

Kazakh-Russian
Medical University

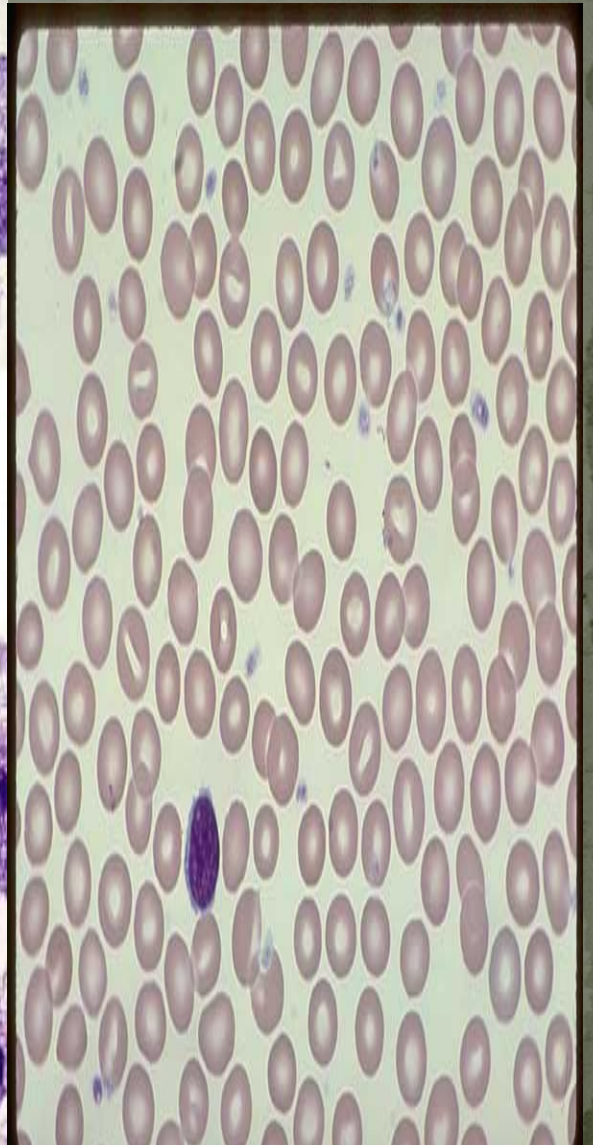
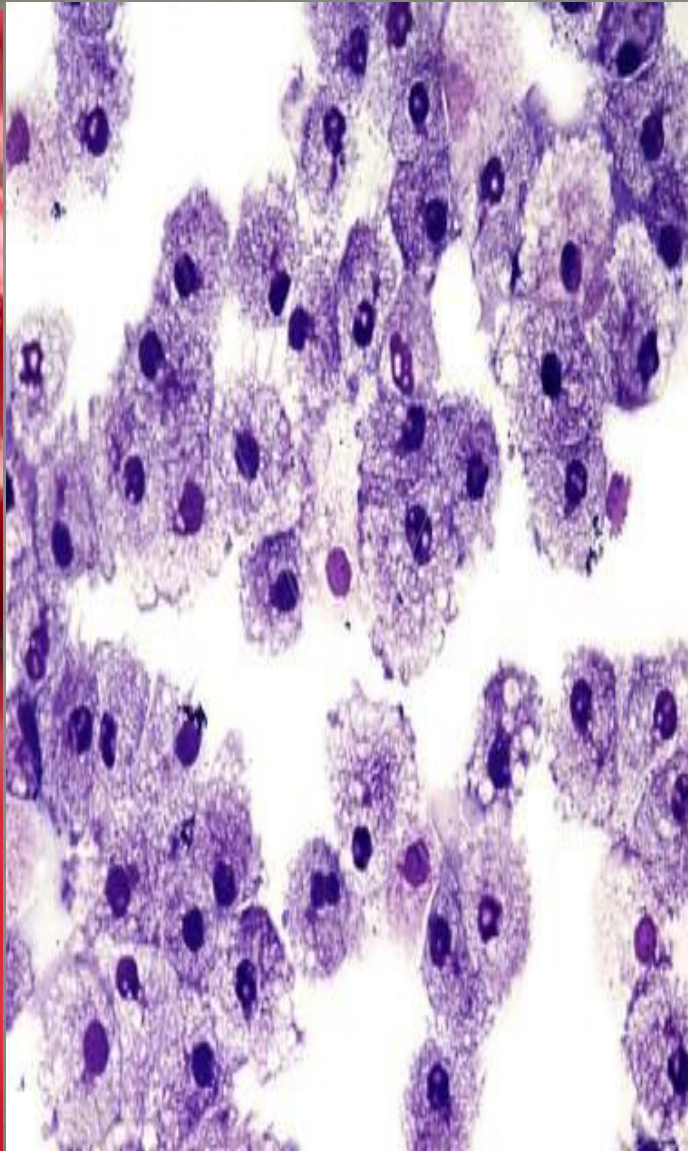
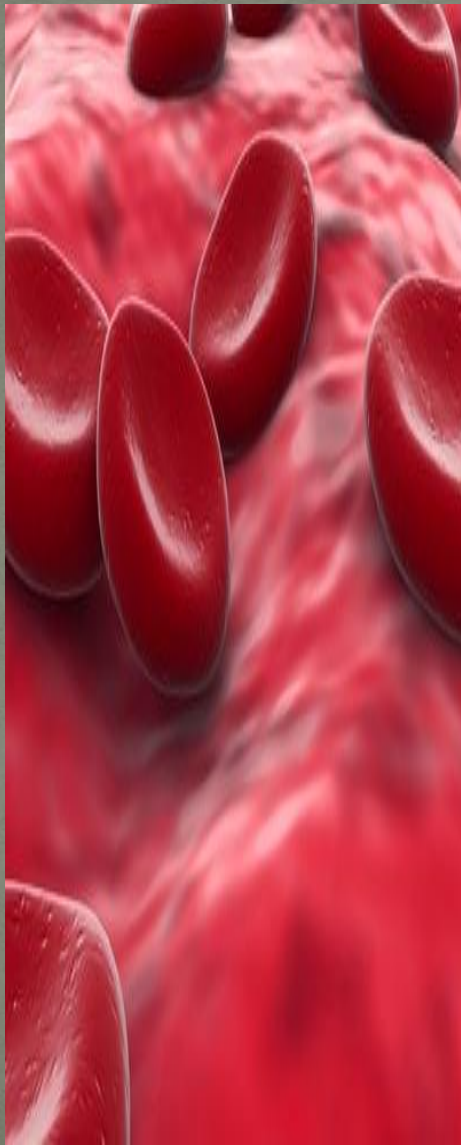
INDEPENDENT WORK

