LIFE PROCESSES

Class 10 Biology

RESPIRATION

PART 2/3

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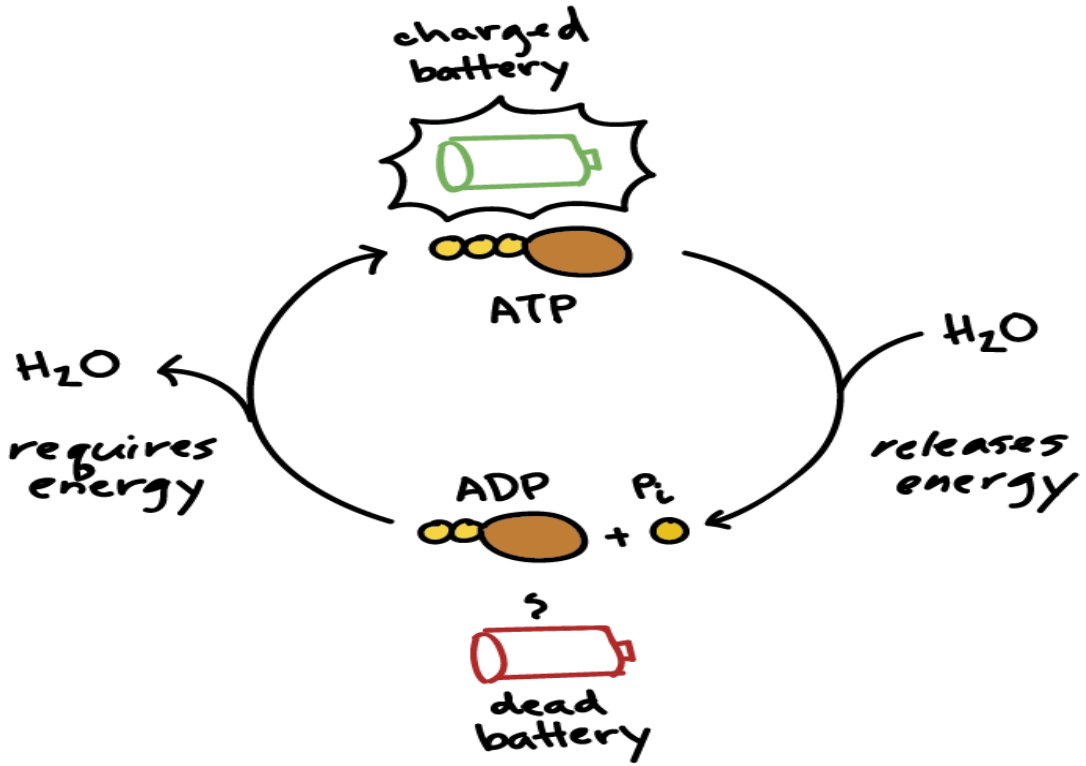
The Energy Currency ATP

- **ATP(Adenosine Tri-phosphate)** and ADP**(Adenosine Di-phosphate) are energy currencies** and they are **inter-convertible**.
- The energy released during the process of respiration is used to make an ATP molecule from ADP and inorganic phosphate.
- Inorganic phosphate (Pi), gets attached to a compound called ADP, to form ATP.
- When **ATP reacts with water** it gets converted back to ADP and Pi and **releases energy equivalent to 30.5 KJ/Mol.**
- The energy released is utilized, for different metabolic activities like contraction of muscles, protein synthesis, conduction of nerve impulses etc.

ADP + Pi + Energy------→ATP
(Low energy) (high energy)

ATP------→ ADP + Pi + Energy
(to be used in cells)



RESPIRATION IN PLANTS AND ANIMALS

- Plants exchange gases through **stomata**. At night, there is no photosynthesis, so CO_2 elimination is the major exchange going on. During the day, CO_2 generated by respiration is used up for photosynthesis, hence there is no CO_2 released. Only oxygen is released at this time. Plants also exchange gases through **root hairs** and **lenticels in woody barks**.

