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# **Fish Oil: The Best Source and Optimal Dosing of this Anti-inflammatory Nutrient** *By Douglas MacKay, ND*

*Source: Vitamin Research Products*

When recommending fish oil to my geriatric and baby boomer patients the most common response I get is, "My grandmother used to make me take cod liver oil from a spoon." As it turns out, grandma was right.

Because of their health-promoting abilities, omega-3 fatty acids have received recognition from some of the top medical organizations in the world including, the American Heart Association, American Diabetes Association, World Health Organization, United Kingdom Scientific Advisory Committee on Nutrition, European Society for Cardiology, and The British Nutrition Foundation.

## **Fish Oil and Health**

The health benefits of fish oil boil down to a few simple concepts.

First and foremost, EPA and DHA are absolutely essential for proper cellular health. EPA and DHA are required constituents of ALL cell membranes from our head to our toes and inside out. As constituents of cell membranes EPA and DHA are determinants of cell receptor action, hormone binding, cell fluidity, signal transduction, ion channel function, and membrane-bound enzyme activity.<sup>1</sup>

Let's pause for a second to ponder the significance of these actions.

There are literally thousands of prescription drugs designed to modify one or more of the cellular functions mentioned above. In regards to fish oil, we are talking about one single non-toxic health promoting substance that can influence ALL of these actions.

The second major benefit of EPA and DHA is related to their function as precursors to eicosanoids. In my years of providing technical support for nutritional supplement companies and talking with doctors about eicosanoid production I have come to the conclusion that few doctors really appreciate the power and complexity of the eicosanoid cascade.

Eicosanoids are short lived, potent, hormone-like molecules that act as messengers and mediators of the immune/inflammatory response. There is a wide variety of eicosanoids produced during an immune response each with a different action and intensity.

Every cell in the body is surrounded by a cell membrane, which consists of a lipid bilayer and embedded proteins and glycoproteins. The lipid bilayer is made-up of individual fatty acids arranged in such a manner to create a semi-permeable barrier that protects a cell from its surroundings. Fatty acids within the cell membrane not only provide a protective envelope, but also serve as a reservoir of individual fatty acids for making eicosanoids.

When the immune system is triggered into action, phospholipase A2 releases individual fatty acids from the cell membrane. While in the extra-cellular space these fatty acids are taken up by enzymes such as cyclooxygenase (COX) and lipoxygenase (LOX) and converted into eicosanoids.

The predominant fatty acids consumed via the Standard American Diet are the omega-6 linoleic acid and arachidonic acid. Americans consume excess linoleic acid by eating a variety of vegetable oils including corn, soy, safflower, and sunflower that are ubiquitous in our food

supply. Arachidonic acid comes mainly from animal products such as meat and eggs. All dietary fatty acids, including omega-3 and omega-6 fatty acids, are incorporated into cell membranes. When the immune system is stimulated by allergens, injury, or infection fatty acids are released from cell membranes. Omega-6 fatty acids are converted into eicosanoids by the same enzymes (COX and LOX) that act on omega-3 fatty acids. Omega-6 and omega-3 fatty acids are actually in competition for binding sites on the COX and LOX enzymes. The critical difference is that the corresponding eicosanoids synthesized from omega-6 fatty acids drive a very aggressive and potent inflammatory response.

On the flip side when omega-3 fatty acids are converted into corresponding eicosanoids, these eicosanoids direct an anti-inflammatory response. Studies have shown that EPA blocks the release of arachidonic acid from cell membranes and reduces the production of prostaglandin E<sub>2</sub>, a very potent inflammatory and platelet aggregatory eicosanoid.<sup>2</sup>

The relative amount of omega-6 to omega-3 fatty acids found within cell membranes will determine the body's inflammatory status. Excess omega-6 consumption results in a high omega-6:omega-3 ratio in cell membranes. When the immune system is challenged by allergy or infection, predominantly omega-6 eicosanoids are formed. This results in an aggressive and sustained inflammatory response. When optimal omega-6:omega-3 ratio (2:1) is maintained, a balanced immune/inflammatory response occurs.

In my years of following fish oil research I have often wondered why only EPA gets recognition for having anti-inflammatory activity. What about DHA? EPA and DHA are molecularly similar. They both reside in the cell membrane, and both are released from the cell membrane by phospholipase A<sub>2</sub>. I have always been suspicious that DHA may play a role in the inflammatory/immune response as well.

Conventional wisdom up to this point has told us that DHA functions only as a structural component of cell membranes. It helps with cell membrane fluidity and signal transduction. DHA has a clinical reputation for treating conditions involving the eyes, brain, and nervous system where DHA is found in higher concentrations within those cell membranes.

My intuition was correct. Recently researchers have discovered that DHA is also a substrate for COX-2. A newer class of compounds, known as resolvins, docosatrienes, and neuroprotectins has been identified in healing inflammatory tissue. It has been determined that these compounds are generated from EPA and DHA and possess anti-inflammatory, protective, and immunoregulatory properties.<sup>3</sup> As more data becomes available we may discover that DHA is a partner to EPA in dampening inflammation and neutrophil mediated injury.<sup>4</sup>

### **Proper Dosage**

When speaking to doctors about the benefits of omega-3 fatty acids the most common question I receive is, "What is the dose?" In my earlier days I would comb through Medline and investigate published studies, looking for information on the particular condition in question, and try to figure out the correct dose.

Anyone who has tried these same steps knows the number of published articles pertaining to fish oil is currently in the thousands with a wide range of doses being investigated. To add to the confusion institutions such as the American Heart Association heed caution with doses higher than three grams per day while influential physicians such as Barry Sears recommend mega-doses in the 10 gram and higher range.

A further complication to the dosing question is that not all fish oil provides the same amount of EPA and DHA. There is cod liver oil, fish body oil, and fish oil concentrates with a broad range of EPA and DHA. Some doctors recommend fish oil in grams and forget to specify if they are

referring to grams of total oil or grams of elemental EPA + DHA (total milligrams of EPA and DHA combined). As you can see the dosing question is as murky as the ocean waters. Recently, I was lucky enough to hear a presentation by Dr. Alex Richardson who shed some light into these murky waters. In her presentation Dr. Richardson made a profound, yet simple, correlation between the optimal dose of omega-3 and its direct correlation to the background intake of omega-6. It finally all made sense to me—clinical benefits, cell membrane function, and the inflammation/immune connection are all based on getting the correct balance of omega-6:omega-3 within the cell membrane.

We need omega-6 fatty acids. In and of themselves, they are not villains. The key is in the relative amounts of omega-6:omega-3. We have all heard how the Paleolithic diet was closer to a 2:1 omega-6:omega-3 ratio while our modern diet is closer to a 20:1. The high omega-6 ratio drives excess inflammation, which is possibly the single biggest underlying cause of chronic diseases such as heart disease, diabetes, metabolic syndrome, autoimmune diseases, and cancer. As physicians we discuss the notion of “balancing our fatty acid intake” but Dr. Richardson took it one step further. She did a thorough analysis of the amount of omega-6 fatty acids consumed by different cultures throughout the world and estimates the amount of omega-3 fatty acids necessary to achieve a target ratio of omega-6:omega-3 (approximately 2.5:1 omega-6:omega-3). Amongst the cultures she analyzed she found the intake of omega-3 fatty acids necessary to achieve a protective tissue level varied more than 10-fold. (Figure 1)

	LA (en%: percentage of daily food energy)	AA (en%: percentage of daily food energy)	omega-3 to achieve 1:1 omega-6:omega-3
Philippines	0.80	0.06	133 mg/d
Iceland	2.48	0.10	689 mg/d
UK	3.91	0.07	867 mg/d
Australia	4.71	0.07	1,133 mg/d
Italy	5.40	0.06	1,244 mg/d
Germany	5.57	0.06	1,267 mg/d
USA	8.91	0.08	2,178 mg/d

**Fig. 1** – Omega-3 requirements vary based on background omega -6 intake.

This information has helped to shape my dosing recommendations tremendously. In patients that I would like to mega-dose for any significant period of time I prefer to start with a blood spot fatty acid analysis to objectively determine the amount of omega-3 necessary to achieve tissue balance.

In patients that I do not blood spot test, I use Dr. Richardson’s estimates. Based on the average consumption of omega-6 oils in the American diet, she has shown that it takes approximately 2 grams of elemental EPA + DHA daily to achieve a protective balance.

Remember, a 2-gram per day recommendation does not simply mean take two 1,000 mg capsules. We are talking about 2 grams of elemental EPA + DHA, which can range from around 3 to 9 capsules depending on the concentration of EPA and DHA in the capsule. (Figure 2)

1 cap: total oil = 1,000 mg	EPA	DHA	EPA + DHA per capsule	# of caps needed
cod liver	90 mg	140 mg	230 mg	2,070 mg <u>9 caps</u>
fish body	180 mg	120 mg	300 mg	2,100 mg <u>7 caps</u>
concentrate	350 mg	250 mg	600 mg	2,400 mg <u>4 caps</u>

Fig. 2 – To prescribe 2 gm/day elemental EPA + DHA.

In my practice the most common fish oil recommendation I make is Nordic Naturals EPA Capsules, 4 per day, with a simultaneous reduction of dietary soy, corn, safflower, and sunflower oils.

### Rancid Fish Oil: More Harm Than Good?

Recently I was taking the history of a new patient who is a pharmacist. When reviewing his supplements, I learned that he was taking a commodity grade fish oil purchased at a discount grocery store. I encouraged him to do a taste test and chew a Nordic Naturals EPA capsule, then chew one of his commodity grade capsules.

To no great surprise the EPA Capsules tasted great and the commodity oil had the characteristic rank taste and smell of a bad fish oil product. The surprise was that the pharmacist's response was, "This fish oil is very inexpensive and fish oil is fish oil—right?" My response: "WRONG!" Any oil exposed to light, heat, or oxygen is subject to free radical attack and oxidative damage. Fish oil is made up of many long chain polyunsaturated fatty acids (PUFAs), which have many double bonds in the chain. Everywhere there is a double bond there is good opportunity for free radical attack.

Recently researchers have discovered that free radical catalyzed peroxidation of omega-3 fatty acids leads to the formation of a family of compounds that may be harmful to the body. For instance, free radical damage to DHA leads to the formation of neuroprostanes. Neuroprostanes are currently being investigated as markers for oxidative stress in the brain that may contribute to neurodegenerative diseases such as Alzheimer's and Parkinson's.<sup>5</sup> Rancid oil will simply add to the body's oxidative stress load and expose it to molecules such as neuroprostanes. The best fish oil manufacturers test their oil for freshness by analyzing it for peroxide value, anisidine value, and totox value. These measurements give a good indication of how much free radical damage has occurred in the oil. In addition, if fish oil smells or tastes rank, it should be thrown out.

### Omega-3 Fatty Acids: The Best Sources

Fish oil is unequivocally the best source for omega-3 fatty acids. Some purists still recommend eating fish to achieve optimal omega-3 levels. Unfortunately contamination of our oceans has made reaching optimal omega-3 levels via eating fish a potential health hazard. Both the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) have sounded

the alarm regarding the potential dangers of consuming too-much fish because of the associated toxins.<sup>6</sup> In addition, studies have compared levels of mercury and organochlorines in fish versus fish oil supplements and concluded fish oil provide the benefits of omega-3 fatty acids without the risk of toxicity.<sup>7-8</sup>

Because there are no fish oil quality standards in the United States, individuals must determine what standards a manufacturer is voluntarily following—if any—to ensure the fish oil is without contamination. The highest standards in the industry today are the Norwegian Medicinal Standard (NMS) and the European Pharmacopoeia Standard (EPS). By following these standards a manufacturer can guarantee quality products by setting maximum allowances on peroxides, heavy metals, dioxins, furans, and PCBs.

During new patient visits I am dismayed to find patients still take flax oil as a source of essential omega-3 fatty acids. Flax and flax oil can be a part of a healthy diet, but it is not an adequate source of the omega-3 fatty acids EPA and DHA.

Flax oil is an excellent source of the long chain omega-3 fatty acid known as alpha-linolenic acid (ALA). This 18-carbon fatty acid is a precursor to EPA (a 20 carbon omega-3 fatty acid) and DHA (a 22-carbon omega-3 fatty acid). ALA is not associated with the many health benefits attributed to EPA and DHA. To get EPA and DHA from consuming ALA requires several metabolic steps (elongation and desaturation) that are governed by two important enzymes known as delta-6 desaturase (D6D) and delta-5 desaturase (D5D).

Metabolic studies have shown that the enzymatic activity of D6D and D5D are impaired by intake of saturated and trans fatty acids, alcohol, stress-hormones, smoking, viral infections, ionizing radiation, and aging. It is hard to find a patient without these obstacles to converting ALA to EPA and/or DHA.

In general, the exact rate of conversion of ALA to EPA and DHA is a matter of debate. A thorough review of the literature reveals a range of estimated conversions of ALA to EPA with a maximum being around 15 percent and a minimum of 2-3 percent. The estimates are even less promising for conversion to DHA.

Therefore, in conditions that have been shown to be supported by EPA and/or DHA, pre-formed EPA and DHA from fish oil is the most effective means to nourish the body with these essential fatty acids.

### **Why I Use Nordic Naturals Fish Oils**

In my practice I use Nordic Naturals exclusively for several reasons. All of Nordic Naturals products taste great. Taste is directly correlated to freshness and lack of oxidative damage to the oil. Using great tasting fish oil that does not repeat on my patients results in good patient compliance leading to clinical results.

Nordic Naturals takes several steps during the manufacturing process to eliminate free radical damage. The owners of Nordic Naturals are Norwegian and have developed relationships with independent fishermen that use smaller boats rather than larger trawling vessels that spend a longer time at sea. This means there is less time between the catch and the initiation of the oil extraction, which is done in a low heat, nitrogen-rich environment. Third party analysis of

Nordic Naturals oils has resulted in anisidine values between 1 and 2, five to 10 times below the industry average.

Nordic Naturals also adheres to Norwegian Medicinal Standard (NMS) and the European Pharmacopoeia Standard (EPS) and consistently are well below allowable amounts of peroxides, heavy metals, dioxins, furans, and PCBs. Another reassuring fact is that leading research institutions around the world choose Nordic Naturals oils for their clinical trials.

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# Fish Oil and Fighting Cancer

By Yu Shao

Source: <http://www.cpmmedical.net/articles/fish-oil-and-fighting-cancer>

**Cancer:** The word itself causes a strong reaction in most of us. It evokes images of a slow, painful death. Each year over 1.3 million Americans are diagnosed with cancer. Every minute one person dies from this disease. Traditional medicine offers us surgery, chemotherapy, and/or radiation as treatments. But these painful, toxic and sometimes even cancer-causing treatments only offer a less than 33% cure rate. Are there any ways we can prevent and fight cancer? Statistical data shows us that about 60% of women's cancers and 40% of men's cancers are related to nutritional factors. At least 40% of cancer patients die from malnutrition, not from the cancer itself. Based on numerous scientific studies, cancer researchers around the world have begun to believe that certain natural nutrients can prevent and sometimes cure cancer. This gives new hope for those suffering from cancer.

**History of The Magic Fish Oil** Interest in the potential benefits of fish oils emerged from the observation that cardiovascular diseases and cancer incidence rates are generally low in the Eskimos of Alaska and Greenland. (1, 2) These populations eat a diet high in fish fat and low in carbohydrates. This is in contrast to the diets of North American and other western populations who also consume a high fat diet but mostly from animal and vegetable oils. **Animal fats contain saturated fatty acids.** Vegetable oils, like corn oil and safflower oil, contain high levels of polyunsaturated fatty acids of omega-6 type. Because a high intake of animal fat is related to an increased risk of heart disease, and intake of polyunsaturated fatty acids (such as corn oil) can lower cholesterol levels (believed to be beneficial to heart disease prevention), Americans tend to consume more vegetable oil than animal fats. Researchers found that fish oil can significantly inhibit cholesterol production. The beneficial effects of fish oils come from their unique composition of high levels of the omega-3 polyunsaturated fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Additionally, these omega-3 polyunsaturated fatty acids can increase the HDL (so-called good cholesterol) levels. Fish oil also provides anti-inflammatory and anti-aggregatory effects which play a crucial role in the formation of atherosclerosis and thrombosis. Due to these findings, it is believed that both healthy people and heart disease patients can benefit from fish oil supplementation.

**Fish Oil And Cancer** One exciting aspect of fish oil is its significant inhibitory effects against various human cancers in animal models, including breast cancer, colon cancer, skin cancer, pancreatic cancer, prostatic cancer, lung cancer, larynx cancer, etc. (3-8) Unlike fish oil--which is high in omega-3 polyunsaturated fatty acids--fats that are high in omega-6 polyunsaturated fatty acids (like corn oil) can increase tumor growth. Using a chemical carcinogen-induced cancer model, researchers found that a high intake of fish oil significantly lowered the cancer incidence in animal studies as compared to animals fed either low-fat diets or high corn oil diets. (9) By implanting human tumors into immune-deficient mice, researchers have found that a high fish oil diet can slow tumor growth. (9) These results suggest that fish oil can be used for both prevention and treatment of cancer.

**Proposed Mechanisms For Fish Oils Tumor Growth-Slowing Effects** Although there is no clear mechanism to explain fish oils

significant anti-cancer effects, researchers have uncovered several potential models of action: 1. Alteration of cell membrane composition. After ingestion, fish oil is easily incorporated into cell membranes (especially tumor cells), which changes the cell membrane composition. This alteration will change the cells response to growth factor, hormones, antibodies, etc. 2. Inhibition of prostaglandin production. Prostaglandin can stimulate tumor cell growth. Fish oil can inhibit the enzyme responsible for prostaglandin synthesis called prostaglandin synthase. After a high intake of fish oil, prostaglandin (especially in the tumor cells) is decreased significantly, which in turn, slows tumor growth. 3. Immune system stimulation. 4. Hormone profile changes, which may provide important benefits for hormone -related cancers like breast cancer. 5. Tumor cell toxicity, probably by causing lipid peroxidation in the tumor cells. **Fish Oil And Metastasis** One of the big concerns in cancer treatment is metastasis, the process by which tumor cells spread from the primary location to distant parts of the body. Metastasis is increased by a high intake of omega-6 fatty acids (i.e., corn oil), but is inhibited by fish oil. Using an immune-deficient mouse implanted with human breast cancer, researchers found that feeding a high fish oil diet (23%) to the mice significantly reduced human breast cancer cell metastasis to the regional lymph nodes and lungs. (10) This indicates the significant beneficial effects of fish oil supplementation in cancer treatment. **Fish Oil And Cachexia** Over 40% of cancer patients died from cachexia, not from cancer itself. Cachexia is the malnutrition and wasting away caused by cancer. Cachectic patients are characterized by extreme weakness and emaciation. If we can overcome this cancer-induced malnutrition, we can potentially save or prolong the life of over 40% of cancer patients. Researchers in England found that fish oil could significantly prevent cachexia in an experimental model. Feeding the animals a high fish oil diet (compared to either a low-fat diet or a high corn oil diet), significantly decreased the loss of body weight caused by cachexia, and at the same time, muscle mass was significantly increased. Additionally, fish oil showed a dramatic anti-cancer effect which was as effective as some chemotherapy drugs. The researchers concluded that fish oil could significantly prevent the cachexia caused by cancer, and at the same time, provide potent anti-cancer action. (11) **Fish Oil And Chemotherapy** Researchers at Allie M. Lee Cancer Research Laboratory at the University of Nevada, Reno first declared that fish oil supplementation may be of benefit in cancer chemotherapy. By using a human breast cancer model, they found that feeding the animals a high fish oil diet both slowed the tumor growth and increased the tumor responsiveness to chemotherapy drugs by altering the drug activating systems. They also found that a high fish oil diet can significantly protect the host animals against the toxicity of chemotherapy drugs. The researchers concluded that fish oil supplementation will provide a three-pronged attack on cancer: 1. A strong anti-cancer effect. 2. Protection from chemotherapeutic drug toxicity. 3. Cachexia prevention. (12,13)

**Summary** As a dietary supplement, fish oil shows significant benefits in cancer prevention and treatment. Due to the high incidence of cancers and the relatively low levels of fish oil intake in North America, it is likely that most people can benefit from fish oil supplementation.

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# Important Cod Liver Oil Update

Posted By [Dr. Mercola](#) | December 23 2008 | 416,645 views

For years, I have recommended cod liver oil as a dietary supplement to support healthy vitamin D levels. However, based on more recent findings, I am updating my recommendations regarding cod liver oil, as it may not serve you as well as previously believed.

My previous recommendation was based on the fact that cod liver oil contains vitamins D and A in addition to healthy omega-3 fats. These vitamins are essential for most everyone who cannot get regular sun exposure year-round.

But more recent research has discovered that the ratios of these two vitamins may be of paramount importance in order to extract optimal health benefits, and unfortunately, modern cod liver oil does not supply these vitamins in healthy ratios to each other.

## What You Need to Know About Vitamins A and D in Cod Liver Oil

At least 2,000 genes, or nearly 10% of your genes, have been identified that are directly influenced by vitamin D, which in turn impact a wide variety of health issues, from preventing the common cold and flu to inhibiting at least 16 different types of cancer. There's even evidence linking vitamin D to the process of brain detoxification of heavy metals such as mercury.

Widespread vitamin D deficiency has also been strongly linked to the childhood epidemics of autism, asthma, and diabetes, both type 1 and 2.

Vitamin A, which is essential for your immune system just like vitamin D, is also a precursor to active hormones that regulate the expression of your genes, and they work in tandem.

For example, there is evidence that without vitamin D, [vitamin A can be ineffective or even toxic](#). But if you're deficient in vitamin A, vitamin D cannot function properly either.

There are many problems with modern cod liver oil but one of the primary ones is that there is no standard definition of what constitutes cod liver oil. Manufacturers are free to add or subtract as much vitamin A or D as they see fit. In fact cod liver oil was discovered in the sewers of England several hundred years ago by starving children who drank it and scientists noticed they did not get rickets. Cod liver oil is in fact a highly processed food that was never consumed by humans prior to this.

## Primary Justification Why You Should AVOID Cod Liver Oil

There have been two recent meta-analyses done. The first one showed that people who took vitamin A supplements in cod liver oil, or in supplements, had an 18 percent increase in death rates. The other study showed that unlike third world countries where vitamin A supplementation

appears to decrease infections, vitamin A supplementation in developed countries like the U.S. actually increases infections.

The researchers believe this is due to massive nutritional deficiencies in the third world because most of their calories are from grains and they simply don't have an opportunity to consume as many fresh fruits, vegetables, butter, eggs and other vitamin A containing foods that those in the developed world do.

In fact current research could not find any vitamin A deficiency at all, but approximately 5% had vitamin A toxicity. The converse is true in the third world where vitamin A toxicity is virtually unheard of, yet vitamin A deficiency is pervasive.

Additionally new research has shown that vitamin D protects against cancer. But a paradox was found as those with higher vitamin D levels did not seem to have this benefit. A bright Harvard researcher carefully analyzed the data in the study that showed this and found that when he removed the people with high vitamin A and vitamin D levels, those with normal vitamin A levels and high vitamin D levels continued to have reduced risk of colon cancer. So those that did not take vitamin A had the protective effect from higher levels of vitamin D.

Other research is now showing a connection between high levels of vitamin A and osteoporosis. In fact many Scandinavian countries that regularly supplement with cod liver oil have rampant osteoporosis even though they are getting adequate amounts of oral vitamin D.

Dr. John Cannell, head of [the Vitamin D Council](#), along with 15 other researchers, recently released an article "[Cod Liver Oil, Vitamin A Toxicity, Frequent Respiratory Infections, and the Vitamin D Deficiency Epidemic](#)" in the November issue of *Annals of Otolaryngology, Rhinology and Laryngology*. In this paper Dr. Cannell raised questions about the efficacy of cod liver oil due to its highly variable and frequently excessive amount of vitamin A. Typically modern cod liver oil contains far less vitamin D than it used to, due to the deodorization process used today which removes much of this essential nutrient.

Dr. Cannell and other prominent researchers believe the vitamin A contained in most cod liver oil is excessive, and can reduce the effectiveness of vitamin D by inhibiting the binding of its active form to your DNA, effectively preventing its ability to regulate the expression of your vitamin D-responsive genes.

The Weston Price Foundation, of which I am an advisory member, holds a contradictory view. They believe vitamin D can only effectively target genes when its "partner receptor" is activated by vitamin A. If vitamin A is absent, certain molecules called co-repressors bind to the receptors and prevent vitamin D from functioning. It is their position that cod liver oil is still a highly recommended supplement.

After reviewing the evidence, I am personally convinced that there is sufficient vitamin A in the current American diet to facilitate sufficient vitamin D activation. This does not appear to be the case in third world countries, where cod liver oil, or some other preformed retinol supplement, would still be useful.

## **Most Cod Liver Oils Have Excessive Vitamin A (Preformed Retinol)**

However, even the Weston Price Foundation acknowledges that there are dangerous versions of cod liver oil out there, even from some highly reputable companies produce a cod liver oil that is clearly excessive in vitamin A as it only has 3 to 60 units of vitamin D per tablespoon but between 150 and 12,000 times as much vitamin A.

It's a delicate balance.

Both vitamins are essential to obtain optimal health benefits, however, the ratios can become dangerously unbalanced -- much like the omega-3/omega-6 balance, which has become inversed in our modern diet.

Nearly all brands of cod liver oil provide a token amount of vitamin D, typically a mere 400 to 1,200 IU of vitamin D per tablespoon but anywhere between 4,000 to 30,000 IU of vitamin A. This is clearly inappropriate. About the lowest ratio I have seen is ten times as much vitamin A as vitamin D but, as I stated above, it can be as high as 12,000 times as much vitamin A.

First of all, this is clearly an insufficient amount of vitamin D for even the smallest child. This is in part due to the government recommendations, which are FAR too low to offer any health benefits; the recommended daily dosage being no more than 200 to 600 IU, depending on age. Meanwhile, researchers have since established that the therapeutic dosage is anywhere between 2,000 to 10,000 IU per day, depending on your weight and other factors, such as skin color and level of regular sun exposure. (Some people may require, and can safely take, as much as 20,000 IU daily.)

Consuming such high amounts of vitamin A as contained in cod liver oil and most multi-vitamins, while not getting nearly enough vitamin D, combined with the fact that most people are deficient in vitamin D to begin with, could potentially cause vitamin A to become toxic.

The concern Dr. Cannell and the other researchers have is that vitamin A in cod liver oil is excessive and actually antagonizes vitamin D by inhibiting the binding of its active form to DNA and thus preventing its ability to regulate the expression of vitamin D-responsive genes.

The Weston Price Foundation's strong belief is that vitamin A is not at all toxic but is necessary for optimal vitamin D function. However they believe there is sufficient vitamin A in the diet of most Americans, especially if they are taking a multivitamin. In the third world this is not the case and they would likely benefit from vitamin A supplementation.

The Weston Price Foundation does not agree with Dr. Cannell's conclusion that cod liver oil itself may cause vitamin A toxicity, however they also do not recommend taking any cod liver oil that is low in vitamin D. Yet even their recommendations, in my opinion have far too low amounts of vitamin D to be clinically useful. But more importantly it appears that the high amounts of vitamin A may limit the effectiveness of vitamin D even if more is taken in addition to that received in the cod liver oil.

Although it's still unclear exactly what the balance should be, Dr. Cannell and most of the prominent expert researchers in this area believe that the ratios of these two essential nutrients likely should be reversed from those typically seen in cod liver oil, as you need far greater amounts of vitamin D as opposed to vitamin A.

After carefully reviewing the arguments on both sides of the issue I am convinced that Dr. Cannell's approach is far more likely to be consistent with producing high levels of health and decreased illness.

### **My Revised Cod Liver Oil Recommendations**

As the prevalence of vitamin A deficiency (which would benefit from cod liver oil) in the U. S. is much lower than the prevalence of subclinical vitamin A toxicity, while most everyone suffers from vitamin D deficiency, I **no longer recommend taking cod liver oil** for either adults or children.

However if you are going to use cod liver oil I would recommend Carlson's as they have the best ratio of vitamin A to vitamin D. It is the only one I know of with the right ratio, approximately four to five times as much vitamin D as vitamin A. We do not sell cod liver oil anymore on our site but Carlson's is available at many health food stores.

You're likely getting the vitamin A you need if you regularly consume fresh vegetables high in this nutrient, such as sweet potatoes, carrots, cantaloupe, and other colorful fruits and vegetables, and butter especially, if obtained from grass fed cows.

Although you can obtain Vitamin D from your diet, it is very difficult, and I believe it is very unnatural. It is my strong belief that we were designed to obtain virtually all of our vitamin D from exposing appropriate areas of our skin to sunshine. If this is not possible, the next best choice would be exposure to UVB rays from safe tanning beds, and if that is not possible then one should resort to a high quality vitamin D3 supplement.

**As it stands, it is my strong belief that you're simply not getting the appropriate balance of vitamin A to vitamin D from cod liver oil, which is why I believe it is best to avoid it.**

*Please note that this new recommendation **does NOT apply to either fish oil or krill oil**, as neither of them contain the vitamins A or D, but rather are excellent sources of essential omega-3 fats. EVERYONE still needs a regular high quality source of these absolutely essential and vital nutrients.*

*Another potential point of confusion is that beta carotene is not a concern, as that is PRE vitamin A. Your body will simply not over convert beta carotene to excessive levels of vitamin A. So taking beta carotene supplements is not going to interfere with vitamin D.*

[Am J Clin Nutr.](#) 2010 May;91(5):1185-94. doi: 10.3945/ajcn.2009.29036. Epub 2010 Mar 24.

## Omega-3 fatty acid supplements in women at high risk of breast cancer have dose-dependent effects on breast adipose tissue fatty acid composition.

[Yee LD](#), [Lester JL](#), [Cole RM](#), [Richardson JR](#), [Hsu JC](#), [Li Y](#), [Lehman A](#), [Belury MA](#), [Clinton SK](#).

### Source

Department of Surgery, The Ohio State University, Columbus, OH, USA. [lisa.yee@osumc.edu](mailto:lisa.yee@osumc.edu)

### Abstract

#### BACKGROUND:

Preclinical evidence of the preventive benefits of omega-3 (n-3) polyunsaturated fatty acids (PUFAs) in breast cancer continues to fuel interest in the potential role of dietary fat content in reducing breast cancer risk. The dose of fish-oil/omega-3 PUFAs needed to achieve maximal target tissue effects for breast cancer prevention remains undefined.

#### OBJECTIVE:

To determine the dose effects of omega-3 fatty acids on breast adipose tissue fatty acid profiles, we conducted a study of 4 doses of omega-3 PUFAs in women at high risk of breast cancer.

#### DESIGN:

In this 6-mo randomized open-label study, 48 women with increased breast cancer risk received 1, 3, 6, or 9 capsules/d of an omega-3 PUFA supplement that provided 0.84, 2.52, 5.04, and 7.56 g docosahexaenoic acid (DHA) + eicosapentaenoic acid (EPA) daily, respectively. Subjects made monthly visits, at which time pill counts were made and fasting blood samples were collected to determine fatty acid profiles; anthropometric measurements were made, breast adipose tissue samples were collected, and laboratory tests of toxicity (alanine aminotransferase, LDL cholesterol, and platelet function) were made at baseline and at 3 and 6 mo.

#### RESULTS:

All doses led to increased serum and breast adipose tissue EPA and DHA concentrations, but the response to 0.84 g DHA+EPA/d was less than the maximum possible response with  $\geq 2.52$  g/d. Body mass index attenuated the dose response for serum tissue DHA and EPA ( $P = 0.015$  and  $0.027$ , respectively) and breast adipose tissue DHA ( $P = 0.0022$ ) in all of the treatment groups. The incremental increase in DHA and EPA correlated inversely with baseline fat and serum values. Compliance over 6 mo was  $92.9 \pm 9.2\%$  and was unaffected by treatment arm. No severe or serious toxicities were reported.

## **CONCLUSIONS:**

Daily doses up to 7.56 g DHA+EPA were well tolerated with excellent compliance in this cohort at high risk of breast cancer. Body mass index and baseline fatty acid concentrations modulated the dose-response effects of omega-3 PUFA supplements on serum EPA and DHA and breast adipose tissue DHA.

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PMC2854898

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# Omega-3 fatty acid intake banishes inflammation and changes immune response

Thursday, November 29, 2012 by: PF Louis

Learn more: [http://www.naturalnews.com/038130\\_omega-3s\\_inflammation\\_immune\\_function.html#ixzz2Djwixx1u](http://www.naturalnews.com/038130_omega-3s_inflammation_immune_function.html#ixzz2Djwixx1u)

(NaturalNews) Wading through the varied sources on omega-3 clinical trials and lab research can lead into a labyrinth of contradictions. One study even claims there are no cardiac benefits from omega-3.

Some reports that are slightly more encouraging often suggest or imply that you still need pharmaceuticals for real healing or prevention.

One study claimed omega-3 lowers rheumatoid arthritis (RA) symptoms and supports lower dosages of pharmaceuticals. But what *they added* that NSAIDs (non-steroid anti-inflammatory drugs) or anti-TNF (tumor necrosis factor) drugs, with known side effects, actually curb the disease.

NSAIDs and anti-TNF drugs don't cure. They ameliorate pain somewhat with high risks of adverse side effects. A recent study supports a conservatively positive outlook on omega-3 fatty acids ability to support the immune system and prevent inflammation.

## The recent omega-3 study

A study of 84 men 45 to 84 years old with at least a two year history of diabetes Type II to determine the efficacy of omega-3 on inflammation for Type II mellitus. The omega-3 subjects were given just under three grams daily of omega-3 incorporating DHA and EPA, the types of fatty acids from animal sources.

The study in Tehran, Iran at the *Department of Nutrition and Biochemistry, School of Public Health*. The study lasted only eight weeks to determine the effects of short-term omega-3 intake.

The subjects who were given placebos of sunflower oil capsules had no changes in their inflammatory markers from serum testing, while those who did take the strong omega-3 doses showed lowered inflammatory markers.

The research concluded: "Findings indicate that omega-3 fatty acid supplements may alleviate [inflammation](#) caused by Type II diabetes mellitus." The "may" word is conservative med-speak used by most researchers.

# A little more assertive omega-3 benefit reports from maverick MDs

Two different incidents of young men in Virginia and West Virginia, one in his mid-20s the other in his late teens, suffering from extreme brain damages were brought out of comas and rapidly recovered thanks to massive omega-3 dosing.

They both came out of their comas and rapidly improved toward total recovery. (<http://www.naturalnews.com>)

Dr. Dwight Lundell, a cardiologist with 30 years experience, proclaims the source of heart problems is not cholesterol or fats in general, but arterial inflammation from processed oils and other factors. He advises consuming healthy fats high in omega-3. (<http://www.naturalnews.com>)

Vegetable omega-3 sources, such as flax, olive oil, and other sources, contain ALA (alpha-linoleic acid), which has to be converted by the body into the more beneficial forms of DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid). But not everyone who is in poor health or older can make that conversion.

The animal [omega-3](#) fats (fish, fish oils, grass fed livestock meats), contain already converted DHA and EPA to help deliver immediate, stronger results.

Omega-3 fatty acids comprise most nerve and brain tissue. There are many other omega-3 benefits, including emotional stability, heart [health](#), skin health, blood sugar stability, improved memory, and overall anti-aging.

For normal use, three grams or fewer daily of omega-3 is considered adequate by most health professionals.

## Sources included in this article:

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<http://www.umm.edu/altmed/articles/omega-3-000316.htm>

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<http://www.naturalnews.com>

Learn more: [http://www.naturalnews.com/038130\\_omega-3s\\_inflammation\\_immune\\_function.html#ixzz2Djwr4RJw](http://www.naturalnews.com/038130_omega-3s_inflammation_immune_function.html#ixzz2Djwr4RJw)

# Acacia Fiber from Heathers Tummy Care

**This review is from Amazon for Heather's Tummy Fiber KIT ~ Organic Acacia Senegal CAN AND POUCH for Irritable Bowel Syndrome (Health and Beauty)**

**★★★★★ Best Supplemental Fiber Ever**, September 12, 2008

By [Sharon Pisacreta "emeraldcrab"](#)

**This review is from: Heather's Tummy Fiber KIT ~ Organic Acacia Senegal CAN AND POUCH for Irritable Bowel Syndrome (Health and Beauty)**

Although I don't suffer from IBS, I do have thyroid disease and the stomach problems that sometimes go along with it. I have tried psyllium but found it too harsh and unpleasant to drink. Organic acacia powder dissolves quickly, is tasteless and very easy to drink in a glass of water. I take this in addition to fruits, veggies, whole grains, etc, as well as a probiotic supplement, so I don't rely on this alone to keep my system healthy and regular. But after using this daily for over a year I can definitely say that the addition of acacia powder has significantly improved any stomach problems that may arise. I've recommended this to friends and relatives of all ages, and everyone that has consistently used it is very satisfied with the results. Start with small doses and gradually build up. To see lasting results you must give it time and remember to actually take the acacia powder every day. I take a tablespoon in the morning and a tablespoon at night, but you may require more or less. Adjust your intake and experiment with what works best for you. Check out Heather's website for more details.

**★★★★★ Works better than other fiber and IBS products**, January 6, 2010

This product is good for IBS symptoms, and works better than the other fiber supplements, which ironically can aggravate symptoms. Just follow the instructions, whether starting from scratch or transitioning from another supplement, and you should be fine. I would recommend if you are just starting to use this product to purchase only the refillable canister size first, and then if it works for you, get multiple pouches at a time from Amazon (for free shipping savings vs purchasing from Heather's site). It seems pricey, but frankly, it's worth it to me!

It does sometimes clump, but it is truly flavorless, not gritty, and doesn't thicken liquid, so its not bad at all -- just don't look at the floaters/clumps if they occur in your drink. It seems to help if I have a thinner, even layer of it in the glass (vs a large \*lump\*), then add an ounce or two of liquid, swish it around until its all moistened, and then add the rest of the liquid. I break each dose up into two smaller drinks (i.e., drink 4-5 oz with a small amount of the fiber, then repeat immediately afterwards) to avoid clumping. Sometimes, you just have to stir, stir, stir briskly for a full minute. It won't work in my peppermint/fennel tea (hot liquid makes it clump to the point I can't break it up), but other than that, it works well.

You can also bake with it and sprinkle it on warm, moist foods to keep your system full of soluble fiber throughout the day. I keep a 4 oz container of it at work to use during lunch to boost my soluble fiber intake. Since its in a clear container, no one knows what it is and I can keep it in sight so I don't forget.

I also drink a glass of water with it first thing in the morning or when I haven't eaten for several hours--it seems to help, along with following Heather's tips on diet (check out her books) and her peppermint/fennel teas. The peppermint caps and hypnosis CDs never helped me (nor IBS Advantage), but this product seems to make a difference.

Everything I've read on Acacia Senegal indicates a lack of side effects from prolonged use, but I would still mention its use to any health professionals.

## "Discover the All-Natural Organic Solution to Getting the Fiber You're Probably Not Getting in Your Diet" by Dr. Mercola

Link: <http://organicindia.mercola.com/psyllium.aspx>

In the U.S., in Canada, and around the world, we're experiencing a "fiber crisis."

Shocking new research suggests that the general public – which likely includes you – is simply *not* getting the fiber needed every day for optimal health and wellbeing.\*

In fact, a recent survey determined that fewer than 10 percent of us are consuming the optimal recommended daily amount of fiber. And, if that doesn't startle you, consider that the average American consumes *less than half* the suggested amount of fiber daily!

Why is a diet deficient in fiber a problem?

Numerous studies now reveal the potential drawbacks of a diet low in fiber for individuals of all ages.

Once regarded simply as a way to help with regularity or to aid occasional constipation, the results of study after study force us to rethink the fundamental benefits and value of fiber.\*

In fact, a high fiber diet may help you **maintain your digestive health and regularity (including providing ideal food for your beneficial bacteria), and your heart healthiness.**\*

Additionally, studies suggest that high fiber diets may also **assist you in the battle against the bulge** by helping you feel full and therefore eat less.\*

So, since most of us are dramatically deficient in our daily intake, it's time for you to take firm action.

It's time for a change. And I'm here to help.

Believe me when I tell you that you simply cannot afford to wait any longer.

### **It's Time for You to Understand the Benefits of Fiber**

Fiber has long been recognized for helping with **digestive regularity and occasional constipation**, however the advantages of a fiber-rich diet go far beyond these basic benefits.\*

In fact, diets low in saturated fat and cholesterol that include 7 grams of soluble fiber per day from psyllium seed husk may reduce the risk of heart disease.\* One serving of ***Fiber Harmony Organic Psyllium*** provides 4-6 grams of this soluble fiber (depending on the flavor).

In addition, a diet rich in fiber:

- **Can contribute to a sense of fullness which may prevent over-eating and help you regulate your weight.\***
- Can promote the growth of your healthy bacteria and the food they need to thrive, which may help enhance your immune system's ability to promote good immune health.\*
- **Can slow your absorption of sugars, which has the potential to promote healthy blood glucose levels.\***
- Can add "bulk" to your stool as it supports regularity and elimination.\*

As you can quickly see with even this short list of benefits, fiber has entered the scene as a major player in your health and wellbeing.\*

So, the question then becomes obvious:

## **Are You Getting Your Daily Fiber Fill?**

It doesn't matter your age – getting the recommended allowance of fiber is an important part of your daily diet.

But, do you even know how much is the right amount? If you don't, you're not alone. A recent survey by the National Fiber Council showed that 88 percent of Americans have no idea how many grams of fiber they need a day.

This is one instance where ignorance is not bliss. In fact, the Columbia Institute of Human Nutrition reports that *only 10 percent* of all Americans get the recommended amount of fiber in their daily diet. And, what's worse – **the average American only eats about half the recommended fiber they need.**

But we shouldn't be all that surprised by these startling numbers because – even if we don't want to admit it – most of us don't really have a good handle on our fiber needs.

- A 2005 national study revealed that over 50% of Americans think steak is high in fiber – but in reality meat has little or no fiber.
- The same study discovered that one in five people has no idea how much fiber they eat daily -- and nearly 60 percent of all respondents in the survey have never talked with their health care provider about fiber.

Again, it really should come as no surprise that most people have no idea how much fiber is needed daily.

So, how much fiber do you need -- and where can you get it?

### **You Need at Least 32 Grams of Fiber Every Day\***

When it comes to fiber, 32 grams is your minimum magic number. That's the amount of recommended fiber you should consume daily.

But, if you're like most, **you're likely only getting 10-15 grams** – and yes, I know, it's pretty shocking, isn't it?

Plus, if you're on a low carb diet or just don't consume many fruits, vegetables or grains, you're probably even further from your magic number. According to the *Annals of Internal Medicine*, **people on low carb diets typically get only seven to eight grams of fiber daily!**

I'll let you do the math, but it should be obvious: For your optimal health and wellbeing, you can't go wrong with adding more fiber into your daily diet.\*

Ideally, your diet will have foods high in soluble and insoluble fiber, including:

- dried beans
- peas
- flax seed
- green beans
- cauliflower

But, with the hustle and bustle of daily life, it's often difficult to get the optimal amount of fiber you need.

That's why my team and I decided to offer you a powerfully effective (and great-tasting) way to supplement your daily fiber requirements.

It's time for you to discover *Fiber Harmony Organic Psyllium*...

### **Get Your Fiber Fill with *Fiber Harmony Organic Psyllium* – The All-Organic Solution**

Finally, you have a choice when it comes to supplementing your daily fiber needs. No longer do you have to settle for less-than-optimal health just because you don't have the time to create a high fiber diet.

