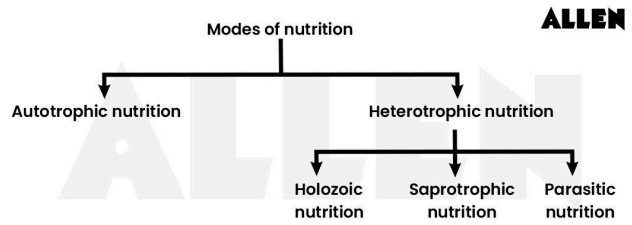
CBSE Class 10 Science Notes Chapter 6 Life Processes

If an organism is alive, it must keep repairing and maintaining its structures. The maintenance functions of living organisms must go on even when they are not doing anything particular. The processes which together perform this maintenance job are called life processes.

Nutrition

- Nutrition is the process of intake of nutrients (like carbohydrates, fats, proteins, minerals, vitamins and water) by an organism as well as the utilization of these nutrients by the organism.

Modes of nutrition



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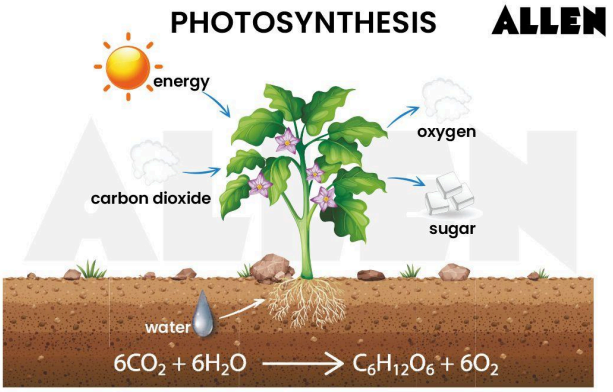
Autotrophic Nutrition

- It is the process by which organisms take in simple inorganic substances from outside and use them to synthesize organic molecules and then convert into stored forms of energy.
- For example green plants prepare their food by using carbon dioxide and water in the presence of chlorophyll and sunlight.
- The organisms having autotrophic mode of nutrition or can make their own food are called autotrophs or autotrophic organisms.
- Examples : Green plants and some bacteria.

Photosynthesis

- Photosynthesis is the process of preparing organic food (carbohydrate) by combining carbon dioxide and water, using solar energy by chlorophyll pigments.
- The sugar produced in photosynthesis is stored in the form of starch in plants and it is the source of reserved internal energy.



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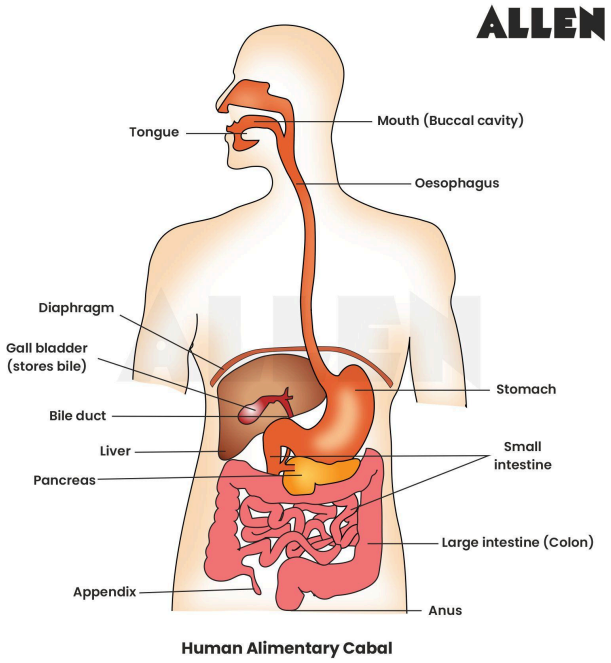
Heterotrophic Nutrition

