

SELENIUM

The Great Protector



Reduces Cancer Risk
Anti-Viral • Liver Detox • Thyroid Health
Immune Strength • Anti-Inflammatory

Sandra Cabot MD

Selenium

The Great Protector of your health

By Sandra Cabot MD

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Selenium is a great protector

For over 30 years I have been researching the health effects of the mineral selenium. I have looked at hundreds of scientific studies from all over the world and I have treated thousands of patients with selenium supplements. Selenium is indeed a fascinating mineral in the fabric of human health.

Selenium is obtained through the diet and acts in the body as a cleaning up agent, or antioxidant, which neutralises toxic substances. Without antioxidants cell damage occurs, and serious disease, and even death may occur.

Selenium helps antioxidant enzymes in the body called selenoproteins. These selenoproteins recycle cellular antioxidants, especially the body's most powerful antioxidant called glutathione.

This preservation of glutathione reduces oxidative stress, which is the main cause of degenerative diseases and premature aging



I have looked
at hundreds
of scientific
studies from
all over the
world

Selenium is a tireless repairer and protector of your cells

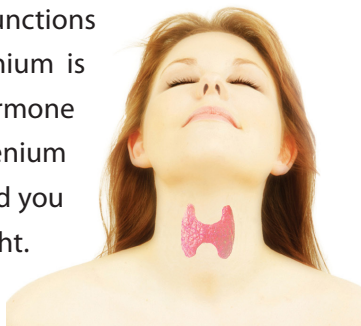
Selenium's Health Benefits

Selenium has numerous health benefits, which have been shown in a large number of clinical studies.

Selenium exerts health benefits in the following areas:

- Autoimmune problems
- Cardiovascular disease including atherosclerosis and strokes
- Arthritis including osteoarthritis, rheumatoid arthritis and psoriatic arthritis
- Neurological diseases including Alzheimer's disease
- Pancreatitis (inflammation of the pancreas)

- Thyroid Problems – both under and overactive thyroid states. Selenium concentration is higher in the thyroid gland than in any other organ in the body; in other words the thyroid gland accumulates selenium. Like iodine, selenium has important functions in thyroid hormone manufacture. Selenium is required by the cells to convert thyroid hormone into its active form. If you are low in selenium your thyroid function will be sluggish and you will be fatigued and inclined to gain weight.
- Viral infections including HIV (which causes AIDS), and viral hepatitis. British researcher Margaret Rayman has shown that viruses can become much more dangerous in people who are selenium deficient. This includes hepatitis viruses, herpes viruses, influenza viruses and viral encephalitis.
- Reduces the risk of many types of cancer. Multiple studies show that low selenium levels in the blood, hair, or nail clippings are associated with a two to threefold increase in overall cancer risk.



In one study, older people taking 200 mcg of selenium daily had their risk of dying from all cancers reduced by a whopping 50%.

For some types of cancer such as thyroid cancer, the risk rises to nearly 8-fold. Selenium deficiencies are now known to increase risk of cancers of the lung, bladder, stomach, esophagus, and liver. A meta-analysis of nine controlled clinical trials with 152,538 participants proved that selenium supplementation reduced the risk for ALL cancers by 24%. This cancer-preventive effect was higher (36%) in people with low body selenium levels.

Selenium: What Forms Protect Against Cancer?

Recent research data has stimulated medical interest in the anti-cancer properties of the mineral selenium. Researchers have found that selenium can influence gene expression to suppress a protein that regulates tumor onset, growth and spread (metastasis).

It is important to know that there are several forms of selenium and each has special anti-cancer effects.

Three forms of Selenium are required for Cancer Prevention

Humans obtain selenium from a variety of foods (plant and animal sources) and this occurs in these foods in several different forms; each form has its own unique effects.

The three forms of selenium most active in preventing cancer are:

1. Selenium-methyl L-selenocysteine
2. Sodium selenite
3. L-selenomethionine

All three selenium compounds stimulate cell death in various types of cancer, but each compound is better at destroying some cancers than others.

Because of these synergies between the different forms of selenium, you can understand why all 3 forms of selenium taken together (namely selenium-methyl L-selenocysteine, sodium selenite and selenomethionine) are much more effective at killing off early or developing cancers in your body.

Note: Most people, including many medical doctors, do not know that selenium is available in several different forms which can complement each other.

Selenomune

I have formulated a product called Selenomune to enable people to get all 3 forms of selenium combined together in one capsule. I have also added other essential minerals to support the cellular immune system. The body's cellular immune system fights cancer and some infections. I have also added activated B vitamins to support liver detoxification pathways. I think the Selenomune formula is a truly excellent combination of critical nutrients and

many people can benefit from it.

Selenomune contains in each capsule:

- **3 Types of Selenium** - Selenium-methyl L-selenocysteine and Sodium selenite and L-selenomethionine
- Vitamin C (as Ascorbic Acid) 100 mg
- Folic Acid 200 mcg
- Vitamin B-12 (as Methylcobalamin) 20 mcg
- Iodine (from Kelp) 150 mcg
- Zinc (as Zinc Oxide) 5 mg
- Manganese (as Manganese Sulfate) 1 mg
- Chromium (as Chromium Chelate) 20 mcg
- Molybdenum (as Molybdenum Chelate) 50 mcg
- Boron (as Boron Citrate) 0.1 mg
- Brewer's Yeast 500 mg

Selenomune capsules contain a special designer yeast which is cultivated to incorporate a high concentration of essential trace minerals. The special yeast in Selenomune is very beneficial for nutritional health, and just as there are both good and bad bacteria found in the intestines, there are good and bad yeasts. The yeast in Selenomune is a good yeast, in that it enhances immunity, whereas the bad yeasts (pathogenic yeasts) such as candida, will deplete the body of energy and increase the workload of the immune system.



Three types of selenium

Three types of selenium

1

Selenium-Methyl L-Selenocysteine

Selenium-methyl L-selenocysteine is an organic combination of selenium with a sulfur-containing amino acid called L-cysteine. It is the most potent form of selenium known in nature, and Selenium-methyl L-selenocysteine is found in plants in the allium family (such as garlic and onions) which are grown in selenium-enriched soils.

Selenium-methyl L-selenocysteine has the effect of inhibiting new blood vessel formation (angiogenesis) in tumors; this effect reduces tumor growth. Selenium-methyl L-selenocysteine has shown positive synergistic effects with various chemotherapy drugs, including those used in prostate and breast cancers.

