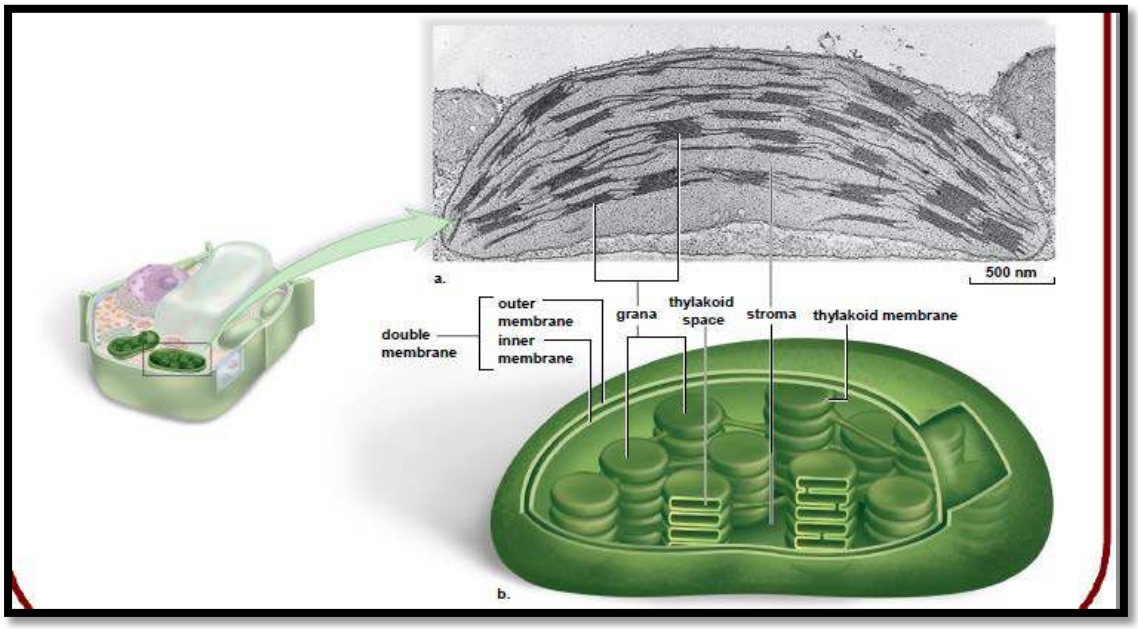
Chloroplast

- Bounded by double membrane
- Inner membrane in folded
  - Forms disc-like thylakoids, which are stacked to form grana
  - Suspended in semi-fluid stroma
- Green due to chlorophyll
  - Green photosynthetic pigment
  - Found ONLY in inner membranes of chloroplast

- **Functions** : Photosynthesis
  - Synthesizes carbohydrates from CO2 & H2O
  - Makes own food using CO2 as only carbon source
  - Energy-poor compounds converted to energy-rich compounds

  solar energy + carbon dioxide + water → carbohydrate + oxygen

Only plants, algae, and certain bacteria are capable of conducting photosynthesis



✸ cytoskeleton

The **cytoskeleton** is a system of interconnected fibers and threads in the cytosol.

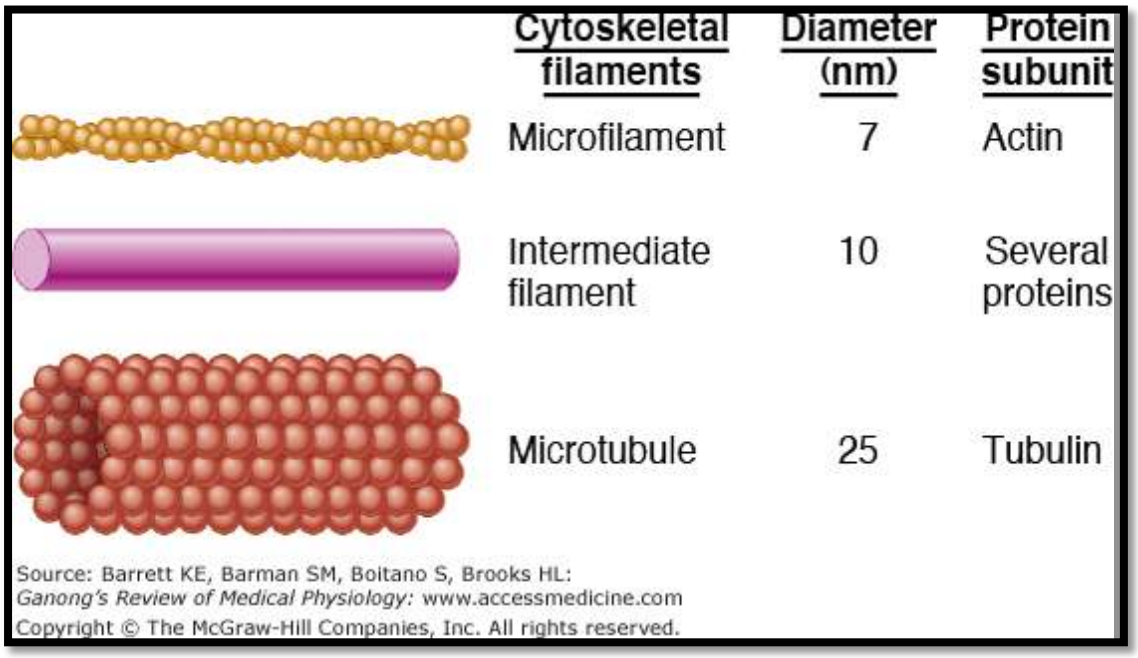
The function acts to organize and maintain the cell's shape, anchors organelles in place, helps during endocytosis and their ability to move.

✸ Cytoskeleton contain :-

1- Microtubules: are the largest cytoskeleton elements. Their function microtubules help move cell parts.

2- Microfilaments: support some part of a cell, such as the plasma membrane.

3- Intermediate filaments: are heteropolymers whose subunits vary among the cell types in different tissues.



Cell component	Prokaryotes	Eukaryotes
Nucleus	no membrane, single circular chromosome	Membrane bound a number of individual chromosomes.
Extra-chromosomal DNA	present in form of plasmid	Present as mitochondrial DNA
Organelles in cytoplasm	Non	Mitochondria and chloroplast in photosynthetic organisms
Cytoplasmic membrane	Contain enzyme of respiration, sit of phospholipids and	Semi-permeable layer not possessing function

	DNA synthesis	
Cell wall	Rigid layer of peptidoglycan	No peptidoglycan
Sterols	Absent	Present
Ribosome	70 S in cytoplasm	80 S in cytoplasmic reticulum