

Mustansiriyah University
College of science
Biology Dept.
Zoology
4th class
Laboratory Technique LAB.
(3)

NAME :

Laboratory Departments

Teaching hospital

- ***Clinical Biochemistry (Chemical Pathology)***
- ***Haematology***
- ***Histopathology***
- ***Microbiology***
- **Immunology**
- **Virology**
- **Sub Fertility – associate department**
- **Cytology**
- **Others e.g. Genetics**

What constitutes a sample

- **Any biological material taken from a patient for diagnostic, prognostic or therapeutic monitoring**
- **Under the new Human Tissues Act tissue includes**
 1. **blood**
 2. **urine**
 3. **faeces**
 4. **sweat**
 5. **semen**
 6. **tissue**
 7. **& other fluids**

Infection risks

- A. All samples must be considered to be infectious**
- B. Use of “Universal Precautions” handling**
- C. Never assume any sample is “*safe*”**
- D. Today’s symptoms may be tomorrow’s diagnosis of infection**

Phases of analysis

1) Pre-analytical (from the patient to the lab)

2) Analytical (in the Lab.)

3) Post-analytical (from the lab to the notes)

1. From the patient to the lab

- **What can (and does) go wrong**

- **Incorrect identification of patient**
- **Patient preparation – fasting, diet, supine, time, drugs.**
- **Sample poorly/ incorrectly taken**
- **Inaccurate timing**
- **Wrong type of sample**

2. Analytical (in the Lab.)

What can (does) go wrong?

- **Incorrect container(s)**
- **Under-filling**
- **Mislabelling/ no labelling**
- **Incorrect storage/ transport (ice, warm, delay)**
- **Loss, breakage etc.**

2. Post-Analytical (from the Lab.)

- **Write Patient's name fully and correctly**
- **Make sure for the test result**

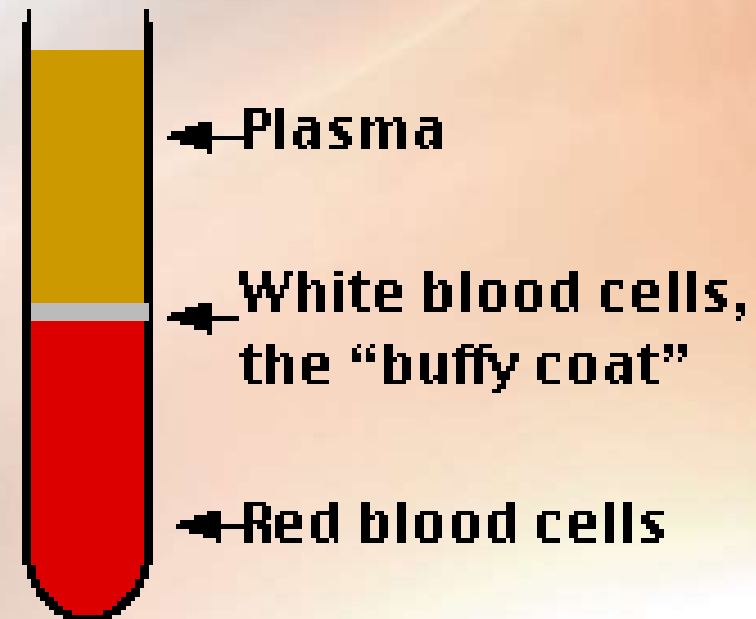
Blood

- **Blood is a liquid tissue. Suspended in the watery plasma are seven types of cells and cell fragments.**
- **Red blood cells (RBCs) or erythrocytes**
- **Thrombocytes**
- **five kinds of white blood cells (WBCs) or leukocytes**
- **Three kinds of granulocytes: Neutrophils; Eosinophils; Basophils**
- **Two kinds of leukocytes without granules in their cytoplasm: lymphocytes and monocytes**

Blood Components

From 10 ml of blood:

- Plasma or serum 6-7 ml
- Lymphocytes and mononuclear cells $10\text{-}20 \times 10^6$ Cells/ml
- Erythrocyte (red blood cells) and other cells – 5×10^6 cells/ μl ; 10-15 mg HB



Venous blood sampling



Syringe



Hybrid



Evacuated



Plain Tube



EDTA Tube



Heparin Tube



PT Tube



Serum Tube



SST Tube



ESR Tube



Glucose Tube



Multi Sample Needle



Butterfly Needle



Hypodermic Needle



Disposable Syringes



Blood Lancets



Tourniquet




Needle Holder



Specimen Container

Vacuum Collection Tubes

- **Vacuum collection tubes are glass or plastic tubes sealed with a partial vacuum inside by rubber stoppers.**
- **The air pressure inside the tube is negative, less than the normal environment.**
- **The difference in pressure between the inside of the tube and the vein causes blood to fill the tube.**
- **Different blood tests requires different types of blood specimens.**
- **Most tubes have additives called anticoagulants which prevent clotting/coagulation of the blood.**
- **Plastic tubes may have an additive to enhance clotting of the blood**

		Blood Culture	Aerobic followed by Anaerobic - if insufficient blood for both culture bottles, use Aerobic bottle only	Use blood culture collection packs only	
	Cat. No. KFK119 Draw Volume 2.7ml	Citrate	Coagulation Studies, INR + KCCT, D-Dimer, Fibrinogen	Tube must be full	3-4
	Cat. No. KFK168 Draw Volume 6ml	Serum	Bacteriology and Viral Serology, Selenium, Zinc, 17 OHP, Androgens, Androstendione, IGF1/IGFBP3, DHAS, GH, Vit D, Insulin, C peptide, Antibiotic Assays. Cryoglobulin (2 Red + EDTA)	Immunology requests except C3D	8-10
	Cat. No. KFK114 Draw Volume 6ml	SST™ II	Aldosterone, B12, Ferritin and S. Folate, Downs Screen and all routine Biochemistry profiles except those mentioned elsewhere	Tube must be full	5-6
	Cat. No. KFK099 Draw Volume 6.5ml	Heparin	Carboxyhaemoglobin Methaemoglobin Cytogenetics	Tube must be full	8-10
	Cat. No. KFK171 Draw Volume 4ml	EDTA	FBC, Platelets, Sickle Test, Malaria, HbA1c, Hb Electrophoresis. The following tests require a separate tube and need to be sent to the laboratory straight away: Tacrolimus, Mycophenolate, Viscosity, Cyclosporin, Lead, C3D, Ammonia, ACTH, ESR, Chromosomes, Renin, Cryoglobulin (+2x Red), CTX	Tube must be full	8-10
	Cat. No. KFK277 Draw Volume 6ml	Cross Match	Blood Group Cross Matching	Tube must have four patient identifiers and be signed	8-10
	Cat. No. KFK250 Draw Volume 2ml	Fluoride Oxalate	Blood Glucose Ethanol Lactate	Tube must be full	8-10

Blood Collection: Color-code Tubes

- **Red-top tubes**
- **contain no additives.**
- **These tubes are used for tests performed on serum samples and DNA.**
- **When you use the red-top tubes, the sample can be placed for 1-2 hours so that the serum and blood clots will be separated.**
- **Blood clots can be used for DNA analysis.**

Blood Collection: Color-code Tubes

- **Green-top tubes contain heparin**
- **Blue-top tubes contain sodium citrate and citric acid**
- **Black-top tubes contain sodium oxalate**
- **Yellow-top tubes contain acid-citrate-dextrose (ACD) solution.**
- **Grey-top tubes contain a glycolytic inhibitor.**

Blood Collection: Color-code Tubes

- **Lavender-top tubes contain EDTA**, commonly used clinically for complete blood cell counts.
- This is the way to obtain lymphocytes for DNA extraction, plasma for nutritional analysis, and red blood cells for other assays.