CLASS-X

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BIOLOGY

Life Processes

LIFE PROCESSES

- All the plants and animals (including human beings) are alive or living things.
- The most important criterion to decide whether something is alive (or not) is the movement.

▪ ***The characteristics of living things are : -***

(i) Living things can move by themselves.
(ii)Living things need food, air, and water.
(iii)Living things can grow.
(iv)Living things can respond to changes around them. They are sensitive.
(v)Living things respire (release energy from food).
(vi)Living things can reproduce. They can have young ones.

❖ LIFE PROCESSES: The basic functions performed by living organisms to maintain their life on this earth are called Life processes.

▪ **The basic life processes common to all living organisms are**: Nutrition and respiration; Transport and Excretion; Control and coordination(response to stimuli);Growth;and Movement and Reproduction.

- Food : It is a kind of fuel which provides energy to all the living organisms.

NUTRITION

- **NUTRITION**: It is a 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.

or

- The process of taking in food (consuming food) and utilizing it is called **nutrition.**
- **NUTRIENT**: A substance which an organism obtains from its surroundings and uses it as a source of energy or for the biosynthesis of its body constituents.

MODE OF NUTRITION

- Modes of nutrition means method of producing food or obtaining food by an organism.

There are mainly two modes of nutrition :

1.Autotrophic

2.Heterotropic

1.Autotropic mode of nutrition

The word 'auto' means 'self' and 'trophe' means 'nutrition'.

Autotrophic nutrition is that mode of nutrition in which an organism makes its own food from the simple inorganic materials like carbon dioxide and water present in the surroundings.

- **Autotrophs:** Those organisms which can make their own food from carbon-dioxide and water are called autotrophs.

Ex: all the green plants and certain bacteria are autotrophs.

2.**Heterophic Mode of Nutrition**:

The word 'heteros' means 'others' and 'trophe' refers to 'nutrition'.

Heterophic nutrition is that mode of nutrition in which an organism cannot make its own food from simple inorganic materials like carbon dioxide and water,and depends on other organisms for its food.

Ex: all the animals, most bacteria and fungi are heterotrophic mode of nutrition.

- **Heterotrophs**: Those organisms which cannot make their own food from inorganic substances like carbon dioxide and water, and depend on other organisms for their food are called heterotrophs.
  Ex: all the animals and non-green plants(like yeast) are heterotrophs.

Types of Heterotrophic Nutrition :

Heterotrophic mode of nutrition is of three types :

1.Saprotrophic nutrition.

2.Parasitic nutrition.

3.Holozoic nutrition.

1.**Saprotrophic Nutrition**(or Saprophytic Nutrition):

Saprotrophic nutrition is that nutrition in which an organism obtains its food from decaying organic matter of dead plants,dead animals and rotten bread e.t.c.

Sapro means ‘rotten’.

Saprophytes: saprophytes are the organisms which obtain their food from dead plants (like rotten leaves),dead and decaying animal bodies and other decaying organic matter(like rotten bread).

Ex: Fungi(like bread,moulds,mushrooms,yeast),and many bacteria are saprophytes.

2.**Parasitic Nutrition**: parasitic nutrition is that nutrition in which an organism derives its food from the body of another living organism(called its host) without killing it.

Ex : several fungi, bacteria, few plants like Cuscutta (amarbel) and some animals like *Plasmodium* and roundworms.

Parasite: The organism which obtains the food is called a parasite.

Ex: ticks,lice,leeches and tapeworms.

Host: A parasite is an organism (plant or organism)which feeds on another living organism called its host.

3.**Holozoic Nutrition:**

‘Holozoic nutrition’ means ‘feeding on solid food’.

The holozoic nutrition is that nutrition in which an organism takes the complex organic food materials into its body by the process of ingestion, the ingested food is

digested and then absorbed into the body cells of the organism.

Ex: human beings,animals(cat,dog) and Amoeba etc.

NUTRITION IN PLANTS

- Green plants are autotrophic and synthesize their own food by the process of photosynthesis.
- Chlorophyll is present in the green coloured bodies called Chloroplasts.
- Photo means 'light' and synthesis means 'to build'.

