SAMPLE COLLECTION, PRESERVATION OF SAMPLES, ORDER OF DRAW, LABORATORY SAFETY.

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SAMPLE COLLECTION

- SAMPLE TYPE
- SITE:- PREPARATION OF SITE.
- TIMING
- METHOD

TYPES OF SAMPLES:

1. Whole Blood
2. Plasma
3. Serum
4. Sputum
5. Throat swab
6. seaman
7. Urine
8. Feces
9. Body fluids
    1. Cerebrospinal fluid (CSF),
    2. Peritoneal fluid
    3. Synovial fluid

Lab request form must be contain:

- Patient Name
- Time & Date
- Unique identification number
- Age/sex
- Name of Test
- Name of Doctor
- Location
- History

What to see on and inside the vaccuette?

On Vacuette

- Colour of vaccuette
- Name
- Unique identification number

Inside the vaccuette

- Sample volume

Specimen rejection criteria:

- Specimen improperly labeled or unlabeled
- Specimen improperly collected or preserved
- Specimen submitted without properly completed request form
- contaminated form
- Improperly volume & leakage sample
- Absurd blood sample -: High electrolyte level
- Hemolyzed sample (show tubes)

Phlebotomy

Gloves

Needles

The Hub

Evacuated Collection Tubes

Alcohol Wipes

Syringes

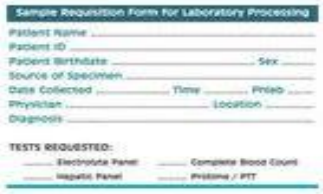
Bandages/Tape

Gauze Sponges

Tourniquet

Sharps Container

Povidone/Iodine Swabs/Wipes



Requisition Form

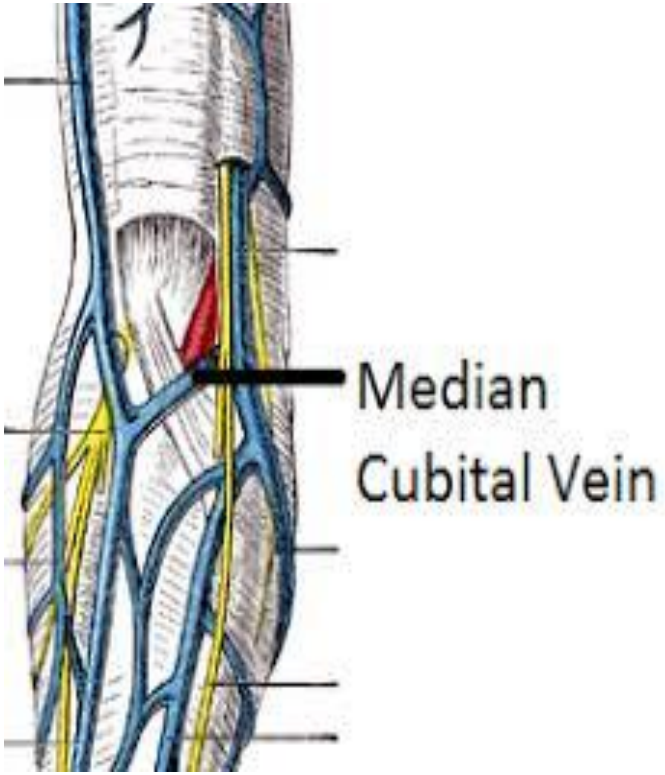
Selecting vein site

Median cubital vein is the best choice (why?)

good blood flow

Most superficial

and from femoral artery



70% Alcohol

- Circular motion and from the site to outward.

Antiseptic allow to dry

↓

If not dry - Hemolysis

↓

Should not be touched

TIMING

- Fasting blood Sample

⇩

Approximately 8 to12 hours fast before blood test.

-Drink only water

- Regular drug allow

- Postprandial blood sample

⇩

2 Hours after Regular major Meal

- Random blood sample

⇩

Anytime irrespective to meal

Lipid profile

- Fasting required

Tri glyceride is high in non fasting sample

- Why fasting is not require for cholesterol & thyroid profile ?

Method of blood collection

1) With Syringe and non-vacuum vacutte
2) With vacuum Vaccutiner
3) With Butterfly Needle
4) Lancet

1) With Syringe and non-vacuum vacuette

- **Advantage:**
- Cheaper
- Not extra accessory requiry

- **Disadvantage:**
- Improper volume – especially when blood collection is require for cougulation profile
- Haemolysis

2) With vacuum Vaccutiner

- **Advantages:-**

- Maintain proper volume of blood
- Safe & Speedy
- Reducing the risk of haemolysis

- **Disadvantages:-**

- not suited for small veins.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3) With Butterfly needle

- **Disadvantages**.
- 1) The risk of hemolysis
- 2) It is difficult to collect large quantity of blood as well as in multiple vacuette
- **Advantages:**
- Useful in infants & children

Difference between Serum & Plasma

Plasma = Serum + Clotting factors (Fibrinogen).

