

## 3- Blood

### Lec 3

Blood is considered a **connective tissue** for two basic reasons:

- 1- Embryologically, it has the same origin (mesodermal) as do the other c.t. types.
- 2- Blood connects the body systems together bringing the needed oxygen, nutrients, hormones, and removing the wastes.

Blood consists of the cells and fluid contained in the closed circulatory system that flow in a **regular unidirectional movement** propelled mainly by the rhythmic contractions of the heart. **An adult human male has about 5.5 L of blood.** Blood is made up of two parts: formed elements or **blood cells, and plasma.** The formed elements are **erythrocytes or red blood cells ; platelets or thrombocytes ; and leukocytes or white blood cells.**

### **Plasma:**

Is the fluid that transports all nutritive materials, it constitutes **55% of the blood, cellular elements account for 45%.** Plasma is a homogeneous, **slightly alkaline fluid** containing substances of small or large molecular weight that make up 10% of its volume.

**The plasma proteins account for 7% of the volume and the inorganic salts for 0.9 %, the remainder of the 10% consists of several organic compounds like**

amino acids , vitamins , hormones , lipoproteins , etc.

**Formed elements of blood:**

**1- Erythrocytes.**

**2- Leukocytes:-**

**A. Lymphocyte.**

**B. Monocyte.**

**C. Neutrophil.**

**D. Eosinophil.**

**E. Basophil.**

**3- Blood platelets.**

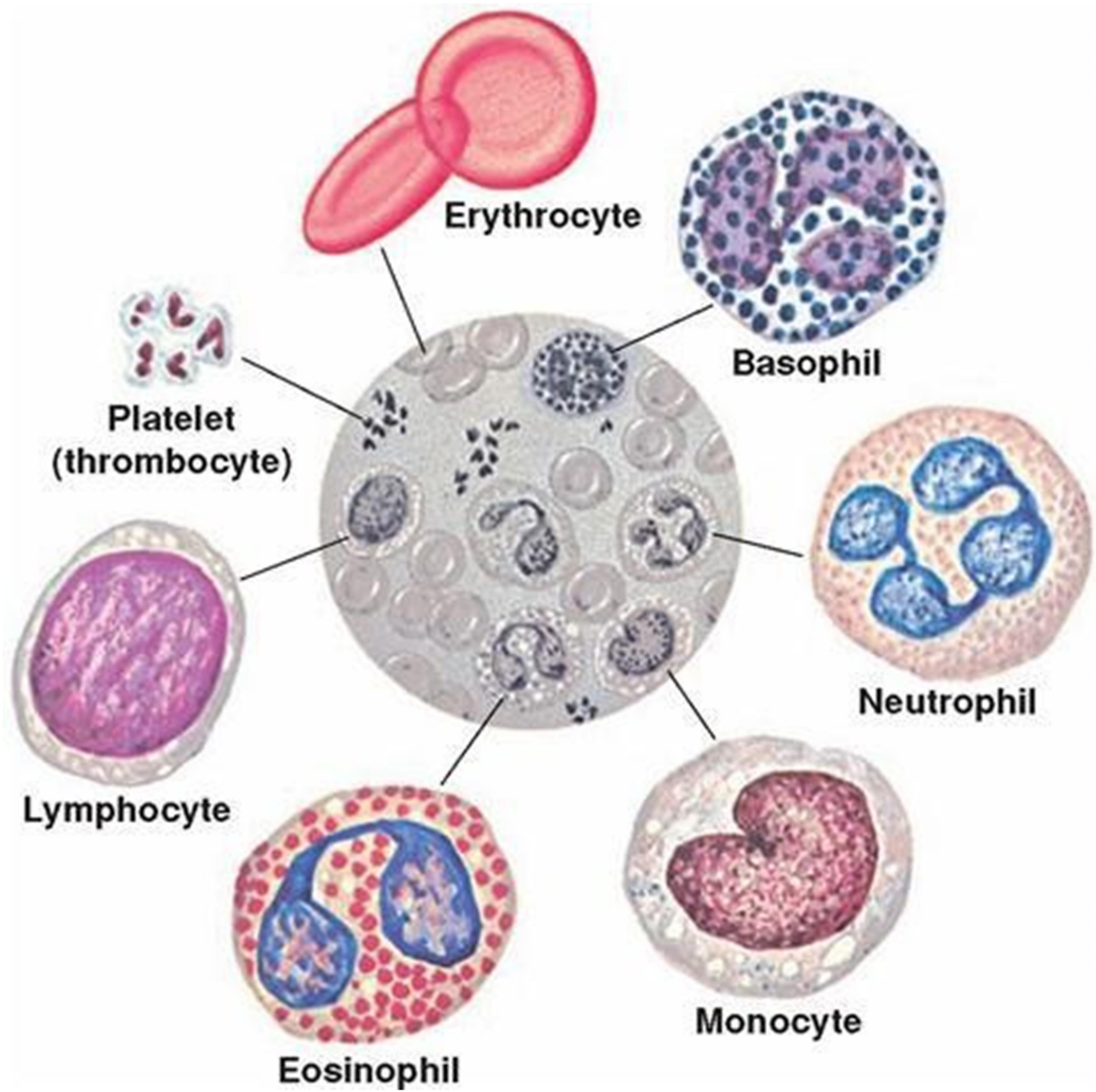
