



**AL-Mustaqbal University College**

**Medical laboratory Techniques Department**

**Clinical Biochemistry**  
**(Calcium Test)**



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# Calcium



☐ Calcium is one of the chemical elements necessary for the body. The cells of the body, especially the brain, muscles and heart, need a healthy level of calcium in the blood in order to function properly. Calcium reaches the body through the food we eat and is absorbed from the digestive system into the body, where part of the calcium in the blood enters the cells.

☐ Blood calcium is stored in the body in the bones, while excess amounts are excreted in the urine. The level of calcium in the body is controlled by several hormones, especially parathyroid hormone (PTH) and vitamin D.



# Clinical symptoms of calcium

The high level of calcium in the blood caused by a health problem, it may be the result of one of these problems: **Hyperparathyroidism**

- Hyperparathyroidism.
- Some types of cancer.
- Paget's disease.
- Take large amounts of antacids that contain calcium.

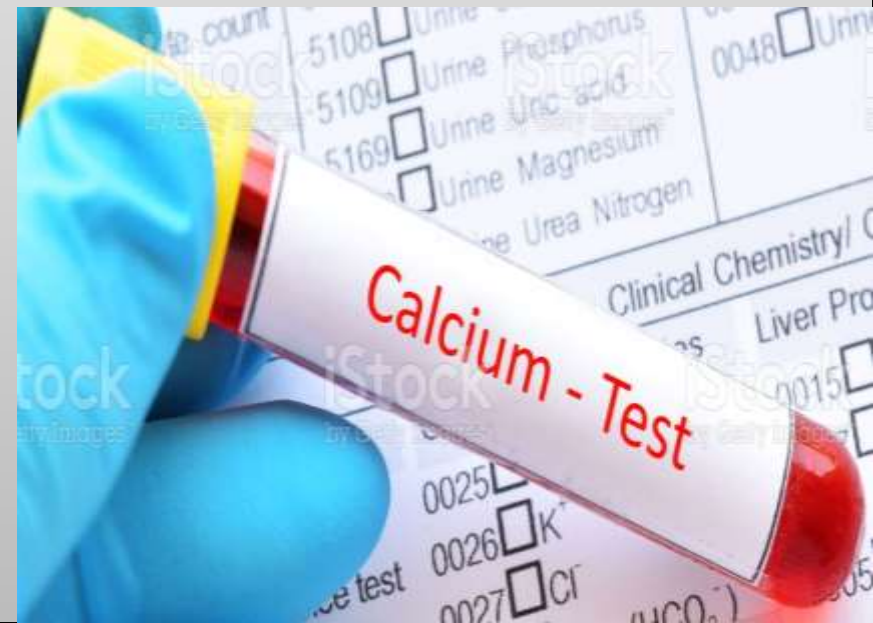
# Clinical symptoms of calcium



If the level of calcium in the blood is lower than the normal rate, it may indicate a number of health problems, including the following:

## Hypoparathyroidism

- Vitamin D deficiency.
- Magnesium deficiency.
- Kidney disease.
- Pancreatitis.
- Hypoparathyroidism.



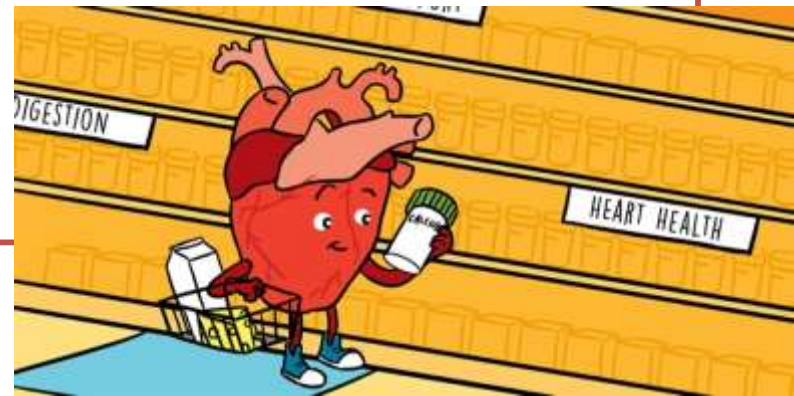
# When is the examination performed?