Theme: The Corpuscular
Elements of Blood

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Elements of Blood

Blood includes 40 to 45% formed elements:

- **Red Blood Cells (erythrocytes).**
- **White Blood Cells (leukocytes).**
- **Platlets (thrombocytes).**

55 to 60% plasma:

**Transparent liquid in which the cellular components
of blood are suspended**

Elements of Blood

Blood Characteristics:

6 to 8% of body weight in normal healthy humans.

Density: 1060 kg/m^3

**Therefore, most of people have between 4.5 and 6 L of
blood.**

Elements of Blood

Blood Viscosity:

The viscosity of blood is in the range 0.003 to 0.006 N
s/m²

**Blood is a non-Newtonian fluid: its viscosity is not a
constant with respect to the rate of shearing strain.**

**The viscosity is also dependent on the T and the volume
of blood that consists of RBC (hematocrit)**

Elements of Blood

A normal hematocrit is between 42 and 45%

Lower hematocrit: anemia.

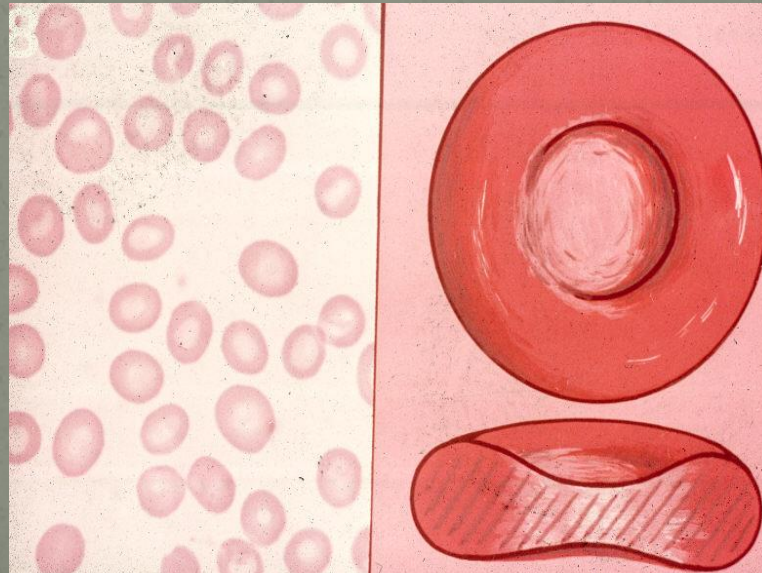
Higher hematocrit: polycythemia

Elements of Blood

Erythrocytes:

Erythros: red ; kytos: hollow

Biconcave discs with a diameter of around 8 μm .



