



ARJUNA NEET BATCH



BODY FLUIDS AND ITS CIRCULATION-LECTURE -02



LEUCOCYTES(WBC):

- **1.NUMBER:** $6000-8000/\text{mm}^3$ blood ✓
- **2.FORMATION:** LEUCOPOESES ✓

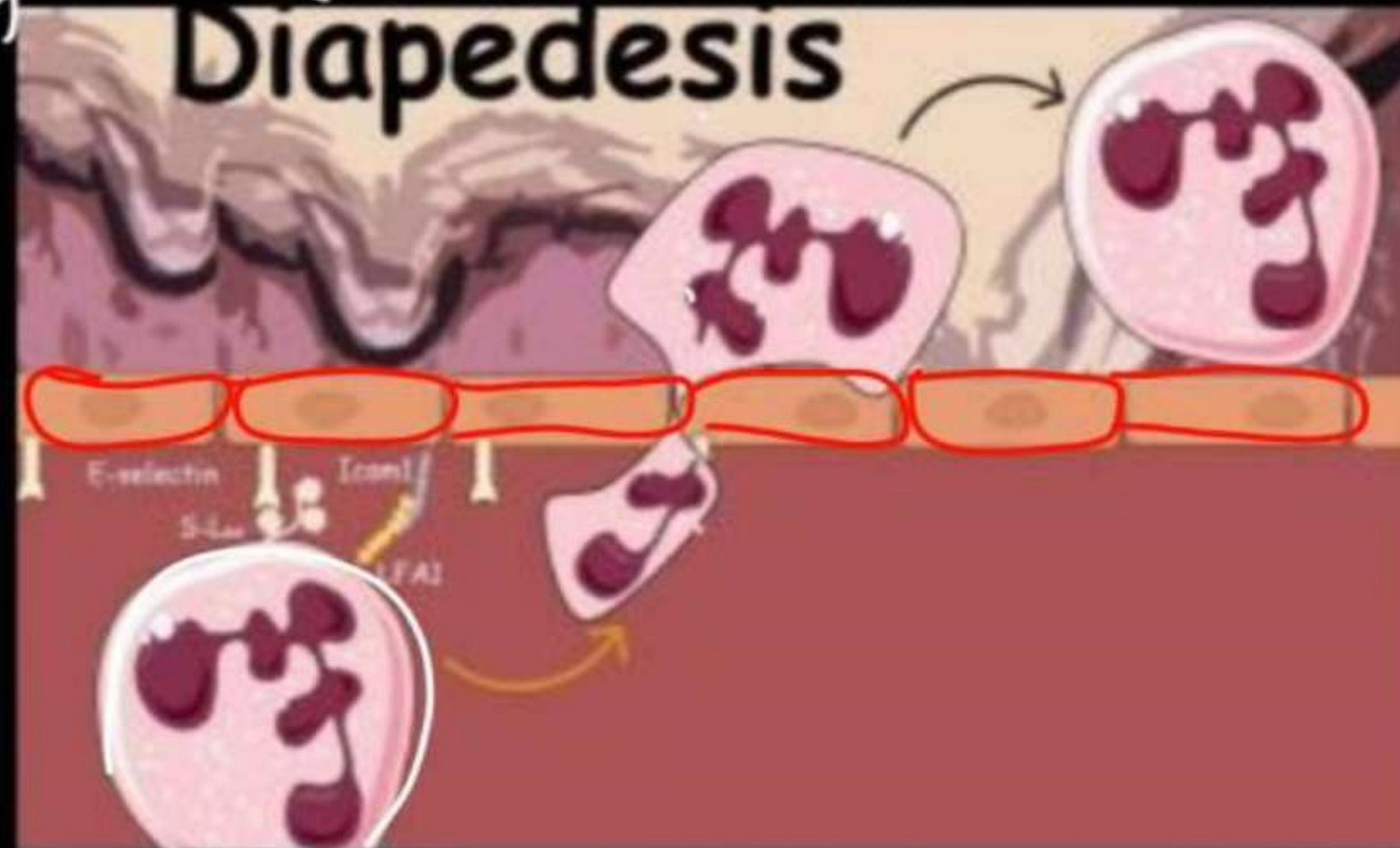
LEUCOCYTOSIS: increase in No. of WBC. (during infection).

