

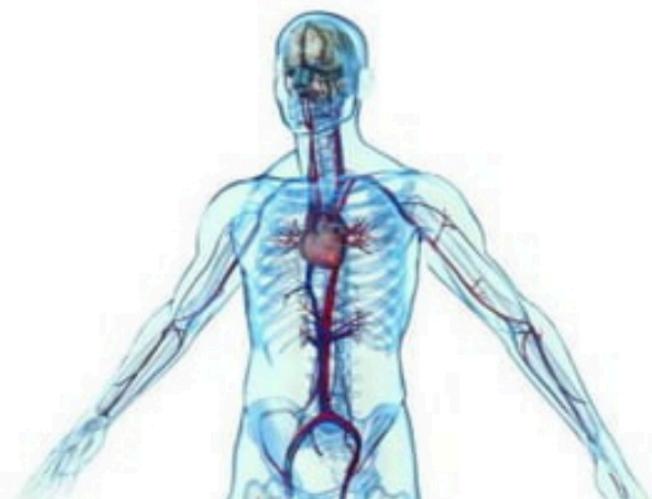
# Blood

The circulating fluid including plasma and different cells such as red blood cells, white blood cells and platelets in the vascular system of humans and other Vertebrates.



## Functions of blood

- Supplies essential nutrients in cells such as glucose, fatty acid and amino acids.
- Transport oxygen  $O_2$  and carbon dioxide  $CO_2$ , and hormones in the body.
- Protects from pathogens, blood loss and diseases.
- Helps regulate body temperature.



