

Blood

→ Defn: A fluid that carries O_2 and nutrients to the tissue and take away \dot{O}_2 , CO_2 and waste products.

function:

- ① Transport O_2 and nutrients.
- ② Regulate fluid-electrolyte balance
- ③ Works as a buffer system.
- ④ Regulate body temperature.
- ⑤ Protection against pathogen.

Characteristics:

- ① Amount : 4-6 L
- ② Color: Arterial blood — bright red.
Venous blood — dull red.
- ③ pH : 7.35 - 7.45
- ④ Viscosity : 0.003 - 0.006 Nsm⁻²

Blood

- Plasma: 55% of total blood. ~~So~~ \approx 51% of its is water. Rest 4% have both organic and inorganic materials. Ex: O_2 , CO_2 , Blood protein (fibronogen, Prothrombin, Albumin, Globulin) etc. They transport nutrients, hormones, CO_2 as HCO_3^- .
- Blood cells: They are RBC, WBC and Platelet.

RBC

→ Red blood cell / Erythrocyte.

→ No nuclei when mature.

→ $4 \text{ Heme} + 2 \text{ Globin} \rightarrow$ Iron

Hemoglobin: ~~Heme~~ Heme (pigment) + Globin (protein)

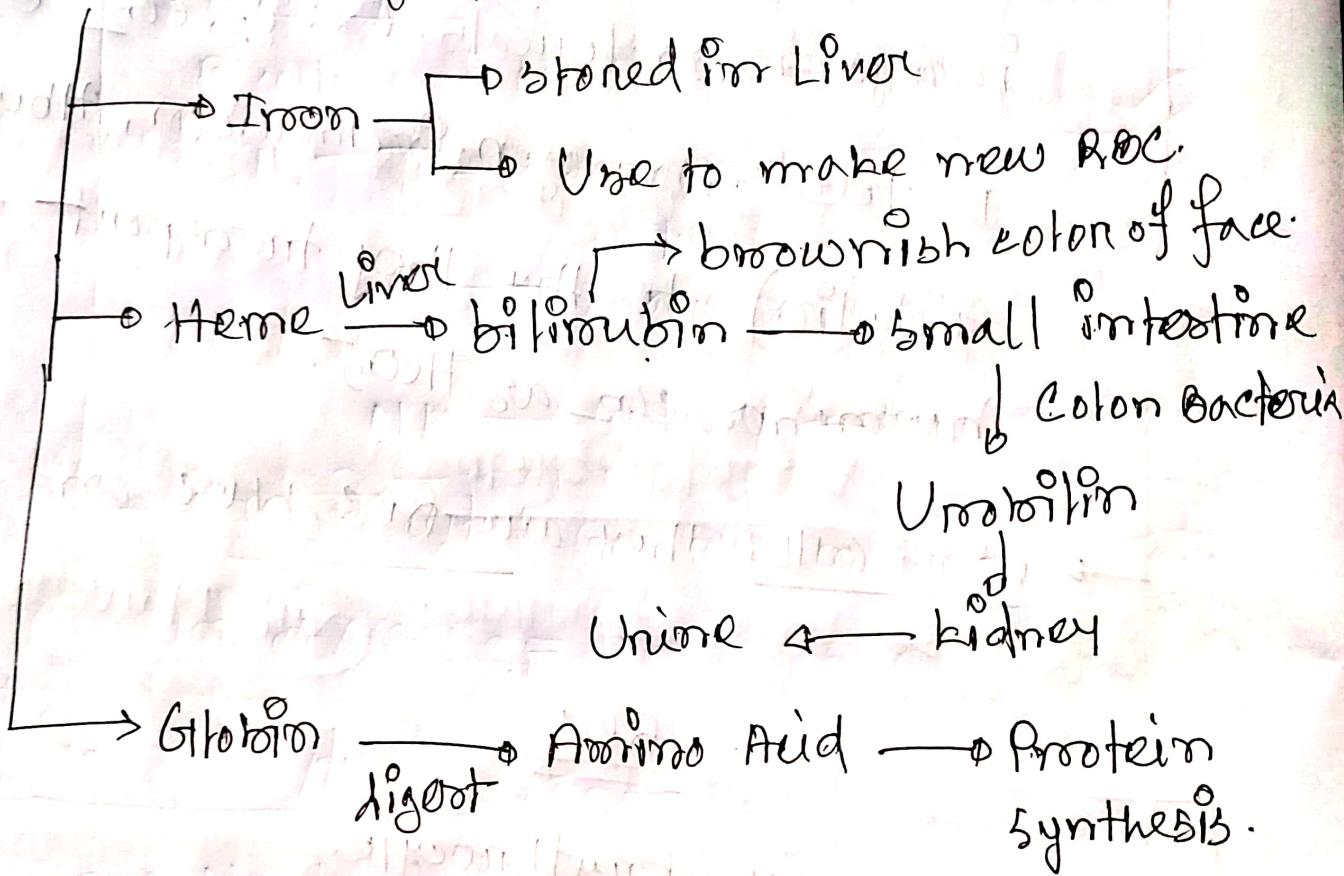
Red color of blood.
tissue

* Hypoxia (O_2 in ~~blood~~ body): hypoxia stimulates ~~the~~ kidney → produce erythropoietin → increase the rate of production of RBC in RBCM.

