



جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم
قسم الانظمة الطبية الذكية
Lecture: (4)

Subject: **The Blood System terminology**

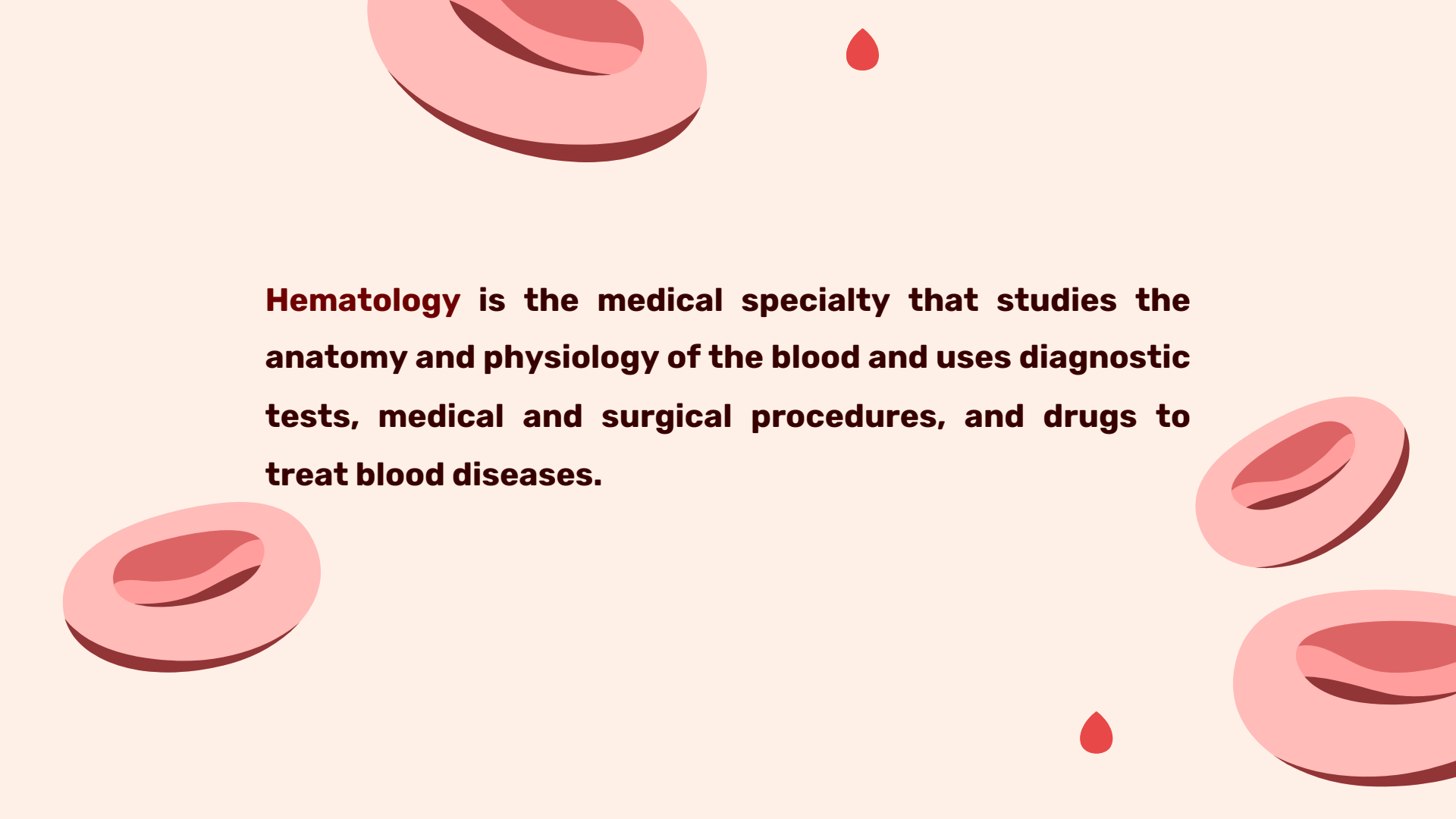
Level: First

Lecturer: MSc. Mustafa Yousif



The Blood

- Contains blood cells, blood cell fragments, water, and other substances (proteins, clotting factors, etc.)
- Transports oxygen, carbon dioxide, nutrients, and waste products
- Contains cells that also function as part of the immune system

