Minerals

Lecture.7

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Mineral

- Essential inorganic (non-carbon-containing) nutrients, required in small amounts.
- Found in water and in natural foods
- Required for growth, maintenance, reproduction and lactation.

- **The Macro minerals:** are nutritionally important and their daily requirement is more than 100 mg.
    - Calcium (Ca).
    - Phosphorous P
    - Potassium K
    - Sulfur S
    - Sodium Na
    - Chlorine Cl
    - Magnesium Mg

Calcium (Ca)

- Major component of bones and teeth and essential in blood coagulation, nerve and muscle function.
- **Vitamin D** helps the intestines absorb **calcium**.
- **Deficiency: Children**: impaired growth

  Adults: osteoporosis.
- **Sources:** milk, yogurt, spinach.

Sodium(Na).

- Normal 135-145 mEq/L
- **Hyponatremia:** A deficiency of sodium**:**

- Anorexia
- Muscle weakness
- Seizures
- Hypotension

- **Hypernatremia:** An excess of sodium that causes:
  - Edema
  - Hypertension
  - Red, flushed skin
  - Decreased urine output

Phosphorus (P)

- Together with calcium, is necessary for the formation of bones.

1. Strong, rigid bones and teeth.

2. Like calcium, phosphorus is stored in bones, and its absorption is increased in the presence of vitamin D.

- **Deficiency signs:** lack of appetite, fatigue.
- Excessive use of **antacids** can cause deficiency.
- **Sources:** **best sources** are protein-rich foods such as milk, cheese, meats, poultry, and fish .

Potassium (K)

- Potassium is also necessary for transmission of nerve impulses and for muscle contractions.
- Available in many foods, especially fruits and vegetables.
- **Potassium** maintains the fluid level **within** the cell, and **sodium** maintains the fluid level **outside** the cell.
- Normal 3.5-5.5 mEq/L

- **Hypokalemia**: low blood levels of potassium caused by diarrhea, vomiting, severe malnutrition, or excessive use of laxatives or diuretics.

Symptoms of deficiency: **Hypokalemia**

- Cardiac disturbances
- Muscle weakness
- Leg cramps
- ↓ Bowel sounds

- **Hyperkalemia:** high blood levels of potassium can be caused by: Excessive intake.

Magnesium (Mg)

- It is essential for metabolism and regulates nerve and muscle function, including the heart. Plays a role in the blood-clotting process.
- Deficiency signs: Nausea and, muscular disorders
- Sources: Milk is also a good source.
- **2 cups of fat-free milk provide about 60 mg of magnesium**

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The Microminerals: Daily requirement is less than 100 mg.

Iron (Fe)

Iodine (I)

Zinc (Zn)

Selenium (Se)

Copper (Cu)

Iron (Fe):

- **The principal role of iron is:**

  1. To deliver oxygen to body tissues.

  2. It is a component of hemoglobin, the coloring matter of red blood cells (erythrocytes).

  3. Hemoglobin allows red blood cells to combine with oxygen in the lungs and carry it to body tissues.

- Deficiency signs: Impaired immune function, lethargy, fatigue, itchy skin, pale nail beds and eye membranes, impaired wound healing,

Sources: Beef liver, red meats, fish, poultry.

Iodine

- **Found in:** seafood , cow's milk
- **Requirements:** for adults is **150 mg a day.**
- **Deficiency.** When the thyroid gland lacks sufficient iodine, the manufacture of thyroxine T4 and Triiodothyronine T3. In its attempt to take up more iodine, the gland grows, forming a goiter.
- The children of mothers lacking sufficient iodine may suffer from **Cretinism** (retarded physical and mental development)

Zinc (Zn)

1. Zinc is a cofactor for more than 300 enzymes.

2. It affects many body tissues, essential for growth, wound healing, taste acuity.

Sources: The best sources of zinc are **protein foods**, especially meat, fish, eggs, dairy products.

Selenium (Se)

Selenium is a essential of most body tissues, help to make DNA and protect against cell damage and infection.

Sources: seafood, kidney, liver, and muscle meats.

Requirements: for an adult male and female is 70 g.

Thank you