2

Sodium Selenite

Sodium selenite destroys cancer cells in different types of cancers through a variety of mechanisms. It generates free radicals (reactive oxygen species) which cause the destruction of mitochondria that exist in cancer cells, but not in healthy cells.

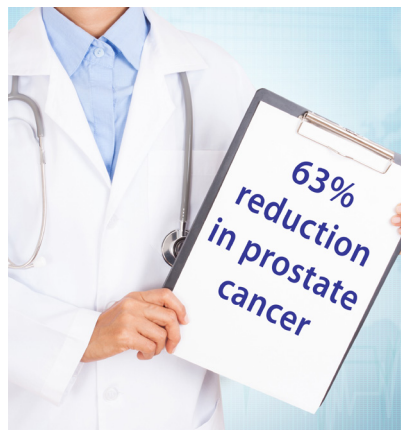
Numerous human studies with sodium selenite support the use of this form of selenium as a possible adjunct therapy for cancer patients and for preventing new or recurring cases of cancer.

3

L-Selenomethionine

L-selenomethionine is an organic form of selenium combined with the sulfur containing amino acid called L-methionine. It is the form of selenium found in most preparations of selenium-enriched yeast, which has been used in many clinical trials.

Studies by Dr. Larry C. Clark from the University of Arizona demonstrated a 63% reduction in occurrence of prostate cancer among men with a history of previous cancers.



Selenium's 11 anti-cancer mechanisms

Selenium is a trace element now recognized to be essential in human nutrition. It has attracted increasing scientific interest over the past few years for its powerful cancer-preventing potential. Selenium occurs in multiple forms in nature, three of which are especially important in preventing human cancers. Each of these three forms of selenium has produced intriguing findings.



Laboratory studies reveal the reason:

Each form of selenium has a unique suite of mechanisms, and each affects different cancer types somewhat differently. Only by combining all three forms of selenium can you be sure of optimizing your cancer risk reduction. In that way you'll be taking advantage of all of the 11 known mechanisms by which selenium compounds prevent cancer.

Studies show that selenium uses 11 different mechanisms to prevent potentially cancerous cells from growing into a fully developed tumor.

These mechanisms act together to maximize cancer protection.

There is a large amount of scientific evidence to show that selenium has anti-cancer effects, and that selenium supplements are worthwhile.

There are skeptics who promote the theory that selenium is useless or even dangerous and many people remain confused by this attitude. I think this skeptical attitude and misinformation mainly stems from the publication in 2009 of a single negative study, about the efficiency of selenium in cancer prevention.

This negative study is known as SELECT (Selenium and Vitamin E Cancer Prevention Trial). This study appeared to show that selenium, alone or in combination with vitamin E, had no detectable effect on preventing cancers. Many experts have subsequently questioned the SELECT trial's methodology and conclusions. One problem with that study was that it used only a single form of selenium which is just one of several different forms of selenium available. Another significant fault in this study is that it used synthetic

vitamin E (alpha tocopherol), which displaced critical gamma tocopherol from cells, thereby increasing cancer risk.

Selenoproteins are anti-aging

The body incorporates selenium into body proteins to make over 25 different selenoproteins – (the most important one is glutathione peroxidase). These proteins are some of the strongest antioxidants that work to prevent cellular damage throughout the whole body from free radicals. This is how selenium exerts its powerful anti-aging effect.

Selenium Deficiency

Selenium deficiency in humans and animals is common worldwide because:

- Processing of foods and the mass production of foods lowers selenium.
- Poor absorption of minerals is common in people with intestinal disorders (such as celiac disease, Crohn's disease, cystic fibrosis etc.) or those taking antacid drugs.
- Selenium levels are often very low in people living with chronic viral infections such as HIV, Epstein-Barr virus (Glandular Fever), mosquito transmitted viral infections and viral hepatitis.
- Poor soil quality - selenium deficiency is widespread throughout Australia. Deficient prone areas are coastal sandy soils, acidic soils, sedimentary and granite soils usually in high rainfall regions (made worse by high superphosphate application and clover dominance).

China has soils which are extremely deficient in selenium. Studies in the Jiangsu Province of China have indicated a reduction in the prevalence of many diseases by taking selenium supplements.



Selenium concentrations in soils in the USA vary a lot and to see a map visit- <http://tin.er.usgs.gov/geochem/doc/averages/se/usa.html>

One finding that shows up repeatedly is that adults living in selenium deficient geographic areas have severely reduced life spans. Heart muscle damage is common at autopsy in these selenium-deficient cases. In 25 cities in the United States, low selenium correlates with high rates of heart attack and cancer. Selenium prevents toxic effects of cadmium and mercury, and helps to modulate the active transport of calcium out of the arterial system.

Measurement of Selenium in the Body

The most commonly used measures of selenium status are plasma and urine selenium concentrations. Concentrations in blood and urine represent recent selenium intake. Because selenium is concentrated inside the body's cells (especially in the genetic material) and also in specific organs such as the thyroid gland and breast tissue, a blood test for selenium levels is not an accurate measurement of total body selenium status. The blood and urine selenium levels are just the tip of the iceberg – in other words they do not represent the true total body selenium status. These levels can be in the normal range but you may be deficient. Plasma or serum selenium concentrations of 8 mcg/dL or higher in healthy people, typically meet needs for selenoprotein synthesis. This means the body has enough selenium for basic functions but may not be optimal for people with specific health problems.

Methods for measuring selenium content in the body:

- Analyses of hair or nail selenium content can be used to monitor longer-term intakes over months or years. These tests can become unreliable if there are hair and nail diseases.



Can selenium be toxic?

Toxic symptoms include “garlic breath”, dry skin, nausea, diarrhea, nails may develop white patches, become brittle, and loose. Lesions may occur in the skin and nervous system. Studies in China have found that the nail and hair loss occurs when selenium intake reaches 4,990 mcg/day over a prolonged time. (*J Trace Elem Electrolytes In Health And Disease* 94;8:159-165).

It is therefore logical that taking a dose of 200–400 mcg/day, which has been proven to help in cancer, AIDS, and other diseases, on top of whatever one consumes in their diet, wouldn't be a problem. Research consistently has shown these levels to be totally safe and effective.

Brazil nuts contain high amounts of selenium (68–91 mcg per nut) and may cause selenium toxicity if consumed regularly in large amounts, although I have never seen this. Selenium content of soils varies so much that not all Brazil nuts are high in selenium.