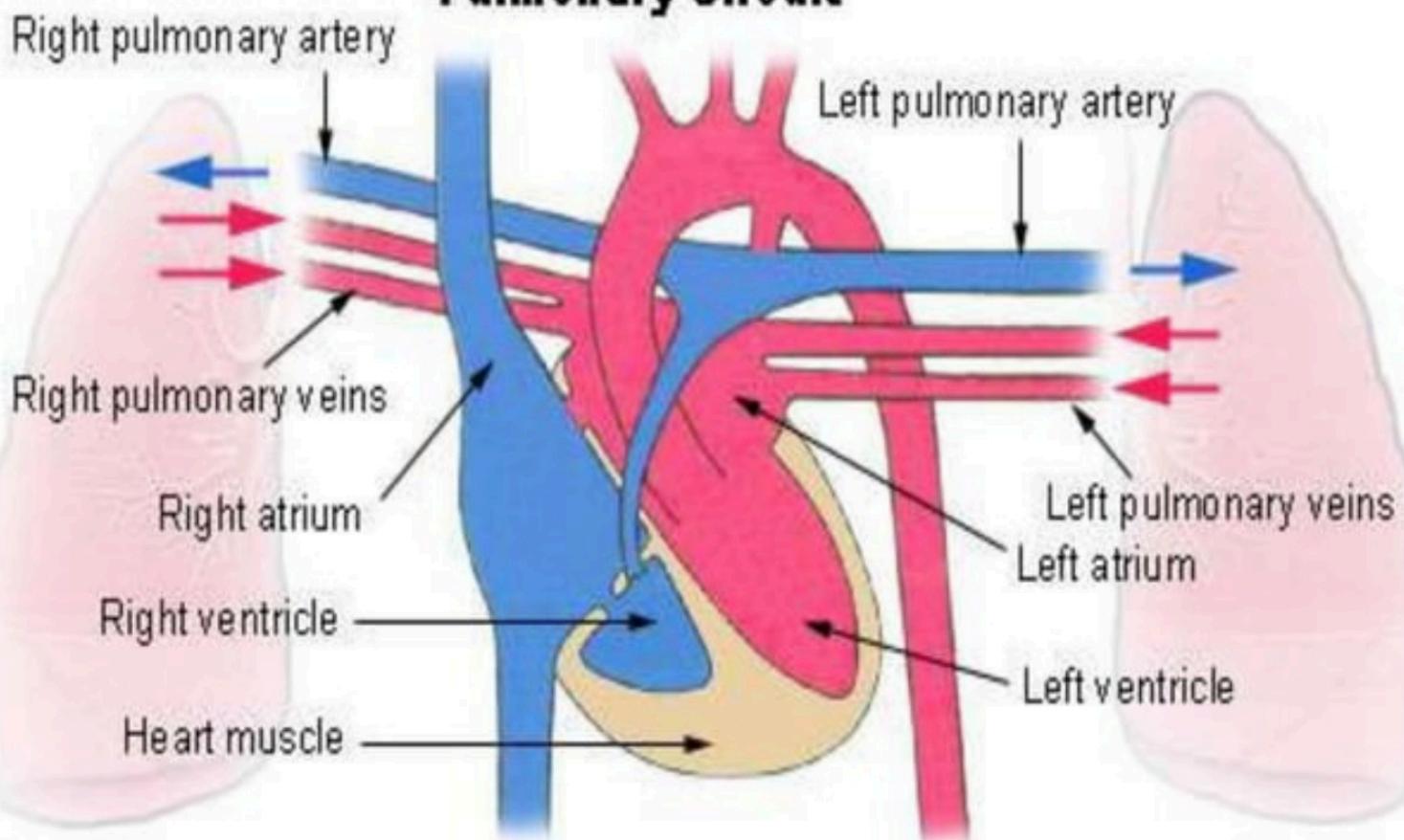


## Physical characteristics

- More viscous(thick) than water.
- 100.4 degree F temperature.
- 8% of total body weight.
- Average blood volume in males is 5-6 liters.
- And 4-5 liters in average female.

# Circulation of blood

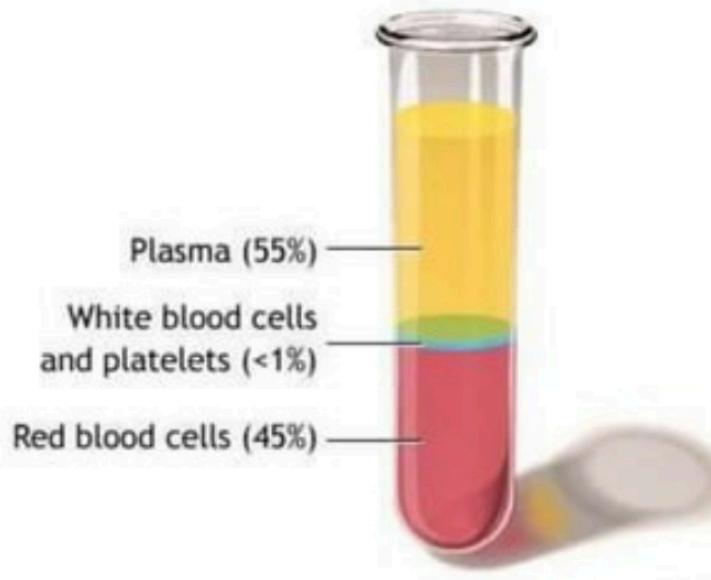
## Pulmonary Circuit



# Components of blood

Blood is made up of two main components.

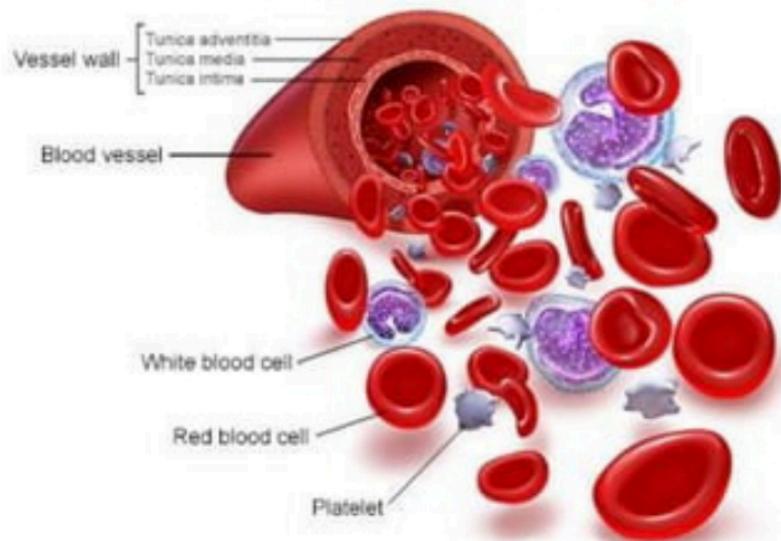
- Blood cells (45%)
- Plasma (55%)