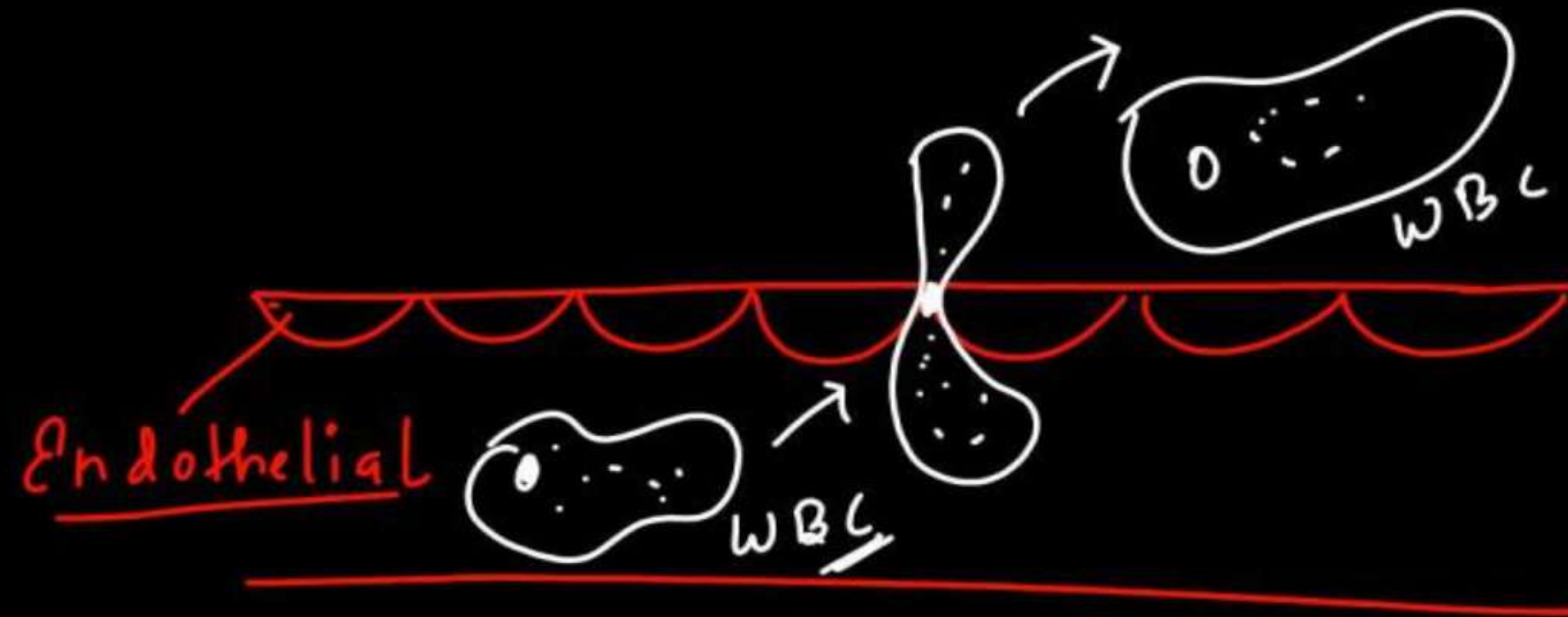
LEUKEMIA: Abnormal ↑ in No. of WBC (Blood cancer)