- **Promotes regularity and growth of your healthy gut bacteria\***
- Helps with occasional constipation\*
- **Provides heart-healthy soluble fiber\***
- Certified Organic by a USDA-accredited certifying agent

- Tasty whole husk.
- **Plus, every 12-ounce canister is packed with 48 servings**

***Fiber Harmony Organic Psyllium* has the soluble and insoluble fiber you want.**

- Soluble fiber that can propel food, sugars, cholesterol and fats cleanly through your digestive tract. Importantly, soluble fiber can **contribute beneficially to your heart health.**\*
- Insoluble fiber that may act as a bulking agent to **improve your digestive regularity** and to move food quickly through your colon.\*

***Fiber Harmony Organic Psyllium* allows you to easily supplement your daily diet with 4-6 grams of dietary fiber in every great-tasting serving. That's 14-22 percent of your daily recommended allowance in every single serving!**

But, the benefits of ***Fiber Harmony Organic Psyllium*** don't end there...

## **The Top 5 Reasons Why I Believe *Fiber Harmony Organic Psyllium* is the Right Choice for You**

You've already seen why fiber is so important to your well-rounded diet. Plus, you've discovered how ***Fiber Harmony Organic Psyllium*** is so effective at delivering your daily recommended allowance of soluble and insoluble dietary fiber.\*

Now, you may be pleasantly surprised to discover more in depth why I believe ***Fiber Harmony Organic Psyllium*** is the right choice for you.

### **1. The support for heart health you desire.\***

Soluble fiber, such as the fiber in ***Fiber Harmony Organic Psyllium***, when included in a low saturated fat and cholesterol diet, has been **shown to help lower cholesterol.**\*

In fact, clinical studies have shown that, when taken daily as a part of a diet low in saturated fat and cholesterol, 7 grams of soluble fiber from psyllium may help reduce heart disease risk by helping to lower cholesterol – both total cholesterol and LDL cholesterol levels.\* One serving of ***Fiber Harmony Organic Psyllium*** provides 4-6 grams of this soluble fiber (depending on the flavor).

So, it doesn't matter whether you're in your thirties or sixties, man or woman, I believe that now is the right time for you to start taking your heart health seriously.

***Fiber Harmony Organic Psyllium*** gives you one of the easiest tools you can use to help support your heart health.\* Your heart may just thank you!\*

### **2. The 'probiotic difference' you deserve**

There are trillions of microorganisms that live in your digestive system – some are good, but others do not provide any benefit. When it comes to your health and wellbeing, they play an incredibly important role and your fiber intake can make a big difference.\*

“Beneficial flora” are microorganisms that assist with digestion and absorption of your food, **help strengthen your immune system**, and contribute to your body’s overall health and function.\*

Since less desirable flora in the gut must compete with the helpful microbes already in residence, daily probiotic use can be an effective measure to help us keep the balance of intestinal flora tipped in favor of beneficial flora.\*

Probiotics are foods and supplements that actually contain these living beneficial microbes. Probiotics can help support your body’s natural and healthy flora and support a healthy balance.\*

How does all this relate to fiber? Well, it’s simple.

**Beneficial bacteria love to feed on fiber** (such as that found in *Fiber Harmony Organic Psyllium*).\* Whereas, less desirable bacteria like to eat refined sugars and fats – which *Fiber Harmony Organic Psyllium* may help reduce within your digestive system.\*

**Note:** We are proud to offer our Complete Probiotics with *Fiber Harmony Organic Psyllium* as an incredible package to help you reach your optimal health goals (*see below for details and to order yours today*).

### 3. **The organic choice you want**

Since *Fiber Harmony Organic Psyllium* is your all-organic choice, you can feel confident that you are consuming Psyllium **grown without pesticides, herbicides or chemical fertilizers -- plus, it contains no additives or sweeteners.**

Additionally, the Psyllium in *Fiber Harmony Organic Psyllium* was grown using organic crop rotation practices, so there is **no risk that *Fiber Harmony Organic Psyllium* has been contaminated** by previous crops that were treated with chemical pesticides, herbicides, and fertilizers.

*Fiber Harmony Organic Psyllium* was the first USDA certified organic psyllium product and now you can take advantage of this all-natural solution.

### 4. **One of the easiest ways to add fiber to your diet... and it’s tasty, too!**

With three quick and easy options, adding fiber to your diet has never been easier. Take three times a day to add as much as 18 grams of dietary fiber to your diet.

### 5. **Help maintain your digestive health and perhaps even your optimal weight\***

You know that *Fiber Harmony Organic Psyllium* may help relieve occasional constipation and contribute to optimal digestive health.\* But, did you know that a high fiber diet may also contribute to a sense of

fullness which may prevent overeating?\*

Now, maintaining your optimal weight may not be such a struggle when you keep a diet rich in fiber starting with *Fiber Harmony Organic Psyllium*.\*

As you can see, there's never been a better time for you to start taking control of your health and wellbeing -- and I believe that *Fiber Harmony Organic Psyllium* is one of your best options.\* See for yourself...

## Compare Other Leading Brands to *Fiber Harmony Organic Psyllium*

You might be asking yourself: "Aren't all fiber supplements the same?"

The short and simple answer is **NO**.

But, instead of me telling you why I believe *Fiber Harmony Organic Psyllium* is far superior to other brands, I want you to see for yourself. So, I've put together a chart so you can compare *Fiber Harmony Organic Psyllium* to the other supplements out there.

Looking at this, I'm sure you'll see why I believe so strongly in *Fiber Harmony Organic Psyllium*.

Benefits You Want	Fiber Harmony Organic Psyllium	Other Brands
100% organic supplement	YES – because it is USDA certified 100% organic, you can be confident with <i>Fiber Harmony Organic Psyllium</i> .	Many supplements are not organic.
All-natural Psyllium as the active ingredient	YES – it uses all natural Psyllium Husk, you are assured that you are receiving a totally natural solution for your needs.*	Many supplements use synthetic or semi-synthetic active ingredients that do not contain Psyllium, including Methylcellulose and Calcium Polycarbophil.
Contains significant fiber	YES – <i>Fiber Harmony Organic Psyllium</i> contains between 4-6 grams of dietary fiber (depending on which product you choose) in every serving with a recommended 3 servings per day.	Many brands contain considerably less dietary fiber in each serving.
Contains soluble AND insoluble fiber	YES – <i>Fiber Harmony Organic Psyllium</i> contains the best of beneficial soluble and insoluble fiber for you.*	Many supplements only contain soluble fiber, so you lose the benefits of insoluble fiber.



## Nutrition Articles

### 10 Ways To Lower Estrogen Toxic Load

by Charles Poliquin 1/25/2012

Source:

[http://www.charlespoliquin.com/ArticlesMultimedia/Articles/Article/801/10\\_Ways\\_To\\_Lower\\_Estrogen\\_Toxic\\_Load.aspx](http://www.charlespoliquin.com/ArticlesMultimedia/Articles/Article/801/10_Ways_To_Lower_Estrogen_Toxic_Load.aspx)

Prevent cancer and lose weight by detoxifying estrogen from the body. High estrogen levels and problems eliminating it are well known to result in prostate and breast cancer. Estrogen is a problem for men as well as women due to multiple factors, especially the huge amounts of chemical estrogens we are exposed to in our daily lives. Did you know that there are chemical estrogens in plastic bottles, cosmetics, shampoo and personal care products, oil-based coatings, pesticides, and animal hormones?

That's right, but the ills of estrogen on the body don't just come from the environment. The ineffective way we metabolize estrogen is directly linked to prostate and breast cancer risk. It also produces poor body composition and inhibits weight loss.

According to functional medicine expert Dr. Bob Rakowski, living on earth is a risk for toxic estrogen exposure. As human, we are swimming in a sea of estrogens. Too much estrogen affects men and women, and this article is focused on what men need to know and what they can do to minimize the health effects and risks that come from too much estrogen. But, women can benefit as well, especially since women are exposed to the same chemical estrogens as men, and in general, our bodies metabolize estrogen the same way, regardless of gender. Exposure to chemical estrogens is a big issue for children too, making this a major health issue for any parent.

Studies show that genetics and obesity contribute to about 30 percent of the cancers that affect the sex organs (breast, prostate, ovarian), but the cause of the remaining 70 percent is still unclear. It is likely due to chemical estrogen exposure and problems with metabolism due to diet and a sedentary lifestyle. The solution is to live a lifestyle that both detoxifies and minimizes exposure to chemical estrogens. This article will tell you why and how you can do this by changing your lifestyle in the following *ten ways*:

- 1) Improve Gastrointestinal Health
- 2) Improve Diet
- 3) Decrease Body Fat
- 4) Use Phytoestrogens To Improve Estrogen Detoxification

- 5) Stop Testosterone From Turning into Estrogen
- 6) Improve Estrogen Metabolism
- 7) Ensure Complete Elimination
- 8) Supplement With Essential Nutrients
- 9) Watch What You Drink
- 10) Limit Chemical Estrogen Exposure

### **Estrogen: The Basics**

Estrogen is a hormone that is produced primarily in the ovaries in women and in the testes in men. For men, it plays an important role in sperm production and bone maintenance. Estrogen is also produced by other tissues in both men and women, including fat and the brain.

The amount of estrogen needed by men to support these functions is very small, and men tend to have excess estrogen in their systems for two reasons. First, an enzyme called aromatase that is found in tissues throughout the body will turn testosterone into estrogen. Aromatase is found in body fat meaning that men with more fat will produce more aromatase and therefore have higher estrogen levels and lower testosterone. The good news is you can block aromatase by eating or supplementing with nutrients that do this naturally. There are also drugs that inhibit aromatase that are used to prevent breast and prostate cancer, but it's best to take the natural route without consuming synthetic drugs.

Secondly, men have excess estrogen because of the chemical estrogens in the environment, such as BPA and phthalates. BPA is a petroleum based chemical that mimics estrogen in the body and studies have shown that it affects endocrine response in the body in humans and animals. For example, one study in the journal Toxicology Letters found that BPA exposure led to lower testosterone and poor sexual function in both men and rats because it inhibited the production of androstenedione—the hormone from which testosterone is produced.

Phthalates are another chemical estrogen that are used in plastics and many personal care products such as shampoo and lotion. They contribute to excess estrogen levels and need to be detoxified as safely and quickly as possible in order to minimize the damage they have on tissues in the body. Just as you can inhibit aromatase with proper nutrition, you can also give the body the nutrients it needs to detoxify excess estrogen safely from the body.

### **How Estrogen Is Detoxified By The Liver**

Estrogen is metabolized by the liver. The liver converts excess estrogens into compounds that can be excreted by the body. The catch is there are three pathways through which estrogen can be metabolized. One is a “toxic” pathway that is linked to cancer development, the second is unfavorable for health, and the third is more benign and preferable.

If your body can convert estrogens along what is called the 2-hydroxy pathway it will be healthier and you'll decrease your cancer risk, whereas if your body converts along the 16-alpha-hydroxy pathway it will be at greater risk of cancer. Don't worry about the chemical names of the pathways, just remember that what I will call the C-2 pathway is healthier and the C-16 pathway is toxic. The other unfavorable pathway is the C-4 pathway, which should also be avoided. The solution is to nutritionally support conversion of estrogen along the C-2 pathway, which can be initiated by ensuring you have a healthy gut.

### **1) *Improve Gastrointestinal Health***

Poor gastrointestinal health can inhibit excretion of unwanted estrogen from the body and promote its reabsorption. A healthy gut with dietary fiber in the form lignan, such as flaxseeds, can bind to estrogen in the digestive tract so that it will be excreted from the body. Dietary fiber also reduces the amount of an enzyme (called B-glucouronidase) that uncouples or breaks apart bound estrogen that is on its way out of the body. When the estrogen breaks free in the large intestine, it re-enters circulation and is not removed from the body. This is a bad situation.

The solution is to eat adequate fiber and include lignans in the diet, including flax, leafy greens, and bran (oat, rye, barley—if you're not gluten-free). A probiotic is essential because it will increase the “good bacteria” in the gut and support neurotransmitter function.

### **2) *Improve Diet With Low Carb, High-Protein, Omega-3 Fats***

A diet that is low in simple carbs and high in vegetable carb sources will help you detoxify estrogens and provide adequate fiber. To avoid excess estrogen, you need to manage insulin because it doing so is better for body composition, and persistently high insulin produces a poor endocrine profile that can inhibit estrogen detoxification.

Getting your carbs from vegetable and fruit sources will provide the lignans and fiber needed for gut health and increase antioxidant levels, which can abolish free radicals that produced by estrogen that goes down the C-16 pathway. Omega-3 fats, which are found in fish, have been shown to promote the C-2 pathway over the 16 pathway, particularly EPA omega-3 fatty acids. On the flip side, diets low in omega-3s have resulted in estrogen being metabolized primarily through the C-16 pathway. I've written a lot about omega-3s so I won't go into detail here, but supplementation with a high concentration of EPA and DHA fish oil daily is recommended for estrogen metabolism.

A high protein diet will produce a better body composition for most people. Plus, low protein diets have been shown to decrease activity of something called cytochrome P450 that detoxifies estrogen. The amino acids lysine and threonine have been shown to support liver function and since estrogen is metabolized by the liver, it is thought that these proteins can help get rid of estrogen from the body. Lysine and threonine are found in meat, fish, beans, eggs, and some seeds (sesame, fenugreek). Sesame seeds also provide fiber and fenugreek helps lower the insulin response to carbs, making both good additions to your diet.

### **3) *Decrease Body Fat***

The more fat you have, the more estrogen you'll have because fat tissue increases levels of the aromatase enzyme that turns testosterone to estrogen. Decreasing body fat and building lean mass are key to cancer prevention and estrogen detox.

Another way to protect the tissues from circulating estrogen is to keep it bound to sex hormone binding globulin (SHBG). When it is bound to SHBG, estrogen is not available to bind with cellular receptors and won't have its estrogenic impact. Flaxseed hulls are especially good at increasing SHBG (as well as inhibiting aromatase).

### **4) *Use Phytoestrogens To Promote the C-2 Pathway***

Include foods with phytoestrogens in your diet because they will take natural and chemical estrogens out of play in the body. Phytoestrogens are plant-based compounds that can bind to

estrogen receptors, but they have about 1/1000th of the effect on the body as real or chemical estrogen. When phytoestrogens bind to estrogen receptors they basically take up the parking spot of the true estrogen, and keep it from exerting its effect.

Lignans and isoflavones are the main phytoestrogens, and in addition to binding with estrogen receptors, they can increase SHBG levels (protects the body by binding to estrogen), decrease aromatase (prevents testosterone turning into estrogen), and shift metabolism of estrogen away from the C-16 pathway to the C-2 pathway (the safer pathway).

The best phytoestrogens to include in the diet are flax, sesame, leafy greens, kudzu, alfalfa, clover, licorice root, and legumes. Greens, flax, and sesame can be easily added to the diet, and the others can be supplemented to support estrogen detoxification.

### **5) *Block Aromatase and Stop Testosterone From Turning into Estrogen***

Blocking aromatase is key for getting rid of estrogen because it plays the main role in producing estrogen in men. If aromatase is present, there are two chances for estrogen to be produced in the body. First, the hormone androstenedione will be turned into testosterone unless aromatase is present in which case it will be turned into estrogen. Then, aromatase will turn testosterone into estrogen as well.

Nutrients that have a proven effect on aromatase include selenium, melatonin, zinc, green tea, and citrus flavonones—substances found in orange and grapefruit rinds along with tomato skins. You can include these in your diet and take a supplement for best results.

We know aromatase inhibitors work because there are numerous studies demonstrating their influence, and one of the most illuminating is a review that found that men who took a combination of zinc, folic acid, acetyl-l-carnitine, and had adequate omega-3s improved fertility and sexual health. Flax and lignans were also part of the diet. This study tells us that estrogen detox is not a simple endeavor. Rather, it's a lifestyle that includes the ideal diet with additional nutrient supplementation to inhibit aromatase, boost SHBG, and reduce the ratio of estrogen that goes down the C-16 pathway in favor of the C-2 pathway.

### **6) *Improve Estrogen Metabolism By Promoting the C-2 Pathway***

Promoting the C-2 pathway of estrogen metabolism is probably the most important thing you can do to prevent cancer. The first step of estrogen elimination is for enzymes to initiate metabolism by joining the estrogen molecule. This will happen at either the 2-carbon position or the 16-carbon position of the molecule, which determines the pathway the estrogen will head down.

The C-2 pathway produces very weak estrogenic activity and is termed “good” estrogen. In contrast, the C-16 pathway produces robust estrogenic activity and promotes tissue damage that leads to cancer. There's also a C-4 pathway, that is not good, but its role is small and for simplicity sake you only need to know that you want to avoid it as well.

Research shows that men and women whose estrogen is metabolized down the C-16 pathway have significantly greater rates of prostate and breast cancer than those whose C-2 pathway dominates. In one large scale study of premenopausal women, those who metabolized estrogen predominantly via the C-2 pathway were 40 percent less likely to develop breast cancer during the five-year study.

Key nutrients for supporting the C-2 pathway are EPA fish oils, phytoestrogens, and of special importance, B vitamins and a substance called DIM. The B vitamins, particularly B6, B12, and folic acid promote the C-2 pathway. B6 is also known to decrease gene activity once estrogen is bound to a receptor, meaning this vitamin can inhibit cell damage and cancer development.

DIM is a compound found in cruciferous vegetables such as broccoli and cauliflower. It is often taken in supplement form because you would need to eat large quantities of these vegetables daily in order to provide sufficient DIM to have an effect on estrogen elimination.

Take note that most people need to supplement with a B vitamin and that trainees who take BCAAs will quickly become deficient in B vitamins, making it essential that you get extra. A high protein diet that provides adequate BCAA levels also requires extra B vitamins.

### **7) *Ensure Complete Elimination of Estrogen***

Once you shift your estrogen elimination to the C-2 pathway you have to make sure it gets excreted from the body. Two things can happen along the way out that cause big problems. First, estrogen that is heading down the C-2 pathway can be easily turned into something called quinones, which are “highly reactive” and can damage DNA and cause cancer.

In order to avoid the production of quinones you must have adequate amounts of two nutrients—magnesium and something called SAM. This process of metabolizing estrogen to avoid quinones is called methylation and is the first place that things can go wrong on the estrogen detox pathway. Another notable antioxidant that can support damage to the body by estrogen quinones is alpha lipoic acid, which I mention here because it is one of my favorites and has many health benefits.

As estrogen is heading out of the intestine, it needs to be bound to glucuronic acid, but there is a “bad” intestinal bacteria that contains an enzyme that breaks estrogen apart from the glucuronic acid. This is the second place estrogen detoxification can go wrong. When the “bad” bacteria, called glucuronidase, uncouples the bond between estrogen and glucuronic acid, estrogen re-enters circulation, effectively raising estrogen levels in the body and damaging tissue. To avoid this, you need a healthy gut as mentioned in #1, which you can get by taking a probiotic, and eating lots of fiber and lignans.

### **8) *Supplement With Essential Nutrients***

To review, the essential nutrients to help detoxify estrogen are the B vitamins, zinc, omega-3 fish oils, DIM (nutrient found in cruciferous vegetables), green tea, magnesium, selenium, and melatonin. The only nutrient I haven’t already mentioned is vitamin E, which is a potent antioxidant.

Magnesium plays a role in methylation, or that final phase of estrogen excretion mentioned in #7. I call your attention to it here because almost everyone needs to supplement with magnesium because people are chronically deficient. Athletes and strength trainees are especially susceptible to low magnesium because this nutrient plays a role in muscle contractions. Low vitamin E is associated with elevated estrogen and it has been shown to inhibit the growth of breast and prostate cancer cells.

### **9) *Watch What You Drink***

Eliminate all alcohol besides certain red wine. Sardinian and Spanish wines are rich in antioxidants that help remove estrogens. Other good choices are Pinot and Merlot. Alcohol increases estrogen levels in men and women, and it has been shown to decrease testosterone as well. Even moderate alcohol consumption (other than Sardinian, Spanish and certain French wines) has been shown to increase the risk of prostate and breast cancer.

The one exception is wine rich in either resveratrol or trans-resveratrol, which has been shown to inhibit aromatase (the enzyme that turns testosterone into estrogen), thereby lowering estrogen levels. For example, a study that was just published showed that red but not white wine acted as an aromatase inhibitor and resulted in lower estrogen levels after one month in premenopausal women. The group of women that drank eight ounces of red wine daily had higher testosterone and lower estrogen levels than the group that drank white wine daily. Previous studies have shown that red wine appears to lower overall cancer risk, and it provides cardioprotective effects along with increasing insulin sensitivity.

### **10) *Limit Chemical Estrogen Exposure***

Avoiding chemical estrogens is one of the most important strategies for preventing cancer and protecting yourself. If you were able to have no contact with chemical estrogens, and you had good nutrition, a lean body composition, and a large proportion of muscle mass, it is very unlikely you'd have excess estrogen or be at risk of cancer. But, chemical estrogens are everywhere. It is only recently that the mainstream medical community has started to seriously consider the connection between cancer and the toxic environment the industry has created with the lax regulation of toxic estrogenic chemicals.

There is even a movement in public health advocacy that government regulatory bodies and chemical companies need to take action to reduce environmental toxins. Although there is an awareness that the responsibility of reducing cancer risk shouldn't be on the individual because we cannot completely avoid contact with chemical estrogens, the reality is that you have to take responsibility for eliminating estrogen from your body and the bodies of your loved ones.

Tomorrow, look for a list of ten things you can do to minimize your chemical estrogen exposure.

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# Is Gluten Making You Fat?

April 12, 2011

Link: <http://articles.mercola.com/sites/articles/archive/2011/04/12/is-gluten-making-you-fat.aspx>

Experts are beginning to accept the idea that sluggishness and weight gain can be blamed on a substance that lurks in wheat and many other common grains -- gluten. Gluten is a protein found in wheat, barley, and rye, and many food additives.

People are taking notice. Sales of gluten-free products grew about 30 percent a year from 2006 to 2010, and the total sales will reach \$3.9 billion by next year. In fact, 10 percent of new foods launched in 2010 featured a "gluten-free" claim.

Yahoo Health reports:

*"... [F]or people with celiac disease ... eating foods that contain gluten can lead to a cascade of nasty reactions ... Even if you don't have celiac disease, gluten may still be bad for you ... A rising percentage of people in the United States consider themselves 'gluten-sensitive' ... Some may have a form of wheat allergy."*

There is also emerging research that eating wheat, which contains gluten, can cause certain individuals to become psychotic. Most of the research on schizophrenia is focused on neurotransmitters, and the usual treatment is neuroleptic medication. However, the medicine tends to have serious side effects.

Some researchers have been looking at an unlikely suspect in the pathogenesis of schizophrenia - wheat. Many schizophrenics seem to have a history of celiac disease (gluten/wheat intolerance) as children -- as much as 100 times the amount of celiac disease in the regular population.

Meanwhile, populations who traditionally eat a gluten-free diet have extremely rare occurrence of schizophrenia -- just 2 in 65,000 versus close to 1 in 100 in grain-eating countries. And when populations Westernize their diets, schizophrenia becomes common.

According to *Psychology Today*:

*"[In A Case Report of the Resolution of Schizophrenic Symptoms on a Ketogenic Diet](#), a high fat, low carb, low protein diet (thus very low in wheat) results in the remission of psychotic symptoms in a single case report."*

Dr. Mercola's Comments:

Gluten-free diets have become all the rage in some parts of the United States, with restaurants, caterers and grocery stores all increasing their offerings of gluten-free foods.

How did gluten, virtually unknown just a few years back, transition into a household word?

It began with the realization that gluten, a protein found in grains such as wheat, rye and barley, wreaks havoc in people with celiac disease, triggering an immune reaction that damages the small intestine and prevents absorption of nutrients.

But now an increasing number of people *without* celiac disease are also jumping on the gluten-free bandwagon and experiencing a range of health benefits, including weight loss.

## Why You May be Better Off Avoiding Gluten

According to statistics from the University of Chicago Celiac Disease Center, an average of [one out of every 133](#) otherwise healthy people in the United States suffer from celiac disease (CD), but previous studies have found that this number may [be as high as 1 in 33](#) in at-risk populations.

Those with celiac disease must avoid gluten to manage the condition, but in my experience, there is an epidemic of people with hidden intolerance to wheat products and gluten who would benefit from avoiding it entirely as well.

In fact, a primary part of our [nutritional typing program](#) is that everyone start out gluten-free for 60 days.

I also recommend that everyone following my [beginner nutrition plan](#) eliminate all gluten from their diets. Among the most important to avoid are those gluten-containing grains that contain gliadin molecules, such as wheat.

When gliadin in gluten becomes water soluble, it is free to bind to cells in your body. If you are sensitive, your body will make antibodies to gliadin and attack the cells gliadin has attached itself to, treating those cells as an infection. This immune response damages surrounding tissue and has the potential to set off, or exacerbate, MANY other health problems throughout your body, which is why gluten can have such a devastating effect on your overall health.

## Can Avoiding Gluten Help You Lose Weight?

Gluten often hides in processed foods like ready-made soups, soy sauce, candies, cold cuts, and various low- and no-fat products, as well as refined grain products like bread, pizza crust, pasta, cookies and pastries.

When you cut all of these foods from your diet, you end up cutting out primarily refined carbohydrates, which are [linked to weight gain and obesity](#).

So it's very possible that switching to a gluten-free diet could help you lose weight, particularly if you've been eating a lot of refined gluten-containing foods. When eating gluten-free, however, you need to be careful that you're replacing the gluten-containing foods with healthy choices, like vegetables and other whole foods.

If you instead opt for gluten-free processed foods, like the wide assortment of gluten-free cookies, pasta and breads that are now commercially available, there's a good chance that you will not lose weight, and may actually gain instead.

In fact, one study of people with celiac disease who followed a gluten-free diet found that [81 percent gained weight](#) after two years. So keep in mind that just because a food is gluten-free it does not necessarily make it healthy or automatically good for weight loss.

To lose weight effectively, you've still got to follow the [principles of a healthy diet](#), which includes avoiding gluten-containing grains *and* focusing on whole food choices, not processed alternatives.

## Can Gluten Even Impact Your Brain?

It appears so, yes.

Research suggests that exorphins, opioid peptides from food proteins like gluten, may travel from your gut to your brain and [cause symptoms of schizophrenia](#). In a [paper by F. Curtis Dohan](#), he concluded that the following evidence makes it very likely that gluten may have a significant impact on schizophrenia:

*"1. In the 1960's many observations suggested schizophrenia and celiac disease ... share some but not all genes. Therefore, the role of gluten in schizophrenia was examined.*

*2. Epidemiologic studies demonstrated a strong, dose-dependent relationship between grain intake and the occurrence of schizophrenia ...*

*3. Clinical trials and case reports show that gluten is toxic for acute and relapsed schizophrenic patients, but only occasional long-term chronic patients respond to gluten or its absence.*

*4. Because of the evidence above, peptides with potent opioid activity were sought and found by National Institutes of Health investigators in enzymatic digests of gluten, its gliadin subfraction, and a-casein from milk. These opioid peptides were named exorphins.*

*5. Urinary excretion of small peptides by individuals with schizophrenia is greatly increased. Some are apparently from gluten. Some peptides are neuroactive, including opioid-like effects.*

*6. A specific gliadin peptide fraction, which in large doses is psychoactive in individuals with celiac disease, produced stereotyped behaviors and limbic seizures in rats hours after intracranial injection."*

Another connection between gluten and your mental health is the fact that grains are inherently pro-inflammatory and will worsen any condition that has chronic inflammation at its root -- and not just inflammation in your gut, but anywhere in your body. Chronic inflammation in your body can wreak havoc on your brain, and the importance of [reducing inflammation when dealing with mental health issues](#) is well known.

Further, it is very common for people to experience an array of mental health and emotional improvements upon eliminating gluten from their diet.

## Which Grains are Gluten-Free?

Certain types of grains, seeds and flours available are naturally gluten-free, including:

- Rice
- Corn (only have non GMO)
- Quinoa
- Sorghum
- Soy (which I [don't recommend eating for other reasons](#))
- Flax and amaranth seed

Buckwheat and millet do not contain the gliadin molecule that can provoke the inflammatory reaction from gluten. Therefore, they are usually safe to eat as well

When you start out on a gluten-free diet, be patient.

Most people don't feel better immediately as it may take 30 to 60 days for the inflammation to subside, and up to 9 to 12 months for the lining of your small intestine to heal.

On some occasions, an individual may experience significant improvement within weeks of eliminating gluten from their diet, but in other cases people may feel considerably *worse* upon initially starting a gluten-free diet, which may be due to other unidentified [food allergies and food sensitivities](#).

However, it's important to stick with it as by around 6 to 9 months of eliminating gluten from your diet noticeable physical and mental/emotional changes will have taken place.

# Top 10 Health Benefits and Reasons people use Chia Seeds

As mentioned by diet and food expert Joy Bauer on the MSNBC Today Show, March 2010

10. [1 ounce of Chia uses 2.8% of the calories in a 2000 calorie diet.](#) The full daily servings only add up to 139 calories and 1 ounce of Chia Seeds has a Glycemic Index of 1.

9. [Chia seeds have many benefits for vegetarians](#) Chia seeds are great for vegetarians because unlike flaxseed, chia can be stored for long periods without becoming rancid and don't require grinding. The oil they contain does not go *rancid* because of the high level of antioxidants. In a October 20th, 2009 Cleveland Plain Dealer [health fit article by Kate Spector](#), Cleveland Clinic's Dr. Michael Roizen and Dr. Andrew Weil of the University of Arizona - are saying it is a good idea to include the tiny black seed in your diet they contain omega 3 fatty acids, essential fats your body does not make but needs to function properly. The last reason is it is a raw food, which means you do not have to cook it. See [Vegan Running Dad](#) blog.

8. [Chia Seeds fill you up](#) - When they come in contact with water, pudding, juice, yogurt etc. they grow to 9x their size and they slow down the absorption of carbs to control the appetite.

7. [Gluten free Chia Seeds are very good for a Raw Food Diet](#) because they are high in protein, calcium, omega 3 and 6 and don't need to be cooked. Unlike Flax Seed, you do not have to ground up Chia Seeds when you make a smoothie.

6. [Chia Seeds are great for workouts.](#) Prior to a run or athletic event which you need to hydrate, Chia Seeds in a bottle of water will help you hydrate. They will also help with protein to do the event without cramping up. [Chia](#) is good for the digestive system because it is a hydrophillic colloid.

5. [Chia Seeds are high in Omega 3](#) - 1 oz of Chia Seeds has 4915mg of Omega 3. Omega 3 fatty acids are loaded with protein which is great for healthy skin, hair, and nails Chia Seeds are high in calcium and naturally have Boron in them which transfers the calcium into your

bones.

4. [Chia Seeds are good for a Diabetic](#) - 1 oz of Chia Seeds has a Glycemic Index of 1. Chia seed supplies fiber in 2 forms: insoluble (won't dissolve in water) from its outer coat and soluble fiber (will dissolve in water) from its inner shell. Soluble fiber has been found helpful in lowering cholesterol and [diabetes](#)

3. [Chia Seeds are high in fiber and help digestion.](#)

2. [Chia Seeds are good for your Thyroid](#) - They are known to help deal with thyroid medication symptoms like lack of energy, dry skin and hair, [thyroid weight](#) problems, and colon issues.

1. [Chia Seeds are good for lowering cholesterol](#) - Chia seed supplies fiber in 2 forms: insoluble (won't dissolve in water) from its outer coat and soluble fiber (will dissolve in water) from its inner shell. Soluble fiber has been found helpful in lowering cholesterol and [diabetes](#). Also the omega 3 and 6 has been shown to help.

**What if there was a natural food which would slow down the conversion of carbohydrates into sugar while adding protein?**



There is, it is called **Chia**.

**Chia's** hydrophillic structure holds water, so when mixed with sauces, drinks, yogurt, salad, dressings, cream cheese, jellies and preserves, salsa, hot/cold cereal, dips, puddings, soups, etc. It displaces calories and fat without diluting flavor. In addition to extending foods by 50% - 75% calories

and fat have been reduced without compromising flavor, with an ingredient that is 90% water. **Chia** gel is also a great fat replacer for baked goods and special qualities for sugar control and weight loss.

### **Chia Seeds can be easily incorporated in any Diet**

can be easily incorporated into one's diet and can be used with many other foods and beverages. I myself have Gerd (Gastro Esophagus Reflux Disease), acute gastritis, and a gastric ulcer and IBS. [Learn more.](#)

[Chia sample packs](#) which can easily fit in a pocket, wallet and purse.

In the last twenty-five years, there has been a resurrection in the definition of medicine, a resurrection that amplifies the significance of our eating habits and our lifestyle. Medicine is not only defined as a treatment for illness and disease, it is now understood to be for the prevention of illness and disease. That would mean, for example, laughter is a medicine because research found it to boost the immune system.

Exercise is good medicine for its cardio-vascular stimulation, muscle toning and flexibility and expelling toxins and for giving you a feeling of well being all immune boosters. To express a positive attitude towards life is not only good medicine for you, it is good medicine for those in contact with you.

But the most important medicine, especially for the prevention of illness and disease, is our diet. It only needs our cooperation in supplying proper hydration and the needed nutrients to effectively maintain a state of well being.

Research has revealed that more than two thirds of all deaths in the United States are diet related. More than 50% of all deaths are caused from coronary occlusion, blockage of the blood flow to the heart and/or the brain.

These are all preventable deaths according to the Journal of American Medical Association which published in 1961 that, "All coronary occlusion can be eliminated by 97% through a vegetarian diet." Fourteen hundred American's are dying of cancer every day. In the prestigious advances in Cancer Research, they concluded, "At present, we have overwhelming evidence...

(That) none of the risk factors for cancer is... more significant than diet and nutrition." Because the question of what might be the optimum diet can, at times, be emotionally charged for many people, having had a significant emotional commitment in believing they know what's best, I would like to

suspend the issues of diet and introduce you to a “super” food that all would agree on.

It is once valued so much that it was used as currency, this unique little seed has exceptional nutritive and structural benefits. Chia is familiar to most of us as a seed used for the novelty of the Chia Pet™, clay animals with sprouted Chia seeds covering their bodies.

Little is known, however, of the chia seeds tremendous nutritional value and medicinal properties. For centuries the Indians of the southwest and Mexico used this tiny little seed as a staple food. Known as the running food, its use as a high-energy endurance food has been recorded as far back as the ancient Aztecs. It was said the Aztec warriors subsisted on the Chia seeds during the conquests.

The Indians of the southwest would eat as little as a teaspoon full when going on a 24hr. forced march. Indians running from the Colorado River to the California coast to trade turquoise for seashells would only bring the **Chia seeds** for their nourishment.

***Buy Chia seeds for as little as \$4 a bag 100% natural, pesticide free, and no pesticides used in growing, so simple yet so beneficial to all who use it.***

If you try mixing a spoonful of Chia Seeds in a glass of water and leaving it for approximately 30 minutes or so, when you return the glass will appear to contain not seeds or water, but an almost solid gelatin. This gel-forming reaction is due to the soluble fiber in the Chia Seeds.

Research believes this same gel-forming phenomenon takes place in the stomach when foods containing these gummy fibers, known as mucilage's, are eaten. The gel that is formed in the stomach creates a physical barrier between carbohydrates and the digestive enzymes that break them down, thus slowing the conversion of carbohydrates into sugar.

In addition to the obvious benefits for diabetics sugar levels, this conversion of carbohydrates into sugar offers the ability for creating endurance. Carbohydrates are the fuel for energy in our bodies. Prolonging their conversion into sugar stabilizes metabolic changes, diminishing the surges of highs and lows creating a longer duration in their fueling effects.

One of the exceptional qualities of the **Chia** seed is its hydrophilic properties, having the ability to absorb more than 12 times its weight in water. Its ability to hold on to water offers the ability to prolong hydration. Fluids and electrolytes provide the environment that supports the life of all the body's

cells. Their concentration and composition are regulated to remain as constant as possible.

With Chia seeds, you retain moisture; regulate, more efficiently, the body's absorption of nutrients and body fluids. Because there is a greater efficiency in the utilization of body fluids, the electrolyte balance is maintained. Example: Fluid and electrolyte imbalances occur when large amounts of fluids are lost resulting from vomiting, diarrhea, high fever, or more commonly from sweating?

The loss of extra cellular fluid occurs in these conditions. Intercellular fluid then shifts out of cells to compensate, causing abnormal distribution of electrolytes across cell membranes resulting in cellular malfunction. So. Retaining and efficiently utilizing body fluids maintains the integrity of extra cellular fluids, protecting intercellular fluid balance. The results of which ensure normal electrolyte dispersion across cell membranes , maintaining fluid balances, resulting in normal cellular function.

Chia seeds are the definitive hydrophilic colloid for the 21-century diet. Hydrophilic colloids, a watery, gelatinous, glue-like substance form the underlying elements of all living cells. They possess the property of readily taking up and giving off the substances essential to cell life. The precipitation of the hydrophilic colloids cause cell death. The foods we eat, in the raw state, consist largely of hydrophilic colloids.

When cooked on the other hand, precipitates its colloidal integrity. This change in the colloidal state alters the hydration capacity of our foods so as to interfere with their ability to absorb digestive juices. If we were to eat a raw diet we wouldn't need to introduce the addition of any hydrophilic colloid to our diet.

Uncooked foods contain sufficient hydrophilic colloid to keep gastric mucus in the proper condition. But even with raw foods, they must first be partially broken down by the digestive juices, beginning in the mouth and continuing through the upper tract, to allow the gelatinous reaction to take place.

Because of this upper tract digestive process, those who suffer from slow digestion, gas formation, relaxed cardiac and heartburn in which the burning is due to organic acids instead of an excess of the normal hydrochloric acid, which frequently accompanies chronic inflammation disease affecting such organs as the heart, lungs, gall bladder and appendix, are usually restricted from eating raw foods.

A hydrophilic colloid incorporated with these foods may be used either in connection with the patient's regular food or with whatever diet the physician feels is best suited for his patient.

The patient with gastric atony or nervous indigestion who complains of heartburn and/or vomiting four to five hours after eating is often helped. There is a lessening of emptying time of the stomach and an improvement in gastric tone. A strict dietary regimen is as necessary when the hydrophilic. Chia seeds may be used in conjunction with almost any diet your doctor or nutritionist feels is necessary for your condition.

The Chia's hydrophilic colloidal properties aid the digestion of any foods contributing to the patients suffering as a result of a Even if you have sensitivity to certain foods, they may be tolerated with slight discomfort or none at all if a hydrophilic colloid is made a part of your diet.

The positive effects on the digestion in the upper portion of the gastrointestinal tract often leads to puree their foods may find benefits from hydrophilic colloids which may lead to eliminating the necessity for pureeing. Even raw vegetables, green salads and fruits, which are largely restricted, may often be given to these patients with little or no discomfort after a short time.

There are several hydrophilic foods available that offer these natural benefits. Cactus juice, beet juice, agar, the edible seaweeds, and many proprietary preparations, which include the silica gels, mucilaginous substance of vegetables origin, are among colloids that prove effective. Each one of the above mentioned substances have one or more drawbacks. They are either too expensive, they may produce toxic side effects, bad tasting, not readily available, insufficient hydration capability, or it is indigestible.

Chia seed, a muscle and tissue builder and an energizer of endurance with extensive hydration properties, possesses none of the above disadvantage, and because of its physiochemical properties, supports effective treatment in immediate problems of digestion.

Exactly why this should be true may be puzzling at first. However, if we consider the effect of unusual irritation upon the nerves of the gastrointestinal canal, it is reasonable to think that a less violent and more balanced digestion might quiet the activity of the otherwise hyperactive gut. Inasmuch as the same foods, which formerly produced irritation, may frequently be continued without harm when hydrophilic colloids are used.

The relief to nerve irritation seems to offer a logical explanation. The change, in the lower gastrointestinal tract, is due to the effect of the hydrophilic colloid and to a more complete digestion-taking place along the entire tract due to physiochemical alterations. Both factors are important, as there is undoubtedly a better assimilation of food that supports enhanced nutritional absorption while significantly extending necessary hydration as well as encouraging proper elimination.

As a source of protein, Chia Seeds, after ingestion, is digested and absorbed very easily. This results in rapid transport to the tissue and utilization by the cells. This efficient assimilation makes the Chia Seed very effective when rapid development of tissue takes place, primarily during growth periods in children and adolescents. Also for the growth and regeneration of tissue during pregnancy and lactation, and this would also include regeneration of muscle tissue for conditioning, athletes, weight lifters, etc.

Another unique quality of the Chia seeds is its high oil content, and the richest vegetable source for the essential omega 3 fatty acid. It has approximately three to ten times the oil concentrations of most grains and one and a half to two times the protein concentrations of other grains. These oils, unsaturated fatty acids, are the essential oils your body needs to help emulsify and absorb the fat soluble vitamins.

Chia seeds are rich in the unsaturated fatty acid, linoleic, which the body cannot manufacture. When there are rich amounts of linoleic acid sufficiently supplied to the body through diet, linoleic and arachidonic acids can be synthesized; from linoleic acid.

Unsaturated fatty acids are important for respiration of vital organs and make it easier for oxygen to be transported by the blood stream to all cells, tissues, and organs. They also help maintain resilience and lubrication of all cells and combine with protein and cholesterol to form living membranes that hold the body cells together.

Unsaturated fatty acids are essential for normal glandular activity, especially of the adrenal glands and the thyroid gland. They nourish the skin cells and are essential for healthy mucus membranes and nerves.

The unsaturated fatty acids function in the body by cooperating with vitamin D in making calcium available to the tissues, assisting in the assimilation of phosphorus, and stimulating the conversion of carotene into vitamin A. Fatty acids are related to normal functioning of the reproductive system. Chia seeds contain beneficial long-chain triglycerides (LCT) in the right proportion to reduce cholesterol on arterial walls.

The **Chia** seed is also a rich source of calcium as it contains the important mineral boron, which acts as catalyst for the absorption and utilization of the calcium by the body.

The seed's hydrophilic (water absorbing) saturated cells hold the water, so when it is mixed with foods, it displaces calories and fat without diluting flavor. In fact, I have found that because Chia gel displaces rather than dilutes, it creates more surface area and can actually enhance the flavor rather than dilute it. Chia gel also works as a fat replacer for many recipes.

Top your favorite bread dough before baking with Chia gel (for toping on baked goods, breads, cookies, piecrust, etc., reduce the water ration to 8 parts water to 1 part Chia seed) for added shelf life. There are additional benefits from Chia seeds aside from the nutritive enhancements when used as an ingredient. The Indians and missionaries as a poultice for gunshot wounds and other serious injuries also used it. They would pack the wounds with Chia seeds to avoid infections and promote healing.

If you place a seed or two in your eyes it will clean your eyes and will also help to clear up any infections. There is a wealth of benefits beyond the information outlined in this article and treasure-trove of benefits yet to be discovered. Chia seeds have a qualitatively unique situational richness along with a profound nutritive profile is one of man's most useful and beneficial foods and is destined to be the Ancient Food of the Future By: William Anderson.

Sustained by the Chia Seed the Tarahumara Indians of Mexico hunted their prey to exhaustion. In 1997, a 52-year-old Tarahumara Indian, Cirildo Chacarito won the Nike sponsored 100 mile run in California. He completed this astonishing feat in a time of 19 hours, 37 minutes and three seconds. He beat a field of hundreds of competitors with more than an half-hour lead, wearing only his home-made tire tread shoes. When asked how he did this his response was taking the Chia seed before and during the race.

James F. Sheer wrote the book " The Magic Of Chia" Revival Of An Ancient Wonder Food. In his book he interviews Bill Anderson and Hal Neiman whom have done extensive research on Chia Seeds. I suggest reading this book as it holds a lot of information about different studies being preformed.

In an interview with body builder Milos Sarcev (world famous body builder) Milos told James Sheer " I had never heard of chia seeds until a year ago. Then Bob Anderson gave me a manuscript copy of this book, and I was impressed. He also gave me samples of chia seeds. These are a real blessing. I train daily for at least two hours, and these seeds turn out to be a

perfect food for bodybuilders—any athletics, for that matter—and people in general.

Chia seeds are truly a renaissance food. I take it every day, and my energy and endurance levels are sky-high. He goes on to recommend it to anyone who works out in the gym. Recent studies have shown the seeds help with cancer, ADD, AIDS, Diabetes, thyroid disorders, digestive problems, menopause, and a long list of other ailments.