Life Cycle of RBC:

After 120 Days,

RBC \rightarrow phagocytosis by liver, spleen, RBCM



ABO Blood Group:

| Type | Antigen on RBC | Antibody on Plasma |
|------|-------------------|-----------------------|
| A | A | B |
| B | B | A |
| AB | A, B | |
| O | | A, B |

④ To donate blood, Antigen should be matched.

Type A receives Type B blood →

↓
Blood has anti-B that binds to B antigen in blood
thus, first clump & then ruptures.
may clot.
capillaries.

⑤ Rh blood Grouping: only has antigen, no antibody

⊕ → D antigen present

⊖ → D antigen absent

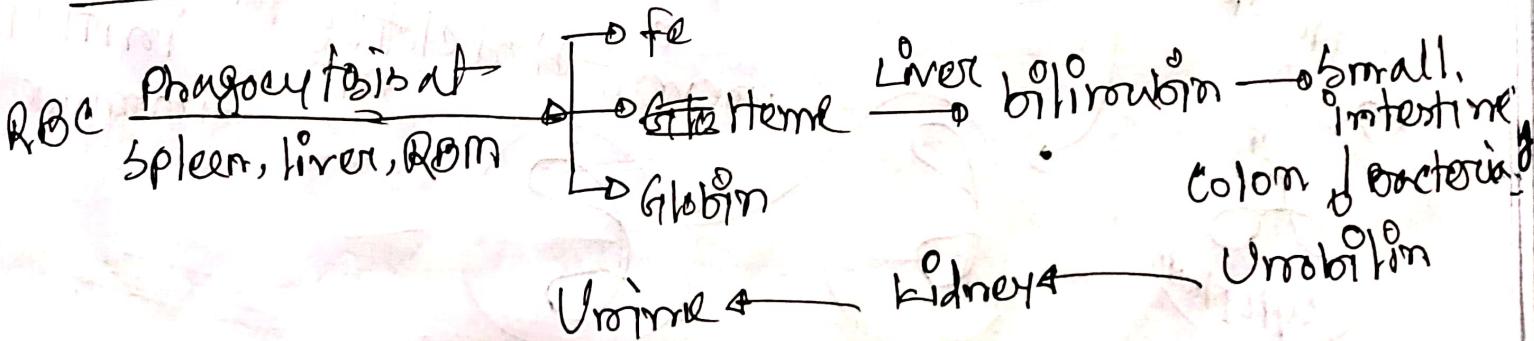
clag.
↑

clump → Rupture

O → No antigen → Both A & B antibody

A- → A-antigen → B antibody
No D antigen

⑥ Bilirubin formation:

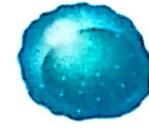


WBC : White blood cell / Aganulocyt

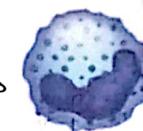
Aganulocyt



Monocyte



Lymphocyte



Basophil



Eosinophil



Neutrophil

○ Aganulocyt

→ Lymphocyte: ♂T bra

○ cells and NK (No

cell. T → roco.

Granulocyt

destroy

○ → becomes plasma cells.

NK → destroy free foreign cell mem-
brane

→ monocyte: becomes macro-

-phages. ♂T does phagocytosis.



