

INDIAN SCHOOL MUSCAT

CLASS X

BIOLOGY- NUTRITION IN ANIMALS- REFERENCE MATERIALS

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Nutrition in Animals

Animals are heterotrophs and hence they depend on other organisms (plants and other animals) for their food.

All the animals can be divided into three groups on the basis of their food habits. These are:

Herbivores

Carnivores

Omnivores

Herbivores: Those animals which eat only plants are called herbivores. Examples are Goat, Cow, and Deer etc.

Carnivores: Those animals which eat only other animals as food are called carnivores. Examples are Lion, Tiger, and Lizard etc.

Omnivores: Those animals which eat both, plants and animals are called omnivores. Examples are Man, Dog and Crow etc.

It is the energy of sun which provides food for plants, and animals.

Different steps in the process of nutrition in animals

There are five steps in the process of nutrition in animals.

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

Digestion: the process in which the food containing large, insoluble molecules is broken down into small, water soluble molecules is called digestion.

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

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

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

Nutrition in Simple Animals:

Amoeba and paramecium are two very simple unicellular animals. In unicellular animals, all the processes of nutrition are performed by the single cell.

Nutrition in Amoeba:

Amoeba eats tiny plants and animals as food which floats in water in which it lives.

The mode of nutrition in Amoeba is holozoic.

The process of obtaining food by Amoeba is called phagocytosis.

Steps involved in the nutrition of Amoeba:

Ingestion:

Amoeba ingests food by forming temporary finger-like projections called pseudopodia around it.

The food is engulfed with a little surrounding water to form a food vacuole ('temporary stomach') inside the Amoeba.

Digestion:

In Amoeba, food is digested in the food vacuole by digestive enzymes which break down the food into small and soluble molecules by chemical reactions.

Absorption:

The digested simple and soluble substances pass out of food vacuole into the surrounding environment.

Assimilation:

The absorbed food materials are used to obtain energy through respiration and make the parts of Amoeba cell which leads to the growth of Amoeba.

Egestion:

The remaining undigested material is moved to the surface of the cell and thrown out of the body of Amoeba.

Nutrition in Paramecium:

Paramecium is also a tiny unicellular animal which lives in water.

Ingestion:

Paramecium uses its hair like structures called cilia to sweep the food particles from water and put them into mouth.

Ingestion is followed by other steps such as digestion, absorption, assimilation and egestion. (as written in Amoeba)

Nutrition in Human Beings (Complex Multicellular Animal):

The various organs of the human digestive system in sequence are: Mouth, Oesophagus (Food pipe), Stomach, Small intestine and Large intestine.

The glands which are associated with the human digestive system are: Salivary glands, Liver and Pancreas.

The various steps of nutrition in human beings are as follows:

Ingestion:

In human beings, food is ingested through the mouth. The food is put into the mouth with the help of hands.

Digestion:

The digestion of food begins in the mouth itself.

The teeth cut the food into small pieces, chew and grind it. (Physical digestion)

The salivary glands in our mouth produce saliva (watery liquid) which contains an enzyme salivary amylase which digests the starch (carbohydrate) present in the food into sugar. (Chemical digestion)

Our tongue helps in mixing this saliva with food.

The digestion of food remains incomplete in mouth.

Oesophagus:

The slightly digested food in the mouth is swallowed by the tongue and goes down the food pipe called oesophagus.

When the slightly digested food enters the food pipe, the walls of food pipe start contraction and expansion movements called as peristaltic movement.

This peristaltic movement of food pipe pushes the slightly digested into the stomach.

Stomach:

The stomach is a J-shaped organ present on the left side of the abdomen.

The stomach walls contain s three tubular glands in it walls which secrete gastric juice.

The gastric juice contains three substances: Hydrochloric acid, the enzyme pepsin and mucus.

The hydrochloric creates an acidic medium which facilitates the action of the enzyme pepsin i.e. digestion of protein.

The mucus helps to protect the stomach wall from its own secretions of hydrochloric acid.

The partially digested food then goes from the stomach into the small intestine.

Small intestine:

From the stomach, the partially digested food enters the small intestine.

The small intestine is the largest part (about 6.5m) of the alimentary canal.

The small intestine is very narrow and arranged in the form of a coil in our belly.

The small intestine in human beings is the site of complete digestion of food (like carbohydrates, proteins and fats)

The small intestine receives the secretion of two glands: Liver and Pancreas.

Liver secretes bile (greenish yellow liquid made in the liver and stored in gall bladder).

Bile performs two functions:

Makes the acidic food coming from the stomach alkaline so that pancreatic enzymes can act on it.

Bile salts break the fats present in the food into small globules making it easy for the enzymes to act and digest them.

The pancreas secretes pancreatic juice which contains enzymes like pancreatic amylase for breaking down starch, trypsin for digesting proteins and lipase for breaking down emulsified fats.

The walls of the small intestine contain glands which secrete intestinal juice. The enzymes present in it finally convert the proteins into amino acids, complex carbohydrates into glucose and fats into fatty acids and glycerol.

In this way the process of digestion converts the large and insoluble food molecules into small water soluble molecules.

Absorption:

The small intestine is the main region for the absorption of digested food.

The inner surface of the small intestine has numerous finger-like projections called villi which increase the surface area for rapid absorption of digested food.

The digested food which is absorbed through the walls of the small intestine goes into our blood.

Assimilation:

The blood carries digested and dissolved food to all the parts of the body where it becomes assimilated as part of the cells and is utilised for obtaining energy, building up new tissues and the repair of old tissues.

Egestion:

The unabsorbed food is sent into the large intestine where more villi absorb water from this material.

The rest of the material is removed from the body via the anus.

The exit of this waste material is regulated by the anal sphincter.