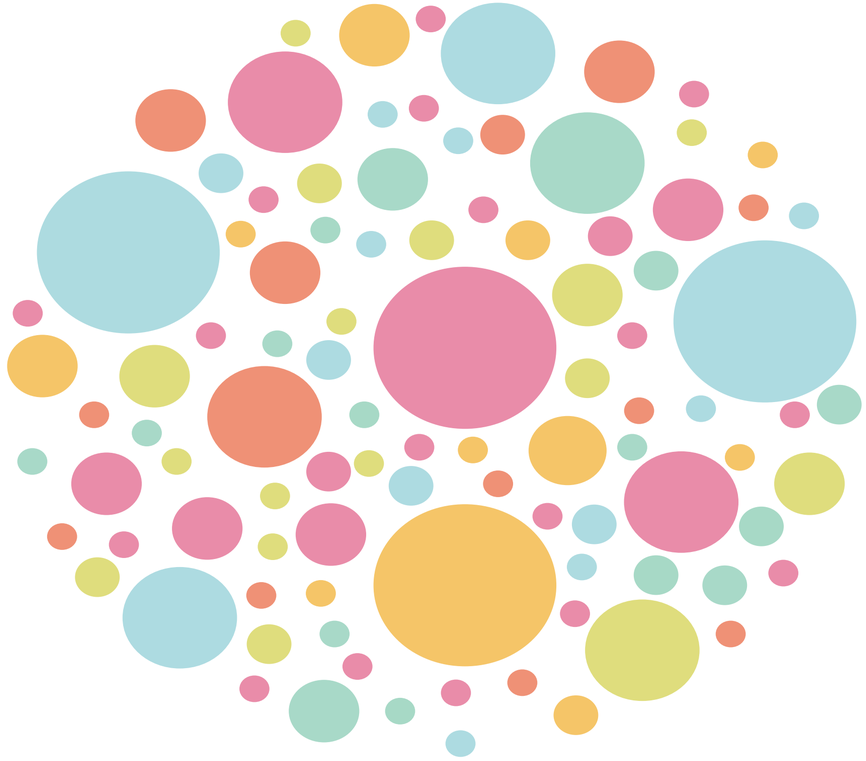
Republic of Iraq

Ministry of Higher Education And Scientific Research

Al-Zahraa University for Women

College of Pharmacy



Human Biology

First semester/ Lab.2

Cell biology &Blood

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Define the cell ?

What is the cell ?

- The cell is the basic structural, functional, and biological unit of all known living organisms. A cell is the smallest unit of life are often called the "building blocks of life". The study of cells is called cell biology.
- Cell biology: is a branch of biology deals with the study of cells from morphology, structure, function and biochemical point of views, the idea and concept of cell biology evolved during 19th century as a result of gradual advancement in the field of microscopy and biochemistry

- The first cells were observed and named by Robert Hooke in 1665 from slice of cork.

- Cells consist of cytoplasm enclosed within a membrane, which contains many biomolecules such as proteins and nucleic acids . Organisms can be classified as unicellular (consisting of a single cell; including bacteria) or multicellular (including plants and animals).

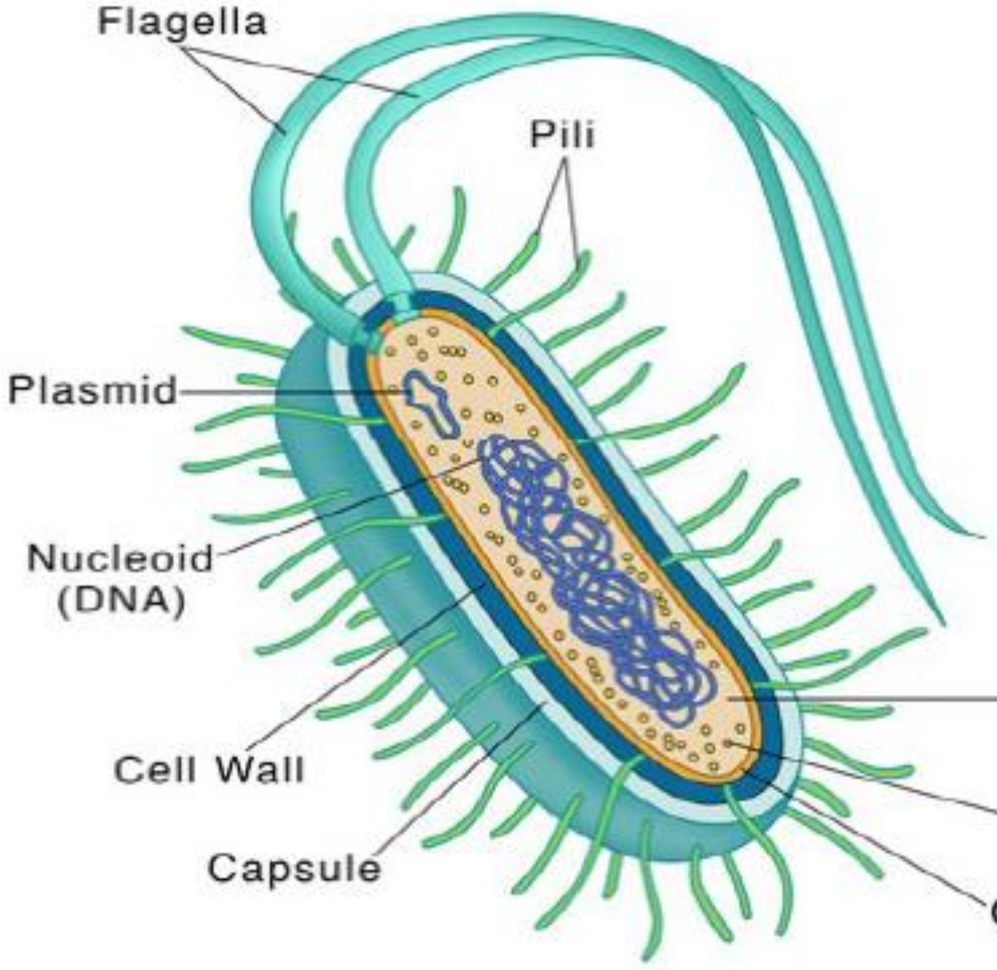
- Humans contain more than 40 trillion cells.

