

Republic of Iraq
Ministry of Higher Education & Scientific Research
Al-Hadi University College
Anesthesia Techniques Department



The Scope of Clinical Biochemistry

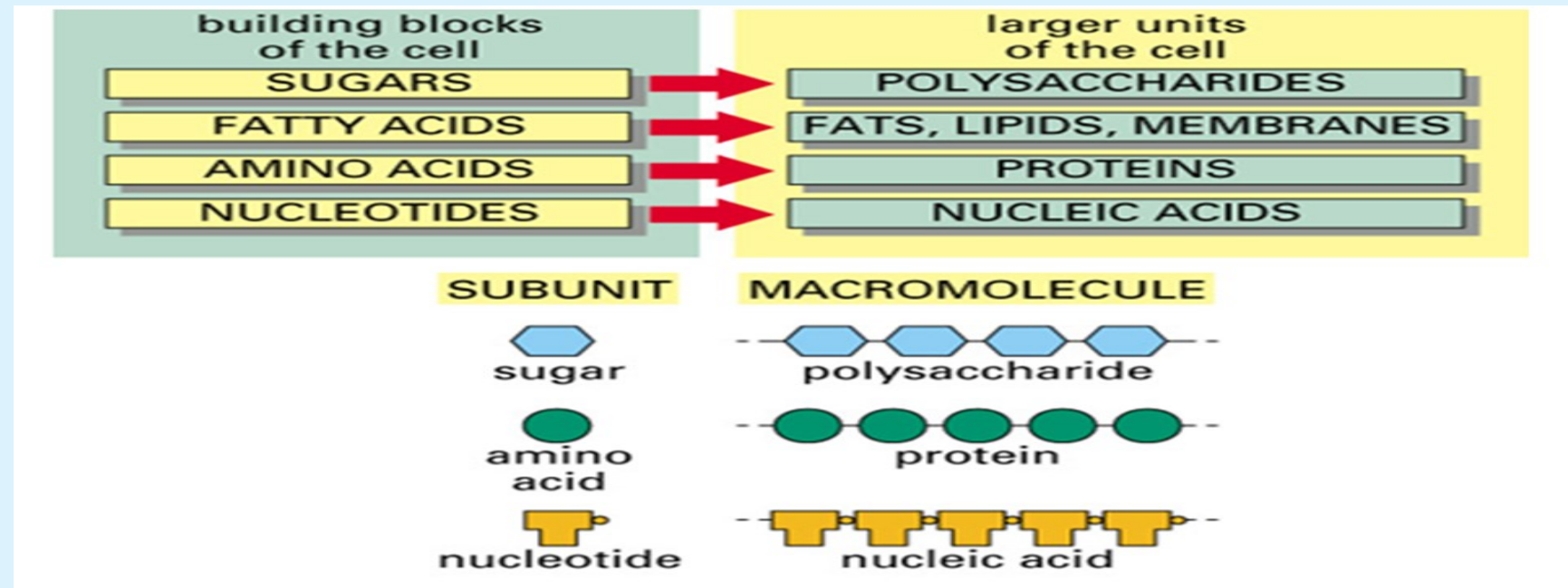
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First Class

By

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- ❖ The Chemistry of the human organism's structures amino acids and proteins, carbs and lipids are the chemical components of the human body.
- ❖ Nutrition, Metabolism, and Assimilation of nutrients, vitamins, and minerals, Bioenergetics.
- ❖ Examination of body fluids aid in the screening, diagnosis, and treatment of pathological disorders.

