# Nutrients: Definitions, Functions, Sources, and Deficiency Diseases

## 1. Introduction to Nutrients

Nutrients are chemical substances obtained from food that are essential for the body's growth, maintenance, repair, and energy production. They are required for all physiological activities such as digestion, circulation, and immunity.

A lack of proper nutrients can lead to weakness, diseases, and poor health.

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## 2. Classification of Nutrients

Nutrients are divided into two main categories:

### A. Macronutrients (Required in large amounts)

- Carbohydrates
- Proteins
- Fats

### B. Micronutrients (Required in small amounts)

- Vitamins
- Minerals

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## 3. Macronutrients

Macronutrients are the main sources of energy and body structure.

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### 3.1 Carbohydrates

**Definition:**
Carbohydrates are the primary source of energy for the body.

**Types:**

- Simple carbohydrates (sugars)

- Complex carbohydrates (starch and fiber)

**Functions:**

- Provide energy for daily activities
- Fuel for brain and muscles
- Help digestion (fiber)

**Sources:**

- Rice, wheat, bread
- Fruits and vegetables
- Sugar and honey

**Deficiency:**

- Weakness
- Fatigue
- Ketosis

**Excess:**

- Obesity
- Diabetes

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## 3.2 Proteins

**Definition:**
Proteins are body-building nutrients made up of amino acids.

**Functions:**

- Growth and repair of tissues
- Formation of enzymes and hormones
- Strengthening immune system

**Sources:**

- Eggs, meat, fish
- Milk and dairy products
- Pulses, beans, nuts

**Deficiency Diseases:**

- Kwashiorkor (swelling, poor growth)
- Marasmus (severe wasting)

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### 3.3 Fats

**Definition:**
Fats are concentrated sources of energy.

**Types:**

- Saturated fats
- Unsaturated fats
- Trans fats

**Functions:**

- Energy storage
- Protection of organs
- Insulation of body
- Absorption of vitamins A, D, E, K

**Sources:**

- Oils, butter, ghee
- Nuts and seeds
- Fish

**Excess:**

- Heart disease
- Obesity

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## 4. Micronutrients

Micronutrients are essential for regulating body functions.

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### 4.1 Vitamins

**Definition:**
Vitamins are organic compounds required in small amounts.

**Types:**

- Fat-soluble: A, D, E, K
- Water-soluble: B-complex, C

**Important Vitamins and Deficiencies**

| Vitamin | Function | Deficiency Disease |
|---|---|---|
| Vitamin A | Vision | Night blindness |
| Vitamin C | Immunity | Scurvy |
| Vitamin D | Bone health | Rickets |

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### 4.2 Minerals

**Definition:**
Minerals are inorganic substances required for body processes.

**Functions:**

- Bone and teeth formation
- Oxygen transport
- Nerve function

**Important Minerals**

| Mineral | Function | Deficiency |
|---|---|---|
| Iron | Hemoglobin formation | Anemia |
| Calcium | Bone strength | Weak bones |
| Zinc | Immunity | Growth issues |

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# 5. Water

**Importance:**
Water is the most essential nutrient.

**Functions:**

- Regulates body temperature
- Transports nutrients
- Removes waste
- Lubricates joints

**Daily Requirement:**

- About 2–3 liters per day

**Deficiency (Dehydration):**

- Thirst
- Fatigue
- Dizziness

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# 6. Dietary Fiber

**Definition:**
Fiber is an indigestible part of plant food.

**Types:**

- Soluble fiber
- Insoluble fiber

**Functions:**

- Helps digestion
- Prevents constipation
- Controls blood sugar

**Sources:**

- Fruits
- Vegetables
- Whole grains

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# 7. Deficiency Diseases

Lack of nutrients leads to deficiency diseases:

- Vitamin A → Night blindness
- Vitamin C → Scurvy
- Vitamin D → Rickets
- Iron → Anemia
- Protein → Kwashiorkor, Marasmus

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# 8. Balanced Diet

**Definition:**
A balanced diet contains all nutrients in the right proportion.

**Components:**

- Carbohydrates
- Proteins
- Fats

- Vitamins
- Minerals
- Water
- Fiber

**Importance:**

- Maintains health
- Prevents diseases
- Supports growth and development

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# 9. Key Points for Exams

- Nutrients are essential for life
- Macronutrients provide energy
- Micronutrients regulate body functions
- Balanced diet is necessary for good health
- Deficiency leads to diseases

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