ARJUNA NEET BATCH

BODY FLUIDS AND ITS CIRCULATION-LECTURE -01

NEET → 2- 3

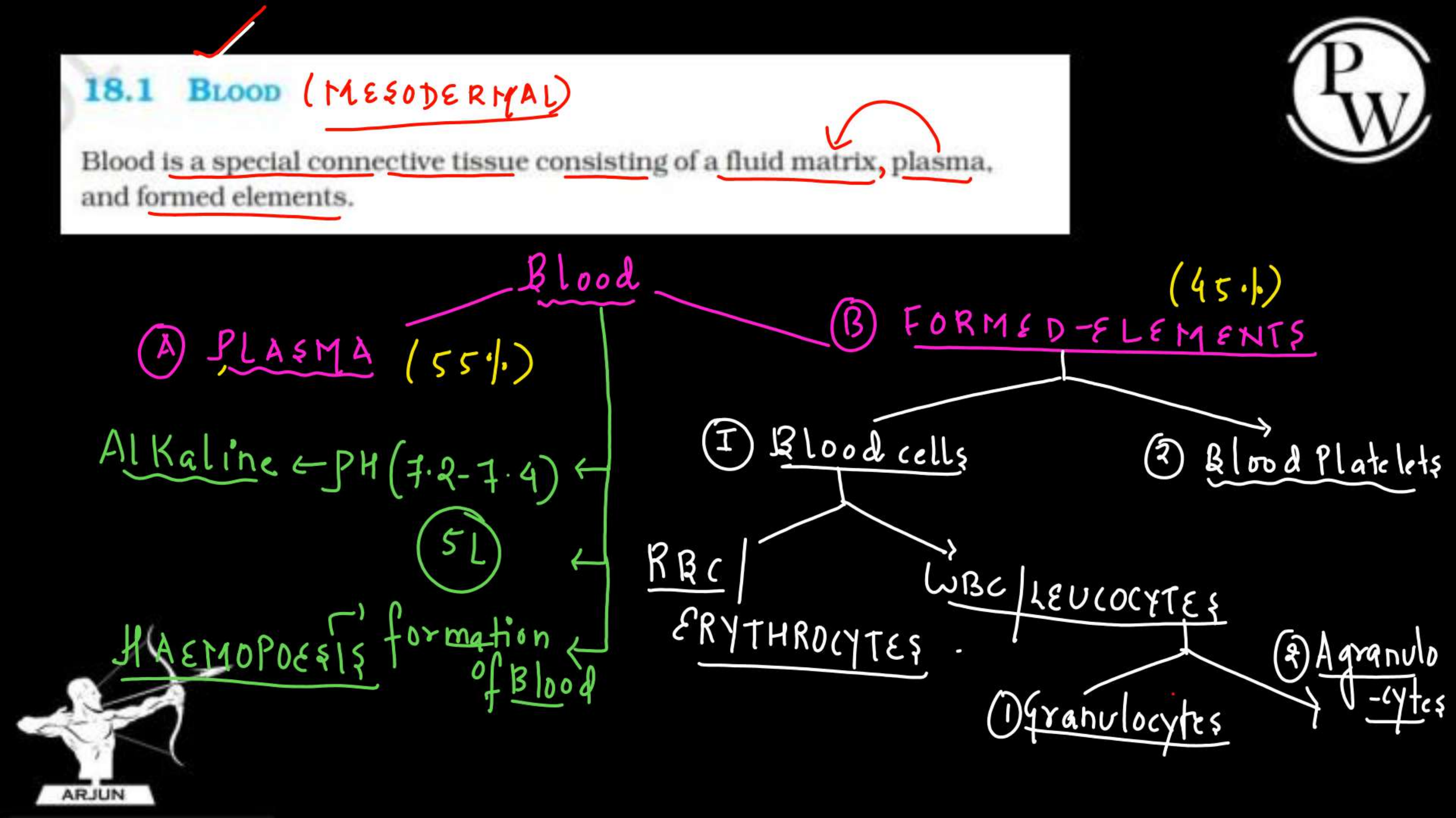
① FLUID — Blood, Lymph

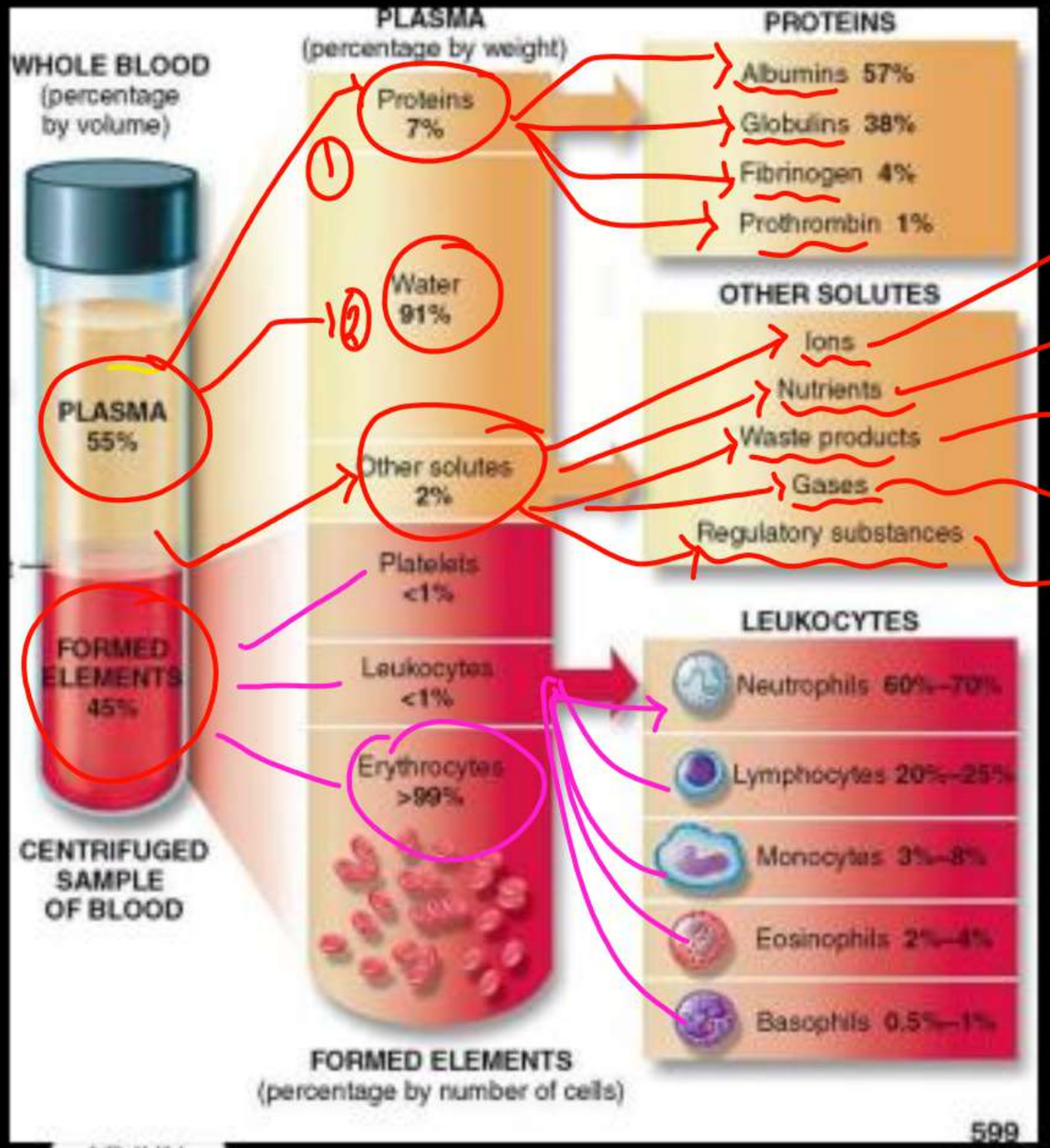
② Heart

③ Blood vessel

18.1 BLOOD (MESODERMAL)

Blood is a special connective tissue consisting of a fluid matrix, plasma, and formed elements.





$Ca^{2+}, Mg^{2+}, Na^{+}, HCO_3^{-}, Cl^{-}$ –

Glu, aa etc

Urea

O_2 & CO_2

Hormones, Enzymes

PLASMA: (Matrix - 55%)

→ ① WATER: (90-92%)

→ ② PROTEINS: (6-8%)

→ ③ Glucose, amino-acid etc in a transient stage

→ ④ IONS: Na^+, Ca^{2+}, K^+, Cl^-, Mg^{2+}, HCO_3^- etc.