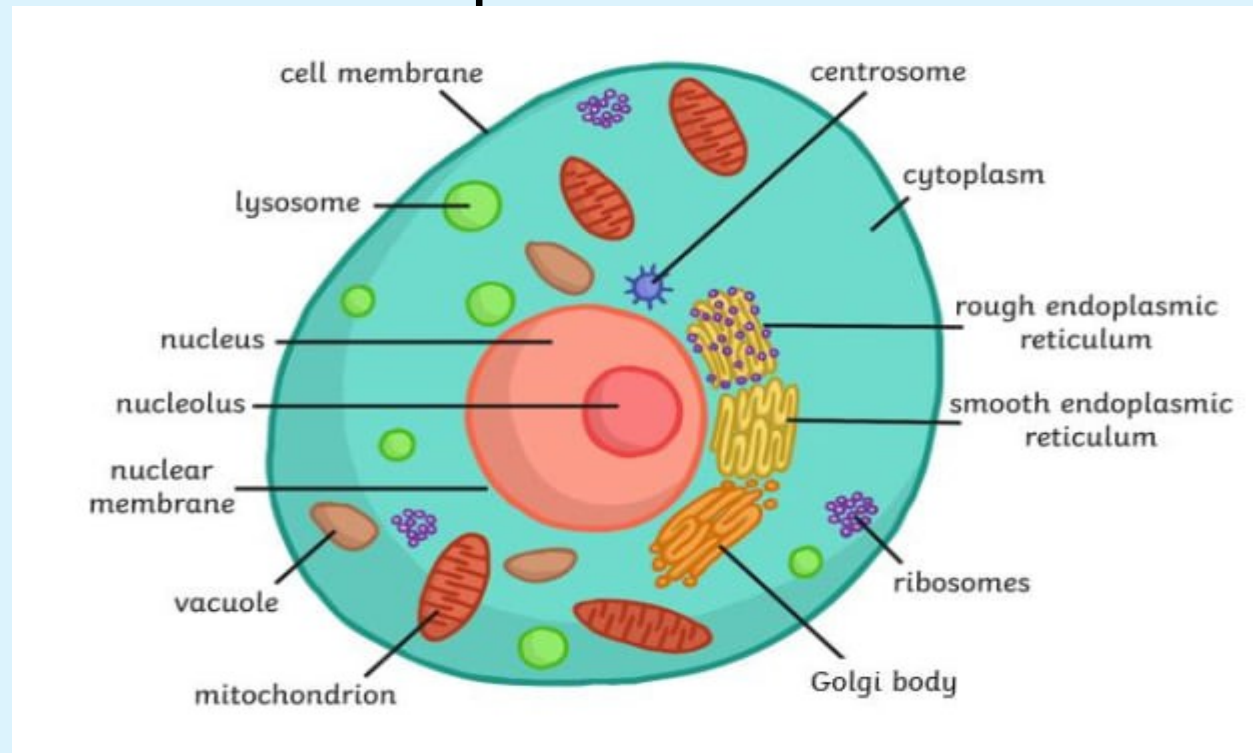


Biochemistry, often known as biological chemistry, is the study of chemical reactions that occur inside and relate to living organisms.

Clinical biochemistry, often known as medical biochemistry, is a branch of chemistry that deals with the study of bodily fluids, which aid in the diagnosis, medication, monitoring, and management of the majority of human disorders.

- In summary, clinical chemistry is more focused on the analysis of specific substances in biological fluids, while biochemistry is more focused on the underlying biochemical processes that are involved in disease and normal physiology.