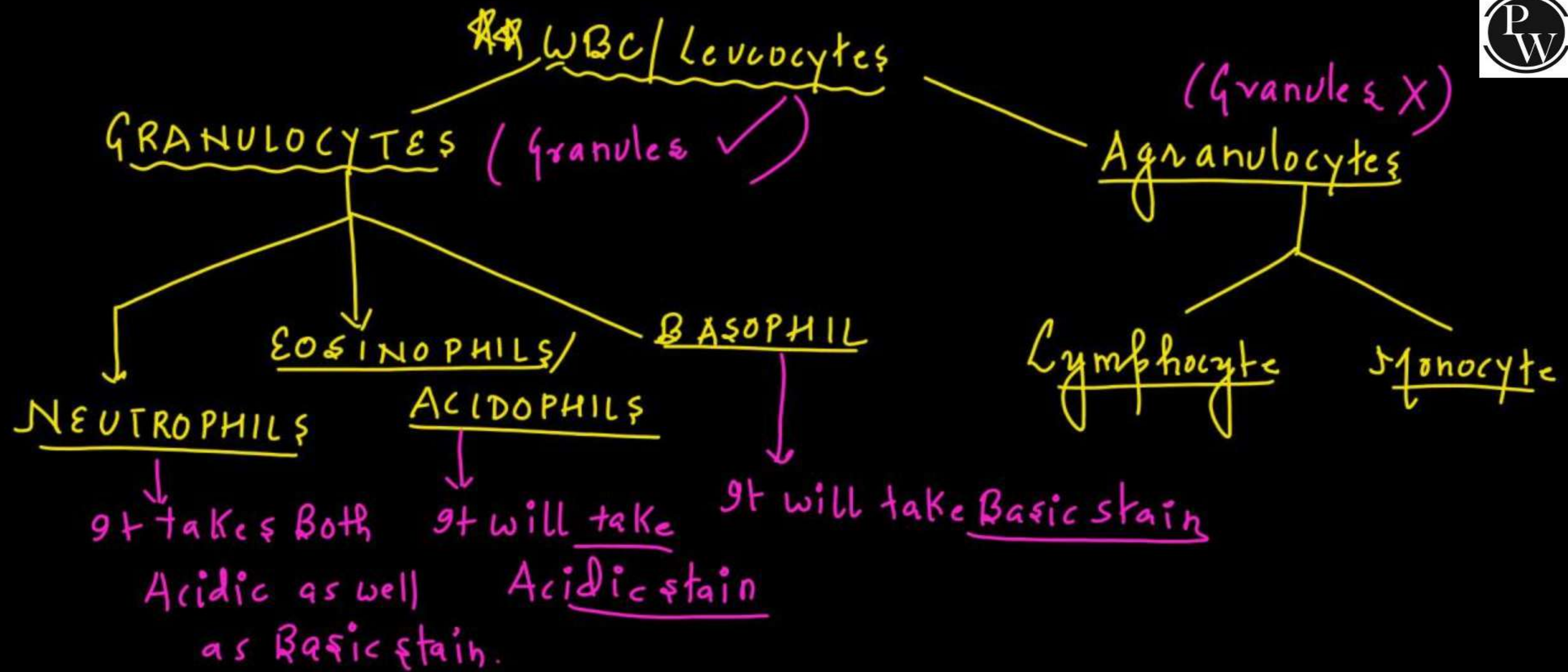
✓ DIAPEDESIS

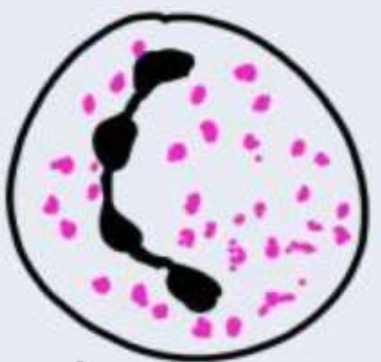




→ Squeezing of some WBCs out of the Blood capillary hence is related with movement of WBC.