Whether you are interested in chia seeds for weight loss, hydration during physical activities, nutritional values or to control diabetics sugar levels it is truly an amazing food.

100% natural and 99% organic, so simple yet so beneficial to all who use it. I have watched my customer's response and it is overwhelming. The fact that you can add to any beverage or food without changing the taste is a bonus. I take the chia seeds myself and have noticed a difference in my energy levels and digestive tract. When you buy our bulk chia seeds there will be instructions and a list of the nutrients in the package.

I first learned about Chia Seeds on the about thyroid site. The guide was recommending them for weight loss and energy and I am glad I brought them into my store and I do hope you try them. They will speak for themselves.

One pound of chia seeds would make 24 cups of gel once hydrated which if you took the recommended dose of three tablespoons three times a day of the gel it would last you over a month. I recommend to my customers to just use 1/3 cups of seeds and put in two cups of water and whisk to hydrate then place in fridge. It will last three weeks.

Chia seeds are available in [black](#) and [white](#), [ground white chia seed](#), and in [Chia Acai Energy Bars](#).

## Migraines from citrus sodas and Brominated vegetable oils

by **Candeepal** on Sun Mar 22, 2009 9:05 pm

Brominated vegetable oil. These are added to carbonated beverages, especially citrus-based sodas, like orange soda. Bromine is added to oil, which offers a thicker appearance to many sodas. Bromine cannot be easily expelled from the body and accumulates in fat cells. It has been shown to cause thyroid, kidney, and liver dysfunction in rats

9. Brominated vegetable oil (BVO) is used to keep flavor oils in soft drinks in suspension. Bromate, the main ingredient of BVO, is a poison. Just two ounces of a 2% solution of BVO can severely poison a child. In adults, this additive reduces immune defenses and depletes histamine, which can lead to allergic reactions. It has been linked to major organ system damage, birth defects, and growth problems, and is considered unsafe by the FDA. The FDA has not taken action regarding BVO, however, thus it is still lawfully used, and worst of all, manufacturers are not required to list BVO on food labels.

Bromide: Brominated vegetable oil (BVO): Used as an emulsifier in some foods and a clouding agent in many popular drinks. Bromate is the main ingredient which can poison a child. From fumigated grain products. Will replace chloride and accumulate, will also be taken up by thyroid gland instead of iodine, adverse effects on brain and thyroid function

[http://forum.womenshealthchannel.com/hc-forum/migraine\\_peer-to-peer\\_f125/migraines-from-citrus-sodas-h\\_t49573.html](http://forum.womenshealthchannel.com/hc-forum/migraine_peer-to-peer_f125/migraines-from-citrus-sodas-h_t49573.html)

## Celtic Sea Salt®

### Shattering the Myths About One of Nature's Most Necessary Nutrients

By David Brownstein, MD

There are many myths about salt. This article will address those myths and show you the benefits that unrefined sea salt can have on your health.

**Myth 1:** There is no difference between unrefined sea salt and refined table salt.

**Myth 2:** Salt = hypertension.

**Myth 3:** A low-salt diet is healthy

All of the above statements are false. The use of unrefined sea salt has proven to be a tremendous benefit for my patients and I have found it nearly impossible for someone to achieve their optimal health if they are salt-deficient.

**Myth 1: There is no difference between unrefined sea salt and refined table salt.**

Salt in its natural form is referred to as unrefined salt. Unrefined salt has not been altered by man. Therefore, it contains many different minerals and elements that are useful for the body. For example, unrefined salt, Celtic Sea Salt®, contains over 80 minerals and elements as contrasted with refined table salt, which only contains two major items—sodium and chloride.

#### Refined Salt

Most commercial refined salt has been harvested mechanically from various salt mines. Prior to mechanical evaporation, the brine is often treated with chemicals to remove minerals. These minerals are referred to as "impurities" and are sold to industry. The chemicals used to remove the "impurities" can include sulfuric acid or chlorine. All food-grade salt (i.e., refined

	Refined Salt	Unrefined Celtic Sea Salt®
Sodium	~ 39%	~ 33%
Chloride	~ 60%	~ 50%
Ferrocyanide, Aluminium Silicate, Ammonium Citrate, Dextrose	Up to 2%	0%
Minerals/elements	0%	~ 2%
Moisture	0%	14.3%

salt) available in the U.S. must comply with the National Academy of Science's Food Chemicals Codex Sodium, Chloride Monograph (1996). Up to 2 percent of refined salt may contain anti-caking, free flowing, or conditioning agents, which can be toxic to the body. These agents include sodium ferrocyanide, ammonium citrate, and aluminum silicate. Refined salt has iodide added to it (0.01 percent) to help prevent goiter. However, as I discuss in my book, Iodine, Why You Need It, Why You Can't Live Without It, iodized salt does prevent goiter, but it does not provide enough iodine for optimal thyroid functioning as well as for the body's iodine needs. The final purity of refined salt is between 99.7-99.95 percent "pure." The "pure" refers to sodium and chloride content. The "impurities," including healthy minerals and elements, have been removed from refined salt. The table above shows the major content of refined salt versus unrefined salt.

Unrefined salt contains all of the minerals and trace minerals necessary for optimal functioning of our bodies. The table on page 3 shows the actual contents of the major elements in unrefined Celtic Sea Salt. As can be seen from the tables, there is a tremendous difference between refined and unrefined salt. Refined salt is a toxic item that is devoid of minerals. It is a lifeless product that needs to be avoided. Unrefined salt, in its natural form, with its full complement of minerals should be the salt-of-choice.

## **Myth 2: Salt = Hypertension**

I was taught in medical school that the use of salt would cause hypertension. I accepted this idea unquestionably. Practicing conventional medicine, I would instruct my patients to severely limit the salt use in their diet. For those with cardiovascular problems, my instructions were simple: no salt.

What was the result of these very low-salt diets? Rarely did I see a change in cardiovascular parameters, including blood pressure. Furthermore, patients had a hard time staying on a low-salt diet because food tasted so poor on it.

When I began to research what the literature actually said about the salt = hypertension hypothesis, I was astounded. There was little data to support the dogma that salt = hypertension for the vast majority of people. Furthermore, none of the studies looked at the use of unrefined salt, which contained over 80 essential minerals that are essential to maintaining a normal blood pressure.

Let us take a closer look at the literature. The first report of the link between salt and hypertension was reported in 1904. Ambard and Beujard reported that salt deprivation was associated with lowered blood pressure in hypertensive patients. Over the next 50 years, various animal models were examined to support the hypothesis of salt causing high blood pressure. In almost all of these studies huge amounts of refined salt were given to the animals to induce a hypertensive effect. The use of large amounts of a lifeless product devoid of minerals such as refined salt should have made the results of these studies suspect.

However, the elimination of the large amounts of refined salt on these overdosed rodents resulted in dramatic lowering of blood pressure. Medical researchers and conventional institutions seized on these results and erroneously extrapolated the results to the human population. Since then the dogma of salt = hypertension has been accepted as gospel. In 1979, the Surgeon General issued a report, based in part on the above studies, that claimed that salt was the cause of high blood pressure and a low-salt diet was necessary to combat this.

The INTERSALT Trial was the most popular single study that provided the “smoking gun” proving that salt = hypertension. The study looked at over 10,000 subjects from 52 centers in 39 countries. The authors looked at the relationship between electrolyte excretion (sodium in the urine) and blood pressure. This study showed a mild decrease in blood pressure (3-6mm Hg systolic and 0-3mm Hg diastolic) when there was a dramatic decrease in salt excretion.

The "smoking gun" found in this study was reported from 4 population centers that had significantly lowered salt in their diets and also had a significantly lowered blood pressure.

These four populations were all from nonacculturated populations: Yanomamo and Xingu tribes in Brazil, and tribes in Kenya and Papua, New Guinea. These four population centers all were from areas of the world where the population had very low body weight, did not drink alcohol or smoke cigarettes in any appreciable amounts. The authors reported that blood pressure in these nonacculturated areas did not increase with age as it does in Western countries. However, living a primitive life in the jungle does not portend to a long life span. In fact, in the Yanomamo culture, rarely does anyone live beyond 50 years of age.

Numerous trials trying to look for a link between low sodium diets and lowered blood pressure have been published. Two authors looked at the results of 57 trials of people with normal blood pressure. A low-sodium diet resulted in a reduction of systolic blood pressure of 1.27mm Hg and diastolic blood pressure by 0.54mmHg as compared to a high sodium diet. These numbers are nothing to set national policy with. Many other studies have found similar findings: very modest blood pressure reduction when salt intake is lowered.

Element	%	Element	%
Chloride	59.9000	Zinc	0.00275
Sodium	33.0000	Copper	0.00195
Sulfur	0.82000	Erbium	0.00195
Magnesium	0.44100	Tin	0.00192
Potassium	0.22700	Manganese	0.00180
Calcium	0.12800	Cesium	0.00172
Silicon	0.05200	Fluoride	0.00100
Carbon	0.04900	Rubidium	0.00084
Iron	0.01200	Gallium	0.00083
Aluminum	0.00950	Roson	0.00082
Praseodymium	0.00250	Titanium	0.00079
Strontium	0.00275	Bromine	0.00071

Every ten years, the U.S. government does an analysis of thousands of its citizens looking at various markers of health. One such marker has been the mineral intake and the sodium excretion. This study is known as the National Health and Nutrition Examination Survey (NHANES).

Over the last 30 years, NHANES has found a correlation between inadequate levels of minerals (particularly potassium and calcium) and the presence of hypertension. Furthermore, higher dietary sodium levels were not associated with hypertension. There is enough evidence to discount the myth that salt = hypertension. Good salt, unrefined sea salt, does not cause hypertension. In fact, its use can actually help prevent and treat hypertension.

### Myth 3: A Low-Salt Diet is Healthy

What happens when the salt levels are lowered? If a low-salt diet was healthier you would expect lowered cardiovascular deaths and a longer life span.

Eleven blood pressure trials, which included follow-up from six months to seven years were reviewed. Researchers found that there was no difference in deaths and cardiovascular events between the low-salt groups and the high-salt groups.

NHANES data has shown that compared with a high-salt diet, a low-salt diet has been associated with a greater than 400 percent increase in risk of myocardial infarction (heart attack) in men.

How do you explain the higher risk of myocardial infarction? Low-salt diets have been shown to elevate fasting insulin levels. Insulin resistance is a widespread problem and is associated with dramatic increases in diabetes and cardiovascular disease. LDL cholesterol has also been shown to elevate in individuals consuming a low-salt diet. Elevated LDL cholesterol has been associated with the onset of cardiovascular disease.

A low-salt diet has never been proven to be a health benefit for the vast majority of people. As explained above, there are many studies showing the fallacies and dangers of a low-salt diet. My clinical experience has shown little benefit of a low-salt diet in improving any condition.

### **What About Unrefined Salt?**

If salt does not cause hypertension and if a low-salt diet is not healthy, what type of salt should we eat and do we need salt?

As stated previously, unrefined salt contains over 80 minerals that are essential to life. It is this combination of sodium, chloride and minerals that make unrefined salt a healthy product for our bodies. As shown in NHANES, low mineral levels are associated with elevated blood pressures. Unrefined salt provides these minerals (plus other important trace minerals) that help improve all bodily systems including the immune system, glandular system and the nervous system.

Salt is the second major constituent in the body next to water. We need adequate amounts of salt for our adrenal glands to function normally. The adrenal glands are exquisitely sensitive to the sodium and mineral levels of the body. Adrenal dysfunction is occurring at epidemic rates presently. I have found it nearly impossible to rectify adrenal malfunction when there is a salt deficiency or mineral deficiency in the body. The only way to rectify this problem is with the use of unrefined salt.

*Celtic Sea Salt®* (the author has no financial interest in *Celtic Sea Salt®*) provides the body with a host of well absorbed minerals in the perfect balance to help improve adrenal problems as well as immune system and other disorders.

At the initial visit of every patient I do a blood analysis and a hair analysis looking at electrolyte and mineral levels in the body. Low electrolytes and low mineral levels are very common and are associated with a host of disorders including those mentioned above. The only way to provide the body with the basic raw materials it needs to overcome these disorders as well as perform at its optimal functioning is with supplying the body with an adequate amount of unrefined salt. If someone is not ingesting unrefined salt, they will be salt deficient.

I recommend starting out at 1/2tsp of unrefined salt per day (in the form of *Celtic Sea Salt®*) and ensuring an adequate water intake. The physiological responses are astounding. The immune system works better, energy levels improve and brain function dramatically improves. There are many more positive effects as detailed in *Salt: Your Way To Health*. If you have kidney disease, you must consult with your doctor before adding salt to your regimen.

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# Avoiding This "Forbidden Food" Could Make You Moody

Posted By [Dr. Mercola](#) | August 25 2010 |

By Dr. Mercola

Salt is essential for life — you cannot live without it.

Salt has been important to humanity for life on this planet. Even [the word "salary" comes from \*sal\*](#) because Romans were paid in salt.

African and European explorers traded an ounce of salt for an ounce of gold — *salt was literally worth its weight in gold.*

Unrefined natural salt is important to many biological processes, including:

- Being a major component of your blood plasma, lymphatic fluid, extracellular fluid, and even amniotic fluid
- Carrying nutrients into and out of your cells
- Helping the lining of your blood vessels to regulate blood pressure
- Helping you regulate propagation of nerve impulses
- Helping your brain send communication signals to your muscles, so that you can move on demand (sodium-potassium ion exchange)

Having outlined the importance of salt it is important to realize that too much sodium can hurt you, but the same can be said of most things — even oxygen and water.

Indeed, there is far too much sodium in processed foods. But you shouldn't be eating those foods anyway — high sodium is but one of MANY ingredients in processed foods that will ruin your immune system and cut your precious life short.

One of the latest harmful ingredients is methanol. This toxic alcohol poison is typically in nearly all fresh vegetables and fruits but is bound to pectin so it does not typically cause problems. But once they are canned in glass or aluminum the methanol dissociates from the pectin and can elevate to very high levels and contribute to diseases like MS.

[But getting back to salt, the general question remains — is it harmful?](#)

## Salts of the Earth

As it turns out, salt is a very general term that can mean many things. All salts are NOT equal in terms of origin, chemistry, crystal structure, biological effects — or even flavor!

Chemically speaking, a salt is simply any ionic compound arising from the joining of a positively charged ion and a negatively charged ion, so that the product is electrically neutral.

When people talk about salt, they are usually referring to refined table salt, or sodium chloride. But in fact, most minerals are salts, including magnesium sulfate (Epsom salt) and ammonium nitrate (used in fertilizer).

But with typically edible salts, most people do not realize there are enormous differences between common, refined table salt and natural, unrefined salt.

One is health damaging, and the other is healing.

## **ALERT — Natural Salt is 85 Percent Sodium Chloride and Processed Salt is 98 Percent**

Ordinary table salt [undergoes a great deal of processing](#) between the factory and your grocer. It is approximately 97.5 percent sodium chloride and 2.5 percent chemicals such as iodine and moisture absorbents, dried at over 1,200 degrees Fahrenheit. This high heat alters the natural chemical structure of the salt.

By contrast, unrefined salt is 84 percent sodium chloride and 16 percent other naturally occurring minerals, including many trace minerals like silicon, phosphorous and vanadium.

If you want your body to function properly, you need a balanced salt, complete with all-natural elements and free of pollutants. I will speak more about my favorite natural salt a bit later.

The important point is, today's ordinary table salt has nothing in common with natural sea salt.

## **The Adulteration of Table Salt**

What remains after ordinary table salt is "chemically cleaned" is sodium chloride, an unnatural chemical form of salt that your body recognizes as something completely foreign. Therefore, when you add more salt to your already salty Spaghettios, your body receives more salt than it can dispose of.

Typical processed salt has independent crystals that are totally isolated from each other. In order for your body to try to metabolize processed salt, it must sacrifice tremendous amounts of energy.

Inorganic sodium chloride in the form of processed salt can keep you from an ideal fluid balance and can overburden your elimination system.

When your body tries to isolate the excess salt, water molecules must surround the sodium chloride to break them up into sodium and chloride ions before your body can neutralize them. To accomplish this, water is taken from your cells.

This results in a less-than-ideal fluid balance within your cells.

Every gram of excess sodium chloride your body has to neutralize uses up 23 grams of cellular water. Hence, eating too much common processed salt will cause fluid to accumulate in your tissues, which contributes to:

- Unsightly cellulite
- Rheumatism, arthritis and gout
- Kidney and gall bladder stones

Processed salt will also oftentimes contain potentially dangerous preservatives.

Calcium carbonate, magnesium carbonate, and aluminum hydroxide are often added to improve salt's "pourability." [Aluminum](#) is a light alloy that deposits into your brain — a potential cause of Alzheimer's disease.

## Current Sodium Recommendations

The American Heart Association has suggested limiting your sodium consumption to fewer than 1,500 mg per day to decrease your risk for high blood pressure, stroke and weight gain.

The CDC reports less than ten percent of adults are meeting this limit, and some studies have suggested many Americans are consuming more than 7,000 mg of salt per day, which is the equivalent of approximately 3 teaspoons of table salt.

The *American Journal of Clinical Nutrition* considers a product high in sodium if it contains more than 500 milligrams per 100 gram serving. Similarly, it considers a product low in sodium if it contains less than 120 milligrams per 100 grams.

The foods highest in sodium tend to be processed meats, which often contain a whopping 800 mg per 100 gram serving!

It probably makes sense to limit your intake of refined processed salts to these levels. However, if you are healthy your body should be able to easily tolerate much higher levels of unprocessed salts.

The only exception would be for those who have heart failure and are very sensitive to fluid overload. Those with congestive heart failure (CHF) will typically be on a number of different drugs to improve cardiac function.

So those with established CHF should maintain strict sodium restrictions but should also look into the many effective natural options out there like ubiquinol which has been shown to be highly effective in improving those with lowered cardiac ejection fractions.

## Why are Processed Foods so Loaded With Sodium?

At one time, salting was one of the few ways people could preserve foods. Salt kills bacteria that can cause food to spoil.

But today, between chemical preservatives and refrigeration, salt is added for other reasons — and it's added to processed foods in HUGE amounts. The reason for this has more to do with the fact that salt is an inexpensive way to improve the taste of overcooked, bland, nutrient-butchered carnage in a can that some people call food.

Salt is used in high amounts in lunchmeats and cheeses to extend shelf life. Sodium also helps bind ingredients together and acts as a stabilizer.

Besides sodium chloride, sodium is also a component of other ingredients you will find on your labels, further driving up your sodium level:

- Monosodium glutamate (MSG)
- Baking soda (sodium bicarbonate)
- Sodium benzoate
- Sodium nitrate
- Sodium saccharin

## Hypertension Is Driven More by Excess SUGAR than Excess Salt

While I certainly agree you should not consume large quantities of refined processed salt, just switching to low-sodium foods — especially those in a box or a can — is not going to get you very far toward your health goals.

There are other factors that control fluid and electrolyte balance, blood pressure, kidney disease, obesity and cardiovascular disease.

For example, one of the greatest revelations of late is the link between fructose consumption and hypertension. [Uric acid is a byproduct of fructose metabolism](#), and increased uric acid levels drive up your blood pressure. The amount of salt people in this country are consuming pales in comparison to the amount of fructose they are eating on a daily basis, yet the AMA issues no warnings about this.

I believe that sugar/fructose consumption is the major driving force behind our ever-increasingly elevated blood pressures.

## Can Your Sodium be Too LOW?

Yes it can!

You may not be aware of this, but *you have an increased risk for health problems if your sodium is too low (hyponatremia)*. For example:

- A 2009 study of large-bone fractures in the elderly found the incidence of hyponatremia in patients with fractures was MORE THAN DOUBLE that of non-fracture patients. They postulated the reason for the sodium deficiency might have been the use of selective serotonin receptor inhibitors (SSRIs), a type of antidepressant drugs.
- A 1995 study by the AMA published in the journal Hypertension found low urinary sodium associated with an increased risk of heart attack.

Changes in mood and appetite are among the first noticeable manifestations of sodium deficiency, since [salt is a natural antidepressant](#).

And the preponderance of evidence proves that [sodium intake does NOT affect blood pressure unless you are especially sodium-sensitive](#).

### **Salt as Nature Intended It: Himalayan Crystal Salt**

The more you can move toward a diet of [whole foods in their natural state](#), the healthier you'll be — whether it's veggies, meat, dairy products, or salt. If you are a protein type, you will need more salt than your fellow carbohydrate types.

Given that salt is absolutely essential to good health, I highly recommend switching to my favorite unrefined salt, [an all-natural source from the Himalayas](#).

This salt is very special — it is completely pure, having spent many thousands of years maturing under extreme tectonic pressure, far away from exposure to impurities, so it isn't polluted with the heavy metals and industrial toxins of today. And it's minimally processed — hand-mined and hand-washed.

Himalayan salt contains 84 trace minerals from our prehistoric seas, and its crystalline structure actually stores [vibrational energy](#), which is restorative to your body.

The crystal salt from the Himalayas does not burden your body as refined salts do.

It is very difficult for your body to absorb too much crystal salt since there are effective feedback loops that regulate this process. Natural crystal salt always promotes a healthful balance and does not contribute to high blood pressure like refined table salt.

And it's the most delicious salt you'll ever find!

Not only is Himalayan salt nutritionally beneficial and delicious, but it also has several great healing applications when used topically:

- Bath Soak: As a "brine bath," it is stimulating and even moisturizing to your skin, as well as detoxifying. Use a 1 percent concentration, which is equal to your natural body fluids (add about 2.6 pounds of salt to an average tub of water). Soak for 15 to 20 minutes, and do not shower off—just blot with a towel.

- Salt Sole: Sole simply means a supersaturated saltwater solution (about 8 percent salt), and with this you can treat a number of skin conditions, including itching and rashes.
- Sinus Flush: Mix with pure water in a neti pot a 1 percent solution (normal saline) with warm water for a beneficial sinus or allergy treatment; use 1 gram per 100ml (one-fifth teaspoon in 3.34 ounces lukewarm water).
- Eye rinse: The same 1 percent solution rejuvenates tired or irritated eyes.
- Throat gargle: To treat a cold or sore throat, gargle with a 1 percent saltwater solution (but don't swallow).

#### Sources:

» [Bloomberg News June 24, 2010](#)

## **Iodine's Crucial Role in Health:**

### **A Review of an Unforgettable Gathering of Experts**

By David Brownstein, MD

With an estimated 95 percent of individuals deficient in iodine, I thought it is important to inform you about a recent conference that spotlighted this essential mineral. The conference, titled "Recent Advances in the Use of Iodine in Medical Practice" was a two-day gathering of many of the leaders in the iodine field recently held in Scottsdale, Arizona.

The information presented on Day 1 of the iodine conference was astonishing. I was amazed that people would come from all over the country to hear about one single nutrient. The question and answer session lasted for more than 2 hours—the longest Q & A session I have ever been involved in. I think the Q and A session was an indication about how high the interest is in iodine.

Numerous speakers at the conference each brought their own unique perspective on the use of iodine. Dr. Guy Abraham, my mentor on iodine, was the lead speaker. Dr. Abraham gave an eloquent presentation on the history of iodine and why it is still so important in the modern-day diet. Dr. Abraham presented new information that higher doses of iodine, between 50-100 mg per day may be necessary to decrease oxidative DNA damage. He also showed us why the low RDA doses of iodine are ineffective and have no anti-cancer effect in the body.

In addition to Dr. Abraham's intriguing presentation, the conference also featured Dr. Jorge Flechas. Dr. Flechas presented his laboratory information that illustrated the widespread deficiency of iodine. He has tested thousands of samples from patients all over the country and found consistently that over 95 percent of people are iodine deficient. In my office, my partners and I have found similar results: more than 95 percent of patients we have tested are severely iodine deficient. In fact, most of my lab tests show people have nearly undetectable iodine levels in their body. My numbers correlate very closely with Dr. Flechas' numbers. At the conference, I presented information on my use of iodine in a clinical setting. I showed the audience that iodine deficiency is real and still occurring today.

Learning more about iodine's role in our health is one of the most important things we can do because iodine deficiency is the underlying problem—or one of the main problems—responsible for the high rate of cancer (particularly breast, lung, prostate and ovary) as well as the high rate of autoimmune disorders we are seeing in this country.

Day 1 of this conference was truly one of the most stimulating days at a medical meeting. It brought to the forefront the very real concern that iodine deficiency is truly a national problem.

### **Breast Health, Fluoride Toxicity and Iodine**

The second day of the iodine conference started with Bernard Eskin, M.D. Dr. Eskin is professor of Obstetrics and Gynecology from Drexel University. He has published more than 100 peer-reviewed papers and studied iodine for nearly 50 years. Dr. Eskin presented a wealth of information on iodine and its relationship to breast cancer. It is well known that iodine deficiency results in goiter or a larger thyroid volume and Dr. Eskin showed research correlating increased thyroid volume in women with breast cancer. He also showed us his own earlier research where iodine concentrated in the ducts of the breast, the area most commonly affected by breast cancer. He also presented newer research showing how iodine is used by the breast. He made it clear iodine deficiency induces the earliest form of malignant changes in the breast—dysplasia. Iodine deficiency also makes existing cancer more aggressive. He presented research that iodine deficiency increases the size of breast tumors, while iodine replacement reduces their size. Iodine was also shown to inhibit tumor proliferation and to modulate the estrogen receptors in the breast and lessen negative estrogen influence on cancer formation and the spread of cancer cells. The presentation was so informative that it made me realize that even someone like myself, who has immersed himself in the study of iodine, still has a lot to learn.

Day 2 of the iodine conference continued with Dr. Donald Miller. Dr. Miller is a professor of surgery at the University of Washington School of Medicine. I became acquainted with Dr. Miller by reading an article in the Journal of the American Association of Physicians and Surgeons (Miller DW. Extrathyroidal Benefits of Iodine. Journal of American Physicians and Surgeons 2006;11(4-Winter):106-110). This article was Dr. Miller's review of the benefits of iodine supplementation. I highly recommend this article to anyone

interested in more information on iodine. It is available at his website: [www.donaldmiller.com](http://www.donaldmiller.com).

Dr. Miller presented information on fluoride and its relationship to iodine. He discussed the research calling into question the benefits of water fluoridation and quoted a study from the WHO showing that there is no difference between fluoridated and unfluoridated countries in the tooth decay rate. A huge number of our children (more than 30 percent according to the CDC) are currently being affected by fluoride poisoning, which can manifest as dental fluorosis. He also reviewed the manifestations of fluoride poisoning that include arthritis, osteoporosis, Alzheimer's disease, and an increased risk of cancer.

Next, Dr. Miller reviewed the scope of iodine deficiency and the consequences when we are not obtaining enough of this mineral. He presented information showing iodine functions as a strong antioxidant. Iodine was also shown to induce death in lung cancer cells. Another important part of Dr. Miller's presentation was a comparison between the iodine intake in the U.S. and Japan. What is the consequence of the Japanese ingesting more than 100 times the iodine as the average American? A lowered rate of breast cancer, a much better life expectancy and a lower infant mortality rate.

Dr. Miller's presentation was a wonderful overview of the benefits of iodine. I thoroughly enjoyed his long discussion on the dangers of adding fluoride to the water supply.

After lunch, Dr. William Shevin spoke on his Clinical Experience with Orthiodosupplementation. Dr. Shevin started his talk with showing what has happened to the radioactive iodine released from nuclear tests and accidents. He showed that radioactive iodine has penetrated nearly every area of this country from testing done in Nevada. He presented his clinical experience with testing and treating 186 patients. He reported that 71.5 percent showed "unequivocal improvement," 15.6 percent had improvement, while 4.8 percent reported negative reactions and 8.1 percent of his patients noted no change. The three case histories he presented were highly informative. The most interesting part of the case histories (at least to me) was when he showed how he treated a detox reaction from iodine with sea salt. Dr. Shevin reported from the literature that salt was the treatment of choice to treat bromine toxicity from years past. Many people are exposed to bromine through dietary sources. He felt that iodine use in some will trigger a bromine detox reaction that can be managed by using more sea salt in the diet. I have found similar results in my practice. Dr. Shevin also showed a video of his patients' responses to iodine. I found his talk stimulating, and it provided a lot of useful clinical information on iodine supplementation.

Glenn Ozalan, NMD, and Vimal Patel, RPh gave the final lecture. They presented useful information on how to detoxify the body. They also presented their clinical information on the use of iodine as part of a detoxification plan.

I thought the first iodine conference was truly a special event. I learned a tremendous amount and cannot wait until the next conference. Meanwhile, for those of you who were unable to attend, I highly recommend the DVD that recaptures all these fascinating presentations.

## **Breast Health**

### **Iodine and Other Nutrients Play a Crucial Role**

By Jorge D. Flechas M.D., M.P.H.

Over the next few weeks, the country will nationally be focusing on breast cancer. Of all the cancers women develop, 29 percent are breast cancer. By age 25, 1 in 19,608 women will develop breast cancer. By age 50, this number changes to a shocking 1 in 50 and by age 75 an even more dismal statistic: 1 in 11. In a total lifetime, one woman in 8 will develop breast cancer.

In January 2005, cancer became the leading cause of death in the United States. Each year about 211,000 cases of breast cancer are diagnosed in the USA. The number of new breast cancer cases increased from 82 per 100,000 women in 1973 to 195 per 100,000 women in 2000. The main cause of death prior to that was heart disease. The estimated death rate from breast cancer is 40,600: 40,200 females and 400 males.

Much is said in the public media about a genetic link with this cancer. Yet, genetics play only a small role in the development of breast cancer—less than 7 percent. In the September 8, 2006 issue of *USA TODAY*

one of the lead articles was on Killer Cancer Genes ID'd. It mentioned that 122 breast cancer-causing genes have been identified. The scientist quoted in the article mentioned that we may not be able to tackle all the genes in a tumor but that we may have to work on silencing the cancer-causing genes. Doctors in the future may find that silencing even one of these genes could be enough to keep a tumor in check or kill it. They mention in the article that treatments could be a decade or more to develop.

Yet, the technology for tomorrow is here today in the supplements we have at our disposal. For example, methylation of DNA and gene silencing are affected by nutrition. Many articles exist on silencing genes and how the use of methyl-folic acid, methyl-vitamin B12, selenium, trimethylglycine powder and zinc help to methylate the DNA.

### **Breast Cancer Risk Factors**

Many breast cancer risk factors have been identified such as a high-fat diet, low-fiber diet, tobacco use, and alcohol use. These risk factors can be modified by an individual. There are other factors that are mostly out of a woman's control. The longer a woman is exposed to estrogen in her body, for example, the higher her risk. This would include early age at menarche, late age at menopause, long-term use of birth control pills and nulliparity (never having given birth). There seems to be a group of women whose use of birth control pills for more than 4 years puts them at higher risk before age 45. Women who take thyroid hormone are also at higher risk for developing breast cancer.<sup>1</sup> Conversely, a lower risk for breast cancer is seen in women who are late in age at menarche, early age at menopause, and early age at first pregnancy.

### **Fibrocystic Breasts**

In the *New England Journal of Medicine*, July 22, 2005 issue, there was a lead article showing that benign breast changes in women are associated with breast cancer. Benign breast changes is a new term for what we have called fibrocystic breast disease (FBD) in the past. FBD is currently affecting about 84 percent of the female population in North America.<sup>2</sup> FBD is a misnomer because the medical problem is not a disease in the strictest sense. It is more a problem of cyclic breast pain that is associated with the menstrual cycle. In some patients the breast pain is seen daily, regardless of their menstrual cycle. Tissue biopsy for these benign breast changes that do grow larger are called proliferative lesions and if they do not grow they are called non-proliferative lesions.

Non-proliferative lesions (non-growers) can include cyst of the breast, radial scars, apocrine cells which generally make up sweat glands—the breasts are classified as a modified sweat gland—fibroadenoma, and hyperplastic cells that are normal in appearance under the microscope but are more numerous than usual. Proliferative lesions with normal cells are called sclerosing adenosis, which have a slightly increased risk (1.5 to 2 times). There are proliferative lesions with abnormal or atypical cells that are called hyperplasia—high degree with a moderate increased risk of breast cancer of (4 to 5 times), lobular neoplasia and intraductal papilloma. As a rule in medicine, the more abnormal cells look under the microscope, i.e., the more atypical the cells look, the higher the risk of cancer being present.

### **Iodine's Supportive Role**

Back in the early 1990s it was noted that patients who had iodine deficiency had associated benign breast changes. By giving these patient's iodine the breast changes that were present would regress.<sup>2</sup> It had been noticed a few years earlier that in animal studies, where the animal had been denied access to iodine, the animals developed benign breast changes like humans.<sup>3-5</sup> In animal studies, researchers have been able to produce breast cancer in animals by depriving them of iodine.<sup>4</sup>

In my own personal medical practice I have literally seen the regression of cysts, nodules, scar tissue, and painful breast with the use of 50 mg of Iodoral® per day for 2-3 years. The breast pain goes away in just a few weeks, but the cyst/cysts, scar tissue and breast nodules take up to 2 to 3 years to resolve. On mammograms I have seen a 50 to 80 percent reduction in the scar tissue present in the breast. Studies are needed to show via biopsy that the many different types of FBD will regress with iodine supplementation.

Before starting on iodine therapy, a patient should have their thyroid hormone values investigated. A doctor should check the size of the thyroid for enlargement and or nodules. An iodine-loading test should also be done prior to starting iodine therapy to establish the need for iodine therapy. In this test the patient is given 50 mg of iodine and a 24-hour urine test is then collected. The iodine level in the urine is measured. The more saturated the body is with iodine the higher the level of iodine excreted. The more saturated the body is, the less breast abnormalities have been seen. The test is repeated at 3 months to document increasing saturation. If saturation is not occurring then further investigation is called for to find out why saturation isn't happening.

### **Additional Support**

Several other nutrients/hormones are also important to breast health and can be used in conjunction with Iodoral. DIM (diindolylmethane), the nutrient derived from cruciferous vegetables, for example, is influential in helping the body metabolize estrogen. DIM has been shown to change the way estrogen is metabolized. Metabolism of the natural estrogen estradiol occurs via one of two pathways. The tumor enhancer metabolic pathway, 16 alpha-hydroxylation, is elevated in patients with breast and endometrial cancer and in those at increased risk of such cancers. This increased 16 alpha-hydroxylation activity has been shown to precede clinical evidence of cancer, and it represents a significant risk factor for developing estrogen-dependent tumors.

Conversely, when estrogen veers away from the 16-alpha pathway and takes another route out of the body, the incidence of cancer decreases. This alternate route, which acts as a tumor suppressor metabolic pathway, is called 2-hydroxylation, a process that transforms estrogen into 2-hydroxyestrone (20HE1), an antiestrogen. Healthy individuals not at risk for breast or endometrial cancer bypass the 16-alpha route and instead metabolize estrogen through this preferable pathway. DIM signals the body to metabolize estrogen via the tumor suppressor 2-hydroxylation pathway.

In addition to this more well known estrogen-related mechanism of action of DIM, recent research also indicates that DIM can prevent angiogenesis, the process by which new blood vessels develop. Cancer cells use the development of new blood vessels to spread throughout the body. In mice, DIM inhibited angiogenesis by up to 76 percent.<sup>6</sup> In addition, in mice implanted with human breast cancer cells, tumor growth was inhibited by 64 percent in animals treated with DIM.<sup>6</sup>

Another means of supporting breast health is by using natural progesterone cream. A syndrome known as Estrogen Dominance is prevalent in women, especially postmenopausal women. According to progesterone researcher Dr. John Lee, estrogen unopposed by progesterone results in a number of adverse effects including painful breasts, fibrocystic breast disease, and breast cancer.

Estrogen dominance usually occurs at menopause, when progesterone production falls to approximately 1 percent of its pre-menopausal level. At this time, the production of estrogen falls to about 50 percent of its pre-menopausal levels. This dramatically alters the estrogen: progesterone ratio, causing estrogen to become toxic without progesterone to oppose it. As a result, the risks for breast and uterine cancer and fibrocystic breast disease increase.<sup>7</sup> Therefore, progesterone also has a crucial role to play in maintaining breast health.

Vitamin D is another breast-supportive nutrient. Women who have mutations in their vitamin D receptor gene are nearly twice as likely to develop breast cancer compared to women who do not have the mutation. The vitamin D receptor gene controls the action of vitamin D in the body. Scientists have found that Caucasian women with certain versions of this gene not only have an increased risk of breast cancer but also may suffer from a more aggressive form of the disease if it spreads. The results suggest that vitamin D does indeed play a part in protecting the body against breast cancer, as past studies indicate.

Five to ten percent of breast cancer cases are due to already established gene mutations such as BRCA1. However, the underlying cause of breast cancer in women who do not have this gene and have no family

history of the disease has remained a mystery. The study suggests that the mutation in the Vitamin D receptor gene may have a role to play in disease development in women who would not ordinarily be expected to develop the disease.<sup>8</sup>

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## Iodine, The Rest of the Story

By David Brownstein, MD

In a number of past newsletters, three articles have extolled the value of iodine supplementation. A review of the older research as well as newer research has revealed that iodine deficiency is widespread and may be responsible for many underlying conditions including cancers of the breast and ovary, thyroid disorders, chronic fatigue, and fibromyalgia.

Appropriate testing for iodine deficiency was reviewed. The most accurate test to measure iodine levels is the iodine loading test. This was covered in the November 2005 Vitamin Research News. After taking 50 mg of an iodine/iodide combination, 24 hours of urine is collected. The amount of iodine excreted is measured. When there is iodine deficiency present, little iodine will be excreted during the testing. When there is sufficient body iodine levels present, larger amounts of iodine will be excreted.

I have been involved in the iodine project for approximately four years. During this time, I have tested iodine levels (with my partners) in over 4,000 patients. My results have been consistent: over 95 percent of patients have tested low for iodine.

The iodine loading test has proved useful to gauge the body iodine levels. The first question to come to mind if one tests low for iodine is, "Shouldn't I just take iodine?"

The best results with iodine, as with all nutritional supplements, can be achieved as part of a comprehensive holistic program. As I describe in my book, *Iodine: Why You Need It, Why You Can't Live Without It* 2nd Edition, adding magnesium and vitamin C will enhance the effects of iodine. This is particularly true for individuals experiencing a number of factors related to iodine. This article will cover four major factors sometimes associated with iodine supplementation and how vitamin C and magnesium can support individuals with these concerns:

1. Allergy
2. Autoimmune thyroid disorders
3. Detoxification Reactions
4. Iodism

### Iodine allergy

In my experience, an allergy to inorganic, non-radioactive iodine is very rare. An allergy to radioactive iodine dye, commonly used in many medical procedures, does not guarantee an allergy to inorganic iodine/iodide such as Iodoral®. If an allergy is shown to iodine, do not continue to take it until you seek medical care.

### Autoimmune Thyroid Disorders

Some physicians feel that iodine supplementation causes autoimmune thyroid disorders. They also claim that those with autoimmune thyroid disorders should not take iodine as it will exacerbate their condition.

Before conventional medicine began using radioactive iodine to treat autoimmune thyroid disorders, large doses of iodine was the treatment of choice in treating autoimmune thyroid disorders. There are numerous reports in the literature, some dating back well over 100 years, showing the benefits of using iodine in excess of the RDA to treat autoimmune thyroid illnesses.<sup>1-4</sup>

If iodine was the cause of autoimmune thyroid illnesses, these illnesses should have been decreasing over the last 30 years. The opposite has occurred. In the United States, iodine levels have fallen approximately 50 percent over the last 30 years while, at the same time, autoimmune thyroid disorders have been rapidly increasing.<sup>5</sup>

My clinical experience has shown that in an iodine deficient state, higher doses of iodine, as part of a holistic treatment program, are an effective and safe way to treat autoimmune thyroid illness without appreciable side effects.

### **Detoxification Reactions**

Iodine can cause a detoxification reaction in the body by facilitating the body's release of the toxic halides fluoride and bromide. If the body's detoxification pathways are overloaded when the toxic halides are being released, a detoxification reaction can be triggered. A detoxification reaction can take the form of fatigue, muscle aches, fever, diarrhea, and brain fog, skin rashes, etc.

Though a detoxification reaction to iodine usage is rare, it has happened. A detoxification reaction can be minimized with using nutritional support (vitamins and minerals), balancing the hormonal system, getting the body's pH balanced, eating healthy foods, and other holistic treatments. This will be discussed more at the end of this article.

### **Iodism**

Iodism occurs when the dose of iodine is too high and results in a metallic taste in the mouth, increased salivation, sneezing, headache, and acne. Also, sinus headache, especially headache in the frontal area, and a sense of fever may be present. Iodism occurs in a small minority of patients and is easily rectified by adjusting the dosage of iodine used.

### **Synergistic Supplements**

As with using any nutritional supplement, a comprehensive holistic treatment plan provides the best results. Magnesium is an important part of the iodine treatment plan. Magnesium deficiency is very common. Magnesium is nature's relaxing agent. Magnesium levels (via red blood cell magnesium levels) should be assessed and supplementation instituted. Magnesium supplementation will likely ensure optimal results with iodine.

Vitamin C is also an integral nutrient in the iodine treatment plan. I reported a case study showing how the use of Vitamin C along with iodine helped to improve and possibly repair the transport mechanism for iodine in a patient with Graves' disease.<sup>6</sup> As with magnesium, it is best to use Vitamin C before beginning iodine supplementation.

My experience has also shown that proper mineral support also aids iodine supplementation. Testing for mineral deficiencies and correcting these deficiencies before instituting iodine supplementation leads to the best results. I frequently have my patients measure their pH levels. If an acidic condition is present, correcting the pH imbalance before beginning iodine therapy is the correct way to go. How do you correct a pH imbalance? Eating whole foods, eliminating refined foods, beginning mineral supplementation including magnesium can all help the situation. Iodine itself is also an alkalinizing agent for the body.

### **Summary**

If one is found to be iodine deficient, it is best to correct other nutrient imbalances before instituting iodine supplementation. Proper dosing of magnesium, Vitamin C and minerals will maximize the response to iodine. Before beginning any nutritional program, the best results can be achieved when working with a health care practitioner skilled in the use of natural agents.

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## Iodine

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Iodine, a non-metallic trace element, is required by humans for the synthesis of [thyroid hormones](#). Iodine deficiency is an important health problem throughout much of the world. Most of the earth's iodine is found in oceans, and iodine content in the soil varies with region. The older an exposed soil surface, the more likely the iodine has been leached away by erosion. Mountainous regions, such as the Himalayas, the Andes, and the Alps, and flooded river valleys, such as the Ganges, are among the most severely iodine-deficient areas in the world [\(1\)](#).

### Function

Iodine is an essential component of the [thyroid hormones](#), triiodothyronine ( $T_3$ ) and thyroxine ( $T_4$ ), and is therefore essential for normal thyroid function. To meet the body's demand for thyroid hormones, the thyroid gland traps iodine from the blood and incorporates it into thyroid hormones that are stored and released into the circulation when needed. In target tissues, such as the liver and the brain,  $T_3$ , the physiologically active thyroid hormone, can bind to [thyroid receptors](#) in the nuclei of cells and regulate [gene expression](#). In target tissues,  $T_4$ , the most abundant circulating thyroid hormone, can be converted to  $T_3$  by selenium-containing [enzymes](#) known as deiodinases. In this manner, thyroid hormones regulate a number of physiologic processes, including growth, development, metabolism, and reproductive function [\(1, 2\)](#).

The regulation of thyroid function is a complex process that involves the brain ([hypothalamus](#)) and [pituitary gland](#). In response to thyrotropin-releasing hormone (TRH) secretion by the hypothalamus, the pituitary gland secretes thyroid-stimulating hormone (TSH), which stimulates iodine trapping, thyroid hormone synthesis, and release of  $T_3$  and  $T_4$  by the thyroid gland. The presence of adequate circulating  $T_4$  and  $T_3$  feeds back at the level of both the hypothalamus and pituitary, decreasing TRH and TSH production ([diagram](#)). When circulating  $T_4$  levels decrease, the pituitary increases its secretion of TSH, resulting in increased iodine trapping as well as increased production and release of both  $T_3$  and  $T_4$ . Iodine deficiency results in inadequate production of  $T_4$ . In response to decreased blood levels of  $T_4$ , the pituitary gland increases its output of TSH. Persistently elevated TSH levels may lead to hypertrophy (enlargement) of the thyroid gland, also known as [goiter](#) (see [Deficiency](#)) [\(3\)](#).

