

A Transcription of
The Schrauzer Files
Selenium

By Dr. Gerhard Schrauzer
Interviewed by Blake Graham



The Schrauzer Files: Selenium

By Dr. Gerhard Schrauzer
Professor Emeritus of Chemistry at UC-Santa Barbara
Nominated as an Officer of the American Chemical Society
President of American Longevity's Scientific Advisory Board

Interview by Triple Diamond Blake Graham

SELENIUM

The book cover features a portrait of Dr. Schrauzer, a folder labeled "SELENIUM", and laboratory glassware.



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Dr. Schrauzer is Professor Emeritus (UCSD), a researcher, inventor, and author. He is the Director of the San Diego-based Biological Trace Element Research Institute, and the founder of the Biological Trace Element Research Journal, a scientific journal. Gerhard N. Schrauzer studied chemistry at the University of Munich, where he received his Ph.D. degree and graduated summa cum laude in 1956. He became a member of its Science Faculty in 1963. Dr. Schrauzer came to the United States in 1964, and in 1966 accepted a position as full professor at the University of California, San Diego. In addition to the accomplishments already listed, Dr. Schrauzer has been included in the Top 100 Chemists of All-Time, and is one of the most highly published and quoted scientists of our time.

Dr. G.N. Schrauzer is renowned as the world's leading expert on the trace mineral selenium. He has been the Head of the Chemistry Department at University of California, San Diego, and is an official nominator for the Nobel Prize in Medicine. Additionally, each year in Europe there is an award given for outstanding research on selenium that is named after Dr. Schrauzer – the Schrauzer Award. Dr. Schrauzer was also the lead scientist on a health petition with the FDA on the effects of selenium and cancer. Inside this interview filled with the science behind this amazing mineral, you will discover:

- Qualified Health Claims with the FDA regarding Selenium and Cancer
- Selenium's unique ability to fight free radical damage
- How levels of Selenium in the soil correspond to the occurrence of liver, breast, and lung cancer
- Is Selenium safe or could it be toxic?
- Selenium's vital role in immune health
- Selenium's supportive role in eye and dental health
- Why Selenium is a requirement for normal thyroid function
- Selenium and Cardiovascular Disease
- Selenium effect on viruses including the AIDS virus
- Selenium's critical role in liver and pancreatic health
- Selenium's helpful uses in lymphedema, inflammation, and strokes
- Are all types of Selenium the same?
- Could children and expectant mothers benefit from extra Selenium?



Blake Graham started in pre-med studying chemistry, biology, biochemistry, and even calculus and physics, but soon realized only nutrition could bring the results people were seeking. Over the last 2 decades Blake Graham has worked with some of the world's top natural healing experts, including the head of the chemistry department at a major university, one of the top 10 published scientists in the world who was one of the official nominators for the Nobel Prize in Medicine, another doctor who had successfully sued the FDA multiple times to get health regulations changed, an eye doctor who was using natural healing to reverse blindness, a PhD in biochemistry that taught chemistry to the M.D.'s, and many, many more. The world of natural

healing included diverse fields including ancient Chinese and Ayurvedic medicine, chiropractic medicine, nutrition, essential oils, naturopathic medicine, and even veterinary medicine.

*The information in this interview has not been reviewed by the FDA. The material presented here is informational, and is not intended or claims to diagnose, treat, cure, prevent, or mitigate any disease or illness.

1. About Dr. Schrauzer

Blake Graham: Hello, my name is Blake Graham and it is my pleasure to have here with us today, Dr. Gerhard Schrauzer. Dr. Schrauzer is Professor Emeritus from the University of California in San Diego where he taught for 27 years. He is a graduate with a PhD from the University of Munich. He actually graduated Suma Cum Laude and is one of the youngest PhDs ever from that university. Dr. Schrauzer is associated with many prestigious scientific and health organizations throughout the world. He is a member of the American Institute of Nutrition, the American Association of Cancer Research, the Association of Clinical Scientists, and a Fellow of the American College of Nutrition among many other accolades. He is the director of his own biological trace element research laboratory and is the founder and editor-in-chief of a magazine by the same name - *The Biological Trace Element Research Magazine*. I've seen a list of over 300 publications and I think there were 306 different publications that you have written for different journals. I don't think that's all of them, is it?

Dr. Schrauzer: That's not all of them. That's just what is written in peer reviewed journals.

Blake Graham: You're also an author and co-author of 6 different books. It's a pleasure to have you with us today, Dr. Schrauzer. Dr. Schrauzer, tell us a little bit about your background, obviously you have been interested in nutrition for a long time. Where were you born?

Dr. Schrauzer: I was born in the middle of Europe in a famous Bohemian spa which was founded in the 18th century. It was then frequented by royalty and famous people during the next century and is called Francisbad. It is about thirty miles east of another famous spa called Karlsburg, and about twenty miles north of another famous spa called Marienbad. These were wonderful centers of health, you might say, in the 19th century where thousands of people were coming. What did they do at these spas? They drank mineral water for health. This is what got me interested in trace elements at a very, very early age in my life. We had a hotel and many of our visitors wrote down in the guest book how much they were helped by taking minerals in this mineral water.

