CBSE

Chapter-Wise

TOPPER Handwritten Notes

Social Science

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Mathematics

English

2026
EXAMINATION

Class-10th

CONTENTS

5 CHAPTER

Life Processes

Introduction of Life Processes

- The basic life processes common to all living organisms are movement, nutrition, respiration, transport and excretion.
- **Living things:** They can breathe, eat, move, grow, reproduce and have senses.
- **Non-living things:** They do not grow, move, breathe, eat or reproduce. They do not have any senses.

Nutrition

The process of intake of nutrients by an organism and utilisation of nutrients by organism is called nutrition.

(i) **Autotrophic nutrition:** Involves the intake of simple inorganic materials from the environment (water, carbon-dioxide) and using external energy like the sun to synthesize complex high-energy organic materials.

(ii) **Heterotrophic nutrition:** The organism derives its nutrition by taking ready made food, from dead, or living plants and animals. The survival of heterotrophs directly or indirectly depends on autotrophs.

Types of heterotrophic nutrition:

(a) Saprophytic nutrition is when organisms release enzymes to digest dead organic matter like fallen leaves and excreta, deriving nourishment from decaying substances. Examples include fungi, yeast, and mushrooms.

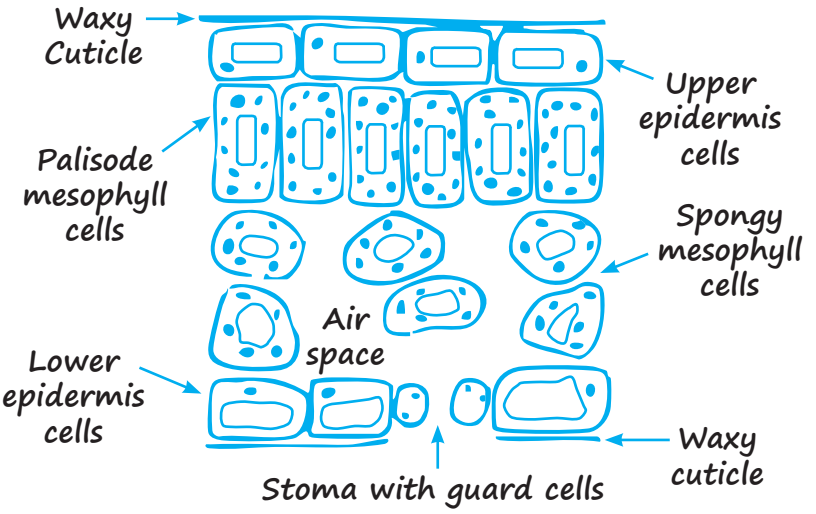
(b) Parasitic nutrition involves organisms living on or inside a host, obtaining nourishment without harming it. Such organisms are parasites, like *Plasmodium* (malaria), Ascaris (roundworm), and *Cuscuta* (a plant parasite).

(c) Holozoic nutrition is a mode of nutrition in which the animal takes in complex solid food or whole material and break down (digestion) of the food takes place inside the body. E.g, Herbivore (Cow), Carnivore (Lion) and Omnivore (Rat).

Autotrophic Nutrition

- Chloroplast (mesophyl cell in leaf) of plant cell is the active site of photosynthesis.
- Light reaction occurs in the grana of the chloroplasts. Absorption of light energy, conversion of the light energy to chemical energy, and splitting of water molecules into hydrogen and oxygen occurs in light reactions.
- Dark reactions occurs in the stroma of a chloroplast. Reduction of carbon dioxide to carbohydrates takes place in this process.

