PATIENT PREPARATION

EXERCISE	- increased in lactate, fatty acid, ammonia, ALT, AST, CPK, LD - increased in growth hormone, prolactin, testosterone, leutenizing hormone. - elevated levels of proteins in urine (proteinuria) - vigorous hand exercise (fist clenching) increases potassium, lactate and phosphate.
FASTING	- 8-16 hrs is required for glucose, lipids and LPP. - **Serum bilirubin** may increase after 48 hrs of fasting - **Plasma triglyceride** increases after 72 hrs of fasting **Basal state collection** — glucose, cholesterol, triglyceride and electrolytes.
DIET	- metabolic products of food can increase in venous blood (High CHON diet — increases urea) - **Serotonin** = will increase the urinary excretion of 5-hydroxyindole acetic acid - **Caffeine** = increases the concentration of glucose, **releases catecholamines from adrenal medulla and brain tissue**. - Increases turbidity or lactescence = triglyceride levels exceed 400 mg/dL -Contributes to degree of ictericia (bilirubin) — 25.2 mg/L -Icteric samples interfere with albumin, cholesterol, glucose and total protein tests.
POSTURE	- patient should be seated/supine for at least 20 min before blood collection to prevent hemodilution or hemoconcentration. - **changing from supine to sitting or standing position** causes constriction of blood vessels and reduction of plasma volume — inc levels of albumin, enzymes and calcium. - **changing from sitting to supine** causes shifting of water and electrolytes into tissue causing hemoconcentration — inc levels of proteins, lipids, BUN, iron and calcium. - **changing from standing to supine** causes extravascular water to transfer to the vascular system and dilutes nondiffusable plasma constituents — decreased levels of cholesterol triglycerides and LPP.
TOURNIQUET APPLICATION	- 1 minute application is recommended - prolonged tourniquet application results to: ✔ hemoconcentration (venous stasis) ✔ anaerobiosis - the pressure from the tourniquet causes biological analytes to leak from the tissue cells into the blood. Increased levels: proteins, enzymes, lactate, cholesterol, potassium and ammonia

SEM-CHEMISTRY Cheat Sheet

by ressentie via cheatography.com/163647/cs/34331/

PATIENT PREPARATION (cont)

TOBACCO SMOKING	- inc in plasma non-esterified fatty acid (NEFA) concentration. - inc in plasma catecholamines and serum cortisol - inc in glucose, growth hormone, cholesterol, triglyceride and urea.
ALCOHOL INGESTION	- inc plasma concentration of urate and triglyceride - inc GCT concentration - it causes hypoglycemia (chronic alcoholism)
STRESS (anxiety)	- affects adrenal hormone secretion - also associated with inc levels of albumin, glucose, insulin, lactate and cholesterol
DRUGS	- TDM specimen collection should be schedule according to the last time of the last dose. - medications affecting plasma volume can affect protein, BUN, iron and calcium concentrations. - hepatotoxic drugs can elevate liver function enzymes - diuretics can decrease plasma sodium and potassium levels.

BLOOD COLLECTION PROCEDURES

PATIENT IDENTIFICATION	-Ask the patient to state his or her full name -Check the patient's ID band/bracelet bearing the patient's name and hospital ID number
SLEEPING PATIENTS	-Wake the person gently and properly identify the patient
UNCONSCIOUS PATIENTS, YOUNG, MENTALLY INCOMP-ETENT OR NON-ENGLISH SPEAKING PATIENTS	-Ask a relative or the patient's nurse or physician to identify the patient
NEONATES & OTHER INFANTS	-ID band -Ask the attending nurse, relative or guardian
OUTPATIENT	-Ask the patient to state his/her name; ID card

BLOOD COLLECTION

SKIN PUNCTURE

- a sharp lancet is used to pierce the skin and a capillary tube
- Outer area of the bottom of the foot (heel stick)
- Fleshy part of the middle of the third/fourth finger (finger stick)

ARTERIALIZED CAPILLARY BLOOD

For blood gas analysis (NB and infants) — measures pH and pCO2 but not PO2

Earlobe — preferred site due to vascularity

Lateral plantar heel surface — most commonly used site

INDICATIONS

-NO accessible veins
-For POCT procedures such as glucose monitoring
-Obtaining blood from infants or children
-For Newborn Screening

THE VASCULAR SYSTEM

Arterial Blood

- Has a larger concentration of oxygen than carbon dioxide
- Pumped by the heart to the body cells

Venous Blood

- Has a larger concentration of carbon dioxide
- Pumped by the heart to the lungs

BLOOD COLLECTION

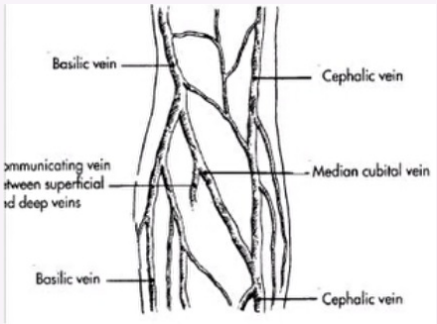
PHLEBOTOMY OR VENIPUNCTURE

It is the act of obtaining a blood sample from a vein using a needle attached to a syringe or evacuated tube

ANTECUBITAL VEIN OF THE ARM

It is the most frequent site for venipuncture

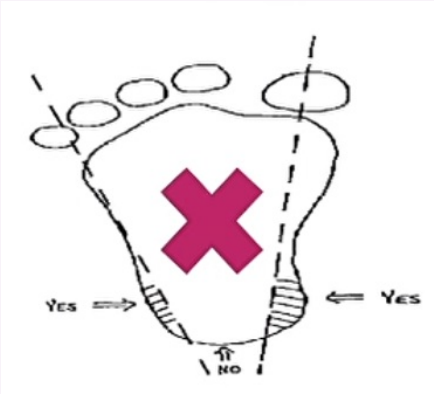
VENIPUNCTURE



Median - 1st choice
Cephalic - 2nd choice
Basilic - Last choice due to nerve endings

CAPILLARY PUNCTURE

SKIN PUNCTURE



Not in the center arch of the heel because of the bone.

MICROHEMATOCRIT TUBES	Hold **50-75ul** of blood **RED/GREEN BAND** - Heparin tubes **BLUE BAND** - Nonadditive tubes
ORDER OF DRAW	EDTA Other additives Serum specimens

CAPILLARY PUNCTURE STEPS

1. Review test requisition
2. Approach, identify and prepare patient
3. Verify diet restriction and latex sensitivity
4. Sanitize hands and put on gloves
5. Position patient
6. Select the puncture/ incision site

-**Adults/ children > 1 yr** - palmar surface of the middle or ring finger of the nondominant hand

-**Infants** - heel puncture (< 2 mm)

7. Warm the site if applicable

-with cloth/towel/diaper moistened w/ warm water for 3-5 min

-Must not exceed 42 deg cel

8. Clean and air-dry site

-70% isopropanol

9. Prepare Equipment
10. Puncture the site and discard the lancet/incision devise
11. Wipe away first drop of blood
12. Fill and mix the tubes/container in order of draw
13. Place gauze and apply pressure
14. Label the specimen
15. Dispose contaminated materials
16. Thank patient, remove gloves and sanitize hands
17. Transport specimen to the lab

TYPES OF SAMPLES

WHOLE BLOOD

BOTH the liquid portion of the blood (plasma) + cellular components (RBC, WBC, platelets)

PLASMA

fluid portion of an anticoagulated blood

SERUM

fluid portion of coagulated blood

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