

Topic: Functions of the Cell I

Subtopics:

1. Feeding – Types, Macronutrients, Micronutrients
2. Nutrition – Autotrophic and Heterotrophic
3. Enzymes and Excretion

Class: SS1

Term: First Term

Duration: 40 Minutes

Lesson Objectives:

By the end of this lesson, students should be able to:

1. Explain the **types of feeding** and list examples of **macronutrients and micronutrients**.
 2. Define **nutrition** and differentiate between **autotrophic** and **heterotrophic nutrition**.
 3. Understand the role of **enzymes** in nutrition.
 4. Describe how the cell **removes waste through excretion**.
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Introduction (5 minutes):

Cells need **energy and materials** to grow, repair, and carry out life processes.

They obtain these materials through **feeding** and **nutrition**.

Cells also produce **waste products** during these activities and must remove them through **excretion**.

In this lesson, we will explore these functions of the cell.

1. Feeding

Definition of Feeding:

Feeding is the process by which organisms **take in food** to obtain energy and materials for growth and repair.

Types of Nutrients:

Nutrients are substances in food that organisms need. They are divided into:

A. Macronutrients (Major Nutrients):

These are needed in **large amounts** and provide **energy** and **body-building materials**.

Macronutrient	Function	Examples
Carbohydrates	Provide energy	Rice, Bread, Yam
Proteins	Growth, repair of tissues	Meat, Fish, Beans
Fats and Oils	Provide energy, protect organs	Groundnut oil, Butter
Water	Regulates body temperature, transports substances	Drinking water
Mineral salts (in large quantity)	Bone formation, muscle function	Calcium, Sodium

B. Micronutrients (Minor Nutrients):

These are needed in **small amounts** but are very important for body functions.

Micronutrient	Function	Examples
Vitamins	Protect against diseases, help body processes	Vitamin C (oranges), Vitamin A (carrots)
Mineral salts (in small quantity)	Help in enzyme function and body balance	Iron, Zinc, Iodine

2. Nutrition

Definition of Nutrition:

Nutrition is the process by which living organisms **obtain food** and **use it for energy, growth, and repair**.

Types of Nutrition:

A. Autotrophic Nutrition:

- Organisms make their **own food** from simple substances like carbon dioxide and water.
- Mostly seen in **plants** and some **bacteria**.

Types of Autotrophic Nutrition:

Type	Description	Examples
Photosynthesis	Plants use sunlight energy , carbon dioxide, and water to produce food (glucose).	Green plants (Hibiscus, Maize)
Chemosynthesis	Some bacteria use chemical energy from reactions (instead of sunlight) to produce food.	Nitrifying bacteria

B. Heterotrophic Nutrition:

- Organisms **depend on other organisms** for food.
- All **animals, fungi, and some bacteria** feed this way.

Types of Heterotrophic Nutrition:

Type	Description	Examples
Holozoic	Feeding by ingesting solid food	Humans, Goat, Lion
Parasitic	Feeding on a host, often harming it	Tapeworm, Mistletoe
Saprophytic	Feeding on dead and decaying matter	Fungi, Bacteria
Symbiotic	Two organisms live together and benefit from each other	Lichen (fungus + alga), Rhizobium in root nodules

Importance of Nutrition:

- Provides **energy** for work
- Supplies **materials for growth and repair**

- Helps in **reproduction** and other life processes
 - Maintains **good health** and immunity
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3. Enzymes

Definition of Enzymes:

Enzymes are **biological catalysts** made by living cells.

They **speed up chemical reactions** in the body **without being used up**.

Role of Enzymes in Nutrition:

Enzymes help to **break down food** into smaller, usable molecules during digestion.

Enzyme	Substrate	Product
Amylase	Starch	Maltose (sugar)
Protease	Proteins	Amino acids
Lipase	Fats and oils	Fatty acids + Glycerol

Properties of Enzymes:

- **Work at specific temperatures** (usually body temperature)
 - **Work at specific pH levels** (acidic, neutral, or alkaline depending on the enzyme)
 - **Speed up reactions** but are not destroyed by the reaction
 - Are **specific to one type of reaction**
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4. Excretion

Definition of Excretion:

Excretion is the process by which **cells remove waste products** formed during metabolism (body processes).

If wastes are not removed, they become **toxic (poisonous)** to the cell.

Waste Products Removed by Excretion:

Waste Product	Source	Removed by
Carbon dioxide (CO ₂)	Respiration	Lungs (in animals), Stomata (in plants)
Urea	Breakdown of proteins	Kidneys (urine)
Water	By-product of respiration	Lungs, Kidneys, Skin
Oxygen (in plants)	By-product of photosynthesis	Stomata

Importance of Excretion:

- Maintains **internal balance (homeostasis)**
 - Prevents **poisoning by waste products**
 - Keeps cells and organisms **healthy and alive**
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Summary of the Cell Functions in Nutrition:

Process	Meaning
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Feeding	Taking in food containing nutrients
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Nutrition	Using food for energy and growth
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Enzymes	Helping to break down food for use
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Excretion	Removing waste from the body
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Conclusion:

Cells carry out essential functions such as **feeding, digestion using enzymes, and excretion**. Without these activities, life cannot continue.