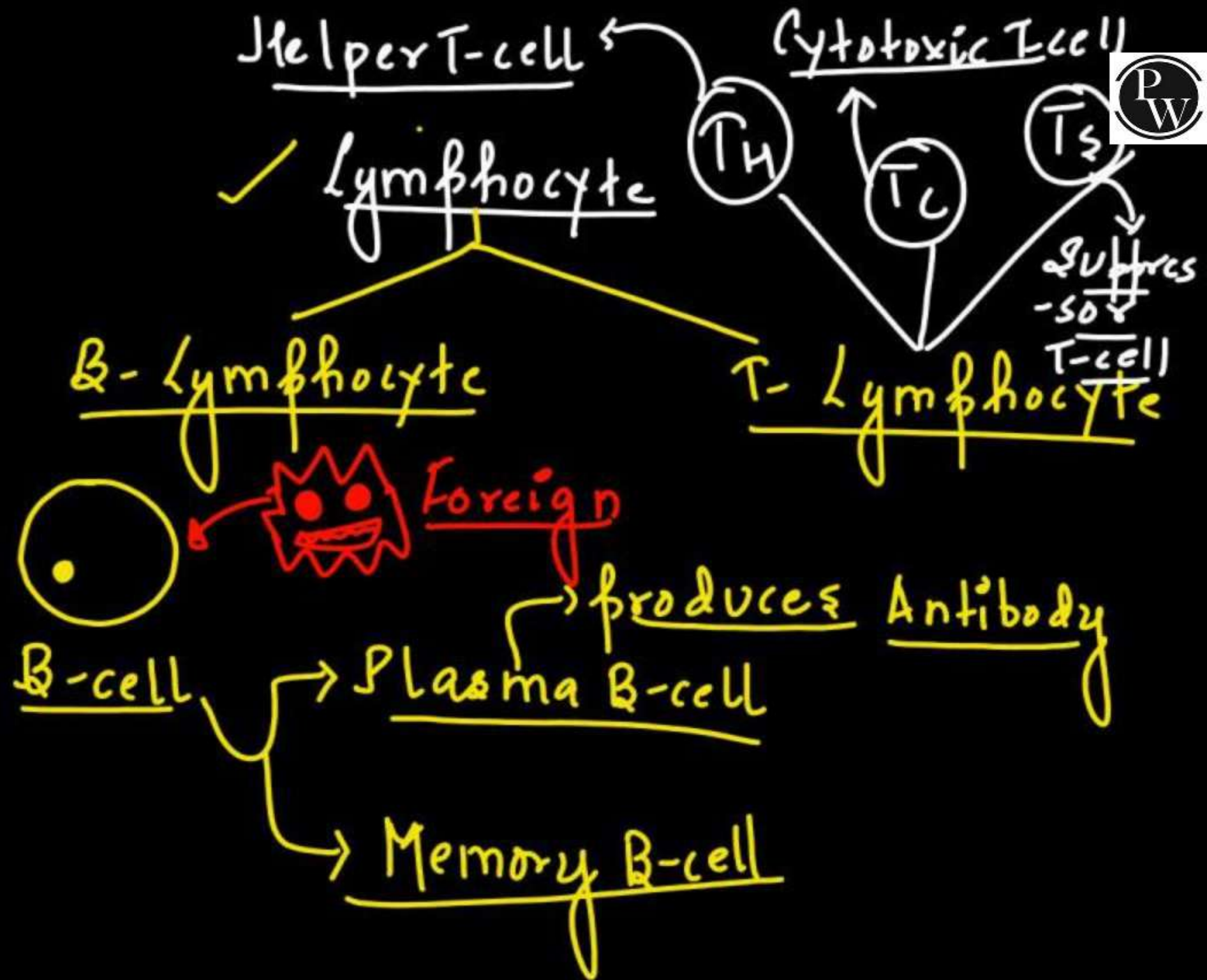
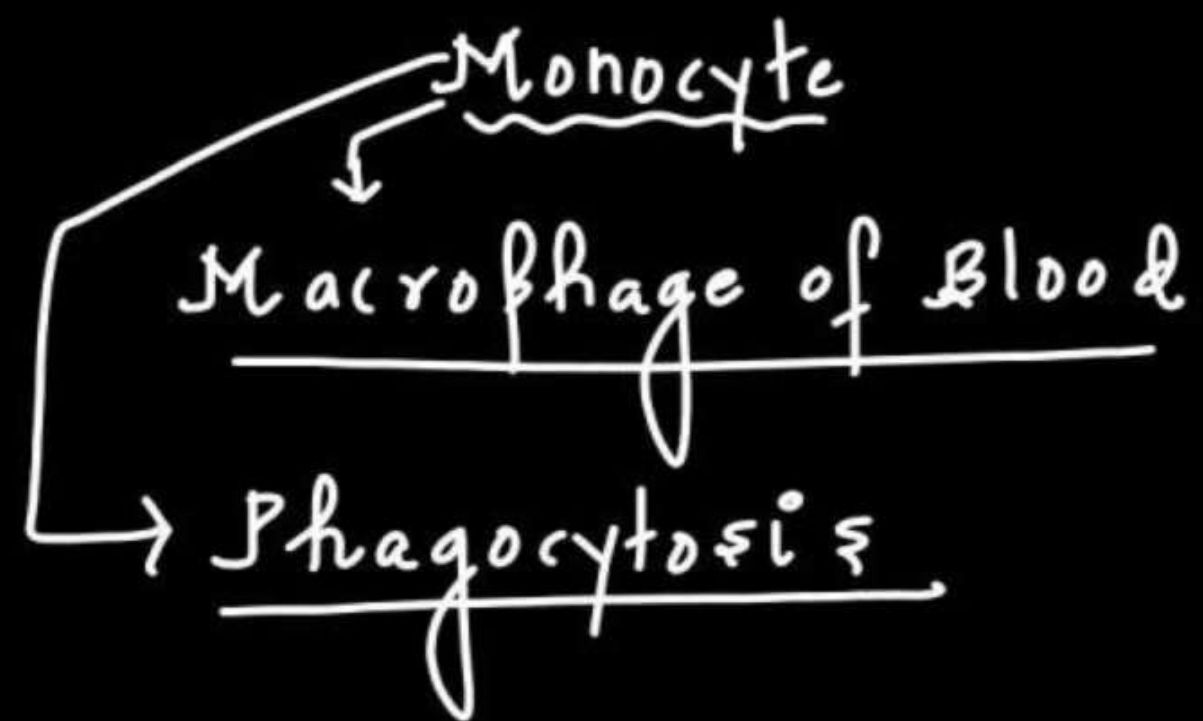
Leucocytopenia
↓
decrease in WBC







