

TRANSPORT SYSTEM

1. What is transportation?

Transportation is a life process in which a substance absorbed or synthesised in one part is moved or transported to other parts of the body.

2. What is the need for transportation in living beings?

Transportation in living beings is required for the transport of

- (i) nutrients
- (ii) metabolic wastes
- (iii) respiratory gases
- (iv) hormones, enzymes and other metabolites
- (v) water, ions and heat
- (vi) protection against disease.

3. What is the need of special tissues or organs for transport of substances in multicellular organisms?

All living organisms require certain basic material for survival and maintenance like oxygen, water, food etc.

In unicellular organism, these materials are picked, synthesised and utilised by the same single cell.

In multicellular organisms, these important materials may be picked or synthesised in one part of body but utilised in some other part or parts.

So there is a requirement of special tissue or organs, which can transport these materials to various body parts of the organism.

4. What are the basic things required for transportation of material in human body?

Basic things required for transportation of material in human body are: (i) Fluid medium to carry material - Blood

(ii) A pump to push this fluid - Heart

(iii) A network of tubes to carry this fluid to various body parts - Blood vessels

(iv) A system that ensure maintenance and repair of this network of tubes damaged - Platelets.

5. Name the fluid connective tissue that helps in transportation in human beings.

Ans: Blood

6. How are different material carried through blood?

Blood consists of fluid medium called plasma in which various corpuscles are present.

Plasma transports salts, food, carbon dioxide and nitrogenous wastes in dissolved form.

Oxygen is carried by haemoglobin present in the red blood corpuscles.

7. Describe the structure of human heart.

- Human heart is four chambered.

- Two upper chambers are atria and two lower are ventricles.

- Atria receive blood and ventricles transport blood out of the heart.

- These chambers are separated by partition called septa.

- Between left auricle and right ventricle valves are present to prevent back flow of blood.
- Heart is made of special muscles called cardiac muscle fibres.

8. Why does human heart has different chambers that are not connected to each other?

- Different chambers in human heart are not connected to each other in order to prevent mixing of oxygenated and deoxygenated blood. - Complete separation of chambers ensures that deoxygenated blood goes to various parts of body. This increases the efficiency of supply of oxygen to the body to meet the high-energy requirements.

9. Describe the flow of blood through human heart.

- Blood is received from various body parts into the right atrium by superior and inferior vena cava, when the chambers are relaxed.
- From right auricle blood flows to right ventricle.
- From right ventricle blood is transported to lungs for purification by pulmonary artery.
- After purification, blood comes back to heart in the left auricle / atrium through pulmonary vein.
- From left atrium blood moves to left ventricle.
- From left ventricle blood is pumped out to all the body parts through aorta.

10. Name the following blood vessels which

- Brings deoxygenated blood into the right atrium from upper body parts -
- Brings deoxygenated blood into the right atrium from lower body parts -
- Takes deoxygenated blood from right ventricle to lungs.
- Brings oxygenated blood from lungs to left atrium -
- Largest artery that takes oxygenated blood from left ventricle to all body parts -
- Supply blood to heart muscles.

i. Superior vena cava.
iv. Pulmonary vein.

ii. Inferior vena cava.
v. Aorta.

iii. Pulmonary artery.
vi. Coronary arteries.

11. Name the chambers of heart that carries

- Oxygenated blood.
 - Deoxygenated blood.
- Oxygenated blood - left atrium and left ventricle.
 - Deoxygenated blood - right atrium and right ventricle

12. List the materials that require transportation in plants.

Water, minerals, sugars and other metabolites synthesised in leaf, hormones synthesised at shoot and root tips, stored food from part of storage to other plant part, etc.

13. Name the two conducting tissues of plants.

Xylem and phloem.

14. Why do plants require a proper system of transportation?

In trees and big plants, diffusion process is not sufficient to provide raw material to the leaves from the roots and energy reserves to the roots from the leaves. Therefore, a proper system of transportation is essential in plants.

15. Why plants can afford to have a slow transport system as compared to animals?
Plants do not move and have a large proportion of dead cells in many tissues. Therefore, their energy needs are less and therefore they can afford to have a slow transport system as compared to animals.

16. What is root pressure?

The pressure that is created due to difference in concentration of salts which forces water absorbed from the soil, to move through the roots and up the stem of the plant is known as root pressure.

17. Why root pressure alone cannot be responsible for transport of water in plants?
Root pressure alone cannot be responsible for transport of water in plants because this pressure created due to concentration gradient and osmosis is not enough to move water over great heights of commonly found tall plants.

18. Explain the mechanism of upward movement of water and minerals in plants.

The events during movement of water and minerals in plants are as follows:

- The tissue responsible for it is xylem
- Water enters roots through special structures called root hair. These are the epidermal outgrowths of roots.
- Root hair of plants are in direct contact with the film of water in between the soil particles.
- Water and minerals dissolved in it enters through root hair due to osmosis and move through root cortex, endodermis, root xylem, stem xylem, xylem of petiole and finally to leaves. This creates concentration difference and hence water is forced to move in.
- The pressure that forces water in is called root pressure.
- Since root pressure is not sufficient to pull water, suction force created by transpiration pulls water till the leaves.

19. Explain the mechanism of movement of water from soil into the root.

The cells of the root in contact with soil take up ions along with the water by simple diffusion. This creates a difference in the concentration of these ions between soil and the roots, which draws water into the roots from the soil. This leads to steady movement of water into root xylem, forming a column of water that is steadily pushed upwards.

20. When does root pressure becomes a major driving force for movement of water in plants and why?

At night, root pressure becomes a major driving force for movement of water in plants. This is because the stomata are closed during night time and transpiration is not possible.

21. What is transpiration? What is its importance?

The loss of water in the form of water vapours from the leaves into the atmosphere is called transpiration. Evaporation of water molecules from cells of a leaf due to transpiration creates suction, which is responsible for pulling water from xylem cells. Hence, movement of water and minerals from roots to leaves in the form of a continuous column is due to transpirational pull. This water is utilised by plant during photosynthesis.