- Bone diseases such as osteoporosis.
- Cancers of the breast, lung, kidney, head and neck, or multiple myeloma.
- Kidney or liver disease.
- Neurological diseases.
- Diseases of malabsorption of nutrients
- Pancreatitis
- Parathyroid diseases.

# Types calcium of blood test

There are two types of blood calcium tests:

- ❑ A test that measures the level of total calcium (free and bound calcium). It is the type most used by doctors.
- ❑ A test that measures the level of ionized calcium (free calcium) only.





# Laboratory devices and tools

1- *Spectrophotometer*

2- *Centrifuges*

3- *Water bath*

4- *Micropipettes*

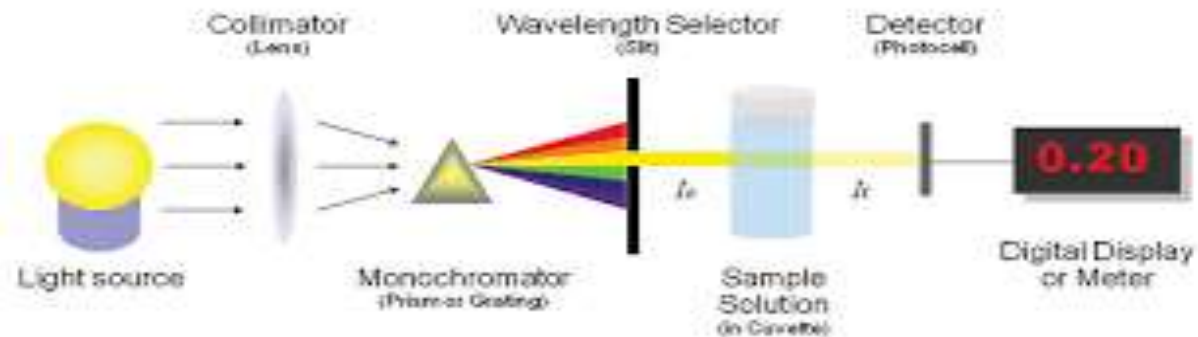
5- *Tubes, cups, cuvettes, tourniquet, syringes, cotton, plain tubes, yellow and blue tip s*

6- *kit **Ca++***



## Spectrophotometer

Principle, Instrumentation, Applications



R1



R2



R3(STD)