After the war I couldn't go to school. So as a young boy of 14, I joined a research institute which did nothing but study trace minerals in mineral waters and soil. This is how I got a first and very deep insight into both chemistry, trace elements, and health related aspects which remained with me all my life. Believe it or not, in my hometown was an area where you could actually see how plant derived minerals formed. When I was just 16 years old, I analyzed colloidal minerals from that source. I found later that some colloidal mineral products or plant derived minerals have very similar compositions.

2. About Selenium

Blake Graham: What are some of the unique chemical characteristics of plant derived minerals?

Dr. Schrauzer: Well, it is the combination of the elements and some of the additional substances that are present. Basically it's the sulfur compounds which are making them so very unusual and healthful, and that's why we are seeing such wonderful effects. Many people report astonishing improvements of their health. Nothing helped, for example, against a bad back. Then they drink plant derived minerals and relatively in a short time they are much better. Now medical science would frown upon such stories, and I was skeptical too myself. But I have problems with my back. Believe it or not, if I am permitted to tell this testimonial here - it helped me so fantastically that today I can carry any kind of luggage unsymmetrically with one hand or the other, and I haven't had any back problems since. And believe me, nothing else really helped before that.

We now know, through the research I have done with the plant derived minerals, why this actually is and why the minerals help. It has to do with the sulfur content and the other minerals that are present that allow the body to be able to produce chondroitin sulfate. Chondroitin sulfate is a rubber-like polymer that helps the spine to remain rigid under stress. Obviously, when you get older, you may not produce chondroitin sulfate polymers rapidly enough. As a result, you get slipped discs, and all kinds of problems with your back. So this is very briefly, the biochemical basis of some of the effects of the plant derived minerals. These are not all of the effects, but some of them are very

important. This explains what always puzzled me as to why so many people said it would help them so much with their back problems.

Blake Graham: You have mentioned the sulfur compounds. Is that what gives many plant derived minerals the astringent bitter taste?

Dr. Schrauzer: That is also true. It's that and some of the minerals present such as iron, and aluminum and so forth.

Blake Graham: Recently you have been involved in a historic movement to get the FDA, the Food and Drug Administration, in America to recognize some of the benefits of a particular trace mineral we know as Selenium.

Dr. Schrauzer: Yes, and the FDA does not allow that anyone could make a health claim about anything. You couldn't say, for example, that selenium helps against certain forms of cancer unless you could prove it. They demand sufficient scientific evidence. So, we accumulated approximately 500 scientific papers and submitted them to the FDA. We were able to get the approval for two health claims. The first one is that selenium can reduce the risk of certain forms of cancer, and the second is that selenium produces anti-cancer substances in the human organism. This is quite a significant achievement. It is purely altruistic also because other companies may use this kind of information. But, at least now we can help people recognize the value of selenium. And I think this is most important because the intake of selenium in many populations is insufficient to maximize its protective effects.

3. Selenium in the World

Blake Graham: Tell us a little bit about that, Dr. Schrauzer. Tell us about the selenium levels in the various countries that you have seen research from or have done the researching yourself.

Dr. Schrauzer: That's right. You see, selenium works on many different physiological levels. One level, for example, is an enzyme called glutathione peroxidase. That is an enzyme that prevents the accumulation of hydrogen peroxide and of lipid hydro peroxides. These are basically oxidized fatty substances in our organism. Now these substances, lipid hydro peroxides and hydrogen peroxides, have the nasty habit that they can decompose. When they decompose they then form very, very destructive oxygen radicals or so called hydroxyl radicals. These hydroxyl radicals will attack anything. They will attack proteins, and attack fats, and will attack even DNA. The latter damage is, of course, the most serious one. It's the most serious because if you get damaged DNA you get mutations and ultimately even help in the progression of a normal cell into a cancer cell. That's why people have measured glutathione peroxidase in the blood, and they determined the amount of selenium that we need on the activity of glutathione peroxidase in our plasma.

On the basis of this is derived certain recommended dietary allowances. However, we have found that this is not sufficient. Selenium affects 23, by now even 25, other selenium enzymes in the body and some of them become activated only at relatively higher dosages. So in determining the RDA for selenium, glutathione peroxidase is now recognized as not being sufficient. You have to think about other enzymes. One of these is the so-called thioredoxin reductase which sounds very chemical. In this enzyme there are certain small molecules that contain sulfur. They can be oxidized until they are reduced to small proteins. They are then called the thioredoxins.

They are very important in the transfer of electrons within the cell and within the organs. When this process doesn't work very well there is havoc in the entire organism. One enzyme, the so-called thioredoxin reductase, will catalyze the reduction of oxidized thioredoxins back into their active reduced form. And that is a selenium dependent enzyme that becomes activated only at significantly higher selenium intake than recommended now based on glutathione peroxidase alone.

Blake Graham: So you're saying that we have a lot of free radicals which are kind of like rust of our cells. It's like how iron rusts, or you see an apple that starts to turn brown. This same kind of activity can happen in our cells. One of the things that helps prevent that is the enzyme, glutathione peroxidase, that our body produces. And that this enzyme glutathione requires selenium to work. There is a certain amount of selenium that the government has recognized in most countries that we need for this one enzyme. But you're saying that because there are actually 23 to 25 different enzymes that use selenium we actually need a lot more.

