

Blood Cells

RBC'S have a shape of a disk that appears to be “caved in” or almost flattened in the middle; this is called biconcave. This bi-concave shape allows the RB C to carry oxygen and pass through even the smallest capillaries in the lungs. The cytoplasm of erythrocytes is rich in hemoglobin, an iron-containing biomolecule that can bind oxygen and is responsible for the red color of the cells, the Mature erythrocytes lack a nucleus.



Function Of RBC

It contains the hemoglobin, which help transports the oxygen to the tissues during intracellular respiration .

Age of cell .

Life-span of an erythrocyte is only (120 days) after which they are destroyed in liver and spleen. Iron from hemoglobin is recovered and reused by red marrow .

Hemoglobin

It is a protein of molecular weight 64.45, it is enclosed in the RBCs. Its major function is to carry

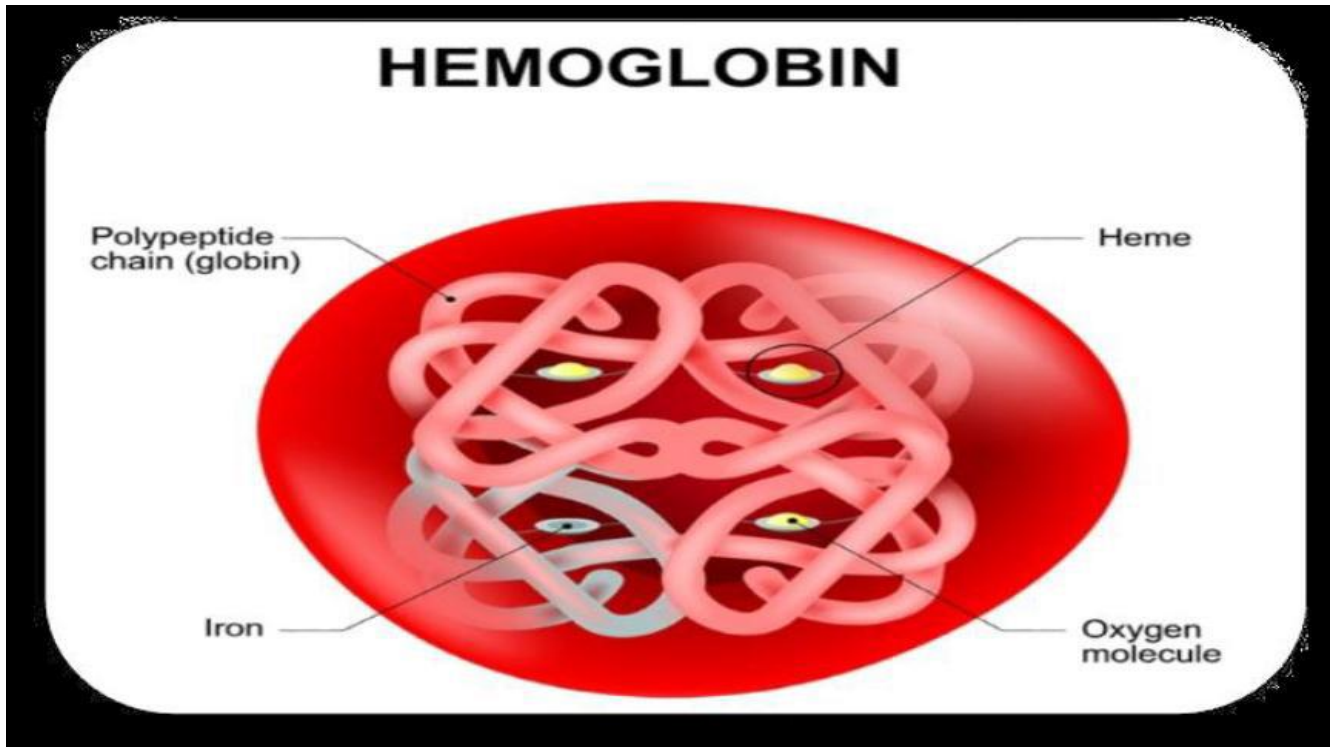
O₂ to the tissues & also it transports CO₂ from the tissues to the lungs

-Hb is a globular molecules, made up of four subunits, each subunit contains a heme molecule & a polypeptide chain.

-Heme is an iron containing.

-In each Hb molecule, 4 atoms of ferrous iron are present & each can bind to a molecule of O₂ ,

-so four oxygen atoms can be transported by each Hb molecule



RBC Production

The formation of RBC's is called (Erythropoiesis).

Red blood cells lose nuclei upon maturation, and take on a biconcave, dimpled, shape.

They are about 7-8 micrometers in diameter

RBC's contain hemoglobin which transports oxygen from the lungs to the rest of the body, such as to the muscles

RBC Degradation

* Red blood cells are broken down and hemoglobin is released.