→ ① ALBUMIN: Maximum, smallest
- To maintain OSMOTIC BALANCE
- Produced By: LIVER.

→ ② GLOBULIN:
- → α
- → β
- ★ ④ → Immunoglobulins produced By PLASMA CELLS → Defense Mechanism

→ Produced By LIVER

→ ③ FIBRINOGENS & Prothrombin:
- help in Clotting Mechanism.
- By LIVER

PLASMA = Blood - Formed elements

SERUM = Plasma - Clotting factors

LYMPH = Blood - { RBC, Larger Proteins, Platelets }

18.1.1 Plasma

Plasma is a straw coloured, viscous fluid constituting nearly 55 per cent of the blood. 90-92 per cent of plasma is water and proteins contribute 6-8 per cent of it. Fibrinogen, globulins and albumins are the major proteins.

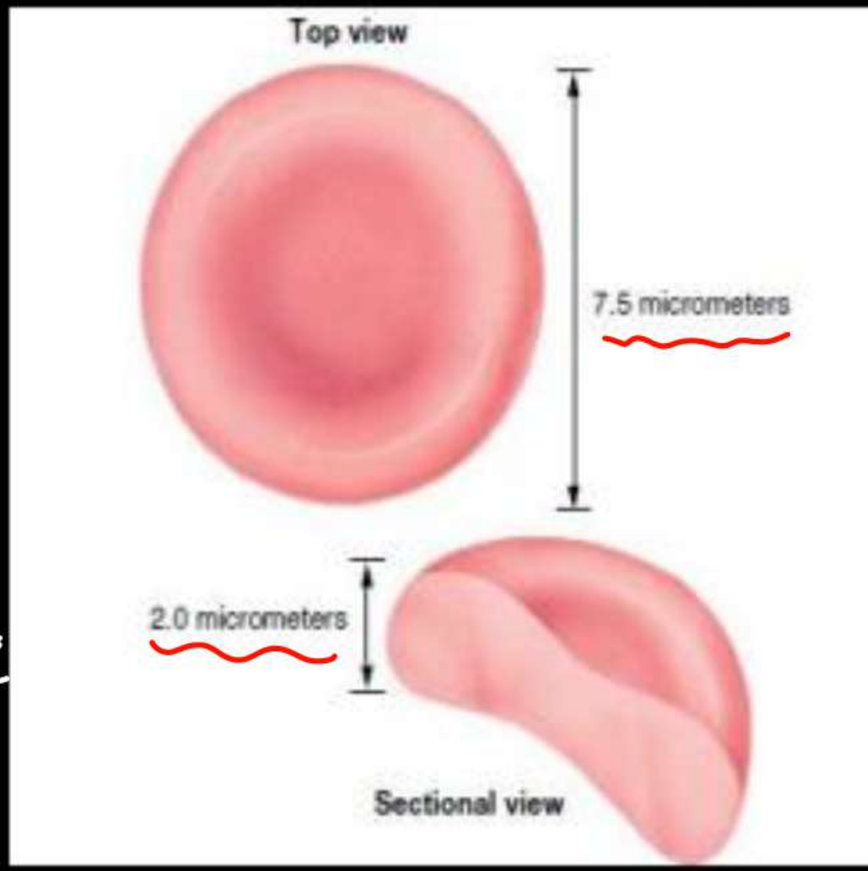
Fibrinogens are needed for clotting or coagulation of blood. Globulins primarly are involved in defense mechanisms of the body and the albumins help in osmotic balance. Plasma also contains small amounts of minerals like Na^+, Ca^{++}, Mg^{++}, HCO_3^-, Cl^-, etc. Glucose, amino acids, lipids, etc., are also present in the plasma as they are always in transit in the body. Factors for coagulation or clotting of blood are also present in the plasma in an inactive form. Plasma without the clotting factors is called serum.

ERYTHROCYTES(RBC):

(RBC > Platelets > WBC

1.NUMBER: 5 - 5.5 million / mm^3 blood

2.SHAPE AND SIZE: Biconcave, Circular (Mammal)
(Except Camel & Lama → Oval, Biconvex)



RBC has NO NUCLEUS, NO CELL ORGANELLE
↓
to create max. space for "Hb".

* No mitochondria
↳ ANAEROBIC RESPIRATION is seen.

