

CBSE Class 11 Biology
NCERT Solutions
Chapter 18
Body fluids and circulation

1. Name the components of the formed elements in the blood and mention one major function of each of them.

Ans. The components of the formed elements in the blood with their major function are:

- a. Erythrocytes (RBC): The erythrocytes play a significant role in transport of respiratory gases.
- b. Leucocytes (WBC): The leucocytes play an important role to fight against infections.
- c. Thrombocytes (Platelets): Platelets are involve in the coagulation or clotting of blood.

2. What is the importance of plasma proteins?

Ans. The major plasma proteins are fibrinogen, globulins and albumins.

- Fibrinogen play important role in blood coagulation.
- Globulins protects the body against infecting agents
- Albumins helps in maintaining the fluid volume within the vascular space.

3. Match column I with column II:

Column I		Column II	
(a)	Eosinophils	(i)	Coagulation
(b)	RBC	(ii)	Universal Recipient

(c) AB Group	(iii) Resist Infections
(d) Platelets	(iv) Contraction of Heart
(e) Systole	(v) Gas transport

Ans.

Column I	Column II
(a) Eosinophils	(iii) Resist Infections
(b) RBC	(v) Gas transport
(c) AB Group	(ii) Universal Recipient
(d) Platelets	(i) Coagulation
(e) Systole	(iv) Gas transport

4. Why do we consider blood as a connective tissue?

Ans. Blood as a connective tissue because:

- Blood serves the purpose of connecting the body systems by transporting substances.
- Blood is mesodermal in origin like any other connective tissues.

5. What is the difference between lymph and blood?

Ans.

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Lymph	Blood
It is red-coloured fluid	It is a colourless fluid.
It contains plasma and lesser number of WBCs and platelets.	It contains plasma, RBCs, WBCs, and platelets.
Its plasma lacks proteins.	Its plasma has proteins, calcium, and phosphorus.
It transports nutrients from the tissue cells to the blood, through lymphatic vessels.	It transports nutrients and oxygen from one organ to another.
It helps in body defence and is a part of the immune system.	It helps in the circulation of oxygen and carbon dioxide.
The flow of lymph is slow.	The flow of blood in the blood vessels is fast.

6. What is meant by double circulation? What is its significance?

Ans. Double circulation is a process during which blood passes twice through the heart during one complete cycle. It consists of two separate circulations:

Systemic circulation: In this circulation the oxygenated blood from the left ventricle of heart is pumped to all the body parts (except lungs) through aorta. After this, deoxygenated blood from various parts comes back to heart by superior and inferior vena cava into the right atria. This completes the 1st circulation.

Pulmonary circulation: In pulmonary circulation the deoxygenated blood brought back from body parts is pumped to lungs by the right ventricle through the pulmonary artery. In lungs deoxygenated blood is again converted back to oxygenated blood and sent back to the heart in left atria by pulmonary veins. This completes the 2nd circulation.

The most important significance of this system is that the oxygenated and deoxygenated

blood does not mix anywhere in the body thus improves the oxygen supplying capacity of the heart.

7. Write the differences between:

(a) Blood and Lymph

(b) Open and Closed system of circulation

(c) Systole and Diastole

(d) P-wave and T-wave

Ans. (a) Blood and Lymph

Lymph	Blood
It is a colourless fluid.	It is red-coloured fluid.
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It transports nutrients from the tissue cells to the blood, through lymphatic vessels.	It transports nutrients and oxygen from one organ to another.
It helps in body defence and is a part of the immune system.	It helps in the circulation of oxygen and carbon dioxide.

(b) Open and Closed system of circulation

Open system of circulation	Closed system of circulation
In this system, blood is pumped by the heart, through large vessels, into body cavities called sinuses.	In this system, blood is pumped by the heart, through a closed network of vessels.

The body tissues are in direct contact with blood.	The body tissues are in indirect contact with blood.
Blood flows at low pressure.	Blood flows at high pressure.
Blood flow cannot be regulated.	Blood flow can be regulated
This is present in arthropods and molluscs.	This is present in annelids, echinoderms, and vertebrates.

