

Selenium is a cancer killer, life saver and fertility giver that strengthens muscles.

As in other chapters, some information comes from many sources and from Googling, which is useful for checking science. It gives hundreds of similar statements about each subject so which should get the credit? Usually none.

Se is non-metallic and is in nearly every cell of the body, though the highest concentrations are in the kidneys, liver, testes, pancreas and spleen. It is a strong antioxidant, necessary for strength, fertility and general health. It boosts the immune system, strengthens neck and other muscles around joints, helps digestion, and can reduce forgetfulness and reduce lack of concentration. Two of its main attributes are anti-ageing by helping the brain, and reducing free radicals.

Selenium is the muscle mineral, discovered in 1817, but only found to be an essential nutrient in New Zealand in about 1957, by I and two Ruakura vets on our peat farm where our cows were scouring excessively which was blamed on 'peat scours' from low copper levels in peat, which is also very low in Se. Feeding Se to our cows gave such an improvement in their overall health that the two vets and I started taking some animal Se, before human Se was available, and we benefitted from it.

The vets measured the blood levels and recommended 1,600 nmol, when the NZ human average was only 600, but in UK is 1,200. We now keep ours close to 2,000. It helped me enjoy a healthier life and help invent 32 items! Born in 1931, I've remained active for longer than most people, thanks to keeping all mineral and vitamin levels close to optimum, and by draining mercury, manganese, lead, diesel and bad heavy metals and toxins out of my body using the skills of naturopath, Chris Rhodes. See Human Health Specialists.

Selenium deficiency is linked to some diseases

It's estimated that 0.5 to 1 billion people worldwide suffer from selenium deficiency while even more consume less selenium than is necessary to provide protection against cancer and severe infectious diseases. Daily Recommended dietary allowance (RDA) is 55 micrograms (mcg) for adults. Selenium is a vitally needed nutrient that helps bodies remain stronger and healthier. Selenium deficiency can cause hypothyroidism or low thyroid, which is also caused by lack of iodine. Five times as many women as men suffer from this condition, which is reaching epidemic proportions in USA.

Se seems to slow the progression of HIV/AIDS. Because HIV is often associated with malabsorption of some nutrients, it's not unusual for those who are HIV positive to have low levels of Se in their blood. Doctors frequently prescribe Se supplements to combat this depletion and malabsorption. In two separate studies, low levels of Se were linked with faster disease progression and higher rate of death among AIDS patients. AIDS infection in much of Africa has reached pandemic proportions, with over a quarter of the population suffering from it in some areas. Figures from Harvard University in the United States put infection rates as follows - Zimbabwe 25%, Botswana 25%, Zambia 19%, South Africa 13%, Tanzania 9%, Ethiopia 9%, Congo 4%, and Senegal in West Africa with the lowest at 2%. Dakar in Senegal, parts of which are on dried up land from the early Eocene Sea, was formed from sedimentary rocks and minerals, derived from the selenium rich phosphorite. Senegal with its natural selenium has the lowest level of cancers and AIDS in the African continent and is one of the most stable countries in Africa. It has one of the fastest growing economies in the world, due to a reform program in 1994 that began with a 50% devaluation of their currency, the CFA franc, in addition to the dismantling of government price controls and subsidies.

Senegal's main industries are manufacturing, food processing, fertilisers, chemicals and textiles.

In 2012 their lawmakers did away with their senate to save \$15 million a year.

The country has a long history of participating in international peacekeeping.

Look at Dakar's good city designs, which in native Africa is unique, possibly thanks to selenium and other minerals in their soils consumed naturally to help the brain, clarity of thinking and excellent health.

The Philippines also has good selenium levels. When they come here, they feel unwell, and feel better when back home. We eat their natural organic coconut oil which has 90 ppm of selenium and 90 ppm of boron. Another brand of coconut oil has heavy metals.

Miscarriages

Three miscarriages, each at five weeks, stopped after her husband took selenium and vitamin E.

Cancer and selenium

There is considerable evidence showing a protective effect of Se against cancer. A number of studies carried out since the 1970s have provided evidence of an inverse relationship between Se intake and cancer mortality.

The number of times that cancer is mentioned is highlighted in red to show how important selenium and its synergisms are.

A wide variety of nutrients, vitamins, amino acids, herbs and minerals, such as copper, zinc, and selenium, are clearly beneficial in slowing death rates in HIV infected individuals. Vitamins A, C and E are known to help reduce the oxidative stress and viral load that characterises HIV/AIDS sufferers. This is especially important in areas where combination therapies are unavailable.

A healthy person, depending on the soil and what is eaten, needs a daily supplementary intake of 150 mcg of selenium (Se), but those with another deficiency or toxin, may need 100% more. Where soil quality is good and produce fresh, the essential nutrients in preventing and fighting HIV/AIDS and other viral diseases are found in some healthy foods. However, the benefits depend more on the soils the foods are grown in, and the fertiliser applied, than the type of food.

Apart from Senegal, there is virtually no selenium in the soils in the rest of Africa, so it is therefore not available to plants, and consequently does not get into their food.