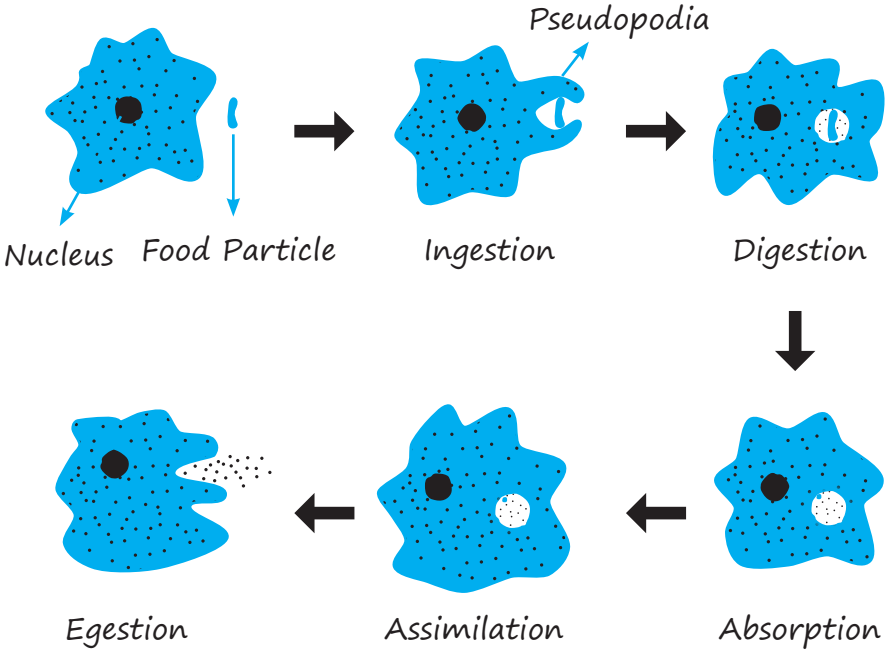
$$\underset{\text{Carbon dioxide}}{6CO_2} + \underset{\text{Water}}{12H_2O} + \text{Light energy} \xrightarrow[\text{Chlorophyll}]{} C_6H_{12}O_6 + 6O_2 + 6H_2O$$



Cross Section of Leaf

- Water used in photosynthesis is taken up from the soil by roots in terrestrial plants. Other material like nitrogen, phosphorus, iron and magnesium are taken from the soil.
- Gaseous exchange usually takes place through stomatal opening and closing. The guard cell's wall swell when water flows into them, causing stomatal pores to open similarly, the pore closes if the guard cells shrink.

Nutrition in Amoeba

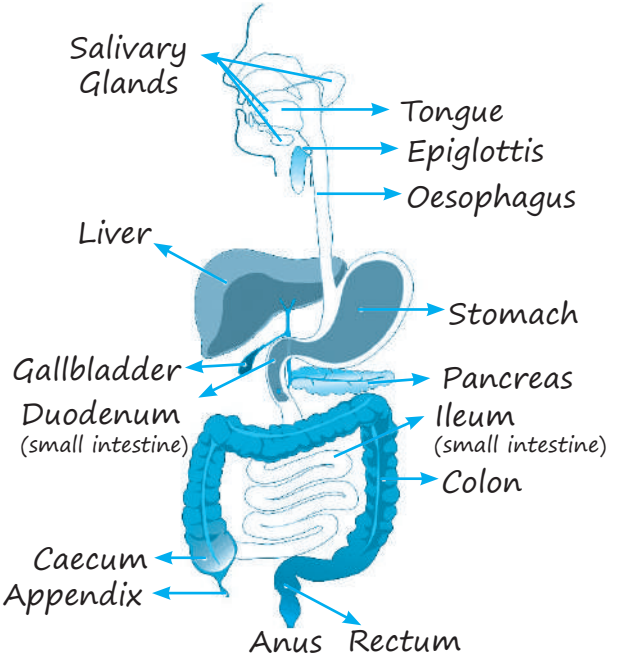


Nutrition in Amoeba

In single-celled organisms, food is absorbed through the entire surface. For example, Amoeba uses finger-like extensions to engulf food, forming a food vacuole where complex substances are broken down and absorbed, while undigested material is expelled. In Paramoecium, a unicellular organism, food is directed to a specific spot on the cell by cilia that cover its surface.

Nutrition in Human Beings

In human beings, the food eaten is broken down by various steps along the alimentary canal, and the digested food is absorbed in the small intestine to be sent to all cells in the body.



Human Digestive System

Mouth	Salivary glands secrete saliva. Starch —(**Salivary amylase**)→ Simple Sugar (Maltose)
Oesophagus	Peristaltic movements (contraction and expansion of alimentary canal).
Stomach	**Gastric juices** **Pepsin** (Breaks down protein) · **HCl**(Makes medium acidic for pepsinogen & kills germs) · **Mucus** (Protects inner lining of stomach)
Small Intestine	**Liver** secretes bile. Large fat globules —(**Bile Juice**, Emulsification)→ Small fat globules **Pancreas** secrete pancreatic juice. Trypsin → Proteins → Peptones Lipase → Emulsified Fats → Glycerol + Fatty acids **Intestinal Enzymes** Carbohydrate → Glucose · Fats → Fatty acid + Glycerol · Protein → Amino acid

Large Intestine	Absorbs excess water.
Rectum	Temporary collection of waste.
Anus	Helps in egestion.

