كلية الصيدلة
Faculty of Pharmacy

LIMU

# Plasma Proteins

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# Plasma Proteins

**Plasma proteins**, are present in blood. They serve many different functions, including **transport of lipids, hormones**, **vitamins** and **minerals** in activity and functioning of the Other blood proteins act as, complement components.

# Types oF Plasma Protein

01

Albumin

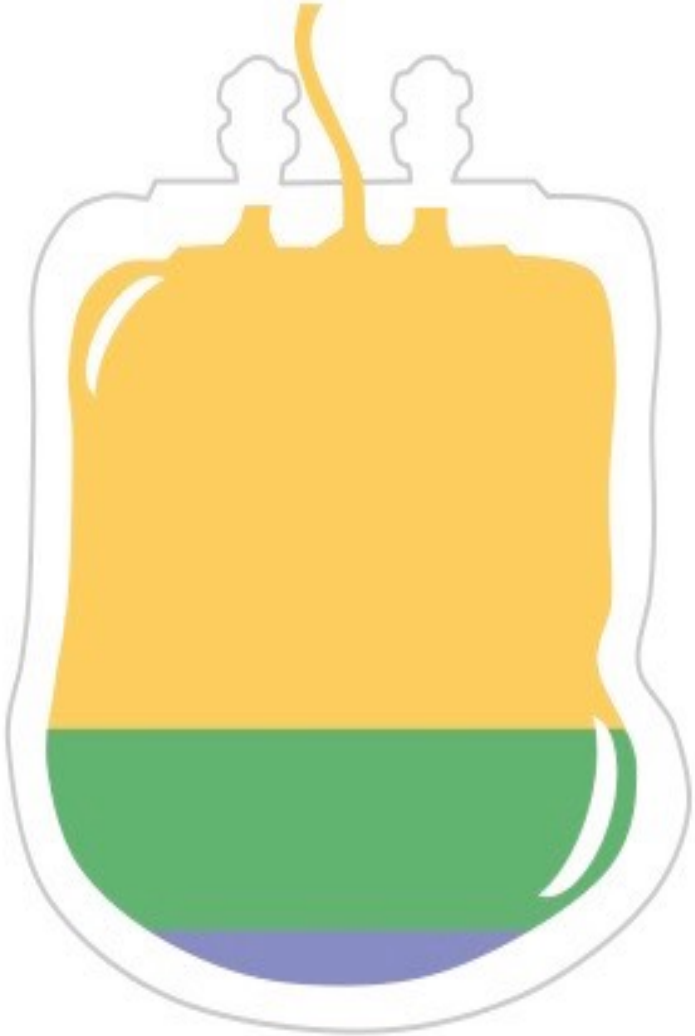
02

Fibirnogens

03

Globulins

- Albumins regulate the osmotic pressure of the blood.
- Globulins participate in the immune system & transporting proteins.
- Fibrinogens are involved in the clotting process.



## Major Types:

**Albumin** *(60%)*

Major component of osmotic pressure of plasma

**Globulins** *(35%)*

Antibodies (immunoglobulin) and transport proteins

**Fibrinogens** *(4%)*

Functions in blood clotting

**Other** *(<1%)*

Various roles (α-1-antitrypsin, coagulation factors, etc.)

# Plasma Synthesis

Serum or plasma proteins are primarily synthesized in the **liver** a smaller percentage due to immunoglobulins is produced by **lymphocytes** and **plasma cells.**

# Normal Range of each Protein

| | Low | Normal | High |
|---|---|---|---|
| **Albumin** | Less than **3.4** g/dl | **3.4** to **5.4** g/dl | More than **5.4** |
| **Globulin** | Less than **2.0** | **2.0** to **3.5** g | More than **3.5** |
| **Fibrinogen** | Less than **2.0** | **2.0** to **4.0** g/L | More than **4.0** |

# Why Plasma Protein Levels Should Be Normal

**Higher-than-normal protein levels are associated with**

- bone marrow disorders
- infections
- Inflammation

**Lower-than-normal plasma protein levels may indicate:**

- severe malabsorption of nutrients
- kidney or liver disease
- bowel problems

**Plasma protein binding** refers to the degree to which medications attach to proteins within the blood.
A drug's efficiency may be affected by the degree to which it binds.
The less bound a drug is, the more efficiently it can traverse cell membranes or diffuse.

# Plasma – Drug bound Explaintion

A drug in blood exists in two forms **bound and unbound**. Depending on a specific drug's affinity for plasma protein, a proportion of the drug may become bound to plasma proteins, with the remainder being unbound. If the protein binding is reversible, then a **chemical equilibrium** will exist between the bound and unbound states,

the unbound fraction which exhibits pharmacologic effects. It is also the fraction that may be metabolized and/or excreted. For example, the "fraction bound" of the anticoagulant warfarin is 97%. This means that of the amount of warfarin in the blood, 97% is bound to plasma proteins. The remaining 3% (the fraction unbound) is the fraction that is actually active and may be excreted

Protein binding can influence the drug's biological half-life. The bound portion may act as a reservoir or depot from which the drug is slowly released as the unbound form. Since the unbound form is being metabolized and/or excreted from the body, the bound fraction will be released in order to maintain equilibrium.

# Summary

- **Plasma proteins**, such as albumin and globulin, that help maintain the colloidal osmotic pressure at about 25 mmHg. Electrolytes like sodium, potassium, bicarbonate, chloride, and calcium help maintain blood pH. Immunoglobulins help fight infection and various other small amounts of enzymes, hormones, and vitamins

- The majority of **plasma proteins** are **synthesized** and secreted by the liver, the most abundant being albumin

- The normal serum protein level is 6 to 8 g/dl. **Albumin** makes up 3.5 to 5.0 g/dl, and the remainder is the total **globulins**.

- **Protein binding** influences the **bioavailability** and distribution of active compounds.

# References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# THANK YOU!