Selenium is an essential micro-nutrient which deals with all the stresses and strains of normal living, and, when it is not available to the body, the immune system eventually reaches a point at which it can no longer cope. Opportunist infections take over, and it is these, rather than the HIV virus itself, that kill the person with a virus. Research has shown that sufficient selenium and other necessary nutrients help those with AIDS to co-exist with the virus.

A study from Nigeria released last year stated that people with AIDS who go onto anti retrovirals, and have adequate levels of selenium in their diet, have 50% fewer hospital visits, fewer side effects, and their T-cell count goes up twice as fast as those who don't have enough selenium.

AIDS, tuberculosis and malaria are spreading across Africa faster than clinics can treat them, despite the billions of dollars spent on pharmaceutical remedies. However, the growing consensus amongst progressive thinkers is that pharmaceutical remedies on their own are not sufficient. Some have found that correct nutrition, with micro-nutrient supplements, taken with drugs, is a much more effective way to save lives.

My experience with selenium showed that taking a recommended 'Human Health' Premium Vision, capsule each day increased the blood selenium levels of my wife and me to 2,000 nmol per litre. Our vegetables also helped being correctly fertilised with Selcote Ultra, at 1 kg per hectare equivalent fertilised to our potatoes, Kumura, broad beans, runner beans, sweetcorn, beetroot, courgettes, carrots, kale, lettuce, spinach, peas, and a desert spoon of coconut and olive oil from the Philippines, increased my level to 3,000 nmol, so I reduced the coconut oil to a level teaspoon a day.

Selcote Ultra, a slow release selenium developed in NZ and supplied by the best NZ fertiliser companies is available in many countries. Contact Mike Shirer <agbioresearch@xtra.co.nz> for your nearest source.

Vitamin E

When Se is taken with its synergism, vitamin E, which is in green growing pastures and some green leafed vegetables, it can help protect against cancer, heart attack, stroke, macular degeneration, cold sores, shingles, lupus, and many other diseases. If vitamin E is not taken with Se, very little benefit will be obtained, as vitamin E and Se are synergistic. Many don't know this, so some companies sell Se supplements without vitamin E, which might work where people eat greens, especially fresh organic ones, but most Western people prefer fast foods, which have little if any greens.

Brazil nuts contain selenium, but can also have Hg 2, Cd 2 and Pb 10 so we don't eat them. They have Vit E in the skins, which drop off very easily.

Bad science & statistics

A USA research using 1,000 people claimed that supplementing with Se didn't help heart health, but it was fed on its own without vitamin E, so they obviously didn't know it was essential. Those researchers could claim that soap doesn't work - if they didn't know to use water with it. Also, was it in a high or low selenium area?

In USA in the 1960s, Se didn't save confinement lambs from dying from white muscle disease of the heart, but it did save lambs in New Zealand from dying when grazing green pastures that are naturally high in vitamin E. Washington scientists learned from my research and trials in 1958/9, and fed confinement lambs vitamin E with Se, with excellent results.

Selenium bashing has been in the typical stirring news items, possibly from those in the health treatment business, rather than in prevention. Some have said that Se has no heart benefits, and some wrote that it doesn't help prostates. Also a university in England did a review of past studies on Se involving 20,000 people and found no difference in the number of strokes and heart attacks, heart disease-related deaths, or deaths from any cause, among people taking Se. However, the problem wasn't Se, it was bad science, because what the studies all did was to give people who were already getting close to the optimum amount of Se from their food in an adequate selenium country, even more Se - 100 to 800 mcg more. Also they didn't mention the necessity of supplying vitamin E with the Se.

Some (not all) scientists think that their degree allows them to say anything, and unfortunately, sometimes just to get paid by sponsors. This is rampant in farming where the majority of scientists in the 'establishment' (Ruakura, AgResearch, Dexcel, DairyNZ, LIC), don't even get the basic agricultural lime and its synergisms correct, because lime is too cheap and plentiful, so agricultural lime companies can't afford to pay the high research trial costs that the 'establishment' asks for. One scientist at Ruakura researched methane in New Zealand for five years at a government cost of \$5,000,000 and found nothing of use, partly because the basis was using USA figures, not New Zealand ones, where the total methane production is only 0.4% of the world's production. See Pollution > Methane. This was bad, expensive, wasteful science, which is too frequent.

Some scientists, consultants and fertiliser companies keep quoting a bad (faulty) lime trial on peat done by Ruakura in 1954 which I inspected in March 1955, and proved was wrong on our two peat farms, and hundreds of other peat farms that I consulted for, but it is still quoted at the expense of peat farms that are crying out for LimePlus. See the chapter on this in Minerals in Soils > Calcium, and in Soils > Peat 1 and 2.

Despite what some are saying, there is a mountain of evidence showing that Se is a powerful disease fighter.

The Journal of the American Medical Association published a study showing that people taking Se and vitamin E reduced their chances of dying from any disease by 20%, and their chances of dying from cancer by 50%.

