

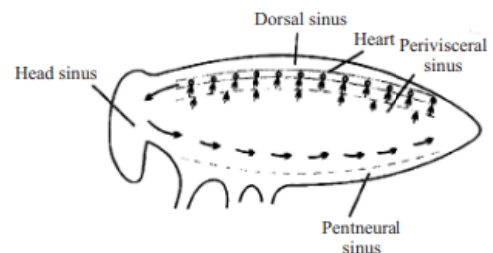
LESSON 15- CIRCULATION OF BODY FLUIDS

- **Circulation** is the transport of nutrients, (such as electrolytes and amino acids), oxygen, CO₂ hormones, blood cells and excretory products to the concerned tissues or organs. These are circulated to and from cells in the body to nourish it.
- For circulation, simple organisms (sponges, coelenterates etc) use water from their surroundings.
- These are circulated to and from cells in the body to nourish it.
- Complex organisms use body fluids (**blood & lymph**) for circulation.
- The components of the human circulatory system include the heart, blood, red and white blood cells, platelets, and the lymphatic system.
- The circulatory system is also known as the **cardiovascular system**.

- The circulatory system may be open or closed type.
- In **Open system** the blood pumped by the heart passes through large vessels into open spaces or cavities called sinuses. E.g: **Arthropods and Molluscs**.
- **Closed Circulatory System**
- The blood pumped by the heart is circulated through blood vessels in a well-defined manner. It is more advantageous as the flow of fluid can be precisely regulated. E.g **Annelids and Chordates**

CIRCULATORY SYSTEM OF COCKROACH

- Blood vascular system is open and lacunar type. Body cavity contains blood, which bathes viscera in it therefore known as **Haemocoel**.
- Blood vascular system consists of a tubular heart, a blood vessel called anterior aorta and a system of ill defined blood spaces or **sinuses**.

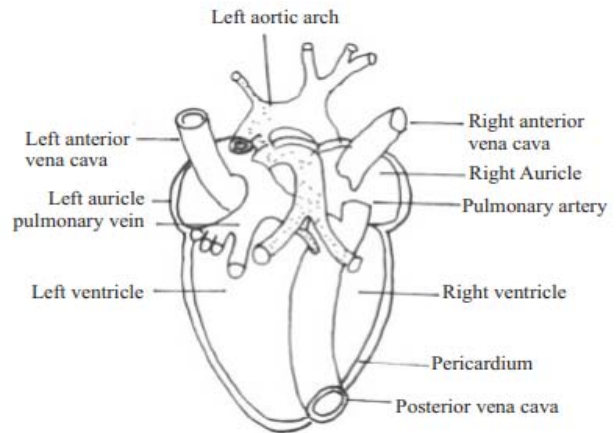


Circulatory system of cockroach

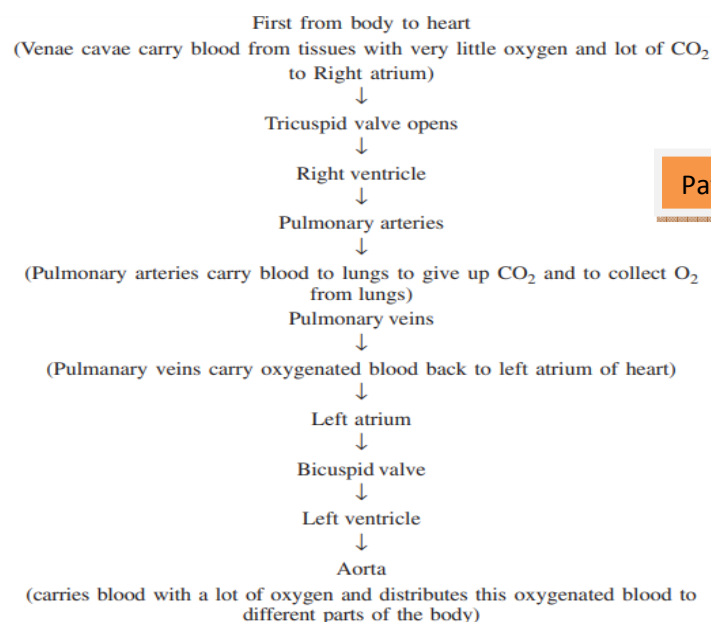
ORGANS OF HUMAN CIRCULATORY SYSTEM

- **Heart** – the central pumping organ.
- **Blood vessels** – the connecting tubes – arteries, veins and capillaries.
- **Blood** – is the circulating fluid, a connective tissue made of a fluid matrix and Plants and animals cells.
- **Lymphatic system** comprises of lymph nodes and lymph vessels