Dr. Schrauzer: Well, you see these recommendations were made before some of these enzymes were actually discovered. There is a certain inertia with all these agencies that don't meet every year. They don't want to change their recommendations all the time. So now we know that there is another enzyme at least, the thioredoxin reductase, and that one is a so-called inducible enzyme. It becomes active only at higher levels of Selenium. It becomes active at levels at which glutathione peroxidase are already maximized, but thioredoxin reductase may be still low. You can increase the selenium intake and up goes the thioredoxin reductase activity.

That is why leading scientists including myself, now say we need significantly more selenium than just for glutathione peroxidase. The recommended dietary allowances are now around 50 to 55 micrograms per day but, we are actually saying the human body needs 300 to 350 micrograms per day. This is actually recognized by our governmental agencies. This is considered the maximum, safe selenium intake. So they acknowledge, yes, you can have higher dosages of selenium every day. We say 350 to be absolutely safe and conservative at the same time. This is why I am recommending based on our work on cancer, that our selenium intake should, in fact, reach that level of 300 to 350 micrograms a day.

Why do I know this? We actually collected blood from many countries. We then discovered that in populations where certain cancers like breast cancer, lung cancer, prostate cancer, and colon cancer are low they all have quite nice selenium levels in their blood. This was proportional to the selenium intakes and brought their selenium blood index in the order of 300 to 350 micrograms a day. Whereas in countries where you had just 50 to 100 micrograms a day of selenium, these types of cancer were invariably quite high.

Blake Graham: Let's talk about two of those countries in specifics. Let's talk about Australia and Japan. What are the daily intake of selenium that people get in their diets in Australia versus Japan and the corresponding cancer rates in those two countries?

Dr. Schrauzer: We actually went to Japan and got blood samples. We found that the Japanese have very nice blood selenium levels ranging between .27 and .30 micrograms per cubic centimeter. However, in Australia it is only .13 which is only about 1/3 of that. And this corresponds to selenium intakes for, let's say an average adult, of 70 kilograms, in Japan of about 300 micrograms per day. In Australia it's only about 100 micrograms per day.

Now mind you, 100 micrograms a day will not give overt signs which scientists would call selenium deficiency syndrome. We will talk about some of these later. So clinically, they may at the moment look healthy because they have enough to saturate glutathione peroxidase activity, but they don't have enough for other protective functions of selenium. That brings us into the cancer range. You see selenium protects against cancer by many different mechanisms. One is, for instance, the immune system, and the immune system requires more selenium. It requires about 200 to 300 micrograms a day. Why do I know this? I know this because I have done studies in some patients that needed artificial intravenous nutrition. They add selenium to the mixture but only about 50 micrograms which is about the RDA. These people had very low antibody production against common antigens. That is very important. When these people are given 200 micrograms extra selenium, their antibody production increased up to tenfold.

So there you have already one example that the recommended dietary allowances were limited to only one parameter in glutathione peroxidase and they totally ignored the immune system when creating the RDA. Why was that? Well because at the time all these regulations were made people were not all that interested in the immune system. But we now know much more about the immune system. We know that we have cells that destroy foreign invaders such as bacteria and viruses. These are so-called cytotoxic cells derived from the specialized white blood cells. Now these produce oxygen radicals to destroy invaders and other tumor cells, but they have to have enough selenium to do this well or else they destroy themselves. Studies have shown that when you give people additional selenium, their cytotoxic cells can destroy up to five times more tumor cells than those who just get the normal RDA of selenium.

Blake Graham: So when you say add additional selenium, how much additional are you talking about? They get some selenium in their diet and then they supplement with additional selenium?

Dr. Schrauzer: That's right and I think it is a good thing to now say we need about 200 to 300 micrograms extra. We don't really need more. And that brings us into the level of the maximum, safe intake that is recommended by the Institute of Nutrition and other agencies. So that shows you that our recommendation is ethical, and you don't have to worry about toxicity. It is well proven that this produces no unsafe levels whatsoever for the entire lifespan and doesn't adversely affect any physiological function. Of course, you will wonder how toxic selenium is, and many people still think selenium is a poison.

Historically, this is because selenium became known as a poison for the first time in the 20s. In the United States, there are some high selenium regions. When they had cattle grazing in these regions they developed diseases attributed to selenium toxicity. For example, horses would lose their hoofs, and farmers were terribly alarmed. You know, they were thinking about poisonous soil and poisonous plants. Then they found out it was selenium. The U.S. Department of Agriculture did extensive studies in these regions to find out how they were located and especially also whether they would do damage to humans. So I can say that selenium from the toxicological point of view is probably the best investigated trace element ever. But they found no evidence in these high selenium regions such as South Dakota or New Mexico, of any damage to human health. So the unfortunate image of selenium as a poison was only for animals, not for humans. But this carried on over the years. When my friend Klaus Schwartz showed in 1957 that selenium was an essential trace element, initially people threw up their arms. They said, "Oh no, selenium the poison is now suddenly needed by the human organism!" And so for awhile it was called the essential poison. We now know, that all elements are basically safe at a certain level and become toxic at a higher level. This is true even for water. Too much water can kill you and too much oxygen can kill you. So we shouldn't worry about this as long as we know the safe window and that is very well known in the case of selenium.