There's evidence that people who suffer from heart disease are usually Se deficient. One researcher got it right when he wrote that Se plays a major part in cellular defence against heart disease. We and New Zealand some sheep farmers knew and used this in 1960.

The latest research I've read goes even further. It showed that the liver plays a big role in providing antioxidants that fight off heart disease, so when you don't have enough Se, the liver can't do its job properly, so the heart suffers.

In New Zealand, prostate cancer is now the most prevalent kind of male cancer. So researchers set out to look at the effects of genetics, diet, demographic and lifestyle factors, and how they affect the risk to the prostate. In their study, which I came across in the Journal of Nutrigenetics and Nutrigenomics, the strongest connection they found was that people with low Se had a much higher risk of prostate disease.

Another study took 1,300 men and split them into two groups. The first took 200 mcg of Se a day, the second a plain pill. The authors called the results "striking." The overall risk of prostate cancer was almost 50% lower in the Se group. However, you might not need 200 mcg a day. 125 mcg of Se - depending on what else is eaten, such as greens, might be enough.

Another eight-year clinical trial of over 5,000 men found similar results: those who took Se with normal PSA levels at the beginning of the study, had their risk for prostate cancer decrease by more than 50%.

One place you won't find enough is in NZ fruits and vegetables, unless home grown correctly or organic correctly fertilised, because our soils are so low in Se. The best way you can obtain Se is from organ meats, garlic, nuts and fish (not Orange Roughy deep sea fish or that near White Island, because of their high mercury level.) I felt very well, but have cut back on the coconut oil because I developed excess Se levels shown by wide white stripes in my thumb nails.

Some people, depending on the person and their age and location, enjoy improved health after taking Se, vitamin E, and other supplements needed. The cost is much lower than doctor's, specialist and hospital visits, and bad health.

Se is unevenly distributed in the earth's soils - usually high in dry, alkali soils, and parts of USA north west states, and low in wet, acid soils, as in New Zealand. Applying agricultural lime and its synergisms of boron and serpentine (magnesium silicate) to deficient soils increases organic matter levels, which help to hold Se (and cobalt), thus increasing Se levels in plants. See Minerals in Soils > Calcium.

When Se levels in herbage are low, it may have to be applied with fertiliser and/or agricultural lime. If low level symptoms show (stiff neck or other stiff muscles), Se supplements should also be taken. Blood levels should be checked at least annually. Aim for at least 1,400 nmol of Se per litre. Mine is 3,000 nmol, and I'm healthier than I have been for decades, also helped by a complete removal of mercury and other heavy metals, and correct foods and supplements, almost no non-organic foods or milk, and back and knee stretching (See the Human Health chapters).

Se and magnesium supplementing is believed to exert a protective effect against mercury, lead, cadmium, and other heavy metal toxins that are increasing in most countries. They now appear in most Nordic supplements and those produced in Norway and USA, caused by decades of dumping circuit boards and electronic equipment, and pollution from oil wells, and factory and power-generating chimney fumes.

Se supplements are also used for treatment of vitamin E deficiency, muscle pain, arthritis, growth problems, asthma, anaemia and mercury toxicity.

Deficiencies also occur in the high rainfall and irrigated parts of Australia, South African winter rainfall southern area, China and Finland, that I know of.

Finland legislated in 1984 that Se must be added to all fertilisers, which means that humans also benefit from it in the vegetables they grow and buy, as well as in animal products they consume. New Zealand should do the same, but is not likely to, because the powerful medical industry wants patient visits and to sell treatment medicines, and not help with prevention. The NZ cost is only \$8 per hectare.

Dry, alkali areas of USA are dangerously high in Se, so extra supplementation should not be taken there, however, many parts are low, but people, especially children, don't like taking pills, and why should they, when the food they eat can be corrected by correct liming and fertilising and/or by supplying the animals.

Figures on how much Se humans should take each day vary substantially, sometimes because of getting Se from other sources. People vary in their absorption of elements, and some things consumed affect absorption of others. People living in houses with copper pipes can get an oversupply of copper. Excess copper lowers the absorption of Se (and of zinc), so if you have copper pipes, drink water from an outside tap, or run the water for a minute before drinking, to avoid consuming water that sat in copper pipes over night.

Selenium also binds with toxic metals, such as lead and mercury, and removes them from the body. It deactivates a whole host of viruses.

Premature ageing, heart disease, arthritis, and multiple sclerosis are frequently linked to selenium deficiency. Selenium also helps maintain the health of hair, nails, muscles, and red blood cells. Selenium helps the immune system remain strong and alert. Additionally, selenium helps to heal inflammatory conditions in the body.

Benefits of selenium

Se is natural and can reduce the ill effects of the toxicity of drugs and toxic metals. It gives some protection against mercury toxicity, which is best drained out of your body with a natural Heel Drainage product, which also drains cadmium and other heavy metals.

Auriel and I have tried three and found Chris Rhodes's the best by far. See Human Health

Specialists.

