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## Choices! Choices! **Which Selenium Supplement To Take?**

### **Why Should I Take a Selenium Supplement?**

#### **Which Selenium Supplement Should I Use Personally?**

#### **Which Selenium Supplement should I Provide My Customers?**

The preceding are all very good questions that you might ask for yourself and for your customers if you are in the nutritional supplement business.

### **Why Should I Take a Selenium Supplement?**

Selenium is an essential trace element meaning that you require it in the diet and that it is needed in very small, or trace amounts. In this regard selenium is like, for example, iron and zinc. All are derived from the foods you eat and most foods contain some iron and some zinc as they are needed by plants taken up from soils. Selenium, however, is not required by plants to grow as is iron and zinc and is often lacking or low in soils. If iron or zinc is not present in soils plants will not grow. If selenium is not present in soils the plants don't care and grow anyway. Animals used for human foods; cattle, swine and chickens get their selenium from the plants they eat and from the selenium supplements provided to them by the feed industry.

**For cancer prevention and maybe even therapeutic effects selenium must be ingested in total amounts of 300–400 microgram Se/day. Such amounts of selenium ingestion are not possible from the diet alone. Supplementation of selenium is required to obtain such levels of intake for cancer prevention**

### **Which Selenium Supplement Should I Use Personally?**

What kinds of selenium supplements are available to me and what are the differences? Selenium exists in two distinctly different forms; inorganic and organic. Inorganic selenium is the form only found in soils, selenites and selenates, and are the forms assimilated by plants, grasses, cereal grains and nuts. Fruits and vegetables contain insignificant amounts of selenium and for practical considerations of the diet can be ignored. Grasses and cereal grains like wheat and nuts, such as peanuts, assimilate the inorganic selenium from the soil and convert it into organic selenium forms. In effect, selenium in plants follows sulfur metabolism as they are always found together. From sulfate in soils plants make methionine. From selenites and selenates these plants instead make L-selenomethionine, which associates with protein. In summary, from plants the only significant form of selenium in the human diet is L-selenomethionine. There are no selenites or selenates of any significance in the human diet from plants or in drinking water.

Another very important organic form of selenium occurs in plant members of the Allium and Brassica families. Members of the Allium family include; garlic, onions, leeks, etc. Members of the Brassica family include broccoli, cauliflower and Brussel sprouts. The major nutritional organic form of selenium in these plants is Se-methylseleno-L-cysteine, which we call SeMC™ Selenium. Just like grasses, cereal grains and nuts these plant families take selenium from the soil as inorganic selenite and selenate and make SeMC™ Selenium. Ask yourself, how much of these Allium and Brassica foods do you eat? And if the soil is very low in inorganic selenium there is very little present even if you ate a pound or more of garlic and broccoli! So SeMC™ Selenium, practically speaking, is not present to any extent in your diet.

From animal foods; chicken, beef and fish, selenium is provided almost exclusively as L-selenomethionine which comes from the plant foods and also selenocysteine, the antioxidant amino acid found in glutathione peroxidase, thioredoxin reductase as well as other selenium containing proteins. The human dietary requirement for selenium is to make these important antioxidant and other selenium containing enzymes, now known to number 25 in total as determined from the human genome. Without selenium in the human diet various disease conditions may occur and chronic low dietary selenium levels may contribute to the progress of chronic diseases; AIDS, viral infections, heart disease and cancer. There is a long history of an association of low dietary selenium consumption and cancer beginning with scientific studies in the early 1960's. Selenium supplementation has been shown to be associated with a lower cancer incidence in the human population. Increased selenium consumption beyond normal dietary intake in animal studies almost without fail shows reduced numbers of tumors, reduced sizes of tumors, reduced incidence of cancer and increases in survival. In the 1996 selenium supplemental study of Clark et al funded by the US National Cancer Institute, cancer of the human colon, lung and prostate cancers were reduced by over 50% from the non-supplemented control group. The SELECT Trial now in progress by the US National Cancer Institute seeks to confirm the earlier study of Clark *et al* using L-selenomethionine.

So selenium in the human diet consists of mostly L-selenomethionine from plant and animal foods, lesser amounts of L-selenocysteine from just animal foods and finally insignificant amounts of L-Se-methylselenocysteine (SeMC™ selenium) from plants of the Allium and Brassica families. In the US, adults ingest about 60-100 ug of selenium from foods each day. About half this amount of selenium, 40-60 ug of selenium is ingested by European adults each day. The reason for the lower selenium consumption by Europeans is that in Europe soils contain much less selenium and animals are not supplemented with selenium as they are in the US. And for cancer prevention and maybe even therapeutic effects selenium must be ingested in total amounts of 300–400 ug Se/day that is not possible from the diet alone. Supplementation is required to obtain such levels of intake for cancer prevention.

