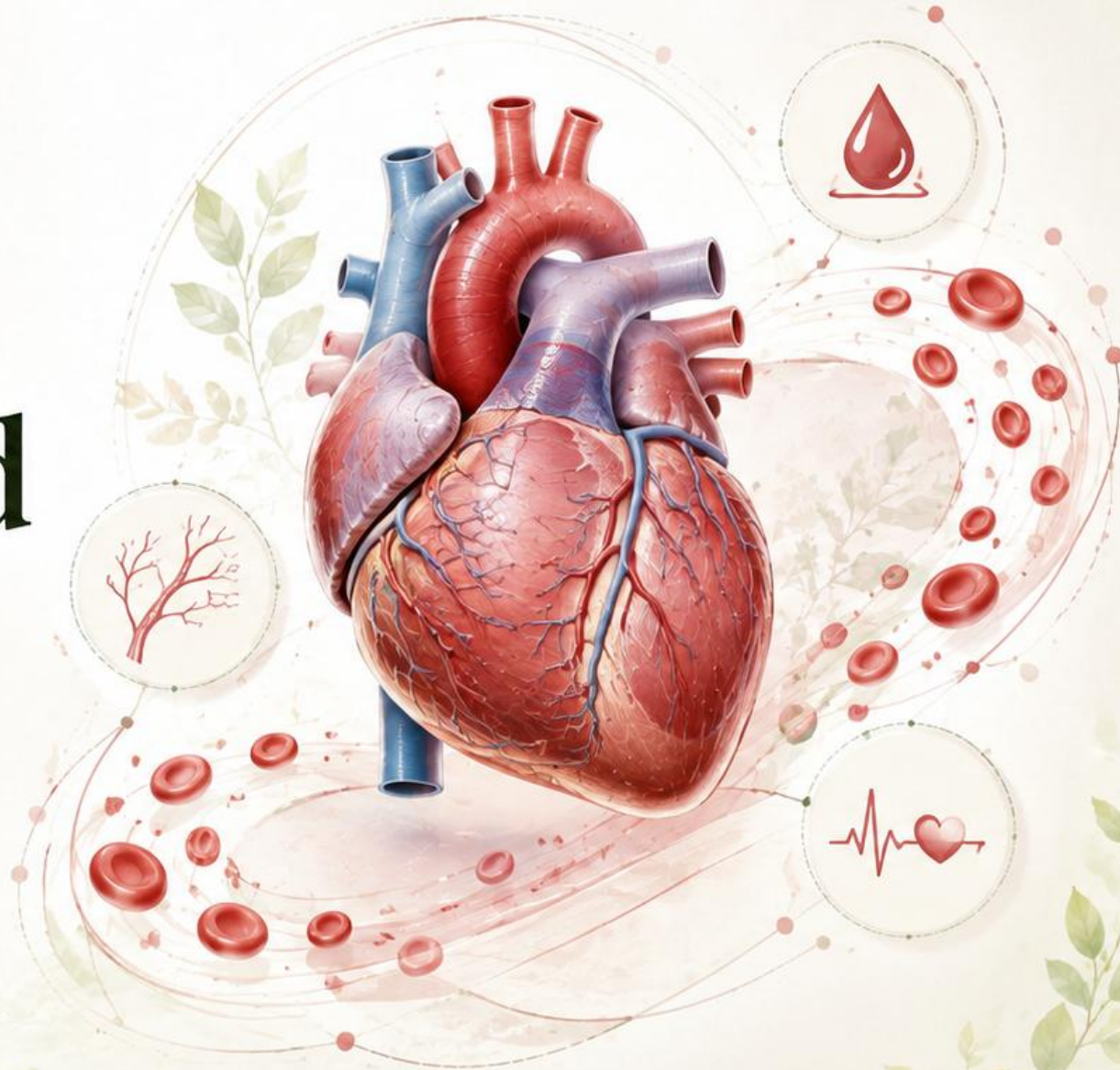


Chapter 15 : Body Fluids and Circulation

Biology Notes | Class 11



BODY FLUIDS & BLOOD COMPOSITION

BODY FLUIDS: fluids that help transport substances within the body.