According to The Life Extension Foundation, the use of Se during chemotherapy, in combination with vitamin A, C and E, can reduce the toxicity of chemotherapy drugs.

Along with preventing the onset of cancer, Se has also been shown to aid in slowing cancer's progression in patients that already have it. Se also helps stop damaged DNA molecules from reproducing, so prevents tumours from developing. Se strengthens the muscles that hold bones together, so, without it, osteoporosis fractures and osteoarthritis pains are worse, because the muscles are weaker, so the grating between bones is worse. Grating is a symptom of knee joints failing, which is a symptom of a replacement being needed.

Injuries

Sports injuries are high in New Zealand sports teams, partly, I believe, because of low Se and low Mg, which are lacking in most New Zealand and some southern USA soils.

Pasture and other feeds from high Mg soils, such as around the USA Great Lakes (Wisconsin area), usually have high Mg levels, but their milking cows may (depending on minerals fed) still need more Mg to avoid metabolic illnesses. Humans are the same.

Benefits of taking a selenium supplement include -

- Is an antioxidant.
- Can be used to treat tuberculosis, heart disease, cancer, AIDS and diabetes. If you have diabetes, keep yours just below 1,000 nmol, but never below 800 nmol.
- Helps to protect the body from toxic metals such as mercury and lead.
- Is involved in maintaining normal liver function and protein synthesis.
- Is involved in the metabolism of prostaglandins that control inflammation.
- Helps with resistance to diseases.
- Is involved in the metabolism of the thyroid hormone.
- Helps keep the immune system healthy.
- Maintains healthy eyes, skin and hair.
- Taking Se has been found to reduce the incidence of breast cancer.
- Treatment of vitamin E deficiency, muscle pain, arthritis, growth problems, asthma, anaemia and mercury toxicity.

Research

- In numerous studies, including clinical trials, observation-based studies and population based studies, researchers have concluded that people with higher intakes and blood levels of Se have a lower incidence of certain types of skin, prostate, bladder and lung cancer.
- In studies undertaken through the 1980s and 1990s in seven dermatology clinics in the USA, doctors concluded that, while taking Se supplements didn't reduce the rate of recurrence for skin cancer, it did decrease the occurrence of overall cancers and death. Specifically, those who took Se supplements showed statistically less incidence of prostate cancer, colorectal cancer and lung cancer.
- A USA trial found that men in particular, with high levels of Se in their blood, had more energy and more optimism.
- Se may lower cholesterol levels and, according to the National Institutes of Health, "Se is one of a group of antioxidants that may help limit the oxidation of LDL and thereby help to prevent coronary artery disease."
- Se may help reduce the symptoms of arthritis by controlling the levels of free radicals in the blood, and the neck muscle carrying your head.
- Se's antioxidant activity may help slow many age-related and immune system disorders.

In addition to major studies, there have been many smaller ones showing that Se may have a significant effect on the progression of macular degeneration, asthma, lupus, pancreatitis, diabetes and skin disorders - including acne and rosacea (red colouring on nose).

It has been demonstrated that the blue rays of the spectrum seem to accelerate macular degeneration more than other rays of the spectrum. This means that very bright light, such as sunlight or its reflection in the ocean and desert, may worsen macular degeneration. Sunglasses that block out

the blue end of the spectrum may decrease the progress of the disease. Too little Se in the diet causes muscular dystrophy in foals.

Cancer prevention

Low serum Se levels have been reported in paediatric and adult patients with cancers.

Cornell University and the University of Arizona did a five year study that showed that people taking 200 mcg of Se a day had 63% fewer prostate tumours, 58% fewer colorectal cancers, 46% fewer lung malignancies, and a 39% overall decrease in cancer deaths.

Se can switch on genes that prevent cancer and, according to data from three randomised trials, patients with the highest levels of Se had a 34% reduced risk of developing colon cancer.

Another study showed that rates of lung and colon cancer fell by 38% when patients took 200 mcg of Se per day.

In Linxian county, China, during a five year study involving 29,500 people, the gastric cancer death rate dropped by 21%, and the oesophageal cancer death rate by 10%, in those given relatively small amounts of Se and beta carotene.

Se fortifies heart energy cells, making sure they get enough oxygen, which is helpful in stroke prevention. Se also helps eliminate arsenic and protects against the bad effects of cadmium and mercury.

One of the primary reasons the public has never discovered the necessity and benefits of selenium, stems from the fear of toxicity - a needless fear. Selenium is definitely one of those compounds that, if its correct use became more widespread, would put a huge dent in the multi-trillion dollar health care system.

Skin cancer

A controlled 10-year trial in the USA in 1996 studied 1,312 people suffering skin cancer. Half were given 200 mcg of Se per day and the other half were given a placebo. The Se did not stop further skin cancers, but, within two years, and over the following eight years of the trial, cancers of the bowel, prostate and lung were reduced to half in those people taking Se daily.

Prostate cancer

In USA there was a 60% reduction in the number of new cases of prostate cancer in those men taking Se, compared with those men who didn't.