The background features several stylized, 3D-rendered red blood cells in shades of pink and red, scattered across the frame. A single, solid red teardrop-shaped drop is positioned near the top center, and another similar drop is located near the bottom right. The overall aesthetic is clean and medical.

Hematology is the medical specialty that studies the anatomy and physiology of the blood and uses diagnostic tests, medical and surgical procedures, and drugs to treat blood diseases.

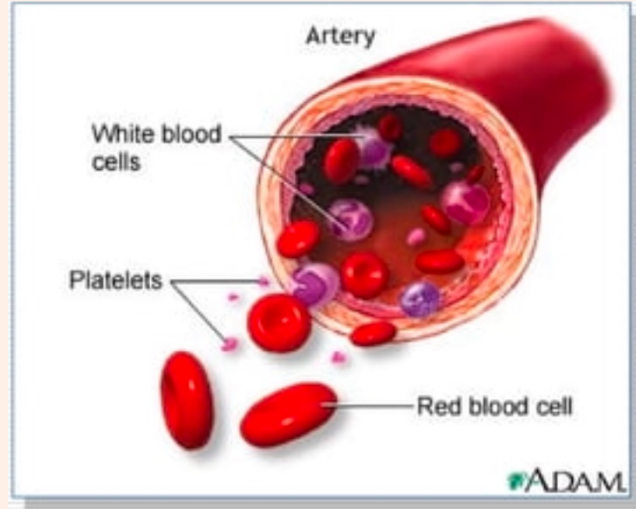
- **Erythrocytes**

Red Cells - RBC

- **Leukocytes**

White Cells - WBC

- **Platelets**

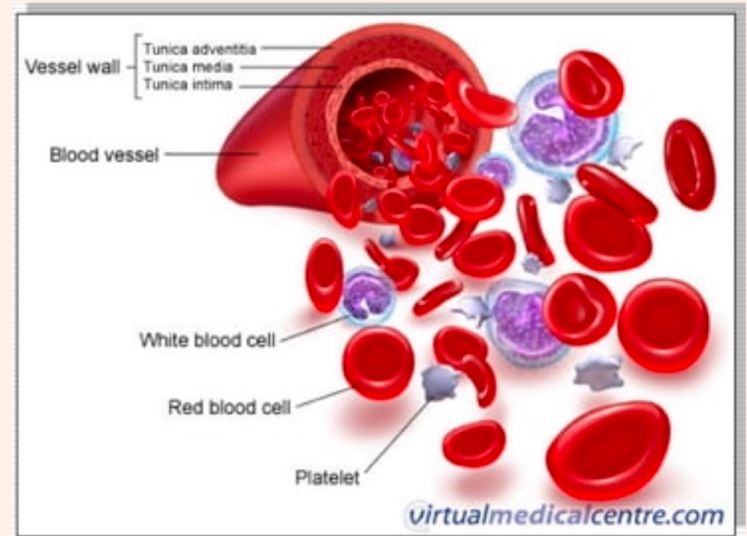