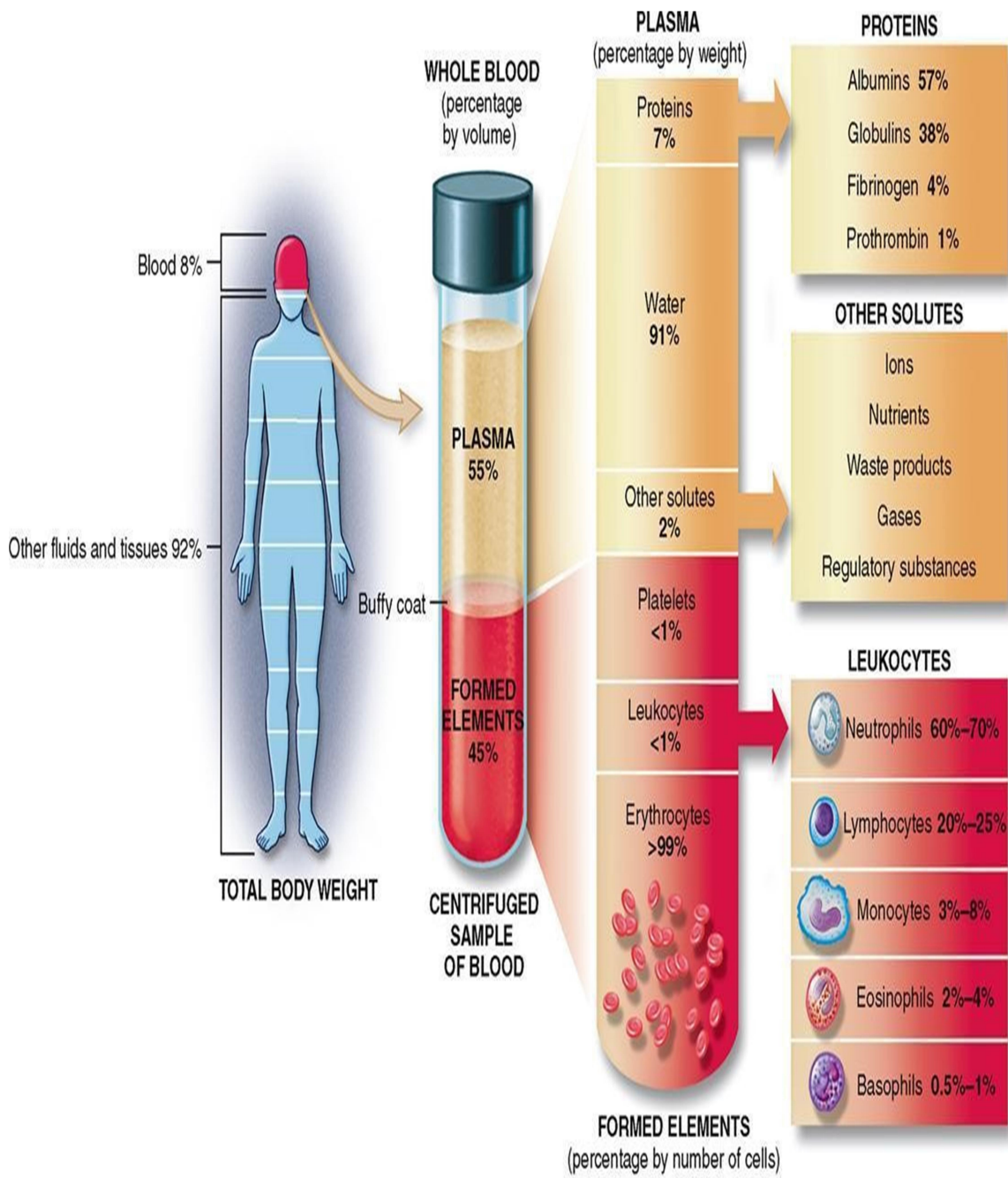


Figure 1 : Formed elements of blood.



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**Figure 2: Elements of blood.**

## **1- Erythrocytes:**

Most mammalian erythrocytes (red blood cells) are described as **biconcave discs without nuclei**. The biconcave shape provides erythrocytes with a large surface-to-volume ratio, **thus facilitating gas exchange**.

In human males there are **5 to 5.5 mil./mm<sup>3</sup>**, in females **4.5-5 mil./mm<sup>3</sup>**.

A single fresh RBC is **pale greenish yellow in colour**. In dried smear, the R.B.C.s stain red (acidophil) with **Leishman or Giemsa stains**.

## **2- Leukocytes:**

White Blood Cells, (WBCs). Are cells that contain **nuclei**. The average No. **5000 – 9000/mm<sup>3</sup>**, in normal human blood. In children is higher. There are two types, **a granular and granular**, the a granular are **lymphocytes and monocytes**. The granular are **eosinophil, acidophil, and neutrophil**

### **3- Blood platelets:**

Thrombocytes are **small protoplasmic discs, colorless** in circulating blood. The normal range of platelets almost **200.000-400.000/mm<sup>3</sup>** of blood. Their number is extremely difficult to count, since they adhere to each other to all surfaces as soon as blood is removed from a vessel.