- The small intestine is the site of complete digestion of carbohydrates, proteins and fats.
- Herbivores eating grass need a longer small intestine to allow the cellulose to be digested. Meat is easier to digest. Hence, carnivores like tigers have a shorter small intestines than herbivores like cows.
- Gradual softening of enamel and dentine is called tooth decay or dental caries. If untreated, microbes may invade the pulp. It causes inflammation and infection.

Respiration

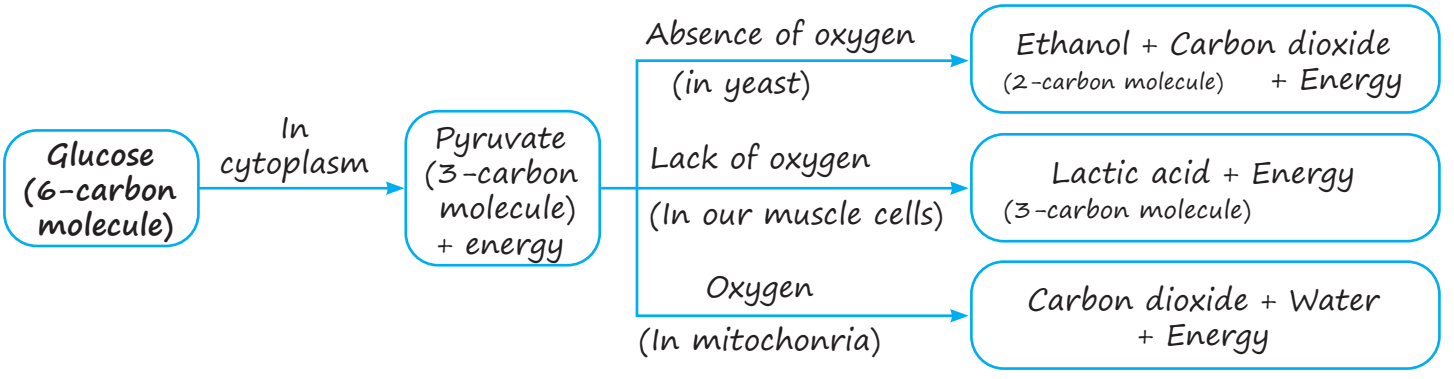
- The process of releasing energy from food is called respiration (Biochemical process).
- ATP serves as the primary energy currency for most cellular processes. During respiration, the energy released is utilized to synthesize ATP from ADP and inorganic phosphate.

Types of Respiration

(a) Aerobic Respiration: Complete breakdown of food (glucose) into carbon dioxide and water in the presence of oxygen and energy is released in the form of ATP.

(b) Anaerobic Respiration: Partial breakdown of food without using molecular oxygen i.e., incomplete oxidation of food takes place.

Break-down of glucose by various pathways:

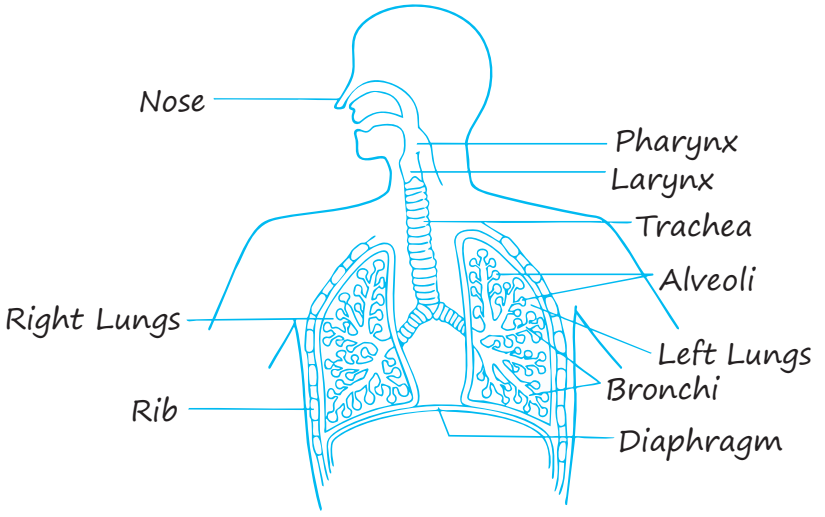


Respiration in Plants

- Import and export of gases in plants are very slow and take place by simple diffusion through young roots, stems (stomata and lenticles) and leaves (stomata).
- The net gaseous exchange in leaves during daytime is: CO_2 diffuses in; O_2 diffuses out and at night is: CO_2 diffuses out; O_2 diffuses in.

