

Lab 3

Collection of Blood Samples

There are two common sources of blood for routine laboratory tests:

- 1- Blood from a superficial vein by puncturing it with a needle
- 2- Blood from skin capillaries by skin-prick.

Blood sample

The term "blood sample" refers to the small amount of blood (a few drops or a few milliliters) obtained from a person for the purpose of testing or investigations. These tests are carried out for aiding in diagnosis and/or prognosis of the disease or disorder.

Sources and Amount of Blood Sample:

I. Capillary blood: The skin and other tissues are richly supplied with capillaries, so when a drop or a few drops of blood are required, as for estimation of Hb, cell counts, and blood films, etc, blood from a skin puncture (skin-prick) with a lancet or needle is adequate.

Capillary blood is obtained by pricking the tip of finger, lobe of ear, from the toe, and in infants is obtained from the heel.

Procedure:

1. The most convenient place to prick is finger. It is to be pricking about ½ cm from the nail, 3 mm deep. The area to be punctured should not be cold. If it is cold, warm it by massaging. Disinfect the site of punctured by using spirit or 95% alcohol.
2. Wipe off the first drop of blood, and use the next drop for testing.
3. After obtaining sufficient amount of blood, let the patient apply slight pressure by using spirit with sterile swab.

II. Venous blood: When larger amounts (say, a few ml that cannot be obtained from a skin puncture) are needed as for complete hematological and biochemical investigations, venous blood is obtained with a syringe and needle by puncturing a superficial vein. In infants, venous blood may have to be taken from the femoral vein, or the frontal venous sinus.

The collection process:

First of all assemble all the necessary equipment's such as:

- 1- Needle.
- 2- Syringe
- 3- Tourniquet.
- 4- Disinfectant.
- 5- Cotton-swab.
- 6- Collection tube.

Procedure:

- 1- First of all decide the amount of blood required and select the container according to the test to be done.
- 2- Lay the arm of patient on the table.
- 3- Apply the Tourniquet and select the prominent vein of the patient.
- 4- Disinfect the puncture site.
- 5- Assemble needle and syringe, check that, it is sharp and unlocked, and it is moving smoothly. Passing air through the syringe can do this. But there should not be any air present in the syringe at the time of blood collection.
- 6- With left hand hold patients arm, so that skin over vein is tightened. Ask the patient to open and close the wrist.
- 7- Take the syringe in right hand, holding index finger against the base of needle, keep the point of needle to upper side and push firmly and steadily without any hesitation in to center of vein.

8- The angle between skin and needle should not be more than 30° - 40°. The moment needle enters in vein, blood flows back into syringe.

9- With your left hand, slightly pull back the piston till required amount of blood is obtained in the syringe.

10- Remove the tourniquet, place cotton swab over the needle and wound. Withdraw the needle slowly and ask the patient to place a cotton swab over the wound. This stops bleeding from wound.

11- Remove the needle from syringe and gently expel the blood into appropriate container.

12- If anticoagulant is used, gently shake the bottle for proper mixing.

Lab 4

What is hemolysis?

Hemolysis is the breakdown of red blood cells (RBC's) due to the mishandling of blood samples during routine blood collection and transport.

The accuracy of the test results is dependent on the quality of the specimens. A quality serum for diagnostic testing can be obtained by following best practices during collection, handling, and transporting the samples to the diagnostic laboratory.

How to avoid hemolysis

1. Choose the right gauge needle.
2. Alcohol used for cleansing the venipuncture site should be allowed to dry completely before drawing the blood.
3. One should collect the blood specimen in the correct blood collection tube (serum separator tube (SST) (Tiger top tubes) or red top tubes without anticoagulants).
4. After performing venipuncture and removing the needle, transfer the blood gently down the side of the collection tube.
5. Invert the tube gently as recommended by the tube manufacturer.
6. Later, the tube should be placed upright for 15-33 minutes at room temperature until complete clot.

Hemolysis can be caused by:








- Shaking the tube too hard.
- Using a needle that is too small.
- Pulling back too hard on a syringe plunger.
- Pushing on a syringe plunger too hard when expelling blood into a collection device.



Blood tubes Collecting

Most blood collection tubes contain an additive that either accelerates clotting of the blood (clot activator) or prevents the blood from clotting (anticoagulant). Some tests require the use of serum, some require plasma, and other tests require anticoagulated whole blood. A vacutainer blood collection tube is a sterile glass or plastic test tube with a colored rubber stopper creating a vacuum seal inside of the tube, facilitating the drawing of a predetermined volume of liquid.

Vacutainer tubes may contain additives designed to stabilize and preserve the specimen prior to analytical testing. Tubes are available with a safety-engineered stopper, with a variety of labeling options and draw volumes. The color of the top indicates the additives in the vial.

Hemoguard stopper	Tube Content	Determination
	Serum separator tube (SST)	All biochemistry not mentioned elsewhere (1 tube), microbiology (1 tube)
	Heparin	Chromosome studies, lead, amino acids, troponin
	Fluoride/oxalate	Glucose
	EDTA	Full Blood Count (FBC) and ESR, C3/C4, Hemoglobin A1c, Homocysteine, ACTH
	Plain (No additive)	LDH, Ca, Drugs (Phenytoin, Theophylline, Lithium), Endocrine testing (except Thyroid)
	Sodium citrate	Coagulation testing, PT, INR, APTT, D-Dimer, etc...
	ESR	Westergren Sedimentation Rate; requires full draw