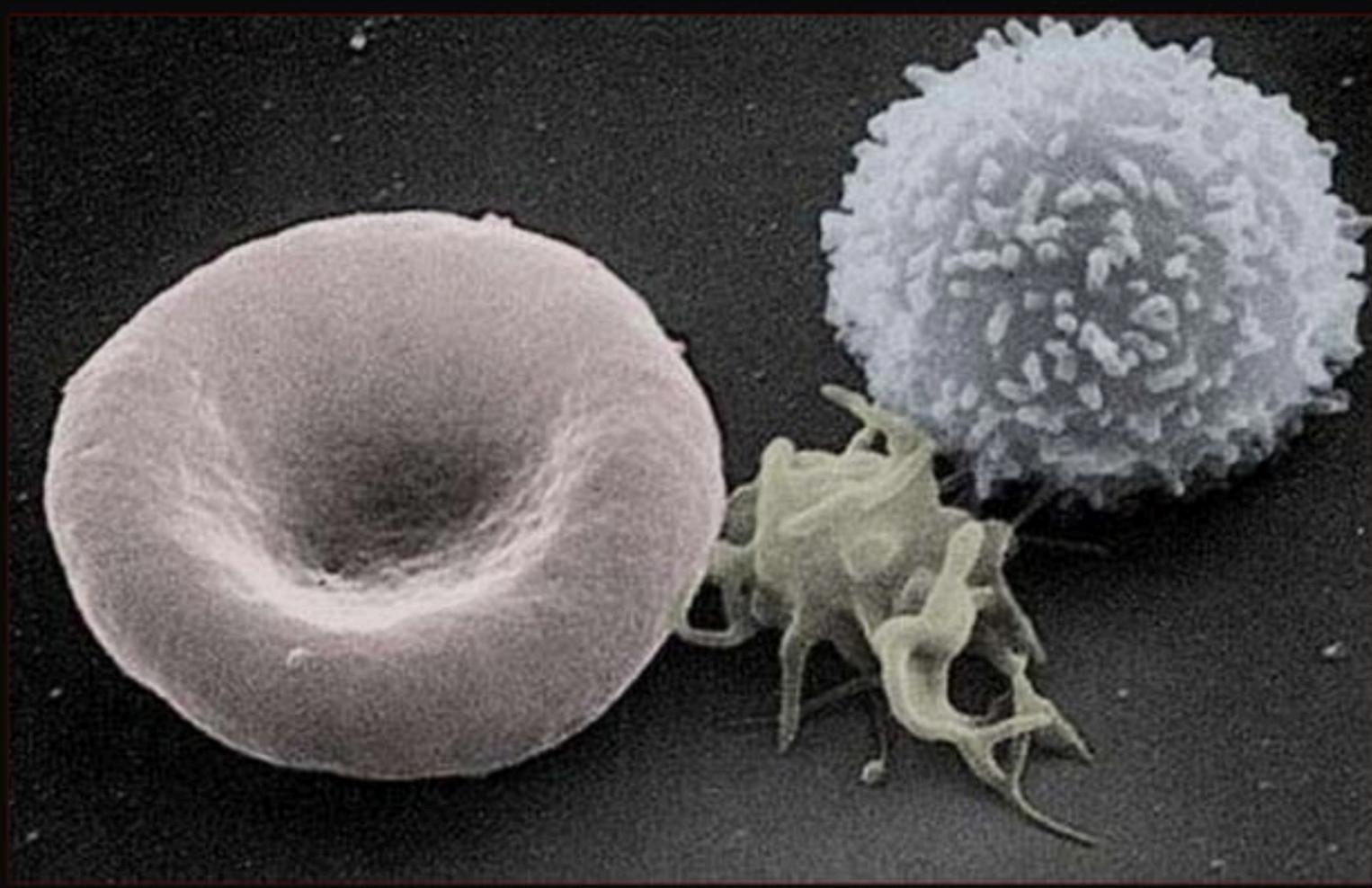
# Blood cells

Three types of blood cells are

- Red blood cells (erythrocytes)
- White blood cells (leucocytes)
- Platelets (thrombocytes)



## Structures of cells



## Red blood cells

- Also called erythrocytes
- Biconcave shape
- Elastic cell membrane
- No nucleus
- 95% of the RBC consist of hemoglobin(red pigment)
- Remaining 5% consist of enzymes, salts and other protein





## Continued red blood cells

- Formed in red bone marrow
- Average life is four months
- About 2-10 million red blood cells are formed and destroyed in every second.
- The **main function** of the RBC is to transport oxygen and carbon dioxide.
- Blood of male contains **5-5.5** million RBC per cubic millimeter.
- Blood of female contains **4-4.5** million RBC per cubic millimeter.

## White blood cells

- Also called as leucocytes
- They are colorless
- Much larger than red blood cells
- One cubic millimeter of blood contains 7000 to 8000 WBC
- Formed in bone marrow
- Their life span depends on the body need so they have life span of months or even years



## Continued white blood cells

- white blood cells are about 1% in healthy people.
- Only 2% of total WBC population circulating in blood at a time
  - Rest is in the skin, lungs and spleen.

### Main function

These are the cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders.

## Types of WBC

- Granulocytes

These WBC have granules in their cytoplasm.

-Granulocytes include neutrophils, eosinophils and basophils.