Researchers from Harvard University studied 33,737 male health professionals, all of whom provided toenail clippings that were stored for later analysis. Because the Se content of toenails is a good indicator of Se status, the stored material provided an opportunity to compare Se status before diagnosis, if prostate cancer developed later on. The study began in 1987 as part of a prostate cancer study in which Se was not supplemented.

Participants filled out questionnaires during the course of the study, and all new cases of prostate cancer were recorded. From 1989 to 1994, the group reported 181 new cases of advanced prostate cancer. Each case was matched with a control subject (one who did not have prostate cancer) of the same age and smoking status. The toenail samples of both the cancer cases and the controls were analysed for Se and results showed the mean toenail Se level was significantly higher in control subjects than in the cancer subjects. When subjects in the highest 20% for Se status were compared with those in the lowest 20%, those in the highest status were half as likely to get prostate cancer as those with the lowest levels.

In a later research study in 2006, high blood levels of Se were associated with a four to five-fold decrease in the risk of prostate cancer. Scientists at Stanford University suggest taking Se supplements to ward off this most common form of cancer in men.

Some health researchers have speculated that the deficit of Se in foods grown in New Zealand should be investigated through studies of colon and prostate cancer.

Liver cancer

Low levels can increase the risk of liver cancer and the chances of cardiac myopathy (a type of heart attack). Individuals infected with hepatitis B are also at increased risk for liver cancer, and a similar risk has been suggested for hepatitis C. Researchers in Taiwan suggest that low blood levels

of Se may be linked to the increased risk of liver cancer in patients infected with these viruses. The researchers report that Se levels were significantly lower in those who developed liver cancer than in those who did not.

Oesophagus cancer

According to the investigators, a previous study has suggested that Se resulted in a 13% reduction in cancer mortality in a population with high rates of oesophageal and stomach cancer.

Low Se blood levels increased the risk of the deadly Barrett's Oesophagus - a pre-cancerous condition-by two to three times in trial patients with low Se levels. No figures were given, but 1,400 nmol per litre of blood is now optimum by Pathlab (NZ human blood testing lab), and 900 nmol is too low.

Mine, after taking Good Health Vision Premium for six months rose to 1,400. It has all the minerals needed except magnesium and boron. People have reported to me that their eyesight improved within months of taking Good Health Premium with its bilberry and selenium.

Other research has shown that taking non-steroidal, anti-inflammatory drugs, such as Cartia, and keeping weight at a healthy level may reduce the progression of Barrett's which, with oesophageal cancer, strikes more than 8,000 Americans a year, and the incidence is rising faster than that of any other cancer in the USA, they say for unknown reasons. See Mercury and Acid Refluxes for reasons.

Mine and the findings of others, suggest that optimum Se consumption may inhibit the progression of Barrett's oesophagus.

Selenium and the brain

The trace mineral selenium has a huge impact on brain function. Nerve cells must have selenium to produce glutathione, one of the brain's most important antioxidants. The brains of animals, for example, fed a low selenium diet make less glutathione. Such selenium-deprived brains also show disturbances in the activity of prominent neurotransmitters serotonin, dopamine, and adrenaline, signifying potential brain damage and dysfunction, according to recent research. Further blood levels of selenium drop as you age—by 7 percent after age sixty and 24 percent after age seventy-five, according to one study.

Low Se levels

Se is very low in all of New Zealand because of our soils, low calcium and high rainfall. The medical profession thought that the average level of 600 nmol per litre in blood in New Zealanders was OK and considered it the optimum level, but it is half the optimum level of the UK where Se is not as deficient.

Applying LimePlus (lime with synergisms of magnesium and boron) and deficient elements, increases organic matter, which holds applied Se, so it last longer, and increases pasture tissue Se levels.

Good farmers now apply Selcote Ultra with fertiliser, preferably with reactive phosphate such as Gafsa, which is an untreated, naturally-mined mineral, which needs elemental sulphur mixed with it to make P more available.

For more information about Se in animals, see Mineral in Soils, Pastures and Animals > Selenium.

Some health campaigners have recommended a daily intake (RDI) of 3 mcg of Se per kilogram weight of person per day, or 247 mcg a day for the average adult weight in New Zealand. Goodhealth Premium Vision tablets have 125 mcg, one of which a day, with 33 mg of vitamin E, improved our blood levels to 1,400 nmol.

At present, South Island (where it is very low) adults receive on average only 0.45 mcg per kilogram a day in their food. This is about one-tenth of what is needed. When lacking in men, the tails of semen drop off so they can't swim to their destination properly. This is mostly not known.

In the October 2006 issue of 'Acres USA', it was reported that, "Relatively harmless viruses, while passing through Se deficient hosts, can mutate into deadlier versions, so Se could be a defence against Avian and other flu." It pointed out that deficiencies could be a reason why new diseases develop in areas where people suffer malnutrition.

The University of North Carolina has done tests and found that viral mutations occurred more often when Se was lacking.

