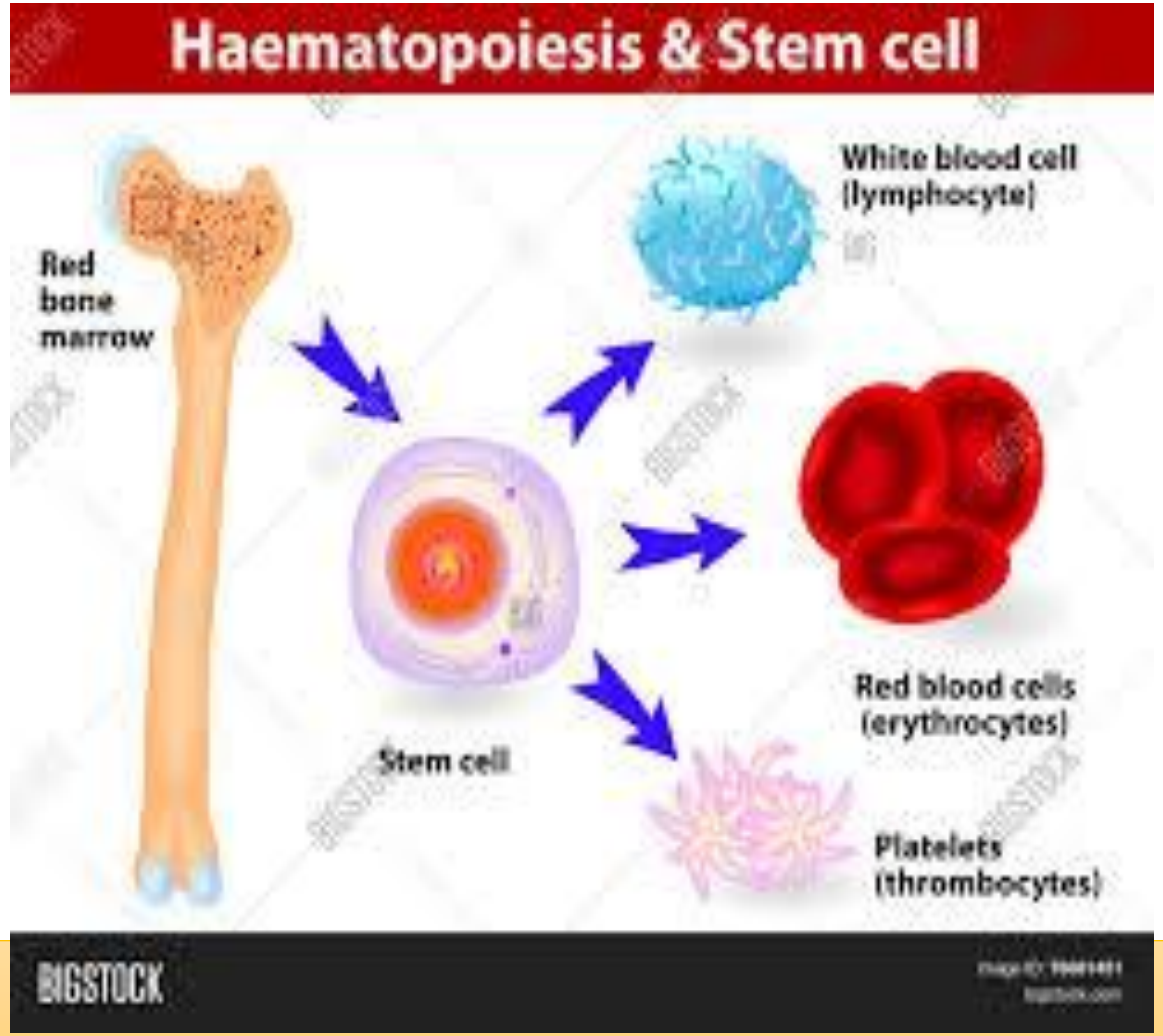
University of Al-Ameed
College of Pharmacy

Practical physiology

Blood physiology

Hematopoiesis

- Is the formation of blood cellular components
- Blood is a mixture of cellular component suspended in plasma
- In the early few weeks of embryonic life blood cells are produced in the yolk sac. (after the third month of pregnancy) they are formed mainly in the liver, the lymph nodes and the spleen.



- The amount of blood in the body has been measured in different ways. Naturally the volume of blood can be expected to vary with the size of the body.

- The blood volume of an adult human of average size is about 6-8 % (in man 52-83 mL/kg; woman 50-75 mL/kg). The normal total circulating blood volume is about 8% of the body weight (5600 ml in a 70 kg man) about 55% of this volume is plasma.

- Blood pH :
  - the acidity or alkalinity of blood .
  - the pH of any fluid is the measure of the hydrogen ion (H^+)concentration .

- A variety of factors affect blood pH including \vomiting , diarrhea , lung function , endocrine function , kidney function , and urinary tract infection.
- the normal blood pH is tightly regulated between 7.35-7.45
- regulated to stay within the narrow range of 7.35-7.45, making it slightly alkaline .
- Blood that has a ph below 7.35 is too acidic , whereas blood ph above 7.45 is too alkaline .


