434
Physiology team

# 8 Compositions And Function Of Blood

إِنَّمَا الْعِلْمُ عِلْمَانِ: عِلْمُ الدِّينِ، وَعِلْمُ الدُّنْيَا، فَالْعِلْمُ الَّذِي لِلدِّينِ هُوَ: الْفِقْهُ، وَالْعِلْمُ الَّذِي لِلدُّنْيَا هُوَ: الطِّبُّ.

الشافعي -رحمه الله-

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# Objectives

- Recognize functions of blood
- Describe Cellular and non-cellular components of blood
- Define Erythropoiesis; leukopoiesis, and thrombopoiesis.
- Describe features of RBCs, WBCs, and Platelets.

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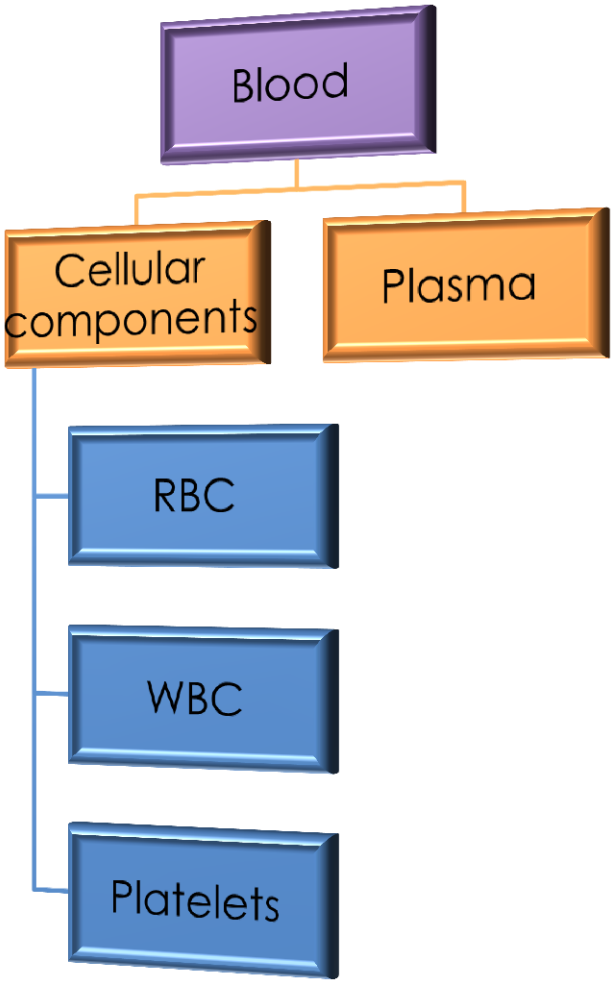
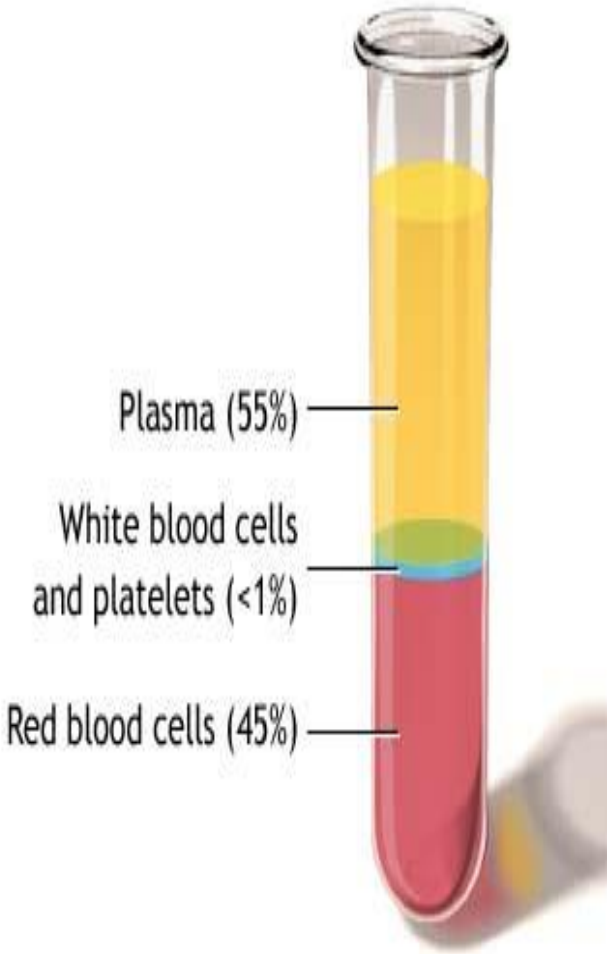
# Blood Components

