Biochemistry

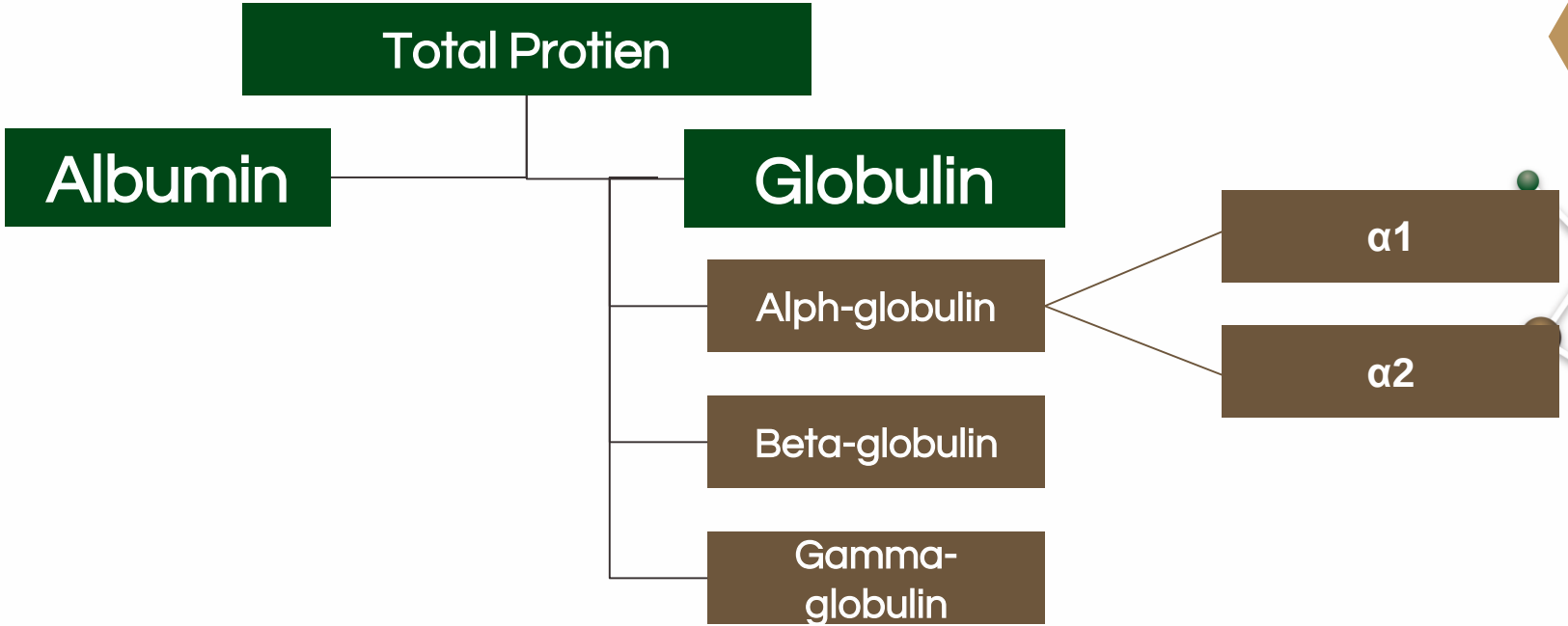
Second Semester

3rd Stage

Serum Total Protein

Serum total protein refers to the measurement of all proteins present in the blood serum, including the major proteins albumin and globulins. These proteins play critical roles in maintaining osmotic pressure, transporting nutrients, and supporting immune function. A serum total protein test is used to evaluate nutritional status and help diagnose various conditions such as liver and kidney diseases, immune disorders, and protein loss conditions.

Normal reference values typically range between **6.0** to **8.3 g/dL**, although the exact range may vary depending on laboratory standards.


Total Protien
Albumin
Globulin
Alph-globulin
α1
α2
Beta-globulin
Gamma-globulin

Functions

Maintaining osmotic balance

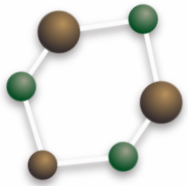
Proteins help retain water within the bloodstream.

Transport of substances

Albumin and other proteins bind and carry hormones, vitamins, and drugs.

Immune response

Globulins, including immunoglobulins (antibodies), play a vital role in defending against infections.



Enzymatic and structural roles

Some proteins act as enzymes or structural

Importance

Diagnostic Tool: Total protein levels are used to evaluate overall health, nutritional status, and the presence of medical conditions.

Disease Diagnosis: Abnormal protein levels can indicate liver disease, kidney dysfunction, immune disorders, and protein-wasting conditions.

Monitoring Therapy: It helps track the progression of certain diseases and the effectiveness of treatments.

Many proteins including albumin, fibrinogen and most globulins are formed in the liver. The technical methods used for separation serum protein types are :

1. **Salt fractionation**
2. **Electrophoresis**
3. **Ultracentrifugation**
4. **Chromatography**
5. **Gel filtration**
6. **Immun chemical analysis**

Clinical Significance

A-Hyperproteinemia

- Dehydration
- Multiple myeloma
- Cirrhosis of liver
- Certain chronic diseases
- Drugs
- Exercise

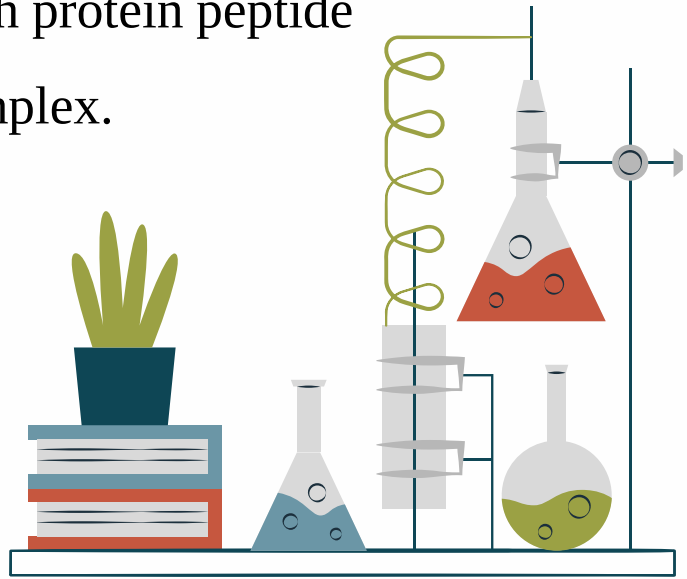
B-Hypoproteinemia

- Over hydration
- Kidney diseases
- Severe burns
- Sever malabsorption
- Fever.
- Extensive bleeding
- Necrosis
- Sever protein deficiency (protein starvation)
- Drugs
- Increase requirement as in growth

Estimation of Serum total protein

Principle:

Cupric ions, in an alkaline medium interact with protein peptide bonds resulting in the formation of colored complex.



Estimation of Serum total protein

Principle:

Cupric ions, in an alkaline medium interact with protein peptide bonds resulting in the formation of colored complex.

Procedure:

	Reagent blank	Standard	Sample
D.W	0.02 ml	--	--
Standard Protein (6 g/l)	--	0.02 ml	--
Serum	--	--	0.02 ml
Biuret reagent	1 ml	1 ml	1 ml

Mix and incubate for 30 min at 20-25C° Measure absorbance of the sample and standard reagent blank.

Thank you