Blake Graham: Isn't it true that the safety issue is also affected by some balancing nutrients such as zinc and copper with selenium? Do zinc and copper added to Selenium help people achieve the right balance in their bodies with higher levels of selenium?

Dr. Schrauzer: That is right and the physiological effects of selenium also depend on how much protein you eat. If you give experimental animals a high selenium diet that will be toxic under normal conditions, you can abolish this toxicity if you also increase the protein intake of these animals. So it is a balance also between the sulfur amino acids in the food and selenium. That's why all the concerns about selenium toxicity are really unwarranted. Selenium has an excellent safety record, and practically nobody was ever seriously poisoned.

Blake Graham: You've also been a visiting professor twice in China and twice in Japan. Tell us about some of the research on selenium that has come out of those areas.

Dr. Schrauzer: Yes, I was especially interested in another selenium deficiency disease. We know the Chinese discovered Keshan Disease, which is a cardiomyopathy, and we will talk a little bit more about that. But then there is another one, the so called Cushing Beck Syndrome, in which children cease growing because the actively growing part of the bone is atrophied and stops growing. As a result, they remain dwarfs. When you visit some of the regions in Shean you still see patients sitting in corners. They are small dwarfs that have Cushing Beck Syndrome. Research showed that selenium can prevent significantly the Cushing Beck Syndrome. I went there and we did some research and found that some additional elements play a role in this disease as well. The deficiency, for example, in iodine, and boron – two elements which we know also helps bone formation - were insufficient in these patients. Then, interestingly enough, a highly neglected element, germanium, which is in some of the colloidal plant derived minerals also played a role in the Cushing Beck Syndrome. So here is an example of synergistic interaction, and that it is not selenium alone that is important. You've got to watch the other ones too, and they have to be given in the diet as well.

4. Selenium and Diseases

Blake Graham: Tell us about some of the conditions that you've seen selenium help with. I know you've talked about bleeding fevers?

Dr. Schrauzer: Yes, hemorrhagic fever is a terrible disease with an extremely high mortality - about 80% mortality. It occurs in some parts of China and has a viral origin. These people basically bleed to death. There was a Chinese doctor during an epidemic of hemorrhagic fever who decided he better do something since these people were dying. He gave these people selenium at relatively high dosages and he could actually lower the mortality from 80% in the acute phase of the disease to about 20%. It was a tremendous success. Some of this wonderful Chinese research goes completely unnoticed in the West, and this is why I actually created a special award for such research called the Klaus Schwartz Award. The doctor's name was Dr. Hou, and he was a recipient of that medal.

Teeth and Eyes

Blake Graham: You've also seen benefits of selenium with teeth and even eyesight, I've heard.

Dr. Schrauzer: That's right. We've done studies in patients and gave them selenium. Then by questionnaire 80% or so reported improvements of their vision. And you see, the eye has very high selenium concentrations. In fact, comparative studies have shown that in animals, the better an animal can see the higher its selenium content is. For instance, cats have very good eyes and the selenium content in the eye is very high. And so yes, it is very, very important for our vision.

In the case of teeth, the dentine is a sort of protein which is sulfur rich and requires selenium to be formed properly. And so selenium is one of the anti-cariogenic trace elements and prevents carious. The striking proof of this was a comparative study of the teeth of antique Greeks. They have perfect teeth, no cavities, nothing compared to modern Athenians who have shocking teeth with a lot of carious. And they showed that the antique Greeks had three times more selenium in their dentine than the present day Greeks. Why is that? It has to do with dietary changes. They eat much more sugar now and sugar was unknown as such in antiquity. There has also been an increase in grain consumption. So it was simply a more healthy diet at that time which gave them automatically more selenium. So selenium is an anti-cariogenic agent.

Thyroid

Dr. Schrauzer: Now let's go down in the body to the thyroid. Selenium is needed for the proper function of the thyroid. Why is that? We have these thyroid hormones and they are inactive forms. They are called T4 and that's the molecule that has four iodines in it -- the tyrosine amino acids. There's four iodine, and that has to be converted to T3 with only three iodines. The enzyme which does that requires selenium. So it now happens that they discovered that some people may have abnormal thyroid hormone production and they cannot produce T3. They did not know how this came about until they found that these people needed additional selenium to produce enough of that enzyme to affect this conversion from T4 to T3.

Heart

Dr. Schrauzer: Now let's go down even further. Let's go to the heart which is a very important organ. The heart cells contract rhythmically. That's the marvel and the miracle of the heart cells, and this contractile function requires selenium. So normally the heart should be rich in selenium. If you make the heart low in selenium you do have a cardiomyopathy which can be fatal.

Viruses

Dr. Schrauzer: May I tell you now a personal story which I haven't told you yet or seldom anyone? So as I told you, I was born in the center of Europe. At that time they didn't know that it was a selenium deficiency region. There was something peculiar in my youth in that I couldn't run very well. I always had trouble running. When I went to Germany and joined the university, I had to have a medical exam and got an x-ray. Suddenly, all these medics called all the physicians and said, "Look at this guy. He has a so-called athlete's heart." At that time, people called anyone with an enlarged heart an athlete's heart because they saw it often in people who exercise a lot. I didn't do much exercise, because as I told you, I couldn't run very well. I actually had the beginnings of Keshan disease, and by taking selenium my heart has normalized in size. It turns out my home town is in a low selenium region.