- Blood is a fluid connective tissue that circulates inside blood vessels.
- It has a liquid matrix called plasma and cellular components called formed elements.

BLOOD = PLASMA + FORMED ELEMENTS

Plasma $\approx$ 55% by volume

Formed elements $\approx$ 45% by volume

FORMED ELEMENTS (CELLULAR COMPONENTS OF BLOOD):

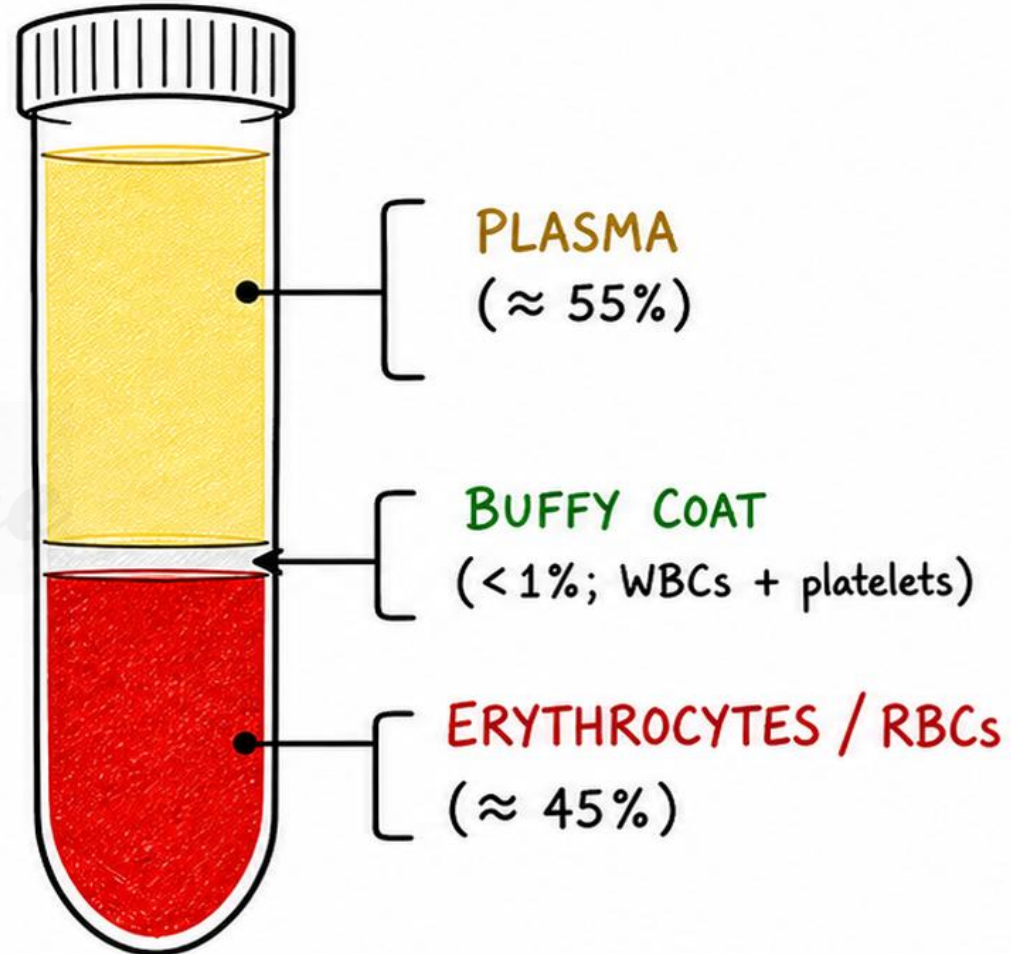
① Erythrocytes
(RBCs)



② Leucocytes
(WBCs)



③ Platelets
(thrombocytes)