- Mode of nutrition in which the organisms derive their nutrition by taking readymade food, from other dead or living plants and animals e.g., Animals, fungi and most of bacteria. The survival of heterotrophs depends directly or indirectly on autotrophs.
- Heterotrophic mode of nutrition is classified into three types on the basis of methods of obtaining food.
- **Holozoic nutrition** - Ingestive nutrition Mode of nutrition in which the animals take complex solid food or whole material and break down (digest) it inside the body. They may be herbivores (Cow), carnivores (Lion) and omnivores (Rat).
- **Saprotrophic nutrition** - In this type of nutrition the organisms obtain their food from decaying organic substances. They are also called saprotrophs. They break down the food material outside the body and then absorb it. e.g., Bacteria, Fungi (bread molds, yeasts and mushrooms).
- **Parasitic nutrition** - Mode of nutrition in which organisms (parasite) derive nutrition from other plants and animals (host) without killing them. e.g., Cuscuta (Amarbel), ticks, lice, leeches and tapeworms.

Nutrition in Human Beings

- In humans, nutrition begins with ingestion, where food is broken down into smaller particles through chewing, aided by saliva.
- Saliva contains salivary amylase, which helps break down starch into simpler sugars.
- The food then moves down the esophagus through peristalsis into the stomach, where further digestion occurs.
- The stomach secretes hydrochloric acid, which creates an acidic environment for the enzyme pepsin to digest proteins.
- Food is then gradually released into the small intestine, where digestion and absorption occur.
- Digestive juices from the pancreas and liver help break down proteins, carbohydrates, and fats. The small intestine absorbs nutrients into the bloodstream.
- After absorption, the indigestible waste is moved to the large intestine, where water is reabsorbed, and the remaining material is excreted.



Human Alimentary Cabal

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Respiration

Respiration is the process by which the food taken through nutrition gets oxidized to release energy for various activities.

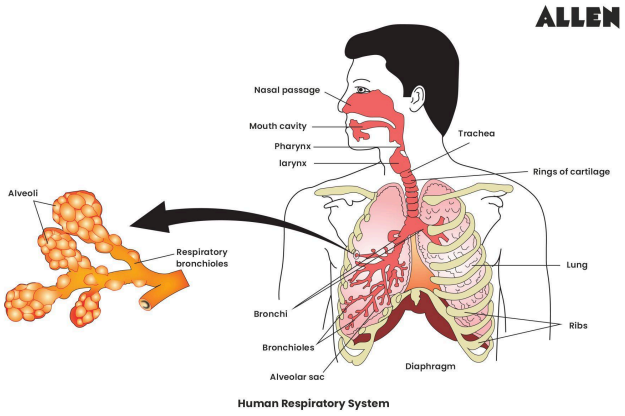
Types of respiration

Difference between Aerobic and Anaerobic Respiration

S. No	Features	Aerobic Respiration	Anaerobic Respiration
1.	O_2 requirement	O_2 required	Not req
2.	Occurs in	Cytoplasm and mitochondria	Cytopla only
3.	Breakdown	Complete	Incomp
		breakdown of glucose takes place	breakdown of glucose takes place
4.	End products	CO_2 and H_2O	CO_2 and ethyl alcohol or lactic acid
5.	Energy produced from one glucose molecule	38 ATP	2 ATP

Human respiratory system

- When we inhale air, it passes through our nostrils into the nasal cavity.
- From the nasal cavity, the air reaches our lungs through the windpipe. Lungs are present in the chest cavity. This cavity is surrounded by ribs on the sides.
- A large, muscular sheet called diaphragm forms the floor of the chest cavity.
- Breathing involves the movement of the diaphragm and the rib cage.