ANIMALS	RESPIRATORY ORGANS
Unicellular animals like Amoeba, Paramecium	Cell membrane
Earthworm	Moist Skin
Insects like Grasshopper, Cockroach	Spiracles and tracheae
Amphibians like frog	moist skin (cutaneous respiration)when in water or through lungs (pulmonary respiration) when on land.
Reptiles, birds and mammals	lungs

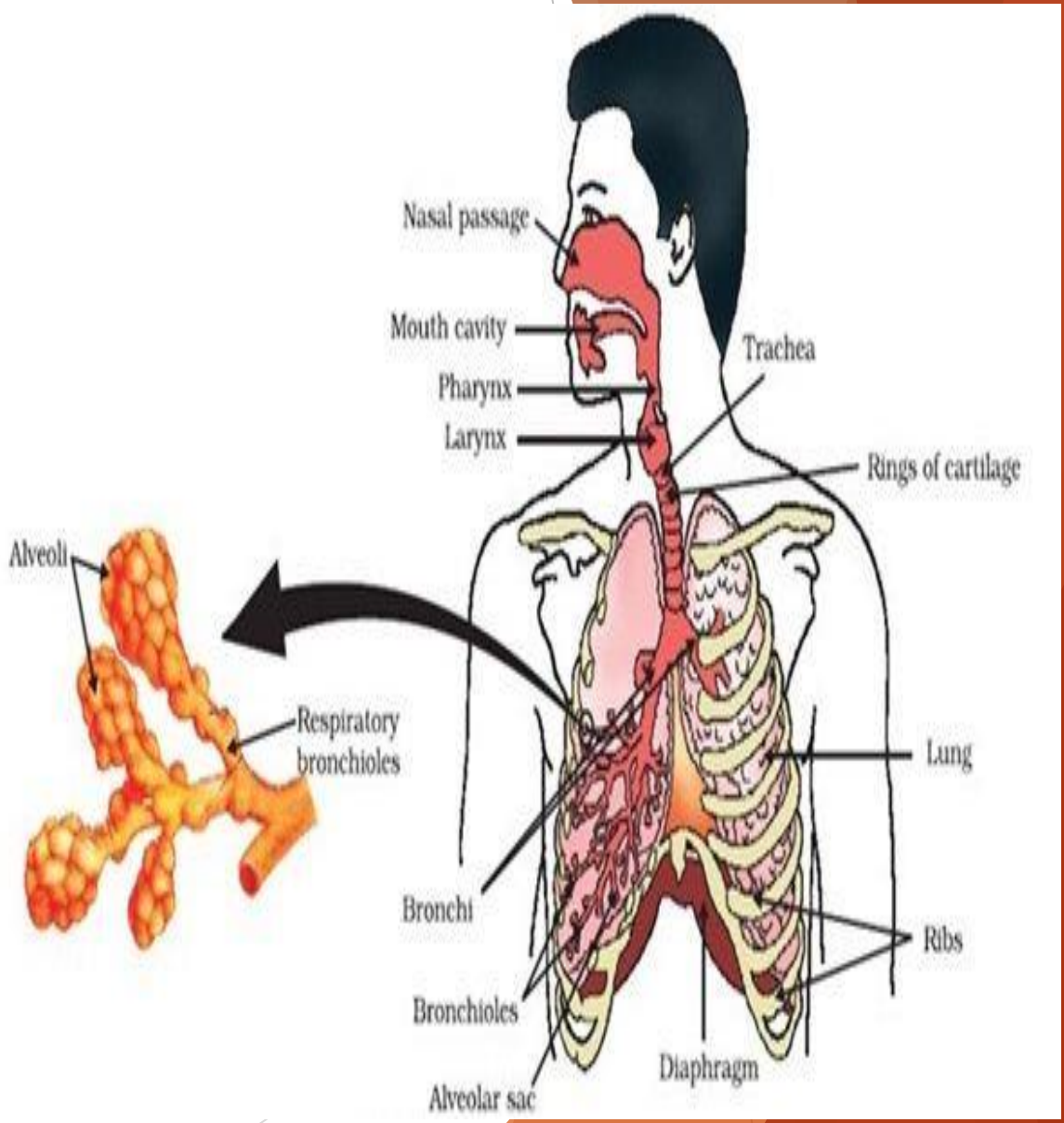
- **Since the amount of dissolved oxygen is fairly low compared to the amount of oxygen in the air, the rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms.**