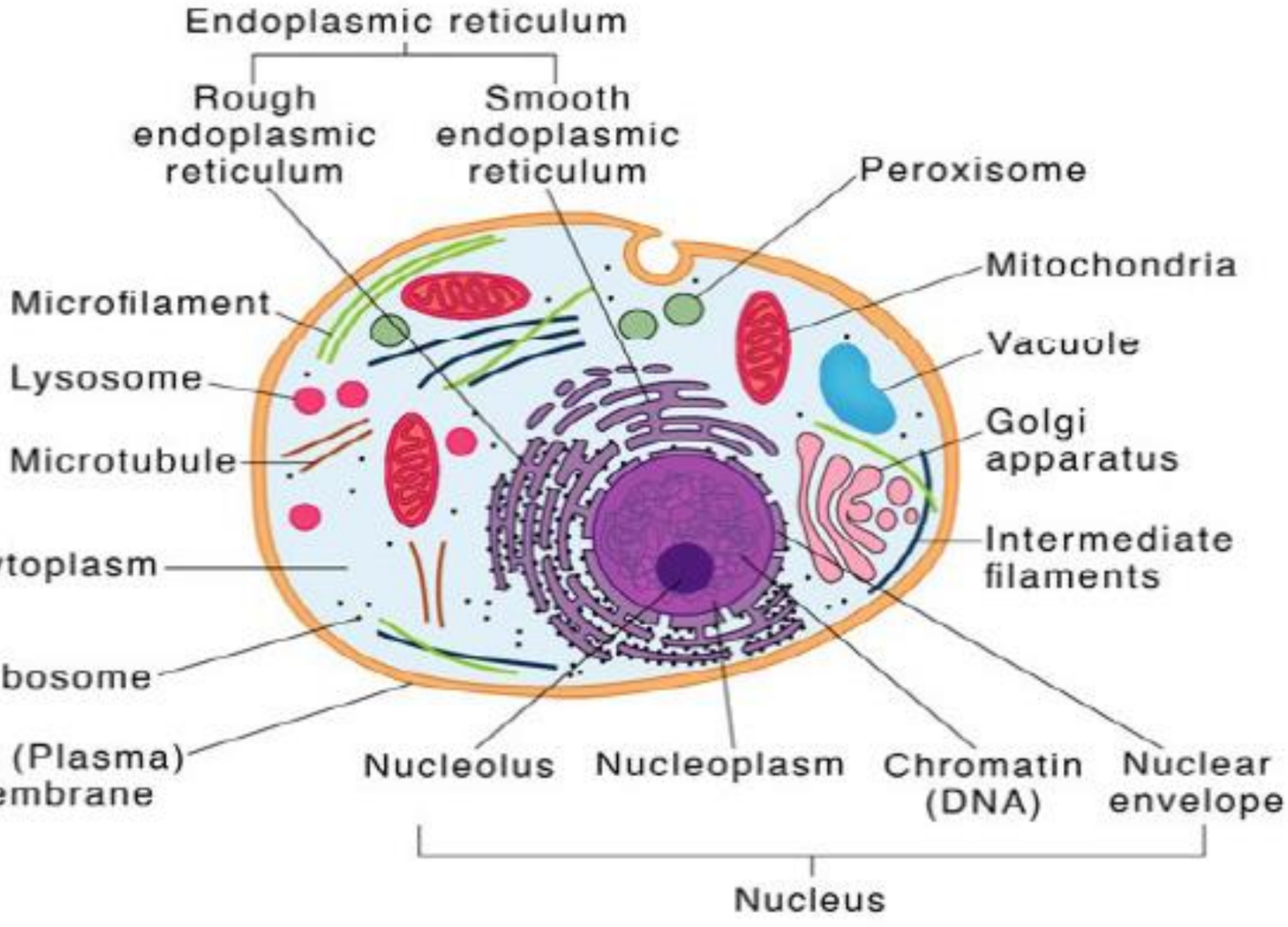
Type of cells

1- Prokaryotic cell : Unicellular organisms which don't have membrane bound organelles like nucleus and mitochondria are referred to as prokaryotic cells. . These organisms are divided into two groups depending on the components of the cell wall: Bacteria and Archaea.