| CHARACTER | NEUTROPHIL | EOSINOPHIL | BASOPHIL | MONOCYTE | LYMPHOCYTE |
|--------------|---|--|---|--|---|
| 1. NUMBER | 60-65% (MAXIMUM) | (2-3%) | (0.5-1%) (MINIMUM) | (6-8%) | (20-25%) |
| 2. SHAPE |  <p>PMNL Polymorpho Nuclear Leucocyte Multilobed Nuclei (4-5)</p> |  <p>"Headphone shaped" / Bilobed Nuclei</p> |  <p>'S' Shaped / trilobed Nuclei</p> |  <p>"Kidney" / Bean shaped Nuclei</p> |  <p>"Round" Nuclei</p> |
| 3. FORMATION | <p>← BONE-MARROW → SPLEEN, LYMPH-NODES</p> | | | | |
| 4. FUNCTION | <p>Microscopic POLICEMEN, reaches to the site of injury, * <u>PHAGOCYTOSIS</u></p> | <p><u>Antiallergic</u> ↳ release Antihistamine - <u>Antiparasitic</u></p> | <p>• Acting like <u>MAST CELL</u> releasing -</p> | <p><u>Inflammation</u></p> <p>HISTAMINE SEROTONIN HEPARIN</p> | |





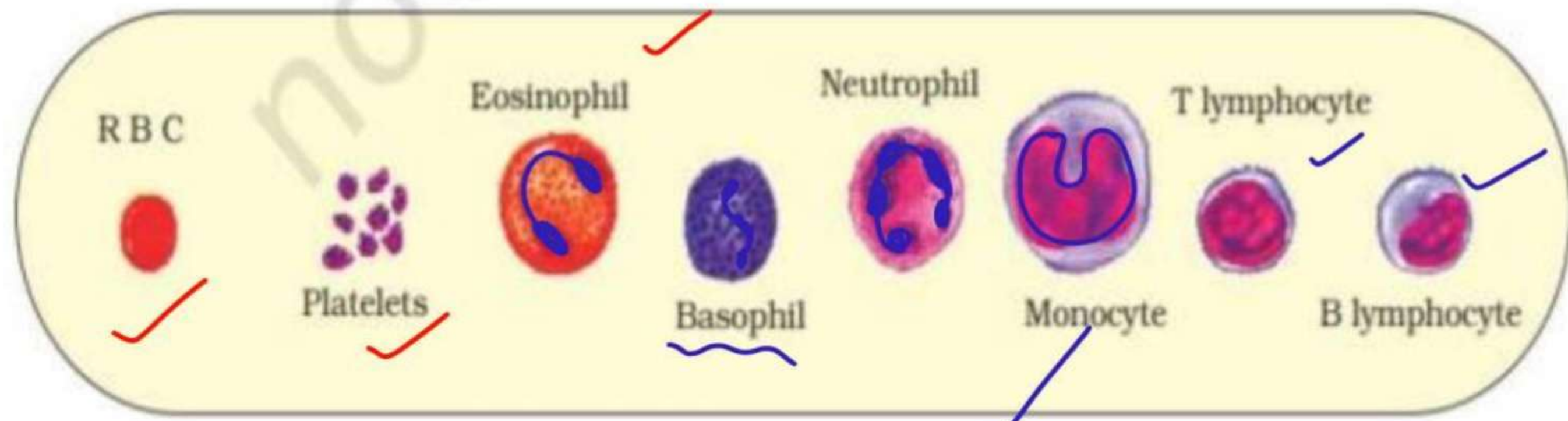
Leucocytes are also known as white blood cells (WBC) as they are colourless due to the lack of haemoglobin. They are nucleated and are relatively lesser in number which averages $6000-8000 \text{ mm}^{-3}$ of blood. Leucocytes are generally short lived. We have two main categories of WBCs – granulocytes and agranulocytes. Neutrophils, eosinophils and basophils are different types of granulocytes, while lymphocytes and monocytes are the agranulocytes. Neutrophils are the most abundant cells (60-65 per cent) of the total WBCs and basophils are the least (0.5-1 per cent) among them. Neutrophils and monocytes (6-8 per cent) are phagocytic cells which destroy foreign organisms entering the body. Basophils secrete histamine, serotonin, heparin, etc., and are involved in inflammatory reactions. Eosinophils (2-3 per cent) resist infections and are also