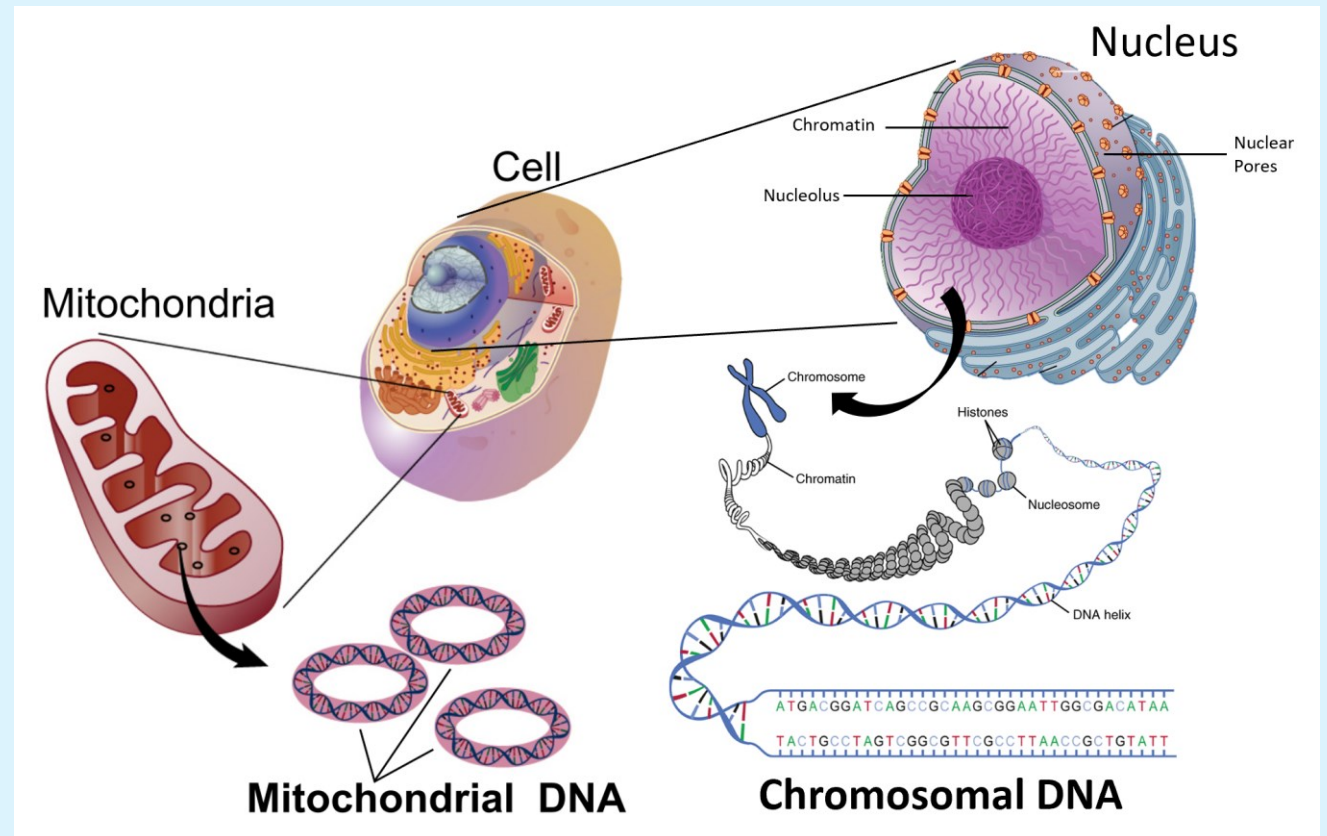
- The basic purpose of biochemistry is to describe life's activities in the language of molecules.
- All biological activities, including vision, thought, digestion, immunity, mobility, and disease situations.
- Fundamental biological unit in human body is cell, knowledge of cellular structure is required.



Cellular Structure

The cell structure comprises individual components with specific functions essential to carry out life's processes. These components include- cell wall, cell membrane, cytoplasm, nucleus, and cell organelles. As well as cell includes of hundreds of organic and inorganic compounds, many of which are huge molecules known as macromolecules:

- Proteins
- Lipids
- Nucleic acids (DNA)
- Carbohydrates



Clinical Biochemistry

Clinical biochemistry is concerned with methodology and interpretation of a wide range of in vitro chemical and biochemical tests performed on body fluids and tissues, to support diagnosis, treatment and monitoring of disease.



Functions of Clinical Biochemistry

The function of clinical chemistry and laboratory medicine is to perform qualitative and quantitative analyses on body fluids or specimen types such as blood, urine, spinal fluid, faeces, saliva, sputum tissue and other materials.

- To sickness diagnosis and treatment.
- The testing must be as precise as feasible.