Types of respiratory organs in animals are trachea as in insects, gills as in aquatic animals, and lungs in terrestial animals.

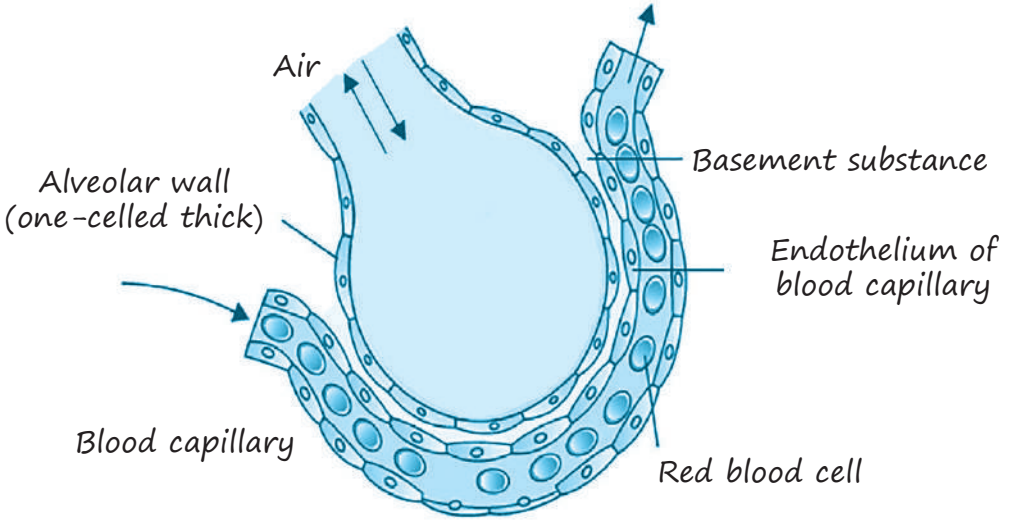
Respiration in Human Beings



Passage of Air through the Respiratory System: External nostrils → Nasal cavity → Pharynx → Larynx → Trachea → Bronchi → Bronchioles → Alveolar sacs → Alveoli.

Mechanism of Breathing	
Inhalation	**Exhalation**
❑ Diaphragm contracts and moves down.	❑ Diaphragm relaxes and moves up.
❑ Ribs move upwards and outwards.	❑ Ribs move down-wards and inwards
❑ Thoracic cavity expands.	❑ Thoracic cavity contracts.
❑ Lung volume increases.	❑ Lung volume decreases.
❑ Air enters the lungs.	❑ Air exits the lungs.

Gaseous Exchange between the Alveoli and Tissues: Alveoli are the structural and functional unit of lungs as these are actual site of gaseous exchange. Alveoli have very thin walls composed of simple non-ciliated squamous epithelium. It is closely surrounded by a network of blood capillaries. Due to very intimate contact of blood capillaries with alveoli, the exchange of gases takes place here.



Gaseous Exchange between Alveoli and Tissues

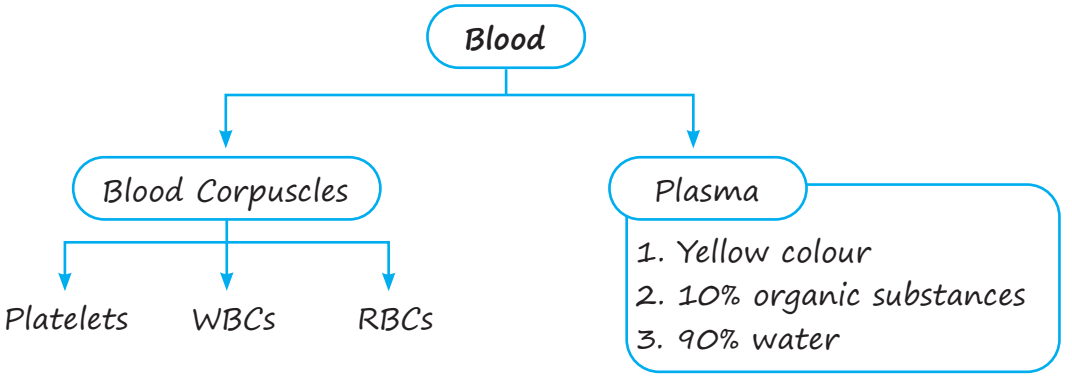
- In human beings, the respiratory pigment is haemoglobin, which has a very high affinity for oxygen. This pigment is present in the RBCs. Carbon dioxide is more soluble in water and hence is mostly transported in the dissolved form in our blood.