As in some pastures, excess and deficiency symptoms of some minerals can cause the same symptoms, so Se deficiency can cause muscular dystrophy, and an excess can cause the same as a deficiency, i.e., muscular weakness and fatigue.

Deficiencies

In 1986, at age 55, I had, according to a doctor, “old age” in my neck, because I couldn’t turn it completely. I had a perpetually stiff neck, stiff muscles and cramps, especially in the morning, and couldn’t do physical work. I met someone who had overcome similar problems after going to Paul Singh, a naturopath. I visited him the next day, and three weeks later all my aches and pains had gone. He recommended many things, but those relating to this topic were boron, MORE Se, zinc and magnesium, and less table salt, which is called ‘poison’ by some analysts and my muscle testing, because of its removals and additives. We now take more Himalayan salt with no problems.

My gums used to bleed a lot. My dentist was amazed at the improvement when he saw me a few months after taking deficient minerals, and asked how I had achieved this. I told him Paul Singh’s address and the minerals I’d increased.

After a year I had my hair analysed. The first test showed that the elements I was taking were adequate, while all those I was not taking were deficient. This is the typical case in New Zealand because soils are so low in so many minerals.

We now grow as many vegetables (10) as possible, using LimeMagPlus, serpentine, compost, sheep pellets, Gafsa organic reactive phosphate, Very fine elemental sulphur, and trace elements based on leaf analyses. We therefore get some Se and other minerals from our foods, without heavy metal toxins, because we don’t use superphosphate, or any P with even a little superphosphate, because it is made from bad cheap phosphate containing heavy metals, which the sulphuric acid releases. Read Minerals in Soils > Phosphate.

In 1960 before taking Se I suffered a stiff neck and weaker muscles, as do many in New Zealand and others in high rainfall and low selenium and/or low calcium areas of the world.

Older people need more than younger, hard working more than those in relaxed jobs, and osteoarthritic sufferers need more Se to help muscles support their neck.

In New Zealand, typical food supplies about 30 mcg of Se per day, while the recommended amount is 150 mcg a day. In USA the recommended maximum daily amount per adult is 400 mcg, and they have much more Se in their drier soils than New Zealand does.

It was found that children living in parts of China with low Se levels were developing a heart disorder known as Keshan disease. After supplementing with selenium the illness was almost eradicated.

Se blood levels are usually lower in people with muscular dystrophy. Dystrophy means malnutrition or defective nutrition, which includes inadequate Se, calcium, boron, Mg, zinc, iodine, etc. In the Science & Technology Dictionary, muscular dystrophy is described as the “wasting of muscles, that supplementing with Se can reduce”.

A friend who was crippled with sore feet recovered after she took MP 65 (magnesium phosphate) and Se, which slow cell ageing, improve skin and eyesight, stamina and endurance, and inhibit clot formation. Amounts taken are not given because these vary between people and what else is being eaten, and where it originates.

Se is claimed by some researchers to reduce the chances of heart disease (cardiac failure). In some cases, Se has also proven effective in helping to fight cold sores and shingles, which are both caused by the herpes virus.

The typical doctor story of, ‘If you are eating correctly, you will be okay without supplements’, is possibly OK in good-soils, lower rainfall, large countries where foods come from a wide area, and for farmers eating their own fresh vegetables grown with ample animal manure, compost and correctly formulated lime and fertiliser. However, for those in New Zealand towns eating the comparatively stale supermarket non-organic vegetables and fruit from depleted market garden soils, fed mostly superphosphate, nitrogen and potassium, it is not.

Even the meat we eat in New Zealand comes mostly from animals raised on ryegrass (without variety) grown on high rainfall, trace element deficient soils, especially peat and pumice, and in the South Island’s west coast’s 3,000 mm of rain a year.

Many friends who have started taking Se and other minerals they need, depending on the person

and their area, have enjoyed vastly improved health, and decreased neck stiffness. Human Health Vision, and their Magnesium Ultra, and Thorne Boron are the best we've tried. The cost is lower than reduced ability, doctor's visits and hospital fees. A 78 year old friend had very bad osteoarthritis in her neck and had to lie down about four times a day to take the weight off it. She could hear it grating when turned. She took the above and within a week her neck started to get better, and after a few months she needed to lie down only once a day and felt much better, with less grating of bones, because the selenium strengthened muscles helped support it, and the boron improved the joints.

A Mississippi (high rainfall, low Se area) farming editor I write for, who visited us in Hamilton, New Zealand, was turning his neck in slight pain. I gave him two Se and vitamin E capsules each day and after three days he said his long-time sore neck was getting better. Others have found the same. Some take longer to get better.

Many mature humans in New Zealand not taking Se, magnesium and zinc daily are suffering. We are all different, so some people don't need all, or as much.

Se deficiency increases the bad effects of iodine and then adrenalin deficiency which is common.

Se deficiency in garden soils and crops is made worse by low calcium and its synergism levels which should be 0.8% in ryegrass tissue (leaves and stems). See Minerals in Soils > Calcium and the free spreadsheet called Pasture Analysis, for levels in other plants.