Blood Sample Collection

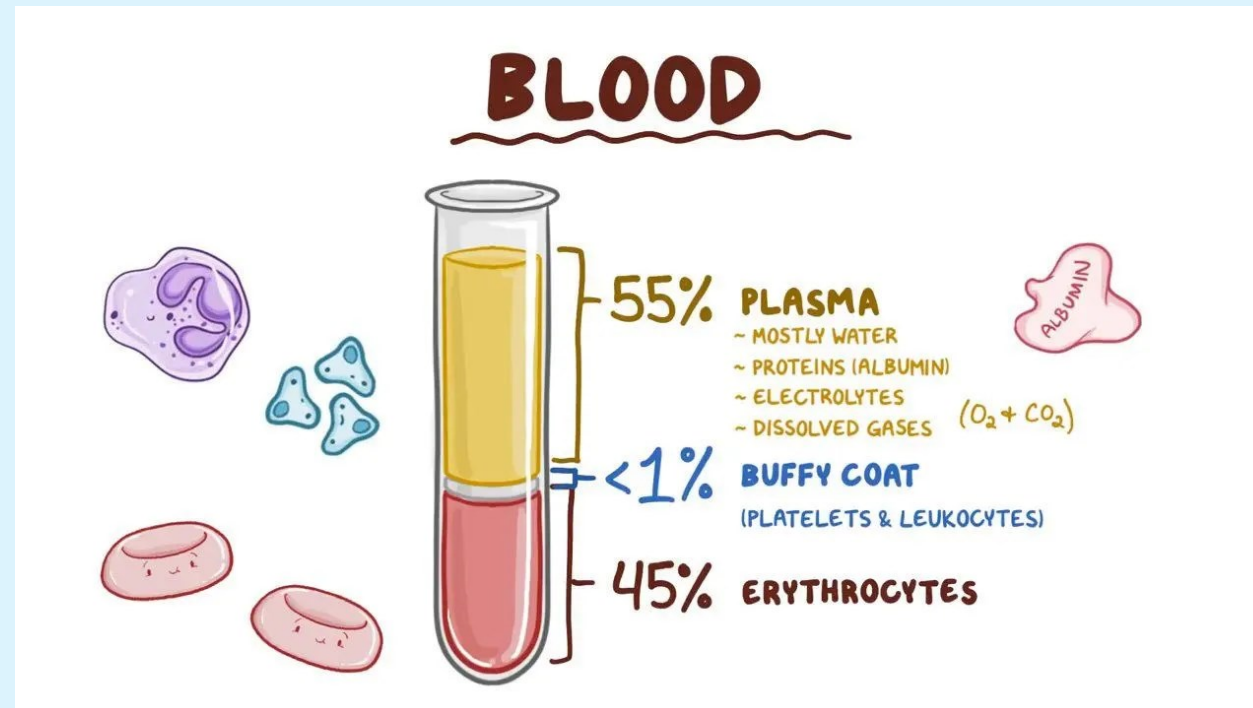
Blood is obtained from the following organs:

- Venous blood for most laboratory tests.
- Arterial blood is used to determine blood gases.
- Finger pricking.
- Cord blood.