## Deficiency

Iodine deficiency is now accepted as the most common cause of preventable brain damage in the world. The spectrum of iodine deficiency disorders (IDD) includes mental retardation, [hypothyroidism](#), [goiter](#), and varying degrees of other growth and developmental abnormalities (1, 4). WHO estimated that over 30% of the world's population (2 billion people) has insufficient iodine intake as measured by urinary iodine excretion below 100 micrograms (mcg)/liter (5); urinary iodine is an indicator of iodine status. Moreover, an estimated 31.5% of school-age children (6-12 years old) worldwide (266 million total children) has insufficient iodine intake (5). Major international efforts have produced dramatic improvements in the correction of iodine deficiency in the 1990s, mainly through the use of iodized salt in iodine-deficient countries (6). Today, 70% of households in the world use iodized salt (7). For more information on the international effort to eradicate iodine deficiency, visit the Web sites of the [International Council for the Control of Iodine Deficiency Disorders](#) (ICCIDD) or the [WHO](#).

Thyroid enlargement, or goiter, is one of the earliest and most visible signs of iodine deficiency. The thyroid enlarges in response to persistent stimulation by TSH (see [Function](#)). In mild iodine deficiency, this adaptative response may be enough to provide the body with sufficient thyroid hormone. However, more severe cases of iodine deficiency result in hypothyroidism. Adequate iodine intake will generally reduce the size of goiters, but the reversibility of the effects of hypothyroidism depends on an individual's stage of development. Iodine deficiency has adverse effects in all stages of development but is most damaging to the developing brain. In addition to regulating many aspects of growth and development, thyroid hormone is important for [myelination](#) of the [central nervous system](#), which is most active before and shortly after birth (2, 6).

### The effects of iodine deficiency by developmental stage

#### *Prenatal development*

Fetal iodine deficiency is caused by iodine deficiency in the mother. One of the most devastating effects of maternal iodine deficiency is [congenital hypothyroidism](#). A severe form of congenital hypothyroidism may lead to a condition that is sometimes referred to as [cretinism](#) and result in irreversible mental retardation. Cretinism occurs in two forms, although there is considerable overlap between them. The neurologic form is characterized by mental and physical retardation and deafness and is the result of maternal iodine deficiency that affects the fetus before its own thyroid is functional. The myxedematous or hypothyroid form is characterized by short stature and mental retardation. In addition to iodine deficiency, the hypothyroid form has been associated with selenium deficiency (see [Nutrient Interactions](#)) and with the presence of [goitrogens](#) in the diet that interfere with thyroid hormone production (see [Goitrogens](#)) (8).

#### *Newborns and infants*

Infant mortality is increased in areas of iodine deficiency, and several studies have demonstrated an increase in childhood survival upon correction of the iodine deficiency (9). Infancy is a period of rapid brain growth and development. Sufficient thyroid hormone, which depends on adequate

iodine intake, is essential for normal brain development. Even in the absence of [congenital hypothyroidism](#), iodine deficiency during infancy may result in abnormal brain development and, consequently, impaired intellectual development [\(10\)](#).

### ***Children and adolescents***

Iodine deficiency in children and adolescents is often associated with goiter. The incidence of goiter peaks in adolescence and is more common in girls. School children in iodine-deficient areas show poorer school performance, lower IQs, and a higher incidence of learning disabilities than matched groups from iodine-sufficient areas. A meta-analysis of 18 studies concluded that iodine deficiency alone lowered mean IQ scores in children by 13.5 points [\(11, 12\)](#).

### ***Adults***

Inadequate iodine intake may also result in goiter and hypothyroidism in adults. Although the effects of hypothyroidism are more subtle in the brains of adults than children, research suggests that hypothyroidism results in slower response times and impaired mental function [\(1\)](#). Other symptoms of hypothyroidism include fatigue, weight gain, cold intolerance, and constipation.

### ***Pregnancy and lactation***

Iodine requirements are increased in pregnant and breast-feeding women (see [The RDA](#)) [\(6\)](#). Iodine deficiency during pregnancy has been associated with increased incidence of miscarriage, stillbirth, and birth defects. Moreover, severe iodine deficiency during pregnancy may result in [congenital hypothyroidism](#) and neurocognitive deficits in the offspring (see [Prenatal development](#)) [\(6, 8\)](#). Iodine-deficient women who are breast-feeding may not be able to provide sufficient iodine to their infants who are particularly vulnerable to the effects of iodine deficiency (see [Newborns and infants](#)) [\(1\)](#). A daily prenatal supplement providing 150 mcg of iodine, as recommended by the American Thyroid Association [\(13\)](#), will help to ensure that U.S. pregnant and breast-feeding women consume sufficient iodine during these critical periods.

Because iodine deficiency results in increased iodine trapping by the thyroid, iodine-deficient individuals of all ages are more susceptible to radiation-induced thyroid cancer (see [Disease Prevention](#)) as well as to iodine-induced [hyperthyroidism](#) (see [Safety](#)) [\(1\)](#).

### **Nutrient Interactions**

Selenium deficiency can exacerbate the effects of iodine deficiency. Iodine is essential for the synthesis of thyroid hormone, but selenium-dependent [enzymes](#) (iodothyronine deiodinases) are also required for the conversion of thyroxine (T<sub>4</sub>) to the biologically active thyroid hormone, triiodothyronine (T<sub>3</sub>) [\(6, 8\)](#). Additionally, deficiencies of [vitamin A](#) or [iron](#) may exacerbate the effects of iodine deficiency [\(6, 14\)](#).

### **Goitrogens**

Some foods contain substances that interfere with iodine utilization or thyroid hormone production; these substances are called [goitrogens](#). The occurrence of goiter in the Democratic Republic of Congo has been related to the consumption of casava, which contains a compound that is metabolized to thiocyanate and blocks thyroidal uptake of iodine. Some species of millet and cruciferous vegetables (for example, cabbage, broccoli, cauliflower, and Brussels sprouts) also contain goitrogens. Further, the soybean isoflavones, genistein and daidzein, have been found to inhibit thyroid hormone synthesis [\(15\)](#). Most of these goitrogens are not of clinical importance unless they are consumed in large amounts or there is coexisting iodine deficiency. Recent findings also indicate that tobacco smoking may be associated with an increased risk of goiter in iodine-deficient areas [\(16\)](#).

### Individuals at risk of iodine deficiency

While the risk of iodine deficiency for populations living in iodine-deficient areas without adequate iodine fortification programs is well-recognized, concerns have been raised that certain subpopulations may not consume adequate iodine in countries considered iodine-sufficient. Vegetarian and nonvegetarian diets that exclude iodized salt, fish, and seaweed have been found to contain very little iodine [\(1, 6, 17, 18\)](#). Urinary iodine excretion studies suggest that iodine intakes have declined in Switzerland [\(19\)](#), New Zealand [\(20\)](#), and the U.S. [\(21\)](#), possibly due to increased adherence to dietary recommendations to reduce salt intake. However, data from the latest U.S. assessment, the National Health and Nutrition Examination Survey 2003-2004, indicate that iodine intake has stabilized [\(22\)](#), and the U.S. is currently considered to be iodine-sufficient. Also, a recent study found that the iodine status of children and pregnant women in Switzerland improved after a mandated increase in iodine concentration of iodized salt in 1998 [\(19\)](#). Switzerland is now considered to be iodine-sufficient [\(23\)](#).

### The Recommended Dietary Allowance (RDA)

The [RDA](#) for iodine was reevaluated by the Food and Nutrition Board (FNB) of the Institute of Medicine in 2001. The recommended amounts were calculated using several methods, including the measurement of iodine accumulation in the thyroid glands of individuals with normal thyroid function [\(6\)](#). These recommendations are in agreement with those of the [International Council for the Control of Iodine Deficiency Disorders](#), the [World Health Organization](#), and [UNICEF](#) [\(2\)](#).

Recommended Dietary Allowance (RDA) for Iodine			
Life Stage	Age	Males (mcg/day)	Females (mcg/day)
Infants	0-6 months	110 <a href="#">(AI)</a>	110 <a href="#">(AI)</a>
Infants	7-12 months	130 (AI)	130 (AI)
Children	1-3 years	90	90
Children	4-8 years	90	90
Children	9-13 years	120	120
Adolescents	14-18 years	150	150

Adults	19 years and older	150	150
Pregnancy	all ages	-	220
Breast-feeding	all ages	-	290

## Disease Prevention

### Radiation-induced thyroid cancer

Radioactive iodine, especially  $^{131}\text{I}$ , may be released into the environment as a result of nuclear reactor accidents. Thyroid accumulation of radioactive iodine increases the risk of developing thyroid cancer, especially in children. The increased iodine trapping activity of the thyroid gland in iodine deficiency results in increased thyroid accumulation of radioactive iodine ( $^{131}\text{I}$ ). Thus, iodine-deficient individuals are at increased risk of developing radiation-induced thyroid cancer because they will accumulate greater amounts of radioactive iodine. Potassium iodide administered in [pharmacologic doses](#) (50-100 mg for adults) within 48 hours before or eight hours after radiation exposure from a nuclear reactor accident can significantly reduce thyroid uptake of  $^{131}\text{I}$  and decrease the risk of radiation-induced thyroid cancer [\(24\)](#). The prompt and widespread use of potassium iodide prophylaxis in Poland after the 1986 Chernobyl nuclear reactor accident may explain the lack of a significant increase in childhood thyroid cancer in Poland compared to fallout areas where potassium iodide prophylaxis was not widely used [\(25\)](#). In the U.S., the Nuclear Regulatory Commission (NRC) requires that consideration be given to potassium iodide as a protective measure for the general public in the case of a major release of radioactivity from a nuclear power plant [\(26\)](#).

## Disease Treatment

### Fibrocystic breast condition

Fibrocystic breast condition is a benign (non-cancerous) condition of the breasts, characterized by lumpiness and discomfort in one or both breasts. In estrogen-treated rats, iodine deficiency leads to changes similar to those seen in fibrocystic breast condition, while iodine repletion reverses those changes [\(27\)](#). An uncontrolled study of 233 women with fibrocystic breast condition found that treatment with aqueous molecular iodine ( $\text{I}_2$ ) at a dose of 0.08 mg of  $\text{I}_2$ /kg of body weight daily over six to 18 months was associated with improvement in pain and other symptoms in over 70% of those treated [\(28\)](#). About 10% of the study participants reported side effects that were described by the investigators as minor. A [double-blind, placebo-controlled](#) trial of aqueous molecular iodine (0.07-0.09 mg of  $\text{I}_2$ /kg of body weight daily for six months) in 56 women with fibrocystic breast condition found that 65% of the women taking molecular iodine reported improvement compared to 33% of those taking the placebo [\(28\)](#). More recently, a double-blind, placebo-controlled, clinical trial in 111 women with documented breast pain reported that molecular iodine (3 mg/day or 6 mg/day) for five months improved overall pain [\(29\)](#). In this study, more than half of the women receiving the highest dosage of molecular iodine reported a  $\geq 50\%$  reduction in self-assessed breast pain compared to 8.3% in those receiving

placebo. Large-scale, controlled clinical trials are needed to determine the therapeutic value of molecular iodine in fibrocystic breast condition. The doses of iodine used in these studies (3 to 7 mg/day for a 60 kg person) are several times higher than the tolerable upper level of intake ([UL](#)) recommended by the Food and Nutrition Board (FNB) of the Institute of Medicine and should only be used under medical supervision (see [Safety](#)).

## Sources

### Food sources

The iodine content of most foods depends on the iodine content of the soil. Seafood is rich in iodine because marine animals can concentrate the iodine from seawater. Certain types of seaweed (e.g., wakame) are also very rich in iodine. Processed foods may contain slightly higher levels of iodine due to the addition of iodized salt or food additives, such as calcium iodate and potassium iodate. Dairy products are relatively good sources of iodine because iodine is commonly added to animal feed in the U.S. In the U.K. and northern Europe, iodine levels in dairy products tend to be lower in summer when cattle are allowed to graze in pastures with low soil iodine content ([6](#)). The table below lists the iodine content of some iodine-rich foods in micrograms (mcg). Because the iodine content of foods can vary considerably, these values should be considered approximate ([30](#)).

Food	Serving	Iodine (mcg)
Salt (iodized)	1 gram	77
Cod	3 ounces*	99
Shrimp	3 ounces	35
Fish sticks	2 fish sticks	35
Tuna, canned in oil	3 ounces (1/2 can)	17
Milk (cow's)	1 cup (8 fluid ounces)	56
Egg, boiled	1 large	12
Navy beans, cooked	1/2 cup	32
Potato with peel, baked	1 medium	60
Turkey breast, baked	3 ounces	34
Seaweed	1/4 ounce, dried	Variable; may be greater than 4,500 mcg (4.5 mg)

\*A three-ounce serving of meat is about the size of a deck of cards.

### Supplements

Potassium iodide is available as a nutritional supplement, typically in combination products, such as multivitamin/multimineral supplements. Iodine makes up approximately 77% of the total weight of potassium iodide ([15](#)). A multivitamin-mineral supplement that contains 100% of the daily value (DV) for iodine provides 150 mcg of iodine. Although most people in the U.S.

consume sufficient iodine in their diets from iodized salt and food additives, an additional 150 mcg/day is unlikely to result in excessive iodine intake (see [Safety](#)).

Potassium iodide as well as potassium iodate may be used to iodize salt. In the U.S. and Canada, iodized salt contains 77 mcg of iodine per gram of salt. In other countries, salt commonly contains 20-40 mcg of iodine/gram of salt; the iodization level depends on variables such as iodine intake from other sources and daily salt consumption. Annual doses of iodized vegetable oil are also used in some countries as an iodine source ([2](#), [15](#)).

## Safety

### Acute toxicity

Acute iodine poisoning is rare and usually occurs only with doses of many grams. Symptoms of acute iodine poisoning include burning of the mouth, throat, and stomach; fever; nausea; vomiting; diarrhea; a weak pulse; and coma ([6](#)).

### Iodine excess

It is rare for diets of natural foods to supply more than 2,000 mcg of iodine/day, and most diets supply less than 1,000 mcg of iodine/day. People living in the northern coastal regions of Japan, whose diets contain large amounts of seaweed, have been found to have iodine intakes ranging from 50,000 to 80,000 mcg (50-80 mg) of iodine/day ([1](#)).

**In iodine deficiency:** Iodine supplementation programs in iodine-deficient populations have been associated with an increased incidence of iodine-induced [hyperthyroidism](#) (IHH), mainly in older people and those with multinodular [goiter](#). Iodine intakes of 150-200 mcg/day have been found to increase the incidence of IHH in iodine-deficient populations. Iodine deficiency increases the risk of developing autonomous thyroid nodules that are unresponsive to the normal thyroid regulation system (see [Function](#)), resulting in hyperthyroidism after iodine supplementation. IHH is considered by some experts to be an iodine deficiency disorder. In general, the large benefit of iodization programs outweighs the small risk of IHH in iodine-deficient populations ([1](#), [31](#)).

**In iodine sufficiency:** In iodine-sufficient populations (e.g., the U.S.), excess iodine intake is most commonly associated with elevated blood levels of thyroid stimulating hormone (TSH), [hypothyroidism](#), and [goiter](#). Although a slightly elevated TSH level does not necessarily indicate inadequate thyroid hormone production, it is the earliest sign of abnormal thyroid function when iodine intake is excessive. In iodine-sufficient adults, elevated TSH levels have been found at iodine intakes between 1,700 and 1,800 mcg/day. In order to minimize the risk of developing hypothyroidism, the Food and Nutrition Board (FNB) of the Institute of Medicine set a tolerable upper level of intake ([UL](#)) for iodine at 1,100 mcg/day for adults. Very high ([pharmacologic](#)) doses of iodine may also produce thyroid enlargement (goiter) due to increased TSH stimulation of the thyroid gland. Prolonged intakes of more than 18,000 mcg/day (18 mg/day) have been found to increase the incidence of goiter. The UL values for iodine are listed by age group in the

table below. The UL is not meant to apply to individuals who are being treated with iodine under medical supervision (6).

<b>Tolerable Upper Intake Level (UL) for Iodine</b>	
<b>Age Group</b>	<b>UL (mcg/day)</b>
Infants 0-12 months	Not possible to establish*
Children 1-3 years	200 mcg/day
Children 4-8 years	300 mcg/day
Children 9-13 years	600 mcg/day
Adolescents 14-18 years	900 mcg/day
Adults 19 years and older	1,100 mcg/day (1.1 mg/day)

\*Source of intake should be from food and formula only.

### ***Individuals with increased sensitivity to excess iodine intake***

Individuals with iodine deficiency, nodular [goiter](#), or [autoimmune](#) thyroid disease may be sensitive to intake levels considered safe for the general population and may not be protected by the [UL](#) for iodine intake (6). Children with [cystic fibrosis](#) may also be more sensitive to the adverse effects of excess iodine (32).

### ***Excess iodine and thyroid cancer***

Observational studies have found increased iodine intake to be associated with an increased incidence of [thyroid papillary cancer](#). The reasons for this association are not clear. In populations that were previously iodine deficient, salt iodization programs have resulted in relative increases in thyroid papillary cancers and relative decreases in [thyroid follicular cancers](#). In general, thyroid papillary cancers are less aggressive and have a better [prognosis](#) than thyroid follicular cancers (33).

### **Drug interactions**

Amiodarone, a medication used to prevent abnormal heart rhythms, contains high levels of iodine and may affect thyroid function. Medications used to treat [hyperthyroidism](#), such as propylthiouracil (PTU) and methimazole, may increase the risk of [hypothyroidism](#). Additionally, the use of lithium in combination with [pharmacologic doses](#) of potassium iodide may result in hypothyroidism. Further, the use of pharmacologic doses of potassium iodide may decrease the [anticoagulant](#) effect of warfarin (coumarin) (6, 32).

### **Linus Pauling Institute Recommendation**

The [RDA](#) for iodine is sufficient to ensure normal thyroid function. There is presently no evidence that iodine intakes higher than the RDA are beneficial. Most people in the U.S.

consume more than sufficient iodine in their diets, making supplementation unnecessary. Given the importance of sufficient iodine during fetal development and infancy, pregnant and breast-feeding women should consider taking a supplement that provides 150 mcg/day of iodine (see [Deficiency](#)).

### **Adults over the age of 50**

Because aging has not been associated with significant changes in the requirement for iodine, our recommendation for iodine intake is not different for older adults.

### References

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There are iodine receptors in the thyroid, breast, salivary glands, brain, stomach lining, parts of the eye, mucous membranes, in fact most parts of the body need iodine.

Iodine is one of a class of elements known as halogens. Bromine, chlorine, fluoride and iodine are halogens. These elements are similar in size and weight and therefore have the ability to compete with each other at binding sites in the body. Fluoride and bromine are toxic to the body.

Symptoms of excess bromine can be delirium, depression, headache, irritability, Schizophrenia-like symptoms, difficulty thinking, and apathy.

Bromine or bromide is used as an antibacterial agent in pools and hot tubs. It is used as a fumigant for agriculture, found in soft drinks (e.g., Mountain Dew, AMP Energy Drink, and some Gatorade products). It is found in a variety of prescription and OTC medications.

Fluoride as medication has a questionable value and sodium fluoride (toothpaste) can be toxic at minimal doses (read the warning label on a toothpaste container).

Chloride is an important mineral salt in normal body functions. Chlorine in a gaseous form is toxic as it has the tendency to combine with organic compounds. It was used in chemical warfare during WW I. When we use chlorinated water in a bath or shower we are exposing ourselves to small amounts of chlorine gas.

The requirement for iodine to prevent goiter is small, about 150 to 300 micrograms a day. Since the prevention of goiter has been the focus of most iodine research, that is the Recommended Daily Allowance (RDA). This is the amount consumed with a normal salt intake. Unfortunately many people think salt is bad for us and avoid it or limit their intake of salt.

With the use of bromine in bread products, as fumigants, and as an antibacterial agent, and the introduction of chlorine and fluorine in our society, the need for iodine is much greater.

This small amount of iodine will prevent goiter but research and experience is showing that much larger amounts may safely protect against a wide variety of chronic conditions due to its antibacterial, anticancer, anti-parasitic, antiviral, and mucolytic properties. See opposite side if this paper for conditions treated with iodine.

#### **Iodine testing:**

A loading dose of iodine is taken consisting of 50mg of iodine/iodide. A 24-hour collection of urine is made. If less than 90% of the 50mg dose is excreted there is a deficiency.

#### **Symptoms of iodine excess:**

Metallic taste in the mouth.

Increased salivation

Sneezing

Headache

Acne

If any of these occur stop taking the iodine.

The best form of iodine supplementation is Lugol's Solution or Iodoral.

Iodoral (over the counter iodine supplement):  
High potency Iodine/potassium Iodide 12.5 mg  
Iodine 5mg/Iodide (as potassium salt) 7.5 mg  
Other ingredients: micosolle/a silica based excipient containing a non-ionic surfactant,  
microcristaline, cellulose vegetable stearins and pharmaceutical glaze.  
Manufactured by: Optimox Corp, Torrance, CA 90510  
For allergies/lumpy breasts

Or you could use Lugol's Solution for iodine replacement: 3-4 drops in juice/day.

To check if you are iodine deficient, you can dab a drop of old-fashioned iodine tincture of methiolate to the skin and if it gets absorbed within eight hours, you may be deficient. If you are iodine deficient, your thyroid will not work well.

For more information:

Breast Cancer and Iodine by Dr. David Derry, M.D., ISBN: 155212884-9

Overcoming Thyroid Disorders by Dr. David Brownstein

The Miracle of Natural Hormones by Dr. David Brownstein, M.D. Medical Alternatives  
Press, 2003

USES FOR POTASSIUM IODIDE - SSKI is added to juice or water or used topically.

Atherosclerosis - Use 4-6 drops daily plus niacin

Beans - SSKI blocks the enzyme inhibitor, and viola, less gas. One drop while soaking then pour off the water.

Cholesterol - 5 drops in water internally daily. It keeps cholesterol in solution.

Dupuytren's Contracture - Mix 50:50 with DMSO plus vitamin E oil & use topically.

Estrogen Dominance - Use 5- 7 drops daily. For both men and women.

Erythema nodosum - Use 5-7 drops daily.

Fibrocystic Breasts - Use 6-8 drops daily in juice or water.

Fistula - Recto-vaginal fistula used topically. (A bit of a trick)

Hemorrhoids - 20 drops in 1 oz. flax or castor oil once or twice daily.

Herpes Eruptions - Used topically with DMSO in a 1:1 ratio. Full strength may burn.

Infections - Hangnails, toenails etc. Mix 20 drops with one oz. flax or castor oil

Keloids or Scars - Apply topically daily - Make take 2 - 3 months

Mucous problems - Chronic lung or sinus problems respond to 10 drops daily.

Peyronie's Disease - Apply topically plus DMSO twice daily

Pylorospasm - Use 5 - 6 drops daily for the delayed opening of the stomach outlet.

Salivary Duct Stones - Use 5 - 6 drops daily and this may also help dissolve kidney stones.

Sebaceous Cysts - Apply daily - Results sometimes in days.

Urinary Infection - Initially 10 drops 3 - 4 times daily

Water Purification - Use 2 drops to each liter and let stand for 15 minutes.

Wrinkles - Use 5 - 6 drops daily taken in water internally

#### PRECAUTIONS:

Allergy - The most common allergic reaction to iodine is a rash, and this is not common.

Thyroid suppression - This can happen with long term usage (more than 3 months). An occasional TSH test can monitor this possibility.

Amino Acids - With the long term use of iodine it is important that you eat animal protein two or three times weekly for the amino acids methionine and cysteine.

Omega oils - Take a T of cod liver oil daily for these.

## Iodine

### IODINE SUPPLEMENTATION

Iodine is an extremely important element yet iodine deficiency is becoming increasingly prevalent because of low levels in the soil and the move away from iodised table salt. Many of us are severely deficient and don't know it. Some problems caused by iodine deficiency include

- Without sufficient iodine, the thyroid gland is unable to make thyroid hormones in adequate amounts. Iodine deficiency can therefore lead to hypothyroidism and goiter formation (the thyroid enlarges in an attempt to make more thyroid hormone).
- Iodine deficiency also increases the incidence of autoimmune thyroid disease such as Hashimoto's disease and Graves disease. Some clinicians suspect the marked increase in the incidence of autoimmune thyroid disease is actually due to iodine deficiency. Other possible factors include subclinical infections, gluten intolerance, mercury and food allergies. Studies have shown that people who are iodine deficient have an increased incidence of antithyroid antibodies.
- Fatigue – iodine deficiency may lead to an abnormal pituitary-adrenal function in addition to low thyroid function.
- Poor Digestion – many people exhibit impaired production of stomach acid as they age which *may be as a result of iodine deficiency as iodine promotes stomach acidity.*
- Iodine is one of a group of similar elements known as halogens also including bromine, chlorine and fluorine. Because they are all of a similar shape, they compete with iodine for binding in the body, particularly the thyroid gland. Unfortunately the other elements are toxic to the body and worsen an iodine deficient problem. They can all therefore cause hypothyroidism. Bromine is used as an antibacterial agent for pools, as a fumigant in agriculture, as a pesticide, in some pharmaceuticals (atrovent), in some bakery products, and in some carbonated drinks (check to see if they contain "brominated vegetable oils"). Fluoride is added to many water supplies, toothpaste and some common medications and causes more harm than good. The benefit of fluoride to teeth is now being questioned while it has been linked to behavioural disorders, hypothyroidism, hip fractures, bone cancer and kidney damage. Chlorine is added to drinking water and has been linked to heart disease and cancer. Most of us are deficient in iodine and in a constant state of toxicity from the other halogens. The good news is that if iodine is present in sufficient amounts, the other halogens cannot affect the thyroid and are excreted from the body. Iodine has also been shown to increase the secretion of other toxic heavy metals such as mercury and lead.

- It appears that iodine deficiency is a risk factor for both breast cancer and fibrocystic breast disease. Fibrocystic disease often reverses with sufficient iodine replacement. Iodine is also very effective at eliminating ovarian cysts. It works for fibrocystic breast disease and ovarian cysts because of its effect on estrogens. It actually helps metabolise estrone (an estrogen which promotes breast cancer cell growth) and its dangerous metabolite 16-alpha-hydroxyoestrone to estriol which is an anti-carcinogenic estrogen.
- Lipoprotein (a) is an important substance as it produces plaques in arteries because it is very sticky and collects platelets, calcium and fibrin from the blood circulating inside our arteries. Excessive clotting and vascular disease resulting from high levels of lipoprotein (a) may be reversed by iodine treatment.

### **Testing for an Iodine Deficiency**

An accurate test for diagnosing iodine deficiency was developed by Dr. Abrahams, a prominent iodine researcher. It involves taking an iodine challenge using 4 iodine tablets (12.5 mg each) or 8 drops of lugols solution followed by a 24 hour iodine urine excretion test. If there is sufficient iodine in the individual the excess iodine is excreted in the urine in the next 24 hours. A person with adequate iodine stores who takes 50 mg will excrete 90% of the iodine in their urine. If iodine is lacking the body retains most of the iodine with little iodine appearing in the urine. There is a risk that if the patient is experiencing a thyroid storm (excess thyroid hormones) the iodine challenge could possibly make it worse so some doctors recommend an initial baseline urine test without the iodine challenge and if iodine replacement is indicated retest after 3 months using the iodine challenge. This would appear to be the safest option however urinary testing does suffer from significant day to day variability in specific individuals so therefore is not generally used or recommended.

Another simple and inexpensive way to test is an iodine skin patch test. This test may indicate if an iodine deficiency exists however it not considered as accurate as the iodine loaded urine test. It involves painting a 5 by 5 cm patch of *iodine tincture* onto your inner arm or thigh. If the stain remains or only slightly lightens after 24 hours then your levels are considered normal. If the stain disappears, or almost disappears, in under 24 hours then there is a possibility you are deficient, if it disappears, or nearly disappears, under 10 hours then are likely to be deficient and should consider supplementation. Please note that an iodine tincture is required for this test which is iodine dissolved in ethanol. A water based preparation such as lugols is not suitable.

Some practitioners recommend to re-test using the skin patch test every 2 weeks to determine when your iodine dose can be reduced.

### **Iodine Supplements**

Prominent thyroid researcher, Dr. Benjamin Eskin, has shown that the thyroid gland and skin prefer to concentrate the iodide form of iodine while the breasts concentrate iodine. His research suggested that the body in general needs both the iodide and iodine form of iodine. This can be accomplished by using Lugols solution which contains a mixture of 10% potassium iodide and 5% iodine in water.

Dr. Abrahams recommends taking 50 mg of Iodine/Iodide (Lugol's solution 8 drops daily) for 3 months as a loading dose. Lugol's solution is available from our online pharmacy. Then this dose should be gradually reduced to the 12.5 mg (2 drops) maintenance dosage under the supervision of a knowledgeable health care professional. Dr. Abraham feels that 14 to 15 mg. of iodine/iodide daily is the upper maximum of safety. This is close to Dr. James Howenstine's (a prominent iodine advocate) recommended dose of 12.5 mg daily (2 drops of Lugol's). A major problem with Lugol's solution is the bitter taste and its ability to stain anything it touches.

Another valuable iodine preparation is a saturated solution of potassium iodide (SSKI drops) which is also available from our online pharmacy. SSKI contains 100g of potassium iodide per 100ml dissolved in water. This only contains the iodide form and thus does not have the correct ratio of iodine/iodide recommended by Dr. Abrahams for correcting general iodine deficiency. It does however have a multitude of valuable healing properties for specific problems and is useful for thyroid and skin conditions as the iodide form accumulates in these organs. We also use it extensively to help promote the conversion of estrone and its bad metabolite into estradiol with great effect. It may also help open up blocked arteries, disinfect water, cure bladder infections, reduce or eliminate ovarian cysts, diminish unsightly keloids, loosen thick bronchial secretions, even reduce or eliminate Peyronie's Disease.

Nascent Iodine is another preparation which consists of a 1% iodine tincture (dissolved in ethanol) exposed to a magnetic field which apparently breaks the diatomic (I<sub>2</sub>) iodine bond to form monatomic (I) iodine. It is argued that this is the form of iodine required to produce thyroid hormones so this is a better formulation. Many people who cannot tolerate Lugol's or SSKI claim they do better on Nascent iodine however it is not known if this is due to the much lower doses of iodine it provides or due to the Nascent state in which it exists. Advocates of Nascent iodine claim it is significantly more effective and as such much lower doses are required – 5 drops 3-4 times a day on an empty stomach (NB: 30 drops of Nascent iodine = 1 drop of Lugol's). The problem is that there is no way to test if the monatomic form is actually present and being in an unstable highly energized state how long does it remain in its monatomic form. Nascent iodine is usually significantly more expensive due to the processing it requires. Our laboratory does produce it sparingly for those who insist on using this form of iodine. We recommend you store your bottle between two powerful neodymium (rare earth) magnets to maintain a constant magnetic field which produces the monatomic state and thus increase the likelihood of actually getting the monatomic form. Some people actually store their Lugol's in this manner and claim it no longer tastes bitter, is better tolerated and works better suggesting it may have converted into the monatomic state.

SSKI and Lugol's iodine supplements are available through our laboratory. [Lugol's solution](#) or [SSKI drops](#) are available here. Alternatively refer to the ordering information page to view the various ordering methods available.

### **Food Sources of Iodine**

Iodine from fish should be limited because of mercury problems. However sardines are a good option as they only have a short life span *and do not get contaminated with mercury*. Brown and red seaweeds contain the most iodine of all sea vegetables. You may still need supplemental iodine to get an adequate dose unless you are eating lots of seaweeds.

### **Things to note about iodine therapy and thyroid function:**

(1) Iodine supplements can reduce the size of the thyroid gland. This is exactly what you would expect when supplementing with iodine. In fact, a decreased thyroid size is a good sign as iodine helps improve the architecture of the thyroid gland. Many iodine users have been scared off by this effect being lead to believe it is a bad thing.

(2) Iodine supplements cause the TSH to rise. It is well known, or should be well known, that iodine is transported into the cell by a transport molecule known as sodium-iodide symporter (NIS). NIS is stimulated by TSH (AJCN. Published online ahead of print December 28, 2011 as doi: 10.3945/ajcn.111.028001) Therefore, when iodine supplementation is begun, one of the first effects seen is a slight elevation of TSH as the body is trying to produce transport molecules (NIS) to move iodine into the cell. Many doctors who only measure TSH then conclude that iodine causes hypothyroid and scare people off using it. This is another reason why we feel the TSH test is of very limited value – [click here](#) for details. If T3 and T4 (the thyroid hormones themselves) had been tested for it would have been found that they were normal and thus thyroid function had NOT been affected by iodine supplementation.

Be Sociable, Share!

# Iodine prevents breast cancer

Thursday, November 19, 2009

by Mike Adams, the Health Ranger

(NaturalNews) Breast cancer seems to be on everyone's mind these days: How do you detect it? Prevent it? Reverse it?

Fortunately, *preventing breast cancer is easy*, and **iodine** is one of the key nutritional strategies for accomplishing precisely that.

Here, we bring you an extremely informative collection of information about how iodine helps prevent breast cancer. You'll learn how it works, which different sources of iodine are available today, and which books to read to learn more.

Personally, I strongly recommend the books and website of Dr. David Brownstein (<http://www.drbrownstein.com>)

## Iodine and [breast cancer](#)

Big Pharma has no financial interest in looking at any [natural](#) product, including [iodine](#). Q: Does iodine supplementation cause goiter? A: No. Iodine [deficiency](#) causes goiter, not iodine supplementation. Medical [research](#) has shown this for over 100 years. Q: Does [iodine deficiency](#) cause breast cancer? A: Breast [cancer](#) is a multi-factorial illness. However, the [evidence](#) linking iodine deficiency to breast cancer is overwhelming. Iodine deficiency may not be the sole cause of the epidemic of breast cancer that is plaguing us today, but, it plays a very large role in this illness.

- [Iodine: Why You Need It, Why You Can't Live Without It](#) by David Brownstein, M.D.

The [thyroid gland](#) needs approximately 6mg/day of iodine for sufficiency. The breasts need at least 5mg of iodine; that leaves 2mg (13mg-11mg) of iodine for the rest of the [body](#). This 2mg is still well above the RDA (14x the RDA) of 150mcg/day of iodine. Either way, this would explain why the RDA for iodine is inadequate and why it is necessary not only to get your iodine levels evaluated but, more importantly, to supplement with the correct amount and form of iodine. FINAL THOUGHTS The connection between iodine deficiency and breast cancer as well as fibrocystic breast disease is strong.

- [Iodine: Why You Need It, Why You Can't Live Without It](#) by David Brownstein, M.D.

Donnie Yance, a [health](#) care provider who works with many [women](#) diagnosed with breast cancer, believes that a genetic predisposition to a weak immune system is a very strong [risk](#) factor for breast cancer. Iodine and thyroid [hormones](#) (both natural and synthetic) generally reduce risk of breast cancer. Max Gerson, M.D., an acclaimed (and controversial) cancer specialist, believed that iodine was critical to the process of countering cancer. Some researchers speculate that the low rate of breast cancer in [Japan](#) is due to the iodine-rich diet.

- [Breast Cancer? Breast Health! The Wise Woman Way](#) by *Susun S. Weed*

At iodine sufficiency, the largest amounts of iodine are found in fat tissue and muscle (striated) tissue. If obesity is present, the body's need for iodine increases as the fat cells of the body would require more iodine. As previously mentioned, women's breasts are major sites for iodine storage. Maintaining adequate iodine levels is necessary to ensure an adequately functioning [thyroid](#) gland and normal breast architecture. I believe it will also lower the incidence of breast cancer and help women overcome breast cancer.

- [Iodine: Why You Need It, Why You Can't Live Without It](#) by *David Brownstein, M.D.*

Breast milk contains more iodine than formula milk and premature babies who are formula-fed may be at risk of deficiency. Iodine deficiency may play a role in fibrocystic breast [disease](#). Hypothyroidism and iodine deficiency may also increase the risk of breast cancer, as a higher incidence of disease has been found in iodine-deficient areas. Good sources of iodine include [vegetables](#) grown in iodine-rich [soil](#), kelp, onions, milk, milk products, salt [water](#) fish and seafood.

- [The New Encyclopedia of Vitamins, Minerals, Supplements and Herbs](#) by *Nicola Reavley*

Other than the thyroid, the highest concentration of iodine is found in women's [breast tissue](#). When the level of iodine is low, the risk of acquiring breast cancer is greater, and as we're aware, the fluoride found in Prozac disrupts the iodine, reducing the iodine level. Also, women who acquire breast cancer normally have elevated [estrogen](#) and a low level of progesterone in their breast tissue as well. The natural progesterone keeps the estrogen levels in check, basically preventing the problem. And if you really want to prevent the problem, you should definitely avoid Paxil?

- [Antidepressants, Antipsychotics, And Stimulants - Dangerous Drugs on Trial](#) by *Dr David W Tanton, Ph.D.*

Excess iodine is excreted in the urine or the sweat, tears, and bile. There have been no reported cases of iodine toxicity from naturally occurring sources in [food](#) or water. The RDA of iodine is 150 mcg for an adult male. Iodine deficiency has been known to cause [hypothyroidism](#). It has been associated with increased cholesterol levels, atherosclerosis, fibrocystic breast disease, and breast cancer. Iodine deficiency can also be devastating to the developing brain, causing a [mental retardation](#) known as cretinism. Most developed countries, therefore, screen for hypothyroidism at birth.

- [Fundamentals of Naturopathic Endocrinology](#) by *Michael Friedman, ND*

But to get back to the topic of [seaweed](#) and breast cancer, there is more in seaweed than just iodine. Seaweed as a popular dietary component in Japan is a rich source of both iodine and [selenium](#). Selenium acts synergistically with iodine. Selenium status may affect both thyroid hormone regulation and iodine availability.

- [You Don't Have to be Afraid of Cancer Anymore](#) by *Bill Sardi*

Women are particularly at risk due to environmental agents depleting iodine reserves and other agents exposing them to radioactive 1-131. After the thyroid gland, the distal portions of the human mammary glands are the heaviest users/concentrators of iodine in tissue. Iodine is readily

incorporated into the tissues surrounding the mammary nipples and is essential for the maintenance of healthy functioning breast tissue. The radioactive decay of I-131 in breast tissue may be a significant factor in the initiation and progression of both breast cancer and some types of breast nodules.

- [Fundamentals of Naturopathic Endocrinology](#) by Michael Friedman, ND

"There is growing evidence that Americans would have better health and a lower incidence of cancer and fibrocystic disease of the breast if they consumed more iodine," he says. Miller points out that Japanese consumption of iodine through seaweed is many, many times that of the [United States](#), and that the health comparisons between the two countries are disturbing. He suggests that iodine consumption may be one of the many reasons why the incidence of breast cancer is so high in the United States and so low in Japan.

- [The Most Effective Natural Cures on Earth: The Surprising, Unbiased Truth about What Treatments Work and Why](#) by Jonny Bowden, Ph.D., C.N.S.

The [foods](#) richest in iodine are dulse and kelp. All [sea vegetables](#) basically contain all of the [minerals](#) of the sea, bringing us a good source of [trace minerals](#) in general. Iodine seems to work as a monitor, or controller, for calcium [metabolism](#). It's one of the key minerals. Iodine has the highest frequency of all of Nature's essential minerals. It supports enzyme systems that help the functioning of certain thyroid hormones and assists in regulating cellular metabolic rates. It may be helpful in protecting against breast cancer.

- [Spiritual Nutrition: Six Foundations for Spiritual Life and the Awakening of Kundalini](#) by Gabriel Cousens, M.D.

Certain parts of the country have little or no iodine in the soil and isolated agrarian cultural groups who refrained from using iodized [salt](#) and cattle feed were subject to this [disorder](#). Iodine deficiency in children may result in mental retardation. In addition, iodine deficiency has been linked to breast cancer and is associated with fatigue, neonatal hypothyroidism, and weight gain.

- [Prescription for Nutritional Healing, 4th Edition: A Practical A-to-Z Reference to Drug-Free Remedies Using Vitamins, Minerals, Herbs & Food Supplements](#) by Phyllis A. Balch, CNC

Women in Japan commonly consume seaweed, known for its iodine content. Seaweed is reported to reduce the risk for breast cancer. [Japanese Journal Cancer Research 92: 483-87, 2001] In one study, thyroid disease incidence was higher in breast cancer [patients](#) than in healthy women (58% versus 18%). But other studies do not confirm that abnormal thyroid hormone levels are associated with breast cancer. [Nutrition Cancer 27: 48-52, 1997] It may be that an increased ratio of thyroid hormone over estrogen sets up a growth-promoting effect on breast tumors.

- [You Don't Have to be Afraid of Cancer Anymore](#) by Bill Sardi

Thyroid and iodine Hypothyroidism and /or iodine deficiency are associated with a higher incidence of breast cancer. Experimental iodine deficiency in rats results in a mammary dysplasia histologically similar to human FBD. Thyroid hormone replacement therapy in hypothyroid, and some euthyroid, patients may result in clinical improvement. Research has shown that thyroid supplementation (0.1 mg/day Synthroid) decreases mastodynia, serum prolactin levels, and breast nodules in, supposedly, euthyroid patients.

- [Textbook of Natural Medicine 2nd Edition Volume 2](#) by Michael T. Murray, ND

There have been attempts to link two other dietary factors to breast cancer because Oriental women, so resistant to the disease, have better dietary supplies of selenium and iodine than do American women. These relationships may prove more tenable, for highly complex reasons. Selenium is related to the metabolism of Vitamin E, which I have already described as an anticancer factor, and iodine is related, of course, to thyroid function, which, as a member of the community of glands, is interrelated with the metabolism of estrogen.

- [Breast Cancer: A Nutritional Approach](#) by Carlton Fredericks

Breast cancer has been linked to iodine deficiency, and the soil in both Japan and Iceland is rich in both iodine and selenium. Japanese people also consume large amounts of fish, vegetables, and green tea, which may be a factor. The Cancer Control Convention in Japan has reported that germanium may be important in the prevention and [cure](#) of cancer. A daily dose of seven to ten servings of fruits and vegetables can reduce cancer risk by about 30 percent.

- [Prescription for Nutritional Healing, 4th Edition: A Practical A-to-Z Reference to Drug-Free Remedies Using Vitamins, Minerals, Herbs & Food Supplements](#) by Phyllis A. Balch, CNC

"We think it's very important for the breast," Cann says about iodine. This mineral, he believes, may prevent and even shrink breast [tumors](#) by combining with certain fatty acids and stopping cancerous cells from multiplying. And without the selenium, iodine doesn't do its job properly. You can see the power of this dynamic duo in Japan, where people eat about 5 grams of sea vegetables virtually every day. Cann points out the Japanese have one of the highest life expectancies and a very low rate of breast cancer.

- [Eat and Heal \(Foods That Can Prevent or Cure Many Common Ailments\)](#) by the Editors of FC&A Medical Publishing

An association has been made between low thyroid function and breast cancer; as a source of iodine and other trace minerals, sea vegetables provide optimal [nutrition](#) for the thyroid gland. The high content of potassium in seaweed is good for the heart and [kidneys](#). The iodine in seaweed aids in [weight](#) loss also. Seaweed nourishes membranes, making it good for nervous [disorders](#), skin conditions, colds, and constipation. It is high in chromium, which helps to control blood sugar levels.