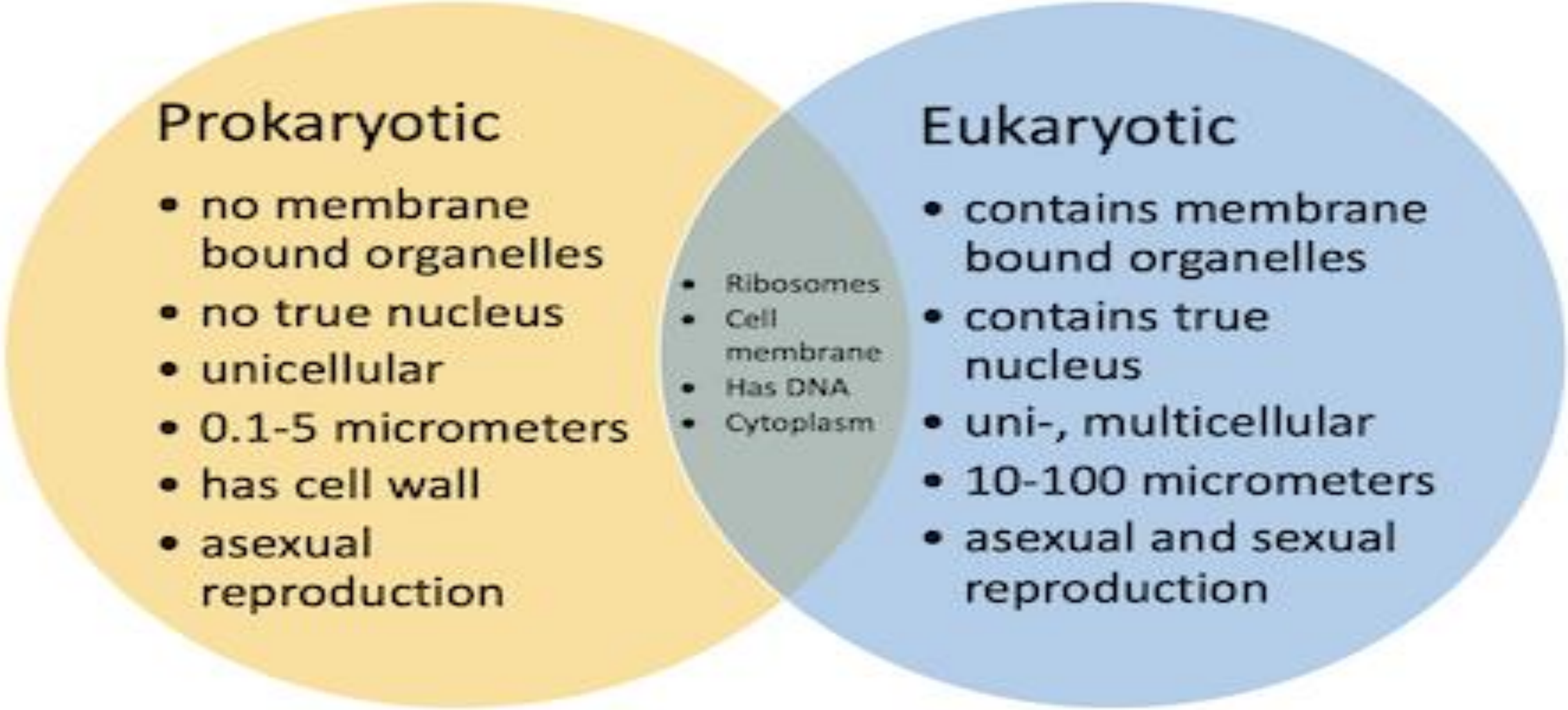
2- Eukaryotic cell : Eukaryotic cells are cells that contain a nucleus and organelles, and are enclosed by a plasma membrane. Organisms that have eukaryotic cells include protozoa, fungi, plants and animals. Eukaryotic cells are larger and more complex than prokaryotic cells Eukaryotic.