Acute selenium toxicity has resulted from taking incorrectly formulated over-the-counter products containing very large amounts of selenium. Over 200 people experienced severe adverse reactions from taking a liquid supplement containing 200 times the labeled amount of selenium. Acute selenium toxicity is usually caused by overdosing with large numbers of tablets or by an industrial accident and can cause severe gastrointestinal and neurological symptoms, acute respiratory distress syndrome, heart attack, muscle pain, tremors, dizziness, kidney failure, heart failure, and, in extremely rare cases, death. *See also page 25*

The Food and Nutrition Board (FNB) has established Upper Limits- *see table below*

Tolerable Upper Intake Levels (ULs) Selenium from FNB				
Age	Male	Female	Pregnancy	Lactation
Birth to 6 months	45 mcg	45 mcg		
7–12 months	60 mcg	60 mcg		
1–3 years	90 mcg	90 mcg		
4–8 years	150 mcg	150 mcg		
9–13 years	280 mcg	280 mcg		
14–18 years	400 mcg	400 mcg	400 mcg	400 mcg
19+ years	400 mcg	400 mcg	400 mcg	400 mcg

These amounts are very conservative and some people may need, and tolerate higher doses.

Selenium and viruses

When it comes to fighting any viral infection, it is critical that you have adequate amounts of selenium in your cells.

Researchers working with influenza viruses discovered that animals deficient in selenium were more susceptible to infectious diseases. When animals with a selenium deficiency, were contaminated with the flu virus, the virus mutated into a far more virulent form when it was passed on to the next animal.

The researchers compared the initial virus to the mutated virus, and found that the initial virus would typically cause only mild pneumonia, while the mutated virus would result in life threatening severe pneumonia.

This breakthrough showed that selenium deficiencies cause viral mutations that could turn a mild flu virus into a worldwide life-threatening flu pandemic. This should have made news headlines all over the world, but it didn't. Why? Drug companies and governments believe more in flu vaccinations and remain ignorant of the selenium research.

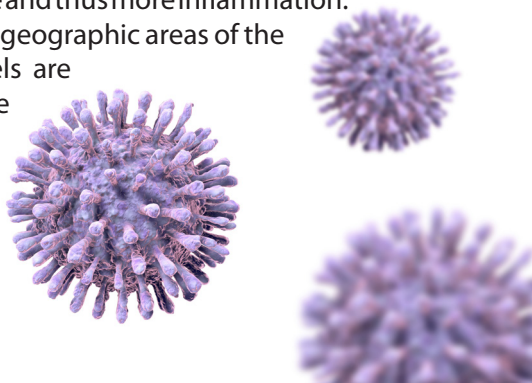
Selenium and the AIDS virus

Recent studies have shown that providing adequate amounts of selenium to the AIDS virus slows its replication. HIV requires selenium, and will invade other cells in an attempt to get more of the mineral. The HIV virus has a large need for selenium.

One of the features of AIDS progression is a decline in the patient's selenium blood plasma levels, which results in a decline in the selenium-containing antioxidant glutathione peroxide and thus more inflammation.

HIV infection rates are highest in geographic areas of the world where soil selenium levels are the lowest and infection rates are lowest where selenium levels are the highest.

The AIDS infection rate is highest in those African countries with low levels of selenium in their soil.



Countries with lowest selenium levels**Incidence of HIV infections**

Zimbabwe	25.84 percent
Botswana	25.10 percent
Zambia	19.07 percent
South Africa	2.91 percent
Cote D'Ivoire	10.06 percent

Senegal in West Africa has the lowest levels of AIDS at 1.77 percent-and the highest levels of selenium-rich soil. Senegal also has one of the lowest rates of cancer in Africa, another benefit of their selenium-rich soil.

A person's selenium reserve, at the time of infection and thereafter, also helps to explain the variable latency period between the time of HIV infection and the appearance of AIDS. For some people, it is short, while for others it can be years-and some HIV-positive patients have never developed AIDS.

Helping patients with HIV Infection

In some countries, doctors have started treating their AIDS patients utilizing either increased amounts of supplemental selenium or the components of glutathione peroxidase - selenium, N-acetyl-Cysteine and glutamine and have seen very good results.

Increasing glutathione levels with NAC and selenium makes the immune system better able to fight viruses. Glutamine reduces depression and repairs the intestinal tract, improving digestion and reducing diarrhea.

Selenium supplements stop the virus from replicating and invading other cells to satisfy its need for selenium.

I would recommend that anyone infected with HIV, supplements with selenium capsules, N-Acetyl-Cysteine (NAC) capsules and glutamine powder to increase glutathione levels.



Some interesting case histories

These cases illustrate the usefulness of selenium

Plantar warts

One of my patients had a recurrent plantar wart in the sole of his foot.

It kept regrowing after surgery and was increasingly painful. I knew immediately that he was selenium deficient as a plantar wart is caused by a wart virus. If someone has plenty of selenium stores in their body the wart virus cannot flourish and warts do not grow or disappear. I prescribed

200mcg of selenomethionine daily and within 6 weeks the plantar wart was gone – impressive eh !



Laryngeal warts

Several years ago I received an email from a concerned grandmother who asked me for help. Her 5 year old granddaughter had undergone 4 surgeries to her larynx (vocal cords) to remove recurrent laryngeal warts. These warts were becoming larger and the doctors were looking at using strong anti-viral chemotherapy to inject into the warts on her vocal cords.

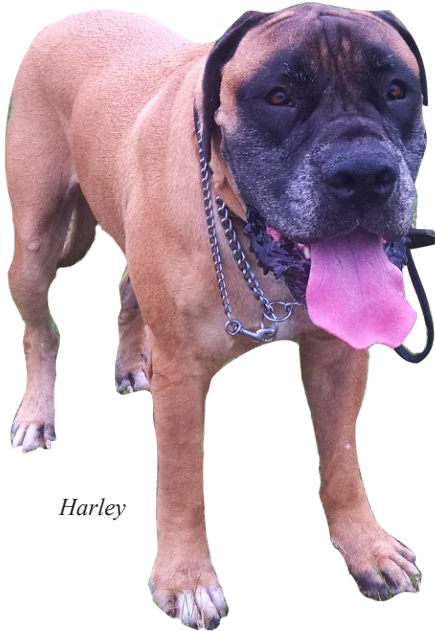
I told this desperate grandmother that her granddaughter was extremely deficient in selenium and perhaps zinc and iodine. She may have also been gluten intolerant, as this aggravates selenium deficiency and weakens cellular immunity. Her granddaughter needed substantial doses of selenium, and possibly zinc and iodine and also needed to have her vitamin D levels checked. Unfortunately I never heard from her again.