BLOOD PH RANGE
6
7
7,35
7,45
7,8
9
DEATH
ACIDOSIS
NORMAL
ALKALOSIS
DEATH
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Functions of blood

- Supplies oxygen and nutrients to different tissues of our body .
- Removes waste products like urea , lactic acid and CO_2 from our body
- Provides immunity to body against foreign particles
- Helps in transportation of substance such as (hormones) throughout the body.
- Aids in blood clotting which is a natural repair mechanism of cells or arrest of bleeding (hemostasis)
- Regulates normal temperature .
- Maintains pH balance

Blood components

1- Water /transport medium ; carries heat

2- Electrolytes

- Membrane excitability
- Osmotic distribution of fluid between ECF & ICF
- BUFFERING OF PH changes

3- Nutrients , wastes , gases , hormones

- No function – just being transported

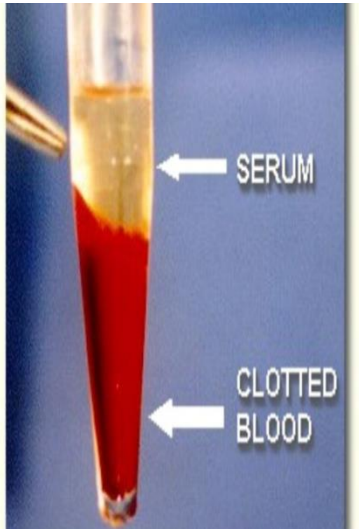
4- Plasma protein /a part of the extracellular fluid of the body. The normal plasma volume is about 5% of the body weight .Plasma consists of an aqueous solution of proteins, electrolytes, and small organic molecules. The major types of protein present in the plasma are albumin ,globulins of α1, α2, β1, β2 and γ types, and

Plasma and serum

Plasma	Serum
Is the liquid , cell-free part of blood , that has been treated with anticoagulants	Is the liquid part of blood AFTER coagulation , therefore devoid of clotting factors as fibrinogen
Anticoagulated	Clotted

- **Blood plasma** is prepared by spinning a tube of fresh blood containing an anti-coagulant in centrifuge until the blood cells fall to the bottom of the tube.

  The blood plasma is then poured or drawn off.
- **Blood serum** is blood plasma without fibrinogen
- or the other clotting factors (i.e. whole blood – both
- the cells and the clotting factors)

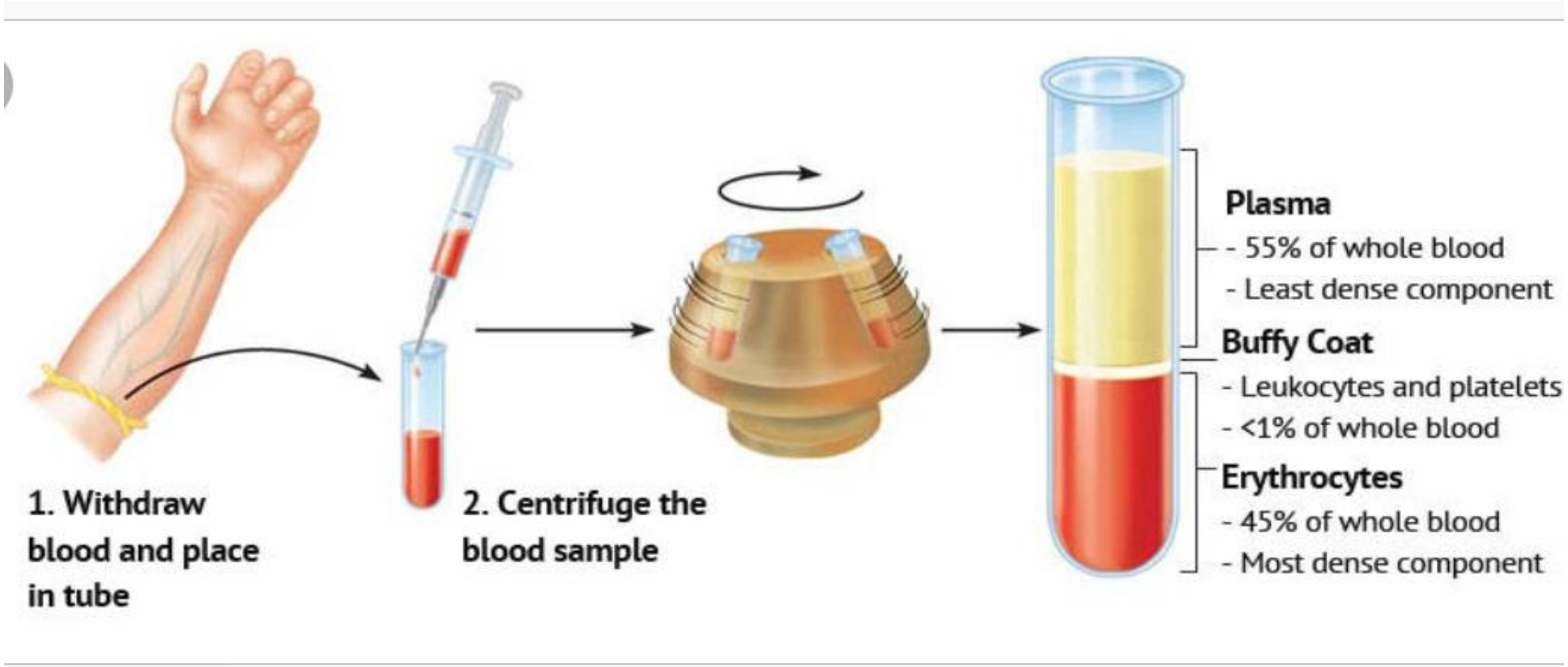


Plasma protein function

(albumins , globulins , fibrinogen)

1. Maintaining colloid osmotic balance (albumins)
2. Buffering pH changes
3. Transport of materials through blood (such as water insoluble hormones)
4. Antibodies (e.g. gamma globulins , immunoglobulins)
5. Clotting factors (e.g. fibrinogen)

procedure


1. Withdraw blood and place in tube
2. Centrifuge the blood sample
Plasma
- 55% of whole blood
- Least dense component
Buffy Coat
- Leukocytes and platelets
- <1% of whole blood
Erythrocytes
- 45% of whole blood
- Most dense component

Thank You