

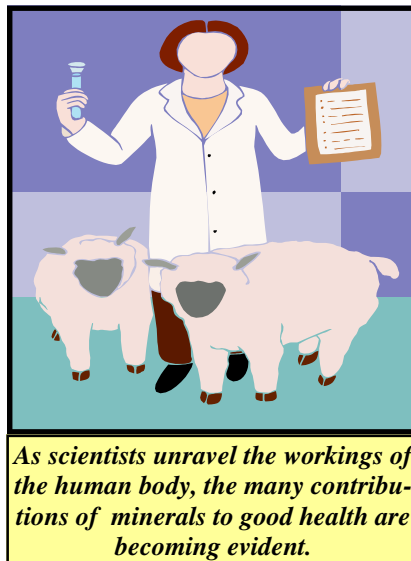
MINERALS FACT SHEET

Minerals are known to contribute to the regulation of body functions and preservation of body structures such as bones and teeth. New technologies have given scientists the ability to refine their understanding of how dietary factors enhance as well as inhibit absorption and/or utilization of minerals within the body. Increased recommended dietary intakes (RDI) for minerals such as calcium are a result of recent research in mineral metabolism. Although minerals are often only a small part of the important chemical reactions that go on within the body, they are essential for very vital processes such as heart muscle contraction, body fluid regulation, oxygen distribution and nerve impulse transmission.

Minerals, unlike vitamins, are inorganic compounds and contain no carbon atoms. Unlike many vitamins, minerals are not vulnerable to heat, sunlight or oxidation but can be lost when dissolved in cooking liquids. Like vitamins, they provide no energy (calories) to the body however are needed by enzymes within the body to provide energy. Within food, factors exist that can enhance or inhibit mineral absorption. Mechanisms within the body also exist to regulate mineral utilization and absorption dependent on the body's current nutrient status. In this way a constant level of mineral content is maintained within the body to allow for normal body function.

Minerals are generally absorbed into the intestines, transported in the blood and then stored in different body organs. Some pass directly into the bloodstream, where they are transported to cells and any excess is then passed out of the body via the urine.

Others attach to proteins and become part of the body's structure. Caution is needed since some minerals are stored and excess amounts may be harmful if the levels consumed are too high for too long. An appreciation for the role minerals play in proper body function and what environmental factors alter the homeostatic balance is helpful in achieving optimal health.



Minerals are classified as either major minerals or trace minerals dependent upon the quantity required by the body. Calcium, phosphorus, magnesium, sulfur, sodium, chloride and potassium are all essential for adult humans in amounts of 100 mg/day or more and therefore are referred to as major or macrominerals. Trace minerals, also known as micro-minerals, are defined as those required in smaller amounts for proper performance of a particular function. The range of effects produced by trace minerals is more subtle and difficult to identify than major minerals, because many of these effects occur at the cellular or subcellular level.

Recommended Dietary Allowances (RDA) have been established for only four trace minerals: iron, iodine, selenium and zinc. Ranges of adequate intake (AI) have been established for five other trace minerals: copper, manganese, chromium, molybdenum, and fluoride.

Consuming a variety of foods can help achieve an intake of all the different minerals needed for health. Foods are complex mixtures of nutrients along with dietary factors that can assist in the absorption of minerals. For example, lactose, the sugar in milk enhances the absorption of calcium. Similarly, vitamin C in orange juice helps the iron in an egg become available for absorption into the body. In contrast, oxalates and phytates in whole grains and certain vegetables make many minerals unavailable for absorption. The extent to which a nutrient, when ingested, is absorbed from the intestine and available for use by the body is considered bioavailability. Therefore the quality of a food as a mineral source relates more to the bioavailability of its minerals than to its actual mineral content. It is also important to consider that when food is processed it often loses these dietary factors and/or minerals that are beneficial to optimal health.

The "take home" message is to choose different foods from each food group each day and drink plenty of water to assure a beneficial intake of all nutrients.

