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Selenium

Technical Background

- Selenium is a trace element that functions as part of the glutathione peroxidase enzyme, a vital antioxidant enzyme system in cells. Glutathione peroxidase neutralizes hydrogen peroxide and organic lipid peroxides and works in conjunction with Vitamin E as an antioxidant. If these peroxides are not removed, damage could occur to the cell membrane.
- Selenium deficiency has been linked to Kashin-Beck's disease (a disease involving the joints). Selenium deficiency has also been observed in people receiving total parenteral nutrition. Deficiency symptoms include muscle pain and weakness, loss of pigmentation of hair and skin, and whitening of the nail beds.
- In the 1970s, selenium deficiency was associated with a form of heart disease termed Keshan disease. It is now known that Keshan disease is caused by a virus, but selenium deficiency appears to predispose people to the virus and adequate selenium resists it.¹
- Selenium may have a protective effect against cancer. A recent study found that taking selenium significantly reduced the risk of digestive cancers.² In some parts of the world, selenium-poor soil correlates with a high incidence of certain kinds of cancer.³ Selenium may also reduce the incidence of carcinomas.⁴
- The role of selenium in cardiovascular health is also receiving attention. Studies have found that those experiencing chronic heart failure and death from heart disease tend to have lower blood levels of selenium.^{5,6} Higher levels of congestive heart failure are reported in geographic regions with low selenium intake.⁷
- Selenium status decreases with age and may contribute to a decline in cognitive functioning in the elderly.⁸

Sources and Recommended Intake

- Selenium is found mostly in grains and seeds, though their selenium content depends on the amount of selenium in the soil in which they are grown. Seafood, kidney, liver, and other meats are also high in selenium.
- The RDA for selenium is 55 mcg per day for men and women, 60 mcg per day for pregnant women, 20-40 mcg per day for children, and 40-55 mcg per day for adolescents.⁹
- The suggested maximum intake for selenium is 550 mcg per day. Intakes of over 750 mcg may result in biochemical changes in nail beds, interference in sulfur metabolism, and inhibition of protein synthesis.¹⁰ The mechanisms for toxicity are not known.

Abstracts

Zheng GH, Li H, Fan WT, Li HQ. Study on the long-time effect on allitridum and selenium in prevention of digestive system cancers. *Zhonghua Liu Xing Bing Xue Za Zhi.* 2005 Feb;26(2):110-2. OBJECTIVE: To evaluate the long-time effect on allitridum and selenium in preventing cancer of digestive system. METHODS: Persons who were recruited into the intervention group and took allitridum and selenium to prevent gastric cancer in Qixia county of China from 1989-1991 were followed up to 2001 and data of deaths was collected. The long effect on allitridum and selenium in preventing cancer of digestive system was analysed. RESULTS: Data were compared to placebo group five years (1992-1996) after the termination of intervention to have found that the accumulative mortality rate of all cancer, digestive system cancer and gastric cancer had decreased 45.5%, 41.2% and 63.3% in the intervention group respectively. By stratum analysis, accumulative mortality rate of all cancer, digestive system cancer and gastric cancer had decreased 51.5%, 51.5% and 67.7% in males of the intervention group, respectively. Relative risks for males in the intervention group were 0.48, 0.47 and 0.30 times more than the placebo group, respectively. All of them were statistically significant. Relative risks for females in the intervention group were 0.74, 0.92 and 0.70 times more than placebo group. Six to ten years later after the termination of intervention, the accumulative mortality rate and relative risk of all cancers in two groups became similar. CONCLUSION: Allitridum and selenium had the effect of decreasing the incidence risk of digestive cancer with a protective rate more than 50% for five years after the termination of intervention program.

References

- ¹ Advanced Nutrition and Human Metabolism 2nd Ed. Ed Groff JL, Gropper SS, Hunt Sm.
- ² Zheng GH, Li H, Fan WT, Li HQ. Study on the long-time effect on allitridum and selenium in prevention of digestive system cancers. *Zhonghua Liu Xing Bing Xue Za Zhi.* 2005 Feb;26(2):110-2.
- ³ Kim YI, Mason JB. Nutrition chemoprevention of gastrointestinal cancers: a critical review. *Nutr Rev* 1996;54:259-79.
- ⁴ Clark LC, Combs GF Jr, Turnbull BW, Slate EH, Chalker DK, Chow J, Davis LS, Glover RA, Graham GF, Gross EG, Krongrad A, Leshner JL Jr, Park HK, Sanders BB Jr, Smith CL, Taylor JR. Effects of selenium supplementation for cancer prevention in patients with carcinoma of the skin. A randomized controlled trial. Nutritional Prevention of Cancer Study Group. *JAMA.* 1996 Dec 25;276(24):1957-63.
- ⁵ de Lorgeril M, Salen P, Accominotti M, Cadau M, Steghens JP, Boucher F, de Leiris J. Dietary and blood antioxidants in patients with chronic heart failure. Insights into the potential importance of selenium in heart failure. *Eur J Heart Fail.* 2001 Dec;3(6):661-9.
- ⁶ Wei WQ, Abnet CC, Qiao YL, Dawsey SM, Dong ZW, Sun XD, Fan JH, Gunter EW, Taylor PR, Mark SD. Prospective study of serum selenium concentrations and esophageal and gastric cardia cancer, heart disease, stroke, and total death. *Am J Clin Nutr.* 2004 Jan;79(1):80-5.
- ⁷ Manar MJ, MacPherson GD, Mcardle F, Jackson MJ, Hart CA. Selenium status, kwashiorkor and congestive heart failure. *Acta Paediatr.* 2001 Aug;90(8):950-2.
- ⁸ Akbaraly NT, et al. Plasma selenium over time and cognitive decline in the elderly. *Epidemiology.* 2007;18:52-58.
- ⁹ Institute of Medicine. Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids (2000). National Academies Press: Washington, D.C.
- ¹⁰ U.S. Department of Health and Human Services. Toxicological Profile for Selenium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service; 2003.