

HETEROTROPHISM OR HETEROTROPHIC NUTRITION.

This is a mode nutrition in which organisms feed on already manufactured organic compounds (food) i.e. organisms feed on other organisms.

Such organisms are called heterotrophs (singular; heterotroph).

All animals, insectivorous plants, fungi and most bacteria are heterotrophs.

TYPES OF HETROTROPHIC NUTRITION.

There are four types of heterotrophism, namely; phagocytosis, parasitism, saprophytism and holozoic nutrition.

Phagocytosis.

this is a mode of feeding in which single celled organisms like bacteria and amoeba engulf food particles through formation of pseudopodia which capture the food material and encloses it in a food vacuole. The enclosed food material is then digested by enzymes and soluble products are absorbed into the cytoplasm.

Parasitism

This is an association or feeding relationship in which one organism(parasite)obtains food from another one called the host. The parasite benefits but the host suffers harm as a result. e.g. caterpillars and tree association.

Saprophytism.

This is a mode of feeding in which an organism feeds on dead decaying organic matter. It is common in fungi and bacteria.

The organisms that carry out saprophytism are known as **Saprophytes**.

HOLOZOIC NUTRITION

This is a mode feeding in which an organism takes in (ingests) solid complex food, digests absorbs and assimilates it in its body.

It is carried out by human beings and other animals.

Types of holozoic nutrition

1. Herbivorous mode

The animal feeds exclusively on plants. Such animals are called **Herbivores**.

2. Carnivorous mode

The animal feeds on other animals i.e. on flesh. Such animals are called **carnivores**.

3. **Omnivorous mode.**

The animal feeds on both plants and other animals. Such animals are called **omnivores**.

THE MAMMALIAN TEETH

Teeth are bony structures found in the mouth used in cutting and mastication of food.

They are firmly fixed in the jawbones from where they grow. Each tooth is fixed in the sockets in the jaw bone and has three external regions.

1. CROWN

This is the part of the tooth above the gum.

2. The Neck

This is a narrow section at the level of the gum or a thin line between the crown and the root.

3. The Root

This is the part of the tooth which is fixed in the socket of the jaw bone. the root is hollow to allow passage of blood capillaries and nerves.

PARTS OF THE CROWN

The outer most part is the **enamel**; it is the hardest part of the tooth. it is made of calcium phosphate and is non-living.

The Dentine

This is found within the enamel. It is a thick bony layer substance which extends into the root. It is also non-living.

Pulp cavity.

This is found within the dentine. it is the living part of the tooth. It contains blood vessels and nerves.

Functions of the parts of the crown

Both the enamel and the dentine are used to strengthen the teeth and protect the living part.

The blood vessels supply nutrients to the teeth.

The nerves are used to detect heat, cold and pain in the tooth.

PARTS OF THE ROOT.

The root of the tooth is covered by a layer of materials which constitute the jaw bone.

The jaw bone is covered by the gum.

TYPES OF MAMMALIAN TEETH.

Mammalian teeth are described as being **heterodont**, meaning; they are of different shape , type and function. most mammals have four different types of teeth. These are;

Incisors(i)

They are at the center of the front jaw. They have sharp, flat edges for cutting of lumps of food. They are **chisel-shaped and have one root.**

Canines (c)

This is a single tooth in each half of the jaw next to the incisors.

They are sharp pointed and are used for tearing flesh.

They also have a single root.

Premolars(pm)

These lie behind the canines. They have wide crowns with ridges and cusps for chewing or grinding food.

They have 2 roots.

Molars (m)

NB: These are not present in the young mammals but appear for the first time in permanent dentition.

Molars have wider crowns with ridges and cusps for grinding food.

They have 3 roots.

NB. A mammal has two sets of teeth in its life time. These are;

1. Milk teeth

It is the first set of teeth consisting of incisors, canines and premolars.

2. Permanent Teeth

It is the second set of teeth consisting of incisors, canines, premolars and molars .

ARRANGEMENT OF TEETH IN THE MOUTH OF A MAMMAL

Terms used

(a) DENTITION

Dentition refers to the total, types arrangement and specialization of teeth in the mouth of an animal.

(b) DENTAL FORMULAR

This is a formular which shows the number and arrangement of teeth in half the upper jaw and half the lower jaw in an animal.

NB; if the dental formular is known, dentition (total number of teeth) can be determined.

In the dental formular, the number of teeth in the upper jaw is written above that in the lower jaw and the order is as follows; incisors (i), canines (c), premolars (pm), molars (m).

Qn: Give the dental formular and dentition of the named herbivore, carnivore and omnivore.

Dental formular of herbivores.

(a) Ruminants e.g. cow, sheep, goat

$$i \frac{0}{3}, c \frac{0}{1}, pm \frac{3}{3}, m \frac{3}{3}; \text{Dentition} = 32$$

(b) Non ruminants e.g. Rabbits

$$i \frac{2}{1}, c \frac{0}{0}, pm \frac{3}{2}, m \frac{3}{3}; \text{Dentition} = 28$$

Dental formular of a carnivore.

(a) Cat $i \frac{3}{3}, c \frac{1}{1}, pm \frac{3}{2}, m \frac{1}{1}; \text{Dentition} = 30$

(b) dog $i \frac{3}{3}, c \frac{1}{1}, pm \frac{4}{4}, m \frac{2}{3}; \text{Dentition} = 42$

Dental formula of an omnivore e.g man

$$i \frac{2}{2}, c \frac{1}{1}, pm \frac{2}{2}, m \frac{3}{3}; \text{Dentition} = 32$$

Qn : Explain how the following animals are adapted to their mode of feeding; a) herbivores, (b) carnivores (c) omnivores.

Adaptation of the herbivores to their mode of feeding.

i. The incisors and canines on the lower jaw are chisel shaped for cutting grass.

ii. They have a hard pad of gum for holding and cutting vegetation.

- iii. They have a diastema that allows the tongue to grasp and turn food in the mouth.
- iv. The premolars and molars are large and broad with ridges and cusps on their crown for crushing and grinding vegetation.
- v. Their teeth grow continuously throughout their life to replace worn out surfaces caused by chewing.
- vi. They have a long tongue which turns vegetation while chewing.
- vii. They have the ability to move their jaws sideways while chewing. This helps to crush vegetation between lower and upper jaw.

Adaptation of carnivores to their mode of feeding.

- i. They have prominent canines for killing their prey and tearing off flesh from bones
- ii. They have long and pointed canines so that they can penetrate deep into the prey and prevent it from escaping.
- iii. The first molar of the lower jaw and the last premolar of the upper jaw are modified into carnassials teeth with sharp cutting edges for cutting off flesh and crushing bones.
- iv. They have small chisel shaped incisors for stripping off flesh from bones.
- v. They have hinge joint between the upper and lower jaw to ensure precise slicing action of the carnassials teeth.

Adaptations of omnivores.

- i. They have incisors with sharp flat edges for biting food.
- ii. They have canines that have blunt tops for tearing flesh.
- iii. Premolars and molars are broad with ridges and cusps on their biting surface for grinding food.
- iv. All types of teeth are arranged close to each other for efficient functioning.
- v. Have hinge joint between the upper and lower jaws to allow upward and downward movement with some slight sideways action during chewing.