That brings me to what I mentioned before, the very important effect of selenium in viruses. They couldn't quite work out why some of the children in the Keshan diseases died while others did not. Then they found out that in the heart of most people are actually viruses which are normally benign. These are called Coxsackie viruses. There are

at least seven different variants of these viruses. They are what we call cardio phyllic viruses, and they will lodge specifically in the heart. They by themselves won't do you much harm, or any harm. However, If your selenium intake is low than we know that you get more oxygen radical production. Now these oxygen radicals will not only damage your heart cell, but they will also damage the virus, the Cocksackie virus. Then what was a benign non-pathogenic virus will suddenly become virulent and destroy the heart of the host.

Blake Graham: So is that why there are a lot of doctors who say when somebody has heart disease that you've got a bacteria or a virus lodged in your heart which you've picked up somewhere? It was actually there all the time, but a selenium deficiency triggered it to become active?

Dr. Schrauzer: Exactly, it triggered it, and it can also be triggered by other environmental influences. For example, they found in Germany that people who were exposed to mercury had a higher incidence of cardiomyopathy. How is that possible? Selenium will react with mercury in the body. Mercury inactivates the necessary enzymes so again we are going back to selenium here. So this is the great story of selenium and the heart. Keshan Disease is not a pure selenium deficiency but it also has to do with viruses. And that brings us now to the absolutely wonderful effect of selenium against viruses. The studies were done by Melinda Beck, an American researcher. She now has also found this is true for influenza virus. That means there are different forms of influenza virus which differ in how much damage they do. She showed that in a selenium deficiency, a mildly active influenza virus would become more virulent. So selenium is also a natural anti-viral agent and that even is true for the AIDS virus. There are now in the United States studies that show or are in the process of looking at the effects of selenium in AIDS patients.

Blake Graham: Now those studies involve much higher levels of selenium than even we've been talking about. Isn't it much beyond even the 300?

Dr. Schrauzer: No, not necessarily they are still physiological. We did research with AIDS patients years ago because I was the first one who recommended selenium supplementation to AIDS patients. This has been subsequently studied and we did this ourselves. We found symptomatic improvement of AIDS patients with selenium. For instance, the French have shown that the cardiomyopathy of AIDS patients can be alleviated by giving them selenium. And Dr. Montonye, one of the co-discoverer of the AIDS virus, actually also always recommends something else to be done against the oxygen radical production in the HIV infected subjects. The oxygen radical production increases the pathogenicity of that virus. So selenium and viruses, who would have thought that, but always you see it's again the higher dosage level that we need optimally for protection. Selenium is not just the trace element that's essential, but it also has protective functions. And for that you need more. In other words you need a little reserve.

Liver

Dr. Schrauzer: Okay, let's go down to the liver, also as we all will agree, a very important organ. The liver should be normally rich in selenium. Animal studies have shown that a healthy animal will have high levels of selenium in the liver. One of the first studies done by Klaus Schwartz was when he made experimentally low selenium diets for rats. These young rats would develop, within two weeks, a fatal liver necrosis. In other words the liver would simply die. And that actually led to the discovery of the essentiality of selenium. And it happens sometimes in humans. I once was asked to help in the case of a serious alcoholic. He had no detectable levels of selenium in his blood, and he had a very severely damaged liver. He was given large doses of selenium. He had a very, very remarkable recovery so selenium in the liver is very, very important.

Blake Graham: I've noticed with my own mother that she had a lot of liver spots. When she started supplementing with extra selenium and with the rest of the essential nutrients those liver spots on her face all faded away and started disappearing from her arms and the back of her hands as well.

Dr. Schrauzer: Yes, a very good point. What are these liver spots? They are caused by basically oxidized fat called lipofuscine which is caused by oxygen radical production. So you then give selenium, and after a while these oxygen radicals no longer produce. As a result, the spots will disappear. So the skin requires selenium, and if you add to this, the immune system, can there be any wonder that selenium is a protecting agent against certain forms of cancer? This becomes quite clear now.

Lymphedema

Blake Graham: Tell us a little bit about the Schrauzer Award. You've got a special award out now for people who do research on selenium. Tell us a little bit about what that represents and some of the studies that have come out from people that you have awarded this to.

Dr. Schrauzer: Right, well actually there is another of these stories of mine which I haven't yet told very much. I once was invited to Germany to talk to former cancer patients. It was one of those self-help organizations. I arrived there late in the evening. Before I left my hotel in Switzerland, I placed some selenium supplements in my trouser pocket and I came to this place where these women were all aggregating. It was Friday night. Suddenly the door opens and a woman comes in. She had lymphedema of the arm and it was very swollen.

Blake Graham: What is lymphedema?

