جامعة المستقبل

كلية التقنيات الصحية والطبية-قسم التخدير

Physiology Practical
Lecture: (2)
HEMATOLOGY

اعداد

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General Objective

To understand the characteristics and components of blood, as well as the processes related to the collection and analysis of blood samples.

Behavioral Objectives

1. Define the components of blood.

2. Explain the role of blood in oxygen transport.

3. Identify the sites for venous blood collection.

4. Describe the steps for preparing a blood sample for analysis.

5. Compare the characteristics of venous blood and capillary blood.

Lecture Topics

(The Blood)

(Blood Components)

(Functions of Blood)

(Collection of Blood Samples)

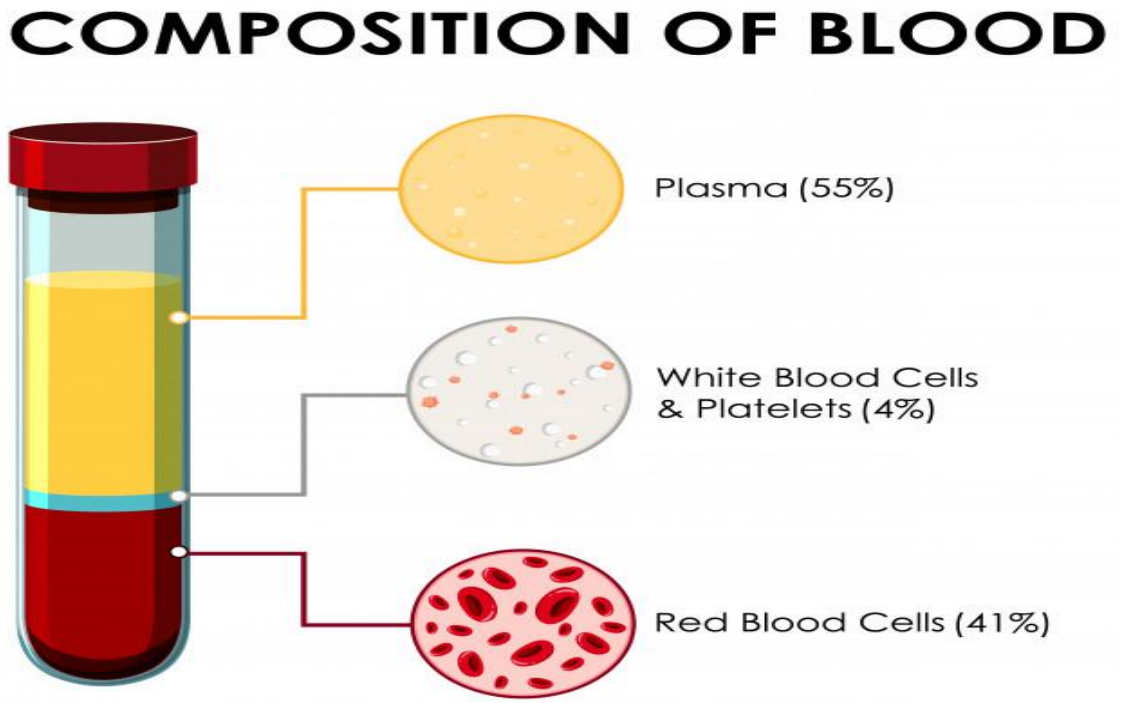
(Preparation of Blood Sample)

What do you know about blood and its components?

The Blood

➢**Blood** . It is a mixture of cellular component suspended in plasma, it is a type of connective tissue because it is made in bone marrow. It has four main components:

- ❖ Plasma
- ❖ Red blood cells
- ❖ White blood cells
- ❖ Platelets



Blood Components

- Plasma

➢ Mixture of water, sugar, fat, protein, and salts.

➢ The main function is: transport blood cells throughout your body such as nutrients, waste products, antibodies, clotting proteins, chemical messengers such as hormones, and proteins that help maintain the body's fluid balance.