A dog with skin problems

Let me tell you a little story that happened in 2011 concerning my bull mastiff puppy Harley who was 4 months old. Well much to my horror, this perfect specimen of a puppy caught the mange from another dog. The local vet did not realize Harley had mange, as it became infected with bacteria.

Harley was then treated with antibiotics and got an allergy, which made his rash worse. I scoured the Internet with Google scholar and made the diagnosis myself – Harley had the dreaded mange!

I was away from home for 7 days and so I called a wonderful vet Dr Ian Billingham who is a holistic vet who has written a book titled Give Your Dog a Bone. Dr Billingham told me to purchase the liquid treatment for mange called Advocate. So I did this but I could not apply it to Harley until I returned home. In the meantime I called my uncle Robert who lives with Harley and I told Robert to give Harley two selenium tablets with his meal, each selenium tablet containing 100mcg of selenium. Well Robert misunderstood my directions and gave Harley two selenium tablets, three times daily with his meals, which provided a total daily dose of 600mcg of selenium. Now Harley is 4 months old and weighs 60 pounds, so that's an excessive dose of selenium.



Harley

When I finally arrived back home and Harley bounded into my arms we had a cuddle! I examined his skin and was delighted – his mange was 90% gone! When I discovered Robert's mistake and realized that Harley had been taking 600mcg of selenium daily for 7 days I understood the connection.

The stubborn rash and sores caused by the mange had been almost eliminated by the selenium, as Robert had not been giving Harley anything else that was different. What had happened is that the high dose of selenium had strengthened Harley's cellular immune system quickly and it had eradicated most of the infection. Harley was a very happy little man but just to be sure we applied the Advocate liquid.

Human Papilloma Virus

I have another patient who suffered terribly because her cellular immune system was not working efficiently. This had enabled the Human Papilloma Virus (HPV) to spread rapidly in the mucous membranes and skin (epidermal layers) of her vulva, anus, rectum and cervix. She was a young woman who desired to have a family and was anxious this chronic infection would reduce

her chances. Conventional medicine and surgery had failed as the virus kept recurring. She did not have any other health problems such as anemia, cancer or AIDS which could be causing immune incompetence.

Why was her cellular immune system so incompetent? Testing revealed the following -

- A deficiency of selenium
- A deficiency of the minerals zinc and iodine
- An inflamed gut which was not able to absorb the nutrients required for immune-competence – the most likely culprit here being gluten intolerance.

It is interesting to know that gluten intolerance can occur in many people who do not have celiac disease. See my book titled *Gluten, is it making you sick or overweight?* Without correcting the gut and liver issues of this patient, we would not achieve complete success. She would require a large dose of selenium, say 400mcg daily, until this virus was controlled.

Severe and/or chronic infections with the Human Papilloma Virus can lead to cancer of the cervix, vagina, vulva, anus, rectum, mouth and throat. Well known actress Farrah Fawcett died with this preventable cancer at a relatively young age.

Herpes Virus causes headaches

A 49-year-old lady presents with a 3-year history of a 24/7 headache in the right frontal-temporal area of her head and deep behind her eyes. This headache is severe, constant and requires daily analgesics, which have caused a fatty liver. She is overweight and extremely tired.

She has been told by a neurologist that it is a migraine, which does not make sense, as migraines are episodic headaches and come and go. Her headaches do not respond to drugs that suppress migraines and the neurologist has not been able to help her. She continues to suffer and sees a gynecologist, who tells her that she has headaches due to menopause! Strange as headaches are not a symptom of menopause, and hormone therapy does not help her headaches.

The clue is that over the previous 3 years she has had two episodes of shingles affecting her right forehead and right eye, which were treated with anti-viral medications. Notwithstanding these treatments, the constant headache remained. Other causes of her headaches were excluded including high

blood pressure, sinus infection and brain tumors, and extensive investigations had revealed no cause for her headaches.

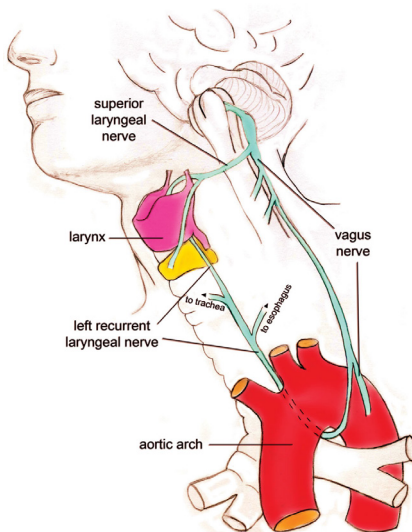
I deduce that she has the herpes virus active in her brain, trigeminal nerve and possibly her optic nerves, which is causing the inflammation and thus the pain.

I prescribe a detox for her liver and supplements of selenium to fight the herpes virus and reduce brain inflammation. Her headaches gradually lessen and she starts to have headache free days. Six months later her headaches have become infrequent.

Herpes Virus affects her voice

A 59-year-old lady presents with paralysis of her left vocal cord causing a hoarse voice and sore throat. She also had some shortness of breath and the left hemi-diaphragm muscle at the bottom of her left lung was raised, and did not move normally. The clue is that the vagus nerve supplies the muscles of the vocal cords and the diaphragm. Thus her left vagus nerve had been damaged by something – we had to discover what it was. She previously suffered with recurrent and severe cold sores on her lips and had positive antibodies against the herpes virus in her blood. I concluded that the most likely culprit was the herpes virus, which had been living in her nervous system and had targeted her left vagus nerve.

After appropriate supplements to strengthen her immune system, including a high dose of selenium, the paralyzed vocal cord and diaphragm start to recover; she is symptom free after 4 months.



The vagus nerve, shown in green, supplies the vocal chords inside the larynx, and the muscles in the diaphragm

Image: Licensed under Creative Commons

Some selected studies of selenium

Selenium reduces risk of cancer

One study involved 1,312 patients with skin cancer. Half received a placebo and the other half received 200 mcg of selenium for an average of 4.5 years. Those who took the selenium had an overall decrease in all cancers of 35 percent compared to those on the placebo. Prostate cancer decreased by 63 percent, lung cancer by 46 percent, and colorectal cancer by 58 percent. The effect was so dramatic that the blinded part of the study was ended early so those on the placebo could be told the benefits of taking selenium (JAMA 96;276:1957-1963).

Other research has found that increasing levels of selenium could cut the incidence of bladder cancer by as much as 70 percent.