- [Prescription for Dietary Wellness: Using Foods to Heal](#) by Phyllis A. Balch, CNC

It may not be chance correlation, then, that geographic differences in the incidence of these diseases are associated with differences in the selenium and iodine values in foods. Selenium is an antioxidant in the body, protecting the chromosomes from damage which can [lead](#) to cancer. Iodine, as you probably know, is essential to thyroid function, but it may also play a role, directly or through its function in thyroid hormone, in susceptibility to breast cancer.

- [Breast Cancer: A Nutritional Approach](#) by Carlton Fredericks, Ph.D.

Seaweed is nature's richest, most bioavailable source of organic iodine, a substance lacking in the average American diet and directly related to the high incidence of thyroid disorders. Many of my patients with ovarian or breast cancer are deficient in iodine and show signs of low thyroid function. Seaweeds are also an excellent source of [calcium](#) and potassium and are rich in all

minerals. They help in the removal of radioactive and [toxic](#) heavy minerals. I am thankful to herbalist Ryan Drum for teaching me the importance of this neglected food.

- [Herbal Medicine, Healing and Cancer: A Comprehensive Program for Prevention and Treatment](#) by Donald R. Yance, Jr., C.N., M.H., A.H.G., with Arlene Valentine

Iodine - Available in seafood, sea vegetables such as [kelp](#) and dulse, and iodized salt, iodine protects against breast cancer and is needed for proper energy metabolism as well as the growth and repair of all tissues.

- [Alternative Medicine the Definitive Guide, Second Edition](#) by Larry Trivieri, Jr.

Spencer of Frenahay Hospital in Bristol found that the so-called "[goiter](#) belts" (regions where goiter is extremely prevalent, due to low levels of iodine in the water and diet) had higher than average cancer rates, a finding that extended over 15 nations on four continents. According to Dr. Bernard Eskin, director of endocrinology at the Department of Obstetrics and Gynecology at the Medical College of Philadelphia, iodine deficiencies are associated with breast cancer in both rats and humans.

- [Stopping the Clock: Longevity for the New Millenium](#) by Ronald Klatz and Robert Goldman

A large fraction of absorbed iodine is taken up by the thyroid gland via the sodium/iodide symporter. In addition to the thyroid gland, active iodide occurs in the salivary glands, the gastric mucosa and in the lactating mammary gland. The nonlactating mammary gland does not accumulate iodide. Recently, it has been reported that accumulation of iodide via a sodium/iodide symporter appears to occur in human breast cancer tissue. The major route of excretion of excess iodine is by the kidneys.

- [PDR for Nutritional Supplements](#) by Sheldon Saul Hendler and David Rorvik

Turning from excessive intake of a dietary factor to deficiency, the association of inadequate diet with decreased resistance to malignancies is well documented. Iodine deficiency may lead to an underactive thyroid and ultimately to a goiter, and goiters have been clearly associated with an increased risk of breast cancer. Similarly, recognizable thyroid underactivity has been demonstrated in 10 percent of the women with another type of cancer (endometrial).

- [Breast Cancer: A Nutritional Approach](#) by Carlton Fredericks, Ph.D.

Both our mammary glands (breasts) and our thyroid glands have been linked from the time we were embryos and both have a special ability to store iodine. This function is vital during pregnancy and breast-feeding. Because bromide has been replacing iodide in our bread and in our breasts for the past fifty years, it is feared that this has led to an increase in both breast cancer and fibrocystic breast disease (both of which have increased dramatically over this time period).

# Iodine Supplementation and Metabolic Syndrome Article from Labrix Labs/ Dr Jay Mead, MD

Consumption of seaweed in amounts typical of the Japanese people may be associated with low metabolic syndrome prevalence.

Metabolic syndrome is characterized by a group of metabolic risk factors in one person. They include:

- :: Abdominal obesity
- :: Atherogenic dyslipidemia (high triglycerides, low HDL cholesterol and high LDL cholesterol)
- :: Elevated blood pressure
- :: Insulin resistance or glucose intolerance
- :: Prothrombotic state
- :: Proinflammatory state (e.g., elevated C-reactive protein)

People with metabolic syndrome are at increased risk of coronary heart disease and other diseases related to plaque buildups in artery walls (e.g., stroke and peripheral vascular disease) and type 2 diabetes. Metabolic syndrome has become increasingly common in the United States. In fact, the incidence of metabolic syndrome is increasing worldwide, with the notable exception of some Asian countries where seaweed is commonly consumed.

A recent study examined the role of iodine in controlling the symptoms of metabolic syndrome. Study participants were separated into two groups: Group 1 was given placebo for one month followed by 4g/day of seaweed for one month. Group 2 was given 4g/day of seaweed for one month followed by 6g/day of seaweed for an additional month. The study states that 4-6g/day of seaweed is typical for most people in Japan.

In Group 2, systolic blood pressure decreased 10.5mmHg after one month of 6g/day of seaweed. Waist circumference changed for female participants in both groups, but was more significant in Group 2 with a 2.1 cm decrease after 4g/day and a further 1.8cm decrease after 1 month of 6g/day of seaweed. The study states that consumption of seaweed in amounts typical of the Japanese people may be associated with low metabolic syndrome prevalence.

What is the magic ingredient in seaweed? Iodine of course! If your patient is dealing with metabolic syndrome, consider a 24 hour urinary iodine test to check for iodine whole body sufficiency. If they are deficient in iodine, supplementation may be warranted.

Reference:

# Teas J, et al. Could Dietary Seaweed Reverse the Metabolic Syndrome? Asia Pac J Clin Nutr. 2009;18(2):145-54.

# [www.americanheart.org](http://www.americanheart.org)

# Many Americans are iodine deficient - are you one of them?

Dr. Jill Busl - [Port Saint Lucie Holistic Health Examiner](#)

Source: <http://www.examiner.com/article/many-americans-are-iodine-deficient-are-you-one-of-them>

Have you come to accept your state of health as normal for you? Do you listen to the radio and hear commercials for antacids and run out to the store to buy the latest antacid pill? If you're tired all the time, do you think you're just working too hard? If you have dry skin, do you simply attribute it to winter dry air? Have you been struggling to lose weight while doing all the "right" things? Do you find your mind in a fog more often than you used to? Are you depressed? Have you been losing hair? Do you feel cold when others are comfortable or warm? If you're a woman, have you been diagnosed with fibrocystic breast disease, [breast cancer](#), or polycystic ovarian syndrome? Did you answer "yes" to three or more of these questions? If so, you might be surprised to learn that you are IODINE DEFICIENT!

## Signs of iodine deficiency

Signs of iodine deficiency are many: lack of energy, dry skin, feeling cold, lack of appetite, inability to lose weight, breast fibroids, gastric reflux (heartburn, indigestion, acid stomach), polycystic ovarian syndrome, depression, losing hair, and brain fog to name a few. Since the introduction of fluoridated water in the US in 1945, the decline in the use of iodized table salt, and the increase in the use of pesticides, herbicides and environmental pollutants, iodine deficiency and concurrent [hypothyroidism](#) (underactive thyroid gland) have risen to epidemic proportions. Yet most Americans think the common symptoms of iodine deficiency are just a part of getting older. Or menopause. Or working too hard. Or dry air, being female, or stress. While these are all factors that can lead to these symptoms, most can be alleviated or certainly lessened by adequate intake of iodine!

## Japanese diet vs. American diet

People in the U.S. consume an average 240 micrograms of iodine a day. In contrast, people in Japan consume more than 12 milligrams of iodine a day, a 50-fold greater amount. They eat seaweed, which include brown algae (kelp), red algae, and green algae (chlorella). Compared to terrestrial plants, which contain only trace amounts of iodine, these marine plants have high concentrations of this nutrient .

Health comparisons between the two countries are disturbing. The incidence of breast cancer in the U.S. is the highest in the world, and in Japan, until recently, the lowest. Japanese women who emigrate from Japan or adopt a Western style diet have a higher rate of breast cancer compared with those that consume seaweed. Life expectancy in the U.S. is 78 years, 48th in 226 countries surveyed. It is 81 years in Japan, the highest of all industrialized countries. The infant mortality rate in Japan is the lowest in the world, 3.5 deaths under age one per 1,000 live births, half the infant mortality rate in the United States.

## **Iodine and breast cancer**

Today 1 in 7 American women (almost 15 percent) will develop breast cancer during their lifetime. Thirty years ago, when iodine consumption was twice as high as it is now (480 µg a day), 1 in 20 women developed breast cancer. Iodine was used as a dough conditioner in making bread, and each slice of bread contained 0.14 mg of iodine. In 1980, bread makers started using bromide as a conditioner instead, which competes with iodine for absorption into the thyroid gland and other tissues in the body. The use of iodized table salt has decreased, with 45% of households using table salt without iodine. Furthermore, the much higher concentrations of chloride in table salt (NaCl) inhibits absorption of its sister halogen iodine (the intestines absorb only 10 percent of the iodine present in iodized table salt). As a result, 15 percent of the U.S. adult female population suffers from moderate to severe iodine deficiency, which health authorities define as a urinary iodine concentration less than 50 µg /L. Women with goiters (a visible, noncancerous enlargement of the thyroid gland) owing to iodine deficiency have been found to have a three times greater incidence of breast cancer. A high intake of iodine is associated with a low incidence breast cancer, and a low intake with a high incidence of breast cancer.

## **Iodine and fibrocystic breast disease**

Similar findings apply to fibrocystic breast disease. The incidence of fibrocystic breast disease in American women was 3 percent in the 1920s. Today, 90 percent of women have this disorder. Six million American women with fibrocystic disease have moderate to severe breast pain and tenderness that lasts more than 6 days during the menstrual cycle.

## **Iodine and acid reflux**

The lack of iodine in the diet is also associated with GERD, or Gastric Esophageal Reflux Disease. This common ailment causes heartburn, sour stomach, acid indigestion, and a reflux of the stomach's contents into the esophagus (throat). Most doctors recommend the use of antacids such as Prilosec, Tagamet, Pepcid AC, Zantac, Tums, or others to control the symptoms and suppress acid production. What they don't realize is that the problem is NOT an overproduction of stomach acid, but an UNDERPRODUCTION of stomach acid, hydrochloric acid (HCl) in particular. This underproduction can be directly related to iodine deficiency, as iodine is essential for the normal production of HCl! Suppressing the production of what little HCl is being produced only exacerbates the problem. Simply supplementing with iodine can solve the problem of GERD and its associated symptoms.

## **Other functions of iodine**

Iodine has other functions that are critical for health. It removes toxic chemicals — fluoride, bromide, lead, aluminum, mercury — and biological toxins, suppresses auto-immunity, and protects against abnormal growth of bacteria in the stomach.

## **Iodine supplementation**

A simple way to determine if you are deficient is to paint a quarter-sized spot on the inside of your forearm with tincture of iodine, which you can buy at the drugstore. Take note of how long it takes for this spot to disappear. If the spot disappears in less than 24 hours, your body is not storing adequate iodine.

Since iodized table salt is only 10% absorbed by the intestines, increasing or adding iodized table salt to your diet will have only a minimal effect on iodine deficiency. Aside from eating substantial quantities of seaweed (recommended), you can supplement with iodine in two effective ways: using Lugol's iodine solution or taking Iodoral tablets. Both Lugol's solution and Iodoral are one-third molecular iodine (5%) and two-thirds potassium iodide (10%). Studies done to date indicate that the best iodine supplement is one that includes molecular iodine (I<sub>2</sub>), which breast tissue prefers. Lugol's can be purchased on Amazon.com:

[http://www.amazon.com/gp/product/B001PN3BUW/ref=ord\\_cart\\_shr?ie=UTF8&m=A20PBGQP5E6E2S](http://www.amazon.com/gp/product/B001PN3BUW/ref=ord_cart_shr?ie=UTF8&m=A20PBGQP5E6E2S) as can Optimox Iodoral:

<http://www.amazon.com/gp/product/B001IJ1QT6>

In deficiency, supplement with Lugol's 2 – 3 drops 3 times a day in water or other beverage. Lugol's has an unpleasant taste and will turn the beverage brown. To maintain iodine levels, supplement with 2 drops of Lugol's once a day. For Iodoral, follow the directions on the bottle. Always consult with your health care practitioner when adding a supplement to your regimen.

Adding iodine to your diet, either in the forms mentioned above or by eating sufficient quantities of iodine-containing foods like seaweed, can make a huge difference in your health in just a short period of time. Give it a try and make note of how you feel in a few weeks! Let me know if you have questions or concerns.

### **The Iodine Paint (Patch) test**

Use Tincture of Iodine- the original , orange-colored solution, not the clear solution. Since iodine may be hard to obtain since it can be used in the preparation of meth, you can ask your compounding pharmacist to obtain it or have Lugol's (Iodine Strong) solution diluted.

Before going to bed, paint a 3 inch by inch square patch of iodine or an area the approximate size of a silver dollar, onto the underside of the forearm or on the inner thigh or abdomen. Note the color of the staining of the skin.

In the morning, upon rising, note the color of the area where the iodine solution was applied.

If the stain is gone or almost completely gone, this would indicate iodine deficiency and iodine supplementation. If the stain is partially but not almost completely gone, this indicates a possibly iodine deficiency and iodine supplementation may be beneficial.

Iodine replacement can be accomplished using;

Lugol's solution (Iodine Strong, USP) which contains 6.25mg of iodine per drop or Iodoral 12.5 mg tablets (Optimox) (scored and easily broken in half) or Prolamine Iodine 3 mg tablet (Standard process)

Start every patient on low dose of no more than 6.25 mg daily for at least a few days to a week to prevent a toxic reaction from the release of toxic halogens.

Increase the dose to one tablet (12.5 mg) daily for 3-4 weeks, and then repeat iodine paint test. Dosage can be increased by ½ tablet for 3-4 weeks anytime the paint test shows deficiency.

Reduce dose immediately if patient symptoms get worse at any time following an increase in dose. Many patients do well on doses from 3 to 12.5 mg daily.

Note: if a person has been exposed to other halogens such as bromide, fluoride and chloride, these halogens can be displaced by iodine supplementation. These halogens are toxins and if too large a quantity is released into the circulation too quickly can make a person feel very ill. Therefore, start very low on iodine dosage. If a patient had exposure to halogens (Bromide: hot tubs, Gatoraide, Mountain Dew, bread; Fluoride: city water, toothpaste; Chlorine: city water, swimming pools), initially start at no more than 3 mg (1 tablet Prolamine Iodine) daily, then two or three weeks increase to 6mg (2tablets), or 6.25 mg daily with 1 drop of Lugol's solution or ½ tablet Iodoral™ 12.5 mg tablet daily for another 2-3 weeks. Repeat iodine paint test and increase the dosage in increments of 3 to 6.25 mg iodine daily for 3-4 weeks.

## Vegans may be at risk for low iodine: study

Iodine deficiency during fetal and early-childhood development is a leading cause of brain impairments in much of the world.

Link: <http://www.worldbulletin.net/?aType=haber&ArticleID=74704>

Some vegans may not be getting enough iodine in their diets, suggests a new study.

That finding is particularly relevant for women who are pregnant, researchers say, as that's a time when a mom's iodine levels are strained by her growing baby.

"It's an interesting observation that we ought to pay attention to," said Dr. Robert Smallridge, an endocrinologist at the Mayo Clinic in Jacksonville, Florida, who was not involved in the new research.

Though the study was small, the researchers "have identified a group that may be more likely to be iodine insufficient," Smallridge told Reuters Health. "That's an important thing for us to recognize and to counsel our patients about."

Iodine, which is present in iodized salt, seafood, eggs, dairy, and some breads, is used by the thyroid gland to help regulate metabolism and development, especially in babies and young kids.

Iodine deficiency during fetal and early-childhood development is a leading cause of brain impairments in much of the world.

Although researchers believe that most people in the U.S. get plenty of iodine in their diets, the American Thyroid Association recommends that pregnant and breastfeeding women take a vitamin with iodine because low iodine can increase the risk of miscarriage and thyroid problems in moms, in addition to mental disabilities in babies.

Dr. Angela Leung of Boston Medical Center, lead author of the new study, said that little research has been done on whether or not vegetarians and vegans may be more likely to have iodine deficiencies because of their dietary restrictions.

As a first stab at that question, she and her colleagues recruited 140 vegetarians and vegans -- mostly women -- and tested their urine for concentrations of iodine.

According to the World Health Organization, the general recommended range of iodine concentrations per liter of urine is between 100 and 199 micrograms, and between 150 and 249 micrograms per liter in pregnant women.

Leung and her colleagues calculated an average iodine level of 147 micrograms in vegetarians and 79 in vegans - those who avoid not just meat but eggs and dairy products as well.

Researchers also measured the participants' levels of thyroid hormones as a gauge of how well their thyroids were functioning, in addition to levels of a couple of chemicals - perchlorate and thiocyanate - known to interfere with iodine in the thyroid.

Thyroid hormone levels were similar in both vegetarians and vegans, and in the normal range, the authors report in *The Journal of Clinical Endocrinology and Metabolism*. Iodine concentrations were not linked to thyroid function in either group.

Leung said that's probably because the study was very small, which makes it harder for those associations to come out.

There was also no relationship between thyroid hormone levels and urine concentrations of perchlorate, a contaminant in food and water, or of thiocyanate, a chemical found in cabbage-like vegetables and in cigarette smoke.

One limitation of the study is that the urine test for iodine is only a window into recent iodine consumption, and can't get at how long-term iodine levels may be affecting the thyroid.

Leung said the purpose of this study was mainly to make the public aware of the issue of iodine deficiency, especially in women who forego some high-iodine foods, and to open the door for more research into this topic.

"In vulnerable populations, especially women that are pregnant or lactating, we want those populations to be sufficient in iodine," Leung told Reuters Health.

"All women of childbearing age should be encouraged to take iodine supplements... to ensure that the fetus is exposed to additional iodine during development," Leung said. "In particular vegan women of childbearing age should be encouraged to do that."

Too much iodine can also cause thyroid problems. Sarah Bath, a PhD student studying iodine in women at the University of Surrey, UK, said that people starting supplements should stay away from kelp and seaweed supplements - which may have widely variable iodine levels. She also said they should have a doctor looking out for them while taking iodine.

Supplements in the form of potassium iodide can be bought for a few cents per capsule.

Smallridge said that this study tells doctors that they should be encouraging their vegan patients to get enough iodine, and possibly trying to identify vegetarian patients who may be at risk of iodine deficiency as well.

"Sometimes iodine gets overlooked with milk-free diets or vegan diets," Bath, who did not participate in the new study, told Reuters Health. "In countries that are iodine sufficient...iodine is not something that people are concerned with because of this overriding assumption that intakes are okay."

Bath cited another recent study, published yesterday in *The Lancet*, which found that half of female adolescents sampled in the UK had at least mild iodine deficiency.

SOURCES: <http://bit.ly/jBZDXP> *The Journal of Clinical Endocrinology and Metabolism*, online May 25, 2011. <http://bit.ly/ipDssd> *The Lancet*, online June 2, 2011.

## Bacteria in the Gut are Shown to Reduce Obesity

by Melanie Grimes, citizen journalist

(NaturalNews) New research has shown that the bacteria in our gut can be a cause of obesity. The human gut is filled with health-giving bacteria, which provide energy, nutrients and digestive aids. Maintaining proper gut flora is important to health. Research has now demonstrated that the amount and type of bacteria in your digestive tract can reduce obesity, and not just improve digestion.

A study conducted at the Washington University School of Medicine in Missouri investigated the digestive tract of fat and thin people. There are over 5,000 bacterial species in the human gut, and many which have not been identified. The three dominant family groups, or phyla, in the human gut are Firmicutes, Bacteroidetes and Actinobacteria. Previous research has shown that a proper ratio between the Firmicutes and the Bacteroidetes is necessary in order to maintain good health. As we age, this ratio changes and might be one of the causes of adult onset obesity.

New research discovered that obese people had higher amounts of Firmicutes. Lean people had higher amounts of Bacteroidetes. When obese people were put on fat reducing diets, the ratio of bacteria in their gut changed, corresponding to the same ratio of bacteria in the guts of the lean people; that is, the amount of Bacteroidetes increased as the obese subjects lost weight.

Aids to restore proper digestive flora can include adding probiotics to the diet. Fermented foods contain nutrients that aid this process as well. This includes foods such as dairy products of yogurt and kefir, as well as pickles, sauerkraut, miso, and chutney. Sourdough bread and other products that use a starter, such as kombucha, contain healthy organisms that feed the [gut](#) flora.

Eating raw food and staying hydrated also help proper digestion. Some people have difficulty digesting raw foods when they are first introduced, and a digestive enzyme can help with this. Raw [food](#) contains many enzymes and nutrients that are not available from any other source.

Probiotics are known to also increase immunity and help prevent colds and flu so it is important to take probiotics daily, especially during flu season. If probiotic consumption causes gas or bloating, it is suggested that it be taken on an empty stomach. Sources such as yogurt or kefir can be eaten alone or with other foods.

<http://www.biomedcentral.com/1471-2180/9/123>

<http://www.ncbi.nlm.nih.gov/pubmed/16188921?dopt=AbstractPlus&holding...>

[http://www.naturalnews.com/027574\\_probiotics\\_colds.html](http://www.naturalnews.com/027574_probiotics_colds.html)

# About the author

Melanie Grimes is a writer, award-winning screenwriter, medical journal editor, and adjunct faculty member at Bastyr University. She also teaches homeopathy at the Seattle School of Homeopathy and the American Homeopathic Medical College.

A trained homeopath, she is the editor of the homeopathic journal, Simillimum, and has edited alternative and integrative medical journals for 15 years. She has taught creative writing, founded the first Birkenstock store in the USA and authored medical textbooks.

Learn more:

[http://www.naturalnews.com/028023\\_intestinal\\_bacteria\\_obesity.html#ixzz2JVWaeGj](http://www.naturalnews.com/028023_intestinal_bacteria_obesity.html#ixzz2JVWaeGj)

# Can “Good” Bacteria Protect Your Breast Health?

## Health News

By Vitamin Research Products Staff

One in every eight women will face breast cancer at some time in her life. Yet in the list of well-known risk factors, ranging from age to excess alcohol consumption, at least one potential cause has long been overlooked. And it begins in the unlikeliest of places: your gut.

Animal studies have already tied high-fat diets to earlier onset of mammary tumors—not to mention a two-fold increase in their incidence and a greater number of multiple tumors.<sup>1</sup> Similarly, research shows that women who eat high-fat diets are nearly *four times* more likely to receive a breast cancer diagnosis than those who don't.<sup>2</sup> But that's not all: Research has also shown that fat-rich foods can negatively alter the composition of your intestinal flora—suggesting a potentially deadly link between breast health and gut flora imbalance.<sup>3-5</sup>

Another critical consideration is estrogen metabolism—a vital function that's equally reliant on a healthy gastrointestinal environment. Friendly intestinal bacteria sequester hormone-laden bile acids and ensure their proper excretion, blocking excess levels from re-entering your circulation.<sup>6-7</sup> And since increased estrogen exposure is also a widely acknowledged risk factor in breast cancer development, it's easy to see how deficient gut flora might pave the way to this devastating diagnosis.

In fact, there's evidence that both factors—a high-fat diet and high estrogen exposure—may actually be connected. In a study evaluating the association between dietary fat to fiber ratios and estrogen metabolism, researchers detected significantly increased total estrogens in the urine of women eating high-fat, low-fiber diets—an observation that they linked to an increased reabsorption of estrogens in the digestive tract, spurred on by excess fat intake.<sup>8</sup>

Of course, estrogen isn't your only concern when it comes to breast cancer risk: Other cancer-causing toxins come into play as well, many of which are introduced through your digestive tract. Luckily, however, this is yet another case in which certain bacteria—including bifidobacteria and *Lactobacillus rhamnosus* GG—can offer protection. Research shows that these probiotic bacteria decrease the functions of enzymes that are involved in the metabolic activation of certain chemicals to become carcinogens, and that they may help to suppress cancer development by reducing the amount of these potentially carcinogenic chemicals in your intestine.<sup>9-10</sup>

The bottom line: If you aren't already taking probiotics for gut health, there's no better reason to start taking them now. That's why Vitamin Research Products offers two high-quality supplements for comprehensive probiotic coverage: Culturelle® (which contains 10 billion live cells of *Lactobacillus rhamnosus*GG in every capsule) and BioPRO™—a blend of *Lactobacillus acidophilus* DDS-1, *Bifidobacterium bifidum*, *Bifidobacterium longum*, *Bifidobacterium infantis*, and *Bacillus coagulans*, balanced with 400 mg of prebiotic fructooligosaccharides (FOS) for optimal growth of the probiotic bacteria and mucosal restoration and protection.<sup>11-13</sup>

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# Gut Bacteria and Breast Health

## Is There a Link?

By Nieske Zabriskie, ND

The incidence of breast cancer is increasing world-wide. According to the American Cancer Society, in 2009 there were 192,370 new cases of invasive breast cancer and 40,170 deaths from breast cancer in the United States. Currently, breast cancer in women is the second most common type of cancer and the risk of a woman having invasive breast cancer some time during her life is approximately 1 in 8. Furthermore, breast cancer is the second leading cause of cancer death in women.<sup>1</sup>

Although at first glance it seems as if the gut and breast health are two unrelated topics, a new study is investigating a potential role of the beneficial bacteria found in the intestines, commonly called probiotics, in the reduced risk of breast cancer. Researchers at Rush University Medical Centre in Chicago are evaluating the possibility that tilting the balance of the GI tract in favor of harmful intestinal bacteria may explain the increase in the incidence of breast cancer. Although the study is currently in progress, the hypothesis the study authors have made is worth noting since they developed their hypothesis on the basis of past research that indirectly suggests that alterations in intestinal bacteria may play a role in breast cancer susceptibility.<sup>2</sup> The researchers also suggest that the intestinal flora passed from mother to child may provide another familial link not previously addressed in genetic breast cancer-risk models. In addition, the investigators propose that if this link is verified, it offers a new therapeutic intervention for reducing breast cancer risk by optimizing the gut bacteria with probiotic supplementation.

## How Probiotics Affect Breast Health

There are several factors that indicate that the hypothesis that gut microflora play a role in breast health is plausible. One factor is that high-fat diets are associated with an increased risk of developing breast cancer and high-fat foods are known to alter the composition of flora in the intestines.<sup>3-4</sup> In fact, one study found nearly a 4-fold increase in the risk of breast cancer in women who ate a high-fat diet compared to women who ate a low-fat diet.<sup>5</sup> Animal studies have shown that mice fed high-fat diets had earlier onset of a second mammary tumor, a two-fold greater incidence, and a greater number of multiple tumors in the breast tissue compared to mice fed a low-fat diet, suggesting that high-fat diets play a role in breast cancer tumor promotion.<sup>6</sup>

It is proposed that changes in intestinal flora may alter either estrogen metabolism or carcinogen exposure. Increased estrogen exposure is a risk factor for the development of breast cancer.<sup>7</sup> Estrogen is excreted through the kidneys as well as via bile excretion into the intestines. The estrogens and the bile salts in the intestines are partially reabsorbed back into the body to be recycled through enterohepatic circulation. Intestinal bacteria directly affect bile acid metabolism by converting primary bile salts into secondary bile salts as well as impact the physiological activity of bile acids.<sup>8</sup> Depending on the species of bacteria, bile salt modifications differ, making optimal flora balance important. Sequestering of bile acids by probiotic bacteria may

result in their effective removal after excretion.<sup>9</sup> One study found that supplementation with the probiotic *Lactobacilli* in rats suppressed the reabsorption of bile acids into the enterohepatic circulation and enhanced the excretion of acidic steroid hormones in the feces.<sup>10</sup> If optimal bacteria can reduce the reabsorption of estrogens by promoting bile excretion from the body, it would reduce excess estrogens associated with increased breast cancer risk.

One interesting study evaluated the association between dietary fat: fiber ratio and estrogen metabolism to attempt to explain the association between diet and breast cancer risk. In this study, half of the women were put on a high-fat, low-fiber diet and the other half were given a low-fat, high-fiber diet. The results showed that the women on the high-fat, low-fiber diet had significantly increased total estrogens measured in the urine. The study also showed that total fat intake correlated significantly with plasma levels of specific forms of estrogens including estrone, estradiol, urinary 2-hydroxyestrone, 2-hydroxyestradiol, 2-hydroxyestrone:4-hydroxyestrone ratio and total urinary estrogens, even after adjusting the data to account for total fiber intake. The study found that dietary fat affects estrogen metabolism more than fiber intake, and that one mechanism resulting in high estrogen values is an increased reabsorption of estrogens into enterohepatic circulation.<sup>11</sup>

The intestinal bacteria also directly react with chemical compounds in the intestines such as hormones.<sup>12</sup>

Additionally, data indicates that certain probiotics such as bifidobacteria decrease fecal enzymes such as beta-glucuronidase, beta-glucosidase, nitroreductase and urease, which are involved in the metabolic activation of some carcinogens.<sup>13</sup> Data also suggests that lactic acid probiotics may exert cancer-suppressing activity due to interactions with other bacteria in the intestines. Lactic acid bacteria may inhibit the growth of bacteria that convert procarcinogens into carcinogens, thereby reducing the amount of carcinogens in the intestine.<sup>14</sup>

## Probiotics

More than 400 strains of bacteria are found in the intestines. These bacteria are necessary for optimal health and provide numerous physiological functions such as improving the barrier function of the intestines, competing with and suppressing pathogenic bacteria and yeast, modulating or stimulating the immune response, reducing inflammation and playing a role in nutrient and enzyme synthesis and absorption.<sup>15-16</sup>

The potential of probiotics to play a role in breast health as well as their ability to optimize overall health indicates that supplementation with these beneficial bacteria can result in improved health. Common probiotic supplements include *Lactobacillus rhamnosus* GG (found in Culturelle®), and *Lactobacillus acidophilus* (DDS-1), *Bifidobacterium bifidum*, *Bifidobacterium longum*, *Bifidobacterium infantis* and *Bacillus coagulans* (found in BioPRO™). Numerous factors can deplete the levels of beneficial bacteria such as drinking chlorinated water, low-fiber diets or using antibiotics or other medications, thus making it important to replace them regularly for optimal health.

BioPRO also includes prebiotics, which are substances such as plant sugars that selectively promote the growth and function of beneficial bacteria in the colon. Prebiotics, such as fructooligosaccharides (FOS), are converted in the intestines to short chain fatty acids (SCFAs) by intestinal bacteria. SCFAs, particularly butyrate, provide several beneficial functions such as provide energy for the cells that line the colon, promote mucosal cell restoration, protect the mucosal lining from damaging intestinal contents and stimulate mucous production that is an important part of the intestinal mucosal barrier.<sup>17-19</sup> Furthermore, research suggests that butyrate may inhibit tumor formation in animal models of breast cancer. One study showed that rats fed a high-fat diet supplemented with butyrate and exposed to chemicals to induce breast cancer showed a decrease in tumor incidence by 20-52 percent compared to the rats fed the high-fat diet alone.<sup>20</sup>

## Conclusion

Research is currently underway to evaluate the possible role that pathogenic intestinal bacteria may play in the development of breast cancer as well as the role that beneficial intestinal bacteria may play in protecting breast health. Previous research provides indirect evidence suggesting that this hypothesis is plausible. Data supporting this possibility indicates that high-fat diets affect both intestinal bacteria and breast cancer risk; intestinal bacteria affect bile and estrogen reabsorption; probiotics can directly affect hormone metabolism; and probiotics can bind to carcinogens in the colon. Thus, probiotics may offer additional beneficial activity protecting breast health.

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# Probiotics

## Balancing Friendly Flora for Digestive and Immune Health

By Nieske Zabriskie, ND

### Source: Complementary Prescriptions

Link: <http://www.cpmmedical.net/articles/probiotics-balancing-friendly-flora-for-digestive-and-immune-health>

There are over 400 different strains of bacteria in the intestines. Healthy intestines are engaged in a perpetual balancing act, where the number of friendly bacteria must outweigh the number of harmful organisms. These friendly bacteria, known as probiotics, are necessary for optimal health and are critical for normal immune system functioning. Probiotics, such as *Lactobacillus* and *Bifidobacteria*, can improve the barrier function of the intestines, compete and suppress pathogenic bacteria in the colon, and modulate or stimulate the immune response.<sup>1</sup> Imbalance of the intestinal microflora can result in immune system disorders such as allergies or inflammation. Prolonged immune dysfunction can lead to more severe disorders such as diabetes, cancer and inflammatory bowel disease.<sup>2</sup>

Several factors such as drinking chlorinated water, low-fiber diets, or using antibiotics or other medications can deplete the levels of beneficial bacteria, thus making it important to replace them on a regular basis for optimal health. Probiotics are important not only for digestion, but are also essential for nutrient and enzyme synthesis and absorption, and for proper immune function.

### Probiotics and Overall Vitality

Ingestion of probiotics has been shown to support the health of people with health concerns including allergies, infections, inflammatory conditions, and gastrointestinal disorders.

Irritable bowel syndrome is one of the most common gastrointestinal diagnoses. Several clinical trials have shown the efficacy of probiotic supplementation in the management of this condition. In one study, the effective rate of probiotic capsules including *Lactobacillus* and *Bifidobacteria* in the treatment of IBS was 56.8 percent by the second week, and 74.3 percent during the fourth week.<sup>3</sup> In another study, probiotic and prebiotic supplementation was shown to decrease nausea, indigestion, flatulence, and marginal colitis in patients with IBS at 2 weeks. At 52 weeks, the rate of IBS remissions was 81.5 percent to 100 percent.<sup>4</sup> Supplementation with lactobacillus and other probiotics has also been shown to significantly decrease the incidence of antibiotic-associated diarrhea by over 21 percent and *Clostridium difficile* diarrhea by 17 percent compared to patients taking antibiotics without probiotic supplementation.<sup>5</sup> Another study showed that supplementation with probiotics and prebiotics in patients with colon cancer decreased cell proliferation and other cancer markers while stimulating the immune response. Additionally, supplementation of these beneficial bacteria decreased the levels of pathogenic bacteria in the colon.<sup>6</sup>

Supplementation with probiotics and prebiotics has also been shown to modulate the immune system and impact conditions such as allergic rhinitis and food allergies.<sup>7-8</sup> In addition, both *Lactobacillus* and *Bifidobacteria* have been shown to impact the sensitization to dietary antigens in infants, and were shown to significantly decrease the extent and severity of atopic eczema (allergic rash) in these patients suggesting the ability to impact allergy prevention and treatment.<sup>9</sup>

In a double-blind randomized clinical trial, supplementation with lactobacillus products was shown to decrease the number and severity of respiratory infections and absenteeism in children attending day care.<sup>10</sup> In another interesting study, researchers using animal models of autoimmune arthritis have shown that supplementation with lactobacillus protects against rheumatoid arthritis progression, and reduced swelling, cartilage destruction, and pro-inflammatory mediators.<sup>11</sup>

Based on the wide role probiotics play in health, supplementation with these friendly microorganisms is one of the simplest and effective ways to help stimulate overall health. A particularly effective combination of probiotics includes a supplement that contains *Lactobacillus acidophilus*, *Lactobacillus sporogenes*, *Bifidobacterium bifidum*, *Bifidobacterium longum* and *Bifidobacterium infantis*.

## **Lactobacillus**

*Lactobacillus* is a group of gram-positive anaerobic colonic bacteria that produce lactic acid. Supplementation with *Lactobacillus* and the resultant increased colonic levels of this organism has maintained the health of subjects with several intestinal disorders including diarrhea, chronic inflammatory bowel disease (IBD), ulcerative colitis, irritable bowel syndrome (IBS), and pouchitis (inflammation of the pouch surgically created for the management of ulcerative colitis).<sup>12-13</sup> Research has shown that *Lactobacillus* effectively competes with pathogenic bacteria in the colon for binding to the epithelial cells that line the intestines.<sup>14</sup> It also inhibits pathogenic bacteria by producing lactic acid and increasing epithelial mucous production. In addition, *Lactobacillus* strengthens the intestinal barrier and inhibits bacterial translocation through the intestinal lining and into the circulation.<sup>15</sup> Research also has shown that lactobacillus modulates immune function and may support synthesis of secretory immunoglobulin A antibodies in response to pathogenic microbes. In fact, lactobacillus has been shown to stimulate the immune system in healthy individuals while down regulating the immune response in individuals with over-active immune systems.<sup>16</sup>

Some evidence suggests that lactobacillus sporogenes can reduce total and low-density lipoprotein (LDL) cholesterol without affecting the beneficial high-density lipoprotein (HDL) cholesterol levels. Numerous studies have been done with the strain *Lactobacillus acidophilus* DDS-1. Research indicates that this strain can produce specific enzymes such as proteases to help digest proteins and lipases to help digest fats. It also produces the enzyme lactase, which helps digest lactose, and may help alleviate symptoms associated with lactose intolerance. In addition, it produces some B vitamins, particularly vitamin B12 and folic acid. This strain has also been shown to improve calcium metabolism. Additionally, *Lactobacillus acidophilus* DDS-1 has been shown to inhibit the growth of 23 toxin-producing microorganisms.<sup>17-18</sup>

## **Bifidobacteria**

*Bifidobacteria* is also a gram-positive anaerobe, which produces lactic acid. Bifidobacteria produce anti-microbial substances that have activity against many pathogenic organisms. Some species of *Bifidobacteria*, such as *Bifidobacterium infantis* and *Bifidobacterium longum*, bind to the intestinal epithelial cells and prevent attachment of pathogenic coliform bacteria. In addition, *Bifidobacterium longum* is particularly resistant to gastric acid, improving the ability to reach the colon intact when ingested. *Bifidobacteria* also exhibits immune modulating activity. In fact, bifidobacteria has been shown to decrease several enzymes in the colon associated with activation of cancer-causing agents.<sup>19</sup>

## **Prebiotics**

Fructooligosaccharides (FOS) are plant sugars and act as prebiotics, which are substances that selectively promote the growth and activity of beneficial bacteria in the colon. FOS supports the growth of these bacteria, which in turn produce enzymes that ferment the FOS, as FOS is not metabolized by digestive enzymes. FOS passes through the small intestine undigested. The FOS is fermented in the colon and is converted into short chain fatty acids (SCFAs) by intestinal bacteria, which is the mechanism in which FOS supports formation of beneficial intestinal microflora and modulates immune function.<sup>20</sup> Specifically, fermentation of FOS increases colonic *Bifidobacteria*, *Lactobacilli*, and lactic acid. FOS also increases intestinal absorption of calcium, magnesium, and iron.<sup>21</sup> In addition, FOS exhibits anti-inflammatory activity on intestinal inflammation.<sup>22</sup>

The SCFAs created by fermentation of FOS has numerous functions in the intestines as well. SCFAs are readily absorbed by the intestinal mucosa, or the innermost lining of the colon, and have been shown to stimulate intestinal mucosal growth and increase sodium and water absorption in the colon.<sup>23</sup> Also, the secretion of mucus, an important part of the intestinal barrier, has been shown to be stimulated by SCFAs in the colon.<sup>24</sup> Some researchers believe that a diet low in resistant starch and fiber and the resulting low production of SCFAs in the colon may explain the high occurrence of colon disorders seen in Western civilizations.<sup>25</sup> SCFA deficiency may play a role in ulcerative colitis, diarrhea, and other intestinal disorders.<sup>26</sup> In addition, research using animal models has shown that supplementation with short-chain FOS dramatically decreased the incidence of colon tumors.<sup>27</sup>

## **Synergistic Friendly Flora Blend**

Clearly, supplementing with a blend of probiotic bacteria is an effective way to enhance digestion, improve nutrient and enzyme synthesis, help regulate cholesterol and promote healthy immune function. When choosing a probiotic blend, a particularly effective option to promote health is a formula that delivers over 10 billion colony-forming units (CFU) per gram of the DDS-1 strain of *Lactobacillus acidophilus*, *Lactobacillus sporogenes*, *Bifidobacterium bifidum*, *Bifidobacterium longum* and *Bifidobacterium infantis* in a nutrient base designed to enhance beneficial bacterial growth in the colon.

## **Conclusion**

Probiotics and prebiotics are crucial for optimal health and immune system functioning. Environmental factors may decrease the number of these beneficial bacteria, and supplementing with these probiotics can restore intestinal and overall health. Research indicates that probiotic supplementation effectively modulates the immune response, aids in the absorption of nutrients, suppresses the colonization of pathogenic bacteria, and may support the health of individuals with intestinal, allergic, infectious, and inflammatory conditions.

Supplementing with a synergistic blend of the DDS-1 strain of *Lactobacillus acidophilus* along with *Lactobacillus sporogenes*, *Bifidobacterium bifidum*, *Bifidobacterium longum* and *Bifidobacterium infantis* can serve as an especially important way to enhance health.

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[The full text of the study can be read at:  
<http://www.gutpathogens.com/content/1/1/6>

Source: <http://www.canada.com/Health/Brain+belly/1518758/story.html>

Brain to the belly

## **Probiotics may benefit both body and mind**

By Jennifer Sygo

Probiotics: They live in yogurt and promote good gut health, but many of us are still in the dark as to what, exactly, these "good" bacteria do for us. In the first of a two-part series, we take a look at the role probiotics play in maintaining mental health.

Can a healthy gut help your brain? This question was recently raised after a study published in the journal Gut Pathogens demonstrated a link between the so-called "good" bacteria and anxiety levels in patients with Chronic Fatigue Syndrome (CFS). The study, conducted by Toronto based researchers, examined the impact of a particular strain of probiotic, known as Lactobacillus casei Shirota (LcS), on 35 patients with CFS. After eight weeks of receiving 24 billion colony-forming units (CFUs) of LcS per day, those taking the probiotic scored better on anxiety tests than those taking a placebo (dummy pills). (A single serving of most probiotic-rich yogurts contains about one billion CFUs.)

What does this mean for the average consumer? Well, it's definitely a piece of niche research, insofar as we are talking about a relatively small study using one strain of probiotic on a very specific population. But the bigger question is an interesting one: Is there a connection between the gut and the brain? And if so, can we influence our mental health through the use of foods like probiotics that support a healthy bowel?

### **EVERYONE'S FAVOURITE BACTERIA**

According to the World Health Organization, probiotics are, by definition, "live microorganisms which when administered in adequate amounts confer a health benefit on the host." Found largely in fermented foods such as yogurt and kefir (a yogurt-like product that is becoming popular because of its high bacterial concentrations), the most common probiotics are derived from the Lactobacillus and Bifidobacterium.

When it comes to taking probiotics for health, the trick is meeting all of the conditions outlined by the WHO. That means figuring out the optimal dose of the right strain for the health condition you are concerned about -- and then finding a food or supplement with bacteria that's still alive by the time you consume it. That's the part that researchers and food and supplement companies are working on.

## **DOES AN ANGRY GUT LEAD TO AN UNHAPPY MIND?**

According to a growing body of research, it seems that our digestive system is something of a window to our overall health. When our gut is functioning well, we are better able to break down food into individual nutrients and absorb them properly. When our digestive system gets out of whack, be it through chronic illness, the use of antibiotics, a poor diet or other causes, our ability to digest and absorb nutrients may become impaired, and our health suffers as a consequence. By promoting a healthy digestive system, then, it is believed that probiotics can improve health in the rest of the body.

When it comes to CFS, digestive issues are remarkably common: More than half of sufferers meet the diagnostic criteria for irritable bowel syndrome (IBS), a condition known for causing intermittent constipation and/or diarrhea, along with bloating, cramping and gastrointestinal upset. Interestingly, IBS itself tends to be linked with symptoms of anxiety, which in turn affect the bowel through a system that has been dubbed the brain-gut axis. It has also been suggested that probiotics can help reduce chronic inflammation, which may also be linked with anxiety and depression. So now the question is, does the anxiety cause the issues with the bowel, or does poor bowel health negatively affect anxiety?

This is the theory that the researchers in the study were testing, and combined with the results of an earlier study that suggested that LcS can help improve mood and depression symptoms in otherwise healthy individuals, there is enough preliminary data to at least suggest that probiotics might be able to support good mental health by supporting a healthy bowel. The trick, of course, is to replicate and expand on these very small early studies by using a variety of different populations, larger study groups and a wider range of doses and bacterial strains.

So for now, it's a matter of staying tuned while you enjoy your morning yogurt.