Prokaryotic Cells VS Eukaryotic Cells





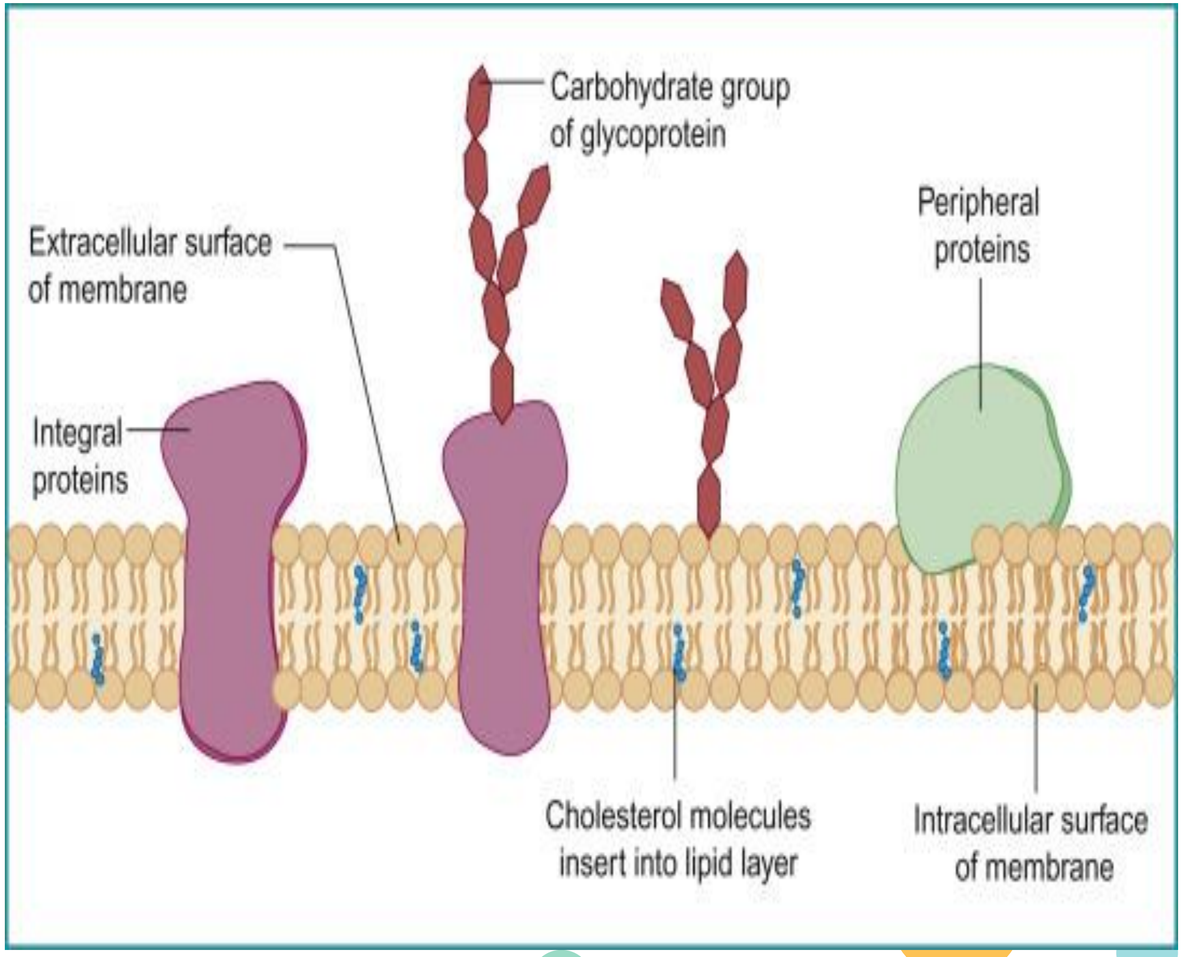
Similarities and Differences



Cell Structure & Function

1. Cell Membrane

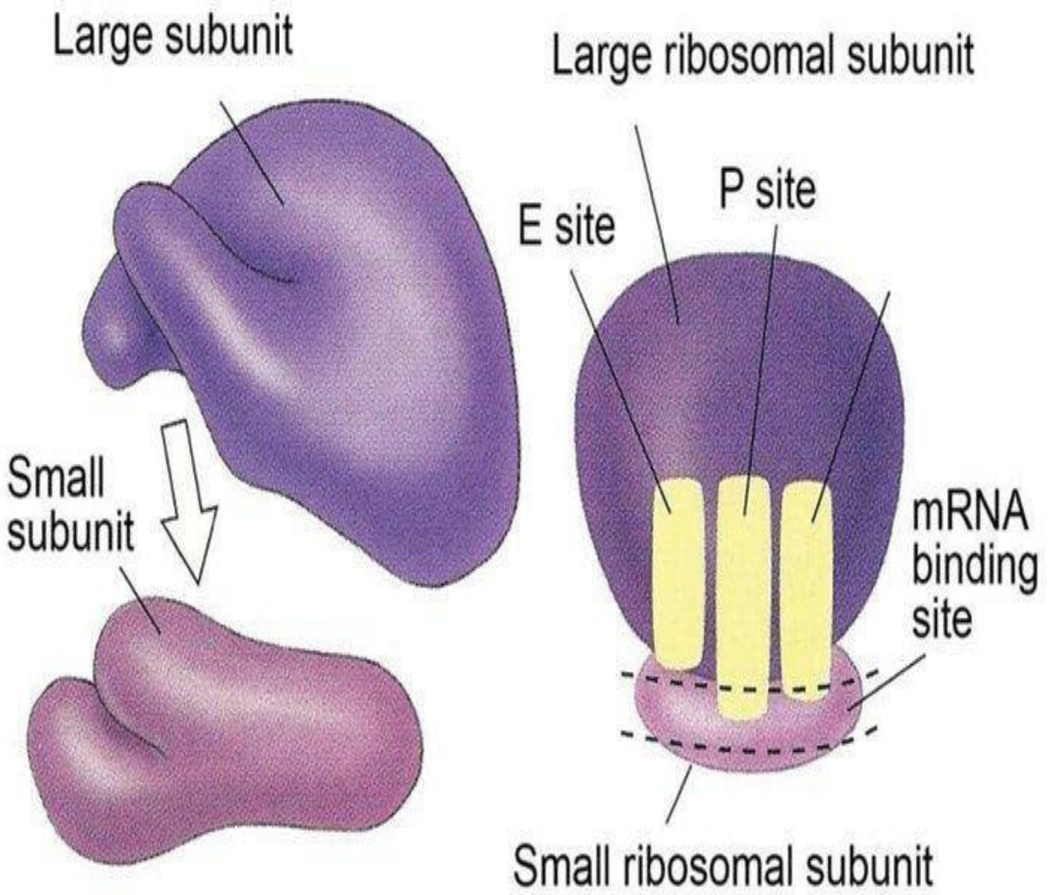
- Components:
  - Lipids
  - Proteins
  - Carbohydrates
- Function
  - Allows selective passage in & out the cell
  - Isolates cell contents
  - Controls what gets in and out of the cell
  - Receives signals



2. Ribosomes

- Structure: Tiny particle, so small. It is composed of two subunits smaller and larger.

- Function: Make proteins.



3. The Nucleus

- Separated from cytoplasm by nuclear membrane.
- Contains genetic material – DNA.
- Nucleoplasm – fluid of the nucleus.

4. Nucleolus

- Inside nucleus.
- Contains RNA to build proteins.

