Al-Mustaqbal University College
Department of Medical Device Technologies Engineering
Stage: 2 nd
Clinical Chemistry.
Lec. No.: 14

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The laboratory techniques used for separation proteins:

1.. Salts or solvent fractionation: it is depending on change in solubility of protein so albumin soluble in sodium sulphite while globulin will precipitate.

2. Ultracentrifugation: depend on variation in molecular mass and molecular shape for proteins, when rotate with high velocity then will be separate each individually.

3. chromatography: depend on the difference in size, shape, electric charge and the rate of flow protein through chromatography media.

4. Immunochemical analysis: is technique used for identification and analyze protein (antigen and antibody), it include Eliza

5. Electrophoresis.: it is mostly used, depend on its diffusion velocity in the electrical field to the difference of electrical charge density on the protein surface**.**

Measurement of protein:

Electrophoresis : Serum protein electrophoresis (SPEP) is a screening test that measures the major blood proteins by separating them into **five distinct fractions: albumin, alpha1, alpha2, beta, and gamma proteins**.

Purpose: Protein electrophoresis is used to diagnose a variety of diseases, such as cancer, intestinal or kidney protein-wasting syndromes متلازمه امراض الكلى, disorders of the immune system, liver dysfunction (ضعف الكبد)

The normal values:

Albumin = 4- 5.5 g/100ml serum

Globulin = 2.2 2.7 g/100 ml serum

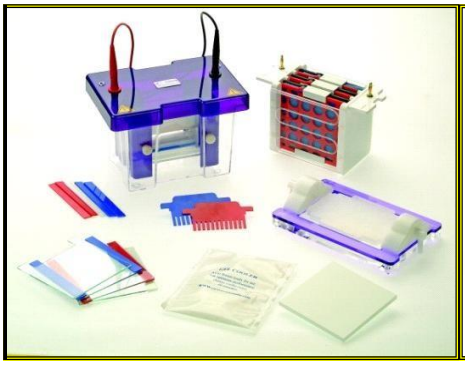
Total protein = 6.2 8.2 g/100 ml serum

Electrophoresis components:

1. Two plastic tank for 500 ml of buffer solution with pH 8.6
2. Supporting medium (Poly acrylamide-gel)
3. Electrical electrode ,micropipette and combs

4. Power supply unit
5. Staining solution
6. Washing solution
7. Scanner

The principle of this test is : Proteins carry a positive or a negative electrical charge, and they move in fluid when placed in an electrical field and applying power supply with 200 mv and 10-15 mA for 45 min. Serum protein electrophoresis uses an electrical field to separate the proteins in the blood serum into groups of similar size, shape, and charge.



