

Selenium

This trace mineral has been implicated in both the primary and secondary prevention of prostate cancer.

While results are promising, supplementation is not necessary for most people. Food sources of selenium are plentiful and meeting dietary recommendations through food alone is preferable for overall health.

The body's first lines of defense against cell-damaging free radicals are antioxidant enzymes. Trace minerals (present in very small amounts in the body), such as selenium, are essential co-factors in these potent antioxidants.

Selenium and the enzyme it works with scavenge free radicals from dividing cells, which may explain selenium's potential as an anti-cancer agent. Without adequate amounts of selenium in the diet, these antioxidant enzymes may not function at peak levels, leaving the potential for cell damage that can lead to cancer.

Epidemiologic studies (those looking at large populations of people) have found an inverse relationship between dietary selenium intake and cancers of the colon, breast and prostate, as well as heart disease. In fact, populations with the lowest risk of almost every type of cancer have an optimal intake of dietary selenium, and vice versa.

The Nutritional Prevention of Cancer (NPC) study¹ found that higher levels of serum selenium (in the blood) were associated with a reduced risk of prostate cancer but only in men with poor selenium status. Other studies have found no association between selenium intake and risk of prostate cancer.

Results from the **SELECT** (SELEnium and vitamin E Cancer prevention Trial) study² demonstrated that supplementation with 200 mcg of selenium did not prevent prostate cancer in generally healthy men.

The Recommended Daily Allowance (RDA) for selenium for adult men (18 years and older) is **55 micrograms (mcg) per day**. The average intake of selenium among North American men aged 60 years and older is approximately 112 micrograms per day³.

Meats, grains (wheat, barley, rye) and other plants (garlic and onions) provide the majority of selenium in the diet. The selenium content of the soil determines the selenium content of grains and vegetables, and varies considerably across North America.

In general, selenium supplements are not recommended unless a person has low serum (blood) levels. Taking unnecessary supplements may be harmful, and large amounts of selenium can lead to hair loss, brittle nails and other side effects. While the Upper Limit (UL) of safety for selenium is 400 mcg per day, supplements containing *more than* 200 mcg may be unsafe and are not recommended.

Most multivitamins contain amounts that are both sufficient and safe, between 25 to 200 micrograms. At this time there is insufficient evidence to support supplementation of selenium for the prevention of prostate cancer.

The following is a list of dietary sources of selenium that are not soil-dependant.

Food item	Serving	Selenium content (mcg)
Brazil nuts, dried, unblanched	¼ cup (60 ml)	680.6
Tuna, canned in water	~ ½ can (75 g)	60.3
Cod, baked or broiled	2.5 oz (75 g)	35.1
Turkey breast, oven roasted	2.5 oz (75 g)	23.1
Beef roast, lean, oven roasted	2.5 oz (75 g)	21.6
Chicken breast, roasted	2.5 oz (75 g)	20.7
Pasta, whole wheat, boiled	½ cup (125 ml)	19.2
Whole wheat flour	¼ cup (60 ml)	14.1
Cottage cheese, 1%	½ cup (125 ml)	12.2
Bread, whole grain/multigrain	1 slice	10.3
Barley, pearled, cooked	½ cup (125 ml)	7.1

Source: Health Canada, Canadian Nutrient File, 2007b version; www.healthcanada.ca/cnf

Research indicates that men with low levels of selenium show the most benefit from supplementation, whereas men with normal or greater than normal levels of selenium show no benefit. This may be because absorption of selenium in the intestine is more efficient when a person is selenium deficient. In fact, an increased intake of selenium frequently results in greater selenium loss in urine! Your selenium status can be measured by a blood test (assessing recent intake) or toenail analysis (measuring intake over the last year). If you are considering taking selenium supplements, talk to your doctor about having your status assessed to determine whether supplementation is necessary.

The Prostate Education & Research Centre



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1. Duffield-Lillico AJ, Dalkin BL, Reid ME, *et al.* Nutritional Prevention of Cancer Study Group. Selenium supplementation, baseline plasma selenium status and incidence of prostate cancer: an analysis of the complete treatment period of the Nutritional Prevention of Cancer Trial. *BJU Int.* 2003; 91(7):608-612.
2. Lippman SM, Klein EA, Goodman PJ, *et al.* Effect of selenium and vitamin E on risk of prostate cancer and other cancers. The selenium and vitamin E cancer prevention trial (SELECT). *JAMA.* 2009;301(1): 39-51.
3. Ervin RB, Wang CY, Wright JD, *et al.* Dietary intake of selected minerals for the US population: 1999–2000. US Department of Health and Human Services. NCHS:Advanced Data No. 339. 2004.