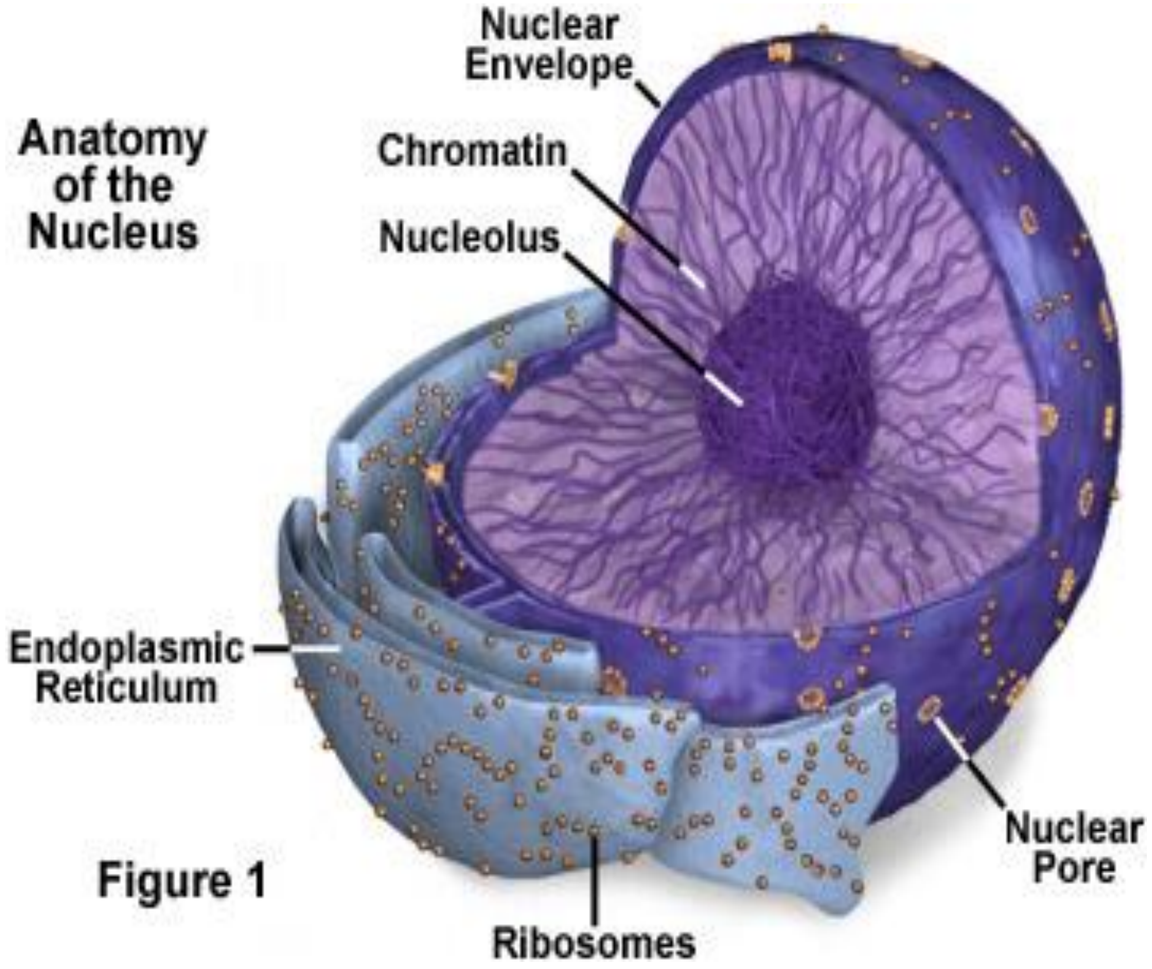
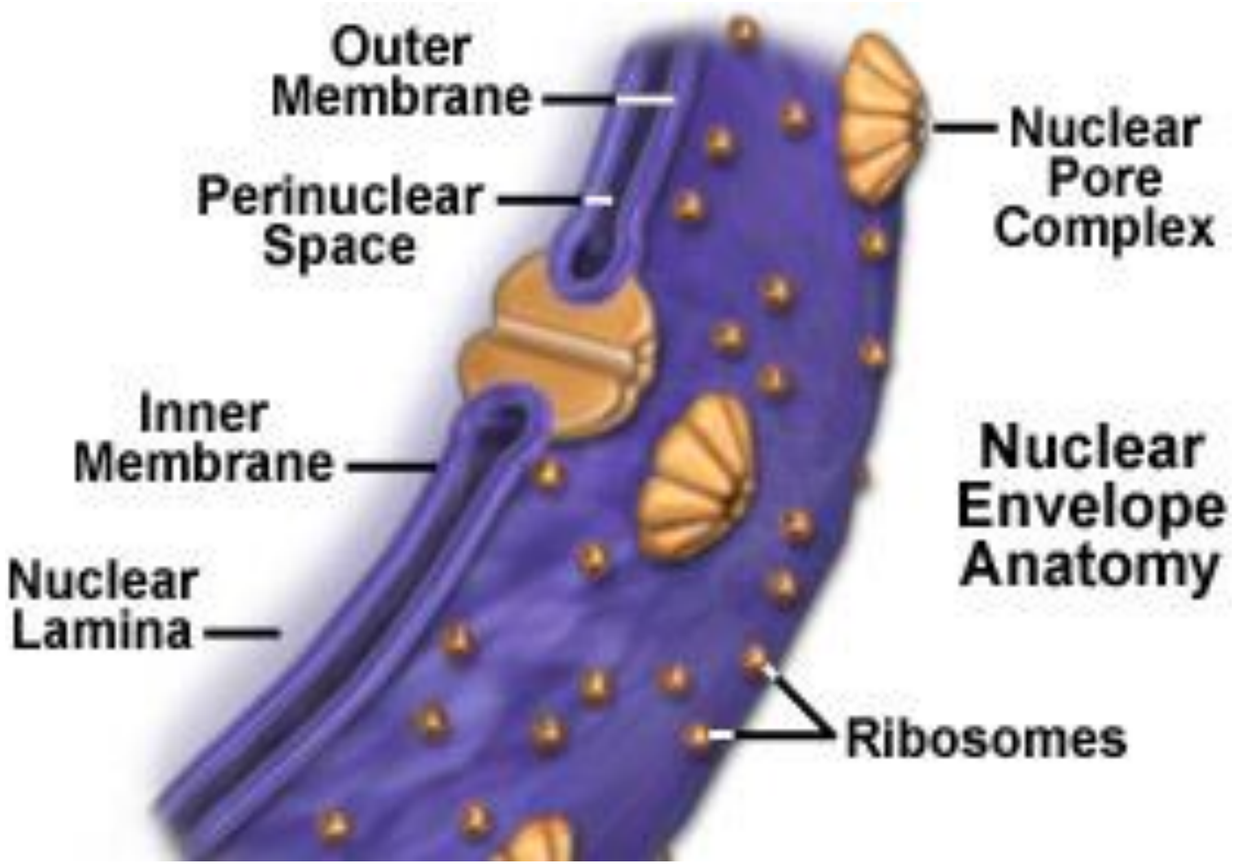


