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IMPORTANT NOTES

CLASS : X

CHAPTER : 6 (LIFE PROCESSES)

TRANSPORTATION IN PLANTS :

The roots of plants absorb water and minerals from the soil. Higher plants have specialised system for the transportation of various materials inside the plant body. These specialized system are :

- a) Xylem
- b) Phloem

1.Transport of water and minerals:

Xylem transport the water and minerals from soil through roots to different parts of plants.

- a) **Root pressure:** In xylem tissue, vessels and tracheids of roots, stems and leaves are interconnected to form a continuous system of water conducting channels reaching all parts of plant. At the roots, root hairs take minerals and ions from soil by diffusion. This creates difference in concentration of ions between root and soil due to which water moves into root from soil by osmosis to eliminate this difference. This steady movement of water into root xylem creates a column of water that is steadily pushed upward. However this pressure is not enough to move water in xylem upwards to highest points of plant.
- b) **Transpiration pull:** Transpiration is the loss of water in the form of vapour from aerial parts of plant. The continuous evaporation of water creates a concentration difference of water between roots and leaves which creates a suction force which pulls water from the xylem cells of roots and provide an upward movement of water and minerals dissolved in it.

Importance of transpiration:

- i)It helps in temperature regulation. In dry windy day the rate of transpiration increases whereas in humid day it increases.
- ii)It helps in absorption and upward movement of water and minerals dissolved in it from roots to the leaves.

2.Transport of food and other substances:

Phloem transport the food from leaves to other parts of plant.

Translocation mechanism: It is the movement of food from leaves to other parts of plant using energy from ATP. The direction of translocation can be upward or downward. In this process phloem transport food and other substances from region of high osmotic pressure i.e. leaves to region of low osmotic pressure i.e. storage organs of roots, fruits, seeds and to growing organs. It takes place in the sieve tubes with the help of companion cells.

Importance of translocation: It is essential for the supply of food from leaves to all parts of plants. As food is needed for producing energy by oxidation. Energy is then needed by all parts of plant to perform their activities.

EXCRETION: It is the process of removal of harmful metabolic waste from the body.

Excretion in human beings – Excretory system in humans include pair of kidneys, pair of ureters, a urinary bladder and a urethra.

- Kidneys : They are located in abdomen one on either side of backbone and are the main excretory organ. The renal artery brings the impure blood containing waste into the kidneys and renal vein carries away the pure blood from the kidneys.
Functions: a) Excretion : kidneys remove waste products that are harmful for the body
b)Osmoregulation: They maintain balance of salts and water concentration in body.
- Ureters : They are thin muscular tubes coming out from each kidney which opens into urinary bladder and drain urine out from kidney.
- Urinary bladder: It is a muscular bag and store urine before being discharged outside.
- Urethra: It is a muscular tube opening that arises from urinary bladder through which urine passes out from body.

Diagram from book fig. 6.13 , page – 110

How is urine produced OR Structure and functioning of nephron:

Structure of nephron: The filtration unit in kidneys are called nephrons. Each kidney has large number of nephrons which are packed close together. Nephron consists of a cup shaped structure called bowman's capsule in which cluster of thin walled blood capillaries form glomerulus. This cup shaped structure is followed by long tubular structure which is twisted and leads to collecting duct.

Functioning of nephron:

- Filtration : When blood enters through renal artery into glomerulus of bowman's capsule, the filtration of blood takes place. The filtrate then passes to tubular part of nephron. The filtrate contains glucose, amino acids, urea, uric acid, salts and major amount of water.
- Re-absorption :As the filtrate flows along the tubule substances some useful substances like glucose, amino acids, salts and major amount of water are selectively reabsorbed into the blood by capillaries surrounding the tubule.
- Tubular secretion: Certain substances which are not needed by body like ammonia, urea, uric acid are secreted from blood capillary into collecting duct. This is called tubular secretion. The fluid entering the collecting duct is called urine which contain major toxic waste, urea. Urine contains 95% water and 5% nitrogenous waste. It flows through ureters into urinary bladder and discharged from urethra. Kidney filters about 180 lit. of blood daily but the volume actually excreted is 1-2 lit. daily.

Diagram from book fig. 6.14, page : 111

Purpose of making urine:

Its purpose is to filter out waste products (urea or uric acid) from the blood.

Regulation of urine production : a) Amount of urine produced is regulated by selective reabsorption in the tubule part of nephron as urine flows along the tube.

b)The amount of water reabsorbed from urine depends on how much excess of water is there in body and how much of dissolved waste is there which is to be excreted.

c)More water and dissolved waste in body will produce more urine and less water and dissolved waste will produce less urine.

Artificial kidney (Hemodialysis):

If somehow due to infection, injury or restricted blood flow, the kidneys get damaged which is called kidney failure (renal failure). Then the process of excretion is performed by artificial kidney. This process is called dialysis. Dialysis machine cleans the blood of person by removing the nitrogenous wastes products from it.

Excretion in plants:

The methods used by plants to get rid of excretory products are:

- The oxygen produced during photosynthesis gets removed through stomata.
- Carbon dioxide produced during respiration also gets removed through stomata.
- The excess of water gets removed through transpiration.
- Some waste gets removed by secreting them in the form of gums and resins.
- Some waste gets removed along with dead cells by shedding of leaves.
- Some waste products are removed through petals, fruits and seeds.
- Some waste substances are excreted through roots into the soil around them.
- Some waste products are stored in cellular vacuoles.