Dr. Schrauzer: You see people who have had breast cancer sometimes get all the lymph nodes of the arm actually taken out. They then may develop a stagnation of lymph in their arm and their arm will swell up and become quite hard. These arms are very sensitive to infections and this is called lymphedema. Most women are being told you have to live with it. It's better than to die from breast cancer and there is nothing we can do about it. But these poor women have to watch very carefully whether their arm gets infected and oftentimes they have to wear gloves all the time to do their work. If a woman has her right hand affected with which she has to do work, she must avoid any form of injury or else she would get erysipelas infection. This infection can be very dangerous. Lymphedema is a very unpleasant condition. On this evening a woman came and had a swollen arm which was seriously inflamed. She was in pain and blisters had formed on it. She passed my table and I simply integrated all my biochemical knowledge. I reached in my pocket, and gave her the selenium. She took that selenium, 800 micrograms I still remember today, and then she was sitting at our table. We could actually within forty minutes or so see how the inflammation disappeared and how the swelling went down. Within 12 hours the total swelling of the arm was very, very significantly reduced. It had practically gone back to normal. So we were, of course, very excited. Since there were so many women there with lymphedema, we did a study with 86 of these women and could confirm that yes, it does work. This is now an accepted therapy in Europe for lymphedema

Blake Graham: Did it work on all 86?

Dr. Schrauzer: It worked on a large percentage of these patients. Of course, you have some patients who had lymphedema for many years or decades, and then it hardens so you have calcium deposits. But even there after longer dosages of selenium we could still achieve a softening of even old existing lymphedema.

Blake Graham: So it seemed to help everyone.

Dr. Schrauzer: It was certainly positive and in the meantime a large scale in clinical studies was done in some clinics. One of the key results was that selenium does prevent the infections and so they don't have to take antibiotics anymore. This is a great achievement. And for this I received a reward. That brought me the idea that selenium must have many, many functions in other diseases associated with inflammation. I first recommended to use selenium in acute pancreatitis, which is another fatal disease. If you have acute pancreatitis, you are in big trouble and selenium does significantly reduce the mortality from acute pancreatitis.

Septicemia

Then the next very fatal condition is septicemia. Medical doctors in Europe have shown that selenium reduces the mortality from septicemia, especially if accompanied by pneumonia. Now this is an achievement, because basically once you have septicemia and pneumonia you better have had written your will, my friend. But here again a significant mortality reduction was achieved.

Stroke

Dr. Schrauzer: So suddenly, all these terrible conditions became treatable. A company that produces selenium drugs decided we have to improve the knowledge of physicians in selenium and stimulate the use in acute medicine.

Therefore they said in honor of me they would nominate people for the Schrauzer Award if they came up with similar usages of selenium as I did. Last year in July, in Berlin, we actually gave away the first Schrauzer award to Dr. Savaskan who discovered another very important thing. He discovered that selenium can reduce the neurological damage subsequent to stroke. Now you know very well that stroke is a rather terrible thing to have, but even worse is the subsequent damage of the brain cells. It leads to these often-permanent effects of stroke.

Blake Graham: The paralyzation?

Dr. Schrauzer: That's right. This is caused by oxygen radical damage to the neuron and one can reduce that damage by selenium. So this is, again, another example of how selenium works. It's a true miracle element and we haven't seen the rest of it yet and many things to come. The story of selenium goes on like I have never seen with any other trace element. Usually when something like this is reported they have an initial increase of research papers and then it stops. In the case of selenium in the past 30 years, it goes on and on and on and becomes more exciting almost every week now.

Blake Graham: How much selenium were they using and what kind of dosage?

Dr. Schrauzer: In acute cases you have to use a little more and they give about 1000 micrograms - often intravenously because a seriously ill patient cannot swallow. Germany is leading in this application of selenium, I have to say.

Blake Graham: How much selenium do you personally use?

Dr. Schrauzer: Let's go back to our nutritional interest in selenium. What you have to do is always make sure that you have a healthy reserve of selenium in your body, in your liver, in your heart, and elsewhere. And therefore 300 micrograms to 400 micrograms a day is how much I have been taking now for 30 years.

5. Selenium and Other Nutrients

Blake Graham: Now there are some other nutrients that help with the effects of selenium. What are some of the synergistic nutrients?

Dr. Schrauzer: Vitamin E, for example, is a well-known synergistic nutrient. This is because you can argue that if selenium doesn't catch all the hydro peroxides you can still form some oxygen radicals. These can then be snatched by vitamin E. Vitamin E can actually reduce the requirement for selenium. You can use less selenium if you have vitamin E so there you have a synergistic affect between selenium and vitamin E. Then there are synergistic affects between selenium and iodine. There is synergism with thyroid hormones and the proper functioning of the thyroid as well as synergistic action between selenium and copper, and selenium and zinc.

Blake Graham: For best results should people be using selenium and the rest of the essential nutrients?

Dr. Schrauzer: For general maintenance just to maintain optimal health all nutrients are necessary. That's probably the best advice I can give you because giving an isolated nutrient is not right. For example, people have shown if you give too much just magnesium you get in to trouble with copper. You can induce a copper deficiency or also reduce iron. So there has to be a proper balance. For example, calcium and magnesium should be given, not just calcium. The body maintains a pretty sharp ratio between calcium and magnesium.

Blake Graham: The same thing I think is true of iron and copper.

Dr. Schrauzer: Yes, you are right. You see there are people who for some reason have iron deficiency anemia and giving them iron alone didn't seem to help. But giving them some copper suddenly improved their condition. Why is this? It's because copper is needed for proper iron utilization.

