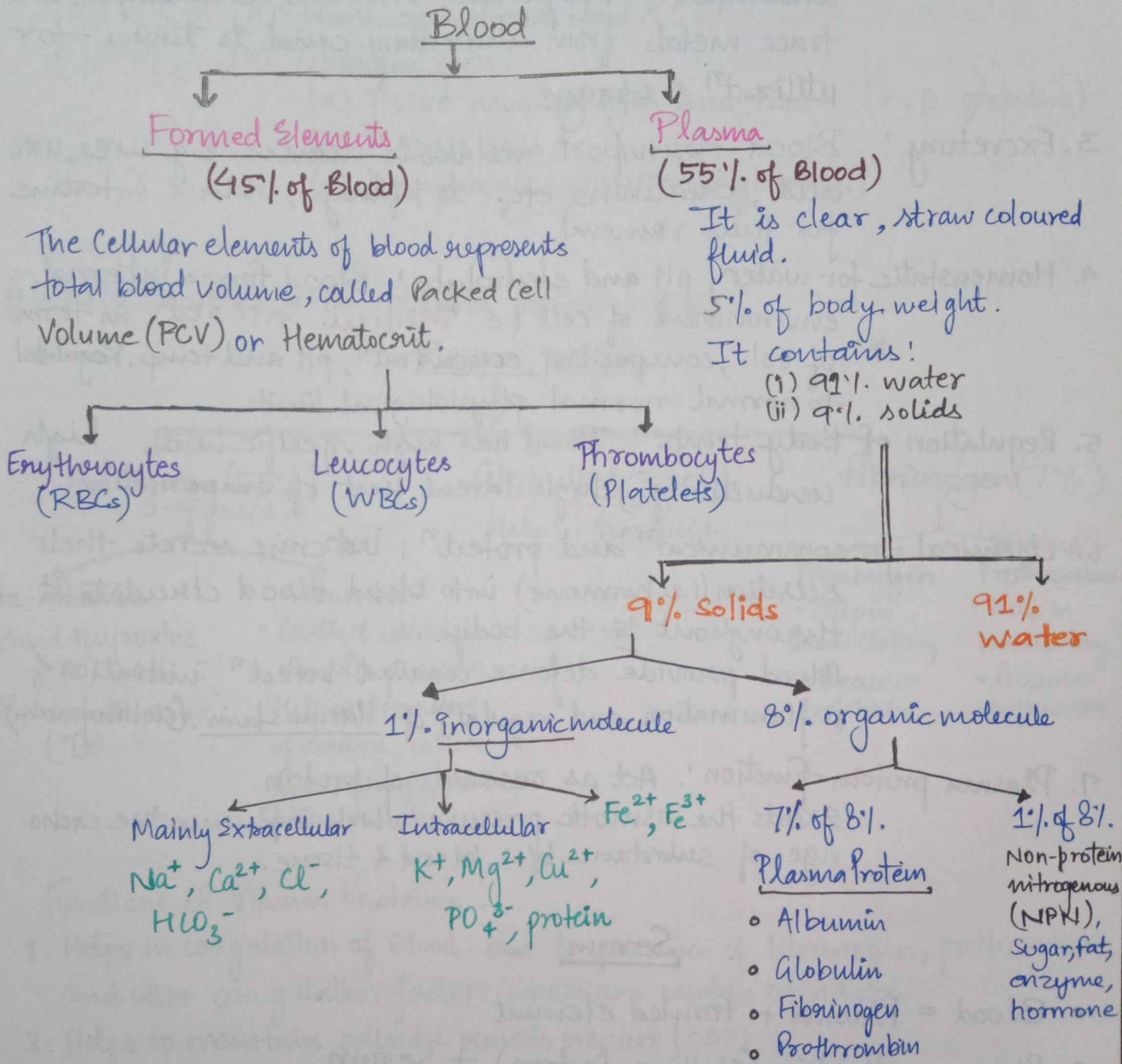


# [Unit - II Blood]

## Q Composition Of Blood. (5M)

- Total Blood Volume : 5-6l (8% of body weight or 80ml/kg)
- pH:  $7.4 \pm 0.05$  (alkaline)