Transportation in Human Beings

Transportation performed by various types of circulatory system, which in humans is classified into two system namely:

Lymphatic System		Blood Circulatory system	
(i)	Lymph	(i)	Blood
(ii)	Lymph vessels	(ii)	Blood vessels
(iii)	Lymph nodes	(iii)	Heart

Human circulatory system consists of three chief components: Blood (the fluid), the blood vessels (the pipes) and the heart (the pump).



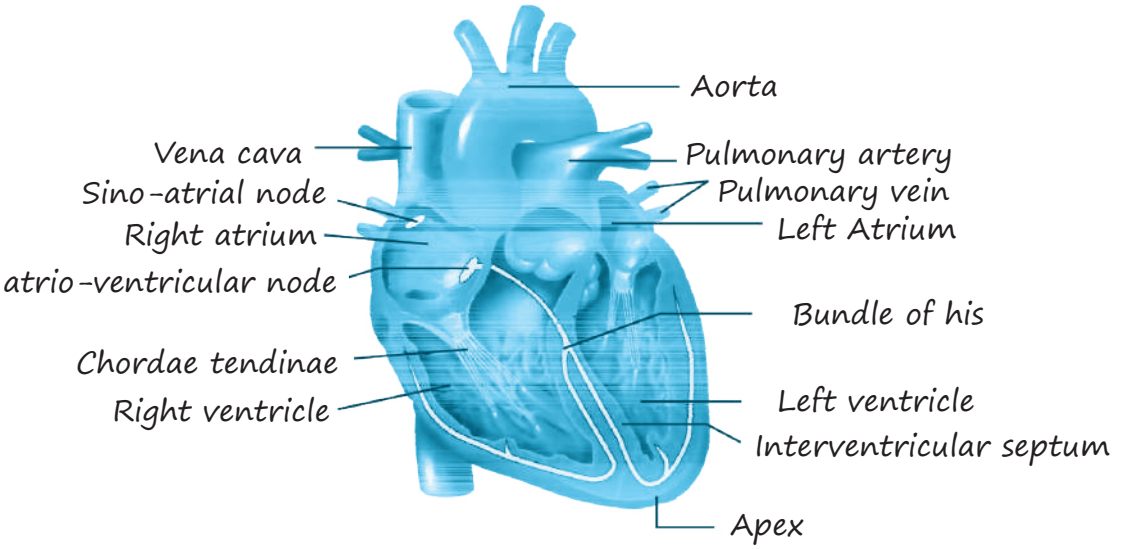
Blood vessels			
Feature	**Arteries**	**Veins**	**Capillaries**
Wall thickness	Thick and muscular	Thin and less muscular	Very thin one cell thick
Lumen size	Narrow	Wide	Very narrow
Valves	Absent	Present (to prevent backflow)	Absent
Function	Carry oxygenated blood (except pulmonary artery)	Carry deoxygenated blood (except pulmonary vein)	Allow exchange of gases and nutrients

Structure of Heart

Size: The size of heart is equal to the size of one's clenched fist.

Shape: Heart is triangular (conical) in shape and composed of cardiac muscles.

Location: Heart is present in between lungs in a space called as mediastinum.