It also appears that breast cancer is far more prevalent in individuals with low selenium levels and supplementation could lower those rates as well (J Surg Oncol;15:67-70) (Mol Carcinog 99;6:213-225).

A study in Arizona of 1,763 individuals found that those with lower levels of selenium were more likely to have polyps in their intestinal tract than those with higher levels of the mineral (33 percent compared to only 9 percent). Polyps are considered precursors to bowel cancer. (J Natl Cancer Inst 04;96:1669-1675).

In studies with sodium selenite (up to 300 micrograms a day), cancer patients reported a better quality of life. Side effects were not reported. Analysis of the immune system revealed beneficial changes such as stimulation of B19 lymphocytes and natural killer cells which fight cancer.

In Germany, a country with selenium deficiency, clinical studies are now carried out on the effects of selenium as "a drug" to reduce side effects of chemotherapy and radiotherapy, and enhance quality of life by reducing toxic side effects.

Studies indicate that low selenium status is strongly associated with colorectal (bowel) cancer (including extension and severity of the disease). This finding means that selenium supplementation could be important in prevention or even adjuvant therapy of colorectal cancer.

HIV and AIDS

There are a large number of studies showing selenium to be an effective adjunctive therapy against HIV infection.



Observational studies have found an association between lower selenium concentrations in people with AIDS caused by infection with the HIV (Human Immune-deficiency Virus) and an increased risk of cardiomyopathy (heart muscle disease) and death.

Some randomized clinical trials of selenium supplementation in adults with HIV have found that selenium can reduce the risk of hospitalization and prevent increases in the amount of virus in the body (HIV viral load).

Hepatitis

A Chinese study in 130,471 people over eight years showed that selenium reduced the risk of liver cancer in people with viral hepatitis. The group who received supplemental selenium had a 35.1% reduction in the incidence of primary liver cancer compared to the placebo group which did not receive selenium. When selenium supplementation was discontinued, incidences of primary liver cancer began to increase, indicating that continuous intake of supplemental selenium is essential to sustain its protective effect against liver cancer. In a sub-group of this study that evaluated 113 patients infected with the hepatitis B virus, the daily intake of 200 mcg of selenium resulted in zero rates of liver cancer, compared to 7 liver cancers in the placebo group (not receiving selenium supplements). When the selenium group stopped taking

the selenium supplement, primary liver cancer rates began to increase.

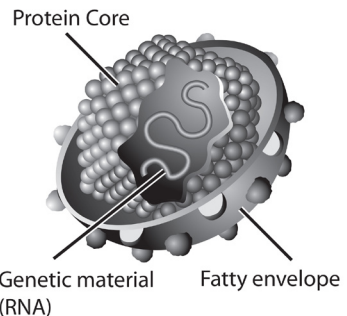
Another study examined the association between plasma selenium levels and the risk of liver cancer (hepatocellular carcinoma) among chronic carriers of hepatitis B and/or C virus in a cohort of 7,342 men. This 5.3 year study showed that those with low blood selenium levels were 47% more likely to develop primary liver cancer compared to those with higher levels of selenium.

A small case history report showed significant benefit to treating advanced hepatitis C patients with a combination of alpha lipoic acid, silymarin (milk thistle) and selenium. Here is what the physician reported regarding his clinical observations:

“The triple antioxidant combination of alpha-lipoic acid, silymarin and selenium was chosen for a conservative treatment of hepatitis C because these substances protect the liver from free radical damage, increase the levels of other fundamental antioxidants, and interfere with viral proliferation. The 3 patients presented in this paper followed the triple antioxidant program and recovered quickly and their laboratory values remarkably improved. Furthermore, liver transplantation was avoided and the patients are back at work, carrying out their normal activities, and feeling healthy.”

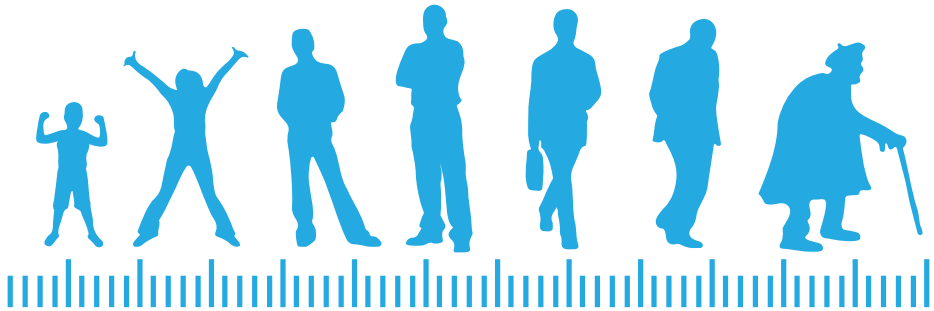
The physician noted that supplementation with these three nutrients is relatively inexpensive compared to more than \$300,000 for liver transplant surgery. He also noted that other problems with liver transplant surgery include a shortage of available livers, re-infection of the new liver with residual virus, and high mortality rates associated with the procedure including greater risks of cancer from the immune-suppressing drugs given to suppress organ rejection.

Another study involving 20,847 people showed that those supplementing with selenium showed a 70% reduction in becoming infected with the hepatitis B virus compared to surrounding populations not receiving supplemental selenium.



Hepatitis C Virus

Selenium and Longevity



Several studies have found that selenium blood levels fall as we age and those with the lowest levels experience shorter life spans. One study showed a drop of 7 percent at age 60 and 24 percent by age 75. In one study involving 1,389 patients aged 60 to 71, it was discovered that, when compared to those with the higher selenium levels, those with the lower levels have the highest likelihood of experiencing cognitive and neurological problems. (Epidemiology 07;18:52-58) (Sci Total Environ 95;170:133-139) (Med Hypotheses 97;48:355-360)

Dr Gerhard Schrauzer

An eminent researcher of selenium

Gerhard Schrauzer, PhD, MS, FACN, CNS is internationally respected for his groundbreaking research on the biomedical aspects of vitamins and essential trace elements, notably selenium, and for his work on cancer prevention. He was Professor Emeritus at the University of California, San Diego, where he served on the faculty from 1966 until his retirement in 1994. He has authored four books and more than 300 papers in peer-reviewed medical and scientific journals.

His findings show selenium is not only effective against cancer, but also against many viral diseases. Unfortunately his research has mainly been ignored by “mainstream” researchers and clinicians; however this is starting to change.

According to Dr Gerhard Schrauzer adequate levels of Selenium (Se) are necessary for the immune system and particularly the immune T-cells, to function properly.