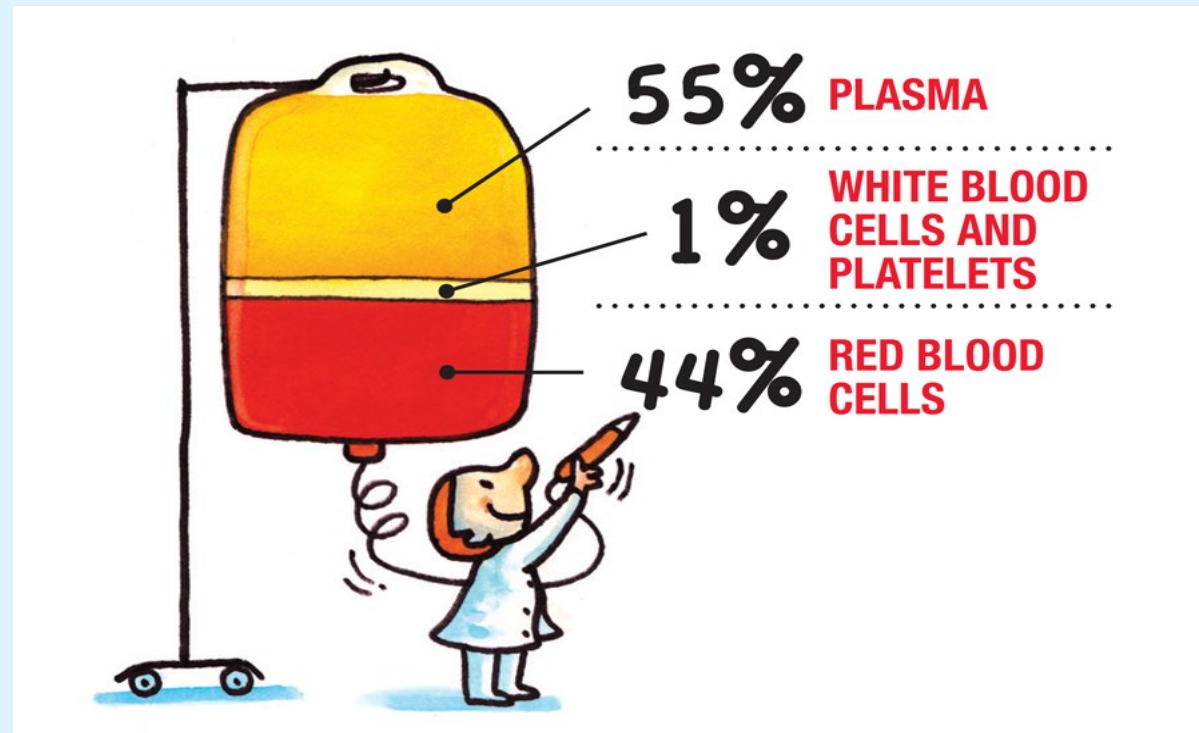
Blood Components

- Plasma accounts for 55% of total blood volume. It is 90% water, salts, lipids, and hormones, with a high concentration of proteins (including albumin), immunoglobulins, clotting factors, and fibrinogen.
- Plasma has various tasks, including carrying blood cells and nutrients, controlling the body's water and mineral salts, fighting infections, and coagulating blood. Plasma contains red blood cells, white blood cells, and platelets.