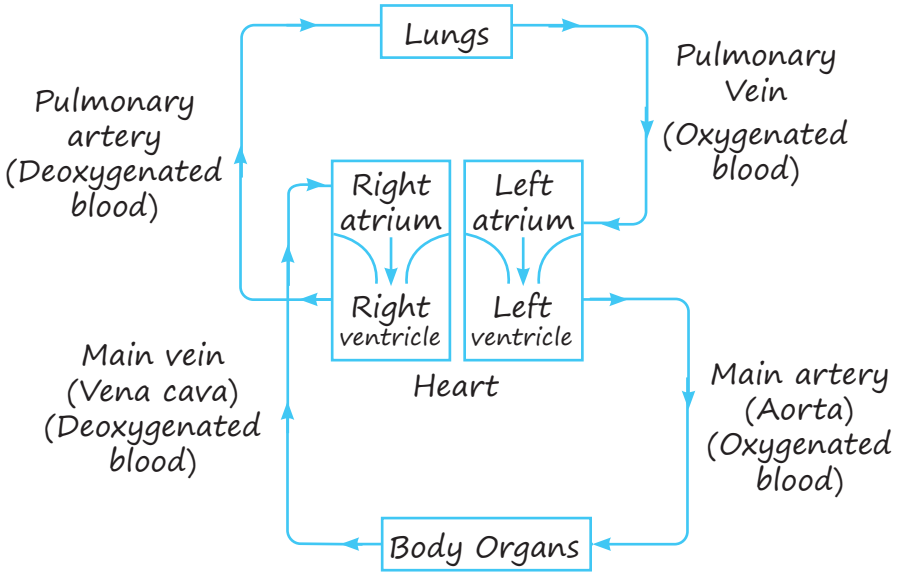
Structure of Heart

Double Circulation in Mammals

In double circulation, the blood is transported twice in a single cycle through the heart to supply blood to the body.

(i) **Systemic circulation:** Oxygenated blood from lungs → Heart → Aorta → Systemic arteries → Body parts → Systemic veins → Heart

(ii) **Pulmonary circulation:** Deoxygenated blood from the body → Heart → Pulmonary arteries → Lungs → Pulmonary veins → Heart.



- Blood pressure refers to the force that blood exerts against the wall of a vessel. This pressure is much greater in arteries than in veins. The average systolic pressure is about 120 mm of Hg and diastolic pressure of 80 mm of Hg.
- Blood pressure is measured by sphygmomanometer.
- Heartbeat refers to one complete contraction and relaxation of the heart. The heart pumps out our blood to the arteries about 70 to 72 times per minute.
- Stethoscope is used to listen to heartbeat.

- Lymph is another type of fluid and help in transportation. Lymph carries digested and absorbed fats from the intestine and drains excess fluid from extracellular space back into the blood.