○ Granulocyt:

pink

→ Neutrophil: phagocytosis

→ Eosinophil: Destroy allergic antibody

→ Basophil: produce heparin & histamine

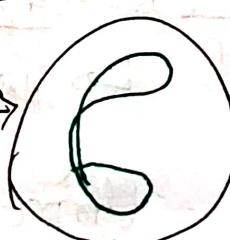
prevent blood clotting in vein

initiates
immune re-
sponse

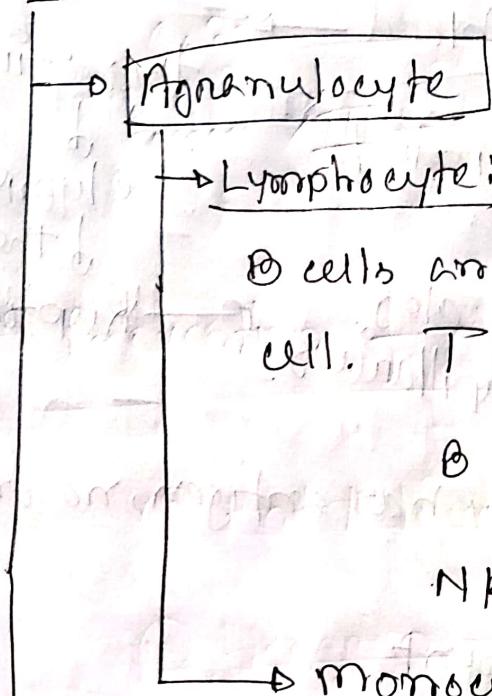
Neckless



cytoplasm



WBC: White blood cell / Leukocytes.



→ Lymphocyte: It has T cells,

B cells and NK (Natural killer)

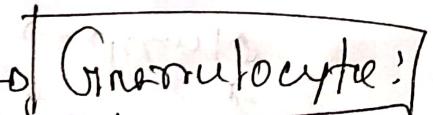
cell. T → recognize foreign antigen & destroy

B → becomes plasma cells.

NK → destroy free foreign cell membrane.

→ Monocyte: Becomes macro-

-phages. It does phagocytosis.



pink

→ Neutrophil: phagocytosis

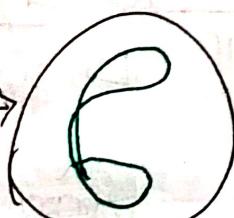
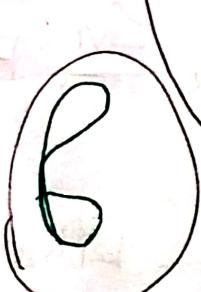
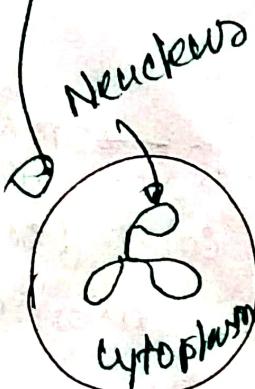
→ Eosinophil: Destroy allergic antibody

→ Basophil: produce heparin & histamine

prevent blood clotting

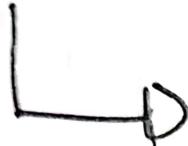
in vein

initiates immune response

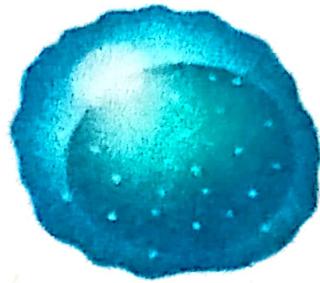


vector-illustration-monocyte-lymphocyte-eosinophil-260nw-1341259

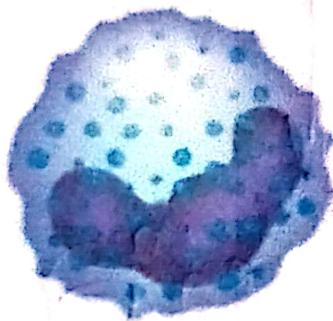
Abnormal WBC



Monocyte



Lymphocyte



Basophil



Eosinophil



Neutrophil

Granulocyte

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destroy free foreign cell mem -
-brane