❑ Transports substances throughout body

- Substances are attached to **red blood cells** or dissolved in **plasma**

❑ **White blood cells** fight infection and disease

❑ **Platelets** initiate blood clotting process



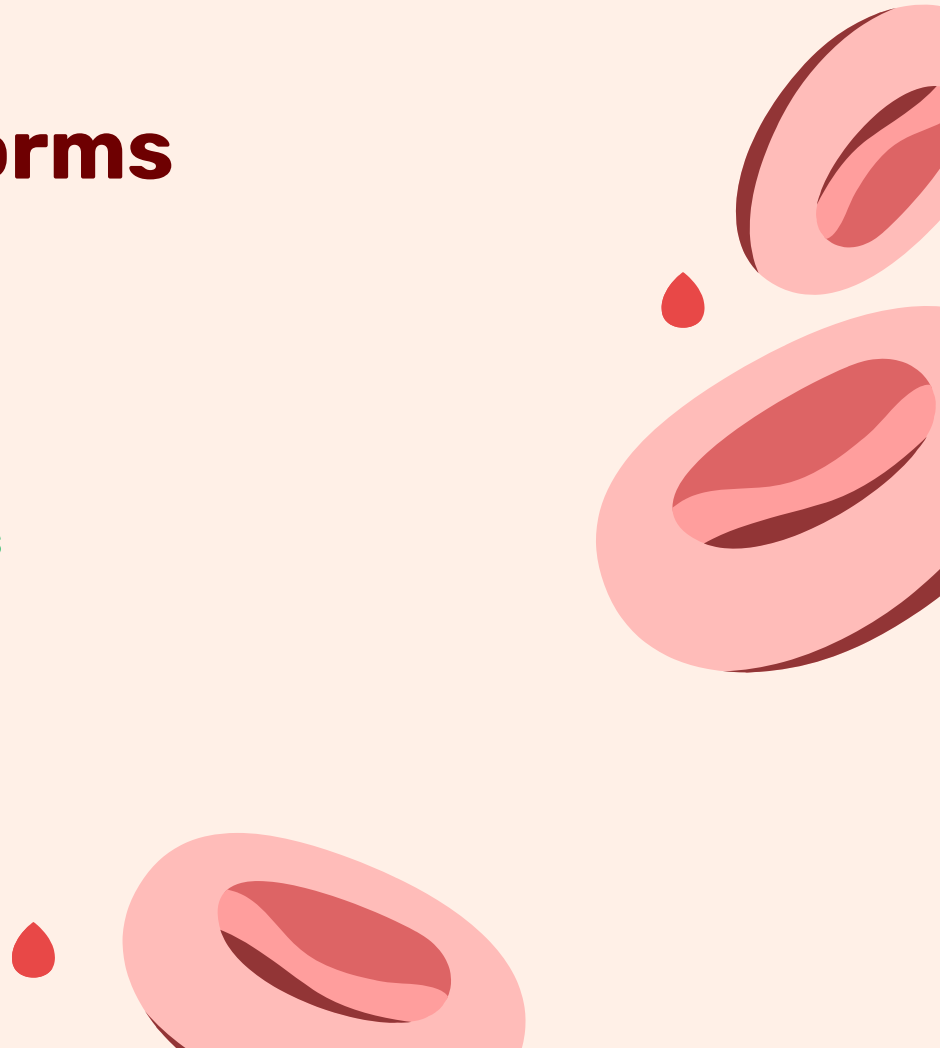
Blood Combining Forms

- agglutin/o
-clumping
- bas/o
-base
- Chrom/o
-color
- coagul/o
-clotting
- erythr/o
-red
- fibrin/o
-Fibers
- granul/o
-granules
- hem/o
-blood
- leuk/o
-white
- morph/o
-shape
- neutr/o
-neutral
- thromb/o
-clot



Blood Combining Forms

- -apheresis
-removal
- -cytosis
-more than normal number of cells
- -emia
- blood condition
- -globin
-protein