- Jennifer Sygo is a dietitian in private practice at Cleveland Clinic Canada ([clevelandcliniccanada.com](http://clevelandcliniccanada.com)), which offers executive physicals, prevention and wellness counselling and personal health care management in Toronto.

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# Probiotics Benefit Metabolic Syndrome Patients

Posted By [Dr. Mercola](#) | May 13 2010 |

A study found that probiotics could help improve the metabolic syndrome by counteracting the adverse effects of a high-fat diet. Metabolic syndrome is a condition characterized by central obesity, hypertension, and disturbed glucose and insulin metabolism.

The benefit comes as a result of reduction in tissue inflammation and metabolic endotoxemia.

NutraIngredients states that:

*“The current study involved administering the probiotic strain B420 to diabetic mice on a high-fat diet. According to the researchers, the probiotic improved the fasting glycemia and restored the glucose turnover rate to the level of the control mice fed with normal chow.”*

## Sources:

 [NutraIngredients April 20, 2010](#)

Dr. Mercola's Comments:

We're hearing more and more about the benefits of probiotics on metabolic syndrome and obesity these days, which is a good thing. Most people do not have the optimal balance of good and bad bacteria in their intestines. This imbalance can wreak havoc on your health in many ways, and yes, it may even contribute to overweight and/or difficulty in shedding excess weight.

Although I'm not a major proponent of supplements (as I believe the majority of your nutrients need to come from food), probiotics are one of my exceptions.

Ensuring that you're getting a regular supply of good bacteria in your digestive system is so important because an estimated 80 percent of [your immune system](#) is located there. So supporting your digestive health is essential to also supporting your immune system, which is your number one defense system against ALL disease.

## How Do You Know Your Gut is Out of Whack?

Signs and symptoms that you may need to address your intestinal balance include:

- Gas and bloating
- Constipation or diarrhea
- Nausea
- Headaches
- Fatigue
- Sugar cravings, and cravings for refined carb foods

These are all signs that unhealthy bacteria have taken over too much real estate in your gut, and rather than reaching for the Pepto Bismol, aspirin, or another cup of coffee to fend off the symptom at hand, the real answer may simply be to add some healthy probiotics to your diet.

## What about Probiotics for Metabolic Syndrome and General Weight Loss?

Several studies have now found that lean people tend to have higher amounts of various healthy bacteria compared to obese people, and researchers suggest that certain bacteria may cause low-grade inflammation in your body, contributing to obesity and difficulty to lose weight.

One such [study found that the bifidobacteria counts](#) taken from infants at the age of 6 months and 12 months were twice as high in healthy weight children as in those who became overweight, while S. Aureus levels were lower. (Interestingly, this finding may explain why breast-fed babies are at a lower risk of obesity, as bifidobacteria flourish in the guts of breast-fed babies.)

[Two other studies](#) found that obese people had about 20 percent more of a family of bacteria known as firmicutes, and almost 90 percent less of a bacteria called bacteroidetes than lean people.

Firmicutes help your body to extract calories from complex sugars and deposit those calories in fat.

When these microbes were transplanted into normal-weight mice, those mice started to gain twice as much fat. So this is one explanation for how the microflora in your gut may play a key role in weight management.

As you probably know, metabolic syndrome and obesity are closely linked, and it actually makes sense that probiotics could help improve both of these conditions, since both are caused by a diet high in sugars and unhealthy fats (think processed trans fat, not saturated fat), which leads to insulin resistance, fuels the growth of unhealthy bacteria, and packs on excess weight.

Keep in mind that *processed foods* in general will destroy healthy microflora and feed bad bacteria and yeast, so the other half of the equation is to switch to a diet of whole, organic foods, as they naturally support a healthy balance.

It doesn't make much sense to use the drug approach to probiotics, thinking you can maintain a diet high in processed foods while taking a probiotic supplement to counteract the ill effects.

Nothing good will come from that in the end, although you may be able to temporarily suppress some of the troublesome symptoms caused by that kind of diet.

## The Health Benefits of Maintaining a Healthy Balance of Bacteria

Your body contains about 100 trillion bacteria -- more than 10 TIMES the number of cells you have in your whole body.

The ideal ratio between the bacteria in your body is 85 percent “good” and 15 percent “bad.”

This ratio is essential for:

- The [proper development and function of your immune system](#)
- Protection against over-growth of other microorganisms that could cause disease
- Digestion of food and absorption of nutrients

The probiotics in your gut also play a role in helping numerous bodily functions, such as:

- Digesting and absorbing certain carbohydrates
- Producing vitamins, absorbing minerals and eliminating toxins
- Keeping bad bacteria under control
- Preventing allergies. Friendly bacteria train your immune system to distinguish between pathogens and non-harmful antigens, and to respond appropriately

One Washington University professor has likened the functioning of this gut microflora in your body to that of an [ant farm that works together as an intelligence](#) to perform an array of functions you're unable to manage on your own.

## **The Viral Component of Obesity – Yet Another Theory**

Taking the gut bacteria/obesity connection one step further is the relatively new term “infectobesity,” which suggests that some cases of obesity may be caused by a virus or other disease-causing organism.

For instance, the human adenovirus-36 (Ad-36) -- a cause of respiratory infections and pinkeye - may be a contributing factor to obesity, as it's been found to [transform adult stem cells into fat cells](#) that are capable of storing additional fat.

As odd as it sounds, infectobesity is actually a plausible theory, and it is possible that there are significant viral causes underlying some cases of obesity. However, please don't take this to mean that losing weight is out of your control, or something that can only be accomplished with medication.

On the contrary, this theory only further supports the importance of balancing out the bacteria in your gut, because what is the most important thing you need to fight off a viral infection?

The foods you eat, and the integrity of your immune system are two important ones.

So it seems all roads lead back to this one central premise: optimizing your gut bacteria is essential for your good health.

Period.

## How to Optimize the Bacteria in Your Gut

The good news is that optimizing the ratio of good versus bad bacteria growing in your body is relatively easy.

Like I mentioned earlier, one of the most important steps you can take is to stop consuming sugary and processed foods. When you eat a healthy diet that is low in sugars and processed foods one of the major benefits is that it causes the good bacteria in your gut to flourish and build up a major defense against the bad bacteria getting a foothold.

This is one of the many reasons I highly recommend [reducing, with the plan of eliminating, sugars and most grains from your diet](#).

Yet, even with an extremely low-sugar diet, there are other factors that influence your gut bacteria, so you'll also want to avoid some of the factors that destroy healthy bacteria, such as:

- [Antibiotics](#)
- Chlorinated water
- Antibacterial soap
- Agricultural chemicals
- Pollution

Considering the many toxins that surround most of us on a daily basis, it's generally a wise choice to "reseed" your body with good bacteria from time to time by taking a high-quality probiotic supplement or eating fermented foods.

In the past, people used [fermented foods](#) like yogurt and sauerkraut to support their digestive health, as these foods are rich in naturally beneficial bacteria.

This is still the best route to optimal digestive health.

Other healthy choices include:

- Lassi (an Indian yoghurt drink, traditionally enjoyed before dinner)
- Fermented milk, such as [kefir](#)
- Various pickled fermentations of cabbage, turnips, eggplant, cucumbers, onions, squash and carrots
- [Natto](#) (fermented soy)

If you were to eat a diet rich in fermented foods that have NOT been pasteurized (as pasteurization kills the naturally occurring probiotics), then you would likely enjoy great digestive health without any additional supplementation.

However, if you simply do not like any of these types of fermented foods, your next best option is to use a high quality probiotic supplement.

I have used many different brands over the past 15 years and there are many good ones out there. I also spent a long time researching and developing my own, called Complete Probiotics, in which I incorporated everything I have learned about this important tool over the years.

## The Foods You Shouldn't Touch With a Ten Foot Pole

By Dr. Mercola

Scientists compared youngsters from a rural African village with another group living in Italy and found a dramatic difference. The African children had less obesity-linked bacteria, and more fatty acids which protect against inflammation.

The diet of the African children was similar to that of people living in the modern Western world thousands of years ago. Of the Italian children, only those who were still breast-feeding harbored bacteria resembling the African children's.

The trillions of microbes that inhabit your gut help you to digest food, protect against disease-causing bugs and limit inflammation.

The Telegraph reports:

*"Pediatrician Dr Paolo Lionetti ... and colleagues said children in industrialized countries who eat ... 'Western' diets may reduce microbial richness — potentially contributing to a rise in allergic and inflammatory diseases in the last half-century."*

### Sources:

» [The Telegraph August 2, 2010](#)

» [Proceedings of the National Academy of Sciences August 2, 2010 \[epub ahead of print\]](#)

Dr. Mercola's Comments:

Obesity is not the only health risk your child faces if he eats a diet consisting mainly of processed foods and snacks. As illustrated by this [study, a junk food diet](#) – with is a largely denatured diet, devoid of "live" nutrients such as healthy bacteria – can also set the stage for asthma, eczema, and a variety of allergies, inflammatory conditions and autoimmune diseases.

Sadly, as the Western-style diet spreads across the globe, much of the natural microbial diversity that is so crucial to good health is actually starting to disappear! Here, the authors stress the importance of "preserving this treasure of microbial diversity from ancient rural communities worldwide."

Indeed, the importance of eating a gut-healthy diet cannot be underestimated. Your gut plays a major role in your physical and even mental health, and having a healthy gut entails maintaining a balance of "good" and "bad" bacteria – ***something you simply will not accomplish by eating highly processed, "dead" foods.***

Until recently, most doctors dismissed the notion that your digestive system did much of anything outside of breaking down food, but in recent years scientists have revealed just how inaccurate this thinking was.

For example, an estimated 80 percent of [your immune system](#) is actually located in your gut, so supporting your digestive health is essential to also supporting your immune system, which is your number one defense system against ALL disease.

Therefore, it should come as no major surprise to find out that lack of beneficial bacteria in your intestines will also allow allergies, inflammation and autoimmune diseases to flourish where they might not otherwise.

Common signs and symptoms that you may need to address your intestinal balance include:

- Gas and bloating
- Constipation or diarrhea
- Nausea
- Headaches
- Fatigue
- Sugar cravings, and cravings for refined carb foods

Chances are, *if you or your entire family eats a lot of processed junk foods and fast foods*, this list may be a description of a more or less an everyday "normal" state for you

## **So What Foods Should You Avoid Like the Plague?**

### **Soda**

In my mind this is where most people will get the biggest payoff for the amount of effort involved. The average person consumes more than one gallon of soda per week. Reducing or eliminating soda from your diet is one of the easiest shifts to make.

Most diet sodas are worse than regular sodas, as you can read in [my recent review on aspartame](#). When people ask me what is safer to drink: diet or regular soda, I ask them what they would rather be hit in the head with -- a baseball bat or a sledgehammer? It's a tough call, but I think a case can be made for regular soda being the lesser of two evils...

That said, regular soda with its high sugar content promotes [yeast overgrowth, which in turn promotes allergies](#). In fact, many people with yeast-related allergies and food sensitivities tend to have sugar cravings, which is doubly problematic since it actually feeds the yeast that is already overgrown in their systems.

While many of you are not likely consuming many sodas, it is vital to understand the importance of this simple change for your friends and family who are not as health savvy as you. Gentle persistent encouragement of this principle will have massively profound implications on their health.

Fortunately there are simple alternatives that are relatively easy to implement. The best is pure clean water. I just completed a four-hour video interview with a leading water industry water expert and hope to share that with you in the next few weeks for more details.

For those who are really struggling, you can purchase carbonated water and use flavored liquid stevias for a taste that is very similar to most sodas. You can also use [Turbo Tapping](#), which is a highly effective, free EFT tapping technique.

### **Doughnuts and Pastries**

Overall these foods are worse than soda as they not only contain sugar, typically in the form of high fructose corn syrup, but they also contain dangerous trans fats. The reason I did not list this one first is that they are not consumed by as many people on a regular basis.

For more information about how [trans fats promotes allergies, while saturated fats relieve them, please see this previous article.](#)

### **French Fries**

Oh, they taste so good, but are ever so bad for you as they are loaded with the worst types of fat on the planet -- typically highly refined and genetically modified omega 6 oils, such as corn, canola, and soybean oils.

If you're still unaware of the link between allergies and genetically engineered food ingredients (particularly soy), please [review this recent article](#) by GMO expert, Jeffrey Smith.

These highly processed omega-6 oils are bad enough if you eat them in the form of unheated salad dressing, but when these oils are heated to a high temperature, they transform into a potent mixture that is sure to destroy your health.

Avoid these like the plague. Be particularly careful when ordering hamburgers and other similar foods in a restaurant as most will include fries by default, and once they are at your table they're hard to resist. So please be sure to order a healthier alternative.

### **Nearly All Breakfast Cereals**

Breakfast is, without question, the single most challenging meal to eat outside of your home. Most of the typical breakfast offerings will drag your health down. The most commonly consumed breakfast are breakfast cereals, which are merely disguised forms of high fructose corn syrup [loaded with genetically modified \(GM\) grains](#). But pancakes, French toast, waffles, scrambled eggs and rolls don't do much to improve your health either.

Many may wonder about the scrambled egg concern but the high heat oxidized cholesterol in the eggs and severely damages it. Far better to have the eggs MINIMALLY cooked or better yet [raw eggs](#).

## Processed Foods and Snacks

In addition to these specific examples, processed foods in general can contribute to allergies for a number of different reasons. Most processed foods contain a variety of [food colorings, flavors, preservatives, and other additives](#) can have a major impact. Junk foods also has a detrimental effect on your gut flora, which has major consequences for your overall health, weight control, and the development of allergies.

## The Many Health Benefits of Maintaining Healthy Gut Flora

The ideal ratio between the bacteria in your body is 85 percent "good" and 15 percent "bad." That's right – you need FAR more beneficial bacteria (probiotics) than you might think in order to maintain the right balance.

The key here is to avoid as many processed foods as you can. This is a challenge because over 90% of the foods that Americans eat are processed and the number source of calories is high fructose corn syrup. So the general principle is to avoid processed foods, but some foods are more particularly pernicious than others so let me give you some examples.

This ratio is essential for:

- The proper development and function of your immune system
- Protection against over-growth of other microorganisms that could cause disease
- Digestion of food and absorption of nutrients
- Producing vitamins, absorbing minerals and eliminating toxins

As you can see, probiotics perform a wide variety of functions, which renders them useful and beneficial for a number of health concerns, including the prevention or control of:

- Food and skin allergies in children
- Vaginitis
- Premature labor in pregnant women
- Inflammatory bowel disease
- Recurrent ear and bladder infections
- Chronic diarrhea

One of the ways friendly bacteria help prevent allergies, infections and inflammatory conditions is by training your immune system to distinguish between pathogens and non-harmful antigens, and to respond appropriately.

When you're deficient in these healthy bacteria, your immune system is ill equipped to address the many pathogens and antigens entering your system on a daily basis, and health problems can easily ensue.

## Your Gut's Microflora Also Impacts Your Weight

The microflora in your digestive system is also emerging as a major player in weight management, and needless to say, junk food and weight gain typically go hand in hand.

Your gut flora is by no means the only underlying reason for this, but it does play an important part.

Multiple studies have shown that obese people have different intestinal bacteria than slim people, and it appears that the microbes in an overweight body are [much more efficient at extracting calories from food](#).

Researchers have also suggested that certain bacteria may cause low-grade inflammation in your body, further contributing to obesity and difficulty to lose weight.

One such [study found that the bifidobacteria counts](#) taken from infants at the age of 6 months and 12 months were twice as high in healthy weight children as in those who became overweight, while S. Aureus levels were lower.

Interestingly, this finding may explain why breast-fed babies are also at a lower risk of obesity, as bifidobacteria flourish in the guts of breast-fed babies.

The breast-fed Italian babies in the [study above](#) were also the only ones harboring bacteria resembling the African children's, which indicates your "diet may dominate other factors such as ethnicity, sanitation, geography or climate," the researchers said.

[Two previous studies](#) found that obese people had about 20 percent more of a family of bacteria known as firmicutes, and almost 90 percent less of a bacteria called bacteroidetes than lean people. (Firmicutes help your body to extract calories from complex sugars and deposit those calories in fat.)

This latest study confirms those results, as here too, the African children had significantly higher levels of Bacteroidetes and far lower levels of the firmicutes linked to obesity.

## How to Optimize the Bacteria in Your Gut

Fortunately, influencing the ratio of bacteria growing in your body is relatively easy. One of the most important steps you can take is to ***stop consuming processed and sugary foods***. This includes ***cutting down on grains***, as most grains are quickly converted into sugar in your body.

Keep in mind, of course, that if you or your children need to lose some excess weight, balancing your gut bacteria is only one part of the equation. [Regular exercise](#) and [addressing any emotional blocks](#) are also very important.

When you eat a healthy diet low in sugars and processed foods, one of the major benefits is that it naturally causes the good bacteria in your gut to flourish.

Yet, even with an extremely low-sugar diet, there are other factors that influence your gut bacteria. [Antibiotics](#), chlorinated water, antibacterial soap, agricultural chemicals, pollution -- all of these things help to kill off your good bacteria. This is why it's a wise choice to "reseed" your body with good bacteria from time to time by taking a high-quality probiotic supplement or eating fermented foods.

In the past, people used [fermented foods](#) like yogurt and sauerkraut to support their digestive health, as these foods are rich in naturally beneficial bacteria. This is still the best route to optimal digestive health.

Healthy choices include:

- Lassi (an Indian yoghurt drink, traditionally enjoyed before dinner)
- Fermented milk, such as kefir
- Various pickled fermentations of cabbage, turnips, eggplant, cucumbers, onions, squash and carrots
- Natto (fermented soy)

If you were to eat a diet rich in fermented foods that have NOT been pasteurized (as pasteurization kills the naturally occurring probiotics), then you would likely enjoy great digestive health without any additional supplementation.

However, if you simply do not like any of these types of fermented foods, your next best option is to use a high quality probiotic supplement.

I have used many different brands over the past 15 years and there are many good ones out there. I also spent a long time researching and developing my own, called Complete Probiotics, in which I incorporated everything I have learned about this important tool over the years.

Keep in mind, however, that ***processed foods in general will destroy healthy microflora and feed bad bacteria and yeast***, so you can't use the drug approach to probiotics -- meaning, you can't maintain a diet high in processed foods while taking a probiotic supplement to counteract the ill effects.

You may be able to temporarily suppress some of the troublesome symptoms caused by that kind of diet, but it won't work in the long run.



## **Promise of Probiotics**

To read the full article please click on link below:

<http://www.womensinternational.com/connections/probiotics.html>

# Researchers Achieve Cancer-Killing Effect With Oral-Dose Vitamin C

by [Bill Sardi](#)

In an overlooked study first published in 2008, for the first time, using a special liposomal form of oral-dose vitamin C, researchers in Britain demonstrated it is possible to achieve cancer-killing blood concentrations of this vitamin without undesirable side effects.

Heretofore, National Institutes of Health Researchers claimed the maximal concentration of vitamin C that can be achieved following oral intake is not sufficient to produce a cancer-killing effect. Now British researchers demonstrate they were able to achieve blood concentrations of vitamin C that were twice what was incorrectly reported to be maximal, and in the range of what is known to be selectively toxic to tumor cells, yet not harmful to healthy cells.

Studies with various forms of cancer show a 30%-to-50% cancer cell-killing effect at the same blood concentration of vitamin C achieved in this study. For comparison, anti-cancer drugs are approved by the FDA if they achieve 50% tumor shrinkage.

Researchers Stephen Hickey and Hilary J. Roberts, long-time advocates of vitamin C therapy and authors of the book *Ascorbate: The Science of Vitamin C*, writing in the *Journal of Nutritional & Environmental Medicine*, believe even higher concentration of vitamin C can be achieved, up to three times what was once [mistakenly believed to be maximal](#), with measured, repeated oral doses.

It was Linus Pauling, the two-time Nobel Prize winner, who first [employed intravenous vitamin C to prolong the lives of terminal cancer patients](#). This was reported in 1978.

A year later Mayo Clinic researchers then followed with a study of their own, which utilized oral-dose vitamin C, and errantly [dispelled the notion of using vitamin C to treat cancer](#). However, oral doses cannot achieve the same high blood concentration that intravenous vitamin C can produce.

Only recently has it come to light that the dismissal of vitamin C for cancer therapy was based upon oral-dose vitamin C, and subsequent studies found [intravenous vitamin C has the potential to be used in cancer therapy](#). Some small [pilot studies](#) appear to be encouraging with the use of intravenous vitamin C therapy. Cancer researchers have recently called for a [reconsideration of intravenous vitamin C therapy](#).

According to researchers Hickey and Roberts, repeated doses, and use of a special [liposomal form of vitamin C](#) that is absorbed in the gut and then into the liver before it is released into the blood stream, are key to making oral vitamin C therapy effective. Another important factor is [to limit the consumption of carbohydrates](#) (refined sugar) which impairs oral absorption of this vitamin.

Dr. John Ely, emeritus professor at the University of Washington, has also shown that [sugar depletes vitamin C from white blood cells](#) and makes them sluggish. White blood cells are the very cells that attack tumor cells and destroy them.

The liposomal form of vitamin C employed in this study consists of 1-gram (1000 milligram) dose sachets of vitamin C powder encapsulated in lecithin (phosphatidylcholine), as supplied by [Livon Laboratories](#) of Henderson, Nevada, USA.

A British laboratory (Biolab, London) that has conducted thousands of vitamin C assays over a 10-year period, confirms that 20-gram and 36-gram doses of oral vitamin C, as utilized by researchers Hickey and Roberts, achieved far higher blood concentration than had ever been measured previously. Repeated dosing rather than massive single-dose vitamin C averts side effects such as diarrhea.

The cancer cell-killing effect of vitamin C is realized by the transient production of [hydrogen peroxide \(H<sub>2</sub>O<sub>2</sub>\) within connective tissues](#) (not in blood), which then [destroys tumor cells](#), and subsequently turns to harmless water (H<sub>2</sub>O), ensuring non-toxic therapy.

Reluctance by modern medical practitioners to offer vitamin C therapy to their cancer patients suggests the public will have to practice vitamin C therapy at home. This need not be a totally unguided experience, as there are [instructive books](#) available.

Why this landmark study has been completely overlooked by the cancer community goes unexplained. The study was published in a journal catalogued by the National Library of Medicine (NLM), but articles from that journal cannot be accessed at the NLM website. When this report was submitted for publication, the publisher of the journal suddenly changed editors and the new editor attempted to scratch the report from its publication schedule altogether. Finally the report did get published, but suddenly the journal itself was discontinued and its articles no longer indexed by NLM. It appears an intentional effort was made to bury this study. An online abstract is provided at the [Journal of Nutritional and Environmental Medicine](#) website.

### **Pharmacokinetics of oral vitamin C**

Stephen Hickey<sup>1, 2†</sup>, Hilary J. Roberts<sup>3</sup> and Nicholas J. Miller<sup>4</sup>

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*Purpose.* To test whether plasma vitamin C levels, following oral doses in supplemented volunteers, are tightly controlled and subject to a maximum in the region of  $220 \mu\text{m L}^{-1}$ , as suggested by previous researchers for depleted subjects. To determine plasma levels following single, variable-sized doses of standard and liposomal formulations of vitamin C and compare the effects of the different formulations. To determine whether plasma levels above  $280 \mu\text{m L}^{-1}$ , which have selectively killed cancer, bacteria or viruses (in laboratory experiments), can be achieved using oral doses of vitamin C.

*Design.* This was a single blind study, measuring plasma levels in two subjects, in samples taken half-hourly or hourly for 6 hours, following ingestion of vitamin C. Data were compared with published results and with data from 10 years of laboratory plasma determinations.

*Materials and methods.* Standard 1-gram tablets of vitamin C; liposomal vitamin C. Plasma levels were analysed using the method of Butts and Mulvihill.

*Results.* Preliminary investigations of the effects of liposomal and standard formulation ascorbate showed that blood plasma levels in excess of the previously assumed maximum of  $220 \mu\text{m L}^{-1}$  are possible. Large oral doses of liposomal ascorbate resulted in plasma levels above  $400 \mu\text{m L}^{-1}$ .

*Conclusions.* Since a single oral dose can produce plasma levels in excess of  $400 \mu\text{m L}^{-1}$ , pharmacokinetic theory suggests that repeated doses could sustain levels well above the formerly assumed maximum. These results have implications for the use of ascorbate, as a nutrient and as a drug. For example, a short *in vitro* treatment of human Burkitt's lymphoma cells with ascorbate, at  $400 \mu\text{m L}^{-1}$ , has been shown to result in 50% cancer cell death. Using frequent oral doses, an equivalent plasma level could be sustained indefinitely. Thus, oral vitamin C has potential for use as a non-toxic, sustainable, therapeutic agent. Further research into the experimental and therapeutic aspects of high, frequent, oral doses of ascorbic acid either alone or (for cancer therapy) in combination with synergistic substances, such as alpha-lipoic acid, copper or vitamin K3, is needed urgently.

January 15, 2010

Bill Sardi [[send him mail](#)] is a frequent writer on health and political topics. His health writings can be found at [www.naturalhealthlibrarian.com](http://www.naturalhealthlibrarian.com). He is the author of [You Don't Have To Be Afraid Of Cancer Anymore](#).

# Vitamin C can curb cancer growth, say New Zealand researchers

*Deutsche Presse-Agentur (dpa)*

07-26-10

Wellington (dpa) - Vitamin C can help curb the growth of cancer cells, according to New Zealand scientists who claim breakthrough research to provide the first real evidence of a connection between the vitamin and the development of tumours.

"Our results offer a promising and simple intervention to help in our fight against cancer at the level of both prevention and cure," Associate Professor Margreet Vissers, of the University of Otago's Free Radical Research Group, said recently.

She said the role of vitamin C in cancer treatment had been the subject of debate for years, with many anecdotal accounts of the vitamin's beneficial role.

While her previous research had demonstrated the vitamin's importance in maintaining cell health and hinted at its potential for limiting diseases such as cancer, the latest study looked at whether vitamin C levels were lowered in patients with endometrial tumours.

She said the study found that tumours were less able to accumulate vitamin C compared with normal healthy tissue and that this related to the ability of the tumour to survive and grow.

"Tumours with low vitamin C levels had more of a protein called HIF-1 which allows them to thrive in conditions of stress," she said.

"The findings are significant as they show, for the first time, a direct relationship between HIF-1 and vitamin C levels in tumours and suggest it would be beneficial for people with cancer cells to have more vitamin C."

"This could help limit the rate of tumour growth, increase the responsiveness to chemotherapy and may prevent the formation of solid tumours."

Details of the research are published in the latest edition of the *Cancer Research* journal.

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## **Vitamin C** by Jane Higdon, Ph.D.

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Source: <http://lpi.oregonstate.edu/infocenter/vitamins/vitaminC/>

Vitamin C, also known as ascorbic acid, is a water-soluble [vitamin](#). Unlike most mammals and other animals, humans do not have the ability to make their own vitamin C. Therefore, we must obtain vitamin C through our diet.

### **Function**

Vitamin C is required for the synthesis of collagen, an important structural component of blood vessels, tendons, ligaments, and bone. Vitamin C also plays an important role in the synthesis of the [neurotransmitter](#), norepinephrine. Neurotransmitters are critical to brain function and are known to affect mood. In addition, vitamin C is required for the synthesis of [carnitine](#), a small molecule that is essential for the transport of fat into cellular organelles called [mitochondria](#), where the fat is converted to energy [\(1\)](#). Research also suggests that vitamin C is involved in the metabolism of cholesterol to [bile acids](#), which may have implications for blood cholesterol levels and the incidence of gallstones [\(2\)](#).

Vitamin C is also a highly effective [antioxidant](#). Even in small amounts vitamin C can protect indispensable molecules in the body, such as proteins, lipids (fats), carbohydrates, and [nucleic acids](#) (DNA and RNA), from damage by [free radicals](#) and [reactive oxygen species](#) that can be generated during normal metabolism as well as through exposure to toxins and pollutants (e.g., cigarette smoke). Vitamin C may also be able to regenerate other antioxidants such as vitamin E [\(1\)](#). One recent study of cigarette smokers found that vitamin C regenerated vitamin E from its oxidized form [\(3\)](#).

### **Deficiency**

#### **Scurvy**

Severe vitamin C deficiency has been known for many centuries as the potentially fatal disease, [scurvy](#). By the late 1700s the British navy was aware that scurvy could be cured by eating oranges or lemons, even though vitamin C would not be isolated until the early 1930s. Symptoms of scurvy include bleeding and bruising easily, hair and tooth loss, and joint pain and swelling. Such symptoms appear to be related to the weakening of blood vessels, connective tissue, and bone, which all contain collagen. Early symptoms of scurvy like fatigue may result from diminished levels of [carnitine](#), which is needed to derive energy from fat, or from decreased synthesis of the [neurotransmitter](#) norepinephrine (see [Function](#)). Scurvy is rare in developed countries because it can be prevented by as little as 10 mg of vitamin C daily [\(4\)](#). However, cases have occurred in children and the elderly on very restricted diets [\(5, 6\)](#).

## The Recommended Dietary Allowance (RDA)

In the U.S., the recommended dietary allowance ([RDA](#)) for vitamin C was revised in 2000 upward from the previous recommendation of 60 mg daily for men and women. The RDA continues to be based primarily on the prevention of deficiency disease, rather than the prevention of [chronic disease](#) and the promotion of optimum health. The recommended intake for smokers is 35 mg/day higher than for nonsmokers, because smokers are under increased [oxidative stress](#) from the toxins in cigarette smoke and generally have lower blood levels of vitamin C ([7](#)).

Recommended Dietary Allowance (RDA) for Vitamin C			
Life Stage	Age	Males (mg/day)	Females (mg/day)
Infants	0-6 months	40 ( <a href="#">AI</a> )	40 (AI)
Infants	7-12 months	50 (AI)	50 (AI)
Children	1-3 years	15	15
Children	4-8 years	25	25
Children	9-13 years	45	45
Adolescents	14-18 years	75	65
Adults	19 years and older	90	75
Smokers	19 years and older	125	110
Pregnancy	18 years and younger	-	80
Pregnancy	19 years and older	-	85
Breast-feeding	18 years and younger	-	115
Breast-feeding	19 years and older	-	120

## Disease Prevention

The amount of vitamin C required to prevent [chronic disease](#) appears to be more than that required for prevention of scurvy. Much of the information regarding vitamin C and the prevention of chronic disease is based on [prospective studies](#), in which vitamin C intake is assessed in large numbers of people who are followed over time to determine whether they develop specific chronic diseases.

## Cardiovascular Diseases

### *Coronary Heart Disease*

Until recently, the results of most [prospective studies](#) indicated that low or deficient intakes of vitamin C were associated with an increased risk of [cardiovascular diseases](#), and that modest dietary intakes of about 100 mg/day were sufficient for maximal reduction of cardiovascular disease risk among nonsmoking men and women (1). A recent [meta-analysis](#) of 14 cohort studies concluded that dietary vitamin C intake, but not supplemental vitamin C intake, was inversely related to [coronary heart disease](#) (CHD) risk (8). Thus, some studies did not find significant reductions in CHD risk among vitamin C supplement users in well-nourished populations (9-11). One notable exception was the First National Health and Nutrition Examination Survey (NHANES I) Epidemiologic Follow-up Study (12). This study found that the risk of death from cardiovascular diseases was 42% lower in men and 25% lower in women who consumed more than 50 mg/day of dietary vitamin C *and* regularly took vitamin C supplements, corresponding to a total vitamin C intake of about 300 mg/day (13). Results from the Nurses' Health Study (NHS), based on the follow-up of more than 85,000 women over 16 years, also suggested that higher vitamin C intakes may be cardioprotective (14). In this study, vitamin C intake of more than 359 mg/day from diet plus supplements or supplement use itself was associated with a 27-28% reduction in CHD risk. However, in those women who did not take vitamin C supplements, dietary vitamin C intake was not significantly associated with CHD risk. Hence, both the NHANES I Epidemiologic Follow-up Study (12, 13) and NHS (14) do not support the conclusions of the above meta-analysis (8). Another pooled analysis of nine [prospective cohort studies](#), including more than 290,000 adults who were free of CHD at baseline and followed for an average of ten years, found that those who took more than 700 mg/day of supplemental vitamin C had a 25% lower risk of CHD than those who did not take vitamin C supplements (15). Additionally, a [randomized, double-blind, placebo-controlled](#) trial in more than 14,000 older men participating in the Physicians' Health Study II found that vitamin C supplementation (500 mg/day) for an average of eight years had no significant effect on major cardiovascular events, total [myocardial infarction](#), or cardiovascular mortality (16). However, this study had several limitations (17); see the [Linus Pauling Institute's response](#) to this study. Data from pharmacokinetic studies of vitamin C at the National Institutes of Health (NIH) indicate that plasma and circulating cells—and thus, presumably, total body pool—in healthy, young subjects became fully saturated with vitamin C at a dose of about 400 mg/day (18). Therefore, the results of the pooled analysis of prospective cohort studies as well as individual, large prospective studies, such as the NHANES I Epidemiologic Follow-up Study (12, 13) and NHS (14), together with pharmacokinetic data of vitamin C in humans (18), suggest that maximal reduction of CHD risk may require vitamin C intakes of 400 mg/day or more (19).

### *Stroke*

With respect to vitamin C and [cerebrovascular disease](#), a [prospective study](#) that followed more than 2,000 residents of a rural Japanese community for 20 years found that the risk of [stroke](#) in those with the highest [serum](#) levels of vitamin C was 29% lower than in those with the lowest serum levels of vitamin C (20). Additionally, the risk of stroke in those who consumed vegetables 6-7 days of the week was 54% lower than in those who consumed vegetables 0-2 days

of the week. In this population, serum levels of vitamin C were highly correlated with fruit and vegetable intake. Therefore, as in many studies of vitamin C intake and chronic disease risk, it is difficult to separate the effects of vitamin C on stroke risk from the effects of other components of fruits and vegetables, emphasizing the benefits of a diet rich in fruits and vegetables in reducing stroke risk. Hence, plasma vitamin C levels may be a good [biomarker](#) for fruit and vegetable intake and other lifestyle factors that contribute to a reduced risk of stroke. A recent 10-year prospective study in 20,649 adults found that those in the top [quartile](#) of plasma vitamin C concentrations had a 42% lower risk of stroke compared to those in the lowest quartile ([21](#)). A [randomized, double-blind, placebo](#)-controlled trial in more than 14,000 older men participating in the Physicians' Health Study II found that vitamin C supplementation (500 mg/day) for an average of eight years had no significant effect on stroke death, ischemic stroke, or hemorrhagic stroke ([16](#)). However, this study had numerous limitations that make it difficult to draw conclusions for the general population ([17](#)); see the [Linus Pauling Institute's response](#) to this study.

## Cancer

A large number of studies have shown that increased consumption of fresh fruits and vegetables is associated with a reduced risk for most types of [cancer](#) ([22](#)). Such studies were the basis for dietary guidelines endorsed by the U.S. Department of Agriculture and the National Cancer Institute, which recommended at least five servings of fruits and vegetables per day. U.S. government organizations currently recommend eating a variety of fruits and vegetables daily; the recommended serving number depends on total caloric intake, which is governed by age, gender, body composition, and physical activity level ([23](#)). A number of [case-control studies](#) have investigated the role of vitamin C in cancer prevention. Most have shown that higher intakes of vitamin C are associated with decreased incidence of cancers of the mouth, throat and vocal chords, [esophagus](#), stomach, [colon-rectum](#), and lung. Because the possibility of bias is greater in case-control studies, [prospective cohort studies](#) are generally given more weight when evaluating the effect of nutrient intake on disease. In general, prospective studies in which the lowest intake group consumed more than 86 mg of vitamin C daily have not found differences in cancer risk, while studies finding significant cancer risk reductions found them in people consuming at least 80 to 110 mg of vitamin C daily ([1](#)).

A prospective study that followed 870 men over a period of 25 years found that those who consumed more than 83 mg of vitamin C daily had a striking, 64% reduction in lung cancer compared with those who consumed less than 63 mg per day ([24](#)). However, a pooled analysis of eight prospective studies concluded that dietary vitamin C was not related to lung cancer when the analysis was controlled for other dietary factors ([25](#)). Although most large prospective studies observed no association between breast cancer and vitamin C intake, two studies found dietary vitamin C intake to be inversely associated with breast cancer risk in certain subgroups. In the Nurses' Health Study, premenopausal women with a family history of breast cancer who consumed an average of 205 mg/day of vitamin C from foods had a 63% lower risk of breast cancer than those who consumed an average of 70 mg/day ([26](#)). In the Swedish Mammography Cohort, overweight women who consumed an average of 110 mg/day of vitamin C had a 39% lower risk of breast cancer compared to overweight women who consumed an average of 31 mg/day ([27](#)). A number of observational studies have found increased dietary vitamin C intake to

be associated with decreased risk of stomach cancer, and laboratory experiments indicate that vitamin C inhibits the formation of carcinogenic compounds in the stomach (28, 29). Infection with the bacteria, *Helicobacter pylori* (*H. pylori*), is known to increase the risk of stomach cancer and also appears to lower the vitamin C content of stomach secretions. Although two intervention studies did not find a decrease in the occurrence of stomach cancer with vitamin C supplementation (7), more recent research suggests that vitamin C supplementation may be a useful addition to standard *H. pylori* eradication therapy in reducing the risk of gastric cancer (30, 31). Another intervention trial, a randomized, double-blind, placebo-controlled trial in more than 14,000 older men participating in the Physicians' Health Study (PHS) II, reported vitamin C supplementation (500 mg/day) for an average of eight years had no significant effect on total cancer or site-specific cancers, including colorectal, lung, and prostate cancer (32). However, the PHS II had several limitations; see the [Linus Pauling Institute's response](#) to the PHS II.

## Cataracts

Cataracts are a leading cause of visual impairment throughout the world. In the U.S., cataract-related expenditures are estimated to exceed \$3 billion annually (33). Cataracts occur more frequently and become more severe as people age. Decreased vitamin C levels in the lens of the eye have been associated with increased severity of cataracts in humans. Some, but not all, studies have observed increased dietary vitamin C intake (34, 35) and increased blood levels of vitamin C (36, 37) to be associated with decreased risk of cataracts. In general, those studies that have found a relationship suggest that vitamin C intake may have to be higher than 300 mg/day for a number of years before a protective effect can be detected (1). A 7-year controlled intervention trial in 4,629 men and women found that a daily antioxidant supplement containing 500 mg of vitamin C, 400 IU of vitamin E, and 15 mg of beta-carotene had no effect on the development and progression of age-related cataracts compared to a placebo (38). Therefore, the relationship between vitamin C intake and the development of cataracts requires further clarification before specific recommendations can be made.

## Gout

[Gout](#), a condition that afflicts more than 1% of U.S. adults, is characterized by abnormally high blood levels of uric acid (urate) (39). Urate crystals may form in joints, resulting in inflammation and pain, as well as in the kidneys and urinary tract, resulting in kidney stones. The tendency to develop elevated blood uric acid levels and gout is often inherited; however, dietary and lifestyle modification may be helpful in both the prevention and treatment of gout (40). In an [observational study](#) that included 1,387 men, higher intakes of vitamin C were associated with lower [serum](#) levels of uric acid (41). More recently, a [prospective study](#) that followed a cohort of 46,994 men for 20 years found that total daily vitamin C intake was inversely associated with risk of gout, with higher intakes being associated with greater risk reductions (42). The results of this study also indicate that supplemental vitamin C may be helpful in the prevention of gout (42). Interestingly, a [randomized, double-blind, placebo-controlled](#) trial in 184 adult nonsmokers reported that vitamin C supplementation (500 mg/day) for two months lowered serum concentrations of uric acid compared to placebo (43).

## Lead toxicity

Although the use of lead paint and leaded gasoline has been discontinued in the U.S., lead toxicity continues to be a significant health problem, especially in children living in urban areas. Abnormal growth and development have been observed in infants of women exposed to lead during pregnancy, while children who are chronically exposed to lead are more likely to develop learning disabilities, behavioral problems, and to have a low IQ. In adults, lead toxicity may result in kidney damage, high blood pressure, and [anemia](#). In a study of 747 older men, blood lead levels were significantly higher in those who reported total dietary vitamin C intakes averaging less than 109 mg/day compared to those who reported higher vitamin C intakes [\(44\)](#). A much larger study of 19,578 people, including 4,214 children from six to 16 years of age, found higher serum vitamin C levels to be associated with significantly lower blood lead levels [\(45\)](#). A U.S. national survey of more than 10,000 adults found that blood lead levels were inversely related to serum vitamin C levels [\(46\)](#). An intervention trial that examined the effects of vitamin C supplementation on blood lead levels in 75 adult male smokers found that 1,000 mg/day of vitamin C resulted in significantly lower blood lead levels over a four-week treatment period compared to placebo [\(47\)](#). A lower dose of 200 mg/day did not significantly affect blood lead levels, despite the finding that serum vitamin C levels were not different than those in the group who took 1,000 mg/day. The mechanism for the relationship between vitamin C intake and blood lead levels is not known, although it has been postulated that vitamin C may inhibit intestinal absorption or enhance urinary excretion of lead.

## Role in Immunity

Vitamin C affects several components of the human immune system; for example, vitamin C has been shown to stimulate both the production [\(48-52\)](#) and function [\(53, 54\)](#) of [leukocytes](#) (white blood cells), especially [neutrophils](#), [lymphocytes](#), and [phagocytes](#). Specific measures of functions stimulated by vitamin C include cellular motility [\(54\)](#), [chemotaxis](#) [\(53, 54\)](#), and [phagocytosis](#) [\(53\)](#). Neutrophils, which attack foreign bacteria and viruses, seem to be the primary cell type stimulated by vitamin C, but lymphocytes and other phagocytes are also affected [\(55\)](#). Additionally, several studies have shown that supplemental vitamin C increases serum levels of [antibodies](#) [\(56, 57\)](#) and C1q [complement proteins](#) [\(58-60\)](#) in guinea pigs, which—like humans—cannot synthesize vitamin C and hence depend on dietary vitamin C. However, some studies have reported no beneficial changes in leukocyte production or function with vitamin C treatment [\(61-64\)](#). Vitamin C may also protect the integrity of immune cells. Neutrophils, mononuclear phagocytes, and lymphocytes accumulate vitamin C to high concentrations, which can protect these cell types from [oxidative damage](#) [\(52, 65, 66\)](#). In response to invading microorganisms, phagocytic leukocytes release non-specific toxins, such as superoxide radicals, hypochlorous acid (“bleach”), and peroxynitrite; these [reactive oxygen species](#) kill pathogens and, in the process, can damage the leukocytes themselves [\(67\)](#). Vitamin C, through its antioxidant functions, has been shown to protect leukocytes from such effects of autooxidation [\(68\)](#). Phagocytic leukocytes also produce and release [cytokines](#), including interferons, which have antiviral activity [\(69\)](#). Vitamin C has been shown to increase interferon levels [in vitro](#) [\(70\)](#).

It is widely thought by the general public that vitamin C boosts the function of the immune system, and accordingly, may protect against viral infections and perhaps other diseases. While

some studies suggest the biological plausibility of vitamin C as an immune enhancer, human studies published to date are conflicting. Further, controlled clinical trials of appropriate statistical power would be necessary to determine if supplemental vitamin C boosts the immune system.

## **Disease Treatment**

### **Cardiovascular Diseases**

#### *Vasodilation*

The ability of blood vessels to relax or dilate ([vasodilation](#)) is compromised in individuals with [atherosclerosis](#). Damage to the heart muscle caused by a heart attack and damage to the brain caused by a stroke are related, in part, to the inability of blood vessels to dilate enough to allow blood flow to the affected areas. The pain of [angina pectoris](#) is also related to insufficient dilation of the [coronary arteries](#). Impaired vasodilation has been identified as an independent risk factor for cardiovascular disease ([71](#)). Many [randomized, double-blind, placebo](#)-controlled studies have shown that treatment with vitamin C consistently results in improved vasodilation in individuals with coronary heart disease as well as those with angina pectoris, [congestive heart failure](#), [diabetes](#), high [cholesterol](#), and high blood pressure ([1, 72-74](#)). Improved vasodilation has been demonstrated at an oral dose of 500 mg of vitamin C daily ([72](#)).