- Both Has Same Following component
  - Electrolytes
  - Enzymes
  - Hormones

- **How both can we separate?**
- **Can we use EDTA sample for biochemistry test analysis?**

Preanalytic Interference In Sample

Haemolysis

- Reddish discoloration of serum/plasma due to rupture of RBCs.
- Factor causing haemolysis
  - Sampling = Inject forcefully in vacutte
  - Store = Frozen = Due to high or low temp,
  - Vigorously shaking of blood - trasnporatation

Icteric

- **Yellowish discoloration of Serum** due to high bilirubin.

Lipemic

- Milky or Turbid appearance of Serum due to high Triglyceride

CSF

- CSF collected in small amount
- So, CSF is collected in Plain Tube

(For glucose estimation)

- Tube immediately transported to laboratory.
- Tube is keep over ice packs but do not allow to frozen
- Sample is as early as possible to analyse

(half an hour)

Blood collection tubes:

- Serum separating tubes (SST)
- Plasma separating tubes (PST)

Plasma Separating Tubes (PST)

Top Color	Additives	Principle	Uses
Lavender 	**EDTA** **Dose= 1to2g/l of blood**	**-The strongest anti-coagulant** **-Ca^{+2} chelating agent**	**- Hematology** **- Blood bank**
Light Blue 	**Sodium Citrate 2g/l**	**Ca^{+2} chelating agent**	**- PT** **- APTT:**
Green 	**Sodium Heparin or Lithium Heparin**	**Heparin binds to Thrombin and inhibits the second step in the coagulation cascade** **(Prothrombin → Thrombin)** **Heparin** **Fibrinogen ⊣ Fibrin**	**Enzymes** **Hormones** **Electrolytes (Na^+, K^+, Mg^+, Cl)**

Top Color	Additives	Principle	Uses
Gray 	**-Sodium Fluoride 2g/l -Potassium Oxalate**	**Glycolysis inhibitor Anti-Coagulant**	**Glucose tests**

Serum Separating Tubes (SST)

Top Tubes	Additives	Principle	Uses
Red 	**------ Sometimes it has gel or silicon at the bottom of tube to reduce hemolysis**	**Enhancing the formation of blood clot**	**Serology -Antibodies -Hormones -Drugs Virology Chemistry Blood cross matching before blood transfusion**

Order of Draw

1) Blood culture tube

2) Citrate tube

3) Plain tube

4) Heparin tube

5) EDTA tube

6) Fluoride tube

Why Blood culture tube collected first?

- Avoid surface contamination by
  - Hands,
  - Vacuette

Why plain tube is take after the citrate tube ???

- ✓ Plain tube –Clot activated

- ✓ This contaminate citrate tube

- ✓ Low result of PT

Why Heparin tube is take after the plain tube???

- ✓ Heparin contain Sodium or Potassium or Lithium salt.

- ✓ So it contaminate plain tube with Sodium or Potassium or Lithium salt.

- ✓ So result of Sodium or Potassium or Lithium is high if heparin tube is collected before plain tube.

Why is EDTA tube take after the Heparin tube???

- ✓ EDTA chelate calcium

- ✓ In plain tube ca+ result is low

- ✓ So Heparin and Plain tube collected before EDTA.

Why Fluoride tube is take after the EDTA tube ???

- ✓ Fluoride can contaminate EDTA tube if collected before EDTA

- ✓ Fluoride can distorted Red Blood cell Morphology.

- ✓ So Peripheral smear can not be reliable.

Laboratory Saftey

LABORATORY SAFETY

1. Never do mouth pipetting.
2. Barrier protection such as gloves, masks, goggles and apron must be available,
3. Phlebotomists must change gloves and adequately dispose of them between drawing blood from different patient.
4. Frequent hands washing whenever gloves are changed.

6. **Facial barrier protection used for spattering of blood or body fluid.**
7. **Avoid using syringes whenever possible and**

   dispose of needle in white coloured container
8. **Make a habit of keeping your hands away from your mouth, nose, eyes and other mucous membrane inoculation.**

11. **Decontaminate all surfaces and reusable device after use.**
12. **Before centrifuging tubes, inspect them for cracks.**
13. **Use biohazard disposal techniques. Eg. Red bag.**
14. **Never leave a discarded tube or infected material unattended and unlabeled.**
15. **All employees must be vaccinated with hepatitis B vaccine.**

Biohazard

Flammable Material Hazard

Toxic Material Hazard

Ionizing Radiation Hazard

THANK YOU