The Blood

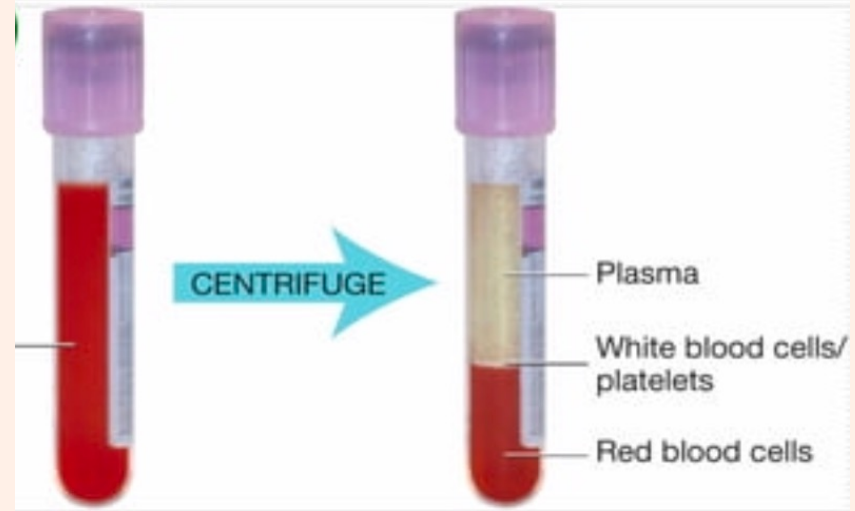
The background features several stylized, pinkish-red illustrations of blood components. On the left, there are two large, disc-shaped red blood cells with a darker red center. Below them is a small red teardrop. In the center, there is a red teardrop containing the letters 'AB' with a small red star above it. To the right, there is a cluster of three small red circles, one of which has a textured, bumpy surface. Further right is another large red blood cell and a small red teardrop. At the bottom center, there is a partial view of a large red blood cell.

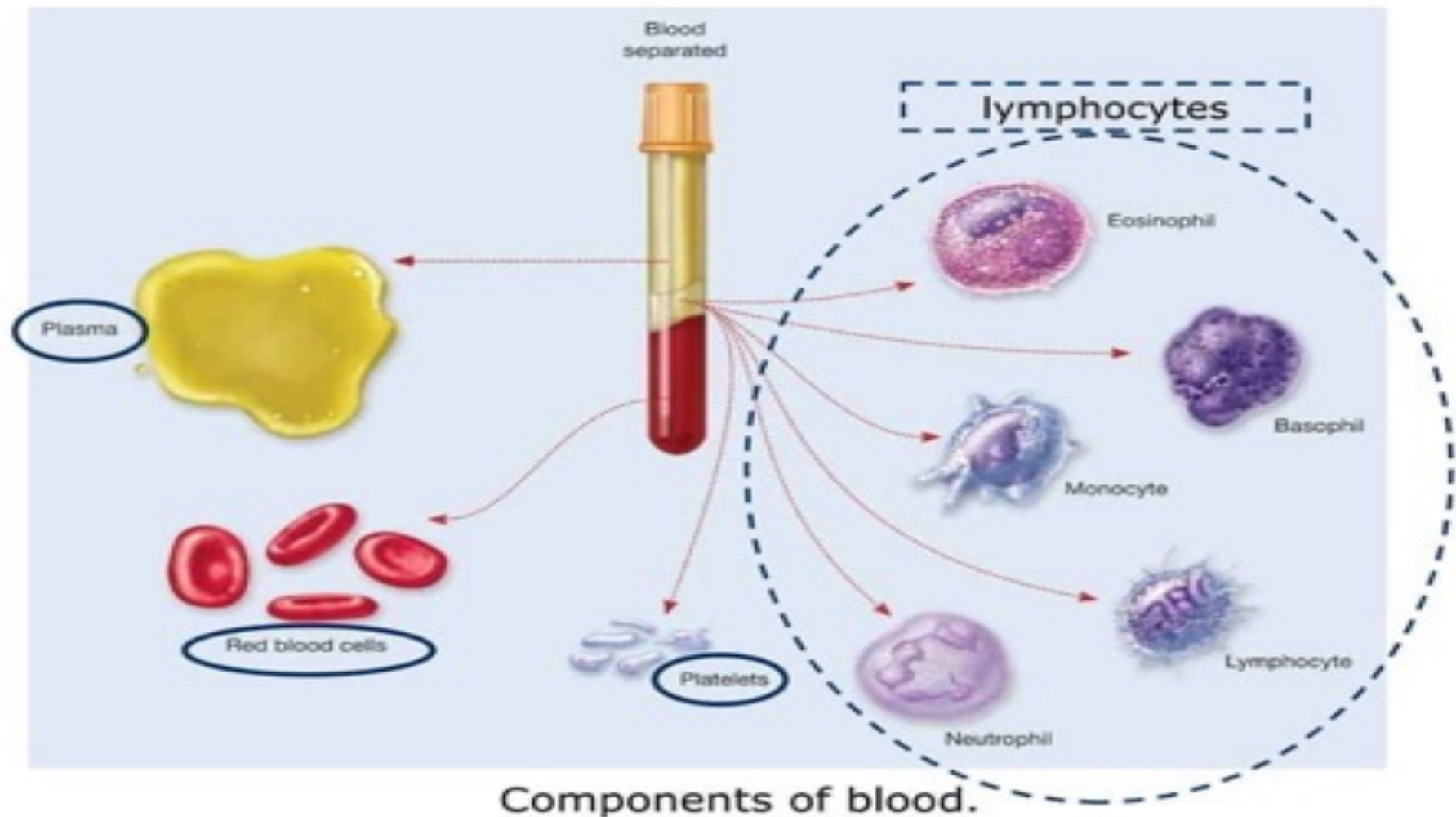
- ❑ Average adult has about **five liters of blood**
- ❑ Circulates through body within blood vessels
- ❑ Blood cells are **produced** in **red bone marrow**
- Process called