Conversely, too much selenium will result in depression, nausea, vomiting, nervousness, loss of hair, and fingers curved up, which mine did slightly when my level got up to 3,000 nmol, after eating too much organic Filipino coconut oil (9 ppm selenium and 9 ppm boron), and home grown vegetables fertilised with 1 kg per hectare of Selcote Ultra containing 1% selenium.

Excess Se - called Selenosis

This photo of excess selenium causing turned up fingers is from Googling for selenosis.

The drier, high-pH parts of USA have Se levels so high that plants take up too much, so some become highly toxic to animals and even poisonous to some.



Calcium specialist Sarah Schmidt wrote, "High calcium soils usually contain more Se. Our distant ancestors seldom had to worry about being short of minerals. They absorbed calcium from the small bones of the fish and birds they ate. So the only time primitive humans might have been short of some minerals was when food was scarce."

The plants they gathered contained higher mineral levels than today's superphosphate fertilised fast growing fruits, vegetables and grains, also because they then grew in mostly calcium-rich soils not depleted by fertilisers, rather than on land depleted from years of farming without applying enough LimePlus.

The high calcium carbonate and calcium-magnesium carbonate in water and soils which increases soil humus in the dry Rapid City, South Dakota area, helps them have the lowest cancer rate and the highest measured blood Se levels in USA, while in Lima, Ohio (a wetter area), the cancer rate is twice that of Rapid City, and their citizens have only 60% of their Se blood level.

Se in soils is higher in dry areas, and lower in wet areas (New Zealand) because it leaches, especially when calcium is low.

The UK has the high calcium White Cliffs of Dover giving optimum calcium in subsoils and pastures, right through to Wales, where a member had 0.9% Ca in ryegrass, which is the highest I've seen.

Consumption of more than 250 mcg a day should be avoided. 400 mcg of Se a day can lead to selenosis. Consumption of about five times the normal dietary intake leads to medical problems. The following are the common side effects of excess Se intake -

- Bad breath that resembles garlic odour.
- Brittle hair and in severe cases, loss of feeling and control in arms and legs.
- Cardiovascular problems like heart damage, heart failure and cardiac arrest.
- Digestive problems such as nausea, vomiting, stomach pain and diarrhoea.
- Effects on mental health that may lead to lightheadedness, peripheral neuropathy, irritability, stress and depression.
- Malfunctioning of the vital organs - liver, kidney and heart.

- Metallic taste in the mouth along with difficulty in breathing.
- Skin problems like rash, dermatitis and flushing.
- Thickening or loss of fingernails; affected nails are then susceptible to infection.
- Upset stomachs, muscular weaknesses and difficulty in breathing.
- Severe nausea, vomiting, abdominal pain, and acute renal failure.
- White horizontal streaking on the fingernails, tenderness and swelling of the fingertips, nausea and vomiting, sour-milk breath odour and increasing fatigue.

If any of these symptoms are observed, reduce intake and seek advice from a qualified physician. Excess Se, if untreated, can be life-threatening.

Excess vitamins E and K can increase the chance of blood clotting, so don't take too much. My weight is 60 kg, so I usually take a little less of everything than recommended, which I prefer rather than getting too much.

High doses of Se (more than 400 mcg) can cause dizziness, nausea, fatigue, hair loss and/or tooth decay. Doses even higher (900 mcg or more) can cause kidney and/or liver damage.

Smaller people should avoid taking too much of any supplement.

In general, a normal dietary intake of Se does not cause any noticeable side effects. One British trial examining the benefits of Se supplements showed that in some cases supplements can do more harm than good. This was possibly because people in Britain have a 1,200 nmol average, double the average blood Se levels of New Zealand (600 nmol) which is much too low. A similar trial in New Zealand would give different results.

Extreme cases of selenosis can result in cirrhosis of the liver, pulmonary oedema, and death.

Warnings

There is no known treatment to reverse the effects of Se poisoning, and animals in high Se areas can die before a diagnosis can be made. Horses don't need as much as cattle, so pasture with optimum Se for cattle and sheep can be highly toxic for horses. If you have horses, read the chapter on Horses in Animals Other.

Se can get too high in low rainfall and high soil pH areas and after applying Se chips which are fast release and not recommended, but organics don't allow Selcote Ultra slow release. There is another brand that claim slow release, but pasture analyses show it is not.

When fertilising vegetable gardens with fast release Se chips made for organic farmers, levels can rise within weeks to three times what it should be, so avoid using them, especially if taking a Se supplement. The safe slow-release Selcote Ultra should be used, but not at more than 1 kg per hectare (1 lb per acre). If pasture analyses show levels are low after 1 kg per hectare, it can be because soil organic matter is low. Selenium fast release organic chips have increased Se to levels that made horses very ill and severely damaged.

Levels in drinking water should not exceed 0.01 ppm.

Treat Se products and fertilisers containing it like the toxic elements they are, by using gloves and washing hands after use.