Figure 1

5. Nuclear Membrane

- Surrounds nucleus.
- Double membrane.
- Openings allow material to enter and leave nucleus.

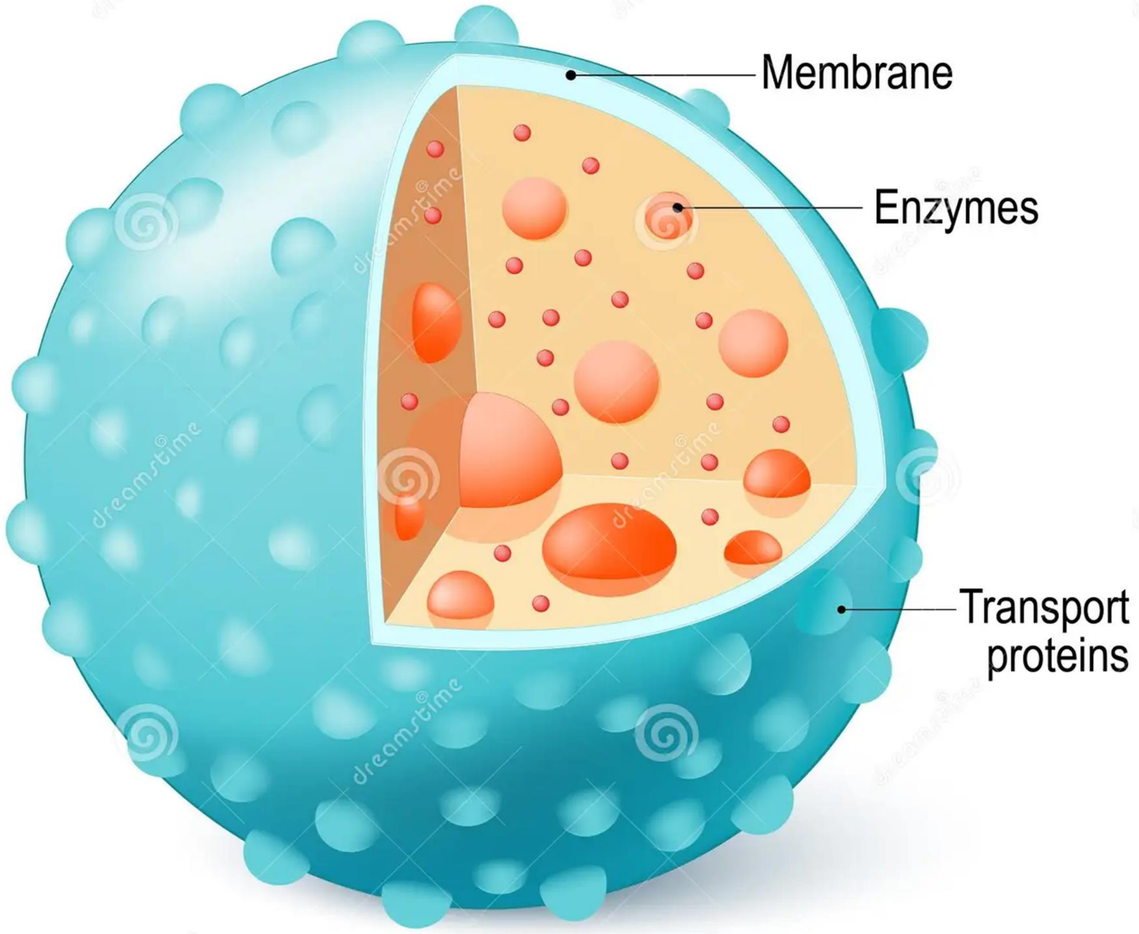


6. Cytoplasm

- Gel-like mixture.
- Surrounded by cell membrane.
- Contains hereditary material.

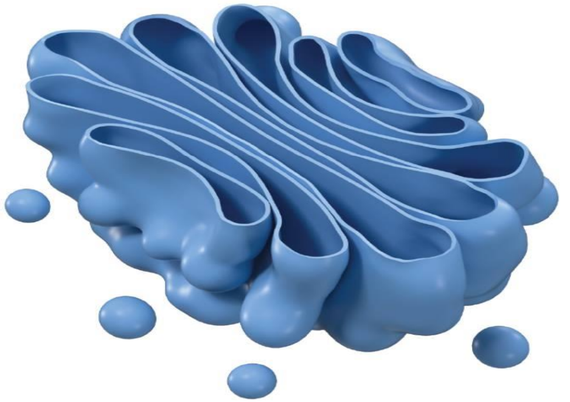
7. Lysosome

- Round organelles surrounded by membrane.
- Transports undigested material to cell membrane for removal.