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- **3.FORMATION:** Its formation is known as ERYTHROPOESIS

Embryonic stage: YOLK SAC, LIVER

After Birth: Red Bone Marrow (Primarily)

→ Leucoblast → Leucocyte

→ Megakaryoblast → Megakaryocyte (NCERT) → Blood Platelets

→ Reticulocyte (Nucleus present) → Mature RBC (No Nucleus)

↑ RBC → Polycythemia

↓ RBC → Erythro - cytopenia

- **4.FUNCTION:** Transport of O_2 & CO_2.
- **5.LIFE SPAN:** 120 days

Graveyard of RBC → SPLEEN

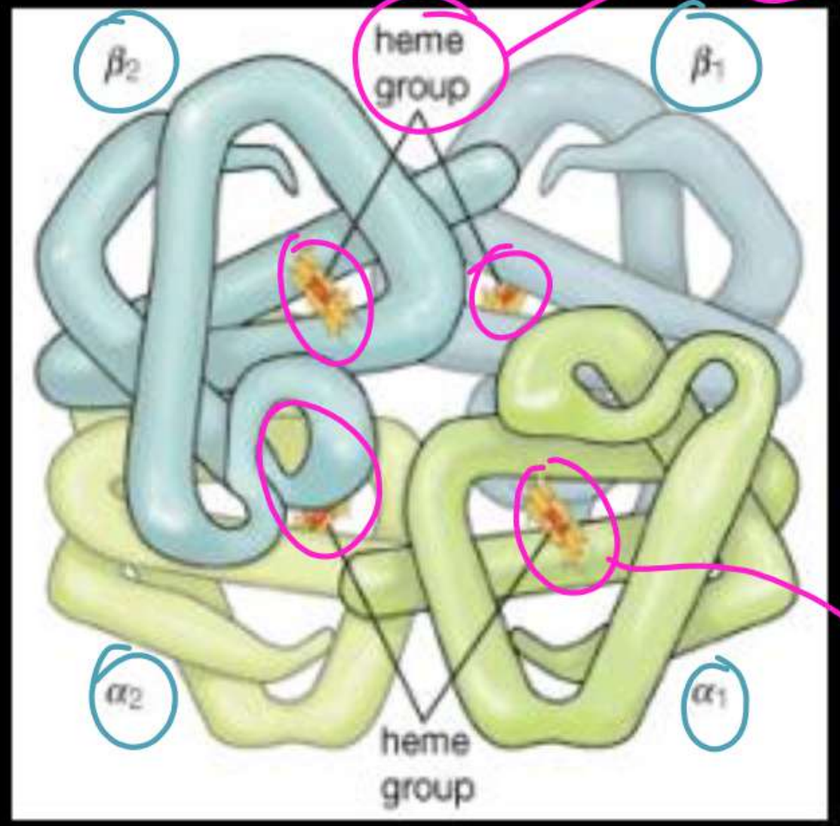
Vit B9 (Follic acid), Vit-B12

HAEMOGLOBIN

Fe^{+2}

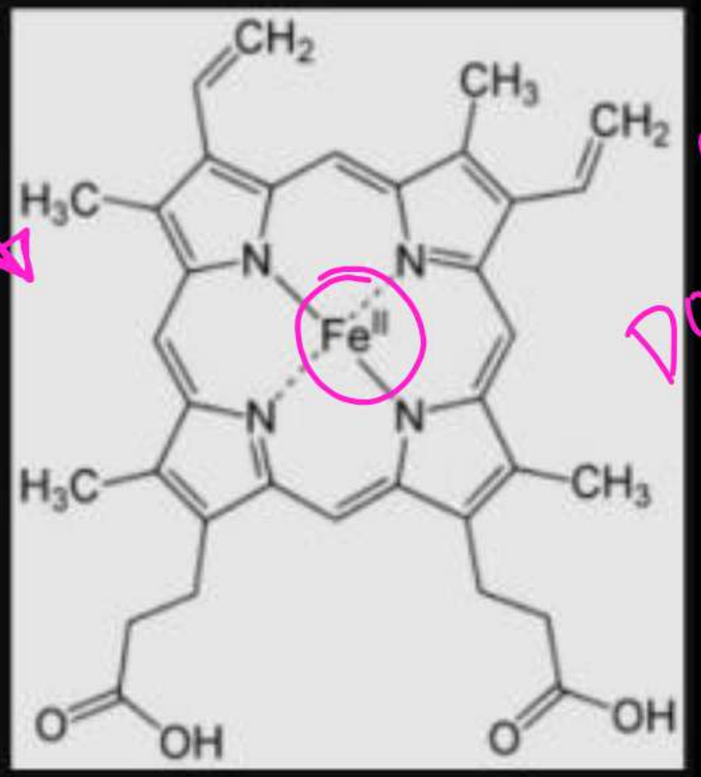
12 - 16 gm / 100 ml Blood

Haem + globin



Adult Hb → 2 α globin chain,
2 β globin chain

Foetal Hb → 2 α, 2 γ



Don't Memorise

Haem → Porphyrin Ring → Centre has Fe^{+2}

