

Plasma proteins

10th week

Plasma proteins

- quantitatively the most abundant blood plasma component

Functions:

- oncotic pressure maintenance
- transport
- acid-base balance maintenance
- hemocoagulation
- immune system
- nutritional function

Plasma proteins synthesis

- liver – hepatocytes
- plasma cells
- finalization in Golgi apparatus

Plasma proteins degradation

- glycoproteins – desialization
- receptors – internalization
- liver – fenestrated capillaries, without basement membrane
- kidney – low molecular weight proteins

Pathobiochemical changes of plasma proteins

Generalized quantitative changes

- hypoproteinemia
- hyperproteinemia

Isolated quantitative changes

- dysproteinemia

Qualitative changes

- paraproteinemia

Hypoproteinemia

Pseudohypoproteinemia

- infusion therapy
- hyperhydratation
- gravidity

Hypoproteinemia

- disorder of synthesis:
 - hereditary
 - acquired
- increased losses:
 - urine
 - feces
 - skin
- insufficient protein intake:
 - starvation
 - malabsorption

Hyperproteinemia

Pseudohyperproteinemia

- lack of fluids
- vomiting
- diarrhea
- decompensated diabetes mellitus

Hyperproteinemia

- hypergammaglobulinemia:
 - polyclonal
 - monoclonal

Albumin

Decreased levels:

- inflammation
- malignant tumours
- hepatopathies
- nephrotic syndrome
- exudative enteropathies
- chronic alcoholism
- protein loss in urine
- burns
- malnutrition

Increased levels:

- hemoconcentration

Plasma proteins determination

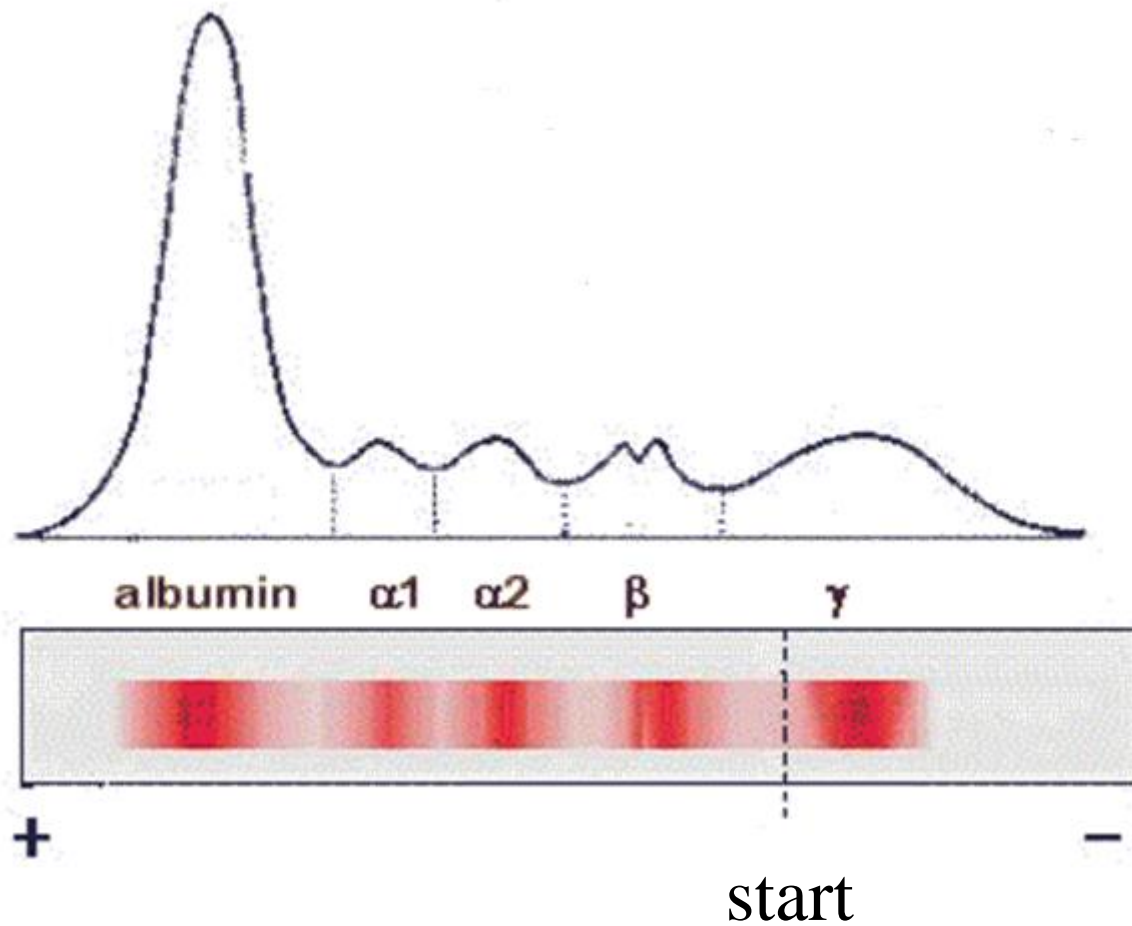
Basic screening

- total proteins – ref. value **60 – 80 g/L**
- albumin – ref. value **35 – 50 g/L**
- proteins electrophoresis

Special determinations

- quantitative immunoelectrophoresis
- nephelometric determinations of individual proteins

Plasma protein electrophoresis



Plasma protein electrophoresis

- **Albumin**
- **Alpha-1-globulins**
alpha-1-antitrypsin, alpha-1-acid glycoprotein, alpha-lipoprotein
- **Alpha-2-globulins**
ceruloplasmin, haptoglobin, alpha-2-macroglobulin
- **Beta-globulins**
C-reactive protein, fibrinogen, transferrin, beta-lipoprotein
- **Gamma-globulins**
Immunoglobulins A, G, M

Plasma proteins levels determination

- total proteins determination
- the combination of total proteins and albumin makes it possible to judge the level of globulins

Determination of specific proteins + meaning

Alpha-1-antitrypsin

- A1AT deficit, juvenile liver cirrhosis, juvenile pulmonary emphysema

Ceruloplasmin

- Wilson's disease

Haptoglobin

- hemolytic states

Albumin, prealbumin

- liver proteosynthetic function assessment

Determination of specific proteins + meaning

Acute phase proteins

- alpha-1-antitrypsin, alpha-1-acid glycoprotein, ceruloplasmin, haptoglobin, fibrinogen, CRP
- assessment of the activity of inflammatory processes, malignant diseases

Fibrinogen

- hemocoagulation disorders

Transferrin

- iron metabolism

Ferritin

- iron reserves estimation

Alpha-2-macroglobulin

- fibromarker for the assessment of the liver fibrogenesis