Blake Graham: Is there a difference in the form of selenium such an inorganic form versus a chelated form versus something from a plant? Is there a difference in how the body utilizes it?

Dr. Schrauzer: Yes, there is a difference and I think this is a very good question. First of all we are talking on nutrition, and what the major nutritional form of selenium is. Plants, at least as is our present knowledge, don't need selenium for growth. They basically absorb it from the soil altruistically to help animals and humans which is actually an amazing phenomenon. In other words, even in very low selenium soils you still get grass growing, but the forage crops on selenium poor soils are not healthy for the animals. This is how it was discovered that white muscle disease in lambs, for example, would erupt. This form of selenium that is in the grass is not inorganic. It's in the protein of the plant and it's in the form primarily of an amino acid called selenomethionine. So it turns out that the key nutritional form of selenium is organic in selenomethionine.

What does selenomethionine do? It is the only amino acid, and I cannot emphasize this enough, which can replace another amino acid in our body, methionine. And therefore, selenium can be stored in the organs. Our muscles which contain up to 40% of the total amount of selenium in the body, contain selenium in the form of selenomethionine. This is important because if you give selenite to animals or humans the body cannot make selenomethionine and therefore you cannot get the selenium into the muscles. And that's why it is so very, very important to have an organic form of selenium in the form of selenomethionine. And therefore, when they say chelated selenium, it is already not the same form because the body cannot make selenomethionine which is the nutritional form.

There are, however, therapeutic forms. It is not the purpose here of our discussion to talk too much about therapy. However, selenite has been used in and is being used in medicine and animal husbandry as a rapid form of selenium that is infused or given to prevent conditions. So yes, you can use sodium selenite for therapy if you need rapid effects like I used for the lymphedema. If somebody has an inflamed condition you cannot give a nutrient and expect rapid results because it first has to be metabolized. You have to do something else when you give selenite. But for nutritional supplementation as we understand it, selenomethionine is the form of selenium that should be given. That was correctly recognized by the people who did a large scale cancer prevention study - Larry Clark. They gave selenium in the form of selenomethionine as it is found in yeast. And in this regard, the study was very important because it was a nutritional cancer prevention study. And so one should always check the label. Is it in the form of selenomethionine? If yes, then it is the nutritional form.

Blake Graham: If somebody is taking selenium supplements, you mentioned that they first have to be metabolized. Would taking enzymes help?

Dr. Schrauzer: Yes, in fact vitamin B6 will help. Enzymes dependent on vitamin B6 will help to metabolize selenomethionine into the biologically active form.

Blake Graham: You mentioned that we store a large part of our selenium - 40% in our muscles. I have heard people that use selenium before they work out and after they work out don't have as many sore muscles afterwards.

Dr. Schrauzer: When I see some of these joggers and when I see how they massage their leg muscles I always have to snicker. I told you I have been taking selenium now for many years. Muscle pain was something I experienced after exercise. Ever since I took selenium, I don't even know what muscle pain or muscle stiffness is.

Blake Graham: Are there other nutrients that help with that as well? I've heard about calcium and its relationship to muscle cramps and leg cramps.

Dr. Schrauzer: Yes, that is true. Calcium and magnesium help as well and they are also very important.

Blake Graham: In talking about nutrition a lot of people have encouraged us to take mega doses of a single nutrient. But in your experience, even experience with the world renowned Dr. Linus Pauling, have you found it much better to take a broad spectrum of nutrition and sometimes taking mega doses of one can throw off your balances in other nutrients?

Dr. Schrauzer: Exactly, and this is especially true for vitamin C which is now one of the most popular vitamins ever. Many people take, in my opinion, too much vitamin C. If you take high doses of vitamin C, it causes a loss of copper which can lead to you developing an aneurism which can be fatal. And so this is one reason why I am against mega dosing vitamin C. Another reason is when you take large doses of vitamin C the body learns to adapt to this situation and excretes more rapidly. If you then stop, the body will continue to deplete the organs of vitamin C and you can get to very dangerously low levels. This is the so called rebound affect.

And lastly, I am against vitamin C over dosage because of a study we actually did in San Diego. Vitamin C is a reducing agent which means it uses up oxygen. You need oxygen. There were studies before World War II where they tested fighter pilots and these fighter pilots didn't have any pressurized cabins. They noticed that if they took some vitamin C their high-altitude resistance would improve. But if they took too much of it, it would get much worse. And this was repeated and they showed that guinea pigs given too much vitamin C had very low high altitude simulated oxygen depletion resistance. We repeated this with American fighter pilots in San Diego at the Naval Air Base. We could show that those who had the worst high-altitude resistance was after dosage of high doses of vitamin C. So this is another reason why I don't do this.

Blake Graham: You talked with Dr. Linus Pauling about that. Did you see any of those affects in him personally?

Dr. Schrauzer: Yes, I knew Dr. Linus Pauling very well and like so many who take high doses of vitamin C it causes your skin to become very pale. This is because it interferes with the melanin production which requires a copper dependent enzyme. We cannot recommend high doses of vitamin C.

