



## Minerals—Why You Need The Salts Of The Earth



Dr. Kate Thomsen and Silky

We cannot function without having minerals present in our diet. Their main functions are for both structure and function. Minerals build strong bones and teeth. They control the movement of body fluids inside and outside the cells. They help maintain normal heart rhythm, muscle contractility, nerve conduction, and acid-base balance. They modulate the activities of the cell and help turn the food we eat into energy. One can see why they are called "essential".

For purposes of health, we divide the minerals into major minerals (also called macro-minerals) and minor minerals (also called micro-minerals). This distinction refers to the amount the body needs – that is, smaller amounts of the micro-minerals.

The macro-minerals are Sodium, Chloride, Potassium, Calcium, Phosphorous, Magnesium, and Sulfur. The electrolytes sodium, chloride and potassium help to maintain proper fluid balance. Calcium, phosphorous and magnesium are the major minerals in bone. Calcium and magnesium are important for nerve transmission. Magnesium regulates over 300 biochemical reactions in the body – a powerhouse of a mineral!! Sulfur is stored in all body cells and becomes part of proteins and vitamins (B1 and B7). It is the fundamental component of keratin which gives strength to skin, hair and nails.

The micro-minerals or trace elements are Iron, Zinc, Iodine, Selenium, Copper, Manganese, Chromium, and Molybdenum. The body also needs very tiny amounts of Nickel, Silica, Vanadium and Cobalt. Iron carries oxygen throughout the body in the red blood cells. Zinc, another powerhouse like magnesium, is also required for the activity of over 300 enzymes. It is critical for immune health and taste

perception. Iodine is integral to thyroid hormones and selenium is a crucial antioxidant. Copper is essential to some enzymes, and is an important part of skeletal and circulatory health. Manganese plays an important role in bone health and participates in enzyme reactions. Chromium helps insulin to herd sugar into the cells and molybdenum assists in antioxidant and energy production functions.

You can see why minerals are ESSENTIAL – they help you do just about everything, you can't live without them and they are not able to be made in your body – they must come from your diet

Minerals have 4 common properties. They are naturally occurring and inorganic (not living). They have a crystal-like structure and a defined chemical composition. The majority of minerals are derived from the Earth's crust. This is how they end up in the soil where they are extracted by plants. Humans and other animals eating plants will take in these minerals. So our major source of dietary minerals comes from our food – plant and animal. We also get minerals from our water.

Soils in different geographic areas contain varying quantities of minerals, some much higher than others. Water also varies in its mineral content. Add to that the "processing" of the water and soils in recent history and it seems unrealistic to be able to predict what type and amount of minerals we are getting in our diet.

Magnesium deficiency can result in the common complaints of fatigue, insomnia, muscle cramps, constipation and palpitations. These common conditions beg the question – are lots of us magnesium deficient? Large studies consistently show that approximately half the US population consumes less than the required amount of magnesium from food. This Estimated Average Requirements (EAR) for nutrients are less than the RDAs (Recommended Dietary Allowances) and the RDAs for essential nutrients were based on the prevention of nutritional deficiency diseases like scurvy (for Vitamin C) and rickets (for Vitamin D). Magnesium intake for OPTIMAL health may be quite a bit higher than the

RDA. Several authorities suggest we get 3 – 5 mg of magnesium per pound of body weight per day (400 – 700 mg/day). Will you get this from eating foods high in magnesium like green leafy vegetables, almonds and pumpkin seeds? Maybe and maybe not. According to a 2011 article in Scientific American, several studies have shown that modern farming techniques designed for faster growing, higher yield crops have produced crops without sufficient growing time to uptake nutrients. Intensive agricultural methods have continually depleted more and more nutrients from the soil creating fruits and vegetables that have lower vitamin and mineral content than those same foods had decades ago. One study reported that in order to get the same amount of Vitamin A from an orange your grandfather ate – you would have to eat 8 oranges today. So – are we magnesium deficient? Does this have anything to do with our epidemics of type 2 diabetes, hypertension, atherosclerosis, osteoporosis, migraine, asthma and other inflammatory conditions? Ya think?