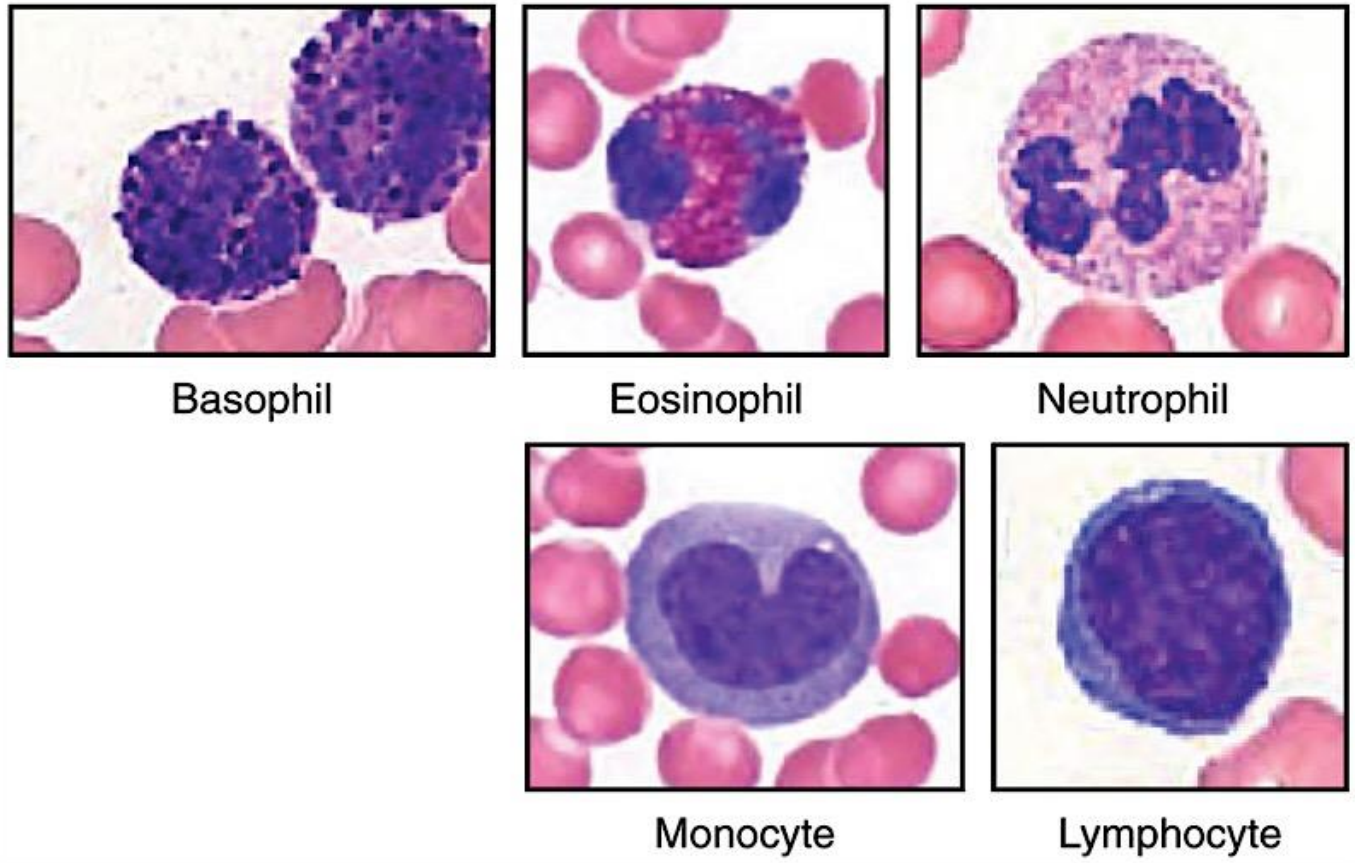
Red Blood Cells (also called erythrocytes or RBCs

- Red cells are the most abundant cell in the blood
- The shape of a red blood cell is a biconcave disk with a flattened center
- Production of red blood cells is controlled by erythropoietin
- Red blood cells have no nucleus and can easily change shape, helping them fit through the various blood vessels in your body.
- Red cells contain a special protein called hemoglobin

White Blood Cells (also called leukocytes)