# Procedure:-

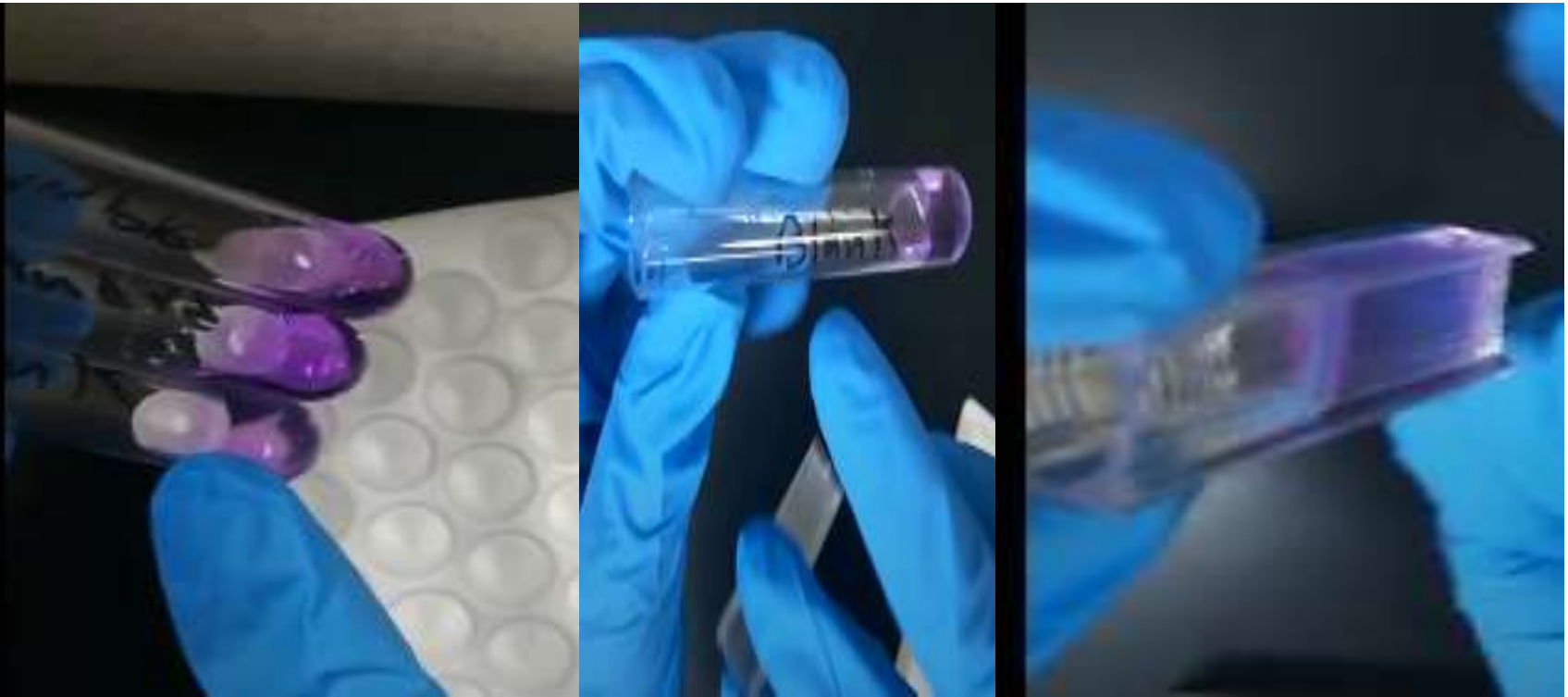
- 1- Take the blood from the person.
- 2- Centrifuge the blood to gets the serum.
- 3-The additions as in the shown Table:

|                      | <b>Blank</b>                 | <b>Standard</b>             | <b>Test</b>                 |
|----------------------|------------------------------|-----------------------------|-----------------------------|
| <b>Reagent (R1)</b>  | <b>500 <math>\mu</math>L</b> | <b>500<math>\mu</math>L</b> | <b>500<math>\mu</math>L</b> |
| <b>Reagent (R2)</b>  | <b>500<math>\mu</math>L</b>  | <b>500<math>\mu</math>L</b> | <b>500<math>\mu</math>L</b> |
| <b>Standerd (R3)</b> | -----                        | <b>25 <math>\mu</math>L</b> | -----                       |
| <b>Serum</b>         | -----                        | -----                       | <b>25 <math>\mu</math>L</b> |
| <b>Distill water</b> | <b>25 <math>\mu</math>L</b>  | -----                       | -----                       |

# Procedure:-

4-Mix well and let for 5 minutes at 37c.

5- Read the absorbance for standard and test against the blank at wave length 570 nm.



# Calculations:-

- $\text{Con. of test} = \frac{\text{(A) of test}}{\text{(A) of standard}} * \text{Con. Of Stad. (100 mg per 100 ml)}$



# Normal value:-

- ❑ For people from birth to 6 months, about 200 mg .
- ❑ From the age of seven months to a year, it is 260 mg.
- ❑ From one to three years, the appropriate rate is 700 mg.
- ❑ From the age of 9 to 18 years, it is 1300 mg.
- ❑ From the age of 19 to fifty, it is 1,000 mg.
- ❑ From age 51 to 71, it is about 1,000 mg for men and about 1,200 mg for women.
- ❑ As for the age over 71, it is necessary to take 1200 mg.
- ❑ For pregnant or breastfeeding women, the appropriate rate is 1,000 mg and up to 1,300 mg, depending on the age of the woman.

**Thanks for your  
attention**