Elements of Blood

- Its lifespan is around 125 days. After this they become fragile and desintegrate.
- 0.8% of RBC are destroyed every day, and the same amount is produced in bone marrow.
- Iron is required to produce hemoglobin necessary for RBC production. 1 to 4 mg of iron/day is the minimum required.

Elements of Blood

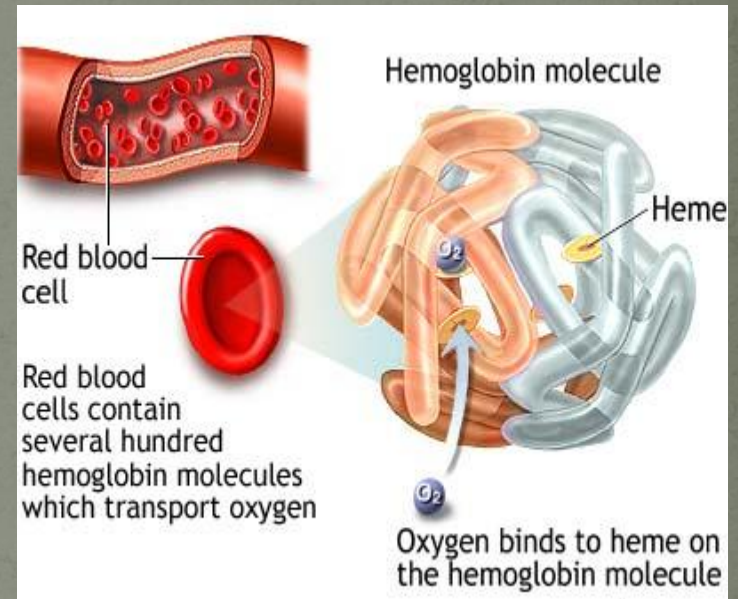
- Normal healthy blood contains around 5 million RBC in each cubic millimeter.

Hemoglobin:

It is a large molecule.

It associates with O₂: red color

It associates with CO₂: bluish purple color



Elements of Blood

Leukocytes:

White blood cells.

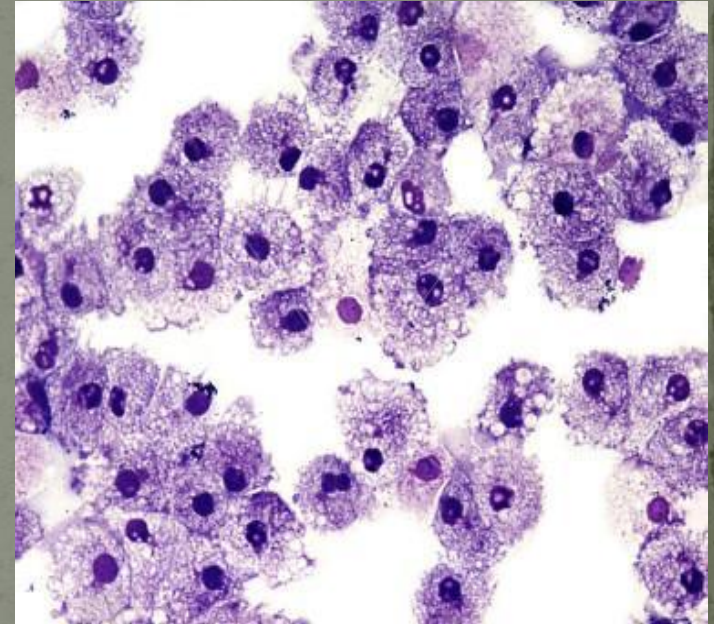
4000 to 11000 leukocytes.

1 leukocyte for 500 RBC.

There are two categories:

Phagocytes: spend their time eating foreign bodies.

**Immunocytes: involved in the immune response of the
body.**



Elements of Blood

Thrombocytes:

Platlets.

Normal lifespan 7 to 10 days. 250 000 platlets/ ml³

- Their role is to form a mechanical plug during normal hemostatic response to vascular injuries.**

Elements of Blood

Plasma:

Around 92% water by volume.

Contains: sodium ions, potassium, calcium, ... (1%).

7% plasma proteins.

Elements of Blood

Blood PH:

Normal PH is between 7.35 and 7.45