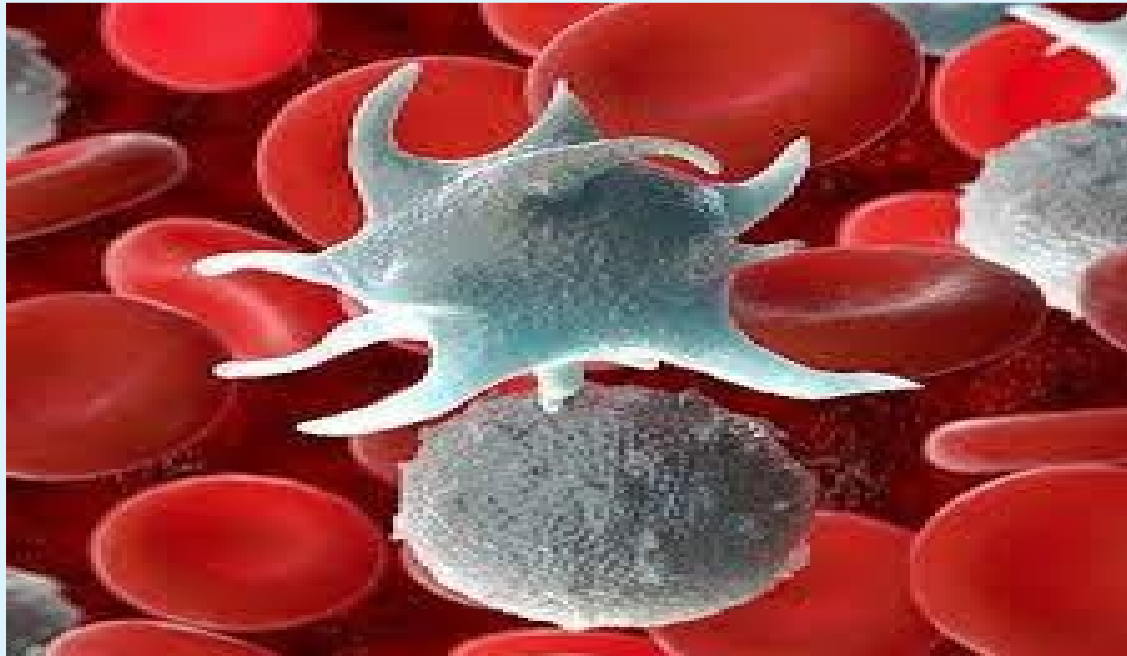
White Blood Cells

- White blood cells are also called leukocytes. They protect you against illness and disease. Think of white blood cells as your immunity cells. In a sense, they are always at war. They flow through your bloodstream to fight viruses, bacteria, and other foreign invaders that threaten your health.
- Each cubic millimeter of blood contains between 6,000 and 8,000 white blood cells. White blood cells are also known as leukocytes.



Platelets

- Platelets are significantly smaller than red and white blood cells.
- Platelets help in blood clotting and wound healing. When a blood artery ruptures, platelets join with fibrin, which is formed from fibrinogen, to create a clot.



