Healthy Nutrition

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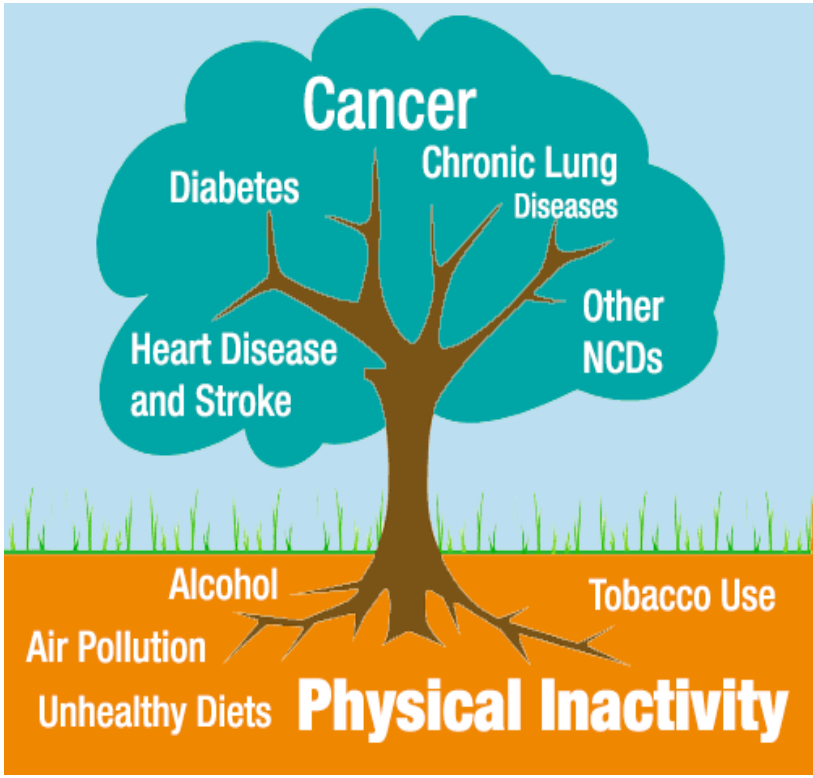
- **Healthy Nutrition: A Balanced Diet for Well-being**
- Healthy nutrition means consuming a well-balanced diet that provides essential nutrients for growth, energy, and overall health. It involves eating a variety of foods in the right proportions to maintain optimal body function.

- **A healthy diet helps to protect against malnutrition in all its forms, as well as noncommunicable diseases (NCDs), including such as diabetes, heart disease, stroke and cancer.**



- **Unhealthy diet and lack of physical activity are leading global risks to health.**

- **Key Components of Healthy Nutrition:**
- **1. Macronutrients (Provide Energy)**
- **Carbohydrates**
- **Proteins**
  Fats

Micronutrients (Vitamins & Minerals)

- **Vitamins**
- **Minerals**

- **3. Fiber (For Digestion & Gut Health)**
- Found in whole grains, vegetables, fruits, and legumes.
  Helps regulate digestion, prevent constipation, and control blood sugar.
- **4. Water (For Hydration & Body Function)**
- Essential for metabolism, temperature regulation, and detoxification.
  Found in fruits, vegetables, and beverages like water and herbal tea.

Food constituents

- The major food constituents are water, carbohydrates, proteins, lipids, minerals, vitamins and Fiber depending on the sources (animals or plants)

Water (H_2O)

- Water A major component of food is water, which can encompass anywhere from10% in grains to 50% in meat products to around 70-80% in fruit and vegetable products.

High-Water-Content Foods (70–95%)

- **Fruits** – Watermelon (92%), strawberries (91%), oranges (86%), apples (85%).
- **Vegetables** – Cucumber (96%), lettuce (95%), celery (95%), tomatoes (94%).
- **Dairy** – Milk (87–89%), yogurt (85%).
- **Beverages** – Juices, soups, and broths (over 90%).

Moderate-Water-Content Foods (40–70%)

- **Meat & Fish** – Chicken (65%), beef (60%), fish (65–80%).
- **Eggs** – About 75% water.
- **Cooked Grains & Pasta** – Absorb water during cooking (around 60–70%).

Low-Water-Content Foods (Less than 40%)

- **Nuts & Seeds** – Around 5–10% water.
- **Dried Fruits** – Raisins (15%), dates (20%).
- **Oils & Fats** – Almost 0% water.
- **Dry Grains & Cereals** – Rice, pasta, and flour contain very little water until cooked.