In the most recent studies, there is compelling evidence that Se status is actually a significant predictor of outcome in HIV infection, and that the relative risk for mortality is much higher in Se deficient patients.

A striking example of potential seleno-protein genes in a virus is provided by the highly pathogenic Zaire strain of Ebola virus. Infection with Ebola is likely to place an unprecedented demand for Se on the host, potentially causing a more drastic Se depletion in a matter of days than HIV infection can accomplish in 10 years. A potential role for Se is highly consistent with key aspects of Ebola pathology, including its effects on Se-rich tissues like blood cells and liver.

Se has apparently been used with considerable success by the Chinese in the palliative treatment of viral hemorrhagic fever caused by Hantaan virus infection. In an outbreak involving 80 patients, oral sodium selenite at 2 mg (2,000mcg) per day for 9 days was used to achieve a dramatic reduction in the overall mortality rate, which fell from 38% (untreated control group) to 7% (Se treatment group), thus giving an 80% reduction in mortality. This result, obtained using Se at a dose of about 13 times the RDA as the only treatment, is all the more striking in light of the fact that, according to conventional medical science, there is no effective treatment for hemorrhagic fever (viral infections with Ebola-like symptoms). Although this did not involve Ebola virus, there are a number of different hemorrhagic fever viruses, and they may share common mechanisms. This example suggests that pharmacological doses of Se may also have some benefit in infections due to other hemorrhagic fever viruses, including Ebola.

Daily doses in the 200 to 400 mcg range are undoubtedly safe

This question of dose level naturally arouses concerns, because in the past so much has been made of the potential toxicity of Se. I believe that the danger of serious toxicity with Se supplementation has been exaggerated. The threat of serious acute toxicity with supplementation is in my opinion non-existent at doses less than 1000 mcg per day, and in several studies people in certain geographical locations have been shown to be ingesting from 600 to over 700 mcg per day for extended periods of time without evidencing any ill effects - in northern Greenland, as much as 1000 mcg per day in some individuals. Thus, daily doses in the 200 to 400 mcg range are undoubtedly safe, especially for the several months required to selenize the cells. In any case, the signs of chronic Se toxicity – namely garlic odor of breath and sweat,

metallic taste in mouth, brittle hair and fingernails are very distinctive, and easily reversed by lowering the dose.

In regard to Se and viral diseases in general, I find myself in the position of Linus Pauling in regard to the anticancer and antiviral benefits of vitamin C. I believe that there is a sufficient body of clinical and basic research data to support the conclusion that Se has not only anticancer benefits, but also chemo-protectant effects versus a broad spectrum of viral infections. Furthermore, Se may have not only be preventive, but also exert therapeutic effects in viral infections - even some infections that can be acutely lethal.

The life-saving benefits of a brief course of treatment with reasonable pharmacological doses of Se (i.e. in the milligrams per day range) has been demonstrated in at least one case.

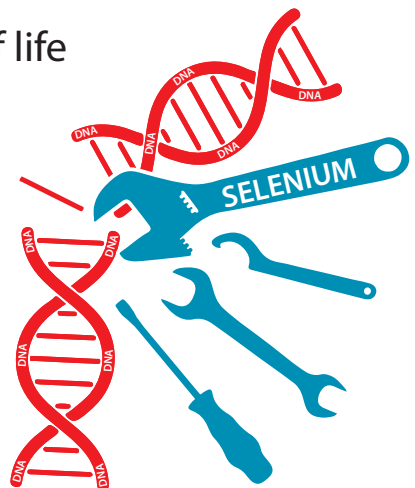
We must seriously consider evidence suggesting that there may be a global trend towards a decrease of Se in the food chain, caused by various factors, including modern agricultural practices, over population, food processing, and acid rain.

Studies have shown that Se levels in the British diet have decreased by almost 50% over the last 22 years. If dietary Se levels have decreased so drastically over 22 years in Britain, a wealthy and highly developed nation, then what is the situation in rapidly developing Third World countries? In light of the evidence showing that Se deficiency is associated with adverse outcomes in viral infections, and can foster the emergence of more virulent viral strains, any localized or global depletion of Se in the food chain could be a significant factor contributing to our increased susceptibility to emerging viral diseases.

Selenium and the protection of life

Selenium influences the genetic material in our cells in a profoundly beneficial way. It can repair damaged DNA in our genes and we can compare it to a mechanic that finds broken pieces in a machine and fixes them.

Considerable experimental evidence indicates that one possible mechanism by which selenium supplementation may exert its benefits is by enhancing the DNA damage repair response. This includes data obtained using cultured cells, animal



models as well as in human clinical studies. In these studies, selenium supplementation has been shown to be beneficial in reducing the frequency of DNA adducts and chromosome breaks, thus reducing the likelihood of bad mutations that ultimately contribute to carcinogenesis. Selenium may be protective by preventing DNA damage from occurring as well as by increasing the activity of repair enzymes such as DNA glycosylases and DNA damage repair pathways that involve p53, BRCA1 and Gadd45.

Low levels of selenium correlate with mass extinctions of life on earth

Low levels of selenium correlate with mass extinctions of life on earth.

Pioneering research from the University of Tasmania could change the way we view Charles Darwin's theory of evolution. This research was awarded one of the nation's top science prizes known as the Eureka Prize for Excellence in Interdisciplinary Research. The research team mapped changes to the ocean's chemistry by analysing pyrite in ocean bed drill cores. They found that low levels of selenium in the ocean floor corresponded with three of five mass extinctions.

Professor Ross Large and his team analysed pyrite (also known as fool's gold) in drill cores, which are sections of rock drilled from deep below the ocean floor.

Their research has shown that almost every major growth period or extinction in the Earth's history correlates with a change in the amount of the trace element selenium in the ocean.

When there are high levels of selenium, there is growth; when levels fall, there are extinctions.

The international research team has analysed around 300 drill cores from across the world, with some of the samples dating back 700 million years.

A few metres deep represent tens of thousands, up to a million years, of sedimentation according to Professor Large. These cores allow us to go back through time.

The pyrite in the rock stores trace elements, like selenium, which allowed the team to map the changes in the ocean's chemistry over time.



Photo: Pyrite in a core sample collected from the ocean bed.

Amazing Breakthrough

Palaeontologist John Long from Flinders University in Adelaide joined the research team and focused on the extinctions — he found that three of the Earth's five mass extinctions correlate with a fall in selenium.

