Changes in Serum Protein Levels

Changes in serum protein levels are Dysproteinaemia and Paraproteinaemia.

Electrophoresis and other tests of serum proteins

The basic screening examination is the **electrophoresis of serum proteins**. A drop of serum is put onto the electrophoretic agarose gel and spread across the "starting line". It is then subjected to the electric field in a buffer-filled box. Thus, the strip with electrophoretic gel can become part of an electric circuit. Electric field causes the proteins to move in the gel. Different proteins travel through the gel with different speed and thus cover various distances from the origin during the given amount of time (generally half an hour). The speed depends on the size of the molecules (the bigger the molecule the slower the movement - this is due to the bigger resistance of the gel to the movement) and electric charge (more charged molecules travel faster due to bigger electric force acting on them). Thus, a protein or a group of proteins makes bands (or peaks) with maximum at the given distance from the origin. After fixation and staining, the amount of protein in individual bands is determined by absorption photometry. Concentrations of individual serum protein can be also assessed, using various separation and analytic methods.

Electrophoresis divides serum proteins into **following bands:**

- **Albumin:** Covers the greatest distance, because its molecules are relatively small and carry significant negative charge in alkalic pH (at which serum protein electrophoresis is undertaken).
- **α_1-globulin:** Within this fraction is α_1-antitrypsin, high density lipoprotein (HDL), thyroxine binding protein (TBG) and many acute phase proteins.
- **α_2-globulin:** Within is α_2-macroglobulin, α_2-antiplasmin, ceruloplasmin (binds copper), very low density lipoproteins (VLDL), haptoglobin (binds free plasma hemoglobin) and many acute phase proteins.
- **β-globulin:** This fraction is very often further divided into β;$_1$-globulin and β;$_2$-globulin fraction. Contains proteins as fibrinogen, transferrin, low density lipoprotein (LDL), C3 and C4 complement components.
- **γ-globulin:** Within is for example factor VIII, C-reactive protein and most importantly all the *immunoglobulins*

Links

Related articles

- Dysproteinaemia
- Paraproteinaemia