Importance of Water in Foods:

- ✔ **Hydration** – High-water foods help maintain body fluids.
  ✔ **Digestion** – Water aids in food breakdown and absorption.
  ✔ **Freshness** – Higher water content makes foods more perishable.
- Eating water-rich foods supports hydration and overall health

- **Detoxification** – Helps flush out toxins through urine and sweat.
  - **Supports Weight Management** – High-water foods are low in calories and increase satiety.
  - **Improves Skin Health** – Keeps skin hydrated, reducing dryness and wrinkles.
  - **Boosts Metabolism** – Proper hydration aids in digestion and energy production.
  - **Regulates Body Temperature** – Water-rich foods help cool the body and prevent dehydration.
  - **Enhances Nutrient Absorption** – Water aids in breaking down food and transporting nutrients.
  - **Prevents Constipation** – Fiber and water work together for healthy digestion.

Carbohydrates (Sugar) $C_6H_{12}O_6$

- The carbohydrates in foods are mixtures of carbon, hydrogen and oxygen and can be classified as simple and complex carbohydrates

Simple sugars

- Also known as **monosaccharides and disaccharides**, are the most basic form of carbohydrates. They are easily absorbed by the body and provide a quick source of energy.
- **Types of Simple Sugars:**
- **Monosaccharides (Single Sugar Molecules):**
  - **Glucose** – Found in honey, fruits, and as blood sugar in the body.
  - **Fructose** – Found in fruits and honey.
  - **Galactose** – Found in dairy products.

- **Disaccharides (Two Sugar Molecules):**
  - **Sucrose** (Glucose + Fructose) – Common table sugar, found in sugarcane and sweets.
  - **Lactose** (Glucose + Galactose) – Found in milk and dairy products.

Sources of Maltose:

- **Malted Grains** – Found in malted barley, used in beer and malted milk.
- **Cereals & Bread** – Present in baked goods made from starch.
- **Sweet Potatoes** – Some starchy vegetables contain maltose.
- **Starch Digestion** – When starch (from rice, potatoes, or bread) is broken down by enzymes, maltose is formed before being further broken down into glucose.

Complex sugars

- Also known as **polysaccharides**, are long chains of simple sugar molecules linked together. They take longer to digest and provide a more sustained energy release compared to simple sugars.

Types of Complex Sugars (Polysaccharides):

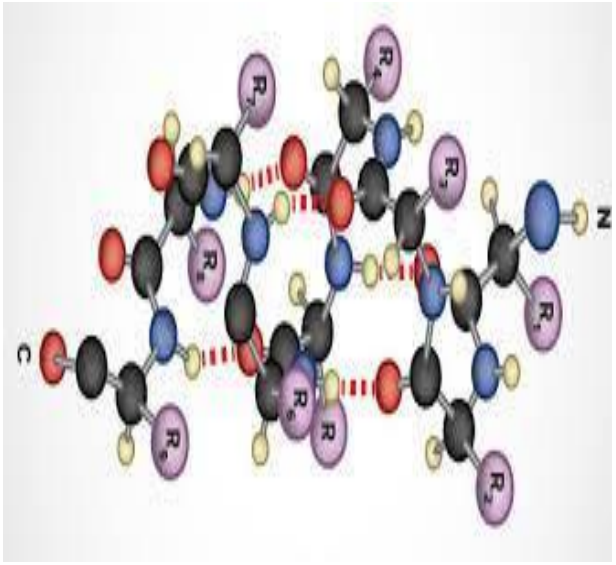
- **Starch** – The main storage carbohydrate in plants.
  - Found in **rice, potatoes, bread, pasta, corn, and legumes**.
  - Slowly broken down into glucose for energy.
- **Glycogen** – The storage form of glucose in animals and humans.
  - Stored in the **liver and muscles** and used as an energy reserve.
- **Cellulose (Dietary Fiber)** – A structural component of plant cell walls.
  - Found in **vegetables, fruits, whole grains, and legumes**.
  - Not digested by humans but important for digestive health.

Benefits of Complex Sugars:

- Provide long-lasting energy.
  Help regulate blood sugar levels.
  Support digestive health (fiber).
  Improve satiety (feeling full for longer).
- Since complex sugars take longer to break down, they are healthier than simple sugars, especially for maintaining stable blood sugar levels and long-term energy.

