

Selenium

Facts:

- ◆ Selenium is an essential mineral found in minute quantities in the body.¹
- ◆ The liver and kidneys contain four to five times as much selenium than tissues and muscle.
- ◆ Selenium is normally excreted via the urine.

Functions:

- ◆ Selenium's primary function is that it inhibits the oxidation of fats. Combined with vitamin E, selenium is a powerful antioxidant. Selenium and vitamin E have been shown to act synergistically in producing antibodies and in helping to maintain a healthy heart and liver.²
- ◆ As an antioxidant, it protects the immune system by inhibiting the formation of free radicals, which can damage the cells and tissues of the body. It also has been shown to confer a protective effect against certain forms of cancer.²
- ◆ It appears to help preserve tissue elasticity by delaying the oxidation of polyunsaturated fatty acids.
- ◆ It aids in the production of prostaglandins, substances that affect blood pressure. Low prostaglandin levels can result in a deficiency in other substances, which help keep the arteries free from platelet aggregation.¹
- ◆ Combined with vitamin E and zinc, selenium can help reduce an enlarged prostate.
- ◆ In addition, selenium supplementation has been shown to be helpful in treating people with alcoholic cirrhosis of the liver, cancer and heart disease, sterility, aging and high cholesterol levels.²

Requirements:

The Food and Nutrition Board of the Institute of Medicine has established the following RDAs for selenium⁴:

Category and Age:	RDA (micrograms):
Infants 0-0.5 yrs.	10 micrograms (mcg)
0.5-1 year	15 mcg
1-6 years	20 mcg
7-10 years	30 mcg
Males 11-14 years	40 mcg
Females 11-14 years	45 mcg
Males and females 15-18 years	50 mcg
Adult males	70 mcg
Adult females	55 mcg
Pregnancy	65 mcg
Lactation	75 mcg

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Signs of Deficiency:

A deficiency reduces the activities of selenium-dependent enzymes resulting in damage to the muscle tissue, including heart muscle, premature aging, diminished vision, nerve disorders.^{2,3} It has been associated with cancer and heart disease, exhaustion, impaired growth, high cholesterol levels, infections, liver and pancreatic impairment and sterility.²

Signs of Toxicity:

Symptoms include: skin lesions, brittle hair and nails, irritability, lethargy, a metallic taste in the mouth, pallor.^{1,2}

Current Research:

Aging: In Finland, 15 elderly nursing-home residents (average age 76) were given 400 mg of vitamin E, 8 mg sodium selenate, and 50 mcg of organic selenium. At the study's conclusion, the experimental group showed "...significant improvement in mental alertness, emotional stability, depression, anxiety, fatigue and other measures of overall health."⁵

Cancer: Studies bear out an inverse relationship with the increased risk of certain cancers corresponding with low levels of selenium in the body. Researchers at the University of North Carolina at Chapel Hill found that 240 people with skin cancer, compared to cancer-free individuals, had low selenium levels.⁴ In China, researchers found a high incidence of lung cancer corresponding with low levels of selenium in the soil. In areas where the selenium in the soil was plentiful, researchers found a low rate of lung cancer.⁴ In a review published in *The Lancet*, one researcher calls on health professionals to take notice of selenium. Margaret Rayman, professor of nutritional medicine at the University of Surrey, found that selenium levels were significantly lower in Europeans than those in North Americans due to selenium depleted European soil. The review links selenium deficiency to early pregnancy loss, male infertility, mood problems, increased risk of cardiovascular disease and arthritis. "Probably the strongest evidence in terms of selenium and health would be the effect on cancer risk," states Rayman.

Breast Tumors: In mice, researchers at Baylor College of Medicine in Houston, Texas found that selenium supplementation reduced the incidence of breast tumors from 80 percent to 18 percent.⁴

Colon Cancer: At the University of Nebraska's Eppley Institute for Research in Cancer, rats fed both a low and high doses of selenium exhibited reduced rates of colon cancer. In the group receiving very high amounts of selenium, 16 out of the 30 rats male rats had developed colon cancer. In the group receiving low amounts of selenium, cancer was found in 28 out of the 29 rats.

Cancer Prevention: In Germany, a study involving mice fed selenium measured selenium's ability to prevent cancer. Out of 50 mice not given selenium, 31 developed tumors. Of 50 mice treated with

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selenium, only 14 developed tumors and the tumors were significantly smaller than those in the selenium-deficient mice.⁵

Prostate Cancer: A Harvard-based study involving 34,000 men found that men with the lowest levels of selenium had three times the likelihood of developing advanced prostate cancer compared to those with the highest selenium levels. According to Gerhard N. Schrauzer, a pioneer in selenium research, states that selenium "...alters the metabolism of carcinogenic substances thus preventing an accumulation of free radicals."⁴

Diabetes: Selenium is an insulin-like trace mineral that transports glucose into tissue for conversion into energy, according to new research published in the journal *Cellular and Molecular Life Sciences*. Although researchers do not fully understand the mechanisms by which selenium imitates insulin, the research indicates that the body has multiple systems to regulate metabolic processes.⁵ Some researchers believe that persons with diabetes benefit from supplemental and dietary forms of selenium.

References:

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<http://www.jn.nutrition.org/nutinfo/content/sele.shtml>.
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