hematopoiesis

The Blood

- ❑ Is a mixture of cells floating in a fluid
- ❑ Fluid is **plasma**
- ❑ Cells are called formed elements
 - **Erythrocytes (RBC)**
 - **Leukocytes (WBC)**
 - **Platelets**








Plasma

- Clear, straw-colored liquid (about 90% water) that makes up 55% of the blood.

❑ **Plasma proteins**

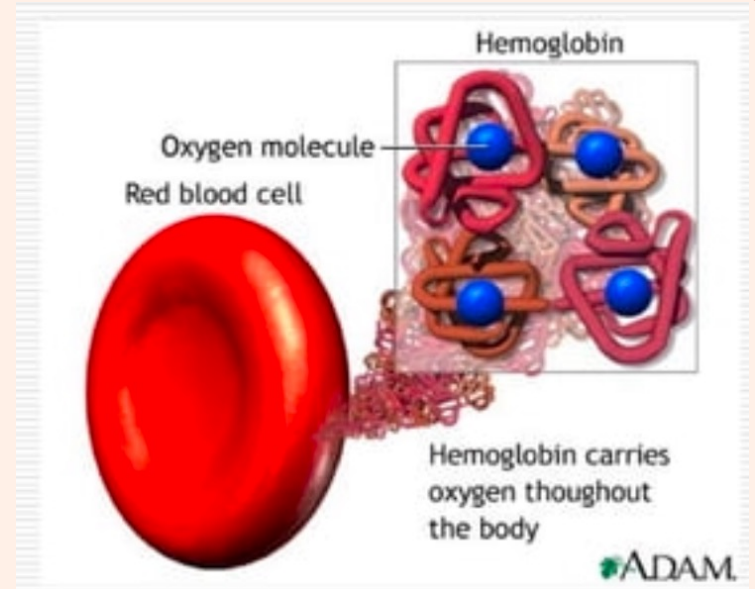
- **Albumin** - helps transport fatty substances
- **Globulin** - **gamma globulins** are antibodies
- **Fibrinogen** - blood **clotting** protein

