)The Ten Experiment:

SERUM PROTEIN

Origin and occurrence :

Proteins are always produced in nature by living matter and chiefly by plants.

Animals may eat proteins and transform them into other types of proteins but animals have limited powers to synthesis proteins.

Proteins occur in living matter or are associated with living things. They constitute a large part of the solid matter of muscles , tendon, ligament, cartilage and blood.

Sources:

1. Dietary : egg , milk and meat.
2. Synthesized in the liver except globulin.

Chemical nature :

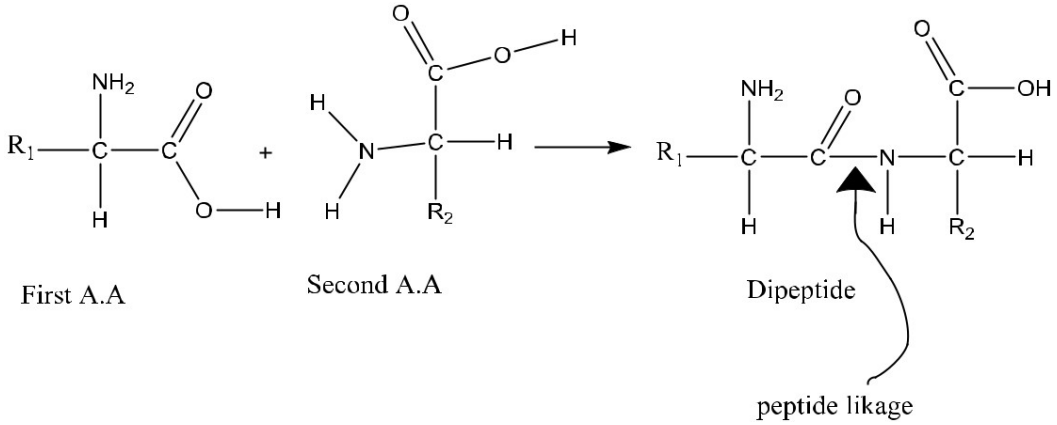
Proteins constitute that class of biochemical compounds and it's are organic compounds containing :

C (52 %) , H (7 %) , O (23 %), N (16 %) , P , S and iodine are also elementary constituents of some proteins.

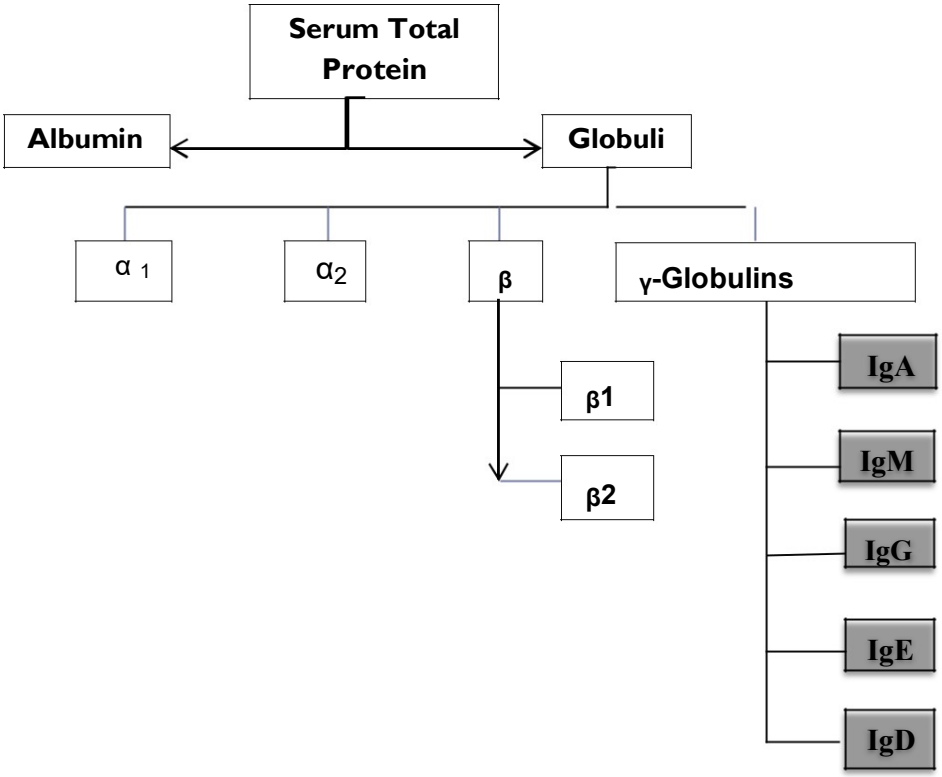
The building units or structural units of which proteins are composed are Alpha-amino acids. Some 40 to 50 different A.A have been isolated from various proteins but only 20 are present in all proteins in varying amounts.

These amino acids are linked together by peptide bonds into long chains, which contain from 50 to many thousands of A.A .

- The molecular weight (6000 – 40000000) A.A.



Classification of serum total proteins:



Laboratory Techniques Used For The Separation And Proteins Classification :

1. Salt or solvent fractionation.
2. Electrophoresis.
3. Ultracentrifugation.
4. Chromatography.
5. Gel filtration.
6. Immunochemical analysis.

Clinical significance:

- **Hyperproteinemia:**
  1. Dehydration.
  2. Multiple myeloma due to formation of myeloma protein.
- **Hypoproteinemia:**
  1. Nephrotic syndrome. 2. Malnutrition.
  3. Burns. 4. Chronic liver disease.

Principles Of Kit Method:

The peptide bonds of protein react with Cu^{+2} in alkaline solution to form a colored complex which absorbance , proportional to the concentration of total protein in the specimen is measured at 550 nm . The biuret reagent contains sodium-potassium tartrate to complex cupric ions and maintain their solubility in alkaline solution.

Procedure:

Let stand reagent and specimen at room temperature.

	blank	standard	Sample
Reagent R1	1 ml	1 ml	1 ml
Reagent R2	1 ml	1 ml	1 ml
Standard	--	20 µl	--
specimen	--	--	20 µl

Mix well and let stand for 10 min at R.T .

Record absorbance at 550 nm (530-570)nm against reagent blank.

Calculation:

Result = ————

Normal value :

Albumin = 4.0 – 5.5 g/dl

Globulin = 2.2 – 2.7 g/dl

Total protein = 6.2 – 8.2 g/dl