SELENIUM DEFICIENCY

The Role of Selenium in Immune System and Thyroid Health

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The trace mineral selenium is essential for proper functioning of the immune system and thyroid gland. Low selenium levels contribute to pain, infection, and disease.

The Mineral Selenium

Selenium is a trace mineral chemically related to sulfur and tellurium. Trace amounts of selenium are essential for the production of various cellular components, primarily enzymes. Selenium deficiency is a known trigger for several different autoimmune diseases including thyroid disorders and psoriasis. Selenium deficiency also causes susceptibility to heart disease and to viral infections, particularly infections with coxsackievirus.

In the body selenium combines with protein molecules to form selenoproteins. Selenoproteins are important antioxidant enzymes that are essential for proper immune system function. Selenium's role in thyroid health is also well known. In addition, selenoproteins help prevent cellular damage caused by free radical molecules. Free radicals are produced as natural byproducts of oxygen metabolism that are suspected of contributing to many chronic inflammatory diseases.

Sources of Selenium

In most countries worldwide, plants are the primary source of selenium. Other sources include some high selenium yeasts, cereals, eggs, meats, particularly beef, chicken and turkey, and some fish, particularly tuna and cod. Brazil nuts also contain high concentrations of selenium and a diet rich in brazil nuts can cause high levels of selenium in certain regions, causing a condition of selenium toxicity.

However, the amount of selenium available in the soil varies and this affects the amount of selenium found in local produce. High levels of selenium are found in the high plains of northern Nebraska and the Dakotas whereas the soil in some parts of China and Russia has scant amounts of selenium. In areas where the diet primarily consists of locally grown food, selenium levels in the body correlate well to soil levels.

The daily value recommended for selenium by the FDA is 70 mcg. When supplements are used, 100-200 mcg daily of selenomethionine is recommended. Amounts greater than 200 mcg should be avoided. Results of the National Health and Nutrition Examination Survey indicate that most Americans obtain adequate selenium from diet. However, studies also show a lower rate of cancer, heart disease and autoimmune thyroid disease in patients with higher selenium levels. Surveys also show that patients with rheumatoid
arthrits with lower selenium levels have more swelling, pain, stiffness and loss of function in their joints.

**Selenium Deficiency**

Selenium deficiency is thought to contribute to autoimmune disease by making the body more susceptible to nutritional and biochemical stresses as well as infectious diseases. Three diseases caused directly by selenium deficiency include Keshan Disease, which causes an enlarged heart, Kashin-Beck Disease, which causes osteoarthropathy, and Myxedematous Endemic Cretinism, a form of hypothyroidism which results in mental retardation.

**Selenium Toxicity**

Selenium toxicity, which occurs when doses higher than 400 mcg daily are ingested over time causes a condition of selenosis. Symptoms include garlic breath odor, hair loss, white blotchy nails, irritability, fatigue, gastrointestinal upset, and mild nerve damage. Selenium toxicity is rare in the United States and primarily is related to industrial accidents.

**Resources:**


Office of Dietary Supplements, National Institutes of Health, Selenium Fact Sheet

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