EXTENSION

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Minerals and the body

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Many people think minerals and vitamins are the same, but they are not. Minerals, like vitamins, are important nutrients found in foods. The main difference is that vitamins are organic substances (meaning that they contain the element carbon), and minerals are inorganic substances. Minerals are needed for many things in addition to eating them in the form of nutrients in foods. The iron and copper in cookware or tools are the same minerals found in food. That is why cooking in a cast iron skillet can provide iron in the diet. When cooking food in an iron skillet, a little bit of the iron comes off and mixes with the food. People can absorb and use it just like iron that is already in food. Minerals are the most permanent part of living things. They do not burn, and in fact, they can be found in the ashes of something that has burned.

Major and trace minerals

There are two groups of minerals, major minerals and trace minerals. Major minerals are needed in the diet in amounts of 100 milligrams (mg) or more each day. A milligram is a very small amount. It is one thousandth of a gram, and there are 28 grams in an ounce. The major minerals are calcium, phosphorus, magnesium, sulfur, potassium, sodium and chloride. We need the trace minerals in smaller amounts (less than 100 milligrams each day). Some trace minerals are iron, iodine, zinc, fluoride, selenium, copper, chromium, manganese and molybdenum.

Uses of minerals

The body contains many different minerals. Minerals by themselves are inactive chemical elements, like the iron in a pan or calcium in a rock, but in the body, calcium is used to make bones and teeth, and iron is used to make the hemoglobin in red blood cells. The body uses this iron to carry oxygen to its cells. Additional minerals help in many other body processes:

- Minerals become part of tissue structure like in bone and teeth.
- Minerals help maintain acid-base balance to keep the body pH neutral.
- Minerals help regulate body processes, such as in enzyme systems.
- Minerals function in nerve impulse transmission and muscle contraction.
- Minerals help release energy from food.

Electrolytes

Sodium, potassium and chloride are minerals that are called electrolytes. In the body, they work to maintain water balance and provide the correct pressure between cells and their surrounding fluids. Sodium and chloride are the major electrolytes in the fluid that surrounds body cells. Potassium is the primary electrolyte within body cells. Table salt is the most common food that contains both chloride and sodium. Most people consume more than enough sodium. In fact, many health experts believe that consuming too much sodium contributes to high blood pressure in people who are “sodium sensitive.”

Mineral toxicity

Minerals can build up in the body, and they can be toxic and cause harmful effects. To avoid this possibility, never take individual mineral supplements unless your doctor prescribes them. Also, make sure to keep supplements that contain minerals in a safe place so children cannot accidentally eat them. A young child can get iron toxicity from taking several adult iron supplements at one time.

Minerals and the USDA Daily Food Plan

Minerals are present in foods in different amounts, and all foods do not contain the same minerals. This is why people need to eat a variety of foods from all of the food groups. Table 1 shows which minerals are found in the different USDA Daily Food Plan food groups.

As Table 1 shows, a variety of foods from each of the USDA Daily Food Plan food groups is required to provide needed minerals. The following table will help provide information on the function and best sources of minerals

Table 1. Minerals Supplied by the USDA Daily Food Plan Food Groups.

Food group	Minerals supplied
Dairy	Calcium, magnesium, phosphorus and potassium
Protein foods	Iron, copper, zinc, chromium, magnesium, potassium, phosphorus and sulfur
Fruit	Magnesium, manganese and potassium
Vegetable	Potassium, magnesium, iodine and selenium
Grain	Iron, copper, zinc, manganese, magnesium, molybdenum, chromium and phosphorus

Table 2. Minerals: Sources and functions

Mineral	Function	Food sources
Summary of major minerals		
Calcium (Ca)	Aids in formation of bones and teeth, normal blood clotting, muscle contraction and relaxation, heart function and nerve function.	Milk and other dairy products, greens, broccoli, salmon, sardines, beans, peas and lentils.
Phosphorus (P)	Aids in formation of bones and teeth. Regulates release and use of body energy. Helps carry fat in the body as a part of phospholipids. Helps maintain normal acid/base balance in the body.	Meat, fish, poultry, eggs, milk and cereal products.
Magnesium (Mg)	Necessary for muscle contraction and nerve function.	Meat, seafood, nuts, beans, peas, lentils, dairy products and whole grains.
Sodium (Na)	Important component of bodily fluids, mostly outside cells.	Table salt, meat, seafood, milk, cheese, eggs, baking soda, baking powder, bread, vegetables and processed foods.
Potassium (K)	Important component of bodily fluids, mostly inside cells.	Potatoes, melons, citrus fruit, bananas, most fruits and vegetables, meat, milk, beans, peas and lentils.
Summary of some trace minerals		
Iron (Fe)	Found in hemoglobin in red blood cells and myoglobin in muscle cells. Needed to carry oxygen.	Liver, meats, egg yolks, nuts, enriched or whole grains, beans, peas and lentils.
Iodine (I)	Part of thyroid hormones (thyroxin and triiodothyronine).	Seafood and idozied salt.
Selenium (Se)	Acts as an antioxidant.	Grains, meat, poultry, fish and dairy products.
Zinc (Zn)	Part of important enzyme systems. Found in the hormone insulin.	Meat, seafood and whole grains.
Chromium (Cr)	Helps body use insulin.	Liver, brewer's yeast, whole grains, nuts and cheeses.

Copper (Cu)	Part of many enzymes.	Beans, peas, lentils, grains, nuts, seeds and organ meat.
Fluoride (Fl)	Part of teeth and bones. Helps prevent cavities in teeth.	Fluoridated drinking water, fish and tea.

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