

## The blood

- ▶ Blood has defined as a highly specialized connective tissue that composed of two phases: a liquid phase and solid phase. The liquid phase known as plasma and the solid phase is made up of cellular elements which include: RBC, WBC and Platelets.
- ▶ The average human body contain about 4-6 liters of blood. The cells or cellular elements occupy about 45% of the volume of blood, and the plasma account for the remaining 55%. (91% of plasma is water).
- ▶ The water (plasma water) has many functions as a vehicle for the transport of blood cells and many materials as well as important in the temperature regulation.
- ▶ Electrolytes and other substance constitute for about 2% of the plasma.
- ▶ Protein are made up 7% of the plasma , which perform number of different function , EX ( transport , coagulation , inflammation , antibodies production and regulation of the osmotic pressure and pH.

### **Blood collection and anticoagulants**

- ▶ There are two main methods for collecting blood samples :

1. Capillary puncture method :

In the method, blood can be taken by pricking the following:

- A. The lobe of the ear.
- B. The side surface of the finger.
- C. In infants from the plantar surface of the heel or the great toe.

This methods are carried when the test need a little amount of blood.

## 2. Vein puncture method :

In this method blood can be collected from many sites especially the antecubital vein of the forearm.

This method is carried when the test needs a lot of amount of blood.

### **How to obtain the serum**

1. After the blood sample collection, it's put in a dry and clean test tube for 5-15 Min under room temperature to allow coagulation.
2. The test tube is put in centrifuge at 3000 r.p.m for 10 Min.
3. When the blood sample is centrifuge the heavier formed elements are packed into the bottom of the tube, leaving the supernatant at the top which represents the serum.
4. The serum is withdrawn by pasteur's pipettes to another tube in order to perform the tests.

### **How to obtain the plasma**

1. After the blood sample collection it's put in an anticoagulants tube (to avoid coagulation).
2. The blood sample is mix gentle by inverting the tube not shaking.
3. The sample is leaved for a period of time and a yellow colored liquid is noticed above, this is the plasma.
4. In addition, the centrifuge can used to obtain all the plasma which withdrawn to another tube to perform the tests.

## Anticoagulants

- ▶ Anticoagulants are chemical reagents that ceased the series of the reaction the lead to the blood clotting.
- ▶ Number of different anticoagulants are present but they differing in the fallowing properties :
  1. MODE OF ACTION
  2. PREPAREATION
  3. UTILIZATION CAUTION

### The following are the commonly used anticoagulants

#### 1. EDTA tripotassium (Ethylene Diamine Tetra Acetic acid):

Mode of action: this anticoagulant removes the free Calcium ions from the blood by chelating.

#### 2. Sodium citrate

Mode of action: this anticoagulant removes the calcium ions by loosely binding them to from calcium citrate complex.

#### 3. Oxalate

Mode of action: this anticoagulant removes the free calcium ions from the blood through the formation of calcium oxalate as insoluble precipitates.

#### 4. Sodium fluoride

Mode of Action: it's used in the measurement of the blood sugar for two purpose; as an anticoagulant and a preserver reagents.

#### 5. Heparin:

Mode of Action: heparin acts as antithrombin and is the only naturally occurring anticoagulant used in the laboratory.

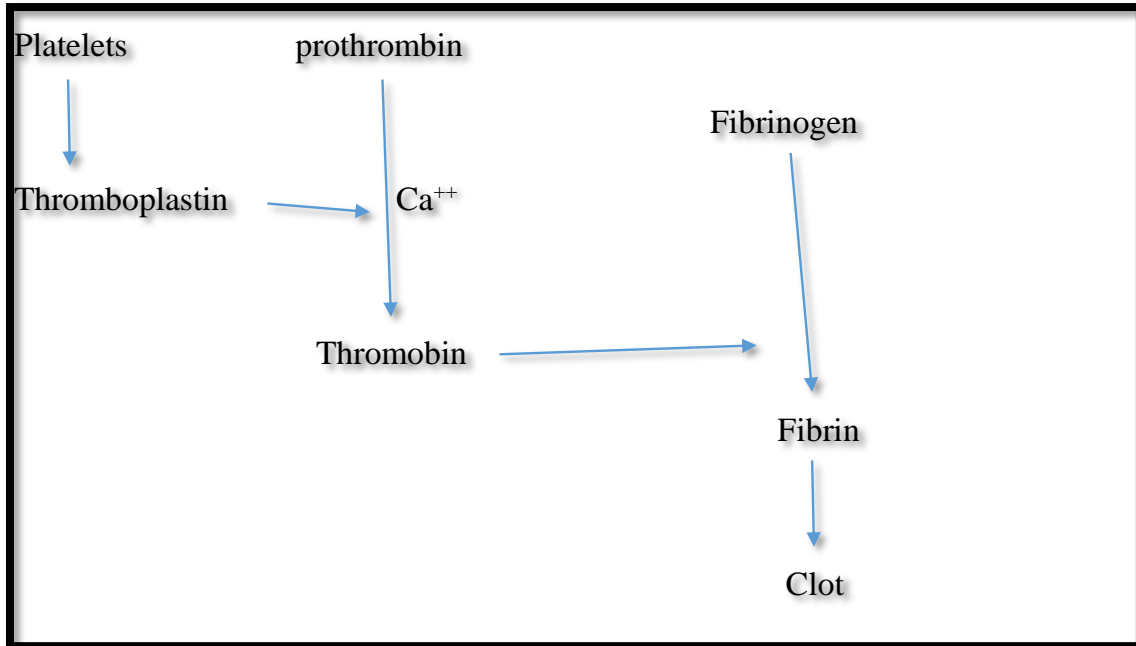
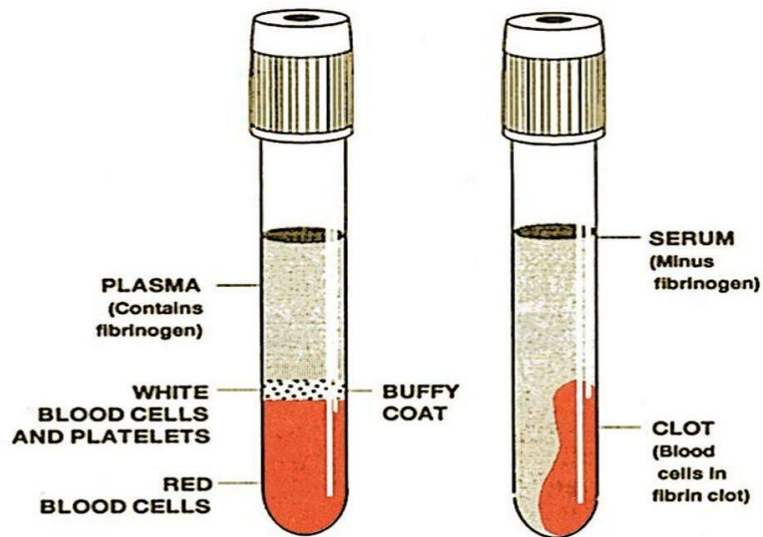


Diagram summarizes the steps of blood clotting process



Difference between serum and plasma