*These phagocytes separate Hb into

* Globin: digesting the globin to amino acids which can be used to synthesis other proteins in the body.

* Heme: The heme portion of the molecule experiences a chemical change and then gets excreted as bile pigment (bilirubin bilirubin bilirubin bilirubin) by the liver

White blood cells(WBC) or Leukocyt -2

There are larger than erythrocytes, have a nucleus, and lack hemoglobin

They function in the cellular immune response

They are made from stem cells in bone marrow

Type of WBC

1.Granular Leukocytes contain granules in their cytoplasm & possess lobed nuclide, are formed in the bone marrow.

A. Neutrophils: - Their nuclei have 2-6 lobes connected by very thin strands Their cytoplasm contain granules stained with acidic & basic stains. Phagocytic foreign substances, which release lysosomes, which destroys certain bacteria.

B. B. Basophils: - Their nuclei are bi lobed or irregular in shape often in the form of a letter S. The cytoplasmic granules are round, variable in size, stain blue – black. Basophils leave the capillaries, enter the tissues & liberate heparin, histamine, & serotonin.

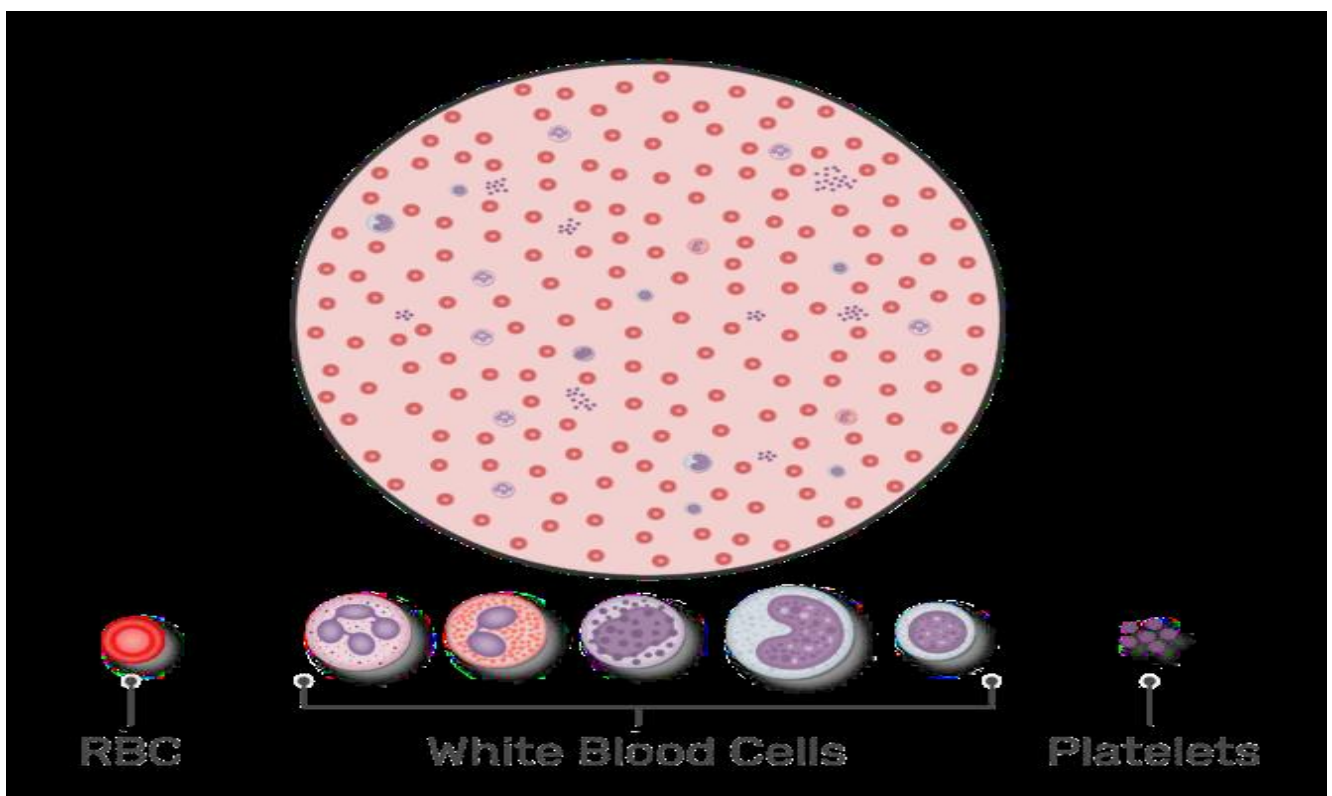
C. Eosinophil's (Acidophil):- contain nuclei usually bilobed. The cytoplasm contain large granules stain red – orange. Eosinophil's are also effective against certain parasitic and worms

2. Un Granular Leukocytes These haven't granules in the cytoplasm, their round nucleus is large, and they are formed in the lymphatic tissue.