Selenium and fertilisers

In New Zealand, if the farm is very low in Se and the farmer and family are living off mostly food grown on the farm, they will be short of Se unless supplementing it. I see some farmers looking worn out, partly due to low Se and low Mg, the use of poisonous sprays and the high work and stress load of farming.

Those who use the correct farm fertiliser, based on pasture analyses, and in their vegetable garden, and take supplements, shine in many ways. I'll give an example. Members in a dairy farmer discussion group I was running on pumice-type soils at Atiamuri, near the middle of the North Island, noticed how really healthy one member looked. All in the group noticed it and several commented on it. He smiled strongly enough for us to ask why. He said that his cows were now so healthy with the balanced reactive phosphate fertiliser, with added trace elements, including Se, that I had formulated, that he used it for his vegetables and fruit trees. See Garden Fertilisers.

Good New Zealand animal farmers have optimum organic levels in their soils shown by correct cobalt levels of 0.13 ppm and fertilise with Selcote Ultra pills twice a year at 0.5 kg per hectare (0.5 lb per acre), containing 1% of elemental Se, costing only \$4/ha, or double the amount once a year,

because it pays them to have healthy animals. Vegetable growers don't. New Zealand vegetables and grains contain only a fraction more Se than those who suffered the Keshan selenium deficiency disease in China. Despite this, our health departments does nothing to promote selenium's use.

The Australian Percy Weston's book, 'Cancer, Cause & Cure', is fascinating and what he did was wonderful. However, it was not solely the phosphate in superphosphate that he claimed caused his and his sheep ill health problems, but also the water soluble sulphur in superphosphate, because this leaches and takes Se and other elements with it. So each time superphosphate was applied, Se levels in pastures decreased, and still do today. In Percy Weston's time, they didn't know about Se, or its leaching by the water soluble sulphur in superphosphate (made by mixing sulphuric acid with the cheapest raw phosphate), and leaf analysing was no yet available.

For more information on Se, fertilisers and animal health (we are animals), see Animal Health > Symptoms and Causes, and Minerals in Soils > Selenium. You'll read about how too much phosphorus (P) can cause animal health problems in cows a month or so after it is applied, causing pasture P levels to increase to toxic levels. Reactive phosphate is slow release, so doesn't cause problems. It must have elemental sulphur with it to make the P available, and because slow release sulphur is needed in soils and bodies. The level can be seen in pasture analyses, and the spreadsheets called Lime Nutrient Planner and Phosphorus Nutrient Planner, which indicate how much to apply, based on the ryegrass level.

Soils

Low calcium soils, based on Ca pasture levels, are usually low in organic matter so allow Se to leach. Sweet, high-organic soils with optimum pasture calcium levels (0.8% in ryegrass) hold Se. Pasture tissue levels are the only accurate way of measuring calcium and cobalt which indicates organic matter levels.

Selenium levels are low in all our soils, vegetables, fruits milk and meat, because most New Zealand soils are so very low in calcium due to our high rainfall, wet acid soils, decreasing calcium causing low organic matter. Annual lime applications have halved over the last thirty years because of the wealthy fertiliser companies sponsoring their research and none done on calcium since MAF's in 1954, which was partly wrong, but still quoted because it suits the fertiliser companies and consultants being paid commissions by them. Selenium in soils is higher in dry areas, and lower in wet areas because it leaches, especially when calcium and humus are low.

Sources

Sources of Se are organic vegetables and fruits, but the amount of Se in any particular fruit or vegetable is dependent on the Se content of the soil in which it was grown, which in New Zealand is almost zero unless applied as Selcote Ultra with LimePlus and/or fertilisers. Because of this, people who live in areas where the soil has been depleted of its Se content may require more Se than they can reasonably consume in whole food sources. In addition, Se is destroyed when foods are processed which may make it less available than is realised. Cooking is processing, so keep it short.

Not all forms of Se are effective or safe to consume. Avoid Se sulphide because it is a toxic form. It is sometimes used in shampoos, where it is safe unless it enters the body via a cut.

Chelated forms of elements are seldom as good as sulphate forms and other natural forms, cost more, and sometimes have toxic additives such as cadmium and mercury. Some vitamins and minerals were adversely affecting me. They had chelates, oxides, and heavy metals. Remember that manufacturers and sales people twist information to sell their products.

My short-term memory started failing at age 78 and, over time, two naturopaths diagnosed heavy metals in me, which affect the brain badly. I started taking 'memory menders', but with no success. Mercury and cadmium were in my body, and after draining them out, they returned. Checking all the pills and tablets I was taking found that many contained heavy metals. The chelated minerals were the worst because mercury is used to chelate (mix and bind) them.

Some web sites, chemists, health supplements stores and supermarkets sell chelated calcium and iron pills, that are advertised to be better absorbed than the much cheaper non-chelated normal natural minerals. Are chelated ones worth the price? Not in my findings, or those of many others who are not selling chelated minerals. Some marketers of chelates use glowing statements galore without comparative facts.

See the Introduction chapter for suppliers.

Further reading on Se is in Minerals in Soils Fertilisers Pastures & Animals > Selenium.