Erythrocytes or red blood cells (RBC) are the most abundant of all the cells in blood. A healthy adult man has, on an average, 5 millions to 5.5 millions of RBCs mm^{-3} of blood. RBCs are formed in the red bone marrow in the adults. RBCs are devoid of nucleus in most of the mammals and are biconcave in shape. They have a red coloured, iron containing complex protein called haemoglobin, hence the colour and name of these cells. A healthy individual has 12-16 gms of haemoglobin in every 100 ml of blood. These molecules play a significant role in transport of respiratory gases. RBCs have an average life span of 120 days after which they are destroyed in the spleen (graveyard of RBCs).

(Except CAMEL & LAMA)

LEUCOCYTES(WBC):

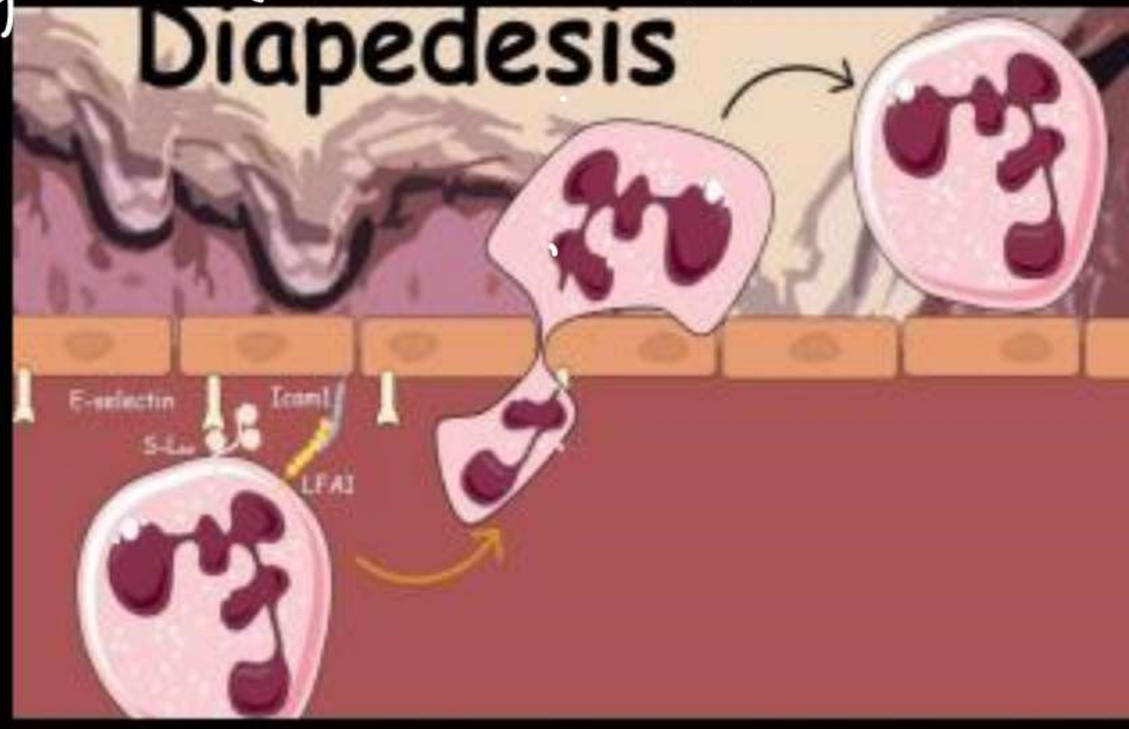
- **1.NUMBER:** 6000-8000/mm^3 blood
- **2.FORMATION:** LEUCOPOESIS

Leucocytopenia → decrease in WBC.

LEUCOCYTOSIS: increase in No. of WBC. (during infection).

LEUKEMIA : Abnormal ↑ in No. of WBC (Blood cancer)

DIAPEDESIS



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