

Ch-6

Life Processes

Life process

The processes which maintain body functions and necessary for survival are called life process.

There are four main types of life process.

1→ Nutrition

2→ Respiration

3→ Transportation

4→ Excretion

Nutrition

Nutrition is the process by which organism obtain nutrients from food and utilise them to obtain energy for their daily activities, building and repairing of their tissues.

* Nutrition

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* Nutrients

Nutrients are those substances which are necessary for the proper growth and maintenance of the living body.

Ex. → Carbohydrate, Protein, Vitamin, Minerals, etc.

* Types of nutrition

1) Autotrophic ~~nutrition~~ nutrition

2) Heterotrophic nutrition

1) Autotrophic nutrition

It is a process in which an organism prepare its own food from simple inorganic material like water and carbon dioxide in the presence of sunlight.

* Autotrophs

Organisms which prepare their food by autotrophic nutrition process are called autotrophs

Ex. → Green plants and some bacteria, etc

2) Heterotrophic nutrition

It is the process in which organism depend upon the other organism for food to survive.

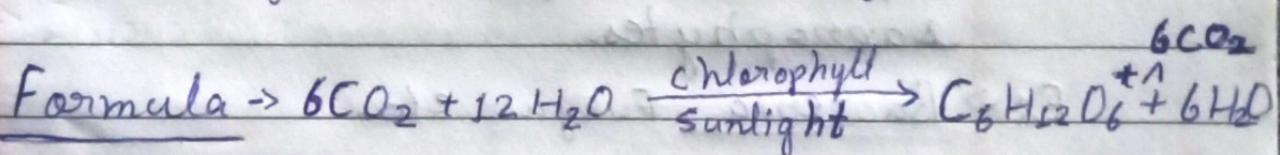
* Heterotrophs

Organisms which prepare their food by heterotrophic nutrition process are called heterotrophs.

Ex. → Human beings, Amoeba, etc.

⇒ Photosynthesis

The process in which green plants convert simple inorganic material ~~like~~ carbon dioxide and water into complex organic food material glucose in the presence of chlorophyll and sunlight is called photosynthesis.



* Event occur during photosynthesis

- Absorption of light energy by chlorophyll.
- Conversion of light energy into chemical energy.
- Reduction of Carbon dioxide to carbohydrates

* Chloroplast

These are the small organism founds in plant cells. It contain chlorophyll which absorb sunlight for photosynthesis.

- ⇒ Types of heterotrophic nutrition
- 1 → Saprophytic nutrition
 - 2 → Parasitic nutrition
 - 3 → Holozoic nutrition

I → Saprophytic nutrition -

The mode of nutrition in which organism obtain food from dead and decaying organic matter.

* Saprophytes

Those organism which make their food by saprophytic nutrition are called saprophytes.

Ex. → Bacteria, Fungus etc.

2 → Parasitic nutrition

It is a type of Nutrition in which the organism live on or inside the body of their host and derive food from them without killing them.

* Parasites → Those organism who make their food by parasitic nutrition are called parasites. They are dependent on host organism.



* Host organism

Organism which provides living ~~environment~~
~~and~~ environment, resources and
nutrients to parasites.

Ex. → ~~Bacteria~~ in Humans are become host by
Mosquito and lice.

(ii), Dogs are become ~~to~~ host by lice and Ticks

3 → Holozoic nutrition

The mode of nutrition that involve
ingestion, digestion, absorption ~~and~~,
assimilation ^{and excretion} of liquid or solid organic
material.

Ex. Human, amoeba

Nutrition in Amoeba

- The entire process is carried through the body surface ~~with~~ with the help of pseudopodia.
- Nutrition in amoeba occurs through a process called phagocytosis.

- Phagocytosis is the process by which the food is engulfed by the organism.
- The mode of nutrition in amoeba is known as holozoic nutrition.
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5 Stages of Holozoic nutrition

~~Nutrition in Human Body~~

- 1 → Ingestion
- 2 → Digestion
- 3 → Absorption
- 4 → Assimilation
- 5 → Excretion

1 → Ingestion → The process of taking food inside the body.

2 → Digestion → The process of breaking down food into smaller molecules that can be absorbed by the body for energy and nutrients.

3 → Absorption → The process in which nutrients, water and other substances are taken up and assimilated into the body from the immediate ~~surroundings~~ surroundings.

(for amoebas or single cell) or the internal environment (for human beings or multicellular)

4 → Assimilation

Releasing energy from digested food.

5 → Excretion

The process in which waste products, toxins and unwanted substances are removed from the body.

Nutrition in human beings

1 → Ingestion in human beings

Entering of food in our mouth

2 → Digestion in human beings

⇒ (i) In mouth

⇒ Teeth

It breaks food into small pieces.

