Blood

- Blood is a connective tissue in fluid form.
- It is considered as the **'fluid of life'** because it carries oxygen from lungs to all parts of the body and carbon dioxide from all parts of the body to the lungs.
- It is known as **'fluid of growth'** because it carries nutritive substances from the digestive system and hormones from endocrine gland to all the tissues.
- The blood is also called the **'fluid of health'** because it protects the body against the diseases and gets rid of the waste products and unwanted substances by transporting them to the excretory organs like kidneys.

PROPERTIES OF BLOOD

1. *Color:*

- Blood is red in color.
- Arterial blood is scarlet red because it contains more oxygen and venous blood is purple red because of more carbon dioxide.

2. *Volume:*

- Average volume of blood in a normal adult is 5 L.
- In a newborn baby, the volume is 450 ml.
- It increases during growth and reaches 5 L at the time of puberty.
- In females, it is slightly less and is about 4.5 L.
- It is about 8% of the body weight in a normal young healthy adult.

3- Viscosity:

- Blood is five times more viscous than water.
- It is mainly due to red blood cells and plasma proteins.

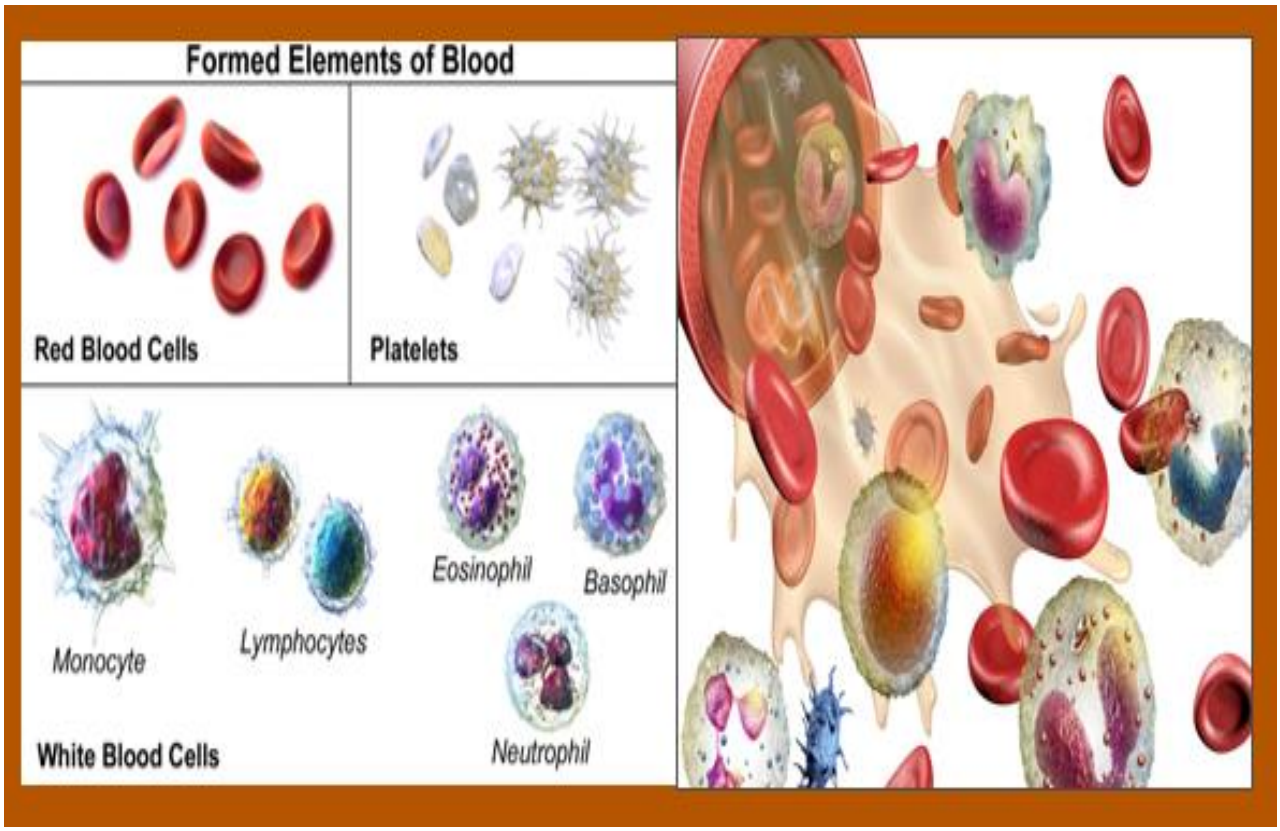
COMPOSITION OF BLOOD

- Blood contains the blood cells which are called formed elements and the liquid portion known as plasma.

