PLASMA PROTEINS

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INTRODUCTION

- Plasma : It is a clear liquid part of blood, Which contains **91-92%** of water and **8-9%** of gases & solied substaces.

- There are some major proteins which present in plasma like:
  - Serum Albumin
  - Serum Globulin

  } Present in Serum
  - Fibrinogen
  - Prothrombinogen

- In Serum,There is deficiency of Fibrinogen.

Normal Value

- Content: Normal value of plasma proteins is 6-8 g/dl

Plasma Proteins	Value (g/dL)
Serum Albumin	4.7
Serum Globulin	2.3
Fibrinogen	0.3
Total Value	7.3 (approximately 6-8%)

- A/G Ratio: It is important indicator of some disease of liver,kidney…etc
- If, it increase- kidney disease
  Infection
  Thyroid disease
- If, it decrease- Hepatitis B
  Hepatitis C
  HIV/AIDS

(Swelling
Dried skin
Hair loss
Diarrhrea/Vomiting
Dehydration)

Properties of Plasma Protein

1. Molecular Weight: Molecular weight of plasma protein is respectively

   - **Albumin<Globulin<Fibrinogen**
     (68,000) (1,58,000) (4,00,000)

2. Pressure: Plasma proteins is mainly responsible for Blood Pressure.
   All of plasma proteins, Fibrinogen Plays major role in blood pressure

   Value: 25 mm-Hg

3. Specific Gravity: 1.026

4. Water Solubility: There are soluble in water cause of polar residues like –NH2 & -COOH are present.

Properties of Plasma Protein

5. Buffer Action: It has Amphoteric nature because of NH2 & -COOH . It act as efficient buffer.

6. Electrophoretic Mobility: It act as ions in Alkaline solution & cation in Acidic solution.
Because of this properties, they posses electrophoretic mobility.

Functions of Plasma Proteins

1. Expert Osmotic pressure: Protein molecules are unable to pass capillary membrane. So, they excreat 25mm-Hg colloid pressure on membrane…out of them 70-80% pressure is given by Albumin fraction.

   - Colloid Osmotic pressure plays an important role in exchange of water between Blood & Tissue fluid.

2. Coagulation of Blood : Mainly Fibrinogen and Prothrombinogen plays important Role in coagulation of blood.

3. Defence Mechanism : γ *Globulin* plays important role in immune system. it defence body from microorganism

4. Acid-Base Balancing : Plasma protein plays important role in balancing pH.
   In Acidic pH: NH_3 act as base and forms NH_4
   In Basic pH: COOH act as Acid and forms COO^-

Functions of Plasma Proteins

5.Transport: Plasma proteins are essential for transport of various substances in Blood.

- Albumin, Globulin (alpha,beta) are responsible for transportation of enzymes,hormons……
- α & β *Globuline are used in Iron transportation.*

6. Viscosity: Plasma proteins provides viscosity to blood, which is important in Blood Pressure.
Mainly Viscosity is Provide by Fibrinogen cause of molecular weight is highest.

7. Role in genetic info.: Many plasma proteins exhibit polymorphism.

8. Role as reserve proteins: Plasma proteins serve as reserve protein.

-It is utilised by Body tissue During: Fasting
Inadequate protein intake
Excessive catabolism of body proteins.

Functions of Plasma Proteins

9.Role in production of trephone substances: trephone substances promotes the growth of cell. There are necessary to nourishment of tissue cell in culture.

10. Role in ESR: Globulin & Fibrinogen accelerate the tendency of roulex formation by RBC, Which is responsible for ESR

Origin

- In Embryo:

  - In Embryo, It synthesized by mesenchyme cells
  - Firstly, Albumin is synthesized.

- In Adults:

  - In Adults it synthesized in mainly- Reticuloendothelial cell of liver
    - Spleen
    - Bone merrow
    - General tissue cell.

Albumin & Globulin – Liver
α & β Globulins - Liver,Spleen
γ Globulins - B-Lymphocytes

Plasmapheresis

- Plasmapheresis is also known as “Whipple’s Experiment”.
- This experiment was done to demonstrates the importance of Plasma Proteins.
- DOG: Blood Is removed completely washed in saline and re-infused into the body with a solution.
- Due to lack of proteins ,the animal undergoes the state of shock.If animal fed with diet containing proteins the normal level of Plasma Proteins are restored.

-These are synthesized by liver of dog.
-After removal of liver, the shock persist and animal lead to death…

Importance: *Plasma Proteins are essential for survival.*
Plasma Proteins are mainly synthesized by liver.

THANK YOU