

The background of the slide is a close-up photograph of a variety of fresh fruits. In the top left, there is a slice of cantaloupe melon. To its right is a whole orange. Below the orange are several dark purple grapes. In the center, there is a slice of kiwi fruit showing its characteristic green flesh and black seeds. Surrounding the kiwi are several bright red strawberries. At the bottom of the image, there are several red apples. The overall composition is a colorful and healthy-looking fruit basket.

The Volgograd State Medical University
The Chair of hygiene and ecology

Lecture:

**Functions, adequate intake,
dietary sources of mineral
substances in diet**

Macrominerals (*macronutrients*) –the body needs these minerals in relatively large quantities.

Calcium, phosphorus, potassium, sodium, iron, chloride, sulfur, etc.

Microminerals, or trace minerals (*micronutrients*) - the body needs these minerals in very small amounts.

Zinc, copper, chromium, manganese, iodine, fluoride, selenium, etc.

- **Some food products that are rich in micronutrients can cause *electropositive shifts* (cations) in the human body.**

- **Some food products that are rich in macronutrients, so that they can cause *lectronegative shifts* (anions) in the human body.**

Classification of minerals.

- 1. Minerals maintaining alkaline-base balance**
(calcium, magnesium, potassium, sodium).
Milk, vegetables, fruits, berries.
- 2. Minerals maintaining acid-base balance**
(phosphorus, sulfur, chloride).
Meat, fish, eggs, cereals
- 3. Biomicroelements. It is an independent group of minerals which are encountered in foods in small quantities, though they are characterized by high biological activity.**

Classification of minerals based on their functions in the body

1. Minerals, which mainly participate in plastic processes of forming the tissues, particularly the bone tissue (normal skelet and teeth development).

Calcium, phosphorus, magnesium, manganese.

2. Minerals facilitating the development of nerve tissue and participating in transmitting the nervous impulses.

Phosphorus, magnesium, calcium.

Classification of minerals based on their functions in the body

3. Minerals regulating osmotic pressure and water in the tissues.

Sodium, potassium, calcium.

4. Minerals participating in forming the hormones.

Iodine, zinc, copper, manganese.

5. Minerals participating in blood-formation.

Iron, copper, cobalt.

6. Minerals participating in forming oxidizing and tissue ferments.

Iron & copper.

The causes of mineral metabolism disorders, despite an adequate intake, can be the following:

- 1. Diets low or excessive in proteins, fats, carbohydrates, and vitamins.**
- 2. Losing of minerals during cooking and refining the food.**

In the process of de-freezing meat and fish in hot water dissolved salts are lost.

Vegetables and fruits also lose their dissolved salts during the process of boiling. If we do not use the water in which we boil the fruits (vegetables), our diet becomes deprived of mineral salts.

The causes of mineral metabolism disorders, despite an adequate intake, can be the following:

- 3. Unusually high or low requirements for minerals due to physiological states. Thus, people working in hot weather conditions have higher requirements for potassium, sodium, chloride and other minerals due to loss of minerals through sweating.**
- 4. Disorders related to absorption of minerals in the gastro-intestinal tract or increased loss of fluid in the human body (e.g. blood loss).**

Calcium.

The recommended daily allowance of calcium for adults is 800 mg, for women during pregnancy and lactation – 1500 mg, for children – 1100 – 1200 mg.

Relation calcium to phosphorus is to be 1: 1,3

Relation calcium to magnesium is to be 1 : 0, 5.

Rich sources of calcium are milk and dairy foods: cheese, cottage cheese, green onions, parsley, beans

Potassium.

The recommended daily allowance of potassium for adults is 3-5 g.

Rich sources of potassium are dried fruits:
dried apricots - 2043 mg, raisins – 860 mg,
dried apples – 580 mg., soya beans -
1607 mg, sea-kale -978 mg, beans -1100
mg, green peas -873 mg., potato - 568
mg (per 100 g)

Phosphorus.

The recommended daily allowance of phosphorus for adults is 1200 mg, for women during pregnancy and lactation – over 1600 – 1800 mg.

Products of animal origin: liver, caviar, cheese

Products of vegetable origin: green peas – 329 mg per 100 g;

buckwheat – 298 mg

millet – 233 mg,

wheat bread – 222 mg

Iron.

The recommended daily allowance of iron for women is 18 mg, for men – 10 mg.

Rich sources of iron: Buckwheat - 6650 mkg;

green peas – 1000 mkg;

beef – 2900 mkg;

pork liver – 20200 mkg,

beef liver – 6900 mkg,

egg yolk – 6700 mkg,(apples - 630 mkg).

Manganese.

The recommended daily allowance of manganese is 5-10 mg.

Rich sources of manganese: Wheat bread - 2314 mg ,

nuts - 4200 mg,

buckwheat - 1560 mg

Iodine.

The recommended daily allowance of iodine for adults is 100 -200 mkg.

Fluoride.

Deficient fluoride in the diet leads to the development of dental caries.

Excessive fluoride can cause fluorosis.