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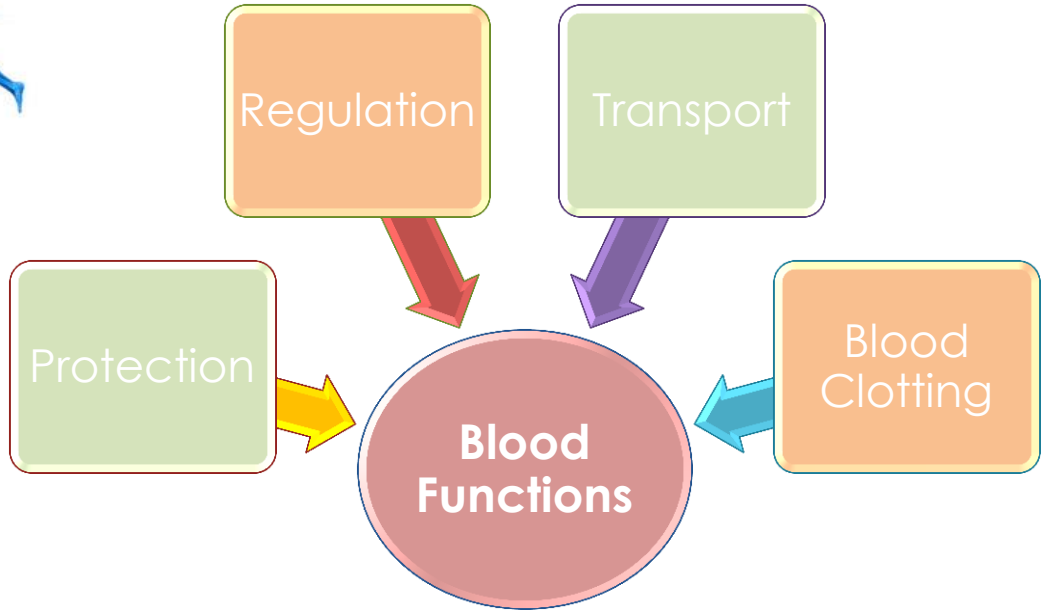


| Comparison between blood cells | | | |
|---|---|---|---|
| | **RBC** | **WBC** | **Platelets** |
| **Number** | 4.7-5.2 million | 4000-11000 | 250,000-500,000 |
| **Span Life** | 120 days | Based on the shape | 5-10 days |
| **Shape** | Flat biconcave and lack nucleus | Have nucleus | Irregular shape |

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# What is Blood ?

- Blood is a fluid connective tissue found within the cardiovascular system
- Its volume is 5-6 L in males and 4-5 L in females
- It is slightly alkaline, with a pH of 7.35-7.45
- accounts for about 8% of TBW
- It has a salty metallic taste

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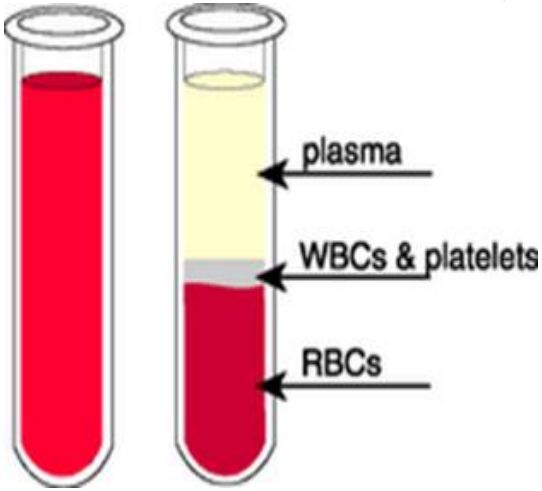
# BLOOD COMPOSITION

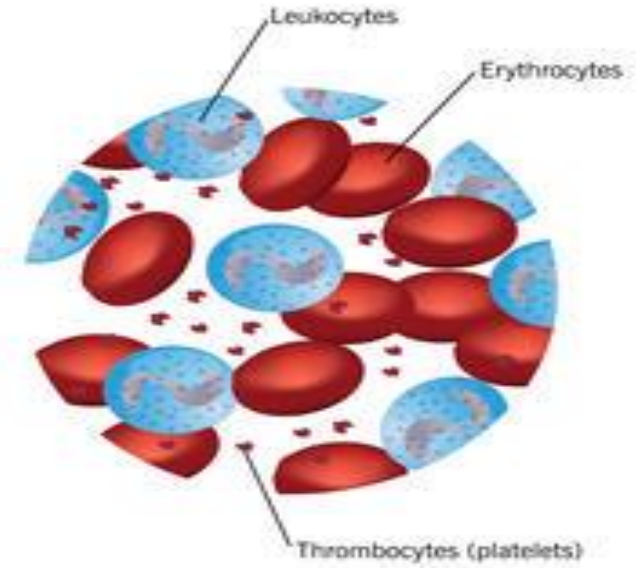
## 1. Cellular components:

- Red Blood Cells, RBCs (Erythrocytes)
- White Blood Cells ,WBCs (Leukocytes)
- Platelets (Thrombocytes)




## 2. Plasma:

- 92% water, ions, plasma proteins (Albumin, globulin, Fibrinogen)
- Same ionic composition as interstitial fluid

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# Plasma protein

❖ **Plasma Proteins:**

- **Albumins** (60%), are the most abundant type of plasma proteins, maintain the plasma volume by osmotic pressure. (No edema).