Human Respiratory System

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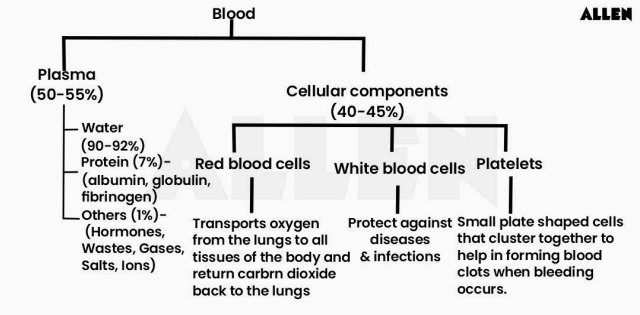
Transportation

- In unicellular organisms a single cell carries out all the life processes as the cell itself is the organism. In advanced forms like the few-celled algae, protozoa, sponges, etc., the size of the organism ensures that all the cells are not very far from each other.
- The uptake of materials from the environment is through the general body surface and the transport within the cells is by diffusion.
- However, more advanced multicellular forms need a transportation mechanism. The sites of absorption and synthesis are very specific and are separated by a greater distance from the other parts of the body.
- The actual movement of materials into the individual cells is by diffusion, osmosis or active transport.

Blood



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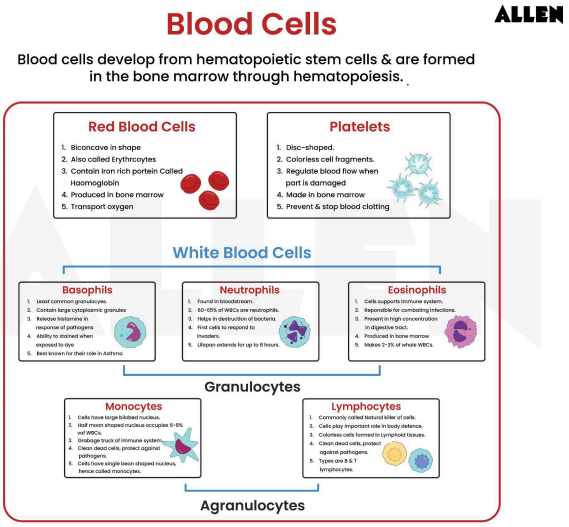

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Blood Vessels

In humans, three types of blood vessels are present.

S. No	Features	Arteries	Veins	Capillaries
1.	Direction of blood flow	Take the blood away from the heart to different parts of the body.	Bring the blood towards the heart from various body parts.	Blood flows from arterioles to capillaries and then to venules.
2.	Kind of blood	Oxygenated blood except in the pulmonary artery.	Deoxygenated blood except in pulmonary vein.	Blood changes from oxygenated to deoxygenated.

3.	Blood pressure	Pressure is high.	Pressure is low.	Pressure is extreme low.
4.	Blood flow	Blood flows rapidly with jerks.	Blood flows smoothly without jerks.	Blood flows smoothly without jerks.
5.	Lumen	Narrow	Wide	Very small
6.	Valves	Absent	Present	Absent
7.	Location	Mostly deep seated.	Mostly superficial	Form a network all over the body and in the organs.

The Heart

- The heart is a muscular organ responsible for pumping blood through two primary circuits: the pulmonary circuit, which connects the heart to the lungs, and the systemic circuit, which distributes blood throughout the rest of the body. It consists of four chambers — two atria and two ventricles — that work together to keep oxygenated and deoxygenated blood separate.

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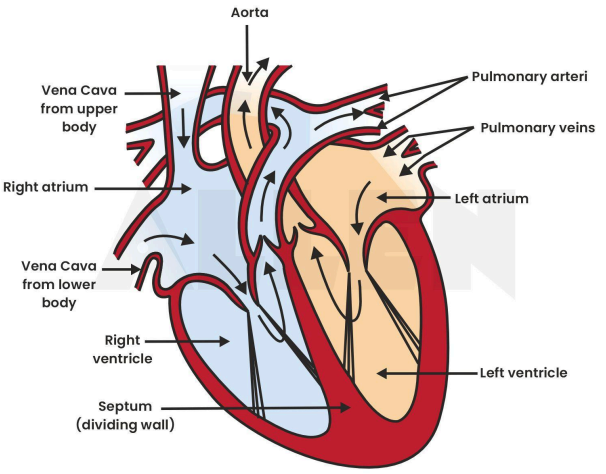
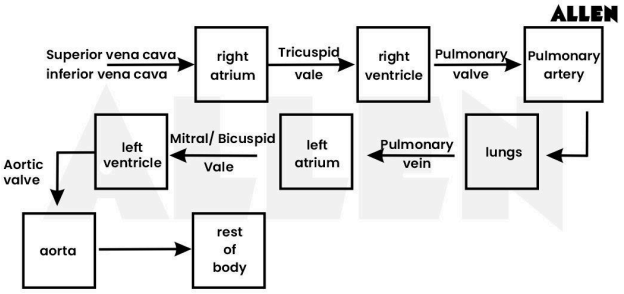


