Selenium for Hormones and Health

Selenium (Se, Selenium Dioxide) is a trace mineral that is considered essential for the human body. The recommended daily intake for selenium is 55 mcg (micrograms) per day with a ceiling of 400 mcg (National Institutes of Health). It is possible to be deficient in selenium through consumption of foods grown in mineral depleted soils, interactions of selenium with other minerals or impaired digestion. It is possible to meet your body's needs for selenium on any diet and there are blood tests and even functional home testing kits available for you to assess your own selenium status if you suspect that you may have low levels.

How your body uses selenium
Selenium is used for many metabolic functions in the human body, most notably the production and recycling of glutathione and the conversion of the thyroid hormone T4 to its active form T3. Glutathione is the mother of all antioxidants and is dependent on selenium along with several amino acids and vitamins for production. Glutathione Peroxidase, the most prevalent form, is the body’s first line of defence against free radicals. Glutathione can also be recycled and that cycle depends on selenium. Some of the intermediaries in this cycle are also very important for fighting free radical damage in the body so it is important to have the nutrients needed for this cycle to be functioning well. Selenium is involved in the production of T4 and the enzymatic conversion from T4 to T3. It is therefore a very important mineral for the proper functioning of the thyroid and metabolism of thyroid hormones. Selenium supplementation has also been shown to increase levels of progesterone in young women (Zagrodzki, Ratajczak & Wietecha-Posluszy). 25 forms of protein-bound selenium have been found in the human body and little is still known about the functions of some of those compounds so far (Ashton, Hooper, Harvey, Hurst, Casgrain, & Fairweather-Tait, 1). Selenium supplementation has been used for brain health, memory, cardiac conditions and boosting immune T-cell production. Selenium has been used to decrease inflammation and to support yeast/candida detoxification.

Deficiencies and excesses
Inadequate selenium intakes are fairly common however the most extreme cases of selenium deficiency have been studied in areas of China with selenium-deficient soils. Keshan Disease, a cardiomyopathy with heart enlargement, and Kashin-Beck’s disease, an early onset of osteoarthritis are seen in these areas due to the lack of selenium (Ashton et al, 1). More general symptoms of deficiency that might be useful to know are muscle pain, weakness, loss of pigment in skin, premature greying of hair and whitening of nail beds. Soils worldwide are becoming more and more depleted and conventional agricultural practices do not yet include any means of replenishing trace minerals. Organic produce is the best choice to optimize selenium.
Processed and refined foods may have decreased levels of selenium and there are several known antagonists to selenium absorption. Heavy metals such as mercury can bind to selenium and reduce the available levels in the body (EXRX). Lead reacts with selenium, reducing the amount available and iron and copper can inhibit uptake (EXRX). Since much of the selenium that we eat is in the form of selenomethionine when a person has insufficient levels of this amino acid (methionine) in their diet it can lead to the selenium that is absorbed in this form being used for building functions in the body rather than the enzymatic functions, for example glutathione and T4/T3 conversion (EXRX). These amino-acid bound forms of selenium are the most common and are usually absorbed easily through the duodenum. Physical damage to this part of the intestinal tract may be an issue for some people.

If you are taking corticosteroids such as Prednisone they can reduce your selenium levels. If you are using chemotherapy you may be told to avoid supplementation with selenium because it has the possibility of making the chemotherapy active Cisplatin less effective. (Darn those antioxidants!)

The recommended daily allowance for adults is currently 55 micrograms of selenium up to 400 micrograms (National Institutes of Health). There is much debate as to whether amounts in excess of 200 micrograms per day are harmful. The only reported cases of selenium poisoning in North America have been due to a selenium supplement containing two hundred times the amount that was stated on the label resulting in customers overdosing for an extended period and then suffering symptoms of hair loss and nail discoulouration (Macfarquhar, Broussard, Melstrom, Hutchinson, Wolkin, Martin, Burk, Dunn, Green, Hammond, Schaffner, Jones, 1).

Are you getting enough?
Selenium status can be assessed through blood plasma, erythrocyte and whole blood selenium levels with the latter two being better indications of long term status (Ashton et al, 13). Blood Glutathione Peroxidase levels can be used in order to extrapolate possible selenium levels in the body. Hair analyses can show selenium levels over time or you can test your own at home with a selenium test kit from Bodybio which is not a lab test but a functional taste test for you to do yourself. When I choose to supplement selenium I use a whole food supplement because artificially produced Sodium Selenate/Selenite is absorbed very differently than the naturally amino-acid bound forms. Beware of Selenium Sulfide in some anti-dandruff shampoos as it is a toxic form of selenium. If you feel that selenium is important in your hormone balancing protocol you can make sure to include some of the following top five selenium rich foods:
### Top 5 Selenium Sources in micrograms per oz (28 g)

<table>
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<tr>
<th>Plant Based Sources That Can Be Eaten Raw</th>
<th>My Secret Sources</th>
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<tr>
<td>Brazil Nuts 577 mcg</td>
<td>Reishi/Chaga powders 1981 mcg (typical serving size 2-4 g containing 140-280 mcg)</td>
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<tr>
<td>Sprouted Brown Rice 6.6 mcg (often eaten as protein powder)</td>
<td>Goji Berries 14 mcg</td>
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<tr>
<td>Oats, Sprouted 4 mcg *</td>
<td>Chia Seeds 15.6 mcg</td>
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<tr>
<td>Cashews 5.6 mcg</td>
<td>Wild Mushrooms, fresh (for example: pine mushroom 563.17 mcg, porcino/penny bun/king bolete 421.67 mcg)</td>
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<tr>
<td>Shiitake Mushrooms 7 mcg</td>
<td>Mustard Seeds 37.4 mcg (typical serving size 10 g with 12.3 mcg)</td>
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*this is an estimate based on the weight of raw hulless oats and weight of sprouts

### References