⇒ Tongue →

It taste the body and rotates food inside the mouth

⇒ Salivary gland → It produces Saliva in which an enzyme is present called salivary amylase. It breaks down ~~food~~ the starch present in the food into sugar.

⇒ Oesophagus (food pipe) →

- Structure is tube like. It connects the mouth to the stomach.
- This pushes the food into the stomach.

* Peristaltic movement

- Contraction and expansion movement of wall of ~~the~~ food pipe.
- It helps to push food into the stomach.

~~The oesophagus pushes the food into the stomach. called peristaltic movement.~~
~~It is a contraction and expansion movement of wall of food pipe.~~

(ii) In Stomach⇒ Gastric glands

- Present in the wall of the stomach
 - These glands release Hydrochloric acid (HCl)
- (ii) Pepsin
(iii) Mucus

* HCl → • Kills germs

- Provide acidic medium which facilitates the action of the enzyme pepsin.

* Pepsin • It is an enzyme

- Digests proteins.

* Mucus → • Protects the inner lining of the stomach from the ~~acidic~~
~~water~~ ~~not~~ harmful effects of HCl(iii) In Small intestine

- It is the longest part of the alimentary canal

⇒ Bile → • Released by the liver

- Stored in gallbladder

* Bile juice → Alkaline the food, so that ~~enzymes~~ trypsin do their work.

* Bile salt \rightarrow It breaks big fat globules into smaller parts. This process is known as emulsification.

\Rightarrow Pancreatic juice

- It is secreted by pancreas.

① Pancreatic amylase

② Trypsin

③ Lipase

① Pancreatic amylase

- It breaks the carbohydrate and starch into sugar.

② Trypsin

- It breakdown protein into amino acid.

③ Lipase

- It convert fat into fatty acid and glycerol.

3 → Absorption

- The process of Absorption is started in small intestine.

* villi:

- It is the finger like projection which increase the surface area for absorption.
- It absorbed the food and supply to blood vessels.

4 → Assimilation

- When food is absorbed by the blood vessels then blood vessels transport all the food to each and every cell of the body.

5 → Excretion

- The food that remains in the small intestine after the process of digestion, goes to the large intestine where the walls of large intestine absorbed maximum water from the food and rest of solid waste exits through the anus.

Respiration

- The process which breakdown food to release energy with the help of oxygen and respiratory enzyme is called respiration. It also involves breathing.
- In respiration most of energy released from glucose.

* Respiratory enzyme

- Those enzymes that involved in the process of respiration.
- They play crucial roles in facilitating the breakdown of organic molecules and the production of energy.

⇒ Stages of Respiration

1 → External respiration

2 → Internal respiration

1 → External respiration

* Breathing

Process in which organism inhal oxygen and exhal carbon dioxide.

Ques 1

* Gases exchange

- Process in which diffusion of oxygen from lungs to blood and diffusion of carbon dioxide from blood to lungs.
- In plants, exchange of gases takes place through the stomata which present on the surfaces of the leaves.

2 → Internal respiration

- Process in which exchange of gases takes place between Arterial blood and body cells.

⇒ Types of Respiration

1 → Aerobic respiration

2 → Anaerobic respiration

1 → Aerobic respiration

- It is the complete breakdown of food in the presence of oxygen
- It releases large amount of energy in the form of ATP molecules.

* ATP

- It is the energy currency for most cellular processes. The energy released during the process of respiration is used to make an ATP molecule from ADP and inorganic phosphate.
- $\text{ADP} + \text{Pi} \xrightarrow{\text{Energy}} \text{ADP} \sim \text{Pi} = \text{ATP}$

P: Phosphate

* Equation of Aerobic Respiration

- Process of aerobic respiration starts from the cytoplasm and continues till the mitochondria.
- ~~Glucose \rightarrow Pyruvate + Energy + 3 ATP Energy~~
- Glucose \rightarrow pyruvate + energy (in cytoplasm)
- Pyruvate \rightarrow carbon dioxide + water + 38 ATP energy
(in the presence of oxygen in mitochondria.)
- Pyruvate formula \rightarrow Six carbon molecule, $\text{C}_3\text{H}_4\text{O}_3$ into a three-carbon molecule called pyruvate.

* This above process is takes place inside the cell so, this process also called cellular respiration.

2. Anaerobic respiration

Ex → Human muscles
Yeast, Bacteria

- It is the incomplete breakdown of food occurring in the absence of oxygen releasing small amount of energy. Ex. Yeast, Bacteria and Human muscles
- When anaerobic respiration occurs in microorganism, then this is known as fermentation.

~~See~~ ~~Oxos~~

⇒ Types of anaerobic respiration on the basis of product formed

- Alcoholic fermentation
- Lactic acid fermentation

* Alcoholic fermentation

- Process in which incomplete breakdown of sugar occurs to form ethanol and carbon dioxide.
- This process is used to make Beer, Wine and Cheese etc.
- This process is shown in yeast.