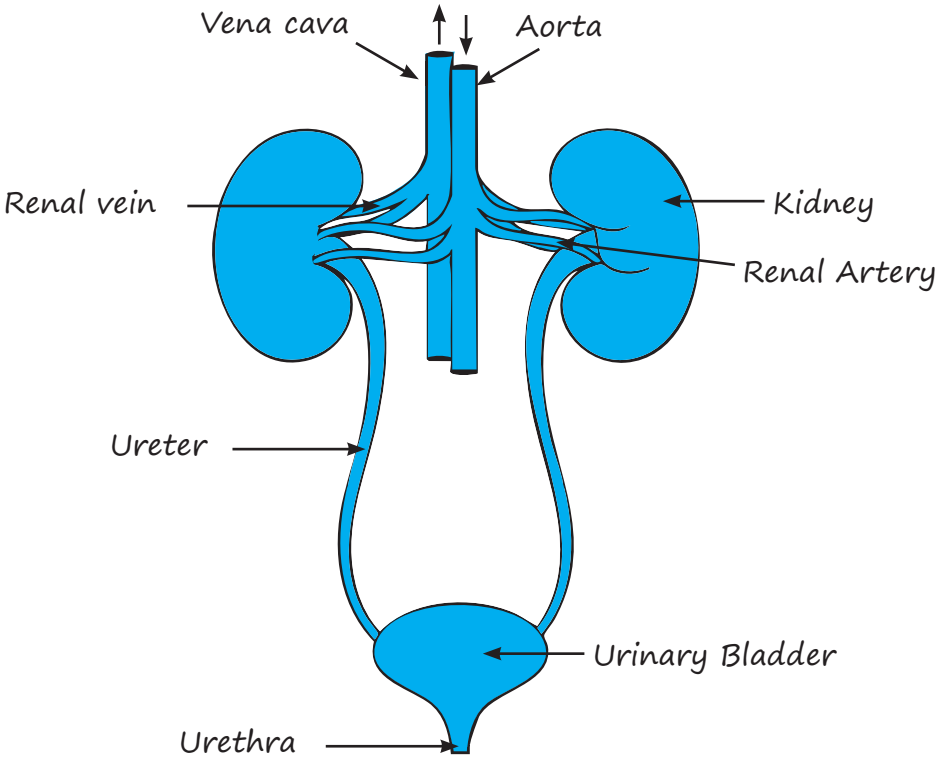
Transportation in Plants

- The upward movement of water and minerals from roots to different plant parts is called the ascent of sap.
- Transport of food in plants takes place utilization of energy. Thus, unlike the transport through the xylem, it is a form of active transport. The flow of substances through the phloem occurs in both directions, i.e., upward and downward, unlike the xylem in which the transport of water and minerals take places in an upward direction.
- Transpiration is the process of water loss as vapour from aerial parts of the plant. This process creates a vacuum which creates a suction called transpiration pull.

Excretion

Removal of harmful waste from the body is called excretion.

Excretory System In Human Beings

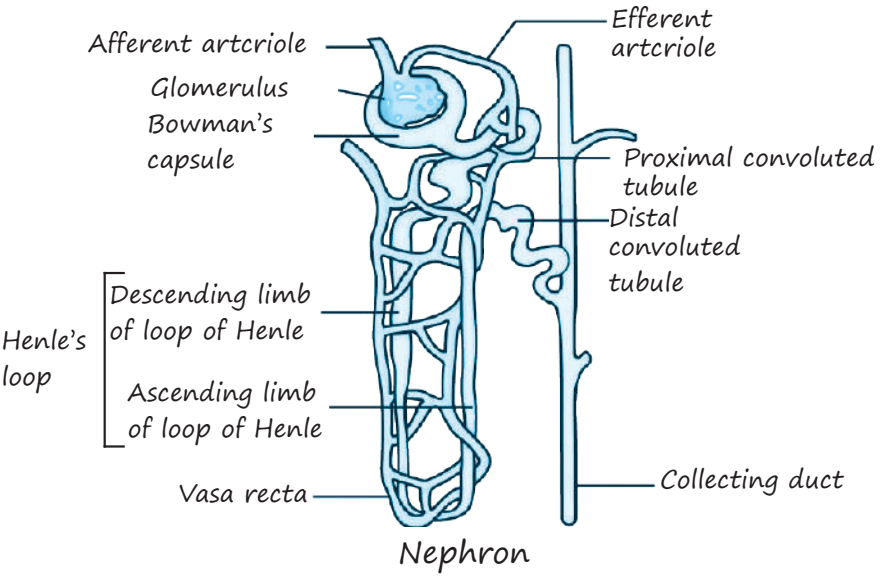


- **A pair of kidneys:** Primary excretory organ that makes the urine. Bean shaped and located laterally on either sides of the vertebral column. The right kidney is slightly lower than the left due to the presence of liver on the right side.
- **A pair of ureters:** Collects urine from the kidneys.
- **A urinary bladder:** Stores urine temporarily.
- **A urethra:** Discharges urine out of the body.

Nephron: Kidney's functional unit, with each kidney containing around one million nephrons.

Mechanism of Urine Formation

1. **Glomerular filtration/ Ultrafiltration:** Occurs in the glomerulus where blood is filtered. Plasma components reach Bowman's capsule, (excluding proteins).
2. **Tubular Reabsorption:** 99% of the filtrate reabsorbed (active & passive transport).
3. **Secretion:** Tubular cells secrete ions into filtrate, maintaining fluid balance and forming urine.
4. **Urine:** Composed of 95% water and 5% nitrogenous wastes like urea, ammonia, and creatinine. Potassium, sodium, and calcium ions are also excreted.



Nephron

- In a healthy adult, about 180 liters of filtrate is produced daily in the kidneys, but only 1-2 liters are excreted as the rest is reabsorbed in the kidney tubules.

Artificial Kidney/Haemodialysis

- **Artificial kidney:** Device to remove nitrogenous waste products from the blood through dialysis. Consist of a number of tubules with a semi-permeable membrane, suspended in a tank filled with dialysing fluid. This fluid has the same osmotic pressure as blood, except that it is devoid of nitrogenous wastes.
- **Haemodialysis:** The process of purifying blood by an artificial kidney. It is meant for kidney failure patients.

Excretion in Plants

(i) Gaseous waste excretion in plants occurs through stomatal pores on leaves and 'lenticels' in stems and is released into the air.

(ii) Carbon dioxide, a waste product of respiration is used in photosynthesis, while oxygen, a byproduct of photosynthesis, is utilized in respiration.