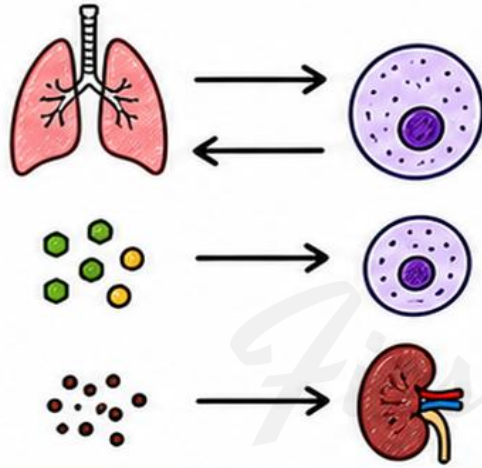
Values are approximate.

MAJOR FUNCTIONS OF BLOOD

Blood links all body tissues by transport, protection and clotting.

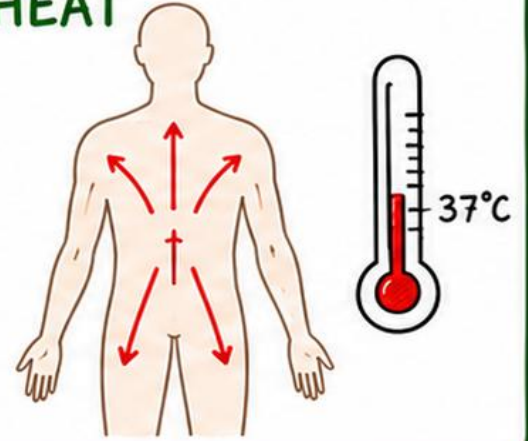
① TRANSPORT

- O_2 : lungs $\rightarrow$ tissues
- CO_2 : tissues $\rightarrow$ lungs
- Nutrients and hormones reach target cells.
- Metabolic wastes move to excretory organs.



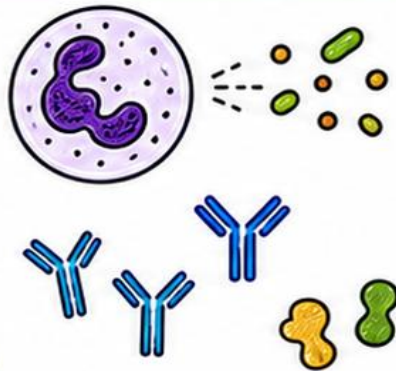
② DISTRIBUTION OF HEAT

- Blood carries heat from active tissues to other body regions.
- This helps maintain a stable body temperature.



③ IMMUNE DEFENCE

- Leucocytes destroy pathogens and foreign particles.
- Antibodies and complement proteins help protect the body.



④ HAEMOSTASIS

- Platelets and clotting proteins work together.
- They reduce blood loss and help repair damaged vessels.



TRANSPORT + HEAT DISTRIBUTION + IMMUNE DEFENCE + HAEMOSTASIS

PLASMA: CONTENTS & PROTEINS

WHAT IS PLASMA?

- Plasma is the straw-coloured liquid matrix of blood.
- RBCs, WBCs and platelets remain suspended in it.



Water $\approx$ 90–92%

Proteins $\approx$ 6–8%

WHAT PLASMA CONTAINS



- Mineral ions: Na^+ , Ca^{2+} , Mg^{2+} , HCO_3^- , Cl^-



- Nutrients: glucose, amino acids and lipids



- Hormones



- Dissolved gases



- Metabolic wastes: urea, uric acid and creatinine

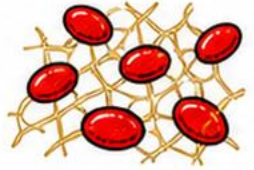


- Proteins and antibodies

MAJOR PLASMA PROTEINS

① FIBRINOGEN

forms fibrin during blood clotting.



② GLOBULINS

immune defence; some also transport substances.



③ ALBUMINS

maintain plasma colloid osmotic pressure and transport several substances.



Plasma carries dissolved substances and supports transport, defence and coagulation.