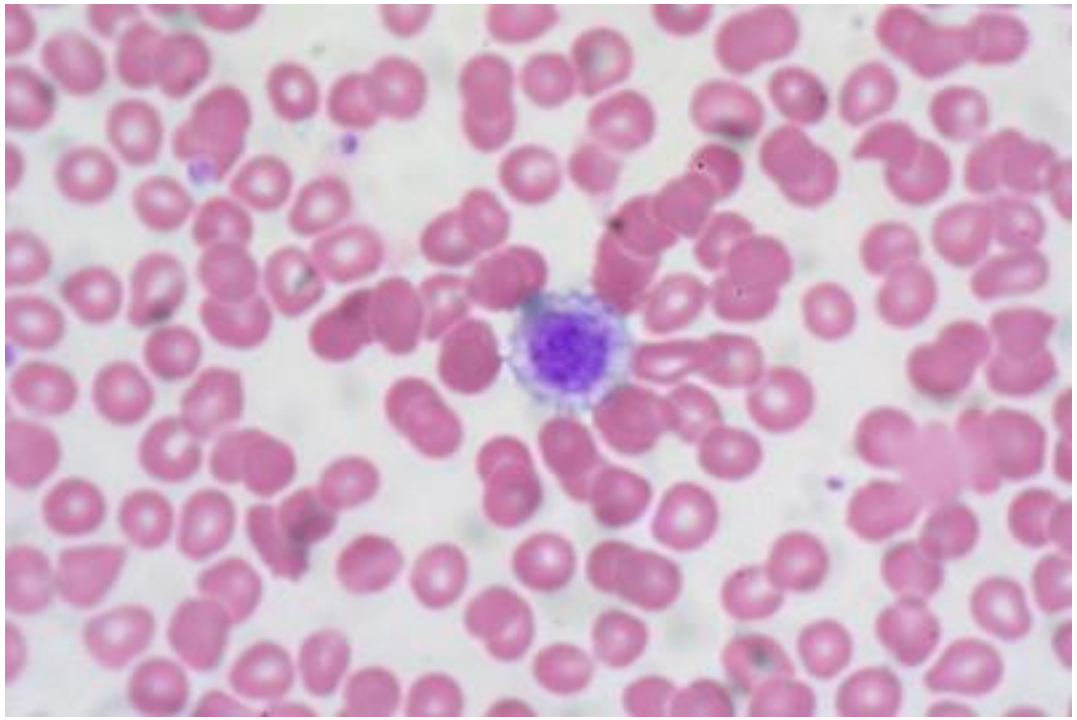
- White blood cells protect the body from infection.
- There are five major types of white blood cells:

- Neutrophils
- Lymphocytes
- Eosinophils
- Monocytes
- Basophils



- **Platelets (also called thrombocytes)**

Platelets help the blood clotting process



Functions of blood

- Transporting oxygen and nutrients to the lungs and tissues
- Forming blood clots to prevent excess blood loss
- Carrying cells and antibodies that fight infection
- Bringing waste products to the kidneys and liver, which filter and clean the blood
- Regulating body temperature

Group activity "How can disorders in blood functions affect daily activities and overall health?"