❑ **Additional important substances**

- Calcium, potassium, sodium, glucose, amino acids, fats, urea, creatinine
- 

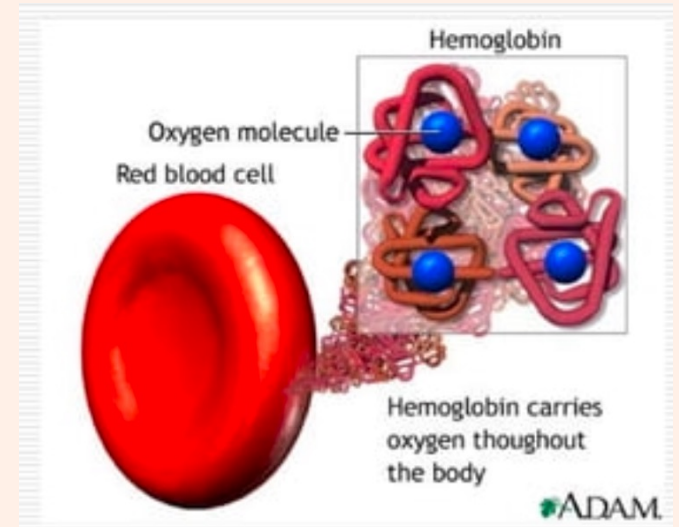
Red Blood Cells (RBC)

- ❑ Called **erythrocytes**
 - Enucleated
 - No nucleus
- ❑ Biconcave disk
- ❑ 5 million per cubic millimeter of blood
- ❑ **Adult** has 35 trillion; more in males



Erythrocytes (RBC)

- ❑ **Hemoglobin** (Hgb, Hb) gives red color
 - Pigment containing iron
 - Responsible for **oxygen transport**
- ❑ Life span of 120 days
 - Spleen removes worn out ones
 - Iron can be reused
 - Bilirubin is waste product disposed of by liver



White Blood Cells (WBC)

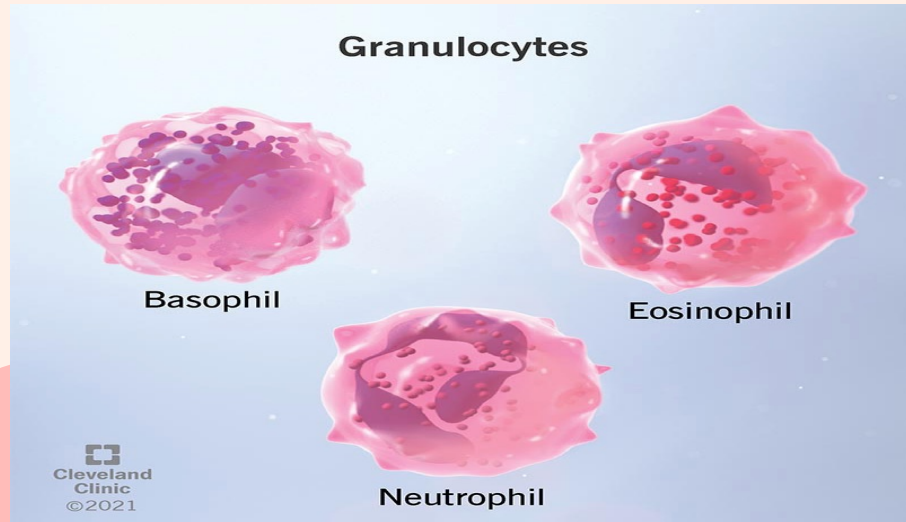
The slide features a light pink background with several decorative elements. On the left, there is a large, stylized red blood cell with a darker red center and a small red blood drop below it. On the right, there is another large, stylized red blood cell with a darker red center and a small red blood drop below it. At the bottom center, there is a partial view of a red blood cell.