So we can now ask the question posed before: **What selenium supplement should I take personally and what supplement would I want my customers to be taking for their best health if I were in the nutritional supplementation business ?**

Here are your major choices:

Selenite, an inorganic form, usually as a sodium salt that is not found in foods but which may be found in insignificant amounts dissolved in drinking water. Not a good choice since it is one of the more toxic forms of selenium and chemically unstable as it reacts

with vitamin C forming elemental selenium. Elemental selenium is not absorbed by the body. Selenate, another inorganic form, usually as a sodium salt that is not found in any foods but which may, like selenite, be found in insignificant amounts dissolved in drinking water. Like selenite, it too is one of the more toxic forms of selenium. These two inorganic forms of selenium are the ones absorbed by plants and converted to organic selenoamino acids. Selenium yeast is another supplemental form of selenium, which may contain either inorganic selenium or organic selenium depending on the manufacturer. To produce the organic forms of selenium, yeasts must be properly grown in large fermentation tanks in which selenite is converted by the yeast to L-selenomethionine and other organic selenium compounds. This is what is called selenium yeast. If manufactured carefully about 80% of the selenium is present as L-selenomethionine and other organic selenocompounds with small amounts of unconverted selenite. Yet some manufacturers have just added selenite or selenate to dried yeast and call it selenium yeast. You are never sure of the kind of selenium present. You may have the following selenium in products labeled selenium yeast:

Yeast with selenite just added,

Yeast with selenate just added,

Methionine mixed in with yeast and selenite or selenate,

L-Selenomethionine just added to yeast.

As some people are also allergic to yeasts, alternative sources of selenium supplements are sought. [One is L-selenomethionine provided in the natural form as found in all plant and animal foods and constituting most of the human dietary selenium. The natural L-selenomethionine is provided for both human and animal supplements and is becoming the predominate form of selenium supplement.](#) Unlike the selenium yeast whose composition is unknown but to the manufacturer and then even he may not be sure of the composition. [The composition of Eburon's L-selenomethionine is 100% L-selenomethionine as made by plants.](#)

The last natural organic form of selenium present only to a very small degree in the human diet is the SeMC™ Selenium, Se-methylseleno-L-cysteine, made by the Allium and Brassica plant families. You have to search very hard to find this selenium supplement for it has only been introduced in the last two years and is now available to the human selenium supplement market.(search [www.google.com:methylselenocysteine](http://www.google.com:methylselenocysteine)) As has been learned over the last decade of animal research, selenium is emerging as the most potent of the natural food selenium supplements for the prevention of cancer. While both L-selenomethionine and SeMC™ at human doses of 200 ug Se/day may afford up to 50% or more cancer protection, SeMC™ emerges as the likely better supplement for this purpose. The difference between the two selenium supplements resides in their different metabolic fates following ingestion that are well understood by today's selenium nutritionist. L-Selenomethionine from the diet not only provides the selenium for glutathione peroxidase and other selenium enzymes but like methionine, its sulfur containing amino acid sister, L-selenomethionine is incorporated into protein in place of its sister amino acid methionine and disappears. SeMC™ Selenium also provides selenium for the selenium enzymes but does not disappear into protein and therefore is taken up by early stage cancer cells where it is metabolized and if in sufficient concentration it induces cancer cell death, what scientists call apoptosis, thereby affording cancer protection.

These then are the your major choices for supplementation; selenite, selenate, selenium yeast, L-selenomethionine and Se-methylseleno-L-cysteine, SeMC™ Selenium.

**There are a few other “supplements” that should be avoided .**

**Anything called a “chelate” or “chelated selenium” is to be avoided!!!**

True chelates of selenium do not exist in nature and any supplement so labeled is pure fraud. Do not buy them as you do not know what the selenium form is really contained within. In the organic selenium amino acids, L-selenomethionine and SEMC™ Selenium, the selenium is fully integrated into the amino acid itself and is not “chelated”. Selenodiglutathione, another possible selenium supplement, is very seldom found in supplements and is to be avoided. Selenodiglutathione is made from selenite and glutathione and remains a very toxic and unstable molecule. There is none in the diet and no known animal studies of dietary selenodiglutathione have been done so its dietary effects remain presently unknown.

For food animal supplementation the animal feed industry is moving rapidly to L-selenomethionine as it is the natural and only amino acid found in animal feeds. The same is true for humans, L-selenomethionine is the natural form of selenium that constitutes 95% or more of the selenium in the normal human diet.

#### Conclusion:

Since selenium intake from the diet alone is not sufficient for cancer prevention, extra selenium supplementation is absolutely needed.

For human use L-selenomethionine is the preferred selenium supplement for cancer prevention.

The so called ( and ill defined) selenium chelates ( L-seleno-methionine chelate and other selenium chelates) must be avoided.

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