- It is a muscular organ made of cardiac muscle fibres.
- It is able to perform its function by coordinating contraction and, relaxation and opening and closing of a number of valves present inside the heart.
- This fist sized organ consists of 4 chambers, the two upper chambers – the atria and two lower chambers – the ventricles



- The tubes transporting blood are called Blood Vessels. There are 3 kinds of blood vessels: (i) Artery (ii) Capillary and, (iii) Vein.
- Double circulation Since blood passes twice through the heart, it is termed **Double circulation**
- In this, First Deoxygenated blood passes from the body to heart and oxygenated blood from heart to the body. Then Deoxygenated blood flows from heart to lungs and oxygenated blood Plants and animals from lungs again to heart, from lungs.
- In **one circulation**, the blood passes through the heart twice. Once from body to heart to lungs and second time from lungs to heart to body.

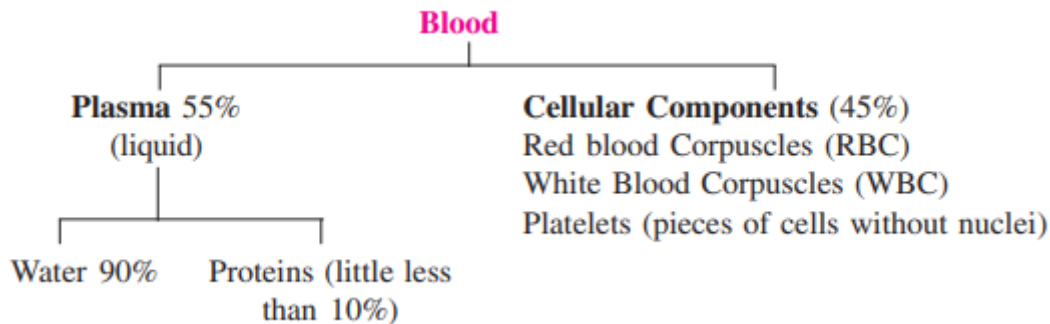


Path of Circulation

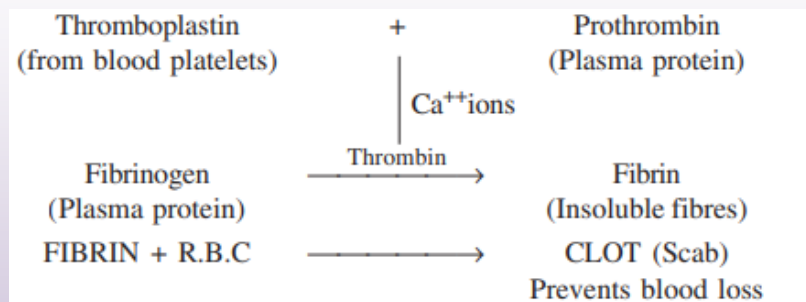
- Superior and inferior venae cavae bring deoxygenated blood to the heart. Pulmonary vein brings pure (oxygenated) blood to the aorta and aorta supplies it to the body.

BLOOD AND ITS COMPONENTS

Blood is a red coloured, thick and slightly alkaline, fluid which keeps circulating in our body through the blood vessels.



- The process of thickening of blood is called **coagulation** or **clotting of blood**.
- When blood vessels are injured, a sequence of reactions takes place to prevent loss of blood. Steps involved are as follows :
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Haemophilia – A genetic disease that results in a condition where blood fails to clot.

- In the A, B, O Blood group system, a person with blood group O is a universal donor and person with blood group AB is universal recipient.
- Rh factor is important in matching blood groups for transfusion as well as in the case of expectant mothers.
- Normal blood pressure for healthy person is $120 \pm 5/75 \pm 5$ mm of mercury and is measured by Sphygmomanometer.
- The colourless fluid moving out of capillary wall is called lymph
- Body's ability to protect itself from harmful substances is called immunity

- Spleen and tonsils are examples of lymphoid organs and house lymphocytes (T-cells and B-cells)

T-Cells	B-Cells
1. Mature in thymus glands	Mature in lymphoid tissues like tonsils and appendix
2. T-cells identify antigens and destroy them	Recognise antigen with the help of surface receptors
3. Attack directly	Produce a large number of antibodies for attack
4. Life span is upto 3-4 years	Antibodies are short lived

- Disorder of the immune system diminishes resistance to diseases. SCID is an immunodeficiency disorder from birth; AIDS is another one caused by HIV virus.

TEST YOURSELF

1. Write the process involved in the **coagulation of blood** or **clotting**.
2. Differentiate between open and closed Circulatory system?
3. With the help of a flow chart describe the steps involved in the circulation?