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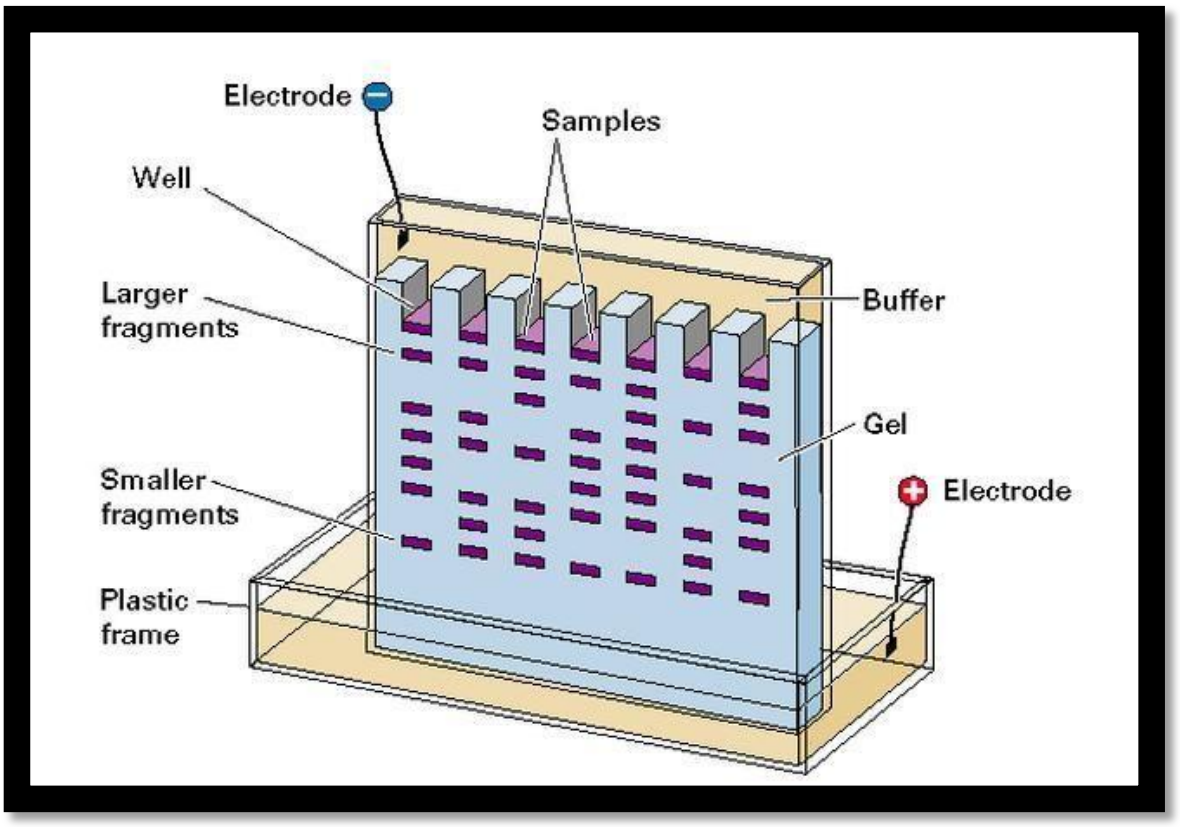
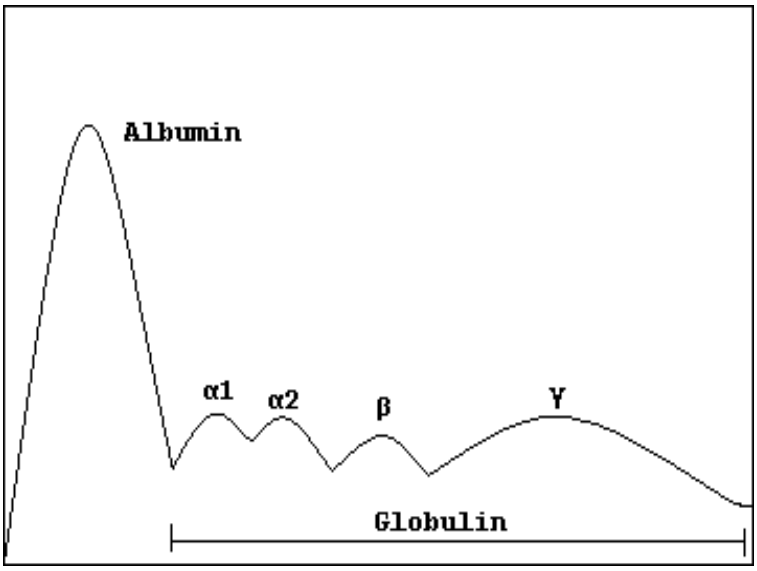
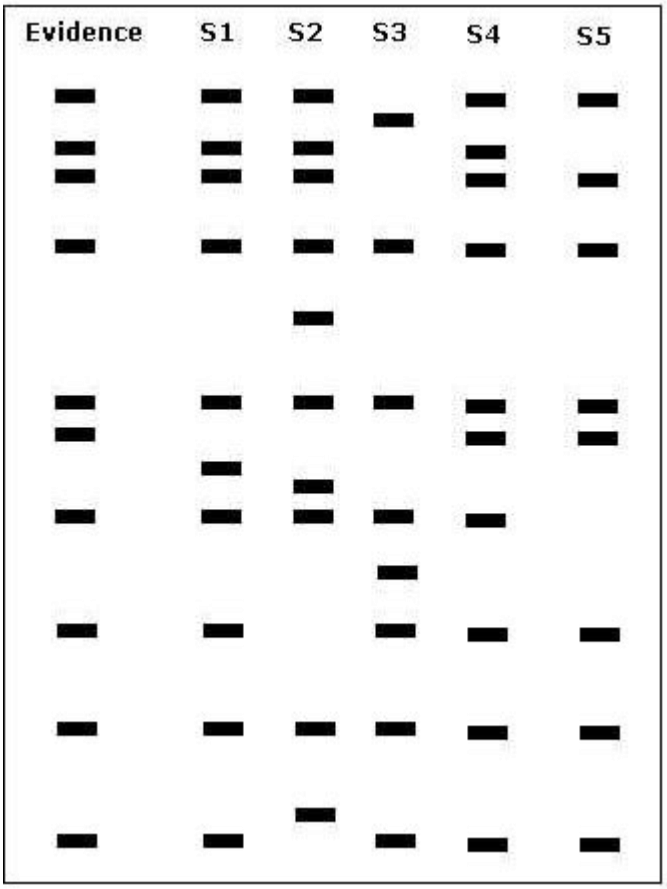
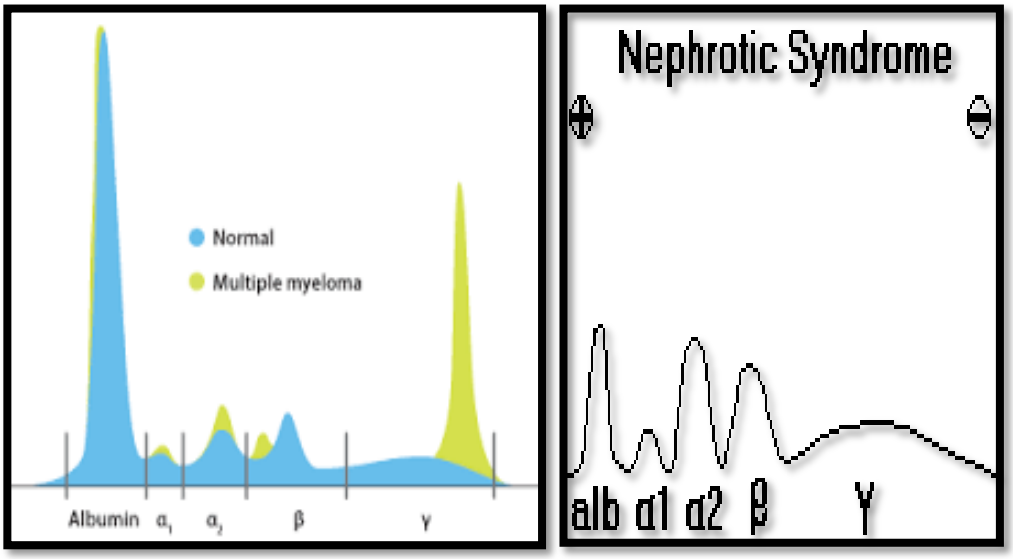




The normal value of protein separation



Separation of protein for different sample



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