| Mineral | What the mineral does | Food sources | US Recommended Dietary Allowances or Adequate Intake |
|------------|--|--|--|
| Sodium | Maintains fluid and electrolyte balance, supports muscle contraction and nerve impulse transmissions | Table salt, soy sauce, processed food, soups, chips, condiments | Adults 31-50 yrs: 500 mg Children 4-8 yrs: 400 mg Infants 7-12 mo: 120-200 mg Pregnant/Lactating: 500 mg |
| Chloride | Maintains fluid and electrolyte balance, aids in digestion | Table salt, processed foods | Adults 31-50 yrs: 750 mg Children 4-8 yrs: 600 mg Infants 7-12 mo: 180-300 mg Pregnant/Lactating: 750 mg |
| Potassium | Maintains fluid and electrolyte balance, cell integrity, muscle contractions and nerve impulse transmission | Widely distributed in many unprocessed foods, fruits, vegetables, meat | Adults 31-50 yrs: 2000 mg Children 4-8 yrs: 1600 mg Infants 7-12 mo: 500-700 mg Pregnant/Lactating: 2000 mg |
| Calcium | Formation of bones and teeth, supports blood clotting | Milk, yogurt, cheddar cheese, Swiss cheese, tofu, canned fish, fortified orange juice, green leafy vegetables. | Adults 31-50 yrs: 1000 mg Children 4-8 yrs: 800 mg Infants 7-12 mo: 270 mg Pregnant/Lactating: 1000 mg |
| Phosphorus | Formation of cells, bones and teeth, maintains acid-base balance | Meats, fish, poultry, eggs, milk soft drinks, bakery products | Adults 31-50 yrs: 700 mg Children 4-8 yrs: 500 mg Infants 7-12: 270 mg Pregnant/Lactating: 700 mg |
| Magnesium | Supports bone mineralization, protein building, muscular contraction, nerve impulse transmission, immunity | Wheat bran, green vegetables, nuts, chocolate, legumes | Adults 31-50 yrs: 420 mg/males 320 mg/females Children 4-8 yrs: 130 mg Infants 7-12 mo: 75 mg |
| Iron | Part of the protein hemoglobin (carries oxygen throughout body's cells) | Meat, eggs, poultry, fish, fortified cereals, vegetables | Adults 31-50 yr: 8 mg/males 18 mg females Children 4-8 yrs: 10 mg Infants 7-12 mo: 11 mg |
| Zinc | A part of many enzymes, involved in production of genetic material and proteins, transports vitamin A, taste perception, wound healing, sperm production and the normal development of the fetus | Meats, seafood, eggs, liver, oysters | Adults 31-50 yr: 11 mg/males 8 mg/females Children 4-8 yrs: 5 mg Infants 7-12 mo: 3 mg Pregnant/Lactating: 12 mg |
| Selenium | Antioxidant. Works with vitamin E to protect body from oxidation | Seafood, meat, nuts, fish, liver, seeds, whole grains | Adults 31-50 yrs: 55 ug Children 4-8 yrs: 30 ug Infants 7-12 mo: 20 ug Pregnant/Lactating: 60-70 ug |
| Iodine | Component of thyroid hormones that help regulate growth, development and metabolic rate | Iodized salt, seafood, bread, milk, cheese | Adults 31-50 yrs: 150 ug Children 4-8 yrs: 90 ug Infants 7-12 mo: 130 ug Pregnant/Lactating: 220-290 ug |
| Copper | Necessary for the absorption and utilization of iron, supports formation of hemoglobin and several enzymes | Liver, cocoa, beans, nuts, whole grains, dried fruit | Adults 31-50 yrs: 900 ug Children 4-8 yrs: 440 ug Infants 7-12 mo: 220 ug Pregnant/Lactating: 1.0-1.3 mg |
| Manganese | Cofactor for enzymes needed in carbohydrate metabolism, bone formation | Whole grains and cereal products, fruit, vegetables, tea | Adults 31-50 yrs: 2.3 mg males 1.8 mg. females Children 4-8 yrs: 1.5 mg Infants 7-12 mo: 0.6 mg |
| Fluoride | Involved in the formation of bones and teeth, helps to make teeth resistant to decay | Fluoridated drinking water, tea, seafood, dental products, seaweed | Adults 31-50 yrs: 4 mg/males 3.0 mg/females Children 4-8 yrs: 1.0 mg Infants 7-12 mo: 0.5 mg |
| Chromium | Involved in glucose tolerance and associated with normal cholesterol and triglyceride blood levels | Egg yolks, whole grains, pork, nuts, mushrooms, beer | Adults 31-50 yrs: 35 ug males, 25 ug females Children 4-8 yrs: 15 ug Infants 7-12 mo: 5.5 ug Pregnant/Lactating: 30-45 ug |
| Molybdenum | Assists enzymes needed in uric acid formation and mobilization of iron from the liver | Milk, beans, cereal, bread | Adults 31-50 yrs: 45 ug Children 4-8 yrs: 22 ug Infants 7-12 mo: 3 ug Pregnant/Lactating: 50 ug |

