

## Selenium: Atomic Number 34, Mass Number 78.96

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### *Abstract*

*Selenium, a trace element, is an antioxidant and is an essential component for normal functioning of the immune system and thyroid gland. It is a micronutrient. Normal daily needs, sources, effects of deficiency and excess of selenium are mentioned. Some current issues and controversies concerning selenium are discussed. These include thyroid function, cancer, heart disease, arthritis, HIV / AIDS, and selenosis.*

**Keywords:** *antioxidant, arthritis, beefed-up broccoli, cancer, heart disease, HIV / AIDS, immune system, micronutrient, selenium, selenium deficiency, selenosis, thyroid function, trace element*

### Introduction

Selenium with Atomic Number  $Z = 34$  and Mass Number  $A = 78.96$  is in group VIA and period 4 of the periodic table of the elements.<sup>#</sup> It has sulfur on top and arsenic next to it. Both sulfur and arsenic have some healing properties, and since neighbors in the periodic table have similar properties, it is not surprising that selenium seems to influence human health.

Its chemical symbol is Se, and is most commonly found in nature as sodium selenite, its inorganic form. Selenomethionine, found in foods, is an organic form.

Over the past two decades an intense controversy over the role of selenium in human nutrition and other therapeutic applications has been prominent. Benefits and toxic aspects are not yet fully understood. Selenium was thought to be toxic and not necessary to human health. But recently it was reclassified as an essential micronutrient, required in a balanced human diet. The National Research Council established the first recommended daily allowance (RDA) in 1989 (Frey 2002).

The human body needs some elements in small amounts. These elements are called trace elements or trace minerals, or micro-

nutrients. Selenium is such an element (US National Research Council, Food and Nutrition Board. 1989). It is essential for keeping the immune system humming and free radicals\* under control.

Free radicals are produced during normal oxygen metabolism. They harm the body by letting oxygen combine with body tissues, literally burning up the body. Chemically, such reactions are called oxidation. High levels of free radicals can damage cells and contribute to the development of some chronic diseases (Combs and Gray 1998).

Compounds that prevent these adverse oxidation effects are called antioxidants. They are one of the body's defenses used to control free radical levels. Selenium is an important part of antioxidant enzymes. Selenium is also essential for normal functioning of the immune system and thyroid gland (Arthur 1991; Corvilain *et al.* 1993; and Levander 1997).

The average selenium content of the human body is less than 1 mg and is concentrated in the liver, kidneys, and pancreas. It is also found in the testes and seminal vesicles in males. Recent studies suggest that selenium reduces incidences of cancer when taken in high doses.

This news has prompted increased use of selenium supplements. Sales rose from \$60 to \$66 million, a 10% increase between 1996 and 1997, according to most recent statistics from

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\* A chemistry table that groups elements of similar properties together.