Proteins

- Protein is a **macronutrient** essential for body growth, muscle repair, enzyme production, and overall health. It is made up of **amino acids**, which are the building blocks of tissues, hormones, and enzymes.. They are mainly composed of carbon, nitrogen, hydrogen, oxygen, and some sulfur. They play a fundamental role in the structure and function of cells.



Functions of Protein in the Body

- **Muscle Growth & Repair** – Essential for athletes and recovery.
  Immune System Support – Helps create antibodies to fight infections.
  Enzyme & Hormone Production – Needed for digestion, metabolism, and regulation.
  Tissue Repair & Cell Function – Essential for skin, hair, and internal organs.
  Energy Source (When Needed) – Provides energy if carbohydrate intake is low.

Sources of Protein in Food

- **1. Animal-Based Proteins (Complete Proteins)**
- These contain all essential amino acids:
  - **Meat** – Chicken, beef, pork, lamb.
  - **Fish & Seafood** – Salmon, tuna, shrimp.
  - **Dairy Products** – Milk, cheese, yogurt.
  - **Eggs** – A highly bioavailable protein source.

2. Plant-Based Proteins (Some are Incomplete Proteins)

- These may lack one or more essential amino acids:
  - **Legumes** – Lentils, chickpeas, beans.
  - **Nuts & Seeds** – Almonds, chia seeds, sunflower seeds.
  - **Whole Grains** – Quinoa, brown rice, oats.
  - **Soy Products** – Tofu, tempeh, soy milk (complete plant protein).
- **Tip:** Combining plant proteins (e.g., beans + rice) provides all essential amino acids.

Protein Requirements

- The daily protein requirement varies based on age, gender, and activity level:
- **Adults: 0.8–1.2 g per kg** of body weight.
- **Athletes & Active Individuals: 1.2–2.0 g per kg** of body weight.
- **Children & Pregnant Women:** Higher protein intake is required for growth and development.
- **Excess vs. Deficiency of Protein**
- **Deficiency Risks:** Muscle loss, weakened immunity, slow wound healing.
  Excess Risks: Kidney strain, digestive issues, potential calcium loss.

lipids

- The term lipid comprises a diverse range of molecules such as water insoluble or non polar compounds of biological origin, including triglycerides, fatty acids, phospholipids, sphingolipids, glycolipids terpenoids, waxes, retinoids and steroids.

Functions of Lipids in the Body

- **Energy Storage** – Provides long-term energy (1g = 9 kcal).
  Brain & Nerve Function – Supports brain health and nerve signaling.
  Cell Structure – Essential for cell membranes.
  Vitamin Absorption – Helps absorb fat-soluble vitamins **(A, D, E, K).**
  Hormone Production – Needed for hormones like estrogen and testosterone.
  Body Temperature Regulation – Acts as insulation.

Typese of Lipids in Food
1. Triglycerides (Fats and Oils) – Main Dietary Lipid

- **Saturated Fats** – Found in **animal fats, butter, coconut oil**; solid at room temperature.
  Unsaturated Fats – Healthier fats found in **olive oil, avocados, nuts, and fish**; liquid at room temperature.
- **Monounsaturated Fats (MUFA)** – Olive oil, almonds, peanuts.
- **Polyunsaturated Fats (PUFA)** – Omega-3 (fish, flaxseeds) and Omega-6 (vegetable oils, seeds).

2. Phospholipids – Important for Cell Membranes

- Found in **egg yolks, soybeans, and sunflower seeds**.
  Help in **fat digestion and absorption**.

3. Sterols (Including Cholesterol) – Essential for Hormones

- **Cholesterol** is found in **egg yolks, meat, and dairy**.
  - Needed for **hormone production (e.g., estrogen, testosterone)** and **cell membranes**.
  - The body produces cholesterol, so dietary intake should be controlled.

Healthy vs. Unhealthy Fats

- **Healthy Fats** – Found in **avocados, nuts, fish, olive oil** (support heart health).
  Unhealthy Fats – **Trans fats** (found in processed foods, fried foods) increase heart disease risk.
  Excess Saturated Fats – Can raise bad cholesterol (LDL) and increase heart disease risk.

Recommended Lipid Intake

- **20-35% of total daily calories** should come from fats.
  - Focus on **unsaturated fats** and limit **saturated & trans fats**.