



# AL-MUSTAQBAL UNIVERSITY

Department of Medical laboratory Techniques  
Department

*Clinical Biochemistry (4<sup>th</sup> stage )*

**(Determination of Calcium)**



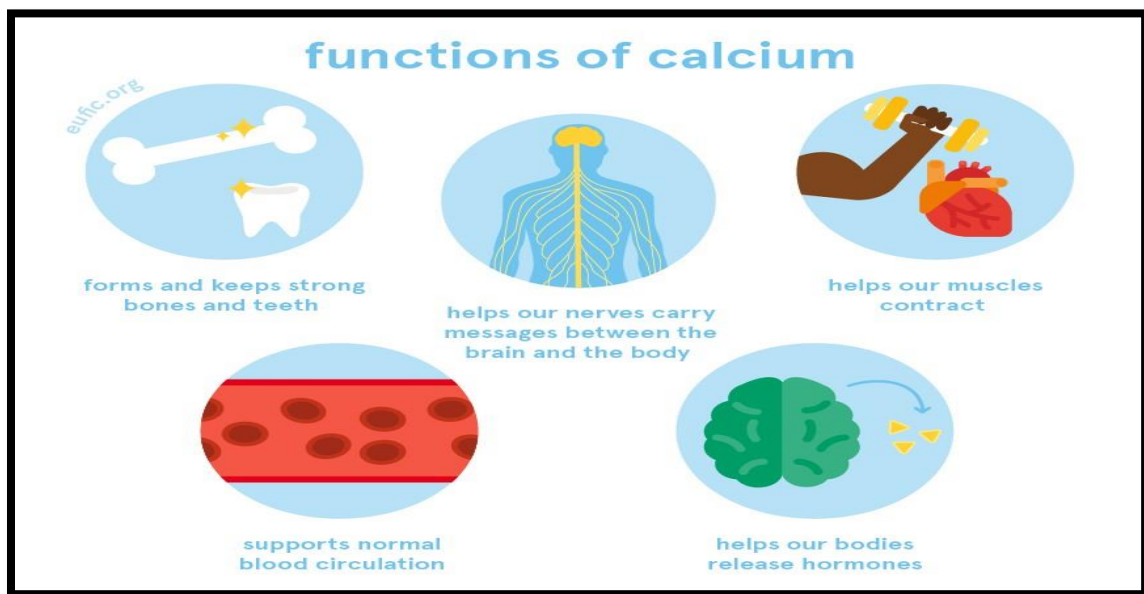
**Lecturer :** Msc. Karam kadhim

Msc. Karrar Ali

## Calcium

ion presents in the body in larger amounts than any cation is found in some foods, added to others, present in some medicines (such as antacids), and available as a dietary supplement. The important dietary sources of Ca include milk, eggs yolk and beans. The adult requires about 800mg Ca daily, but the growing child, pregnant women require more. Calcium is absorbed into blood stream from the small intestine.

Calcium makes up much of the structure of bones and teeth and allows normal bodily movement by keeping tissue rigid, strong, and flexible .



Calcium ion is important in:

- 1-Bone calcification.
- 2-The transmission of nerve impulses.
- 3-The maintenance of normal muscle contractility because it's a neuromuscular sedative.
- 4-As a cofactor in certain enzyme reaction.
- 5-The coagulation of the blood.

6-The transmission of organic and inorganic ions through the cells membranes.

7-Calcium and phosphorus tend to maintain equilibrium in the blood. they are usually considered together, since the disturbances of one quite often results in a disturbance of the other

In the blood, essentially all the Ca exists in three forms:

(1) free  $\text{Ca}^{++}$ (50%).

(2) Bound to protein, primarily albumin (45%).

(3) a complex with certain organic compound, ions like bicarbonate, lactate, phosphate and citrate(5%).

How to prepare for the calcium test

Drugs that can cause increased measurements in this test include calcium salts (for example, in nutritional supplements or antacids), vitamin D, lithium, thiazide diuretics, and thyroxine.

Hypercalcemia:

1. Hyperparathyroidism: One of the important diseases affecting Ca metabolism is the excessive and uncontrolled secretion of PTH (parathyroid hormone), which may occur in tumors of the parathyroid gland. Abnormally high level of this hormone result in excessive release of Ca from the bones and then elevate its levels.


2. Multiple myeloma: It's a tumor of the plasma cells produce g-globulin. Destruction of bone by the tumor and release of Ca in the blood side by side with elevated plasma protein .

## Hypocalcemia:

1-Rickets: decreased calcium and phosphorus levels caused abnormal bone formation due to: a. Deficiency of vit. D. b. Hypoparathyroidism. This disease is characterized by convulsions and muscular twitching

2-Tetany: a substantial reduction in  $\text{Ca}^{+2}$  conc. result by a state of neuromuscular excitability characterized by uncontrollable muscular cramps and tremors.

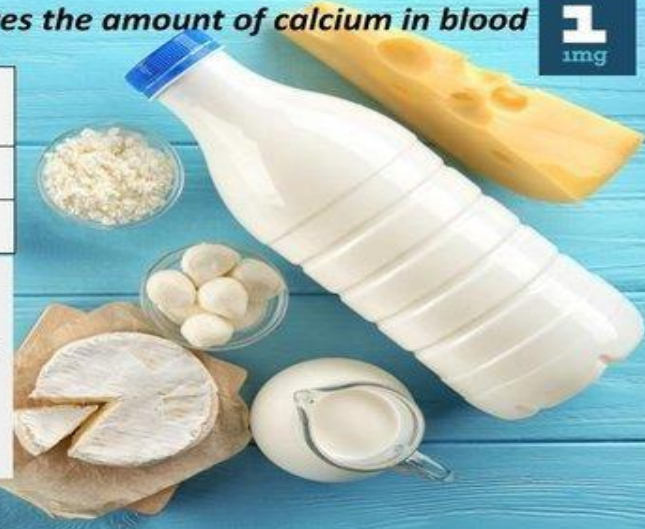
3-Kidney disease: Kidney failure quite regularly results in reduces the ability to excrete phosphorus causing a fall in the Ca level.

**Calcium blood test measures the amount of calcium in blood** 

<b>Normal calcium levels range from 8.5 to 10.5 mg/dL</b>	
>10.5 mg/dL	<b>Hypercalcemia</b>
<8.5 mg/dL	<b>Hypocalcemia</b>

**Symptoms of Calcium Deficiency**

- Muscle spasm
- Numbness and tingling in the hands, feet, and face
- Weak and brittle nails
- Confusion



## Reference Range in Adults

Total calcium – 8.6 – 10.3 mg%

Free calcium – 4.6 – 5.3 mg%