(c) Systole and Diastole

Systole	Diastole
It is the contraction of the heart chambers to drive blood into the aorta and the pulmonary artery.	It is the relaxation of the heart chambers between two contractions.
Systole decreases the volume of the heart chambers and forces the blood out of them.	Diastole brings the heart chambers back into their original sizes to receive more blood

(d) P-wave and T-wave

P-wave	T-wave
In an electrocardiogram (ECG), the P-wave indicates the activation of the Sino-atrial node.	In an electrocardiogram (ECG), the T-wave represents ventricular relaxation.

During this phase, the impulse of contraction is generated by the SA node, causing atrial depolarisation.	During this phase, the ventricles relax and return to their normal state.
It is of atrial origin.	It is of ventricular origin.

8. Describe the evolutionary change in the pattern of heart among the vertebrates.

Ans. The heart of vertebrates evolved from the simple 2-chambered heart of fishes to complex multi-chambered hearts.

Fishes have a 2-chambered heart with an atrium and a ventricle. Amphibians and the reptiles except crocodiles have a 3-chambered heart with two atria and a single ventricle, whereas crocodiles, birds and mammals possess a 4-chambered heart with two atria and two ventricles.

In fishes the heart pumps out deoxygenated blood which is oxygenated by the gills and supplied to the body parts from where deoxygenated blood is returned to the heart (single circulation).

In amphibians and reptiles, the left atrium receives oxygenated blood from the gills/lungs/skin and the right atrium gets the deoxygenated blood from other body parts. However, they get mixed up in the single ventricle which pumps out mixed blood (incomplete double circulation).

In birds and mammals, oxygenated and deoxygenated blood received by the left and right atria respectively passes on to the ventricles of the same sides. The ventricles pump it out without any mixing up, i.e., two separate circulatory pathways are present in these organisms, hence, these animals have double circulation.

9. Why do we call our heart myogenic?

Ans. Heart is called myogenic because all the normal activities of the heart are regulated intrinsically or the activities are auto regulated by specialised muscles known as nodal tissues without the need for an external stimulus to be delivered by the nervous system.

10. Sino-atrial node is called the pacemaker of our heart. Why?

Ans. The sino-atrial (SA) node is a node of specialised cardiac muscle fibres located in the upper part of the right atrium of the heart. The cardiac impulse originates from the SA node triggers a sequence of electrical events in the heart and is responsible for initiating and maintaining the rhythmic contractile activity of the heart. Therefore, it is called the pacemaker.

11. What is the significance of atrio-ventricular node and atrio-ventricular bundle in the functioning of heart?

Ans. The atrio-ventricular node and atrio-ventricular bundle has the ability to generate action potentials without any external stimuli. Their main function is to get excited by the action potential initiated by the Sino-atrial node and conduct the stimulus to the remaining part of the heart through which they branch thus helping in the rhythmic contraction and relaxation of the heart.

12. Define a cardiac cycle and the cardiac output.

Ans. The sequential events taking place in the heart which is the contraction or systole and relaxation or diastole of both the atria and ventricles is called cardiac cycle.

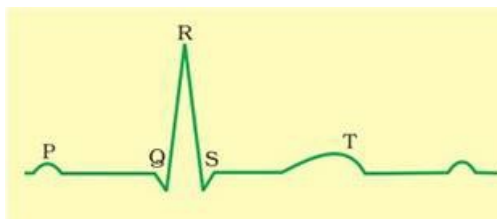
The volume of blood pumped out by the ventricles in one minute is called the cardiac output.

13. Explain heart sounds.

Ans. Two prominent sounds are produced during each cardiac cycle. The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves. These sounds are of clinical diagnostic significance.

14. Draw a standard ECG and explain the different segments in it.

Ans.



Each peak in the ECG is identified with a letter from P to T that corresponds to a specific electrical activity of the heart.

The P-wave represents the electrical excitation or depolarization of the atria. Depolarisation of atria leads to atricular systole.

The QRS complex represents the depolarization of the ventricles which initiates ventricular systole.

The T-wave represents the return of the ventricles from excited to normal state (repolarisation). The end of T-wave marks the end of systole.