The Eighth Experiment:

SERUM CALCIUM

Source:

Dietary in the milk, meat and vegetables .

Occurrence :

1) 99% in the bone and teeth as calcium fluorophosphates.
2) 1% in the serum is found as :
   A. 50 % ionizable Ca^{++} diffusible as ($CaCl_2$, Ca_3PO_4 , $CaHCO_3$ and Ca citrate.)
   B. 40 % is bound to protein non diffusible (20 % globin and 80 % albumin).
   C. 10 % is complex with small anion.

Function of Ca^{++} :

1) Participates in blood coagulation

$$\text{Prothrombin} \xrightarrow{\text{thromboplastin}} \text{thrombin , fibrinogen} \xrightarrow{Ca^{++}} \text{fibrin.}$$

2) Active some enzyme.
3) Decrease neuromuscular excitability.
4) Regulate heart action.

Clinical significance :

- **Hypercalcemia:**
  1) Hyperparathyroidism.
  2) Hypervitamiosis ‘‘Vit. D’’
  3) Multiple Myeloma.
  4) Poltcythemia.
  5) Bone demineralization.
- **Hypocalcemia:**
  1) Hypoparathyroidism.
  2) Tetany.

3) Nephrosis.
4) Nephritis.
5) Rickets.
6) Acute pancreatitis.
7) Hypoproteinemia.

Principles of kit method:

In alkaline solution CPC ‘‘ O-cresol phtalein complex one ‘‘ react with calcium to form an intense violet colored complex which absorbance measure at 578 nm is proportion to the amount of calcium in the specimen.

Procedures :

Pipette into well identified test tube	Blank	Standard	Test
Working reagent	1000 µl	1000 µl	1000µl
Standard	--	10 µl	--
sample	--	--	10 µl

- Mix well incubate for 5 min at room temperature.
- Read absorbance at 578 nm against reagent blank.
- The coloration is stable for 2 hour away from light.

- 1 m/dl = 1x 0.25 mmol/L

Calculation:

$$\text{Serum or plasma : result} = \frac{AbT}{AbS} \times 10$$

Normal Value

Serum or plasma = 8.1-10.4 mg /dL

Urine = 100 – 400 mg/24 hrs