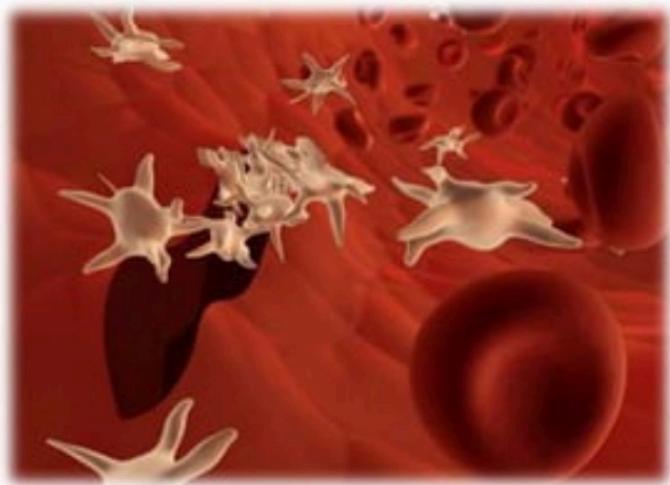
- Agranulocytes

These are without granules in their cytoplasm

-These include monocytes and lymphocytes.

# platelets

- Platelets are also called Thrombocytes.
- Platelets are not cells.  
they are fragments of  
large cells .
- Nucleus are absent
- Random shaped
- 2-4 micron size
- Normal platelet count is 150,000-400,000/  
drop of blood





## Continued platelets

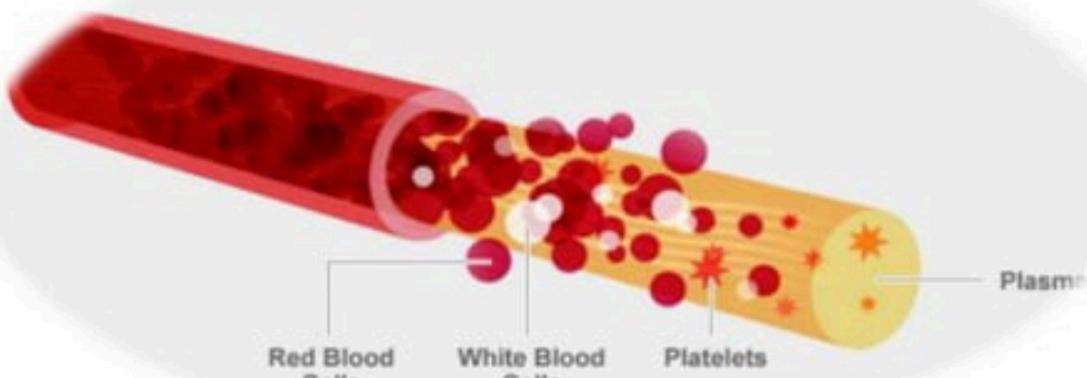
- Platelets have a life span of only 5 to 9 days
- Platelets are formed in Bone marrow

### Function

- Stoppage of bleeding in a quick way when blood vessels are damaged this process is also called Hemostasis
- Prevent hemorrhage(loss of large amount of blood)

# Plasma

- Normally 55% of our blood is made up of plasma
- Composed of approximately 90% water.
- plasma is the liquid portion of the blood.



## Continued of plasma

- Plasma is primarily water in which proteins, salts nutrients and waste are dissolved.  
**Plasma can be divided into six components.**
- Inorganic ions or Mineral ion.
- The plasma proteins
- Organic nutrients in the blood
- Nitrogenous waste products
- Hormones
- Gases



## Function of plasma

- Plasma helps maintain blood pressure .
- Regulates body temperature
- It contain minerals, salts, hormones and proteins that perform important function in the body

## Blood Groups

Type	You Can Give Blood To	You Can Receive Blood From
A+	A+, AB+	A+, A-, O+, O-
O+	O+, A+, B+, AB+	O+, O-
B+	B+, AB+	B+, B-, O+, O-
AB+	AB+	EVERYONE
A-	A+, A-, AB+, AB-	A-, O-
O-	EVERYONE	O-
B-	B+, B-, AB+, AB-	B-, O-
AB-	AB+, AB-	AB-, A-, B-, O-

# **Disorder of blood**

- Anemia**

A condition in which there is a deficiency of red blood cells in the blood.

## **Symptoms**

- Oxygen carrying capacity of blood is reduced
- Fatigue, cold intolerance and paleness
- Lack of oxygen for ATP and heat production



## •Leukaemia

The uncontrolled production of white blood cells (leucocytes) is called leukaemia and it's also called blood cancer.

- Symptoms
- Pale skin
- Tiredness
- A high temperature (fever)
- Weight loss

## Treatment

- The blood of the patient should be changed regularly
- It can be cured by **Bone marrow transplant.**
- it is an effective but expensive treatment.

## Thalassemia

- It is genetically transmitted disease.
- The patient of thalassemia has abnormal haemoglobin.
- This disease is more common in children, especially in children of **Mediterranean** parents

## Treatment

- The blood of these patients should be replaced regularly with normal blood.
- It can be cured by bone marrow transplant. The bone marrow transplant is very expensive. Its cure rate is not 100%



Have a nice day

[iwaleedkhan55@gmail.com](mailto:iwaleedkhan55@gmail.com)  
[muzafarsharif50@gmail.com](mailto:muzafarsharif50@gmail.com)