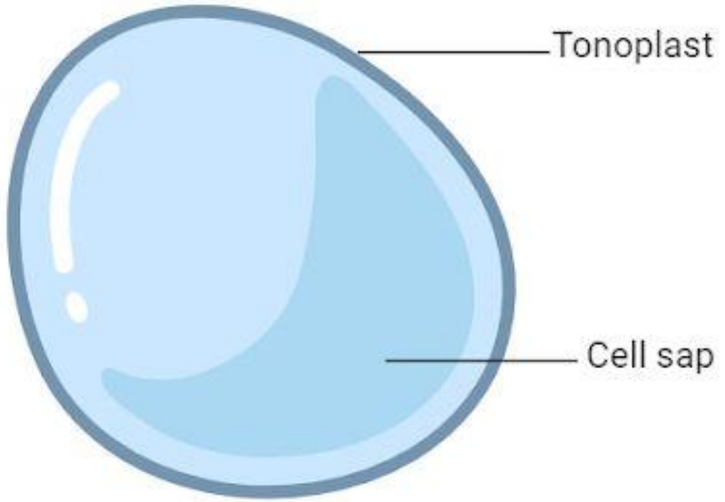
8. Golgi Bodies

- Move materials within the cell.
- Move materials out of the cell.



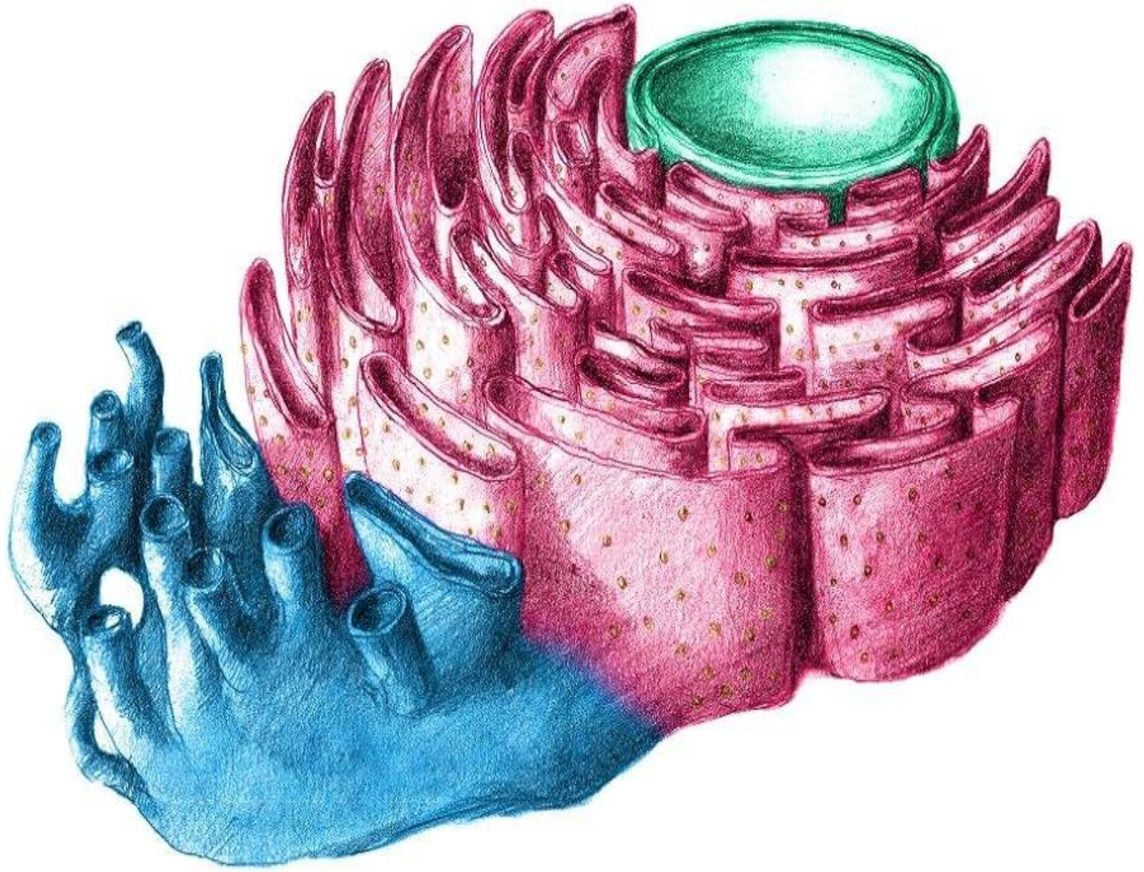
9. Vacuoles

- Membrane-bound sacs for storage , digestion and waste removal.
- Stores food and water.