#### *Hypertension*

Individuals with high blood pressure ([hypertension](#)) are at increased risk of developing cardiovascular diseases. Several, but not all, studies have demonstrated a blood pressure lowering effect of vitamin C supplementation ([75](#)). A small study in individuals with hypertension found that vitamin C supplementation with 500 mg/day for six weeks slightly decreased [systolic blood pressure](#) (1.8 [mm Hg](#) reduction) compared to a [placebo](#) ([76](#)). Another study in individuals with elevated blood pressure found that a daily supplement of 500 mg of vitamin C resulted in an average drop in systolic blood pressure of 9% after four weeks ([77](#)). It should be noted that those participants who were taking antihypertensive medications continued taking them throughout the four-week study. Because the findings regarding vitamin C and high blood pressure have not yet been replicated in larger studies, it is important for individuals with significantly elevated blood pressure to continue current therapy (medication, lifestyle changes, etc.) in consultation with their health care provider.

### **Cancer**

Studies in the 1970s and 1980s conducted by Linus Pauling, Ewan Cameron, and colleagues suggested that very large doses of vitamin C (10 grams/day intravenously for ten days followed by at least 10 grams/day orally indefinitely) were helpful in increasing the survival time and improving the quality of life of terminal cancer patients ([78](#)). However, two randomized placebo-controlled studies conducted at the Mayo Clinic found no differences in outcome between terminal cancer patients receiving 10 grams/day of vitamin C orally or placebo ([79, 80](#)). There were significant methodological differences between the Mayo Clinic and Pauling's studies, and

recently, researchers from the [NIH](#) suggested that the route of administration (intravenous versus oral) may have been the key to the discrepant results. Intravenous (IV) administration can result in much higher blood levels of vitamin C than oral administration, and vitamin C levels that are toxic to cancer cells in culture can be achieved in humans only with intravenous but not oral administration of vitamin C ([81](#)). Dr. Mark Levine and colleagues at NIH have investigated the anticancer mechanism responsible for vitamin C and reported that it involves production of hydrogen peroxide, which is selectively toxic to cancer cells ([82-84](#)). Thus, it appears reasonable to reevaluate the use of high-dose vitamin C as [adjunctive](#) cancer therapy.

Currently, there are no results from controlled clinical trials indicating that vitamin C would adversely affect the survival of cancer patients. Recently, two phase I clinical trials in patients with advanced cancer found that intravenous administration of vitamin C at doses up to 1.5 g/kg of body weight was well tolerated and safe in pre-screened patients ([85, 86](#)); other phase I trials are ongoing ([87](#)). Additionally, phase II clinical trials evaluating the efficacy of vitamin C in cancer treatment are currently under way ([87](#)). Some [case reports](#) have suggested that intravenous vitamin C may aid in cancer treatment ([88, 89](#)). However, vitamin C should not be used in place of therapy that has been demonstrated effective in the treatment of a particular type of cancer, for example, [chemotherapy](#) or [radiation therapy](#). If an individual with cancer chooses to take vitamin supplements, it is important that the clinician coordinating his or her treatment is aware of the type and dose of each supplement. While research is under way to determine whether combinations of antioxidant vitamins might be beneficial as an [adjunct](#) to conventional cancer therapy, definitive conclusions are not yet possible ([90](#)). For more information about intravenous vitamin C and cancer, see the Linus Pauling Institute [Spring/Summer 2006 Research Newsletter](#).

In a presentation at a meeting of the American Cancer Society, a scientist suggested that supplemental vitamin C might enhance the growth of cancer cells or protect them from cell-killing free radicals produced by radiation and some forms of chemotherapy. An article published in the Spring/Summer 2000 issue of the Linus Pauling Institute Newsletter, [Is vitamin C harmful for cancer patients?](#), provides additional insight on this topic.

For information about the clinical use of high-dose intravenous vitamin C as an adjunct in cancer treatment, visit the [University of Kansas Medical Center Program in Integrative Medicine Web site](#).

## **Diabetes Mellitus**

Cardiovascular diseases (heart disease and stroke) are the leading cause of death in individuals with [diabetes](#). Evidence that diabetes is a condition of increased [oxidative stress](#) led to the hypothesis that higher intakes of [antioxidant](#) nutrients could help decrease cardiovascular disease risk in diabetic individuals. In support of this hypothesis, a 16-year study of 85,000 women, 2% of whom were diabetic, found that vitamin C supplement use (400 mg/day or more) was associated with significant reductions in the risk of fatal and nonfatal [coronary heart disease](#) in the entire [cohort](#) as well as in those with diabetes ([14](#)). In contrast, a 15-year study of postmenopausal women found that diabetic women who reported taking at least 300 mg/day of vitamin C from supplements when the study began were at significantly higher risk of death

from coronary heart disease and stroke than those who did not take vitamin C supplements (91). Vitamin C supplement use was not associated with a significant increase in cardiovascular disease mortality in the cohort as a whole. Although a number of [observational studies](#) have found that higher dietary intakes of vitamin C are associated with lower cardiovascular disease risk, [randomized controlled trials](#) have not found antioxidant supplementation that included vitamin C to reduce the risk of cardiovascular disease in diabetic or other high-risk individuals (92, 93).

It is possible that genetic differences may influence the effect of vitamin C supplementation on cardiovascular disease. When the results of one randomized controlled trial were reanalyzed based on haptoglobin genotype, antioxidant therapy (1,000 mg/day of vitamin C + 800 IU/day of vitamin E) was associated with improvement of coronary [atherosclerosis](#) in diabetic women with two copies of the haptoglobin 1 gene but worsening of coronary atherosclerosis in those with two copies of the haptoglobin 2 gene (94). The significance of these findings is not entirely clear, but they suggest that there may be a subpopulation of people with diabetes who will benefit from antioxidant therapy, while others may not benefit or could actually be harmed.

### **Common cold**

The work of Linus Pauling stimulated public interest in the use of large doses (greater than 1 gram/day, also sometimes called "mega-doses") of vitamin C to prevent the common cold (95). In the past 30 years, numerous [placebo](#)-controlled trials have examined the effect of vitamin C supplementation on the prevention and treatment of colds. A [meta-analysis](#) of 30 placebo-controlled prevention trials found that vitamin C supplementation in doses up to 2 grams/day did not decrease the incidence of colds (96). However, in a subgroup of marathon runners, skiers, and soldiers training in the Arctic, doses ranging from 250 mg/day to 1 gram/day decreased the incidence of colds by 50%. Overall, the preventive use of vitamin C supplementation reduced the duration of colds by about 8% in adults and 14% in children. Most of the prevention trials used a dose of 1 gram/day. When treatment was started at the onset of symptoms, vitamin C supplementation did not shorten the duration of colds in seven placebo-controlled trials at doses ranging from 1-4 grams/day. Additionally, the same authors completed a meta-analysis of the 15 trials that assessed the effect of vitamin C on cold severity; no consistent evidence that vitamin C was beneficial in ameliorating cold symptoms was found in this analysis. Thus, the overall conclusion of this meta-analysis was that vitamin C is ineffective as a prophylactic against the common cold, but individuals under stress, such as those exposed to strenuous physical exercise or cold weather, may experience some therapeutic benefit (96). More recently, a randomized, double-blind (but not placebo-controlled) study reported that those who took 500 mg/day of supplemental vitamin C had a 66% lower risk for contracting three or more colds in a five-year period compared to those who took 50 mg/day of supplemental vitamin C (97). The authors of this study did not find any significant differences in the two groups when analyzing data regarding cold severity or duration. However, the doses used in this study were smaller than those used in most of the previous studies.

Some authors have asserted that the studies included in the above mentioned meta-analysis (96) utilized daily doses of vitamin C that would be too low to observe a therapeutic benefit (98, 99). Additionally, results of a recent pharmacokinetic study suggest that dividing the daily dose and

administering it several times throughout the day, thereby increasing dose frequency, would better sustain plasma ascorbate levels (81). Large-scale, controlled clinical trials using pharmacological doses of vitamin C are necessary to determine whether or not higher doses of vitamin C have any therapeutic value in preventing or treating the common cold. For a more detailed discussion on vitamin C and the common cold, see the Linus Pauling Institute's Spring/Summer 2006 [Research Newsletter](#).

## Sources

### Food Sources

As shown in the table below, different fruits and vegetables vary in their vitamin C content (100), but five servings (2½ cups) of fruits and vegetables should average out to about 200 mg of vitamin C. If you wish to check foods for their nutrient content, search the [USDA food composition database](#).

Food	Serving	Vitamin C (mg)
Orange juice	¾ cup (6 ounces)	62-93
Grapefruit juice	¾ cup (6 ounces)	62-70
Orange	1 medium	70
Grapefruit	½ medium	38
Strawberries	1 cup, whole	85
Tomato	1 medium	16
Sweet red pepper	½ cup, raw chopped	95
Broccoli	½ cup, cooked	51
Potato	1 medium, baked	17

### Supplements

Vitamin C (L-ascorbic acid) is available in many forms, but there is little scientific evidence that any one form is better absorbed or more effective than another. Most experimental and clinical research uses ascorbic acid or sodium ascorbate.

#### *Natural vs. synthetic vitamin C*

Natural and synthetic L-ascorbic acid are chemically identical and there are no known differences in their biological activities or bioavailabilities (101).

### ***Mineral ascorbates***

Mineral salts of ascorbic acid are buffered and, therefore, less acidic than ascorbic acid. Some people find them less irritating to the gastrointestinal tract than ascorbic acid. Sodium ascorbate and calcium ascorbate are the most common forms, although a number of other mineral ascorbates are available. Sodium ascorbate provides 111 mg of sodium (889 mg of ascorbic acid) per 1,000 mg of sodium ascorbate, and calcium ascorbate generally provides 90-110 mg of calcium (890-910 mg of ascorbic acid) per 1,000 mg of calcium ascorbate.

### ***Vitamin C with bioflavonoids***

Bioflavonoids are a class of water-soluble plant pigments that are often found in vitamin C-rich fruits and vegetables, especially citrus fruits. There is little evidence that the bioflavonoids in most commercial preparations increase the bioavailability or efficacy of vitamin C ([102](#)). Studies in cell culture indicate that a number of flavonoids inhibit the transport of vitamin C into cells ([103-105](#)), and supplementation of rats with quercetin and vitamin C decreased the intestinal absorption of vitamin C ([103](#)). More research is needed to determine the significance of these findings in humans.

### ***Ascorbate and vitamin C metabolites***

One supplement, Ester-C<sup>®</sup>, contains mainly calcium ascorbate but also contains small amounts of the vitamin C metabolites dehydroascorbate (oxidized ascorbic acid), calcium threonate, and trace levels of xylonate and lyxonate. Although the metabolites are supposed to increase the bioavailability of vitamin C, the only published study in humans addressing this issue found no difference between Ester-C<sup>®</sup> and commercially available ascorbic acid tablets with respect to the absorption and urinary excretion of vitamin C ([102](#)). Ester-C<sup>®</sup> should not be confused with ascorbyl palmitate, which is also marketed as "vitamin C ester" (see below).

### ***Ascorbyl palmitate***

Ascorbyl palmitate is actually a vitamin C ester (i.e., vitamin C that has been esterified to a fatty acid). In this case, vitamin C is esterified to the saturated fatty acid, palmitic acid, resulting in a fat-soluble form of vitamin C. Ascorbyl palmitate has been added to a number of skin creams due to interest in its antioxidant properties as well as its importance in collagen synthesis ([106](#)). Although ascorbyl palmitate is also available as an oral supplement, it is likely that most of it is hydrolyzed (broken apart) to ascorbic acid and palmitic acid in the digestive tract before it is absorbed ([107](#)). Ascorbyl palmitate is also marketed as "vitamin C ester," which should not be confused with Ester-C<sup>®</sup> (see above).

For a more detailed review of scientific research on the [bioavailability](#) of different forms of vitamin C, see [The Bioavailability of Different Forms of Vitamin C](#).

## Safety

### Toxicity

A number of possible problems with very large doses of vitamin C have been suggested, mainly based on [in vitro](#) experiments or isolated [case reports](#), including genetic [mutations](#), birth defects, [cancer](#), [atherosclerosis](#), [kidney stones](#), "rebound [scurvy](#)," increased [oxidative stress](#), excess iron absorption, vitamin B<sub>12</sub> deficiency, and erosion of dental enamel. However, none of these alleged adverse health effects have been confirmed, and there is no reliable scientific evidence that large amounts of vitamin C (up to 10 grams/day in adults) are toxic or detrimental to health. The concerns of kidney stone formation with vitamin C supplementation are discussed [below](#). With the latest [RDA](#) published in 2000, a tolerable upper intake level ([UL](#)) for vitamin C was set for the first time. A UL of 2 grams (2,000 milligrams) daily was recommended in order to prevent most adults from experiencing diarrhea and [gastrointestinal](#) disturbances ([7](#)). Such symptoms are not generally serious, especially if they resolve with temporary discontinuation or reduction of high-dose vitamin C supplementation. For a more thorough discussion of the Linus Pauling Institute's response to the UL for vitamin C, see the article, [The New Recommendations for Dietary Antioxidants: A Response and Position Statement by the Linus Pauling Institute](#), in the Spring/Summer 2000 Newsletter. A more detailed discussion of vitamin C and the risk of kidney stones can be found [below](#) and in the article, [What About Vitamin C and Kidney Stones?](#), in the Fall/Winter 1999 Newsletter.

Tolerable Upper Intake Level (UL) for Vitamin C	
Age Group	UL (mg/day)
Infants 0-12 months	Not possible to establish*
Children 1-3 years	400
Children 4-8 years	650
Children 9-13 years	1,200
Adolescents 14-18 years	1,800
Adults 19 years and older	2,000

\*Source of intake should be from foods or formula only.

**Does vitamin C promote oxidative damage under physiological conditions?** Vitamin C is known to function as a highly effective [antioxidant](#) in living organisms. However, in test tube experiments, vitamin C can interact with some free metal [ions](#) to produce potentially damaging [free radicals](#). Although free metal ions are not generally found under physiological conditions, the idea that high doses of vitamin C might be able to promote oxidative damage in vivo has received a great deal of attention. Widespread publicity has been given to a few studies suggesting a [pro-oxidant](#) effect of vitamin C ([108, 109](#)), but these studies turned out to be either flawed or of no physiological relevance. A comprehensive review of the literature found no credible scientific evidence that supplemental vitamin C promotes oxidative damage under physiological conditions or in humans ([110](#)). Studies that report a pro-oxidant effect for vitamin

C should be evaluated carefully to determine whether the study system was physiologically relevant and to rule out the possibility of methodological and design flaws.

For example, a study in the June 15, 2001 issue of the journal [Science](#) reported that lipid hydroperoxides (rancid fat molecules) can react with vitamin C to form products that could potentially harm DNA, although the reaction of these products with DNA was not demonstrated in this study (108). To find out why the Linus Pauling Institute considers the study's conclusions unwarranted, see [Vitamin C doesn't cause cancer!](#) in the Linus Pauling Institute Newsletter.

## **Kidney Stones**

Because oxalate is a [metabolite](#) of vitamin C, there is some concern that high vitamin C intake could increase the risk of oxalate [kidney stones](#). Some (111-113), but not all (114-116), studies have reported that supplemental vitamin C increases urinary oxalate levels. Whether any increase in oxalate levels would translate to an elevation in risk for kidney stones has been examined in [epidemiological studies](#). Two large [prospective studies](#), one following 45,251 men for six years and the other following 85,557 women for 14 years, reported that consumption of  $\geq 1,500$  mg of vitamin C daily did not increase the risk of kidney stone formation compared to those consuming  $< 250$  mg daily. However, a more recent prospective study that followed 45,619 men for 14 years found that those who consumed  $\geq 1,000$  mg/day of vitamin C had a 41% higher risk of kidney stones compared to men consuming  $< 90$  mg of vitamin C daily—the current recommended dietary allowance (see [RDA](#); (117)). In this study, low intakes (90-249 mg/day) of vitamin C (primarily from the diet) were also associated with a significantly elevated risk. Supplemental vitamin C intake was only weakly associated with increased risk of kidney stones in this study (117). Despite conflicting results, it may be prudent for individuals predisposed to oxalate kidney stone formation to avoid high-dose vitamin C supplementation.

## **Drug Interactions**

A number of drugs are known to lower vitamin C levels, requiring an increase in its intake. Estrogen-containing contraceptives (birth control pills) are known to lower vitamin C levels in plasma and white blood cells. Aspirin can lower vitamin C levels if taken frequently. For example, taking two aspirin tablets every six hours for a week has been reported to lower vitamin C levels in white blood cells by 50%, primarily by increasing urinary excretion of vitamin C (118).

There is some evidence, though controversial, that vitamin C interacts with anticoagulant medications (blood thinners) like warfarin (Coumadin). Large doses of vitamin C may block the action of warfarin, requiring an increase in dose to maintain its effectiveness. Individuals on anticoagulants should limit their vitamin C intake to 1 gram/day and have their prothrombin time monitored by the clinician following their anticoagulant therapy. Because high doses of vitamin C have also been found to interfere with the interpretation of certain laboratory tests (e.g., serum bilirubin, serum creatinine, and the guaiac assay for occult blood), it is important to inform one's health care provider of any recent supplement use (119).

## ***Antioxidant Supplements and HMG-CoA Reductase Inhibitors (Statins)***

A 3-year [randomized controlled trial](#) in 160 patients with documented coronary heart disease (CHD) and low [HDL](#) levels found that a combination of simvastatin (Zocor) and niacin increased HDL<sub>2</sub> levels, inhibited the progression of [coronary artery](#) stenosis (narrowing), and decreased the frequency of cardiovascular events, such as [myocardial infarction](#) (heart attack) and [stroke](#) (120). Surprisingly, when an antioxidant combination (1,000 mg vitamin C, 800 IU alpha-tocopherol, 100 mcg selenium, and 25 mg beta-carotene daily) was taken with the simvastatin-niacin combination, the protective effects were diminished. Since the antioxidants were taken together in this trial, the individual contribution of vitamin C cannot be determined. In contrast, a much larger randomized controlled trial in more than 20,000 men and women with CHD or diabetes found that simvastatin and an antioxidant combination (600 mg vitamin E, 250 mg vitamin C, and 20 mg beta-carotene daily) did not diminish the cardioprotective effects of simvastatin therapy over a 5-year period (121). These contradictory findings indicate that further research is needed on potential interactions between antioxidant supplements and cholesterol-lowering drugs, such as HMG-CoA reductase inhibitors (statins).

### **Linus Pauling Institute Recommendation**

For healthy men and women, the Linus Pauling Institute recommends a vitamin C intake of at least 400 mg daily. Consuming at least five servings (2½ cups) of fruits and vegetables daily provides about 200 mg of vitamin C. Most multivitamin supplements provide 60 mg of vitamin C. To make sure you meet the Institute's recommendation, supplemental vitamin C in two separate 250-mg doses taken in the morning and evening is recommended.

### **Older adults (65 years and older)**

Although it is not yet known with certainty whether older adults have higher requirements for vitamin C than younger people, some older populations have been found to have vitamin C intakes considerably below the RDA of 75 and 90 mg/day for women and men, respectively. A vitamin C intake of at least 400 mg daily may be particularly important for older adults who are at higher risk for chronic diseases. In addition, a meta-analysis of 36 publications examining the relationship between vitamin C intake and plasma concentrations of vitamin C concluded that older adults (age 60-96 years) have considerably lower plasma levels of vitamin C following a certain intake of vitamin C compared with younger individuals (age 15-65 years) (122), suggesting that older adults may have higher vitamin C requirements. Studies conducted at the National Institutes of Health indicated that plasma and circulating cells in healthy, young subjects attain near-maximal concentrations of vitamin C at a dose of about 400 mg/day—a dose much higher than the current RDA. Pharmacokinetic studies in older adults have not yet been conducted, but evidence suggests that the efficiency of one of the molecular mechanisms for the cellular uptake of vitamin C declines with age (123). Because maximizing blood levels of vitamin C may be important in protection against oxidative damage to cells and biological molecules, a vitamin C intake of at least 400 mg daily is particularly important for older adults who are at higher risk for chronic diseases caused, in part, by oxidative damage, such as heart disease, stroke, certain cancers, and cataract.

For more information on the difference between [Dr Linus Pauling's recommendation and the Linus Pauling Institute's recommendation for vitamin C intake](#), select the highlighted text.

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# Do Statin Drugs Cause Vitamin D Deficiency?

Friday, January 08, 2010 by: E. Huff, staff writer

Sources for this story include: <http://www.stopagingnow.com/news/ne...>  
<http://www.vitamincouncil.org/>

(NaturalNews) Many in the medical profession are beginning to recognize that people who take cholesterol-lowering statin drugs are becoming vitamin D-deficient. Cholesterol is required by the body to synthesize vitamin D and statin drugs are responsible for eliminating it, leading many to speculate that statin drug users do not have enough cholesterol to process vitamin D.

Contrary to popular belief, cholesterol actually plays an important role in maintaining health. It regulates proper hormonal levels and is the precursor substance for the production of vitamin D. Cholesterol also works to digest and absorb [fats](#), nutrients, and vitamins.

When converting sunlight into vitamin D, cholesterol in the skin acts as the catalyst for this important process. [Vitamin D](#) is crucial for mineral metabolization and is said to target over 2000 human genes. Deficiency is linked to over 17 varieties of cancer as well as heart [disease](#), autoimmune diseases, muscle and bone problems, and other serious diseases.

In the study, researchers found a clear connection between vitamin D [deficiency](#) and muscle pain. Over 64 percent of patients with muscle pain who were taking [statin drugs](#) were also deficient in vitamin D. Those with muscle [pain](#) in general were found to be deficient in vitamin D.

When study participants who reported muscle pain were given 50,000 IU of vitamin D a week for 12 weeks, more than 92 percent of them were completely relieved of all muscle pain. The prescribed supplementation also raised blood levels of vitamin D to normal levels.

It is also known that statin [drugs](#) are responsible for depleting [CoQ10](#) levels, a vital substance that metabolizes energy in the [body](#). Both CoQ10 and vitamin D supplementation are recommended for anyone who takes statin drugs. A minimum of 2,000 IU of vitamin D and between 100 and 200 mg of CoQ10 daily are appropriate doses.

Studies have shown that taking CoQ10 by itself helps to maintain proper [cholesterol levels](#) without the need for statin drugs. While keeping bad cholesterol (LDL) levels low is beneficial, it is important to keep good cholesterol (HDL) levels high. CoQ10 works well at maintaining healthy levels of both.

Some other [alternatives](#) to keeping cholesterol levels in check include supplementation with niacin and policosanol. In conjunction with a healthy diet low in refined sugars and bad fats, these [natural](#) alternatives are both safe and effective. Exercise and a diet rich in omega-3 fatty acids are also good suggestions.

[Breast Cancer Res Treat.](#) 2010 Jan;119(1):111-8. Epub 2009 Aug 5.

## **Effect of vitamin D supplementation on serum 25-hydroxy vitamin D levels, joint pain, and fatigue in women starting adjuvant letrozole treatment for breast cancer.**

[Khan QJ](#), [Reddy PS](#), [Kimler BF](#), [Sharma P](#), [Baxa SE](#), [O'Dea AP](#), [Klemp JR](#), [Fabian CJ](#).

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### **Abstract**

Vitamin D deficiency and insufficiency may contribute to musculoskeletal symptoms and bone loss observed in women taking aromatase inhibitors (AIs). This study was conducted to determine the prevalence of suboptimal vitamin D levels in women initiating adjuvant letrozole for breast cancer and to determine whether supplementation with 50,000 IU of vitamin D3 weekly could reduce musculoskeletal symptoms and fatigue in women who have suboptimal vitamin D levels. Sixty women about to begin an adjuvant AI were enrolled. Baseline 25OHD levels were obtained, and women completed symptom questionnaires. They were then started on letrozole, along with standard dose calcium and vitamin D. Four weeks later, women with baseline 25OHD levels  $\leq 40$  ng/ml started additional vitamin D3 supplementation at 50,000 IU per week for 12 weeks. 25OHD levels were re-assessed at 4, 10, and 16 weeks; the questionnaires were repeated at weeks 4 and 16. At baseline, 63% of women exhibited vitamin D deficiency ( $< 20$  ng/ml) or insufficiency (20-31 ng/ml). 25OHD levels  $> 40$  ng/ml were achieved in all 42 subjects who received 12 weeks of supplementation with 50,000 IU vitamin D3 weekly, with no adverse effects. After 16 weeks of letrozole, more women with 25OHD levels  $> 66$  ng/ml (median level) reported no disability from joint pain than did women with levels  $< 66$  ng/ml (52 vs. 19%;  $P = 0.026$ ). Vitamin D deficiency and insufficiency are prevalent in post-menopausal women initiating adjuvant AI. Vitamin D3 supplementation with 50,000 IU per week is safe, significantly increases 25OHD levels, and may reduce disability from AI-induced arthralgias.

PMID: 19655244 [PubMed - indexed for MEDLINE]

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#### **Full Text Sources:**

- [Springer](#)
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## **Other Literature Sources:**

- [COS Scholar Universe](#)

## **Medical:**

- [Breast Cancer - MedlinePlus Health Information](#)
- [Cancer Chemotherapy - MedlinePlus Health Information](#)
- [Dietary Supplements - MedlinePlus Health Information](#)
- [Fatigue - MedlinePlus Health Information](#)
- [Joint Disorders - MedlinePlus Health Information](#)
- [Vitamin D - MedlinePlus Health Information](#)

# How Much Vitamin D Do You Really Need to Take?

Posted By [Dr. Mercola](#) | October 10 2009 |

On November 3 at the University of Toronto, Ontario, Canada, noted doctors Cedric Garland and Tracey O'Connor are running a seminar on how vitamin D can be used to prevent breast cancer -- as well as infectious diseases, type 1 diabetes, hypertension, colon cancer, and falls in the elderly.

Presenters will include some of the best known vitamin D researchers/practitioners, such as Robert P. Heaney, Reinhold Vieth, John White and Susan Whiting.

It is estimated that 25 to 50 percent of any healthcare budget could be saved with adequate vitamin D serum levels

The conference will look at the current research and practice with vitamin D to enable everyone to take action today based on what's known to solve the deficiency epidemic, and to start the prevention of many diseases.

## Vitamin D Dose Recommendations

Age	Dosage
Below 5	35 units per pound per day
Age 5 - 10	2500 units
Adults	5000 units
Pregnant Women	5000 units

### WARNING:

There is no way to know if the above recommendations are correct. The ONLY way to know is to test your blood. You might need 4-5 times the amount recommended above. Ideally your blood level of 25 OH D should be 60ng/ml.

### Sources:

» [Grass Roots Health](#)

Dr. Mercola's Comments:

As more and more scientific evidence emerges, confirming that currently recommended daily allowances (RDA) of vitamin D are grossly insufficient for young and old alike, many have asked me to clarify the recommended dosages, especially as it pertains to children.

### **General Information about Adult Vitamin D Requirements**

Before I begin, I want to emphasize that under summer conditions it is frequently possible to generate about 20,000 units of vitamin D by exposing your skin to the sun. That fact makes these recommendations seem more in line with reality.

Currently, the U.S. RDA for vitamin D is 400 IU (international units) for the majority of the population. (IU is frequently shortened to just “units.”) This dose was recommended to prevent rickets, which works well, but does nothing to give the far more important protection from cancer, heart disease and infections.

To achieve the healthy blood levels in the graph below, most adults will need about FIVE THOUSAND units of vitamin D every day. Interestingly, the majority of people I see in my travels that are taking vitamin D are taking 1,000 units, and they believe they are taking “high” doses. Don't fool yourself, as an adult, you likely need about 5,000 IU's a day.

Some also worry that if they are in the sun that they will overdose on vitamin D.

However this is not typically the case, and here's why: When you're exposed to the sun, the UVB rays cause vitamin D to be produced in your skin while the [UVA rays in the sunlight will tend to destroy excessive levels of vitamin D circulating in your body](#). It is somewhat of a natural failsafe mechanism that prevents overdosing.

HOWEVER, please understand that about 10 percent or more of the people reading this needs significantly more than 5,000 units. I have seen people requiring over 30,000 units of vitamin D a day to reach therapeutic levels of 25 hydroxy D in their blood..

Please remember that the ONLY way to know for sure is to get your blood level tested, which I'll go over in just a moment.

### **Current RDA Guidelines for Vitamin D are Outdated in Light of New Research**

At the end of 2008, the [American Academy of Pediatrics doubled its recommended dose of vitamin D](#) for infants, children and adolescents, raising it from 200 to 400 units per day.

Unfortunately this is still a woefully inadequate recommendation for children.

[Recent research](#) reveals children may need *ten times* that amount in order to receive the [health benefits that optimal vitamin D levels have to offer](#).

As of right now, the conventional RDAs are only:

- 400 IU for infants, children and adolescents
- 200 IU for adults up to age 50
- 400 IU for adults aged 51 to 70
- 600 IU for seniors over 70

### **Recommended Daily Intake for Optimal Health**

Based on the most recent research, the current recommendation is **35 IU's of vitamin D per pound of body weight**.

So for a child weighing 40 pounds, the recommended average dose would be 1,400 IU's daily, and for a 170-pound adult, the dose would be nearly 6,000 IU's.

However, it's important to realize that vitamin D requirements are *highly individual*, as your vitamin D status is dependent on numerous factors, such as the color of your skin, your location, and how much sunshine you're exposed to on a regular basis.

So, although these recommendations may put you closer to the ballpark of what most people likely need, it is simply impossible to make a blanket recommendation that will cover everyone's needs.

So how do you ensure optimal vitamin D levels for yourself, your child, and aging parents?

### **Blood Testing is the ONLY Reliable Way to Determine How Much Vitamin D You or Your Child Needs**

Yes, the only way to determine the correct dose is to [get your blood tested](#) since there are so many variables that influence your vitamin D status.

I recommend using Lab Corp in the U.S. If you get it done by Quest, you'll need to divide your result by 1.3 to get the "real" number.

For your convenience, by year's end we hope to offer a blood test that those in the U.S. can do locally and does not require a doctor's order.

### **Step 1: Make Sure You Use the Correct Test**

Getting the correct test is the first step in this process, as [there are TWO vitamin D tests](#) currently being offered: 1,25(OH)D, and 25(OH)D.

The correct test your doctor needs to order is 25(OH)D, also called 25-hydroxyvitamin D, which is the better marker of overall D status. This is the marker that is most strongly associated with overall health.

## Step 2: Determine Your OPTIMAL Level of Vitamin D

Here again it's important to realize the difference between what conventional medicine considers to be "normal," versus what is optimal.

The "normal" 25-hydroxyvitamin D lab range is between 20-56 ng/ml. As you can see in the chart below, this conventional range is really a sign of deficiency, and is too broad to be ideal.

In fact, your vitamin D level should **never be below 32 ng/ml**, and any levels below 20 ng/ml are considered serious deficiency states, [increasing your risk of as many as 16 different cancers](#) and autoimmune diseases like multiple sclerosis and rheumatoid arthritis, just to name a few.

The **OPTIMAL** value that you're looking for is **50-70 ng/ml**.

**This range applies for everyone; children, adolescents, adults and seniors.**

These ranges are based on *healthy people* in tropical or subtropical parts of the world, where they are receiving healthy sun exposures. It seems more than reasonable to assume that these values are in fact reflective of an optimal human requirement.

It's worth to clarify here that ng/ml are U.S. units of measure. Much of the world uses nmol/l. If your test results are measured in nmol/l, simply multiply the above values by 2.5 to get the correct ranges.

## VITAMIN D LEVELS 25 HYDROXY D

Deficient	Optimal	Treat Cancer and Heart Disease	Excess
< 50 ng/ml	50-70 ng/ml	70-100 ng/ml	> 100 ng/ml

Keeping your level in this range, and even erring toward the [higher numbers in this range, is going to give you the most protective benefit](#). And the way you maintain your levels within this

range is by getting tested regularly – say two to four times a year in the beginning, and adjusting your vitamin D intake accordingly.

### **Are Oral Vitamin D Supplements Your Best Choice?**

The best way to optimize your vitamin D levels is through [appropriate safe sunshine or safe tanning bed exposure](#). However, there are many times when it can be nearly impossible to get enough sun.

The darker your skin is, the farther away from the equator you are, and the further away you are from the summer months, the less likely it is that you will produce adequate vitamin D levels from sun exposure alone.

In these cases, supplementing with vitamin D is acceptable, but I strongly recommend you monitoring your blood levels regularly when taking oral vitamin D supplements to make sure you're staying within the optimal range.

### **Only Supplement with the Right Kind of Vitamin D**

There is one other thing you need to be aware of if you choose to use an oral vitamin D supplement and that is that there are basically two types – one is natural and one is synthetic.

- The natural one is D3 (cholecalciferol), which is the same vitamin D your body makes when exposed to sunshine
- The synthetic one is vitamin D2, which is sometimes called ergocalciferol

Once either form of the vitamin is in your body, it must be converted to a more active form. Vitamin D3 is converted 500 percent faster than vitamin D2, and is clearly a better alternative.

Vitamin D2 also has a shorter shelf life, and its metabolites bind with protein poorly, making it less effective. Studies have even concluded that [vitamin D2 should no longer be regarded as a nutrient appropriate for supplementation](#) or fortification of foods (although it continues to be used). So if you choose to use vitamin D supplements make sure it is in the form of vitamin D3.

Please be aware that nearly all the prescription-based supplements contain synthetic vitamin D2, so if you receive a prescription for vitamin D from your doctor, you're most likely receiving the inferior vitamin D2.

### **Getting the Word Out about the Benefits of Optimizing Vitamin D Levels**

When it comes to the benefits of optimizing your vitamin D levels, the evidence is simply overwhelming. Research shows you can drastically reduce your risk of cancer and countless other chronic diseases by getting safe sun exposure, using a safe tanning bed, or taking a high-quality supplement.

Yet, a great deal of people around the world have heard nothing of this great “discovery.” It’s even likely that your doctor is among them, which is why it’s so important to educate yourself.

As a result of flawed assumptions about sun exposure, and the subsequent recommendations, a vast majority of people are deficient in vitamin D. It’s thought that over 95 percent of U.S. senior citizens may be deficient, along with 85 percent of the American public.

Clearly, the word needs to get out but the mainstream media is slow to react. Plus, there’s no money to be made on selling vitamin D (it’s one of the most inexpensive supplements around) and sun exposure is free! So don’t count on any major corporations or drug companies to help get the message out (rather, count on them to try and suppress this lifesaving information).

The longer this information goes largely unnoticed, the more people who will die unnecessarily from potentially preventable cancers and other diseases.

Fortunately, GrassrootsHealth D\*action is on a mission to get the word out and solve the vitamin D deficiency epidemic ... in just one year’s time.

### **The D\*Action Project: How YOU Can Make a Difference**

GrassrootsHealth has launched a worldwide public health campaign to solve the vitamin D deficiency epidemic in a year through a focus on testing and education with all individuals spreading the word.

And you are all invited to join in this campaign!

With Dr. Garland at the helm, The D\*Action Project will be monitoring, for five years, the health outcomes of individuals who get their vitamin D levels to the levels of 40-60 ng/ml. I would highly recommend that you optimize your levels to the high end of this spectrum, as optimal vitamin D levels are 50-65 ng/ml, or 65-90 ng/ml if you are treating cancer.

Says Carole Baggerly, director of GrassrootsHealth:

*"We will be tracking the incidence of many diseases, from cancer to diabetes and muscular function as well as pain levels to see what effect the higher vitamin D levels may have.*

*We expect to see a significant reduction in the incidence of breast cancer (and its recurrence), colon cancer, diabetes and myocardial infarction, compared with the general population. With the expansion of the project by individuals, we could substantially reduce this epidemic in a few years!"*

So how can you get involved? [Join the D\\*action Project!](#)

Simply complete a health questionnaire and test your vitamin D levels two times per year during the 5-year program to help demonstrate the public health impact of this nutrient.

GrassrootsHealth is sponsoring the use of blood spot test kits (laboratory analysis done by ZRT Labs) for a \$40 fee to each individual. The tests are to be done twice a year by each individual along with the submission of some basic health data. The fee includes:

- A vitamin D blood spot test kit to be used at home (except in the state of New York)
- The results are sent directly to you

You will be asked to take a quick health survey and also to take action to adjust your vitamin D levels to get into the desired ranges, ideally in consultation with a knowledgeable health care professional.

If you are a physician, medical institution or other health group, please also get involved by contacting Baggerly directly at: [carole@grassrootshealth.org](mailto:carole@grassrootshealth.org). Baggerly was also instrumental in getting [Canada to investigate the use of vitamin D against the swine flu](#).

The information you provide in the health survey will then be used in a five-year study to evaluate the results of the program in disease prevention, and to help create a long-term plan for public health.

This project depends on a true 'grassroots' health movement. Together we can stop the vitamin D deficiency epidemic in its tracks and improve the health of millions of people.

With only 100 of you joining today, and getting two friends to join in two weeks (and those two friends getting two more), by week 42 there could be 400,000,000 people who are vitamin D 'replete' (more than the United States population)!

Then, do your part to end vitamin D deficiency and improve your own health by [joining the D\\*Action Project](#), and encouraging your friends and family to do the same!

# New Study Shows This Potent Vitamin Helps Prevent Breast Cancer

August 01 2012 | 31,898 views

By Dr. Mercola

If you want to slash your risk of cancer, it's essential that you spend adequate time in the sun or a safe tanning bed, or at the very least supplement with proper amounts of vitamin D3.

This is because maintaining optimal blood levels of this vitamin is one of the most powerful, and virtually *free*, methods to protect against cancer.

Research shows that higher solar UVB exposure, which is associated with higher vitamin D levels, decreases the risk of 15 different types of cancer, and weaker evidence also points to protection against an additional nine types of cancer.<sup>1</sup>

One of these cancers is breast cancer, and new research specifically found vitamin D is particularly effective against estrogen receptor positive (ER+) breast cancer cells.

## Vitamin D's Striking Role Against ER+ Breast Cancer

Many breast cancers are fueled by estrogen, a hormone produced in fat tissue. Breast cancer is defined as ER+ if the cancer cells have estrogen receptors, which are proteins that estrogen binds to. ER+ breast cancer cells depend on estrogen to grow.

In the latest study, researchers reported that calcitriol (the hormonally active form of vitamin D) inhibits the growth of many cancerous cells including breast cancer cells by arresting the cancer cells' replication cycles, promoting apoptosis, and inhibiting invasion, metastasis and angiogenesis.<sup>2</sup> They also revealed new mechanisms by which vitamin D is effective against estrogen receptive positive breast cancer cells. Among them:

- Suppressing COX-2 expression, which is linked to poor prognosis in breast cancer patients
- Increasing expression of 15-PGDH, a tumor suppressor
- Suppressing the expression of aromatase, the enzyme that catalyzes estrogen synthesis in breast cancer cells

Researchers concluded:

*“Cell culture and in vivo data in mice strongly suggest that calcitriol and dietary vitamin D would play a beneficial role in the prevention and/or treatment of ER+BCa [estrogen receptor positive breast cancer] in women.”*

## Vitamin D Might Slash Breast Cancer Risk by 77 Percent

[Carole Baggerly](#) is the director and founder of an organization called GrassrootsHealth, which is primarily focused on creating awareness about the profound importance of vitamin D for optimal health. They're also developing and substantiating research to support the use of vitamin D as a prevention strategy against diseases like cancer.

Carole's interest in this field began with her own breast cancer diagnosis in 2005, followed by a diagnosis of osteoporosis, likely caused by a vitamin D deficiency. This diagnosis quickly led her to also research vitamin D deficiency in relation to cancer, and as the saying goes, the rest is history.

*"Dr. Cedric Garland of UC San Diego School of Medicine and Moores Cancer Center had just published a paper saying that the risk of breast cancer could be cut by 50 percent if people had vitamin D serum levels – this is a blood level of how much vitamin D you've got – somewhere about 40 to 50 nanograms per milliliter. I just sat there and looked at that, and I started crying, [thinking] this **can't** be true... I'm a very skeptical scientist," she says.*

She made some calls to verify the veracity of the study, and discovered that the author, Dr. Garland, was not only well-respected, but had researched vitamin D and cancer for *30 years*. She went on to uncover more and more researching showing that vitamin D has a very real impact on cancer rates, including the study described below, which found it may reduce cancer risk by up to 77 percent:

*"[A] randomized trial... published in 2007 by Joan Lappe out of Creighton University... had a group of about 1,100 post-menopausal women who started out with no cancer (plus control group)... One group got [oral] vitamin D [and calcium] and the other got a placebo. At the end of four years, there was a 77 percent difference in cancer incidence between those that had the vitamin D and calcium versus the placebo.<sup>3</sup> So something is working," she says.*

Here is just a sampling of the studies to date showing vitamin D's therapeutic actions against cancer:

- Some 600,000 cases of breast and colorectal cancers could be prevented each year if vitamin D levels among populations worldwide were increased, according to previous research by Dr. Garland and colleagues.<sup>4</sup> And that's just counting the death toll for two types of cancer.
- A large-scale, randomized, placebo-controlled study on vitamin D and cancer showed that vitamin D can cut overall cancer risk by as much as 60 percent – and up to 77 percent when only the last 3 years of data were used.<sup>5</sup> This was such groundbreaking news that the Canadian Cancer Society has actually begun endorsing the vitamin as a cancer-prevention therapy.
- Light-skinned women who had high amounts of long-term sun exposure had half the risk of developing advanced breast cancer (cancer that spreads beyond your breast) as women with lower amounts of regular sun exposure, according to a study in the *American Journal of Epidemiology*.<sup>6</sup>
- A study by Dr. William Grant, Ph.D., internationally recognized research scientist and vitamin D expert, found that about [30 percent of cancer deaths](#) -- which amounts to 2 million worldwide and 200,000 in the United States -- could be prevented each year with higher levels of vitamin D.

## Vitamin D Can Radically Improve MS and Other Autoimmune Diseases

The beauty of vitamin D is that it is far from an ordinary “vitamin.” In fact, it is a steroid hormone that influences virtually every cell in your body. Receptors that respond to vitamin D have been found in nearly *every* type of human cell, from your bones to your brain, and this helps explain why it has such a powerful impact on so many diseases.

So far, scientists have found about 3,000 genes that are upregulated by vitamin D, which is remarkable when you consider the human body only has between 20-25,000 genes total. Vitamin D researchers keep finding health benefits from vitamin D in virtually every area they look, including:

Cancer	Hypertension	Heart disease
Autism	Obesity	Rheumatoid arthritis
Diabetes 1 and 2	Multiple Sclerosis	Crohn’s Disease
Cold & Flu	Inflammatory Bowel Disease	Tuberculosis
High Blood Pressure	MRSA Infections	Dementia
Birth Defects	Reduced C-section risk	Infertility
Melanoma (skin cancer)	Asthma	Depression
Osteoporosis	Alzheimer’s disease	Schizophrenia

Oftentimes the role of vitamin D is quite substantial. For instance, several past studies have shown that vitamin D can be beneficial for reducing flare-ups from autoimmune diseases such as multiple sclerosis (MS). But now a new study showed just how big a difference D supplementation can make in people with MS. The target level of vitamin D was 40 ng/ml or higher, and researchers found that those persons with ng/ml levels higher than 48 ng/ml saw a 75 percent reduction in relapse rates.<sup>2</sup>

Researchers also found that it made a difference as to which type of vitamin D they supplemented with—this new research used D3, rather than D2.

