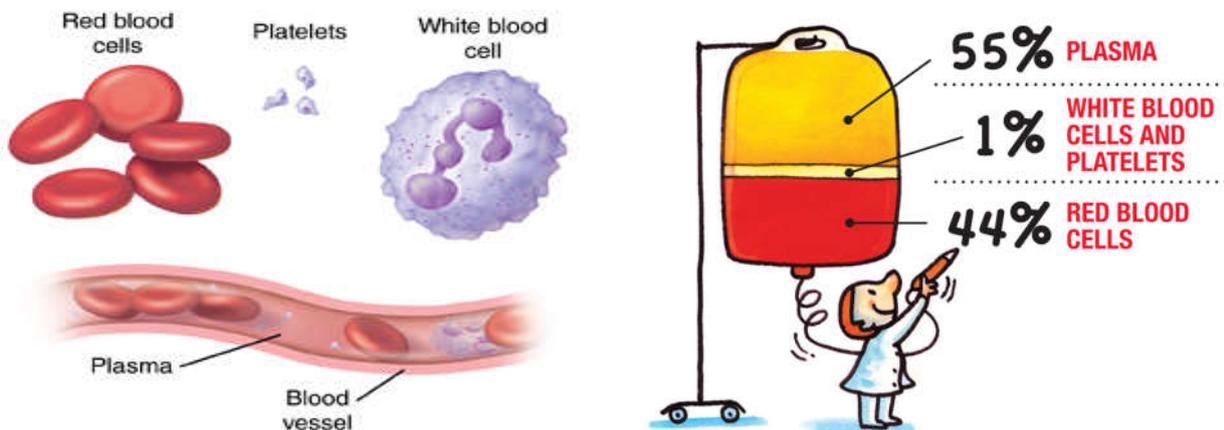


Introduction

BLOOD

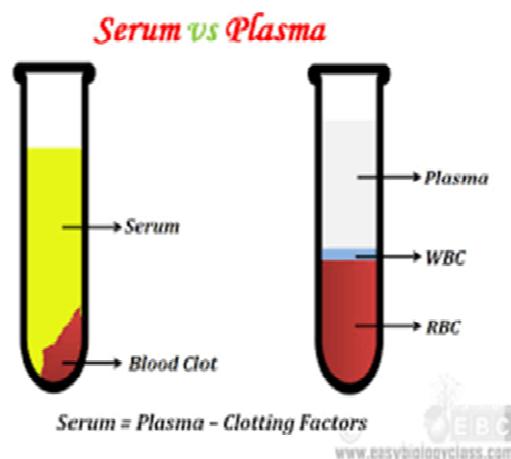
The fluid that circulates through the heart, arteries, capillaries, and veins and is the chief means of transport within the body. It transports oxygen from the lungs to the body tissues, and carbon dioxide from the tissues to the lungs. It transports nutritive substances and metabolites to the tissues and removes waste products to the Kidneys and other organs of excretion.



Whole blood: A venous, arterial or capillary blood sample in which the concentrations and properties of cellular and extra-cellular constituents remain unaltered when compared with them in vivo state.

Plasma is the part of the blood that contains Serum+ clotting factors.

Serum liquid portion of blood that remains once the clotting factors like fibrin have been removed.



Preparation of serum & plasma

Blood is centrifuged to remove cellular components. Anti-coagulated blood yields plasma containing fibrinogen and clotting factors.

Coagulated blood (clotted blood) yields serum without fibrinogen, although some clotting factors remain.

Physical Characteristics of Blood

Thicker than water, 8 % of total body weight, temperature - 100.4⁰F, pH - 7.35 to 7.45.

Collection and handling of blood**1- venous blood:**

It is now common practice for specimen collection. We need: disposable Plastic Syringes and Disposable Needles, Tourniquet, Cotton & Alcohol.

2-capillary blood.

- Skin puncture can be used for obtaining a small amount of blood.

- Drawing blood from the finger.

-Disinfect the pad of the middle finger with ethanol. Stop circulation in the middle of the finger with the thumb until the end of the middle finger has deep red color.

-Press the fingerpicker or lancet on the skin of the middle finger.

-Wipe off the first drop of blood as it contains a large amount of other tissue fragments, and start drawing blood. If bleeding subsides, massage the finger.

precautions of blood collection

1-Special care must be taken to avoid risk of infection from various pathogens during all aspects of laboratory practice.

2-The operator should wear disposable plastic or thin rubber gloves

3-Care must be taken to prevent injuries, especially when handling syringes, needles and lancets

4-Disposable sterilized syringes, needles and lancets should be used.

5- Cannot use hemolyzed samples in lab tests (Hemolysis: the breakdown of red blood cells, with the release of hemoglobin into the plasma or serum).

Anticoagulant: Additives that inhibit blood and/or plasma from clotting. The main types:

1. **EDTA:** Ethylene diamine tetra-acetic Acid. The sodium and potassium salts of EDTA are powerful anticoagulants and they are especially suitable for routine hematological work. EDTA acts by its chelating effect on the calcium molecules in blood.
2. **Citrate: Trisodium citrate:** principle: Ca^{+2} chelating agent forming calcium salts. A mixture of one-part citrate with nine parts blood to determine the erythrocyte sedimentation rate. It uses in blood transfusion.
3. **Heparin:** for the determination of ionized calcium (inhibit Xa factor).
4. **Sodium Fluoride -Potassium Oxalate:** principle Glycolysis inhibitor Anti-Coagulant. used for glucose test.
5. **ACD (Acid-Citrate Dextrose: DNA Studies.**

Types of Plastic/glass vacuum blood test tube:

- SSGT tube (Serum-separating gel tubes), with additive of Gel & clot activator, yellow cap.
- Serum Tube, with additive of Clot activator, red cap.
- Plain Tube, No additives, red cap
- EDTA tube, with additive of EDTA K2/K3, purple cap.
- Heparin Tube, with additive of Sodium Heparin/Lithium Heparin, green cap.
- PT Tube, with additive of Sodium citrate (1: 9), blue cap.
- ESR tube, with additive of Sodium citrate (1: 4), black cap.
- Glucose tube, with additive of Fluoride Oxalate, grey cap.

Complete Blood Count (CBC) What is measure

1-Red blood cell data {Total red blood cell count (RBC), Hemoglobin (Hgb), Hematocrit (Hct), Mean corpuscular volume (MCV), Red blood cell distribution width (RDW)}

2-White blood cell data {Total white blood cell (leukocyte) count (WBC), A white blood cell count differential may also be ordered}.

3-Platelet Count (PLT)

Blood smear (film)

Procedure of blood smear

- 1) placing a drop of blood from mixed sample on a clean glass slide.
- 2) Spreader slide using another clean glass slide at (30-40) degree angle.
- 3) Control thickness of the smear by changing the angle of spreader slid.
- 4) Allow the blood film to air-dry completely before staining.