- All the respiratory organs have common features like **large surface area for absorption of oxygen, thin wall for easy diffusion and exchange of gases and rich supply of blood vessels to absorb the oxygen.**

HUMAN RESPIRATORY SYSTEM

RESPIRATION IN HUMAN BEINGS:

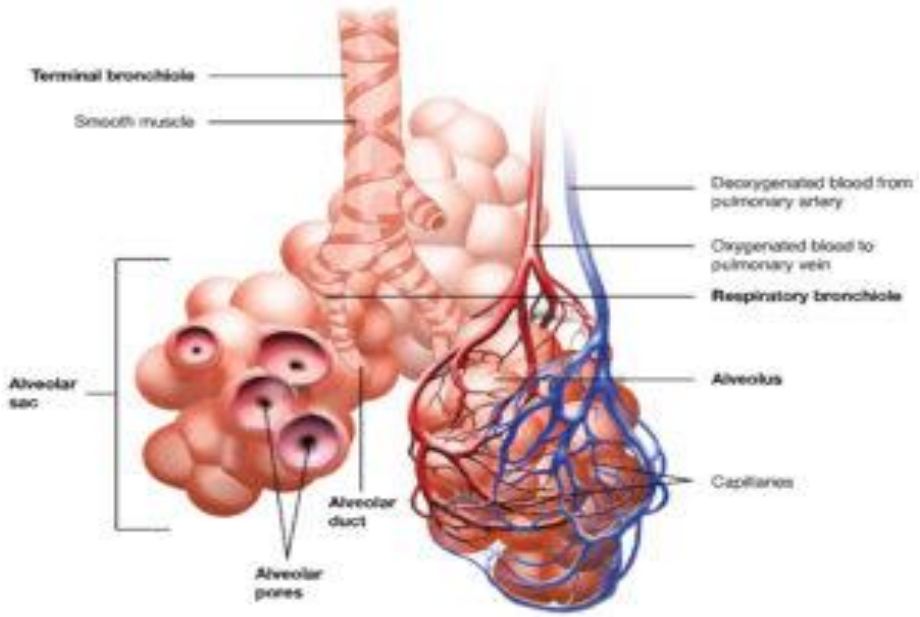
- In human beings air is taken into the body through the nostrils.
- The air passing through the nostrils is filtered by fine hairs that line the nasal passage. Also the passage is lined with mucus to remove the dust and germs.
- The air passes through the throat into the trachea in the thoracic cavity(chest cavity) and then into the lungs.
- Rings of cartilage line the trachea. These rings ensure that the air-passage does not collapse.
- The trachea breaks into two bronchi and each bronchus enters the right and the left lung.

