Exp#3

Total Protein

Quantitative determination of total protein in serum using a biuret reaction

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Definition

A large group of nitrogenous organic compounds that are essential constituents of living cells; consist of polymers of amino acids (are joined together by the peptide bonds); essential in the diet of animals for growth and for repair of tissues; can .be obtained from meat , eggs and milk

:Total Serum Protein*

A total serum protein test measures the total amount of protein in the blood. It also measures the amounts of two major groups of proteins in the blood: albumin and .globulin

-:Types

.**Albumin**

(α1globulin (α1 Antitrypsin

(α2globulin (haptoglobulin

(β globulin (transferrin, fibrinogen

.(γ globulin (Immunoglobulins

} **globulin**

:Functions of T.P

Structural protein: e.g. keratin .1

Enzyme and catalytic protein: e.g. pepsin .2

Transport protein: Hb, serum albumin .3

Hormonal protein: e.g. hormones as insulin, adrenalin .4

Contractile protein: e.g. actin and myosin .5

Storage protein: e.g. oval albumin, glutamine .6

(Genetic protein: e.g. nucleic acid (DNA & RNA .7

.(Defense protein: e.g. IG (immuno-globulins .8

. Receptor protein: hormones .9

Sources

.Albumin and most of α and β globulins are formed in liver

IGs are synthesized by the plasma cells in lymph nodes, .bone marrow and spleen

.**TP= Globulin+ Alb**

Serum globulin can be separated into several subgroups by .serum protein electrophoresis

Albumin→ is tested for liver and kidney diseases

.**Globulin**→ is tested for multiple myeloma

Clinical significance

(Hypoproteinemia or Hemodilution: (LOW*

.seen in : starvation, mal-absorption and burns

(Hyperproteinmia or Hemoconcentration: (HIGH*

:Occurs due to

(dehydration (diarrhea, vomiting-

excess synthesis of plasma proteins (multiple-

(myeloma

Protein in other body fluids

:A: Urine protein

proteinuria: due to increase concentration of total .protein in urine > 12mg/dl

.B: CSF protein

:Principle

(Protein + Cu++ $\xrightarrow{\text{Alkaline PH}}$ Cu-protein complex(violet

The intensity of the violet color is proportional to the amount of protein present when compared to a .solution with known protein concentration

:Effective Reagents*

Sodium potassium tartrate → combined with Cu++ .to prevent precipitation in the alkaline solution

Potassium iodide → which acts as an antioxidant

:Procedure

	STD	Test Tube
WR- µl	1000	1000
STD	20	--
Test	--	20

.Mix and let stand at RT for 10 min

Read the absorbance of standard and test at 540 nm .against blank

Calculation

$$\frac{\text{(A test}}{\text{A Std}} \quad X \quad \text{Conc.of Std (5g/dl)} = \quad \text{T.P (g/dl}$$

:Normal Range*

Adult 6.4-8.3 g/dl