Al-Mustaqbal University

College of Engineering and Technologies

Biomedical Engineering Department

Practical Biology

Lecture: 3

Hematology

Prepared by:

Dr. Asma'a Hassan Mohamed

Asmaa_Hassan@uomus.edu.iq

2024-2023

Hematology:

Can be defined as the scientific study of blood and the tissues that make it .

There are main field in laboratory diagnostic for hematology:

1- Routine hematology (ex. full blood examinations, morphology)

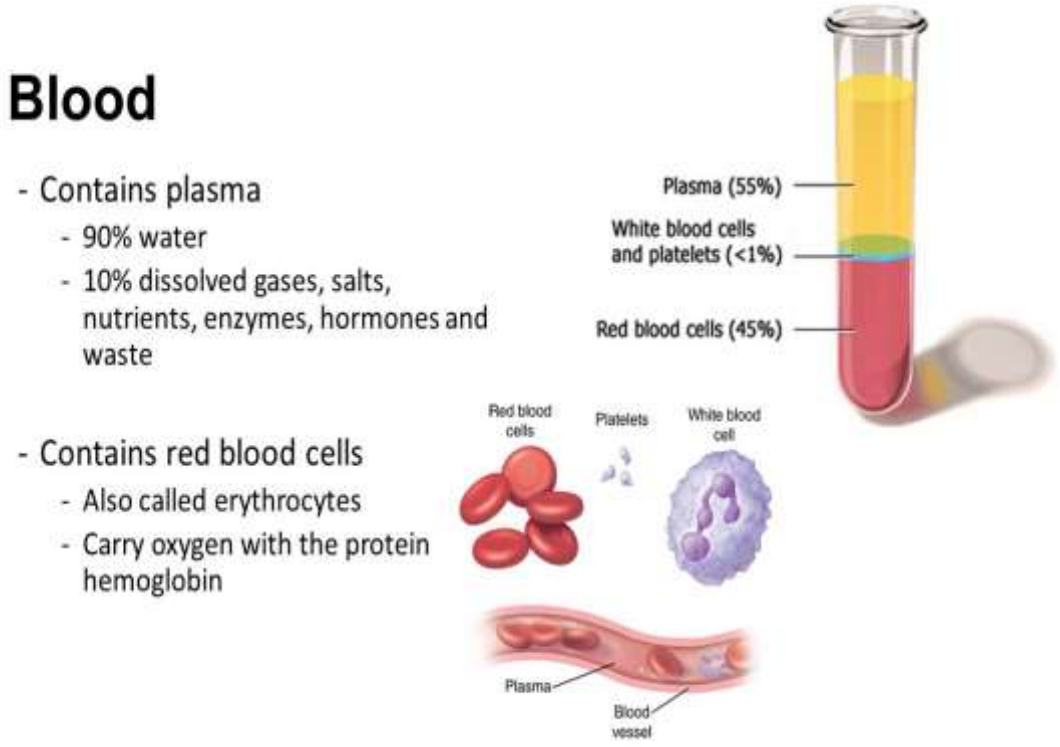
2- Coagulation-tests

Blood :

- is the red fluid that circulates in our blood vessels, i.e. veins and arteries. The main function of blood is to act as the body's transport system, but it also has a major role in the body's defense against infection.
- Blood consist of cells and plasma (proteins, sugars, water)
- The 3 main types of blood cells :
- 1- Platelets help the blood to clot. Clotting stops the blood from flowing out of the body when a vein or artery is broken.
- 2- Red blood cells carry oxygen. they each have a life span of about 120 days. Red blood cells are also called erythrocytes.
- 3- White blood cells responsible in infection. Its also called leukocytes.

Blood sampling :

- Three different specimens:
- Whole blood used for performing complete blood counts (blood films)
- Plasma is the fluid contain blood cells(RBC,WBC, platelets)
- Serum is the fluid remain after separation of the clot when the blood put in the tube without anticoagulant



Serum preparation:

- 1- Collect whole blood in a covered test tube.
- 2- After collection of the whole blood, allow the blood to clot by leaving it at room temperature. This usually takes 15–30 minutes.
- 3- Remove the clot by centrifuging at 3,000 x g for 10 minutes in a centrifuge.
- 4- The resulting supernatant is designated serum.

- 5- transfer the liquid component (serum) into a clean tube using a Pasteur pipette.
- The samples should be maintained at 2–8°C while handling.
- If the serum is not analyzed immediately, the serum should be stored at –20°C or lower.
- It is important to avoid freeze-thaw cycles because this is can invalidate certain tests.

Plasma preparation:

- 1- Collect whole blood into anticoagulant-treated tubes e.g., EDTA-treated (lavender tops) or citrate-treated (light blue tops). Heparinized tubes (green tops) are indicated for some applications.
- 2- Cells are removed from plasma by centrifugation for 10 minutes at 3,000x g using a centrifuge.
  3- The resulting supernatant is designated plasma.
- 4- immediately transfer the liquid component (plasma) into a clean tube using a Pasteur pipette.
- The samples should be maintained at 2–8°C while handling. If the plasma is not analyzed immediately, the plasma should be stored, and transported at –20°C or lower.
- It is important to avoid freeze-thaw cycles. Samples can invalidate certain tests.