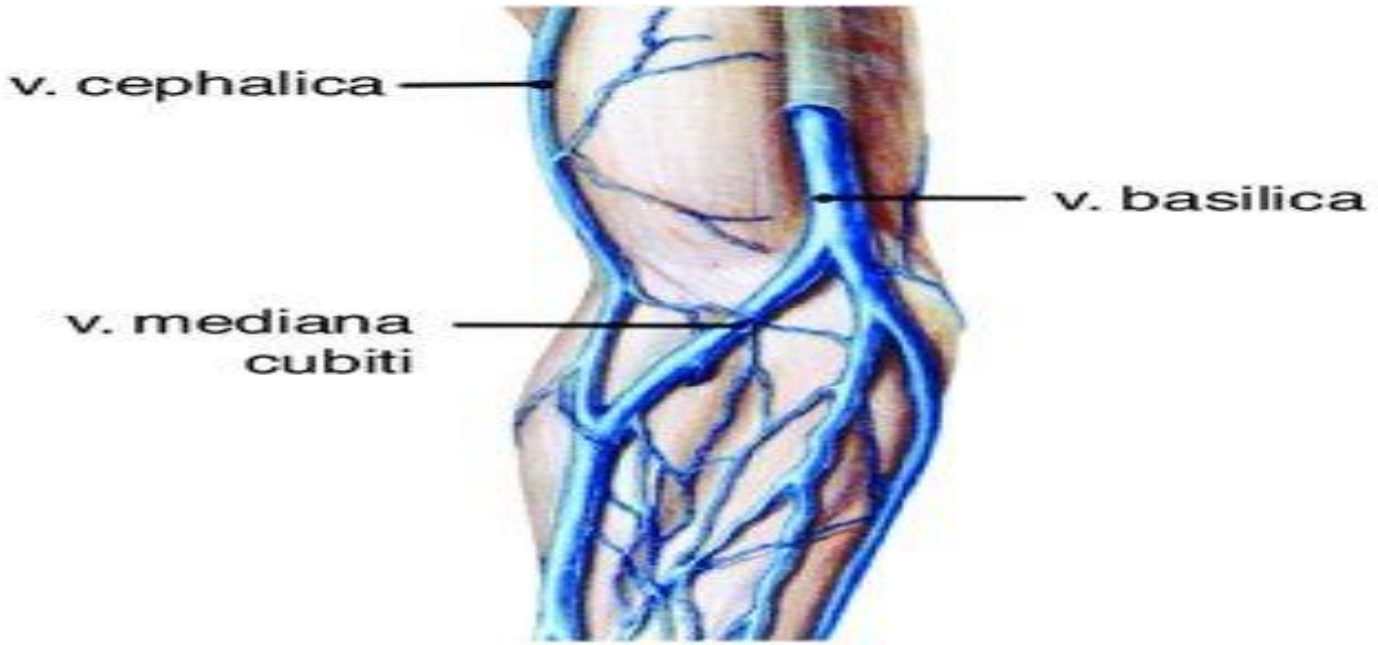
Collection of blood samples

AVENOUS BLOOD

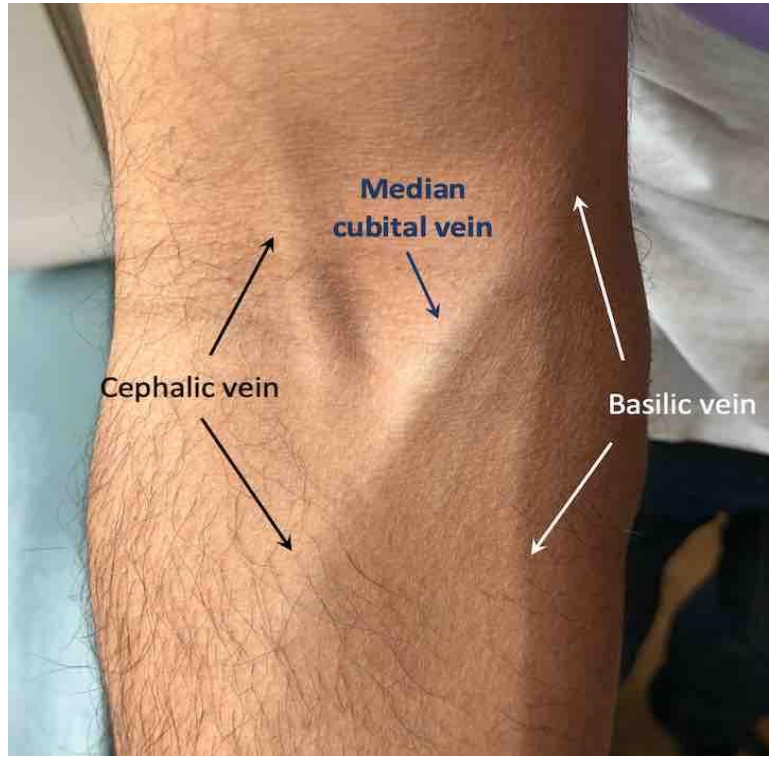
➢Venous blood is deoxygenated blood that flows from tiny capillary blood vessels within the tissues into progressively larger veins to the right side of the heart.

➢**Selecting vein site:**

- **Median cubital vein**
- **Cephalica vein**
- **basilica vein**




VENEPUNCTURE


Median
cubital vein
Cephalic vein
Basilic vein

CAPILLARY BLOOD

- Capillary blood is obtained from capillary beds that consist of the smallest veins (venules) and arteries.
- The venules and arterioles join together in capillary beds forming a mixture of venous and arterial blood.

Specimen type	Method of collection	Common use
Venous	Direct puncture of vein by venipuncture	Routine laboratory tests
Arterial	Direct puncture of artery;	Arterial blood gases
Capillary	Dermal puncture of fingertip or heel	• Infants and young children • Elderly patients with fragile veins • Severely burned patients • Point-of-care testing

Individual Activity

"How can the accuracy of blood samples in analysis be improved?"

