PLASMA PROTEINS

Normal conc :- 6·4 - 8·3 gm/dL

① Albumin

② Globulin
- α-globulin (α_1 ; α_2)
- β-globulin (β_1 ; β_2)
- γ-globulin (γ_1 ; γ_2)

③ Fibrinogen

④ Prothrombin

GLOBULINS

▶ Produced by :-
- Tissue macrophages of Liver ; Spleen ; Bonemarrow (α, β)
- Plasma cells (γ)

▶ Forms of globulins & functions :- [GLITCH in AC]

1.) Glycoproteins
2.) Lipoproteins (· HDL , LDL , VLDL , chylomicrons) → Lipid metabolism
3.) Immunoglobulins → γ-globulins :- Humoral immunity
4.) Transferrin → Iron binding
5.) Ceruloplasmin → Copper binding
6.) Heamagglutinins → Antibodies against red cell antigens

7.) Angiotensinogen :- BP regulation

8.) Coagulation factors :- clotting

FIBRINOGEN

- Precursor of fibrin
- Helps in blood clotting
- Produced by liver

PROTHROMBIN

- Precursor of thrombin
- Helps in blood clotting
- Produced by liver

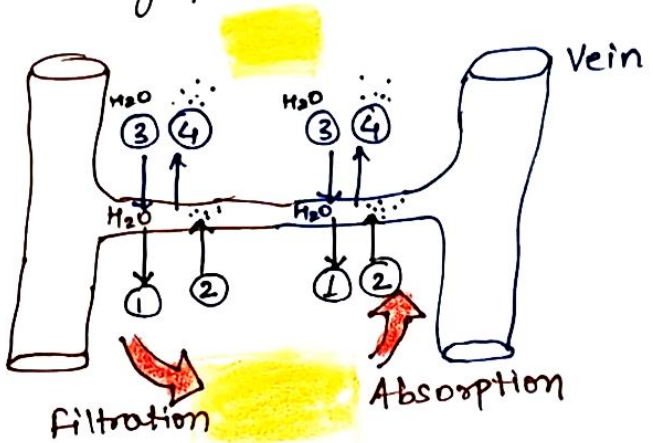
ALBUMIN

- Maximum (55%)
- Smallest (M.wt :- 69,000)
- Produced by liver
- Functions :- PREALBUMIN ⇒ Binds T_3 & T_4

  ALBUMIN ⇒ * Maintains colloidal osmotic pressure**

  * Acts as Binding & carrier proteins

✡ Concept of Starling forces



C.O.P. d/t plasma colloids is aka Oncotic press.

Excess is cleared by lymphatics

Starling forces :-

1. Hydrostatic pressure (capillary) (P_c)
2. Osmotic pressure (capillary) (π_c)
3. Hydrostatic pressure (Interstitial fluid) (P_{if})
4. Osmotic pressure (interstitial fluid) (π_{if})

Arterial end :-

$P_c = 30$
$P_{if} = -3$
$\pi_c = 28$
$\pi_{if} = 8$

Net = $30 + 3 + 8 - 28$
= $+13$ mmHg

∴ Net filtration @ arterial end

Venous end :-

$P_c = 10$
$P_{if} = -3$
$\pi_c = 28$
$\pi_{if} = 8$

Net = $10 + 3 + 8 - 28$
= -7 mmHg

∴ Net absorption @ venous end

Clinical correlation :-

Case of Hypoproteinaemia (esp. Hypoalbuminaemia)
generally seen in

- Kidney disease (d/t leakage)
- Liver disease (d/t defective production)
- Malnutrition (d/t ↓ intake)

⇓

Filtration >> Absorption ⇒ EDEMA

Functions of Plasma Proteins :- ***

1. Maintains colloidal osmotic pressure :- Albumin
2. Immune function :- γ-globulin
3. Transport function
   - Hormones
   - Drugs
   - Metals (Iron, Copper) :- Ceruloplasmin, Transferrin
4. Coagulation of blood :- Fibrinogen, Prothrombin
5. Viscosity of blood :- Fibrinogen, Albumin
6. Reservoir function
7. Arterial BP maintainence [d/t viscosity of blood]
8. Acid base balance / Buffer
9. Stability of blood :- Globulin, Fibrinogen
   - Loss of stability → Rouleaux formation of RBC (RBC pile one over another)