## Q Functions OF Blood (5M)

1. **Respiratory**: Blood transport oxygen from lungs to the tissues and  $CO_2$  from tissue to the lungs.
2. **Nutritive**: Blood conveys absorbed food materials, glucose, amino acid, fatty acids, vitamins, electrolytes and trace metals from alimentary canal to tissues for utilization & storage.
3. **Excretory**: Blood transport metabolic wastes. e.g. urea, uric acid, creatinine etc.. to kidney, skin & intestine for their removal.
4. **Homeostatic for water, pH and electrolyte**: Blood forms internal-environment of cell i.e. **Millieu Interieur** in terms of vol., composition, concentration, pH and temp. Regulated to normal physiological limits.  
\* of vol., composition, concentration, pH and temp. Regulated to normal physiological limits.
5. **Regulation of Body temp.**: Blood has high specific heat, high conductivity, high latent heat of evaporation.
6. **Chemical for communication and protection**: Endocrine secrete their secretion (i.e. hormone) into blood. Blood circulate it throughout the body.  
Blood provide defense against infection, initiation of inflammation and regulation of Haemostasis. (clotting mech.)
7. **Plasma protein function**: Act as reservoir of protein.  
Exerts the osmotic pressure which influence the exchange of substance b/w blood & tissue.

### Serum

- Blood = Plasma + formed element
- Plasma = Protein (clotting factors) + Serum
- Serum = Plasma - Clotting factor.
- when plasma do not contain clotting factor, it is called serum.

## • Origin of plasma protein

1. In Embryo: **Mesenchymal cells** through secret<sup>n</sup> or dissolut<sup>n</sup> of their substance, form plasma proteins.

1<sup>st</sup> Albumin synthesized and then rest of protein.

2. In Adult: (i) Albumin from liver mainly.

(ii) Fibrinogen from liver.

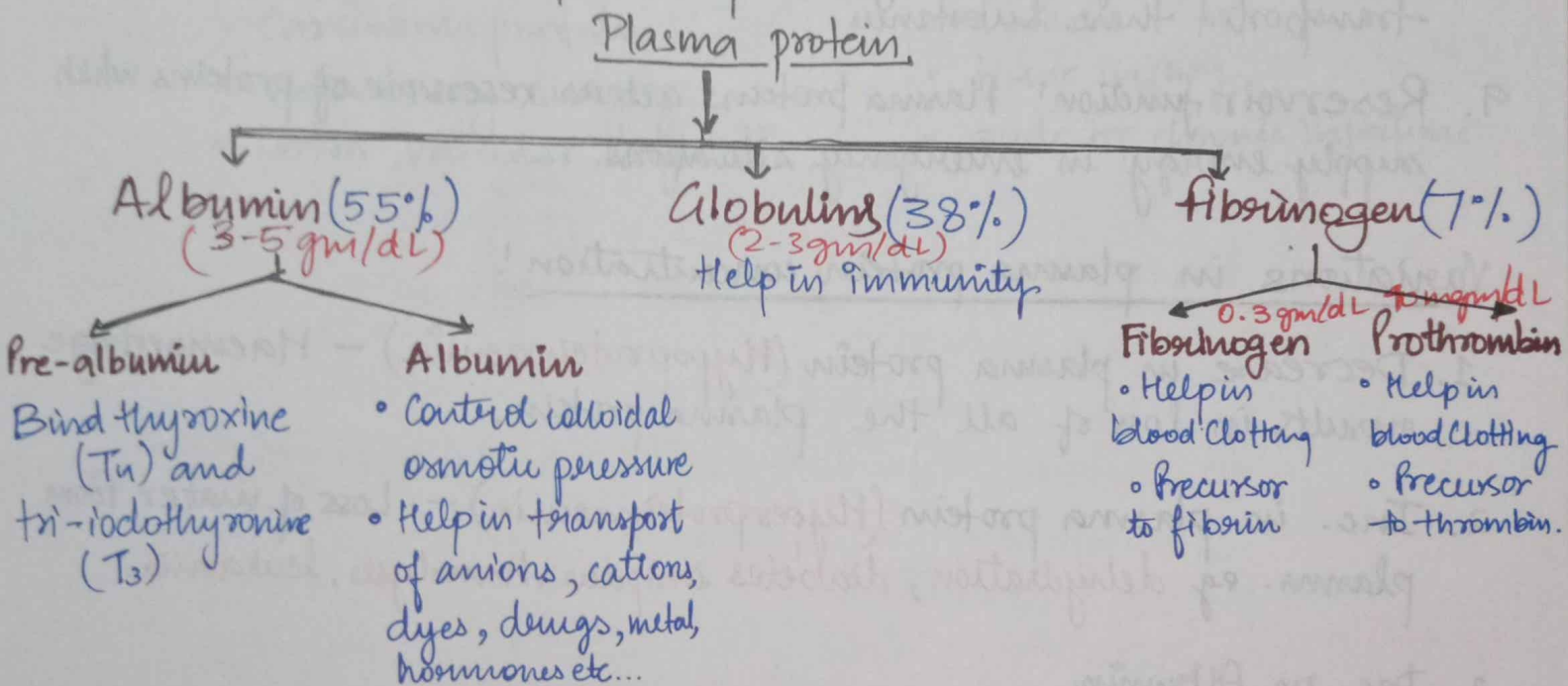
(iii) Globulin from:

(a) Tissue macrophages and liver. ( $\alpha, \beta$ -globulins)

(b) Plasma cells.

(c) Lymphocyte synthesis. ( $\gamma$ globulins)

Q Write short note on plasma protein. (5M)



## Functions of Plasma Proteins:

1. Helps in coagulation of Blood: due to presence of fibrinogen, prothrombin and other coagulation factors which are protein in nature.
2. Helps to maintain colloidal osmotic pressure (COP)

3. Helps in maintaining viscosity of blood.

Viscosity of protein depend on (i) the shape of protein molecules  
(ii) the size of protein molecules

4. Help in maintaining systematic arterial blood pressure constant.  
Plasma proteins maintain the bp constant by maintaining viscosity of blood.
5. Provide stability to blood due to presence of globulin and fibrinogen.
6. Help in maintaining acid-base balance in body. Plasma proteins acts as buffers. Plasma provide  $\frac{1}{6}$ th of total buffering capacity.
7. Immune function: Globulin protein (i.e.  $\gamma$ -globulin produce antibodies) which provide immunity to body.
8. Transport function: Plasma proteins loosely combine with many substances. e.g. **iron, thyroxine, steroid hormones** and then transported these substances.
9. Reservoir function: Plasma proteins act as reservoir of proteins which supply energy in emergency situations.

### Variations in plasma protein concentration!

1. Decrease in plasma protein (**Hypoproteinaemia**) - Haemorrhage results in loss of all the plasma protein.
2. Inc. in plasma protein (**Hyperproteinaemia**) - Loss of water from plasma. eg **dehydration, diabetes insipidus, hemolysis, leukaemia**.

### 3. Dec. in Albumin

Physiological dec in albumin ~~dec~~ in infancy and newborns because of hepatic immaturity.

- Pregnancy (during 1<sup>st</sup> 6 month) - Globulins dec.

### Pathological

Impaired protein syn. due to:

- Hepatitis
- Cirrhosis of liver
- Chronic disease
- Malabsorption

Excessive loss due to!

- Burn
- Nephrosis (inc. loss of albumin in urine)

@surgeon911

4. Inc. in Albumin (i) Dehydration  
(ii) Congestive cardiac failure
5. Inc. in  $\gamma$ -globulin due to extensive tissue destruct<sup>n</sup>,  
(i) Multiple myeloma  
(ii) Tuberculosis, lymphatic leukaemia  
(iii) Cirrhosis of liver and acute hepatitis  
(iv) Nephritis.
6. Dec. in  $\gamma$ -globulin (i) Nephritis  
(ii) Hypogammaglobulinaemia

### 7. Fibrinogen

- | <u>Decrease</u>  | <u>Increase</u>   |
|--|---|
| <ul style="list-style-type: none"> <li>• Congenital (rare)</li> <li>• Carcinoma prostate</li> <li>• Pulmonary surgery</li> <li>• intra-vascular coagulati<sup>n</sup></li> </ul> | <ul style="list-style-type: none"> <li>• Pregnancy, menorrhagia</li> <li>• malaria</li> <li>• tissue injury</li> <li>• acute or chronic infections</li> </ul> |