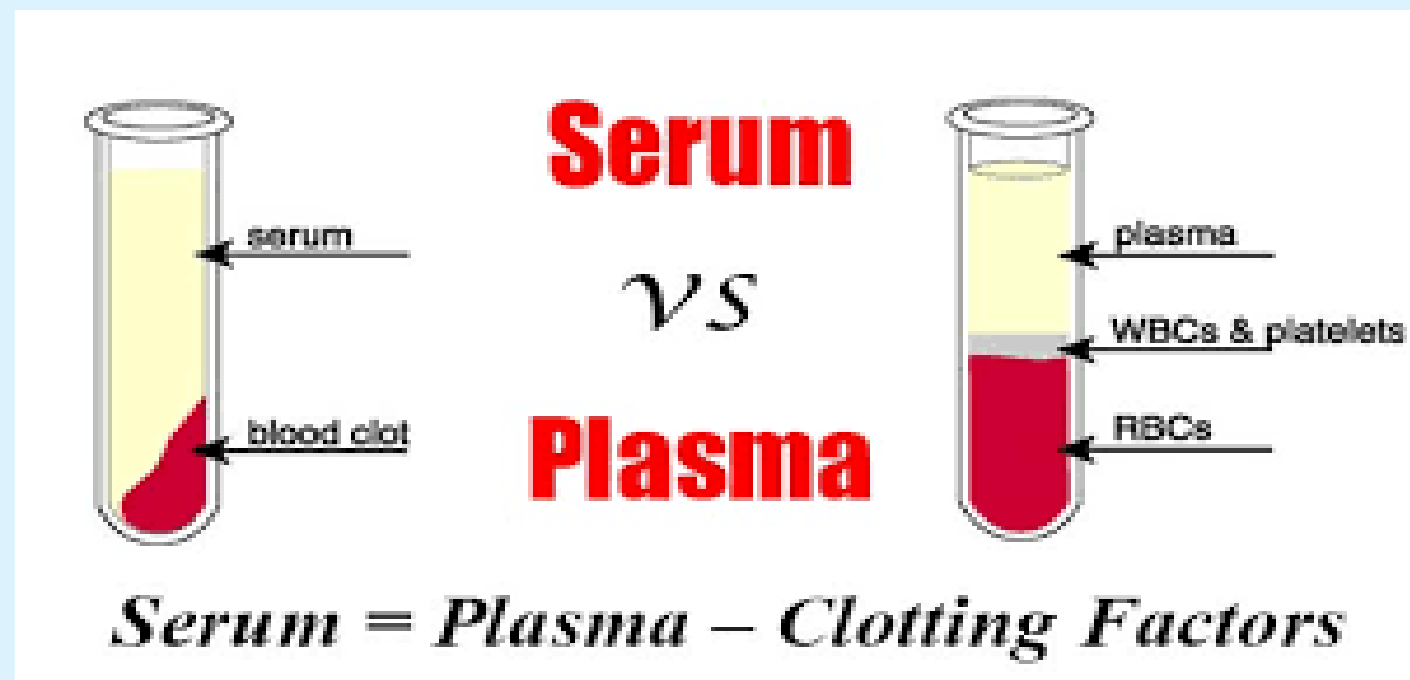
Red Blood Cells

- Approximately 5 million red blood cells can be found in a drop of blood the size of a pinhead (erythrocytes).
- They are little biconcave disks with no nucleus that are red because to an iron-containing protein called hemoglobin.
- Red cells account for approximately 37% and 43% of blood volume in women and 43% to 49% of blood volume in males. Cells transport oxygen throughout the body.



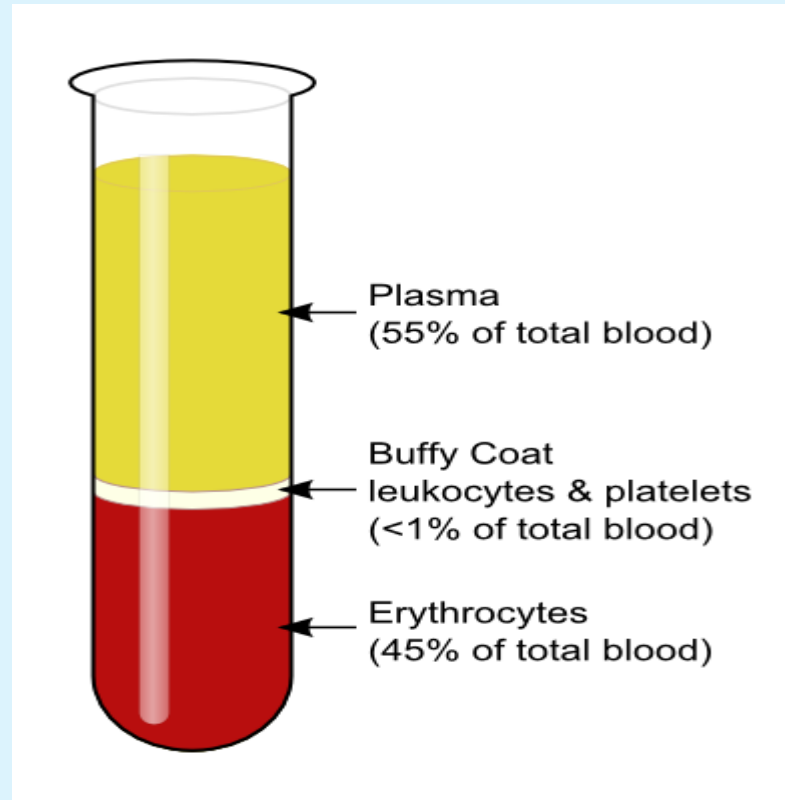
The difference between plasma and serum

- The majority of the components are the same in plasma and serum, with the exception of fibrinogen, which is missing in serum.
- Both plasma and serum may be extracted from blood using a centrifuge, however it is important to note that serum is collected after blood clotting.
- Whereas plasma can be acquired before blood clotting. Plasma is mostly used to treat blood clotting issues.



Blood Fraction Types

- **Whole blood:** for glucose, hemoglobin, and urea testing.
- **Plasma:** for testing of calcium chloride, vitamin C, fibrinogen, and bicarbonate.
- **Serum:** for total protein, albumin, globulin, cholesterol (free, ester), creatinine, uric acid, and enzyme assays.





*Thank you for
your attention*