

Essential minerals for a balanced and healthy diet.

Olivia Davis*

Department of Public Health and Nutrition, University of Auckland, New Zealand

Introduction

Minerals are essential nutrients that play crucial roles in maintaining overall health and supporting various bodily functions. Unlike vitamins, minerals are inorganic elements that the body cannot produce, so they must be obtained through food or supplements. A balanced and healthy diet includes a variety of minerals that support everything from bone health and fluid balance to nerve function and immune support. Incorporating a wide range of mineral-rich foods into your diet ensures that your body has the necessary nutrients to function properly [1].

Calcium is one of the most important minerals for maintaining strong bones and teeth. About 99% of the body's calcium is stored in bones and teeth, providing them with structure and strength. Calcium also plays a vital role in muscle function, nerve transmission, blood clotting, and hormone secretion. Dairy products such as milk, cheese, and yogurt are excellent sources of calcium, but it can also be found in leafy greens like kale, broccoli, and fortified plant-based milks. As people age, calcium needs increase, particularly for women after menopause, making it crucial to ensure adequate intake to prevent conditions such as osteoporosis [2].

Another essential mineral is magnesium, which is involved in over 300 biochemical reactions in the body. Magnesium helps regulate muscle and nerve function, supports immune health, maintains a steady heart rhythm, and is involved in energy production. A deficiency in magnesium can lead to symptoms like muscle cramps, fatigue, and irritability. Magnesium-rich foods include nuts, seeds, whole grains, legumes, and green leafy vegetables. Since magnesium plays a key role in bone health, it also works in tandem with calcium to maintain strong bones [3].

Iron is a mineral that is crucial for the production of hemoglobin, the protein in red blood cells that carries oxygen throughout the body. Without adequate iron, the body cannot produce enough healthy red blood cells, leading to anemia, a condition characterized by fatigue, weakness, and reduced immune function. Iron is found in both plant-based and animal-based foods, with heme iron (from animal products like red meat, poultry, and fish) being more easily absorbed than non-heme iron (from plant sources like spinach, lentils, and fortified cereals). For individuals following vegetarian or vegan diets, it's important to consume iron-rich plant foods along with vitamin C, which enhances non-heme iron absorption [4].

Zinc is another vital mineral, playing a significant role in immune function, protein synthesis, wound healing, and DNA synthesis. It also supports normal growth and development, especially during periods of rapid growth, such as childhood, adolescence, and pregnancy. Zinc deficiencies can impair immune function and lead to delayed wound healing. Zinc-rich foods include meat, shellfish, legumes, seeds, nuts, and dairy products. Since zinc is involved in taste and smell, a deficiency can also affect these senses [5].

Potassium is a mineral that helps regulate fluid balance, muscle contractions, and nerve signals. It is critical for maintaining healthy blood pressure and preventing hypertension, as it helps balance the effects of sodium in the body. Potassium is abundant in fruits and vegetables, particularly bananas, oranges, potatoes, spinach, and tomatoes. A potassium-rich diet can help reduce the risk of stroke, kidney stones, and osteoporosis, as well as support proper cardiovascular function [6].

Sodium, while often considered a mineral to limit, is also essential for the body in small amounts. It helps regulate fluid balance, nerve function, and muscle contractions. However, excessive sodium intake is associated with high blood pressure, which can increase the risk of heart disease and stroke. Most people consume more sodium than necessary, mainly due to high-sodium processed foods. The recommended daily intake of sodium is about 2,300 milligrams for most adults, with a lower target of 1,500 milligrams for individuals at higher risk for cardiovascular disease. Balancing sodium intake and avoiding processed foods can help maintain optimal health [7].

Phosphorus is a mineral that works closely with calcium to build and maintain strong bones and teeth. It also plays a role in energy production, as it is part of ATP (adenosine triphosphate), the molecule that stores energy in cells. Phosphorus is found in a variety of foods, particularly protein-rich sources like meat, dairy products, nuts, seeds, and legumes. Most people get enough phosphorus in their diet, but deficiencies are rare. However, people with kidney disease may need to limit phosphorus intake, as the kidneys play a key role in regulating phosphorus levels in the body [8].

Iodine is a mineral primarily known for its role in thyroid function. The thyroid gland produces hormones that regulate metabolism, growth, and development. Insufficient iodine can lead to thyroid dysfunction, resulting in conditions like goiter and hypothyroidism. Iodine is found in iodized salt, seafood,

*Correspondence to: Olivia Davis, Department of Public Health and Nutrition, University of Auckland, New Zealand. E-mail: davolivelike@gmail.com

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dairy products, and certain vegetables. It is particularly important for pregnant women and young children, as iodine deficiency during pregnancy can lead to developmental and cognitive issues in infants [9].

Copper, although needed in smaller amounts than other minerals, plays an essential role in forming red blood cells, maintaining healthy blood vessels, nerves, and bones, and supporting the immune system. Copper is involved in the absorption of iron and helps form collagen, a protein essential for skin, cartilage, and bones. Good sources of copper include shellfish, nuts, seeds, whole grains, and legumes [10].

Conclusion

Incorporating a variety of mineral-rich foods into your diet ensures that your body receives the full spectrum of essential nutrients necessary for good health. While many of these minerals can be obtained from a balanced diet, certain populations, such as pregnant women, older adults, or those with specific medical conditions, may need additional supplementation. However, it is important to consult with a healthcare provider before taking supplements to ensure the proper dosage and avoid potential interactions with medications or other nutrients. Ultimately, a well-rounded diet rich in essential minerals is key to supporting bodily functions, preventing disease, and promoting long-term health.

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