A. Lymphocyte: have a large round nucleus and are not phagocytic, they are function production of antibodies.

B. Monocyte: - they attack bacteria and help in tissue repair after damage, they can leave the circulation and swell very much to become macrophages, it has kidney shape nucleus

3-Thrombocytes (platelets) Are minute discs 2 to 4 micrometers in diameter. They are formed in the bone marrow Then it is eliminated from the circulation by macrophages in the liver & spleen platelets repair slightly damaged blood vessels and **function** initiated blood clotting



Cell Type	Count of cells/ μ L	Function
Erythrocytes	4 – 6 million	O ₂ and CO ₂ transport
Leukocytes - Granulocytes		
Neutrophil	3000 – 7000	Bacterial phagocytosis
Eosinophil	100 – 400	Kill parasitic worms Destroy antigen-antibody complex
Basophil	20 – 50	Mediates inflammation, Heparin
Leukocytes - Agranulocytes		
Lymphocytes (T Lymphocytes & B Lymphocytes)	1500 – 3000	Cellular or antibody directed immune response
Monocytes	100 – 700	Phagocytosis, Develop into macrophages
Platelets	250,000 – 500,000	Blood clotting, Seal blood vessel tears

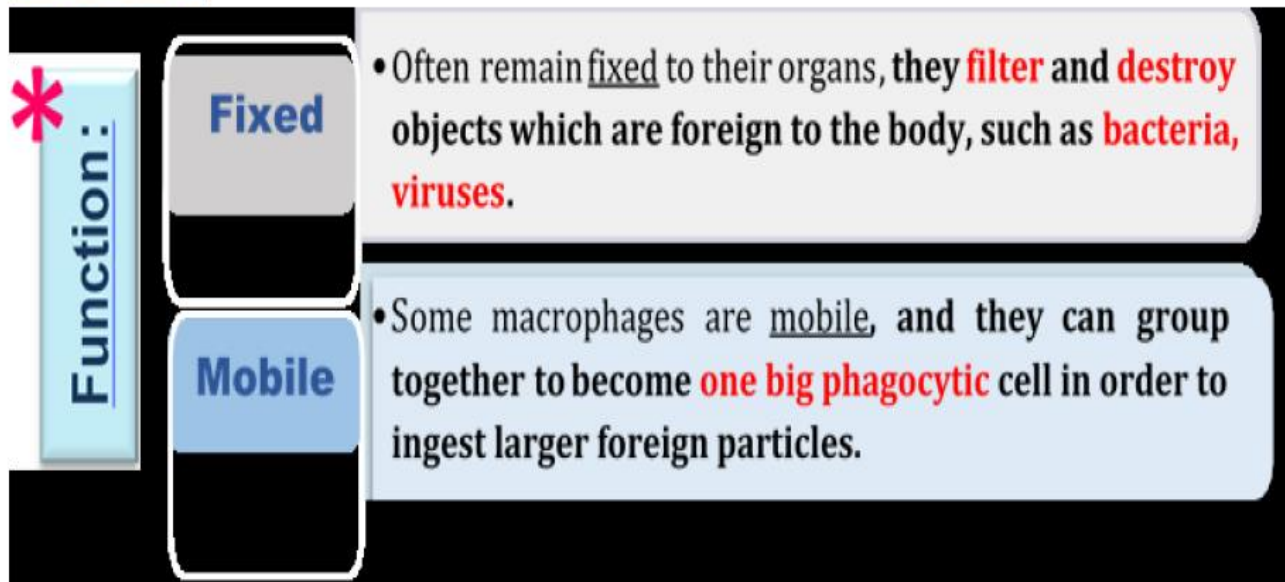
The reticuloendothelial system

- 1-RES removes dead or abnormal cells, tissues, and foreign substances from the circulation in healthy persons ,
- 2-Is formed of phagocytic cells that are found in the circulation and in tissues .
- 3-The RES encompasses monocytes of the blood, macrophages in connective tissue, lymphoid organs, bone marrow, bone, liver, and lung

Components

- . 1-Monocytes. “in the blood” When it’s enter the tissue it called “Macrophage” * The name change with different sites
- . 2-Macrophage: located in all tissues such as skin (histiocytes) liver (kupffer),

Functions



Types

Kupffer cell = In the liver

Microglia = In the brain

Reticular = In the lymph nodes bone marrow, spleen.

Tissue histiocytic = Fixed macrophages”

In subcutaneous tissues(Skin) Alveolar = the lungs