- ❑ Also called **leukocytes**
- Spherical shape with large nucleus
- 8,000 per cubic millimeter of blood
- ❑ Provide protection against pathogens
 - Bacteria
 - Viruses
 - Foreign material
- ❑ Subdivided into two categories
 - Granulocytes - have granules in cytoplasm
 - Agranulocytes - no granules in cytoplasm

WBC - Leukocyte Classification

❑ Granulocytes

- **Basophils** Release **histamine** and **heparin** to damaged tissue
- **Eosinophils** Destroy parasites and increase during **allergic reaction**
- **Neutrophils** Important for **phagocytosis**, engulf and destroy bacteria

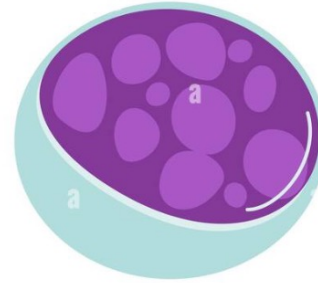




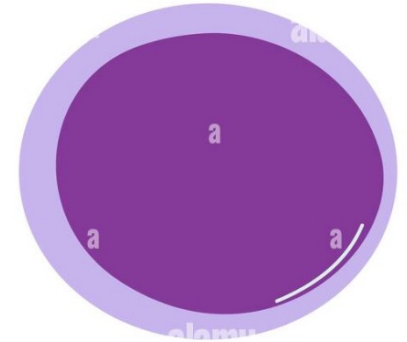
WBC - Leukocyte Classification

❑ Agranulocytes

- **Monocytes** Important for **phagocytosis**
- **Lymphocytes** Provide protection through **immunity**, destroys viruses and produces antibodies



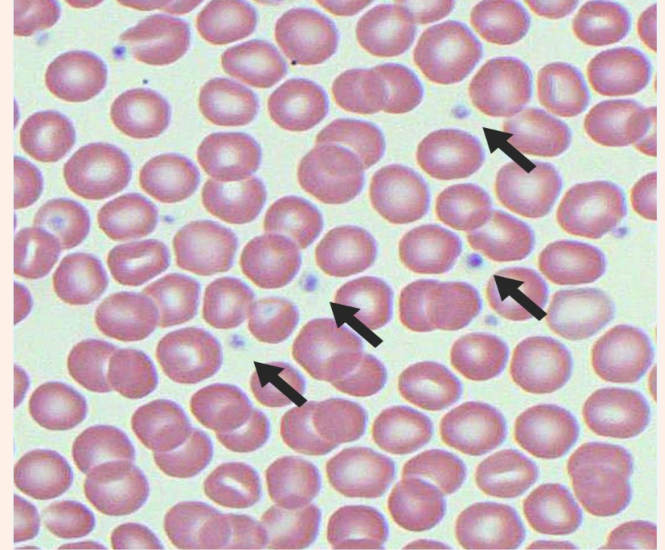
lymphocyte



monocyte

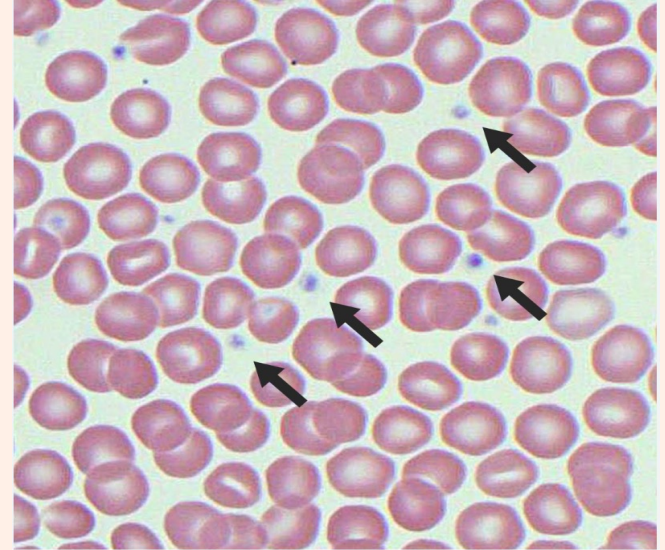
Platelets

- ❑ Also called **thrombocyte**
- ❑ Smallest of all blood elements
- ❑ Plate-like fragments of larger cell
- ❑ 200,000-300,000 per cubic millimeter .
that means they are very, very small !