Supplementation of minerals requires some skill though. 1.) Competition. Minerals from food or supplements will be released from their food sources in the stomach and intestines. There they may have to compete with each other for transport access into the blood (e.g., calcium and iron). If you take these at the same time, you will absorb less of one or both. 2.) Displacement. When some minerals get to their site of action, they may substitute or displace each other like zinc and copper. Taking single minerals (eg., copper) to correct deficiencies can cause a further imbalance that is counterproductive. 3.) Positive Interaction. Combining nutrients in foods or multivitamin/multimineral supplements may outweigh the effects of competition due to other positive nutrient interactions: eg, calcium and magnesium absorbed more in the presence of Vitamin D; iron and chromium in the presence of Vitamin C. 4.) Nutrient Absorption. The form of the mineral is important as well. Magnesium citrate, for example, is more easily absorbed orally while mag-

### Kate Thomsen MD, MPH

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These deplete mineral absorption and increase the risk of mineral deficiency conditions:

- Medications (antibiotics, NSAID's, laxatives, diuretics, pain killers and chemotherapy drugs).
- Low stomach acidity/taking acid lowering medications. Chromium, copper, iron, magnesium, manganese, molybdenum, selenium, and zinc depend on adequate stomach acid for their absorption in the small intestine.
- Phytates from plant foods like grains, corn and rice can interact with zinc in the intestines and prevent its absorption into the blood.
- Stress decreases absorption of minerals.
- Alcohol inhibits breakdown of nutrients by decreasing digestive enzymes; Alcohol also reduces stomach acid and decreases absorption of minerals.
- Caffeine can reduce nutrient absorption (eg, iron). Wait 1 hour after drinking coffee to take minerals
- Exercise brings blood to the muscles, diverting it from the intestines – limiting absorption of nutrients. Intense exercise will limit absorption of nutrients for an hour or two after working out (don't "eat and run" or "run and eat"...)

#### Consider:

- Over cooking and throwing the cooking water away loses minerals. Steam vegetables and use or save the mineral rich steaming water.
- Organic foods will contain more minerals but most organic foods will still be depleted. Rebuilding the mineral content of the soil will be a very slow process.
- Multivitamin supplements may not contain minerals; they may only contain vitamins. Read the label. If you supplement, look for a multivitamin/multimineral complex and be sure to read the label for the correct dose.

Office of Dr. Kate Thomsen  
252 West Delaware Avenue  
Pennington, NJ 08534  
609-818-9700



WWW.DRKATETHOMSEN.COM

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nesium sulfate and magnesium chloride are forms that can be absorbed through the skin. Calcium carbonate (TUMS) is a chalk-like form of calcium and less than 50% will get absorbed from an oral dose. Heme iron (from hemoglobin) found in meat is much more readily absorbed than non-heme iron from plants. 5.) Transport. Different forms of minerals will be able to penetrate into different layers of the body. For example calcium orotate is the only form of calcium known to be able to move into the mitochondria (energy factories) of the cell. 6.) Dangers. There are

mineral excess conditions which would exclude supplementation (iron if you have hemochromatosis; copper if you have Wilson's disease...). There are minerals that can be toxic if taken in excess (selenium...). Mineral supplements may be contaminated (calcium from oyster shells has been found to contain lead...)

The best way to find out if you have deficiencies of minerals (and other nutrients) is to test the nutrient status of your cells. A simple blood test will help you to see how you can OPTIMIZE your health trajectory!!

Dr. Kate Thomsen's office for holistic health care is located in Pennington, NJ. She is board certified in Family Medicine, certified in Integrative/Holistic Medicine, and an Institute for Functional Medicine Certified Practitioner. She has been practicing Functional Medicine for over 15 years. For more information visit [www.drkatethomsen.com](http://www.drkatethomsen.com) or call the office at 609-818-9700