PHOTOSYNTHESIS: The process by which green plants make their own food (like glucose) from carbon dioxide and water by using sunlight energy in the presence of chlorophyll, is called photosynthesis**.**

- **The process of photosynthesis can be represented as:**

$$6CO_2 + 6H_2O + \text{light energy} \xrightarrow{\text{chlorophyll}} C_6H_{12}O_6 + 6O_2$$

Carbon-dioxide Water (from sun) Glucose Oxygen

➢ The process of photosynthesis is takes place in the green leaves of a plant.

➢ ***The photosynthesis take place in the following three steps:-***

(i)Absorption of sunlight energy by chlorophyll.

(ii)Conversion of light energy into chemical energy ,splitting of water into hydrogen and oxygen by light energy.

(iii)Reduction of carbon dioxide by hydrogen to form carbohydrate like glucose by utilizing the chemical energy(obtained by the transformation of light energy).

- **<u>Condition Necessary for Photosynthesis</u>**:

1.Sunlight

2.Chlorophyll

3.Carbon dioxide, and

4.Water

} Raw material for Photosynthesis

<u>NUTRITION IN ANIMALS</u>

Animals obtain their food from plants or other animals(which they eat).

All the animals can be divided into three groups on the basis of their food habits(or eating habits).these are:-

(i)Herbivores

(ii)Carnivores,and

(iii)Omnivores.

1.Herbivores

Those animals which eat only plants are called Herbivores.

Ex: goat,Cow etc.

2.Carnivores

Those animals which eat only other animals as food are called carnivores.

Ex: Lion,tiger etc.

3.**<u>Omnivores</u>**: Those animals which eat both,plants and animals are called Omnivores. Ex:Man,dog,Crow,etc.

DIFFERENT STEPS IN THE PROCESS OF NUTRITION IN ANIMALS

These are:Ingestion,Digestion,Absorption,Assimilation and egestion.

1.Ingestion: The process of taking food into the body is called ingestion.

2.Digestion: The process in which the food containing large, insoluble molecules is broken down into small, water soluble molecules (which can be absorbed by the body) is called digestion.

3.Absorption: The process in which the digested food passes through the intestinal wall into blood stream is called absorption.

4.Assimilation : The process in which the absorbed food is taken in body cells and used for energy,growth and repair is called Assimilation.

5.Egestion: The process in which the undigested food is removed from the body is called egestion.

- Nutrition In Simple Animals
  In unicellular animals,all the processes of nutrition are performed by the single cells.
  Ex: Amoeba and Paramecium.

NUTRITION IN AMOEBA

- The mode of nutrition in *Amoeba* is holozoic.
  1.Ingestion: Amoeba ingests food by using its pseudopodia.
  2.digestion :In amoeba,food is digested in the food vacuole by digestive enzymes.The enzymes from surrounding cytoplasm enter into the food vacuole and break down the

food into the small and soluble molecules by chemical reactions.

3.Absorption: The digested food present in the food vacuole of *Amoeba* is absorbed directly into the cytoplasm of *Amoeba* cell by diffusion.

4.Assimilation: A part of the food absorbed in *amoeba* cell is used to obtain energy through respiration.The remaining part of absorbed food is used to make the parts of Amoeba cell which lead to the growth of Amoeba.

5.Egestion : Amoeba has no fixed place(like anus) for removing the undigested part of food.

NUTRITION IN HUMAN BEING

The various organs of the human digestive system in sequence are:Mouth,oesophagus(or Food pipe) ,Stomach, small intestine and large intestine.The glands which are associated with the human digestive system and form a part of the human digestive system are: Salivary glands,liver and Panceras.

HUMAN DIGESTIVE SYSTEM

In human beings,food is ingested through the mouth.In the mouth it is broken down by salivary amylase.The food moves to the stomach through the oesophagus which perform persistatic movement.The gastric juice contains three substances :hydrochloric acid ,the enzyme and mucus.Enzymes and various digestion juices from liver,gall bladder and pancreas act on the chunks from the stomach inthe small intestine.In the large intestine,the remaining

nutrients are absorbed and the left over is removed from the body through the rectum and anus.