

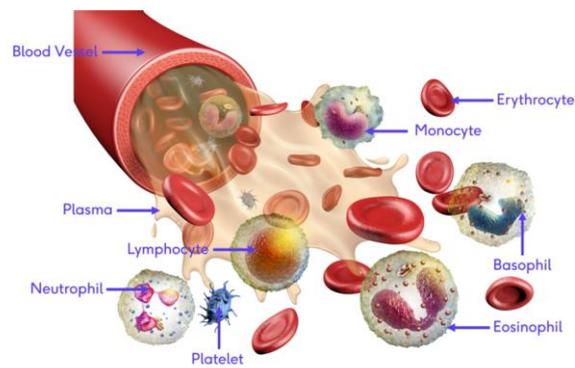


Physiology

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

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

COMPOSITION OF BLOOD

Plasma

Cellular elements

❖ RBCs (erythrocytes)

❖ WBCs (leucocytes)

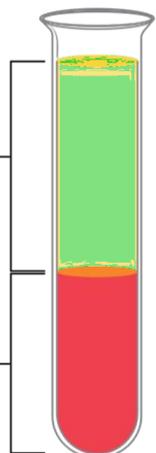
❖ Platelets (thrombocytes)

The blood is about...

55% plasma

and

45% cells



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

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

Functions of RBCs

- ❖ Transport O₂ from lungs to tissues.
- ❖ Transport CO₂ from tissues to lungs.

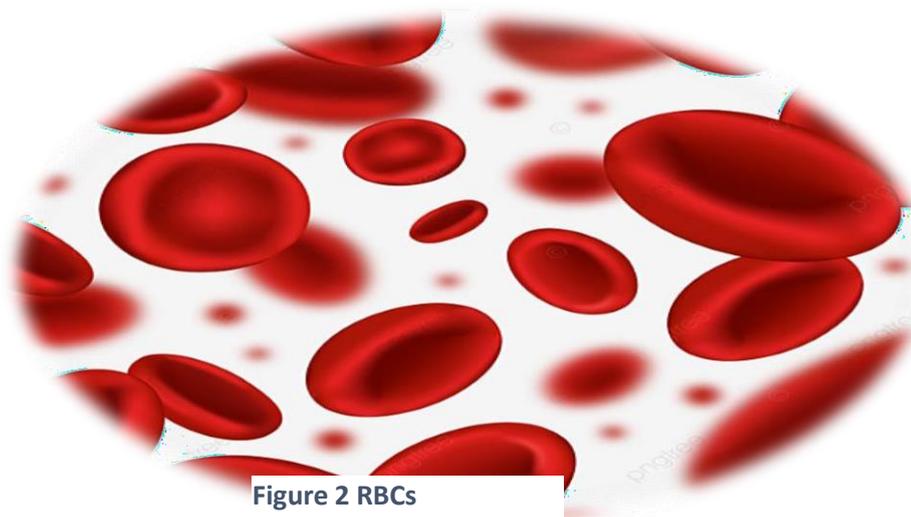
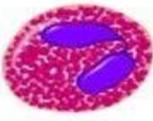
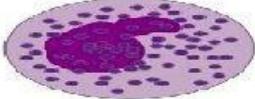
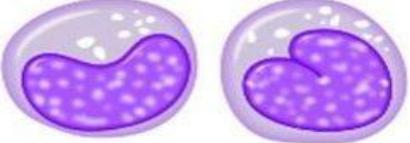


Figure 2 RBCs

2. White blood cells

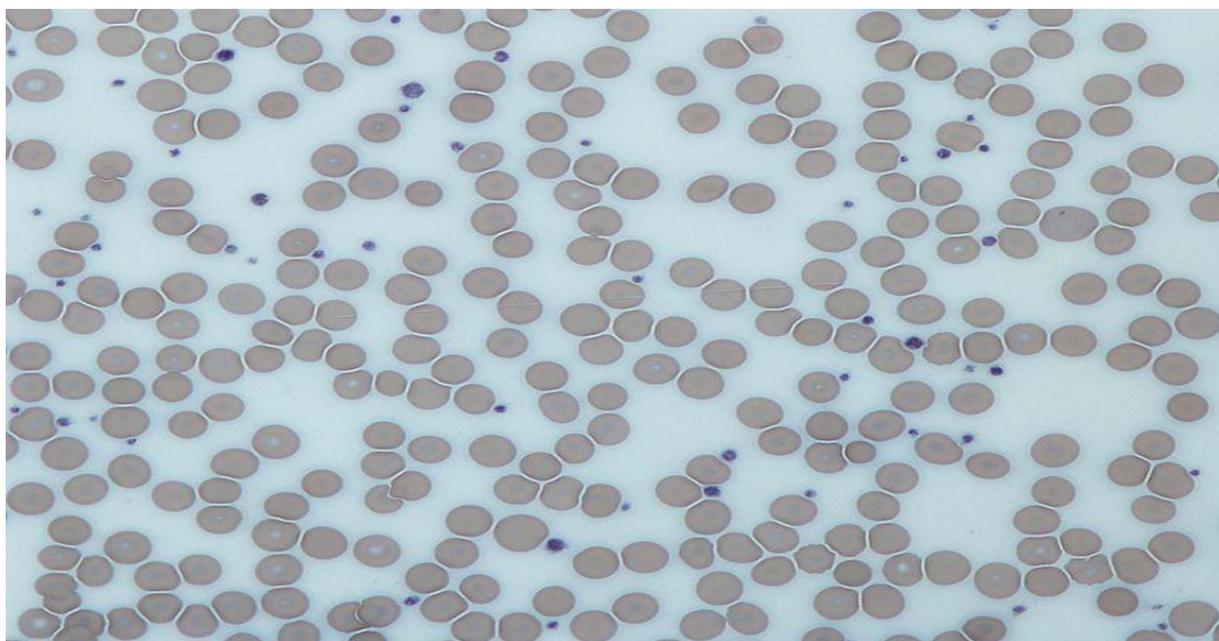
Shape	Amoeboid nucleated
Size	12 – 15 μm
colour	Colourless & translucent
count	5000 – 10000 WBCs/ μL
Life Span	10 – 13 days

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.	

3. Platelets

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



Platelets