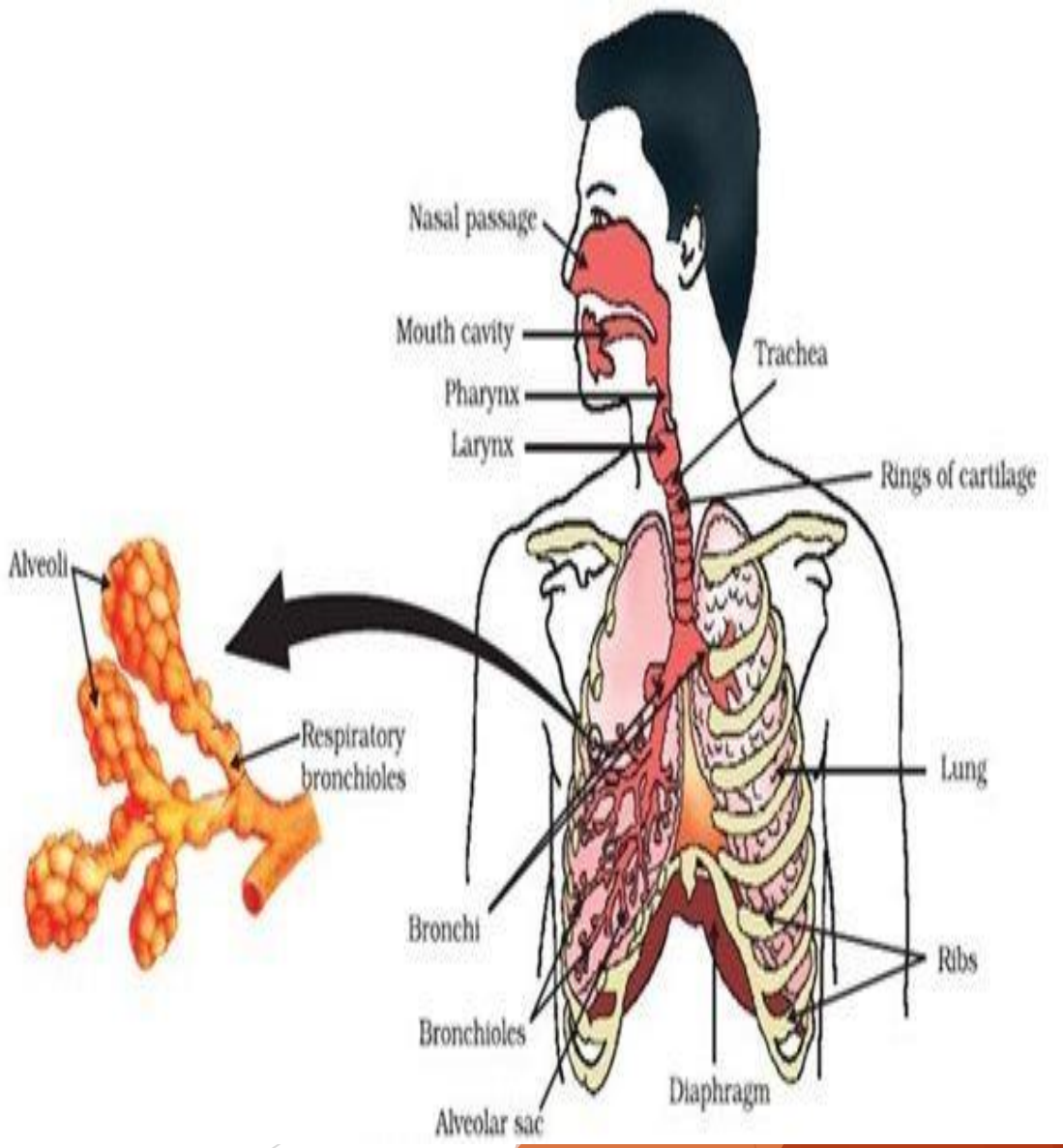


HUMAN RESPIRATORY SYSTEM

RESPIRATION IN HUMAN BEINGS:

- Within the lungs, the bronchi divides into smaller and smaller tubes called bronchioles.
- The bronchioles finally terminate in balloon-like structures which are called alveoli.
- The alveoli increase the surface area for exchange of gases. The walls of the alveoli have an extensive network of blood-vessels.
- If the alveolar surface were spread out, it would cover an area of about 80 m^{2}.
- This large surface area helps in sufficient exchange of gases in the human being.





Resources:

NCERT science text book for class 10

Google

Continued on Part 3

THANK YOU