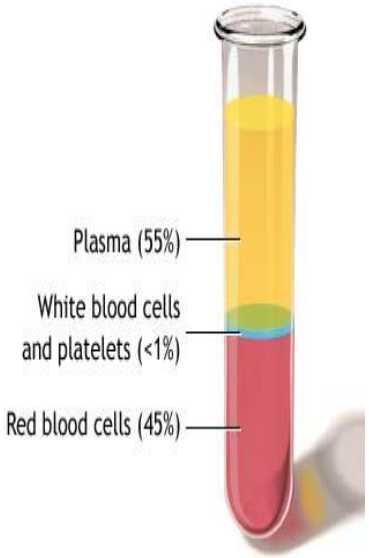
- **Globulins** (35%), alpha and beta Globulins transport lipids and certain minerals through the bloodstream. Gamma Globulins are antibodies.

- **Fibrinogen** (4%) for blood clotting

❖ **Blood volume:**

5 liter in adult

- 45% is packed cells volume (PCV)
- 55% is plasma volume

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# Function of blood

## 1- Transport

**$O_2$, $CO_2$, nutrient, hormones, enzyme waste product, ions, Electrolytes, antibody**

## 2- Homoeostasis

**Regulation of body temperature, ECF pH, Electrolytes, blood pressure**

## 3- Protecting against infections

**White Blood Cells, Antibodies**

## 4- Blood clotting prevent blood loss.

**Electrolytes**: is substance that ionizes when dissolved on suitable ionizing solvent .
eg: Na, K, Cl

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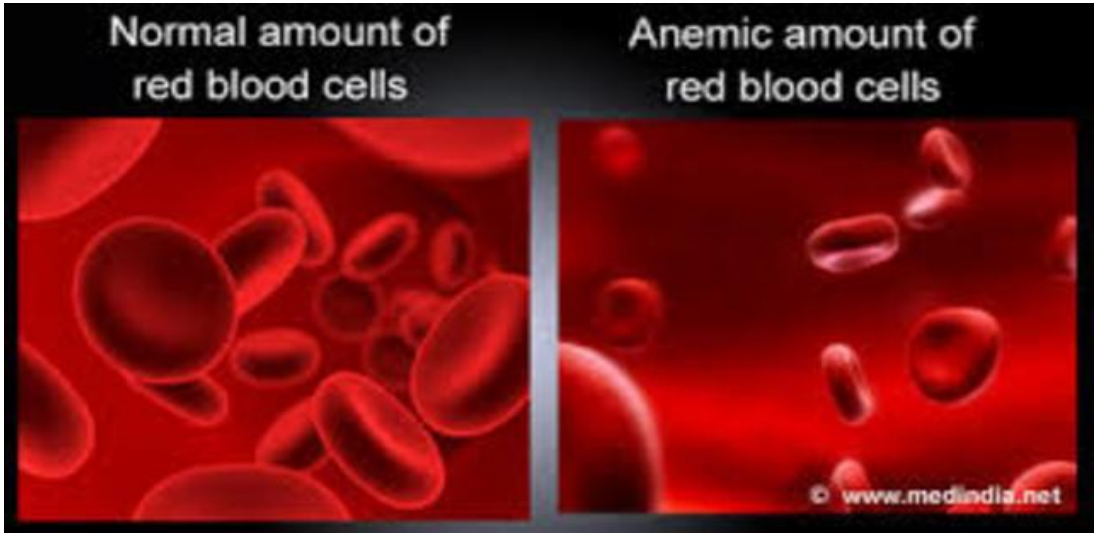
# Anemia

## Definition:

- Decrease number of RBC
- Decrease Hb.

## Symptoms:

**Tired, Fatigue, short of breath, heart failure.**

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# Polychethemia

## Increased number of RBC

**Types:**

**1.Primary (Polycythemia Rubra Vera - PRV): uncontrolled RBC production.**

**2.Secondary to hypoxia: high altitude (physiological), chronic respiratory or cardiac disease**

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# Some YouTube Videos

- Blood components
http://www.youtube.com/watch?v=C5qmKirdiic&hd=1

- Function of Blood
http://www.youtube.com/watch?v=li1rk0newfI&hd=1

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# Check your understanding!

1. **Erythrocyte is also known as:**
a. RBC
b. WBC
c. platelets
2. **55% of blood**
a. RBC
b. WBC
c. plasma
3. **It protects the body from micro organsim**
a. WBC
b. RBC
c. plasma

## Done by :

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