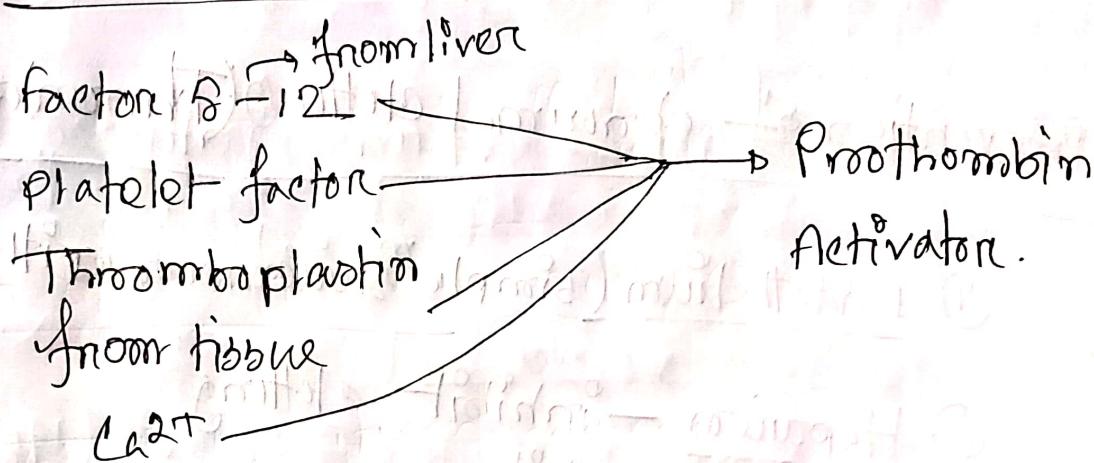
Becomes macro -

cyto.

Blood Clotting mechanism:

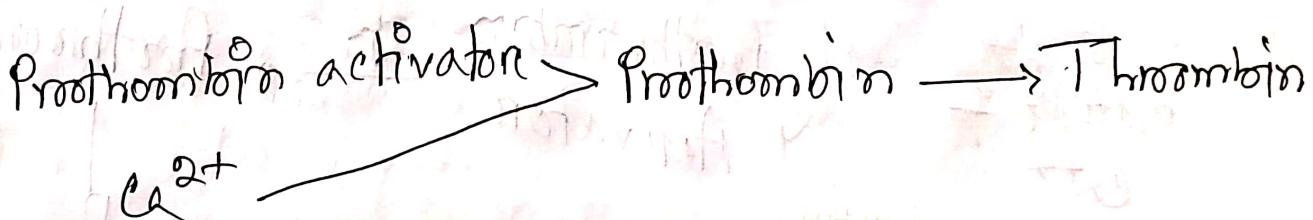
① Construction of blood vessel:

② Formation of prothrombin Activator:



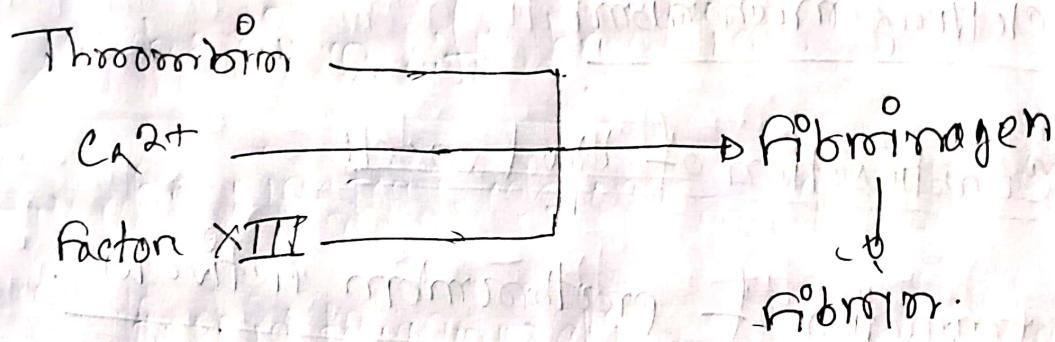
③ Conversion of Prothrombin to Thrombin: Prothrom-

- bin on factor II is inactive form of Thrombin.



④ Conversion of fibrinogen to fibrin: Fibrinogen

on factor I is converted to fibrin by thrombin. Fibrin monomer polymerises to form long fibrin threads that creates fibrin mesh trap called clot.



Prevention of abnormal clotting (Thrombosis):

① Endothelium (simple squamous epithelium)

② Heparin — inhibit clotting
↳ Endophil

③ Antithrombin — formed by liver; inactivates excess thrombin.

(I)

Fg-12
Platelet f
 Ca^{2+}

Thromboplastin

Prothrombin
Activator

$\xrightarrow{\text{Ca}^{2+}}$

(II)

Prothrombin

(III)

Thrombin

fibrin $\xleftarrow{\text{Cat}^{2+}}$ fibrinogen

$\xleftarrow{\text{Cat}^{2+}}$

Polymer → mesh → clot