Blake Graham: Dr. Schrauzer, just to conclude this message, we've heard a lot of the research that you've shared with us that you've come across. Why isn't the public aware of this and why don't more doctors publish these findings and the medical community make a bigger deal about it?

Dr. Schrauzer: Yes, well this is a very difficult question to answer. Why is that? It takes surprisingly long before a message sinks into the medical community. Take cardiomyopathy, for example. Usually doctors see patients much too late, or in other words, when they are already dying of cardiomyopathy. Then they have to do all kinds of things including surgery or whatever. Therefore they are not really interested in nutrition. They say why should I consider nutrition? These patients are dying, and I have to do surgery. So when you ask doctors why they don't give selenium, it's because they never see patients before they develop the cardiomyopathy. It may take years for the cardiomyopathy to develop. And I think this is the real issue at the core of this situation. Medical doctors see everybody far too late. Chronic diseases require many years before they actually manifest and this is where nutrition comes in. This is where I think the recommendation of taking selenium and other minerals become so important because we have to tell healthy people to supplement before any sign of disease is noticeable. Take your selenium, take you minerals, take them now, and you will not ever land in the heart clinic with cardiomyopathy. So we use all the protective properties of minerals in time as they have done in veterinary medicine already for years.

Blake Graham: Part of our message today is not only for people to supplement with selenium, but to help us take this message to other people as well because the medical community is not doing it.

Dr. Schrauzer: Absolutely. It's like talking to the wrong agency. You're talking to the water agency about your gas stove. They will say, "You're a nice guy, we like you, but we have nothing to do with gas stoves." And the same thing I believe ultimately happens if you go to a practicing doctor and ask what you can do about cardiomyopathy. What can he tell you? He is not a nutritionist, and he has his hands full with acute cases. He will say, "I don't know, or don't do anything". And this is where we come in. We can say no, no, no! With good nutrition and mineral supplementation, you will never get these conditions.

6. Conclusion

Blake Graham: Do you have any last experiences that you would like to share with us?

Dr. Schrauzer: Well, I already mentioned that muscular pain has completely disappeared, and I never have it anymore. But maybe I should throw this one in. I was a little near-sighted in my 30s, and I often had to sit in the front row during lectures so I could see to read the slides. And I was afraid because in California we have to take drivers license examinations every three years. They test your eyes and they would have said I needed glasses. When I took selenium suddenly my eyesight improved so much that all these problems disappeared and they remain so today. I don't need glasses. I subsequently have talked to many people who take selenium and many of them say the same thing that their eyesight improved. There are studies with the lymphedema patients that show the same thing.

Blake Graham: What about mood?

Dr. Schrauzer: Yes, that is also important because the brain needs selenium. In fact, selenomethionine specifically goes into the brain. This is a very important fact and I'm glad you brought that up because studies have shown if you put humans on a low selenium diet they become depressed. And if you give them selenium their mood stabilizes and the depression is gone. So it is absolutely essential for brain function and it helps you with mood. We've seen that in our studies with HIV infected patients. They reported no longer being depressed.

Blake Graham: What about for children? Is selenium important for children?

Dr. Schrauzer: This is one of my great concerns because in the first four or five months in the life of babies, their blood selenium levels go down often to very, very low levels. They almost reach acute deficiency levels and then increase slowly. This is true for European or you could say western and Australian children. Interestingly enough, it's not true for Japanese children. Their selenium levels are high to begin with and never show that initial decline. So from this I judge that indeed our selenium supply is dangerously low because children should never go through a period where their selenium level in the blood is very low. It should always be high to begin with so that they can really utilize the protective functions of selenium through every period in their life.

Blake Graham: Is that one of the reasons you see a lot of ear infections in small children?

Dr. Schrauzer: It's well known that the immune system has not yet matured and all that sort of thing. But we know, my friend, without selenium your immune system does not work. Selenium is required for all functions of the immune system. I cannot emphasize this enough. Unfortunately in pediatric nutrition, selenium is, in my opinion, grossly underestimated and neglected.

Blake Graham: So if an adult is taking 300 to 400 micrograms a day, how much would you have an infant take?

Dr. Schrauzer: In infants there are some recommendations that 20 micrograms a day is probably okay. I would however say that if it is the nutritional form of selenium, first of all, there's not much danger of toxicity anyway. So 20 to 50 micrograms for children per day would be perfect. And then especially I think of teenagers and what they need. They grow rapidly, and they are like adults. Don't forget our weight has increased over the last three decades. Many of our discussions are dealing with average weight, yet the RDAs are not really specifying the weight of the subject. Mohammed Ali and Michael Jackson have the same selenium requirement? That's ridiculous. A heavy man must need more selenium.

Blake Graham: What about expectant mothers?

Dr. Schrauzer: Absolutely essential and again veterinary medicine has shown this to be true. Selenium is the key element guaranteeing the healthy birthing of calves, for example. It also reduces the incidents of placental retention which is a very unpleasant thing to happen. It's very costly because these animals must be treated. Placental retention also occurs in humans, and you can prevent it with selenium. So women in pregnancy require selenium. It's the same dose of about 200 to 300 micrograms a day. It's very, very important for pregnant women.

Blake Graham: Thank you very much for your time today, Dr. Schrauzer. We look forward to hearing from you again.

Dr. Schrauzer: Thank you.

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