PLASMA VERSUS SERUM

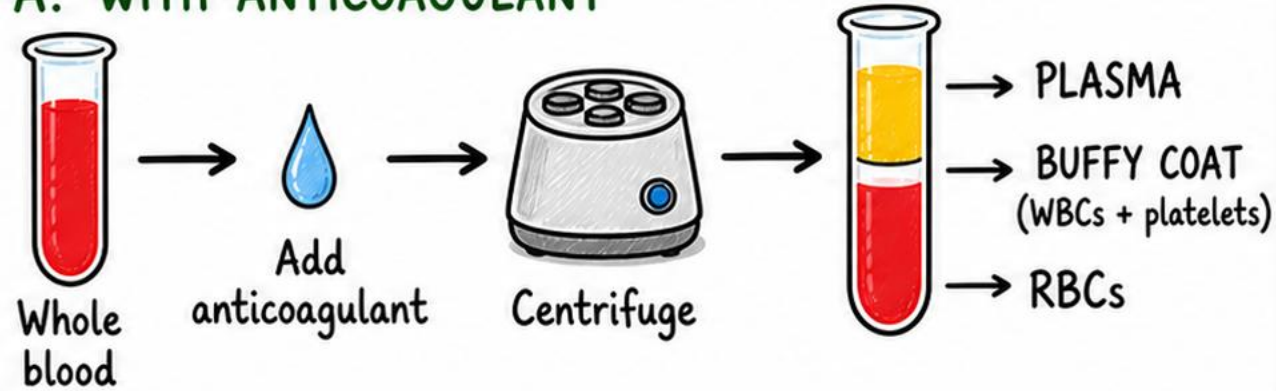
PLASMA

- Liquid part of anticoagulated blood.
- Fibrinogen is present.
- Clotting factors are retained.
- Also contains proteins, antibodies, electrolytes and other solutes.

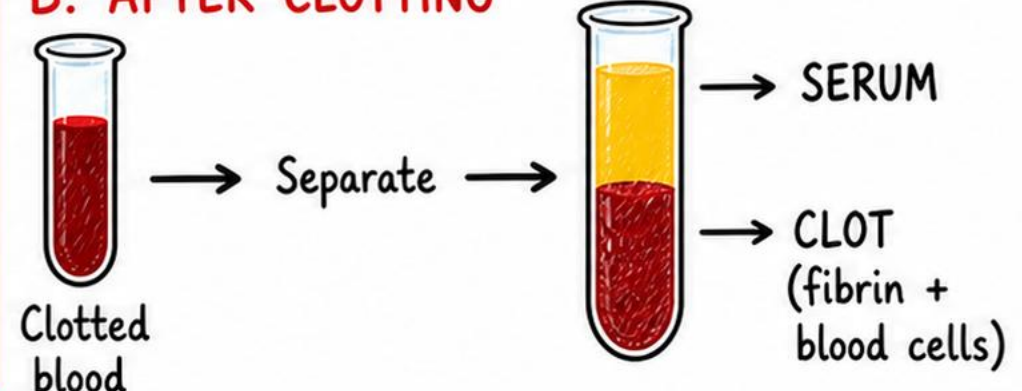
SERUM

- Fluid left after blood has clotted.
- Fibrinogen is absent.
- Most active clotting factors are absent because they are used or removed during clot formation.
- Other proteins, antibodies, electrolytes and solutes remain.

A. WITH ANTICOAGULANT



B. AFTER CLOTTING



SERUM = PLASMA AFTER CLOTTING, WITHOUT FIBRINOGEN AND MOST ACTIVE CLOTTING FACTORS.

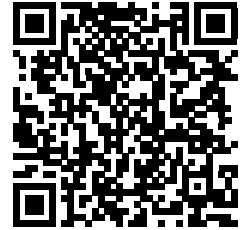


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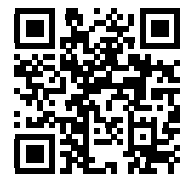


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