John Long said "All mass extinctions have a bit of controversy around them, but these three in particular were not linked to a major impact event like the dinosaur extinction 65 million years ago." He continued "These three mass extinction events are put down to things like global anoxia — a lack of oxygen in the oceans causing extinctions, or cooling events, like ice age events. But none of these events or causes in themselves are total explanations for the widespread extinctions both in the oceans and on land in some instances. So, our explanation of the trace element depauperation (poor development) in the oceans is a very good example of something that covers all the bases and actually gives a better explanation for some of these events. So, we've added a new dimension where you might say that really, it's plate tectonics which controls evolution. Because, indirectly, plate tectonics controls the chemistry of the ocean, and the chemistry of the ocean has a big control on evolutionary pathways," Professor Large explained. "That's why I often say to people basically man came from the mountains. It's mountain building, and the erosion of all those nutrients into the ocean, that controlled man's evolution."

But Professor Large says Darwin's theory still stands - "It is one of the most important breakthroughs in biology and set evolution on the right path, we're just adding a little background to it, we're taking it back into a geological context. I mean, he wasn't aware of plate tectonics back in his time. But I'm sure if he had been aware of it, he would have joined the dots."

Thingvellir National Park Iceland.

The valley lies between the North American and Mid European tectonic plates.



N-Acetyl Cysteine and Selenium are the perfect couple

No discussion of selenium would be complete without mentioning one of its greatest co-workers called N-acetyl cysteine (NAC). NAC is an amino-acid derivative (small protein) with over 40 years of scientific research to back it up. NAC's powerful health benefits derive from its ability to increase intracellular levels of glutathione (GSH).

Have you heard of glutathione? If not, you need to know about it, because glutathione is the body's most powerful naturally produced internal antioxidant.

I often make the simple analogy that in the battle against free radicals, glutathione is like a warrior and selenium is its sword; without a sword, the warrior cannot fight.

Glutathione requires selenium for its production. Glutathione is the granddaddy of all antioxidants and many conditions we associate with aging and disease have been linked to lowered glutathione levels.



Studies have shown that individuals who maintain the highest levels of glutathione remain the healthiest and live the longest. The very important relationship between selenium and glutathione has just recently come to light during the last few years.

NAC is the main precursor of glutathione

NAC may be able to help those with chronic degenerative diseases, including liver disease, lung disease and impaired glucose control.

Today researchers are now realizing just how vital glutathione's actions in the body are, and how many chronic disease conditions are associated with glutathione deficiency. According to Stanford University's Dr Kondala R. Atkuri, "NAC has been used successfully to treat glutathione deficiency in a wide range of infections, genetic defects and metabolic disorders, including HIV infection and Chronic Obstructive Pulmonary Disease. Over two-thirds of 46 placebo-controlled clinical trials with orally administered NAC have indicated beneficial effects of NAC measured either as trial endpoints or as

general measures of improvement in quality of life and well-being of the patients.”

NAC has been shown to increase blood glutathione in HIV-infected patients with low levels of glutathione due to their chronically damaged immune system. NAC's ability to replenish intracellular glutathione and reduce free radical damage provides significant protection against DNA damage and thus cancer development.

NAC neutralizes toxins and pollutants including heavy metals

NAC neutralizes toxins and pollutants including heavy metals that accumulate in the liver, kidneys and fatty parts of the body. Restoring glutathione levels with NAC supplements makes liver cells more able to protect themselves from ongoing damage caused by fatty accumulation, viral infections, drug induced damage, alcohol excess or autoimmune inflammation.

Glutathione helps the liver to protect you against toxicity, and it is most needed by those with liver disease. The stress of chronic liver disease depletes glutathione and this is why supplementing with its main precursor NAC, helps those with liver disease to protect against ongoing liver damage.

Glutathione is the most powerful antioxidant produced in the human body

How can we get more glutathione in our body?

Oral glutathione supplements are available in some health food stores and pharmacies and do not require a prescription. The main problem is that glutathione is not well absorbed from the gut, as it is broken down by digestive enzymes before it has a chance to be absorbed. For this reason, it is far more effective to take its precursor (building block) NAC. NAC is the most important precursor to glutathione synthesis. NAC is easily absorbed from the gut and is rapidly turned into glutathione.

Approximately 150 milligrams daily of glutathione is obtained from the average diet, mainly from fruits and vegetables. However, the majority of glutathione is manufactured within the cells of the body, especially within

liver cells. It is interesting to know that around 80% of the glutathione produced in the liver is transported to the blood stream to be used by the kidneys for detoxification. Thus, increasing glutathione levels is good for the liver and the kidneys.

For people with severely depleted levels of glutathione in their body, we can administer glutathione intravenously.

How is NAC taken?

NAC does not require a prescription and is taken as an oral supplement in doses of 600 to 1800 mg daily. NAC is taken two to three times per day, or as recommended by your healthcare provider. NAC can be taken with or without food.

With over more than 40 years of use in a wide range of medical disorders, NAC has been proven to be safe for long-term treatment. Studies have demonstrated the safety of 1,800 mg per day for 142 days. The most commonly used doses range from 600-1,800 mg daily and clinical studies have found that doses of up to 2,000 mg/day are safe.

Cautions with NAC

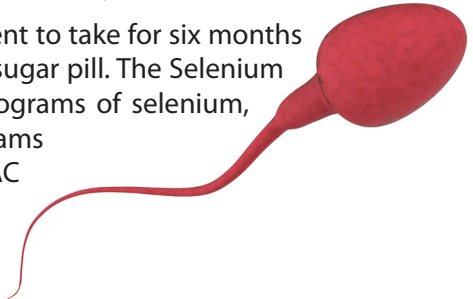
Do not use NAC if you have an organ transplant or a stomach ulcer or if you are pregnant. Before taking NAC consult with your doctor if you are using any medicine or if you are allergic to any medicines including supplements.

NAC and Selenium can help sperm and testosterone

A supplement containing high doses of selenium and N-Acetyl-Cysteine increased sperm cell production and testosterone levels. Researchers at the Shahid Beheshti University in Iran discovered this after doing a trial with nearly five hundred men. The men were experiencing lowered fertility due to having low sperm counts or poor quality sperm cells.

The men were given a daily supplement to take for six months and the placebo group were given a sugar pill. The Selenium group took a daily dose of 200 micrograms of selenium, and the NAC group took 600 milligrams of N-Acetyl-Cysteine. The Se plus NAC group took both NAC and selenium.