Preparation of Blood Sample

- **Whole blood** It must be analyzed within limited time **(why?)**

➢cells will lyses in whole-blood which will change the concentration of some analytes as potassium, phosphate and lactate dehydrogenase.

➢Some cellular metabolic processes will continuo which will alter analytes concentration. like glucose and lactate.

Plasma

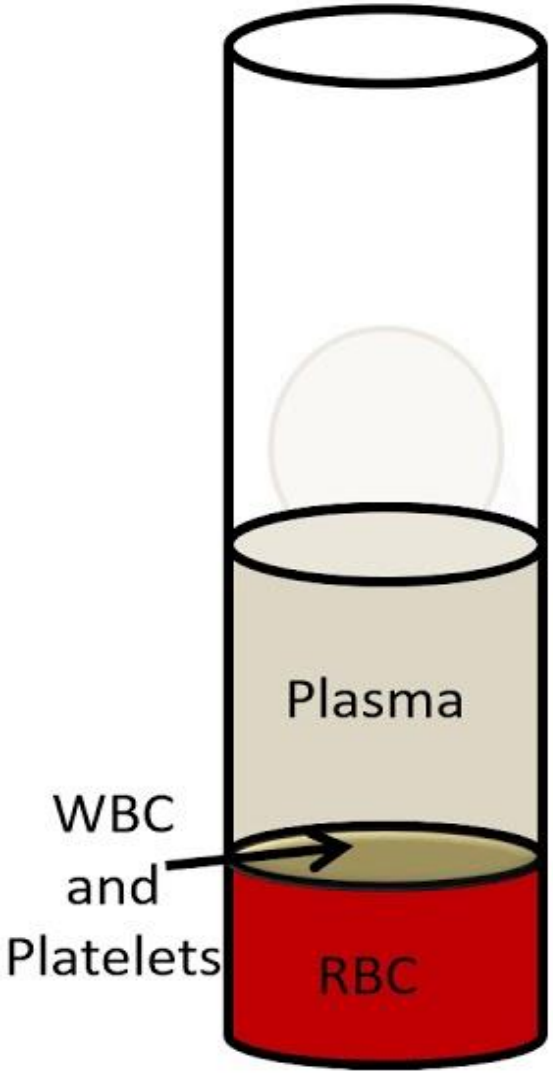
- it has anticoagulant .the plasma has all clotting factor .

- plasma uses; blood chemistry and coagulation study.

Serum

- it has no anticoagulant, it contains all the contents except clotting factor .

- Serum uses :blood chemistry, serology, immunology.



Plasma

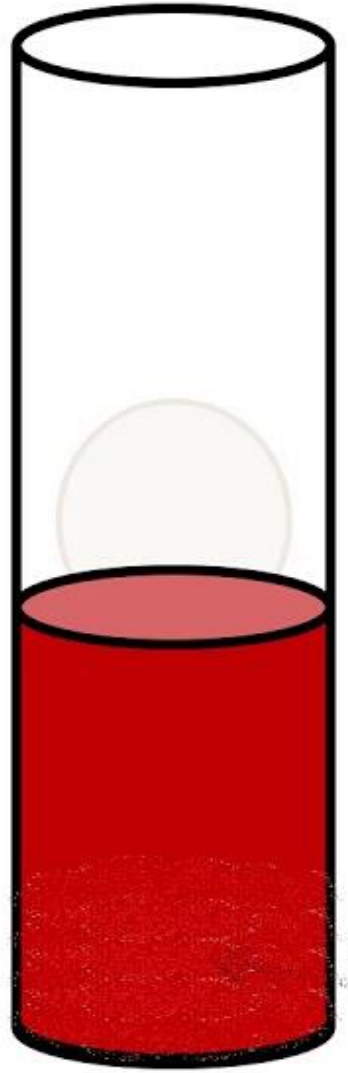
- Centrifugation done directly with anticoagulants
- Clotting factors present e.g. Fibrinogen
- Given to patients lacking blood cells

Vs

Serum

- Centrifugation done after coagulation without anticoagulants
- Absent

  Serum= Plasma- Clotting Factors
- Used for diagnosis



Assignment

Compare the properties of venous blood and capillary blood.

Thank You!