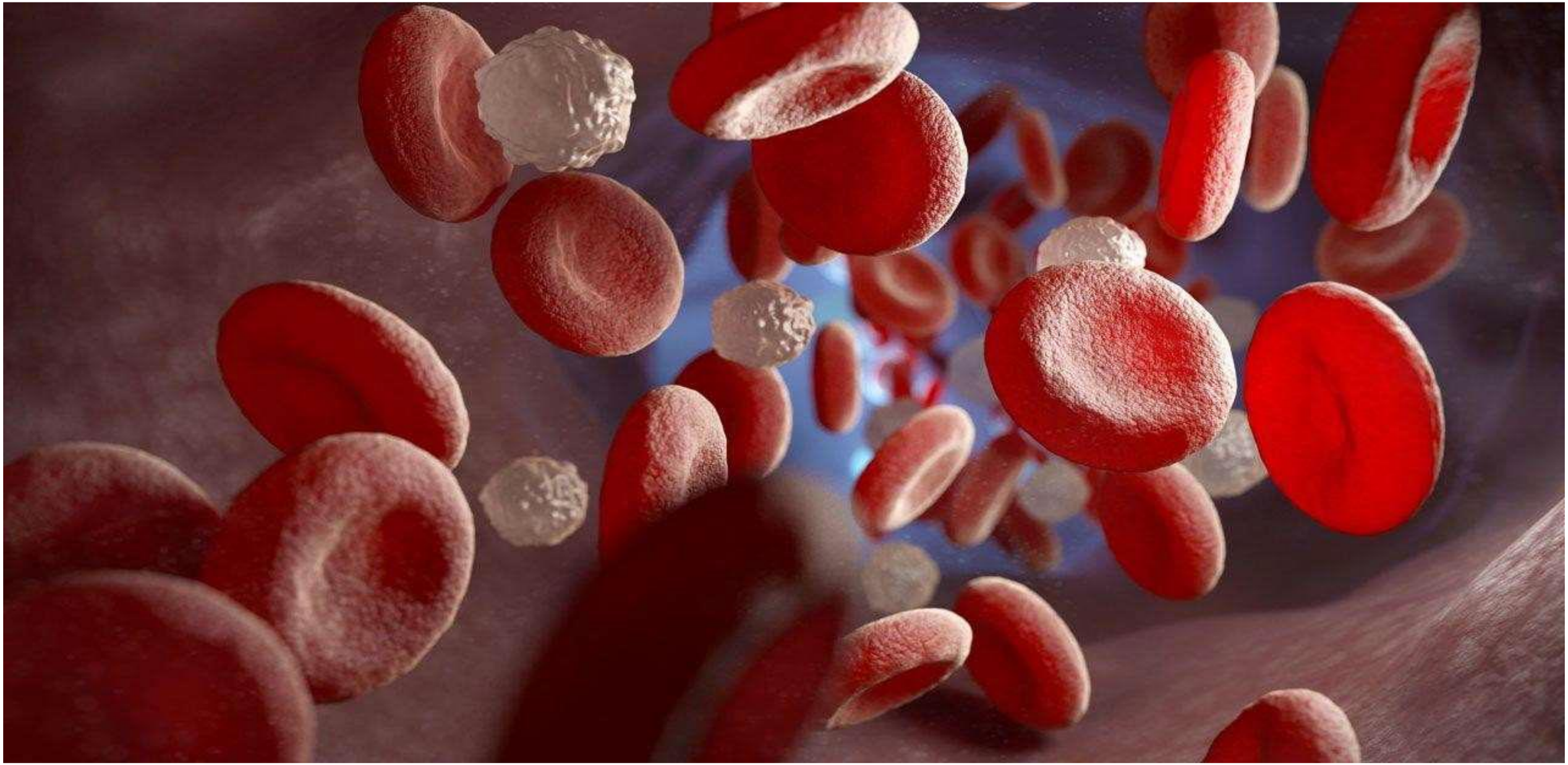


10. Endoplasmic Reticulum (ER)

- Like tubes.
- Smooth ER - no ribosomes attached.
- Rough ER - ribosomes are attached.
- Protein synthesis , lipid synthesis , storing calcium.



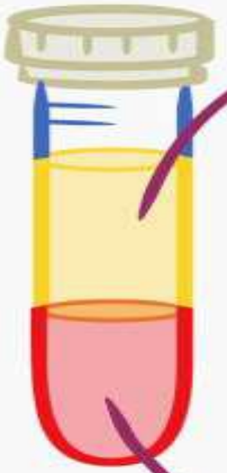
Blood Human



What is Blood?

Blood is a fluid connective tissue that consists of plasma, blood cells and platelets. It circulates throughout our body delivering oxygen and nutrients to various cells and tissues. It makes up 8% of our body weight. An average adult possesses around 5-6 litres of blood.

Blood Composition



55% Plasma

90% Water

10%
- Proteins
  - Albumin
  - Immunoglobins
  - Fibrinogens
- Electrolytes
- Metabolic nutrients
- Metabolic waste products
- Hormones

45% Formed Elements

98-99% Erythrocytes

1-2%
- Leukocytes
  - Granulocytes
  - Agranulocytes
- Platelets

Granulocytes

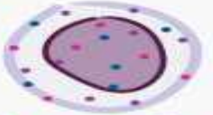
Basophils

Eosinophils

Neutrophils

Agranulocytes

Monocytes



Lymphocytes: B cells & T cells

Serum vs. Plasma: What's the Difference?

Serum and plasma both come from the liquid portion of the blood that remains once the cells are removed, but that's where the similarities end.

- **Serum is the liquid that remains after the blood has clotted it doesn't contain cloting factor.**

- **Plasma is the liquid that remains when clotting is prevented with the addition of an anticoagulant it contain cloting factor such as fibrinogen.**

Functions of the Blood

1. The main function of the blood is to maintain intracellular homeostasis by:

a) Carries O2 and nutrients (glucose, amino acids, lipids, and vitamins) to the cells.

b) Carries CO2 and other wastes (nitrates, creatine, nucleic acid) away from the cell.

2. Providing intercellular communication in the body: carries hormones (secreted by endocrine glands) to the target organs.

3. Protection and defense: it allows cells and immunological proteins to transport from place to place where need them.

4. Self-repair mechanism: clotting cascade (forming blood clots to prevent excess blood loss)

5. regulating body temperature and PH.

Thank you