(iii) The gums, oils, latex, resins, etc are some waste product stored in plant parts like bark, stems and leaves etc.

(iv) The plants get rid of these wastes by shedding leaves, peeling of bark and falling fruits.

(v) Waste products can also be stored in the form of oil produced from orange, eucalyptus, jasmine, latex from the rubber tree, papaya tree, and gums from Acacia. These may be excreted into the soil.

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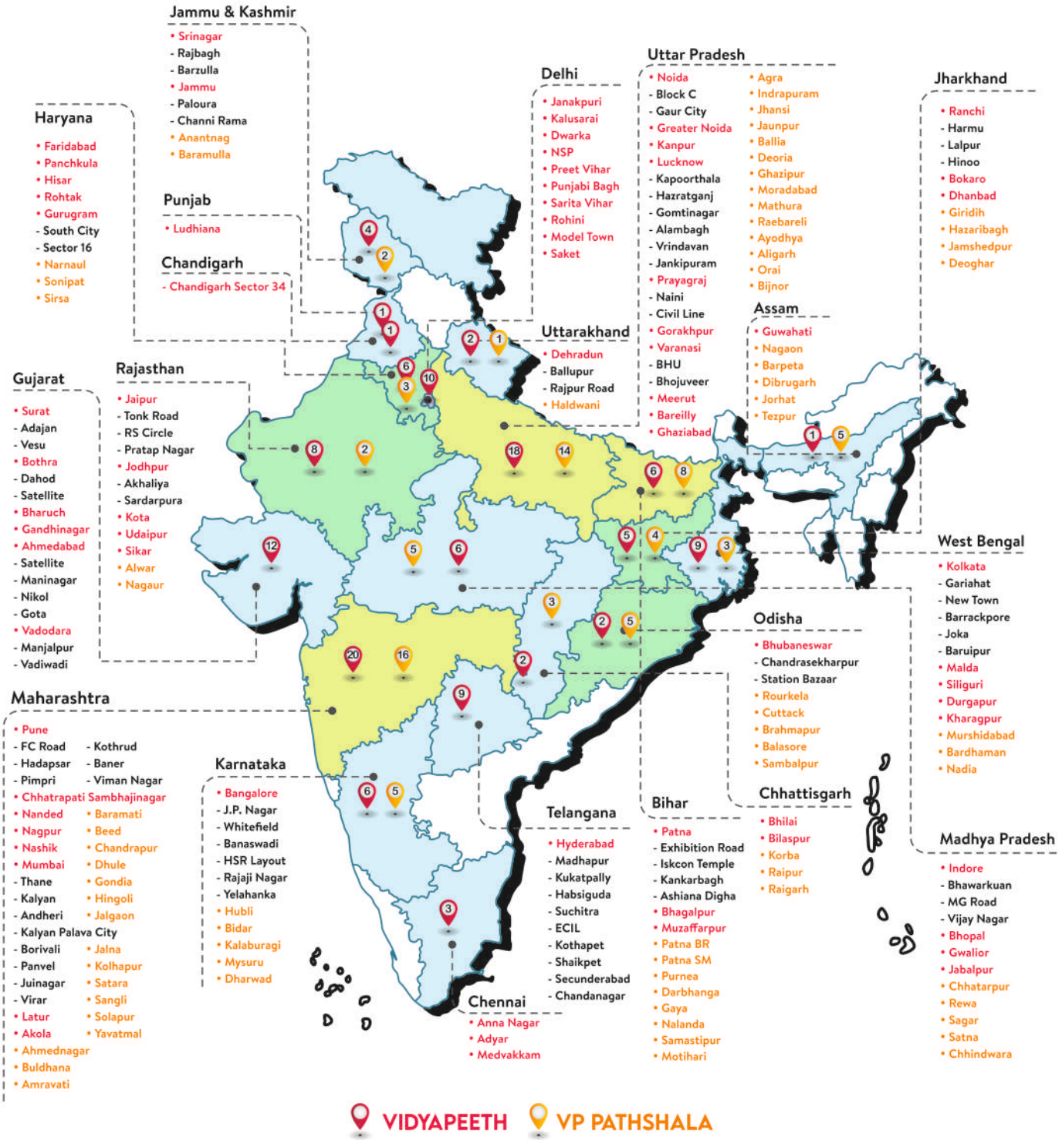

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