Nutrition and Health

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- Nutrition is the science that studies how food and drink affect our bodies with a special regard to the essential nutrients necessary to support human health.
- It includes how nutrients are taken in, broken down, absorbed, and utilized.
- Health is closely connected to nutrition. Proper nutrition supports physical and mental health, enhances immune function, aids in growth and development, and helps prevent chronic diseases such as diabetes, heart disease, and obesity.

Importance of Nutrition in Health

- Supports growth and development (especially in children and adolescents).
- Maintains body functions and organ systems.
- Enhances immunity and helps fight infections.
- Prevents malnutrition and lifestyle diseases like obesity, diabetes, hypertension, etc.
- Promotes mental well-being and emotional balance.

Relationship Between Nutrition and Health

- Proper nutrition is one of the most important factors influencing health. The nutrients obtained from food support the body’s systems, help prevent disease, and promote well-being.

Benefits of Good Nutrition:

- Supports growth and development
- Enhances immunity and reduces the risk of infections
- Helps maintain a healthy body weight
- Reduces the risk of chronic diseases such as diabetes, heart disease, and cancer
- Promotes mental well-being and cognitive function
- Improves physical performance and recovery

Basics of Nutrition

Nutrition consists of essential nutrients, broadly divided into:

1. Macronutrients (required in large amounts)

- Provide energy (calories)

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- Build and maintain body tissues

Carbohydrates

- Primary energy source (4 kcal/g)
- Broken down into glucose (used for energy)
- Stored as glycogen in liver and muscles

Sources:

- Rice, wheat, fruits, vegetables, sugar, honey

Types:

- Simple carbs (sugar)
- Complex carbs (starch, fiber)

Functions:

- Energy production
- Brain function (glucose is the only energy source)
- Spare protein from being used as energy

Proteins

- Essential for growth, repair, and maintenance of body tissues
- Composed of amino acids

Sources:

- Animal: Meat, fish, eggs, milk
- Plant: Pulses, legumes, soybeans, nuts

Functions:

- Builds muscles, skin, enzymes, hormones
- Supports immune function
- Provides energy (4 kcal/g) during starvation

Fats (Lipids)

- High-energy nutrient (9 kcal/g)
- Necessary for hormone production, cell membrane structure, vitamin absorption (A, D, E, K)

Sources:

- Saturated fats: Butter, ghee, meat

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- Unsaturated fats: Vegetable oils, nuts, seeds
- Essential fatty acids: Omega-3, Omega-6

Functions:

- Energy storage
- Thermal insulation
- Cushioning organs

Water

- Makes up about 60–70% of body weight
- Not an energy source, but vital for life

Functions:

- Maintains body temperature
- Aids in digestion, absorption, circulation
- Removes waste products (urine, sweat)
- Lubricates joints and tissues

Sources:

- Drinking water, fruits, vegetables, beverages

2. Micronutrients (required in small amounts)

Do not provide energy, but are essential for enzymatic and physiological functions

Vitamins

- Organic compounds required in small quantities

Vitamin Type	Examples	Functions	Sources
Fat-soluble	A, D, E, K	Vision, bones, immunity, antioxidant, blood clotting	Liver, milk, egg yolk, fish oil
Water-soluble	B-complex, C	Energy metabolism, nerve function, immunity	Citrus fruits, leafy greens, cereals

Minerals

- Inorganic elements essential for structure and body regulation

Mineral	Functions	Sources

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Calcium	Bones, teeth, muscle contraction	Milk, cheese, leafy vegetables
Iron	Hemoglobin synthesis, oxygen transport	Red meat, spinach, legumes
Iodine	Thyroid hormone production	Iodized salt, seafood
Zinc	Immunity, wound healing, growth	Meat, dairy, whole grains
Potassium	Fluid balance, nerve impulses	Bananas, potatoes, oranges
Sodium	Nerve function, fluid balance	Salt, processed foods

Balanced Diet

- A diet that contains appropriate proportions of macronutrients and micronutrients to:
    - Meet energy needs
    - Maintain body weight
    - Support physiological functions

Consequences of Poor Nutrition

- **Undernutrition**: Stunted growth, weakness, anemia, scurvy, rickets
- **Overnutrition**: Obesity, type 2 diabetes, cardiovascular disease
- **Micronutrient Deficiencies**: Night blindness (Vit A), goiter (iodine), osteoporosis (Ca, Vit D)

Importance of Water in the Diet

Physiological Roles of Water

- **Constituent of body fluids**: Comprises about 60–70% of body weight; forms the medium for blood, lymph, digestive juices, and intracellular fluids.
- **Solvent for biochemical reactions**: Facilitates metabolic and enzymatic processes by dissolving nutrients and waste products.
- **Transport medium**: Transports nutrients, hormones, and oxygen to cells and removes waste through urine and sweat.
- **Temperature regulation**: Maintains body temperature through perspiration and evaporation.
- **Lubrication and cushioning**: Lubricates joints (synovial fluid), moistens eyes (tears), mouth (saliva), and cushions organs.
- **Digestive function**: Aids digestion by helping in the breakdown and absorption of food.

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Daily Water Requirements

- Adult males: 3.7 liters/day
- Adult females: 2.7 liters/day
  (Includes water from both food and fluids)

Sources of Water

- Drinking water, milk, juices, tea
- Water-rich foods like fruits, vegetables, soups
- Metabolic water (produced during metabolism)

Consequences of Water Deficiency (Dehydration)

- Thirst, dry mouth, reduced urine output
- Fatigue, dizziness, confusion
- Constipation, kidney stones
- Severe dehydration may lead to heatstroke or organ failure

Importance of Dietary Fibres

Types of Fibre

Type of Fibre	Characteristics	Sources	Functions
Soluble Fibre	Dissolves in water; forms gel	Oats, apples, citrus, legumes, barley	Lowers cholesterol, regulates blood sugar
Insoluble Fibre	Does not dissolve in water	Whole grains, wheat bran, vegetables	Adds bulk to stool, prevents constipation

Physiological Functions of Fibre

- **Promotes regular bowel movement**: Adds bulk and softens stool to prevent constipation.
- **Improves gut health**: Acts as a prebiotic, feeding beneficial gut bacteria.
- **Lowers cholesterol**: Soluble fibre binds to bile acids, reducing LDL cholesterol.
- **Regulates blood glucose**: Slows carbohydrate digestion and glucose absorption.
- **Helps with weight management**: Provides fullness, reducing appetite and calorie intake.

Recommended Daily Intake

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