BLOOD CELLS

Three types of cells are present in the blood:

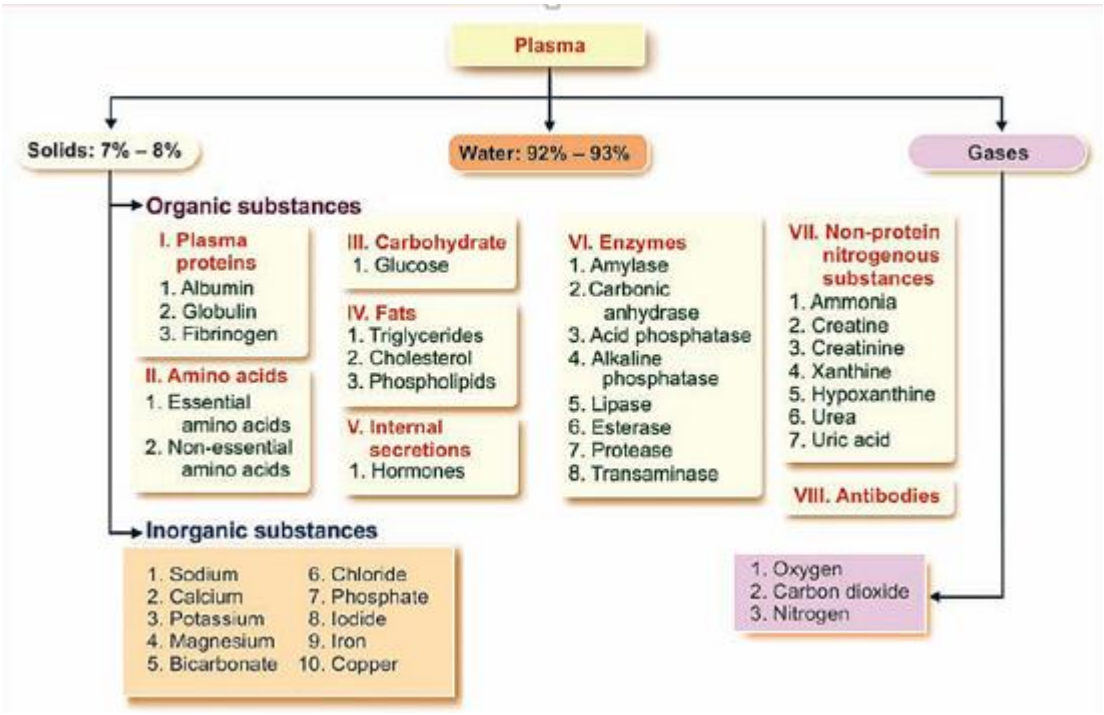
- Red blood cells or erythrocytes
- White blood cells or leukocytes
- Platelets or thrombocytes.



Hematocrit Value

- If blood is collected in a hematocrit tube along with a suitable anticoagulant and centrifuged for 30 minutes at a speed of 3000 revolutions per minute (rpm), the red blood cells settle down at the bottom having a clear plasma at the top.
- Plasma is a straw-colored clear liquid part of blood.
- It contains 91% to 92% of water and 8% to 9% of solids.
- The solids are the organic and the inorganic substances.
- Plasma forms 55% and red blood cells form 45% of the total blood.
- Volume of red blood cells expressed in percentage is called the hematocrit value or packed cell volume (PCV).
- In between the plasma and the red blood cells, there is a thin layer of **white buffy coat.**
- This white buffy coat is formed by the aggregation of white blood cells and platelets

Normal values of some important substances in blood



SERUM

- Serum is the clear straw-colored fluid that oozes from blood clot.
- When the blood is shed or collected in a container, it clots.
- In this process, the fibrinogen is converted into fibrin and the blood cells are trapped in this fibrin forming the blood clot.
- After about 45 minutes, serum oozes out of the blood clot.
- For clinical investigations, serum is separated from blood cells and clotting elements by centrifuging.
- Volume of the serum is almost the same as that of plasma (55%).
- It is different from plasma only by the absence of fibrinogen, i.e. serum contains all the other constituents of plasma except fibrinogen.
- Fibrinogen is absent in serum because it is converted into fibrin during blood clotting.
- Thus, Serum = Plasma – Fibrinogen.