Physiology

3rd stage

Lab . 2

Introduction of Blood Physiology

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Blood

is a body fluid in humans and other animals that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells.

Blood Functions

- Transport of dissolved substances.
- Regulation of pH and ions.
- Restriction of fluid losses at injury sites.
- Defense against toxins and pathogens.
- Stabilization of body temperature.

Physical Characteristics of Blood

Bright red in arteries & dark red in veins	Colour
8 % of the body mass	Mass
Slightly alkaline (pH = 7.35 – 7.45)	pH
Salty	Taste
38° C (100.4° F)	Temperature
3-4 times more viscous than water	Viscosity
5-6 liter	Volume

COMPOSITION OF BLOOD

☒ Plasma

☒ Cellular elements

- ❖ RBCs (erythrocytes)
- ❖ WBCs (leucocytes)
- ❖ Platelets (thrombocytes)

1. Plasma: is the liquid portion of blood.

- ❖ It constitutes about 55 % of blood volume
- ❖ 90% of plasma is water
- ❖ It contains:

Albumin (the chief protein constituent)

Fibrinogen (responsible, in part, for the clotting of blood)

Globulins (including antibodies).

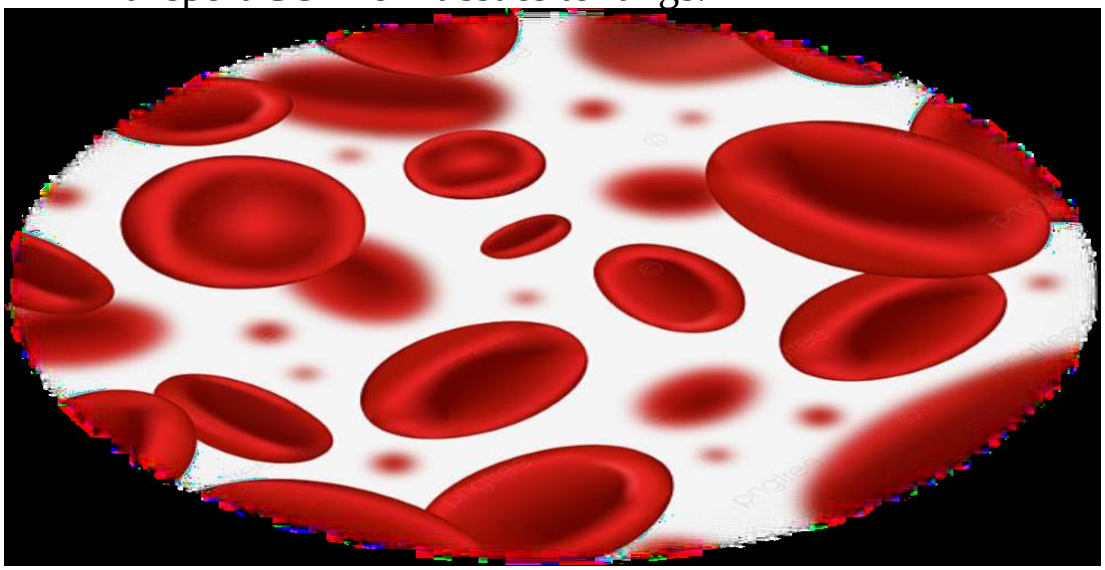
2. Cellular elements

1. Red blood cells

Circular biconcave non-nucleated	Shape
Diameter = 7 – 8 µm	Size
Thickness = 2.5 µm	
Red (hemoglobin pigment)	colour
Adult male = 5.4 million RBCs/µL	count
Adult female = 4.8 million RBCs/µL	
120 days	Life Span

Functions of RBCs

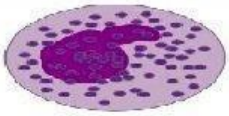
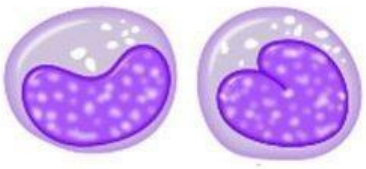
- ❖ Transport O2 from lungs to tissues.
- ❖ Transport CO2from tissues to lungs.



White blood cells

Amoeboid nucleated	Shape
12 – 15 µm	Size
Colourless & translucent	colour
5000 – 10000 WBCs/µL	count
10 – 13 days	Life Span

Granular WBCs

Subtype	Nucleus	Function	Example
Neutrophil	Multi-Lobed	Bacterial or fungal infection. These are the most common first responders to microbial infection.	
Eosinophil	Bi-Lobed	Parasitic infections and allergic reactions (inflammatory).	
Basophil	Bi/Tri-Lobed	Allergic and antigen response (releases histamine causing vasodilation).	
Lymphocyte	Deep Staining, Eccentric	Include B cells, CD4+ helper T cells, and CD8+ cytotoxic T cells. Operate primarily in the lymphatic system.	
Monocyte	Kidney Shaped	Phagocytosis of pathogens. Presentation of antigens to T cells. Eventually, they become tissue macrophages, which remove dead cell debris and attack microorganisms.	

Platelets

Circular biconvex non-nucleated	Shape
2 – 4 µm	Size
1,50,000 – 4,00,000 platelets/µL	count
5 – 9 days	Life Span
Blood clotting	Function