→ inflammation

(ANTI-ALLERGIC)

associated with allergic reactions. Lymphocytes (20-25 per cent) are of two major types – 'B' and 'T' forms. Both B and T lymphocytes are responsible for immune responses of the body.





HORSE-SHOE-SHAPED



THROMBOCYTES(Platelets)

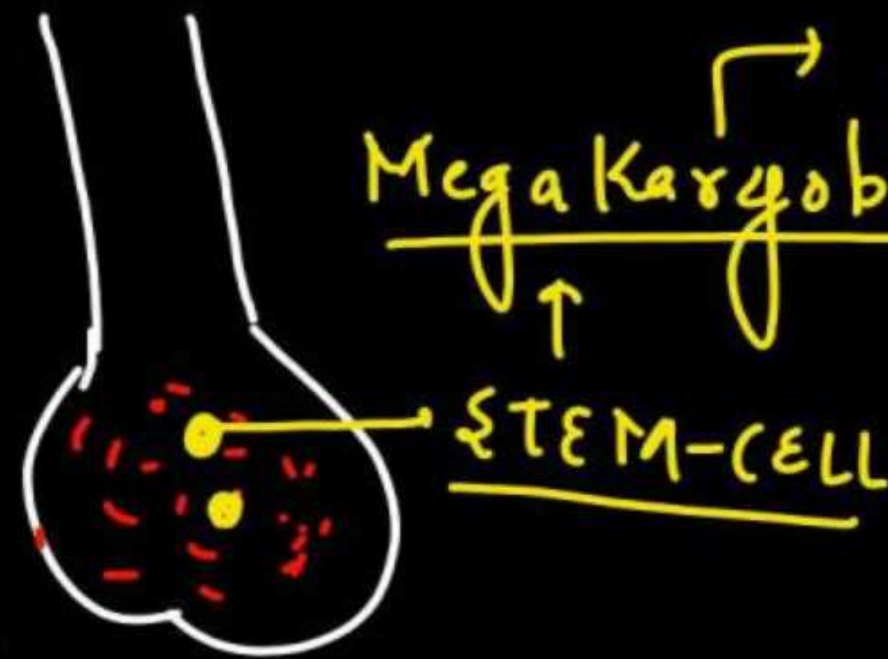
→ formation : Thrombopoiesis



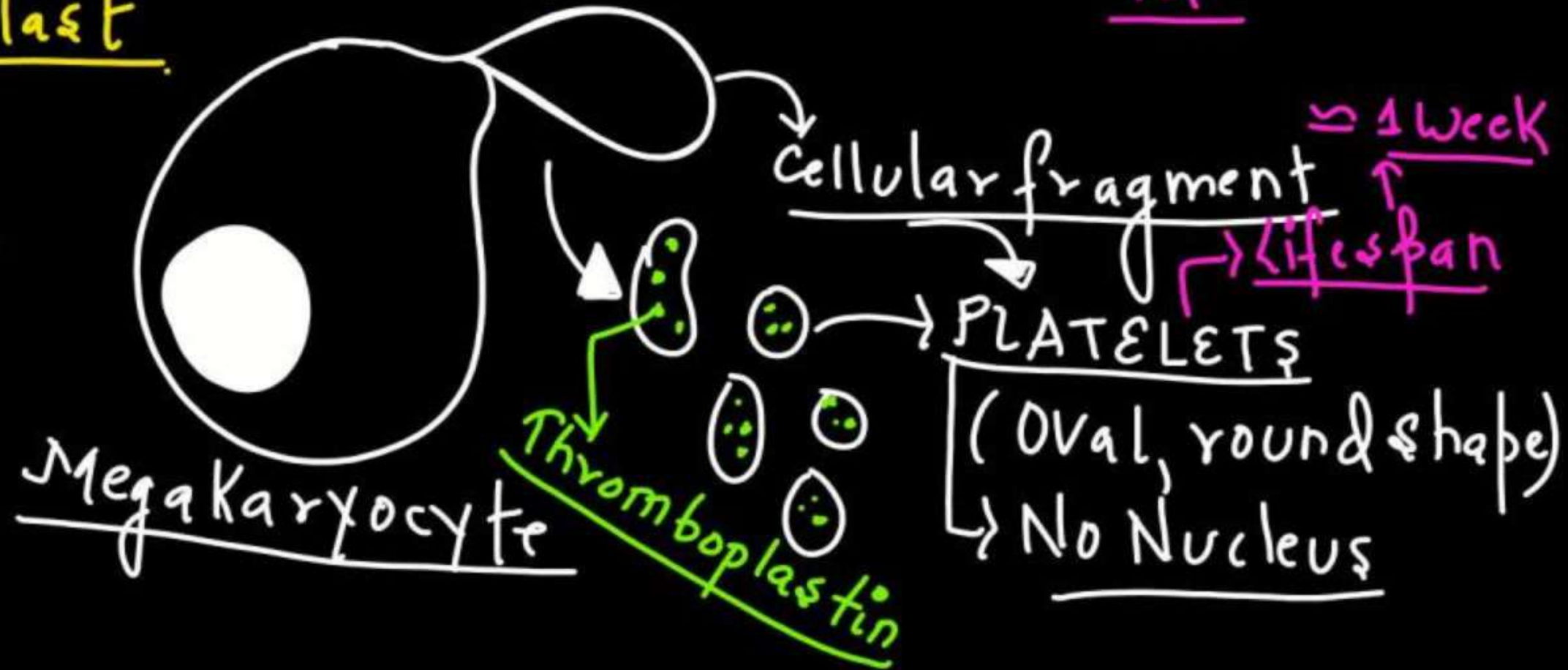
Platelets also called thrombocytes, are cell fragments produced from megakaryocytes (special cells in the bone marrow). Blood normally contains $1,500,00-3,500,00$ platelets mm^{-3} . Platelets can release a variety of substances most of which are involved in the coagulation or clotting of blood. A reduction in their number can lead to clotting disorders which will lead to excessive loss of blood from the body.



THROMBOCYTOPENIA
- 1A



MEGAKARYOCYTE
Megakaryoblast



BLOOD CLOTTING



Injury

Tissue at the site of injury start producing —

THROMBOPLASTIN

(also produced by platelets)

through a
↓ cascade of rxn ↓

THROMBOKINASE

Ca^{2+}

Prothrombin
(inactive)

Thrombin
(active)

Fibrinogen
(inactive)

Ca^{2+}

FIBRIN
(active)

Black
clot
coagulum
formed

Blood platelets will aggregate here & start releasing more THROMBOPLASTIN



Extra gyan:

13 clotting factors present

① → Fibrinogen

② → Prothrombin

③ → Tissue thromboplastin

④ → Ca^{2+}

Note

Blood Bank

↳ They add
 Na^+/K^+ oxalate salts
in Blood

Ca^{2+} Binders

Bind with Ca^{2+} & not
allow CLOTTING



18.1.4 Coagulation of Blood

You know that when you cut your finger or hurt yourself, your wound does not continue to bleed for a long time; usually the blood stops flowing after sometime. *Do you know why?* Blood exhibits coagulation or clotting in response to an injury or trauma. This is a mechanism to prevent excessive loss of blood from the body. You would have observed a dark reddish brown scum formed at the site of a cut or an injury over a period of time. It is a clot or coagulum formed mainly of a network of threads called fibrins in which dead and damaged formed elements of blood are trapped. Fibrins are formed by the conversion of inactive fibrinogens in the plasma by the enzyme thrombin. Thrombins, in turn are formed from another inactive substance present in the plasma called prothrombin. An enzyme complex, thrombokinase, is required for the above reaction. This complex is formed by a series of linked enzymic reactions (cascade process) involving a number of factors present in the plasma in an inactive state. An injury or a trauma stimulates the platelets in the blood to release certain factors which activate the mechanism of coagulation. Certain factors released by the tissues at the site of injury also can initiate coagulation. Calcium ions play a very important role in clotting.