Schematic Sectional View of the Human Heart



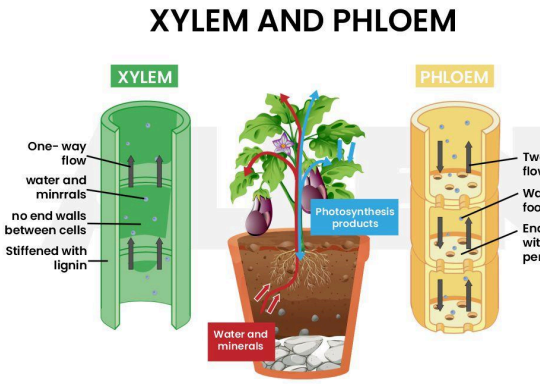
Lymphatic System

- Lymph is a fluid that gathers excess tissue fluid and returns it to the bloodstream.
- It also transports digested fats from the intestine and aids in the immune response.

Transportation in Plants

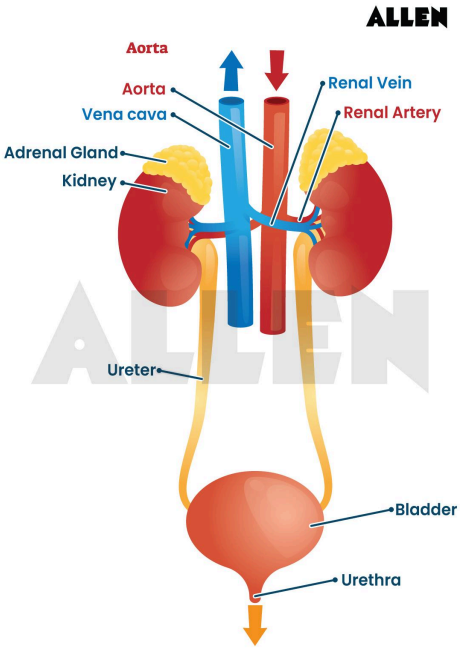
- Plants have specialized systems for transporting water, minerals, and nutrients.
- Xylem carries water from the roots to the leaves, while phloem transports the products of photosynthesis, like glucose, to various parts of the plant.

- Water is moved upwards through transpiration, which also helps regulate the plant's temperature.



Excretion

- A mechanism to filter the blood is required.
- This is done by the blood capillaries in the kidneys. When the blood reaches the two kidneys, it contains both useful and harmful substances.
- The useful substances are absorbed back into the blood. The wastes dissolved in water are removed as urine. Excretory system consists of the following organs :
- A pair of kidneys
- Ureters
- Urinary bladder
- Urethra
- Kidneys are 2 bean shaped organs which help in filtering blood to remove waste.
- A narrow tube called the ureter runs from the inner side of each kidney.
- The ureters, in turn, are connected to a large sac called the urinary bladder. Urine passes from the kidney through two ureters into the urinary bladder. Urine is collected and stored here.
- Leading from the bladder is another tube called the urethra. Urethra works as the outlet passage for urine.



Excretion in Plants

- Plants handle excretion differently.
- During photosynthesis and respiration, they release gasses like oxygen and carbon dioxide through stomata.
- Some wastes are stored in leaves, which are later shed, while others are stored as resins or gums.