The supplements had a positive effect on the sperm quantity and sperm motility. The supplements also



reduced the number of subnormal sperm cells. The researchers also noticed an effect on the testosterone level. After taking the supplements for six months, the placebo group had a testosterone level of 17.4 nanomols per litre. In the Se group and the NAC group, the level had risen to 20.1 nanomols per litre, and in the Se plus NAC group it was highest at 20.9 nanomols per litre. The researchers think that the supplements may have an antioxidant effect in the testes.

J Urol. 2009 Feb;181(2):741-51.



NAC and Selenium can reduce acne

A recent study found that compared to healthy people, severe acne patients have over 20% less glutathione in their skin than average. This is not unexpected because these two nutritional agents reduce inflammation in all layers of the skin.

Autoimmune Disorders

Selenium helps to balance the immune system and reduces pro-inflammatory antibodies and chemicals. Inflammatory arthritic conditions like rheumatoid arthritis and psoriatic arthritis are associated with consistently lower levels of selenium in the blood. Selenium is a part of antioxidant and anti-inflammatory proteins. Studies have shown that along with magnesium and omega 3 fatty acids, selenium can provide significant relief to many with auto-immune arthritis (Biol Trace Element Res 96;53:51-56), Ann Rheum Dis 94;53:51-53), Semin Arthritis Rheum 97;27:180-185. Autoimmune disease affects approximately one in 20 people and is one of the most significant health problems in the USA. There are more than 80 different autoimmune diseases. Many common health problems are autoimmune, yet the average person is not aware that an underlying immune disorder is to blame.

Examples of autoimmune diseases:

- Psoriasis
- Hashimoto's thyroiditis (causes under active thyroid)
- Graves' disease (causes an over active thyroid)
- Arthritis - rheumatoid and psoriatic
- Lupus
- Crohn's disease
- Ulcerative colitis
- Multiple sclerosis
- Celiac disease
- Polymyalgia rheumatica
- Vitiligo

Dr Cabot and Margaret Jasinska have written a book about autoimmune disease that covers all these conditions plus many more.

An autoimmune disease occurs when a person's immune system launches an attack against their own cells, tissues and/or organs. This results in inflammation throughout the body, and potential damage to specific organs.

Your doctor may have told you nothing can be done to heal autoimmune disease and you'll just have to manage your symptoms with a cocktail of

medications for the rest of your life. You may have been told autoimmune disease is genetic and there's nothing you can do about it because you've got faulty genes and you'll just have to learn to live with them.

Yes, genes do play an important role in autoimmune disease but they are only one piece of the puzzle, and a small one at that. Research shows that 70 to 95 percent of the risk of developing autoimmune disease comes from your environment, not your genes.

What causes autoimmune disease?

There are a number of environmental triggers that can spark autoimmune disease in a genetically susceptible individual.

Environmental triggers include:

- Infections
- Specific foods that your body can't tolerate
- Emotional stress
- Exposure to chemicals or toxic metals
- Pregnancy and the postnatal period
- Nutrient deficiencies especially of selenium and vitamin D. These deficiencies are a strong risk factor for development of autoimmune disease.
- Leaky gut (also known as increased intestinal permeability). If your gut lining is excessively permeable, waste products and bacteria will enter your bloodstream, travel to your liver and raise the amount of inflammation in your body.

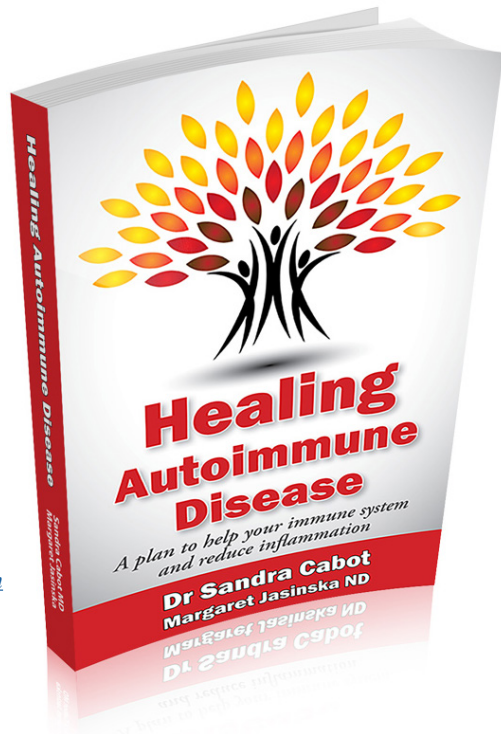


Sandra Cabot MD Margaret Jasinska ND

In their book, Dr Sandra Cabot and naturopath Margaret Jasinska give the reader a step by step plan for healing autoimmune disease, reducing inflammation, alleviating symptoms and halting autoantibody production, thereby stopping tissue destruction. This book offers a medically proven approach to assisting immune system disorders.

In the book, the reader will learn:

- The role of specific foods and supplements in reducing inflammation and healing the immune system.
- The detrimental effects of gluten on the immune system, inflammation and intestinal health of people with autoimmune disease. How gluten causes a leaky gut.
- How common nutritional deficiencies can raise the risk of developing an autoimmune disease. The importance of selenium and vitamin D.
- How leaky gut syndrome is a factor in triggering autoimmune disease.
- The role of hormones in influencing autoimmune disease.
- How vaccinations and environmental chemicals can trigger autoimmune disease in some people. The specific ingredients in vaccines that can harm the immune system.
- Which specific foods to avoid and which foods to eat more of.
- Recipes for healing autoimmune disease



Available from www.liverdoctor.com

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Published in the November 2006 journal *Apoptosis*, one trial investigated if NAC could inhibit liver cell death in acute severe liver failure. Based on an animal model, the researchers concluded that NAC shows a liver-protective role for this type of liver failure.

Published in the January 2008 journal *Liver Transplantation*, a retrospective study found that children treated with NAC for acute liver failure had a better outcome than matched controls not treated with NAC.

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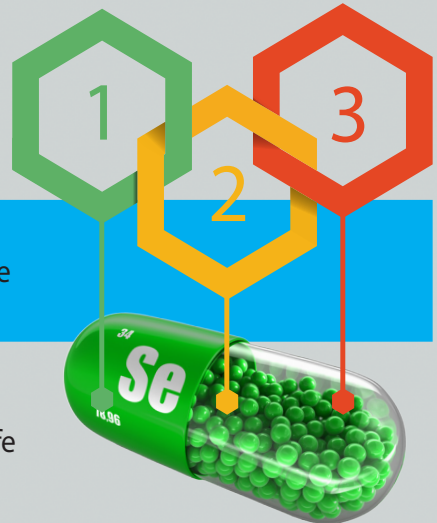
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