Thrombocyte

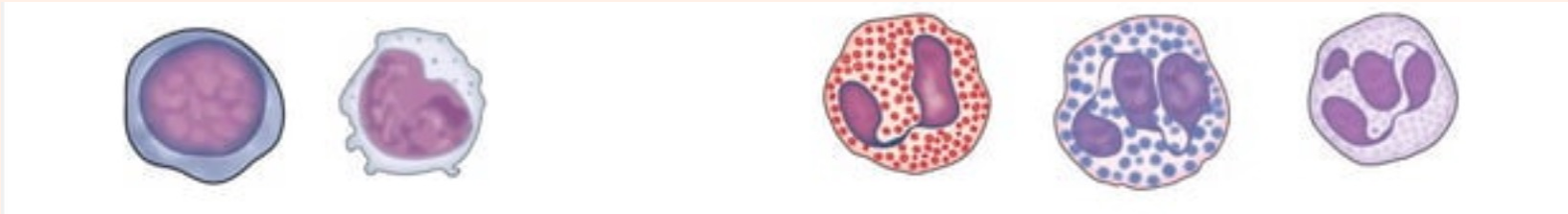
- ❑ Critical in blood clotting
 - Hemostasis
- ❑ Agglutinate into small clusters when blood vessel is damaged
- ❑ Leads to formation of thrombin (enzyme proteins catalyst)
- ❑ Which converts fibrinogen, (plasma protein) from the liver to form the fibrin protein
- ❑ Results in formation of mesh like blood clot



Leukocytes

White Cells

- White blood cells that include five types of cells
 - neutrophils
 - eosinophils
 - basophils
 - lymphocytes
 - Monocytes



The background features several stylized, pinkish-red blood cells of various sizes and orientations, along with a few small red blood drops. The cells are depicted with a slight 3D effect, showing their biconcave shape. The overall aesthetic is clean and medical.

The ABO Blood Group System

There are four major blood groups determined by the presence or absence of two antigens, A and B, on the surface of red blood cells:

Group A

Has only A the antigen on red cells (and B antibody in the plasma)

Group B

Has only the B antigen on red cells (and A antibody in the plasma)

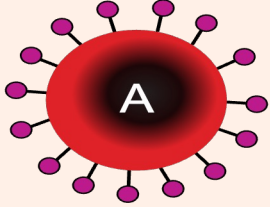
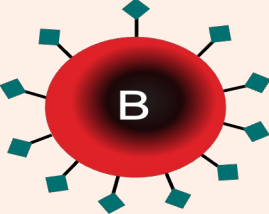
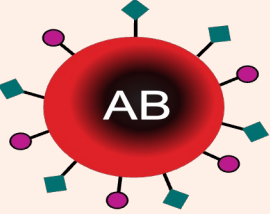
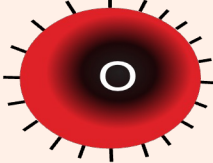


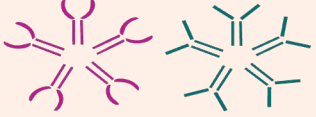



Group AB

Has both A and B antigens on red cells (but neither A nor B antibody in the plasma)

Group O

Has neither A nor B antigens on red cells (but both A and B antibody are in the plasma)

The ABO Blood Group System

	Group A	Group B	Group AB	Group O
Red blood cell type	 <p>A</p>	 <p>B</p>	 <p>AB</p>	 <p>O</p>
Antibodies in plasma	 <p>Anti-B</p>	 <p>Anti-A</p>	None	 <p>Anti-A and Anti-B</p>
Antigens in red blood cell	 <p>A antigen</p>	 <p>B antigen</p>	 <p>A and B antigens</p>	None

The background features several light pink, three-dimensional-looking rings of varying sizes and orientations, scattered across the white space. Interspersed among these rings are small, solid red teardrop shapes. The overall aesthetic is clean and modern, with a soft color palette.

Thanks

Do you have any questions?