⇒ Reaction of alcoholic fermentation

firstly, In cytoplasm, glucose convert into Pyruvate and released some amount of energy and then pyruvate convert into Ethanol and carbon dioxide in the absence of oxygen and in this process less amount of energy is released which is 2 ATP molecules.

* Lactic acid fermentation

- In lactic acid fermentation, sugar convert into lactic acid and energy in the present of insufficient oxygen.

Ex. → Some bacteria turns milk into curd.

⇒ Reaction of lactic acid fermentation

- firstly, glucose converts into pyruvate and some amount of energy is released. After formation of pyruvate, because of insufficient oxygen present in muscle cells, lactic acid is formed and some energy is released in less amount which is 2 ATP

⇒ Respiration in Plants

Plants complete their respiration into two phases.

- Breathing or (Gaseous exchange)
- Release of energy

* Breathing or (Gaseous exchange)

On plants gaseous exchange takes place through the ~~the~~ three parts of the plants which is - Leaves, ~~and~~ Stem & Roots

• Leaves

In plants leaves, tiny pores are found which we call stomata. Around them guard cells are present, which regulate the opening and closing of stomata.

And Stomata are present in all the leaves of the plants which helps ~~in~~ in ~~exchange~~ gaseous exchange.

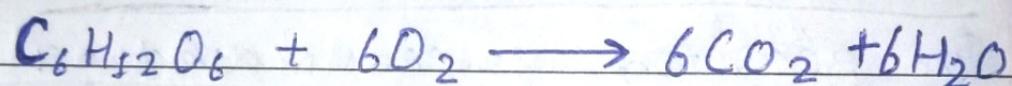
• Stem

In plant's stem small lenticels are present which do gaseous exchange.

• Roots → In plant's root - root hairs ~~on~~ ~~pted~~ are present which do gaseous exchange through the process of diffusions.

* Release of energy

During the process of respiration, in plant cells, glucose which formed during the photosynthesis process, reacts with oxygen and formed carbon dioxide and water.



Respiration in human beings

Inhalation

* Nostril

- It filters the air and prevent lungs from dust particles.

* Trachea (wind pipe)

- It carries air to the lungs

* Lungs

- Bronchi
- Bronchioles
- Alveoli

Exchange of gases

* Alveoli

- Balloon like structure
- Provide surface for gaseous exchange
- It is attached with blood vessels
- It have thin walls
- O₂ present in the alveoli and CO₂ present in the blood vessels.
- With the help of alveoli walls O₂ diffuse into blood vessels and CO₂ into alveoli.
- When oxygen gets into the blood vessels, O₂ associated with hemoglobin and form Oxyhemoglobin pigment.
- And then blood transfer these O₂ at the different cells and tissues.

* Hemoglobin

- Red colour pigment.
- Found in blood
- Which transfer oxygen into different cells and tissues.

Exhalation

- When O_2 enter in ~~the~~ alveoli, CO_2 go ~~in~~ into the trachea and then get out through nostril.

Transportation

⇒ Transportation in humans

1. Blood

2. Lymph (Tissue fluid)

⇒ ~~Blood~~ Blood (components of blood)

- Plasma
- RBC
- WBC
- Platelets

⇒ Plasma

- This is a straw colour fluid
- It contains 90 to 92 percent water and 6 to 8 percent protein
- Minerals, vitamins are found inside it
- RBC, WBC and platelets are also dissolved in plasma.

⇒ RBC (Erythrocytes)

- It is biconcave in size
- They do not have a nucleus or any other cell organelles.
- An important iron rich pigment is found inside RBC which we call hemoglobin
- It combines with oxygen to form oxyhemoglobin and helps a lot in the transport of oxygen.

⇒ WBC (Leucocytes)

- It is phagocytic cells that help the body ~~for~~ fight from infection.
- It protects the body from harmful foreign material.

⇒ Platelets (Thrombocytes)

- Its function is clotting of blood

Heart

- It is a muscular organ made up of cardiac muscle.
- Located in the chest cavity.



Double circulation

- Process in which blood passes through the heart twice for every complete circuit of the body.

~~Double~~

* Lungs

- Converts de oxygenated blood to oxygenated blood.

* Pulmonary artery

- Transport deoxygenated blood from ~~dead~~ heart to lung.

* Pulmonary vein

- It carries oxygenated blood from the lungs to the heart.

* Aorta

- Transport oxygenated blood from the heart to the body.

* Vena cava

- Carries deoxygenated blood from the body to the heart.

→ Blood vessel

1. Arteries
2. Veins

* Arteries

- These are the thick blood capillaries which carry oxygenated blood in our body.
- Red in colour.
Exception Only pulmonary artery carry deoxygenated blood.

* Veins

- These are the thin blood capillaries which carry deoxygenated blood in our body.
- Blue in colour.

Exception Only pulmonary vein carry oxygenated blood.