



Blood Tissue

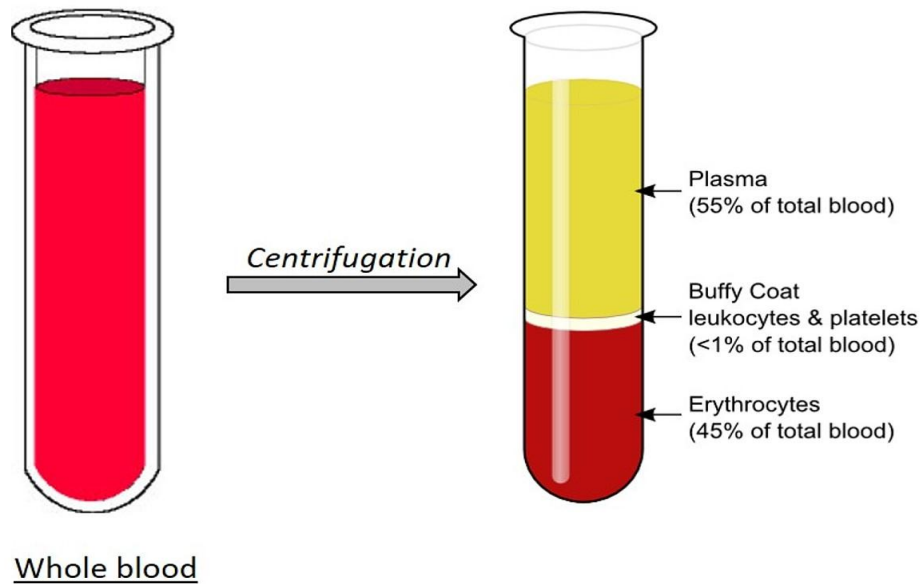
Blood is a fluid connective tissue (specialized C.T.) constituting about 7% of our total body weight (about 5 liters in the human).

Blood has a number of **functions** that are central to survival, including:

- Supplying oxygen to cells and tissues
- Providing essential nutrients to cells, such as amino acids, fatty acids, and glucose
- Removing waste materials, such as carbon dioxide, urea, and lactic acid
- Protecting the body from infection and foreign bodies through the white blood cells
- Transporting hormones from one part of the body to another.
- Regulating acidity (pH) levels and body temperature

The primary components are:

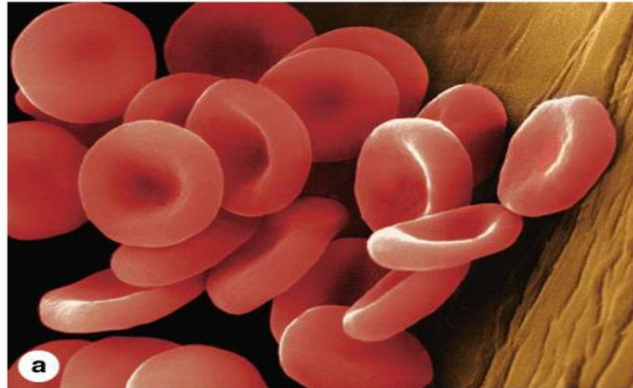
A. Plasma: The liquid in which blood cells are suspended. Composed of water, electrolytes, 7% plasma proteins (such as albumin, fibrinogen, globulins), hormones, fats, amino acids, vitamins, carbohydrates, lipoproteins as well as other substances. The normal plasma volume is 55% of body total blood volume.



B. Formed Elements (blood cells):

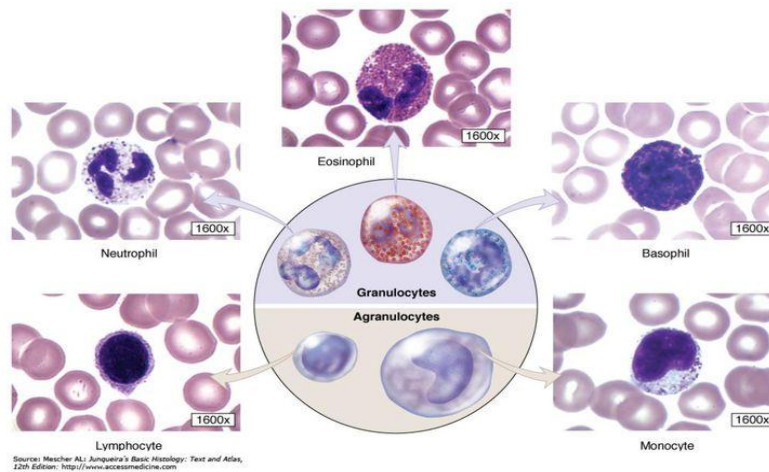
1. Erythrocytes (red blood cells or RBC): occupy about 40-45% of the total blood volume. Shaped like biconcave discs- flattened discs with depressed centers—they appear lighter in color at their thin centers than at their edges. lack a nucleus (are anucleate). The mature erythrocyte has a life span of approximately 120 days in the circulation.

Erythrocytes



2- **Leukocytes** (white blood cells or WBC) and **Platelets**: together make up about 1-2% of the total blood volume.

Leukocytes





Leukocytes

White blood cells include granulocytes (neutrophils, eosinophils and basophils), lymphocytes and monocytes.

- **Granulocytes**

(neutrophils, basophils, and eosinophil). All granulocytes are phagocytes.

Neutrophils: 50–70% of the WBC. Contains very fine granules that are difficult to see. Neutrophil nuclei consist of three to six lobes. Because of this nuclear variability, they are often called polymorphonuclear leukocytes (PMNs).

Eosinophils account for 2–4% of all leukocytes. Nucleus has two lobes connected by a broad band of nuclear material. Large, coarse granules.

Basophils are the rarest white blood cells, averaging only 0.5–1% of the leukocyte population. Their cytoplasm contains large, coarse, histamine-containing granules. The deep purple nucleus is generally U or S shaped.

- **A granulocytes**

Lymphocytes, accounting for 25% of the WBC. When stained, a typical lymphocyte has a large, dark-purple nucleus that occupies most of the cell volume. The nucleus is usually spherical but may be slightly indented.

- **T lymphocytes (T cells)** function in the immune response by acting directly against virus-infected cells and tumor cells.
- **B lymphocytes (B cells)** give rise to plasma cells, which produce antibodies (immunoglobulins) that are released to the blood.



Monocytes account for 3–8% of WBCs. They have an average diameter of 18 μm and are the largest leukocytes. U or kidney shaped nucleus.

3- Platelets they are cytoplasmic fragments of extraordinarily large cells called megakaryocytes. Platelets essential for the clotting process.

Blood Cells



Monocyte



Lymphocyte



Neutrophil



Eosinophil



Basophil



Macrophage



Erythrocyte



Platelets

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Preparing a blood smear.