Overall, correcting a vitamin D deficiency may cut your risk of dying by more than half, according to an analysis of more than 10,000 patients. People with low levels of vitamin D were found to be more likely to have diabetes, high blood pressure, and diseased heart muscle -- and were three times more likely to die from any cause compared to those with normal levels.<sup>8</sup>

## Four Important Points to Know About Vitamin D

The four major points to remember about [vitamin D](#) are the following:

1. Your best source for this vitamin is exposure to the sun, without sunblock on your skin, and [as near to solar noon as possible](#). During this UVB ray-intense time you will be able to produce vitamin D in plenty. Plus, when the sun goes down toward the horizon, the UVB is filtered out much more than the dangerous UVA. You should continue the exposure until your skin turns the lightest shade of pink.

While this isn't always possible due to the change of the seasons and your geographic location (and your skin color), this is the ideal to aim for. A safe tanning bed is the next best option. Safe tanning beds have electronic ballasts rather than magnetic ballasts, which helps you avoid unnecessary exposure to health-harming EMF fields. They also have less of the dangerous UVA than sunlight, while unsafe ones have more UVA than sunlight. The last option is vitamin D supplementation, which can help fill the gaps during the winter months outside of the tropics, when healthy sun exposure is not an option.

2. When you do supplement with vitamin D, you'll only want to supplement with natural vitamin D3 (cholecalciferol). Do NOT use the synthetic and highly inferior vitamin D2, which is the one most doctors will typically give you in a prescription unless you ask specifically for D3. According to the most recent findings by Carole Baggerly, which involved research on nearly 10,000 people, shows the ideal adult dose appears to be **8,000 IU's a day** to get most into the healthy range.
3. Get your vitamin D blood levels checked! The only way to determine the correct dose for you is to [get your blood tested](#) since there are so many variables that influence your vitamin D status. The above recommendation is only an estimate. I recommend using Lab Corp in the U.S.
4. The correct test your doctor needs to order is 25(OH)D, also called 25-hydroxyvitamin D, which is the better marker of overall D status. This is the marker that is most strongly associated with overall health.

The OPTIMAL value of vitamin D that you're looking for is explained in the chart below. If you were in the sun nearly every day with large amounts of your skin exposed and not taking any oral vitamin D, your level would be around 100 ng/ml. This range applies for everyone: children, adolescents, adults and seniors. Unless you get a deep dark tan, which is a pretty good gauge that your vitamin D levels are where they need to be, it is wise to get your blood levels checked; that is the only way to know for certain you have reached therapeutic levels.

# VITAMIN D LEVELS

## 25 HYDROXY D

Deficient	Optimal	Treat Cancer and Heart Disease	Excess
< 50 ng/ml	50-70 ng/ml	70-100 ng/ml	> 100 ng/ml

Multiply ng/ml by 2.5 to convert to nmol/litre

## **Pesticides Related to Vitamin D Levels**

A recently published study indicates that low-dose organochlorine pesticide exposure is associated with low serum concentration of Vitamin D in humans. Previous animal and field studies suggest that chemicals such as organochlorine pesticides that are lipophilic (lipid-loving) and deposit in the fat tissue may influence levels of Vitamin D, which is also fat-soluble.

The subjects included 1,275 adults age 20 years or older. The researchers evaluated serum concentrations of 25-hydroxyvitamin D and seven organochlorine pesticides detectable in 80 or more of the participants.

Three of the seven organochlorine pesticides showed an inverse association with serum concentrations of vitamin D, meaning that as the levels of these pesticides increased, the level of serum vitamin decreased. Adjusting the data for age, race and various health conditions, p,p'-DDT (dichlorodiphenyltrichloroethane) showed a consistent inverse association in all subgroups, but showed a stronger association among subjects with old age, white race or chronic health conditions.

The researchers concluded that the background exposure to some organochlorine pesticides may lead to vitamin D deficiency in humans.

### Reference:

Yang JH, Lee YM, Bae SG, Jacobs Dr. Jr, Lee DH. Associations between Organochlorine pesticides and Vitamin D Deficiency in the U.S. Population. PloS One. 2012;7(1):e30093. Published Online Ahead of Print.

# Read This Shocking Vitamin D Report or You'll Kick Yourself for the Next Decade

Posted By [Dr. Mercola](#) | March 16 2010 | 335,319 views

The *British Medical Journal* has published a remarkable paper confirming that low vitamin D levels obtained in the past are a risk factor for developing colon cancer in the future.

But the study contained an even more significant finding -- as Dr. Cannell's site has [reported before](#), vitamin A, even in relatively low amounts, can thwart vitamin D's association with reduced rates of colon cancer.

This is the largest study to date showing vitamin A blocks vitamin D's effect.

Hidden on page eight of the paper was one sentence and a small table, showing that the benefits of vitamin D are almost entirely negated in those with the highest vitamin A (retinol) intake.

And the retinol intake did not have to be that high -- only about 3,000 IU/day. Young autistic children often take 3,500 IU of retinol a day in their powdered multivitamins, which doesn't count any additional vitamin A given in high single doses.

The finding explains some of the anomalies in other papers on vitamin D and cancer -- similar studies sometimes have widely different results. This may be because the effect of vitamin A was not taken into account. In some countries, cod liver oil, which contains vitamin A, is commonly used as a vitamin D supplement, and in others it is used more rarely, causing differences in the results.

## Sources:

- » [The Natural Advocate February 28, 2010](#)
- » [Vitamin D Council](#)
- » [British Medical Journal, BMJ 2010;340:b5500](#)

Dr. Mercola's Comments:

If you already subscribe to the excellent newsletter from [The Vitamin D Council](#) then you're aware of this important information. If not, I highly recommend becoming a subscriber, as The Vitamin D Council is a great source of information on this vital topic.

In this recent article by Dr. Cannell, he discusses the [latest research published in the \*British Medical Journal\*](#), which confirms his previous assertion: that [too much vitamin A negates many of the beneficial health effects of vitamin D](#).

In his [December 2008 issue](#), Dr. Cannell explained:

*"The crux of the problem is that a form of vitamin A, [retinoic acid](#), weakly activates the vitamin D response element on the gene and perhaps blocks vitamin D's more robust activation. In fact, the authors of a [1993 study](#) state "there is a profound inhibition of vitamin D-activated...gene expression by retinoic acid."*

So what does this mean?

### Vitamin A versus Vitamin D

Well, naturally, since appropriate vitamin D levels are crucial for your health, it means that it's essential to have *the proper ratio* of vitamin D to vitamin A in your body.

This also means that vitamin A supplementation is potentially hazardous to your overall health, as vitamin D plays a significant role in a large number of common diseases and afflictions.

In a [paper published in the August 2007 issue of the \*American Journal of Clinical Nutrition\*](#), Anthony Norman, an international expert on vitamin D, identified vitamin D's potential for contributions to good health in:

- Your adaptive and innate immune systems
- The secretion and regulation of insulin by your pancreas
- Heart and blood pressure regulation
- Muscle strength
- Brain activity

There are only 30,000 genes in your body and vitamin D has been shown to influence over 2,000 of them. That's one of the primary reasons it influences so many diseases, including:

Cancer	Hypertension	Heart disease
Autism	Obesity	Rheumatoid arthritis
Diabetes 1 and 2	Multiple Sclerosis	Crohn's disease

Flu	Colds	Tuberculosis
Septicemia	Aging	Psoriasis
Eczema	Insomnia	Hearing loss
Muscle pain	Cavities	Periodontal disease
Athletic performance	Macular degeneration	Myopia
Pre-eclampsia	Seizures	Fertility
Asthma	Cystic fibrosis	Migraines
Depression	Alzheimer's disease	Schizophrenia

Vitamin A production is tightly controlled in your body. The substrate, or source of the vitamin A, are carotenoids from vegetables in your intestine. Your body converts these carotenoid substrates to exactly the right amount of retinol. However, when you take vitamin A as retinol directly, such as in cod liver oil, you bypass all the natural controls in this closed system.

Ideally, you'll want to provide all the vitamin A and vitamin D substrate your body needs in such a way that your body can regulate both systems naturally.

This is best done by eating colorful vegetables (for vitamin A) and by exposing your skin to sun every day (for vitamin D).

### **Even Low Amounts of Vitamin A Can Negate Benefits of Vitamin D**

Given that cancer, heart disease and diabetes are three of the top causes of death in the United States, ensuring that you are getting enough of this crucial vitamin should be a top priority.

A study by Dr. William Grant, Ph.D., another internationally recognized research scientist and vitamin D expert, found that about [30 percent of cancer deaths](#) -- which amounts to 2 million worldwide and 200,000 in the United States -- could be prevented each year with higher levels of vitamin D.

Knowing this, it's clearly important to avoid anything that might hamper your vitamin D production, and it appears vitamin A supplementation may indeed have this effect.

I highly recommend you [read Dr. Cannell's article](#) about this latest BMJ study, in its entirety, as he explains quite well how even the researchers themselves seem to have missed this crucial connection.

He writes:

*“Dr. Mazda Jenab and his 45 colleagues from the International Agency for Research on Cancer confirmed that low vitamin D levels are a risk for colon cancer in a dose response manner; those with the highest levels were about twice as less likely to develop colon cancer compared to those with the highest levels.*

*However, hidden on page eight is one sentence and a small table, which shows that the benefits of vitamin D are almost entirely negated in those with the highest vitamin A intake. And the retinol intake did not have to be that high in these older adults to begin to negate vitamin D's effects, about 3,000 IU/day.*

*Remember, young autistic children often take 3,500 IU of retinol a day in their powdered multivitamins, which doesn't count any additional vitamin A given in high single doses.*

*This is the largest study to date showing vitamin A blocks vitamin D's effect and explains some of the anomalies in other papers on vitamin D and cancer.”*

## **The Synergistic Effects of Vitamin A on Vitamin D**

It's highly unfortunate, but many people in developed countries are potentially sabotaging the multitude of health benefits they could receive from adequate vitamin D by taking excessive amounts of vitamin A, either in the form of multi-vitamins or cod liver oil.

I spent many hours reviewing this issue in the latter part of 2008, and as a result, I issued a [revision of my long held recommendation for cod liver oil](#). If you missed that important update, please take the time to review it now.

I had recommended cod liver oil as a source of vitamin D for quite some time, prior to this revision. My stance was based on the fact that cod liver oil contains vitamins D and A in addition to healthy omega-3 fats.

These vitamins are essential for most everyone who cannot get regular sun exposure year-round.

However, as I began reviewing the latest research, I realized there was compelling evidence that the *ratios* of these two vitamins may be of paramount importance in order to extract optimal health benefits. And this latest study appears to confirm that theory.

It's important to understand that vitamin A is essential for your immune system and a precursor to active hormones that regulate the expression of your genes just like vitamin D, and the two *work in tandem*.

For example, there is evidence that without vitamin D, vitamin A can be ineffective or even toxic. But if you're deficient in vitamin A, vitamin D cannot function properly either.

So proper balance of these two vitamins is essential. Too much or too little of either may create negative consequences.

Unfortunately, we do not yet know the optimal ratios between these two vitamins, but it is clear that nearly all cod liver oil products supply them in levels that do not appear to be ideal.

You also need to discern between various forms of vitamin A.

It is the *retinoic acid (retinol)* form of vitamin A that is problematic. Not beta carotene.

Beta carotene is not a concern because it is PRE-vitamin A. Your body will simply not over-convert beta carotene to excessive levels of vitamin A. So taking beta carotene supplements is not going to interfere with your vitamin D.

### **How Can You Ensure Proper Ratios of Vitamins A and D?**

As Dr. Cannell has stated in earlier writings on this topic, the ideal way to obtain the proper vitamin A to D ratio is to obtain it the way your body was designed to obtain it:

- Vitamin A through your diet, in the form of colorful vegetables
- Vitamin D through daily sun exposure on your skin

In addition, it is important to realize that a high quality source of chlorella is an important superfood that is loaded with natural beta carotene and can be very useful for optimizing vitamin A levels.

## **Serum 25-hydroxyvitamin D and risk of post-menopausal breast cancer--results of a large case-control study.**

Carcinogenesis. 2008 Jan;29(1):93-9

Authors: Abbas S, Linseisen J, Slanger T, Kropp S, Mutschelknauss EJ, Flesch-Janys D, Chang-Claude J

Various studies suggest that vitamin D may reduce breast cancer risk. Most studies assessed the effects of dietary intake only, although endogenous production is an important source of vitamin D. Therefore, the measurement of serum 25-hydroxyvitamin D [25(OH)D] better indicates overall vitamin D status. To assess the association of 25(OH)D serum concentrations with post-menopausal breast cancer risk, we used a population-based case-control study in Germany, which recruited incident breast cancer patients aged 50-74 between 2002 and 2005. Information on sociodemographic and breast cancer risk factors was collected by personal interview. For this analysis, we included 1394 cases and 1365 controls, matched on year of birth and time of blood collection. Conditional logistic regression was used to calculate odds ratios (ORs) for breast cancer adjusted for potential confounders. Serum 25(OH)D concentration was significantly inversely associated with post-menopausal breast cancer risk. Compared with the lowest category (<30 nM), OR [95% confidence intervals (CI)] for the higher categories of 25(OH)D (30-45, 45-60, 60-75 and  $\geq$ 75 nM) were 0.57 (0.45-0.73), 0.49 (0.38-0.64), 0.43 (0.32-0.57) and 0.31 (0.24-0.42), respectively (P(trend) < 0.0001). Analysis using fractional polynomials indicated a non-linear association. The association was stronger in women never using menopausal hormone therapy (HT) compared with past and current users (P(interaction) < 0.0001). Our findings strongly suggest a protective effect for post-menopausal breast cancer through a better vitamin D supply as characterized by serum 25(OH)D measurement, with a stronger inverse association in women with low serum 25(OH)D concentrations (<50 nM).

PMID: 17974532 [PubMed - indexed for MEDLINE]

## Sunlight emerging as proven treatment for breast cancer, prostate cancer and other cancers

Monday, July 11, 2005 by: Staff writer, citizen journalist

(Natural News) Taking a daily 10 to 15 minute walk in the sun not only clears your head, relieves stress and increases circulation – it could also cut your risk of breast cancer in half. At least that's what Esther John, an epidemiologist at the Northern California Cancer Center, recommends. And there's plenty of proof to back her up. One study found that sunlight exposure lowered the risk of breast cancer by 30 to 40 percent. In *The Breast Cancer Prevention Diet*, Dr. Robert Arnot claims that national rates of [breast cancer](#) inversely correlate to [solar radiation](#) exposure. In other words, breast [cancer](#) occurs at a much higher rate in colder, cloudier northern regions than in sunnier southern regions. Johns Hopkins University Medical School conducted a ten-year epidemiological study that showed [exposure](#) to full-spectrum light (including the ultraviolet frequencies) is positively related to the prevention of breast, colon and rectal [cancers](#).

How does this work? There is in fact a scientific answer. The sun stimulates production of a hormone in your skin. Ultraviolet B rays, the kind of rays that give you sunburns, interact with a special cholesterol in unblocked skin. Once stimulated, this cholesterol triggers your [liver](#) and kidney to make [vitamin D3](#). Vitamin D3 isn't exactly a vitamin, but rather a type of steroid hormone that can drastically improve your [immune system function](#).

Vitamin D3 also controls cellular growth and helps you absorb calcium from your [digestive tract](#). Most importantly, this hormone/vitamin inhibits the growth of [cancer cells](#). In laboratory tests performed on animals, vitamin D3 inhibited the growth of malignant [melanoma](#), breast cancer, [leukemia](#) and mammary tumors. Vitamin D3 also slowed down angiogenesis, which aids the growth of cancer cells. Vitamin D3 stops cancer-aiding [blood vessels](#) from being formed, curbing the tumor's ability to spread and disrupt other functions in the [body](#). Donald R. Yance Jr. writes that vitamin D3 may also inhibit the activity of hormones such as [estrogen](#) in breast cancer, thereby decreasing its spread.

Since high doses of vitamin D3 are [toxic](#), scientists have formulated vitamin D derivatives that can be administered to breast cancer [patients](#). In tests, these derivatives have stopped the proliferation of breast cancer cells and sometimes have actually decreased the size of experimental mammary [tumors](#). Further findings like these might point to yet another undiscovered function of vitamin D3: regulating the expression of protein [products](#) that prevent and even inhibit breast cancer.

There is a concern relevant to this issue. Haven't we been told for the last 10 years to stay out of the sun? What about [skin cancer](#)? Dr. Richard Hobday, author of *The Healing Sun*, says our fear of the sun does more harm than good. Most recommended daily sunscreens block ultraviolet B rays, the same rays that trigger the production of vitamin D. The number of people who die from breast cancer, colon cancer, [prostate cancer](#), ovarian cancer, heart disease, [multiple sclerosis](#) and osteoporosis -- all maladies that sunlight could benefit -- is far greater than the number of [deaths](#) from skin cancer. After reviewing 50 years of [medical literature](#) on cancer, Dr. Gordon Ainsleigh

concluded that **the benefits of regular [sun exposure](#) outweigh the risks of squamous-basal skin cancer, accelerated ageing and melanoma.**

Despite the obvious advantages, most Americans are not getting enough vitamin D. Massachusetts General Hospital recently found that 59 percent of hospitalized patients had too little vitamin D in their bloodstream. Many experts infer that the Massachusetts [vitamin D deficiency](#) is almost as widespread in the general American population. Evidence also suggests that people with heavily pigmented skin (darker skin color) require more sunlight for adequate vitamin D production.

Given the obvious need for vitamin D, many researchers are looking for other sources for providing it to patients. While sunlight is the best naturally occurring source of vitamin D3 for humans, there are alternatives to a leisurely walk in the sun. Sheldon Saul Hendler, MD, PhD, describes an interesting paradox: While people living in [Japan](#) are exposed to relatively low levels of sunlight, the incidence of cancer among Japanese is very low. Hendler claims that the resistance to cancer apparent among the Japanese is explained by their diet, which includes large quantities of [fatty fish](#) that are rich in vitamin D.

Other sources of vitamin D include salmon, tuna, [fish oils](#) and vitamin D supplements. If you plan on drinking vitamin D fortified milk, however, be warned: Researchers at Boston University School of Medicine found the [labels](#) misleading. 80 percent of milk samples contained either 20 percent less or 20 percent more vitamin D than the amount advertised on labels. Too much vitamin D can be toxic and cause calcification in the [kidneys](#) and heart. So watch for the warning signs: anorexia, disorientation, [dehydration](#), fatigue, weight loss, weakness and vomiting.

## The experts speak on sunlight and breast cancer

The annual [death rate](#) from breast cancer varies considerably from region to region, practically doubling from the US South and Southwest to the high-risk Northeast. In addition, the [risk](#) of fatal breast cancer in the major cities is "inversely proportional to intensity of local sunlight." It increased in low sunlight areas and decreased in sunnier climes. [Vitamin D](#), created in the course of exposure to sunlight, is thus associated with a low risk of fatal breast cancer. The Garlands concluded that differences in the amount of ultraviolet light reaching the population may account for the striking regional differences in breast [cancer deaths](#) (5). The same was true in the Soviet Union (6).

*Cancer Therapy by Ralph W Moss PhD, page 67*

In tropical nations, where exposure to sunlight is normal, the incidence of [osteoporosis](#), hip and spinal fracture, cataracts, and colon and breast cancer is less common. The lack of sunlight seen in cold climates in winter [causes](#) a failure of adequate vitamin D production which damages the immune system and may [lead](#) to more cancer than is seen in warm climates where vitamin D levels tend to be higher.

***A Physicians Guide To Natural Health Products That Work By James Howenstine MD, page 173***

Cancer: A ten-year epidemiological study conducted at Johns Hopkins University Medical School, in Baltimore, Maryland, showed that exposure to full-spectrum light (including the ultraviolet frequency) is positively related to the prevention of breast, colon, and rectal cancers. Another report found that exposure to full-spectrum sunlight reduced the risk of developing breast cancer. In Russia, a full-spectrum lighting system was installed in factories where colds and sore throats had become commonplace among workers. This lowered the bacterial contamination of the air by 40%-70%. Workers who did not receive the full-spectrum light were absent twice as many days as those who did.

***Alternative Medicine by Burton Goldberg, page 305***

Sunlight stimulates a hormone in skin that triggers the liver and kidney to make the active form of vitamin D3. Two equally effective sources of vitamin D in humans are derived from plant ergosterol, which is converted to ergocalciferol (vitamin D2) and cholecalciferol (vitamin D3) by the action of sunlight on the skin. The body uses vitamin D3 for normal immune system function, to control cellular growth, and to absorb [calcium](#) from the digestive tract. Vitamin D3 can inhibit the growth of malignant melanoma, breast cancer, leukemia, and mammary tumors in laboratory animals. Vitamin D3 can also inhibit angiogenesis, the growth of new [blood](#) vessels that permit the spread of cancer cells through the body. In warm weather, about 10-15 minutes of direct sun (in morning or late afternoon, to avoid skin damage) two to three times a week can produce sufficient vitamin D. As we age, however, our skin becomes less efficient at making vitamin D. People who live in cloudy climates with long winters may not get enough vitamin D. Many [health](#) experts believe that adults may benefit from 400 to 800 international units of vitamin D. But don't exceed this amount without your doctor's advice, since too much vitamin D can be toxic. Vitamin D can cause calcification in the kidneys, heart, and other tissues. Symptoms of vitamin D toxicity include [anorexia](#), disorientation, dehydration, fatigue, [weight loss](#), weakness, and vomiting.

***Permanent Remissions by Robert Haas MS, page 215***

Vitamin D may have the ability to inhibit the proliferative activity of [hormones](#), such as estrogen in breast cancer, and has been shown to suppress breast and prostate cancer growth. Sunlight exposure, which leads to an increased level of vitamin D, correlates with a reduced risk of breast cancer. I usually recommend small amounts of vitamin D (400 to 1,000 IU) for those people without [sunlight exposure](#), especially during the [winter](#). I also occasionally recommend cod liver [oil](#) during the winter months as a source of vitamin D and omega-3 fatty acids. Vitamin D [deficiency](#) is very common in the elderly and in people who live in parts of the world with little sunlight; it is also one of the major contributing factors to osteoporosis.

***Herbal Medicine Healing Cancer by Donald R Yance Jr, page 186***

Vitamin D3 can be toxic in doses required to slow down the spread of breast cancer, so scientists have formulated vitamin-D derivatives that inhibit the proliferation of breast cancer cells and cause regression of experimental mammary tumors. Taken together, these facts suggest that vitamin D and its derivatives may play a role in regulating the expression of genes and [protein](#) products that prevent and inhibit breast cancer. The cancer-stopping [power](#) of vitamin D has

been documented in osteosarcoma (bone cancer), melanoma, [colon cancer](#), and breast cancer. These cancer cells contain vitamin-D receptors that make them susceptible to the anticancer effects of this vitamin-hormone made by the skin when it is exposed to sunlight. Vitamin D-rich foods include [salmon](#), tuna, fish oils, and vitamin D-fortified milk and breakfast cereals. Caution: Since vitamin D can be toxic in high doses.

***Permanent Remissions by Robert Haas MS, page 108***

A study comparing the health habits of 133 breast cancer patients with [women](#) who did not have the [disease](#) found that exposure to sunlight lowered the risk of breast cancer by 30 to 40% or more. In reaction to sunlight exposure, the body manufactures vitamin D, which is thought to confer the protective effect.

***Reducing Cancer Risk by Richard Harkness Pharm FASCP, page 98***

Women who live in southern states are known to get breast cancer significantly less than those who live in the North. Some northern states don't get enough sun from November to February to make the required levels of vitamin D. "It's possible that all it takes is 10 or 15 minutes outside in bright sunlight to get a benefit," said Esther John, an epidemiologist at the Northern California Cancer Center. "And that's just casual exposure. The sunlight you get on your face and neck and arms and hands when you're regularly dressed." So while the exact dose of sunlight needed is not known, a brief outdoor stroll might do it. She said the amount needed to protect against breast cancer is probably not enough to cause skin damage. Sunscreens that block ultraviolet rays would also block the formation of vitamin D. However, we don't really know for sure if the [benefits](#) of sunlight are actually due to vitamin D. Other unrecognized factors may be involved.

***Reducing Cancer Risk by Richard Harkness Pharm FASCP, page 98***

However, there is mounting [evidence](#) that vitamin D from sunlight and [fish oil](#) may reduce the incidence of certain cancers, such as breast cancer. Hence, some vitamin D residuals in the fish oil may actually increase its protective value against cancer as well as CHD.

***Textbook of Natural Medicine Volumes 1-2 by Joseph E Pizzorno and Michael T Murray, page 735***

Numerous [research](#) papers have shown that metabolites (breakdown products or derivatives) of active vitamin D can actually suppress the growth and spread of malignant melanoma cells. Your eyes aren't playing tricks on you. We indeed just said that active vitamin D can retard the development and spread of melanoma. It is a tumor-inhibiting hormone. And what's more, its effects reach much farther than the skin; research has shown that active vitamin D can also impede the growth and development of breast cancer, colon cancer, and cancer of the prostate. And where do we get active vitamin D? From the sun—from the interaction of the UVB portion of sunlight with the special cholesterol in our unblocked skin. If adequate [sunshine](#) and vitamin D production can impede the development of these malignancies, then it stands to reason that inadequate amounts may promote them. And indeed that appears to be the case. Some researchers have even speculated that the inadequate vitamin D production that occurs in people with heavily pigmented skin living in geographic locations with limited sunlight, such as in northern latitudes and in the winter, might in part explain why these cancers behave so much more aggressively in black Americans (who, because of heavier pigment, may require more sunlight for adequate vitamin D production) than in white ones. (The same might be true for the

millions of people who would never dream of going outside without covering every exposed inch of skin with a strong sunblock to "protect them.")

***The Protein Power Lifepan by Michael R Eades MD and Mary Dan Eades MD, page 242***

Breast cancer rates vary directly with the amount of solar radiation. The colder, cloudier Northeast has a higher rate of breast cancer than the warmer, sunnier South. What's the connection? Exposure to sunlight helps the body manufacture vitamin D. Women in the Northeast manufacture less vitamin D because they are exposed to less [natural](#) sunlight, especially in the winter season. Here's how researchers made the connection. They graded a woman's exposure to the sun by the amount of skin damage she had suffered. Those with the most severe loss of elasticity in the skin had, paradoxically, the lowest risk of breast cancer! You might wonder why women didn't make up for the lack of vitamin D through sunlight by eating the right kinds of vitamin D-rich foods. A recent study from Massachusetts General Hospital showed that 59 percent of hospitalized patients had too little vitamin D in their bloodstream. That leads many experts to conclude that vitamin D deficiency is widespread in the general American population.

***The Breast Cancer Prevention Diet by Robert Arnot MD, page 150***

To put it bluntly; your life could depend on it. Sunlight may cause skin cancer, but there is also evidence that it could prevent a number of very common and often fatal diseases: breast cancer; colon cancer; prostate cancer; [ovarian cancer](#); heart disease; multiple sclerosis; and osteoporosis. When combined, the number of people who die from these conditions is far greater than the number of deaths from skin cancer; which is why the current bias against sunlight needs, in my opinion, to be redressed, and why I would advise you to read this book.

***The Healing Sun by Richard Hobday, page 11***

There have been a number of scientific studies in the last 20 years that support the view that sunlight can inhibit cancer, and it is clear that the mortality and incidence of breast cancer and colon cancer in [North America](#) and other areas of the world increases with increasing [latitude](#). In 1992, Dr Gordon Ainsleigh published a paper in the journal Preventive Medicine in which he reviewed 50 years worth of medical literature on cancer and the sun. He concluded that the benefits of regular sun exposure appear to outweigh by a considerable degree the [risks](#) of squamous-basal skin cancer, accelerated ageing, and melanoma. He found trends in epidemiological studies suggesting that widespread adoption of regular moderate [sunbathing](#) would result in approximately a one-third lowering of breast and colon cancer death rates in the [United States](#). Colon cancer and breast cancer are the second and third leading causes of cancer deaths in North [America](#) and Dr Ainsleigh estimated that about 30,000 cancer deaths would be prevented each year if moderate sunbathing on a regular basis became the norm.

***The Healing Sun by Richard Hobday, page 68***

Interestingly, a country which is an exception to the link between low sunlight exposure and high incidence of colorectal and breast cancer is Japan. Even though people living in Japan are exposed to the low amount of sunlight, which is associated with these cancers in other areas, the incidence is very low in that country. This is undoubtedly because the Japanese eat a large quantity of fatty fish, which is rich in vitamin D.

***Vitamin And Mineral Encyclopedia by Sheldon Saul Hendler MD PhD, page 98***

Breast cancer is the most common form of cancer in women, causing about 370,000 deaths annually worldwide. Each year some 220,000 women in Europe and 180,000 women in North America are diagnosed with the disease. About 15,000 British women die of breast cancer annually, a [death](#) rate that is higher than elsewhere in Western Europe. One in 12 British women will develop breast cancer at some time in their lives and, as we have already seen, the incidence of breast cancer is increasing. The reasons for this are not altogether clear, but lack of sunlight could be a factor. In 1989 the Drs Garland, together with Dr Edward Gorham, published the first ever epidemiological work on the relationship between sun exposure and breast cancer (see Table 4). Their research demonstrated that, as in the case of colon cancer, there was a strong negative correlation between available sunlight and breast cancer death rates. The chances of women from areas of the United States with less available sunlight dying of breast cancer were 40 per cent higher than those of women who lived in Hawaii or Florida.

*The Healing Sun by Richard Hobday, page 70*

Since vitamin D can be toxic in doses that greatly exceed this value, researchers have developed synthetic analogues of vitamin D that retain the ability to inhibit cancer cell growth without the toxicity associated with high doses. These analogs have been successfully used in animal models of leukemia and breast cancer. Vitamin D may be related to other cancers. One study found that women who get low levels of sunlight experience high rates of breast cancer, suggesting that low vitamin D levels may play a preventive role in the disease. Low blood levels of vitamin D have been found in people with colon cancer.

*Permanent Remissions by Robert Haas MS, page 132*

As far as internal cancers are concerned, few [physicians](#) seem to have actually used sunlight therapeutically. One notable exception is the American physician Dr Zane Kime. In his book, *Sunlight Could Save Your Life*, which was published in 1980, Dr Kime describes how he encouraged one of his patients with breast cancer to sunbathe. He took this rather unusual step following a consultation with a 41-year-old woman whose breast cancer had spread to her lungs and bones. She had already undergone a mastectomy and chemotherapy but to no avail. Dr Kime did not treat the cancer directly but instead, introduced a programme to improve the general health of his patient. She was only allowed to eat whole foods, and all of the refined polyunsaturated oils and fats were removed from her diet. She was also encouraged to spend time sunbathing; and the combination of diet and sunlight seems to have achieved remarkable results. Within a few months the patient was back at work and in the years that followed there were no apparent [symptoms](#) of her metastasized cancer. Unfortunately Dr Kime did not devote much of his book to this episode, nor did he state how many years of remission his patient enjoyed and, sadly, Dr Kime died in 1992.

*The Healing Sun by Richard Hobday, page 75*

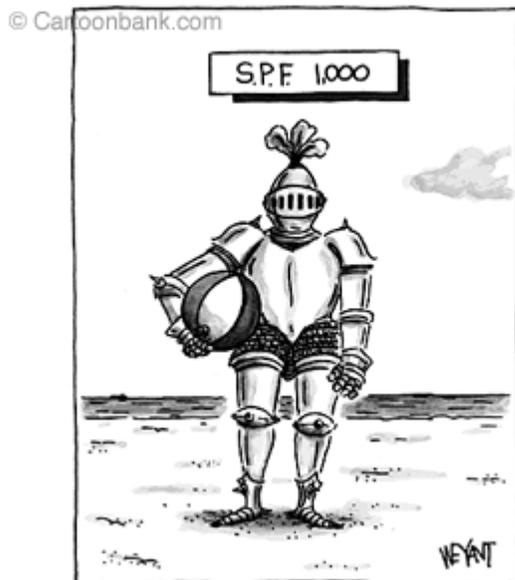
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## "If You Use Sunscreen, This is Urgent Information You Must Have" - by Dr. Mercola

Sunscreen blocks your body's production of vitamin D. Most brands contain toxic free radical generators which I believe can increase your risk of disease. Here's the ultimate way to protect yourself this summer...



You may be one of those people for whom summer is *far* too short!

But like it or not, most of you only have a few short months to enjoy the great outdoors in most of the continental US. Why waste it dealing with the two most vexing hassles of the outdoor summer season?

After spending six or more months stuck inside buildings under cover from rain, snow and sleet, you rush out and spend all day on a Saturday or Sunday in the sun. Not only is the golf course beckoning, but so is yard work, the kids' sporting events, and the grill.

It's easy to overdo your sun exposure in your quest to finally spend *some* time outdoors... especially when your skin is lily-white from being inside for months -- and not used to the sun.

There are many simple lifestyle changes you can make to radically decrease your risk of sunburn, such as choosing your essential fatty acids wisely, increasing raw vegetables loaded with skin protecting antioxidant phytonutrients, and avoiding processed foods and sugars.

I go into more details in the video so be sure and watch it.

## **Clothing Can Protect You -- Especially Caps**

Additionally you can use clothing wisely to avoid sun induced skin damage. My favorite is a cap which allows me to avoid wearing sunglasses and benefit from all of the 1500 wavelengths in sunshine. But the cap also keeps the sun off the very thin skin around my eyes which is particularly sensitive to photoaging damage from the sun.

However if you are looking for an additional level of protection beyond clothing then my team has come up with something that will really work for you and your family.

Daytime sun isn't the only summer headache you can have.

Ever been out on a beautiful summer evening enjoying the afterglow of sunset and onset of stars -- only to have it ruined by ten thousand pesky mosquitoes? Or was that ten million? In several states, mosquitoes have been dubbed the "state bird". Nasty little critters!

In a damp year, mosquitoes don't limit themselves to evening warfare either.

They love sultry, still, humid days ... and parks, campgrounds, wooded and swampy areas, and even your own backyard in broad daylight! Hard to escape them! Worse, they'll sneak into your house and buzz around your bedroom while you try to sleep.

Now, you could try solutions like DEET-based insect repellents -- but I certainly don't recommend it. In a moment, I'll tell you why that's a *non*-solution, and provide you with a viable all-natural alternative.

Equip yourself now to have a ton more fun this summer with this **Summer Survival Kit ...**

**[The Case AGAINST Using Sunscreen -- Even "Natural" Ones -- Except for This NEW Exclusive Lotion from Acapulco...](#)**

It's true.

I normally advise against using sunscreens. Even most "all-natural" sunscreens.

As a subscriber to my weekly newsletters, you may already know this. And if you aren't familiar with the reasons, I'll share them with you in a moment. But first, I need to get something off my chest.

Natural sunlight's potential to harm you has really been blown out of proportion. This is thanks to many doctors, health officials, advertisements, beauty experts, corporations, and well-meaning friends. They basically tell you that you need to stay out of the sun because the sun will kill you. This simply isn't true.

For starters, there is little scientific evidence to justify the many health campaigns that urge you to completely avoid the sun. Avoiding the sun just doesn't make sense. And it certainly doesn't make any sense when study after study shows that ...

## The Sun is Not Deadly

In fact, the sun is healthy for you. Think about it. How could it be any other way?

After all, your ancestors survived outdoors, working outside under the sun's rays far more often than they were indoors and out of the sun.

This brings up an obvious question.

How on earth would it be possible for your body to end up being configured in such a way that the sun is now a deadly threat to you, me, and the entire human race?

Like I said, it simply isn't true.

That's not to say sunlight can't be harmful. Of course, it can be...

For instance, long-term, excessive exposure to sunlight can increase the risk of certain types of skin cancer. Yet moderate sun exposure is less dangerous than sporadic sun exposure.

Plus, there's a good deal of evidence that sun exposure without sunburn significantly *decreases* the risk of melanoma (a more deadly form of skin cancer.) So safe sun exposure is key.

## What You Should Know About UVA and UVB Rays

Ultraviolet light from the sun comes in two main wavelengths -- UVA and UVB. It's important for you to understand the difference between them, and your risk factors from each.

Consider UVB the 'good guy' -- though of course you can't de-select UVA if you're going to be in the sun. UVB helps your skin produce vitamin D.

UVA is considered the 'bad guy' because it penetrates your skin more deeply and causes more free radical damage. Not only that, but UVA rays are quite constant during all the hours of daylight throughout the entire year.

By comparison, UVB waves are low in morning and evening and high at midday.

So, if you're out early in the morning or late in the day, you get lots of UVA (bad guy) and not much UVB (good guy). Not a good way to produce vitamin D. Plus you increase your risk of cancer if that's your only sun intake, and you fail to protect your skin.

What's more, have you ever gotten a scorching sunburn on a cloudy day? You think you don't need to protect yourself and you wind up being really sorry you didn't. That's the UVA rays at work. They can break through cloud cover and pollution and do some real damage your skin.

Kind of a Catch 22.

### **How Sunscreens Keep You from Enjoying the Many Benefits of the Sun's Healthy Rays**

As you may know, wearing a sunscreen on your uncovered skin blocks your body's production of vitamin D. In fact, sunscreens reduce vitamin D production by as much as 97.5 to 99.9%. And interfering with your body's production of vitamin D by 97.5 to 99.9% may have dire health consequences.

After all, vitamin D plays a crucial role in your overall health and well-being. For example, this superb vitamin is known to:

- **Support your cardiovascular health**
- Promote optimal cholesterol levels
- **Enhance your muscle strength**
- Help produce optimal blood pressure levels
- **Help maintain a healthy immune system**
- Support healthy kidney function
- **Promote healthy teeth**
- Help keep your bones strong and healthy

Please understand -- this list of important benefits represents a tiny fraction of the ways vitamin D keeps you healthy and fit. And, although you can get vitamin D from natural food sources, experts agree on one thing.

### **Natural Sunlight is Far and Away the Best Way to Get Your Vitamin D!**

And it is the ultimate way. Why? Because as soon as the sun's ultraviolet rays strike your skin, your body is programmed to do something remarkable. It starts producing its own natural vitamin D.

Better yet, your body produces the most active form of vitamin D in existence -- calciferol. Also known as vitamin D3. Vitamin D3 is actually the *precise* form your body needs for the proper functioning of your organs and cells.

And luckily for all of us, our bodies automatically generate enough of it with virtually no risk of overdose. They just know when to stop producing natural vitamin D before it can reach toxic levels.

However, elevated vitamin D levels obtained strictly from oral supplements can take six months or longer to normalize. That's why I don't recommend supplementing your vitamin D with pills.

If you do take vitamin D supplements, you need to get your blood levels tested regularly to avoid toxicity.

With natural sunlight, you may be wondering what precautions you need to take...

### Should You Use a Sunscreen to Guard Against SUNBURN?

Absolutely! But **not any kind of commercial sunscreen**. More on that in a moment -- but first, let me just say...

As much as I prefer you steer clear of sunscreens because they interfere with natural vitamin D production, there is one critical exception.

The exception is when it is impossible to limit full body exposure to sunlight! So if you can't limit your exposure for whatever reason, do use a safe sunscreen to protect your skin from sunburn. It is for YOUR own good.

Your risk of getting melanoma may increase in relationship to sunburn frequency and severity. Limiting sun exposure, wearing protective clothing, and using a 100% all-natural, non chemical sunscreen can reduce the risks of skin cancer and other harmful effects of the sun.

Studies revealed that people who spend more time outdoors *without* getting sunburn, actually *decrease* their risk of developing melanoma.

Now get this:

**Safe sunlight exposure has also been shown to protect against as many as sixteen different types of cancer**, including breast, colon, endometrial, esophageal, ovarian, bladder, gallbladder, gastric, pancreatic, prostate, rectal, and renal cancers, as well as non-Hodgkin's lymphoma.

So, yes, your body needs a bit of unprotected sun exposure. For all the benefits I've mentioned earlier. But if you can't avoid the following three scenarios:

- **You're forced to be in the direct rays of the sun for a longer time than is safe...**
- You must go into intense sunlight without having the opportunity to gradually build up to it...
- **You're in a situation where blocking the sun with strategic clothing or sunshades is impractical...**

...use a sunscreen to help guard against sunburn. But, don't just slap on any of the standard commercial brands you find on store shelves. With that in mind...

### It's Time to Expose the Sunscreen Smokescreen!

In my opinion, corporate greed has created products that are harmful.

I'm talking hundreds of sunscreens that I believe are toxic because they contain man-made chemicals ... chemicals I believe can cause serious health problems and increase your risk of disease. Here's why.

The main chemical used in sunscreens to filter out ultraviolet B light is octyl methoxycinnamate. OMC for short. OMC was found to kill mouse cells even at low doses. Plus, it was also shown to be particularly toxic when exposed to sunshine. And guess what?

**OMC is present in 90 percent of sunscreen brands!**

But that's not the half of it. A common ultraviolet A filter, butyl methoxydibenzoylmethane, has also demonstrated toxic properties.

Furthermore, several studies show that the chemicals commonly used in sunscreens are absorbed through the skin and end up circulating in your blood stream. Not good. So...

**If Your Sunscreen Contains Any of These Chemicals That I Consider Dangerous and Potentially Life Threatening, Do Yourself a BIG Favor...**

Dump it in the trash now .

Yes, that's right. Toss your sunscreen in the trash if it contains any of these questionable chemicals:

- **Para amino benzoic acid...**
- Octyl salicyclate...
- **Avobenzone...**
- Oxybenzone...
- **Cinoxate...**
- Padimate O...
- **Dioxybenzone...**
- Phenylbenzimidazole...
- **Homosalate...**
- Sulisobenzzone...
- **Menthyl anthranilate...**
- Trolamine salicyclate...
- **Octocrylene...**

And, oh yes, let me not forget...

Potentially harmful chemicals such as **dioxybenzone** and **oxybenzone** (*two chemicals I just mentioned*) are some of the most powerful free radical generators known to man!

So if your sunscreen contains dioxybenzone, oxybenzone, or any of the other chemicals I just revealed, I highly recommend you switch to a formula that is safe and healthy for your skin.

And a note to moms ... You are undoubtedly very conscientious about caring for your children. But when you lather up your son or daughter with sunscreen thinking you're doing the right thing, you could in fact be doing more harm than good.

So check the labels on your sunscreen, and throw them out if they contain any of the potentially dangerous chemicals named above. After all, your skin is your largest organ, as your child's skin is theirs.

Fortunately, there's a much better option than chemical-laden commercial sunscreens...

### **Introducing a Major Breakthrough in All-Natural Sunscreen Lotions**

This is the story of an incredible product. So incredible that I know of no other sunscreen lotion that is as beneficial and healthy for your skin.

The name of this 100% all-natural sunscreen is **Natural Sunscreen**. The formula used in this lotion was originally used by Acapulco natives.

In fact, each ingredient in this unique formula serves its own special purpose to nourish, protect, and moisturize your skin. One of those ingredients is GREEN TEA. I included green tea for a couple of good reasons.

First, many studies show that green tea is a powerful antioxidant. Second, recent studies also suggest that green tea may help you reduce the appearance of skin damage from sun radiation. In short, green tea helps protect your skin's cells by providing antioxidant protection.

Simply put, this highly concentrated lotion helps protect you by reflecting UV rays away from your skin. Plus, **Natural Sunscreen** is also water resistant, hypoallergenic, and:

- **FREE of chemical fragrances...**
- **FREE** of parabens (harsh chemical preservatives)...
- **FREE of nanoparticles** (allows sunscreen to be more cosmetically appealing as it's less visible, yet it remains on your skin's surface)...

### **Active Ingredients in Natural Sunscreen Are ALL Natural**

Make no mistake: **Natural Sunscreen** meets the immediate need for a non-chemical sunscreen.

Each active ingredient in this outstanding product has been carefully chosen to specifically protect and nourish your skin. With that said, let's review together all the ingredients you'll find in this 100% all-natural sunscreen lotion starting with:

**Titanium Dioxide (6.0%) & Zinc Oxide (6.0%):**

These two active ingredients in **Natural Sunscreen** are natural minerals. Minerals that actually come from clay and beach sand deposits. This means, they are not harsh, synthetically-produced chemicals you'll often find in popular brands.

And it may surprise you to find out that **zinc oxide has been used all over the world for over 75 years as a safe sunscreen to help you** prevent excessive sun exposure.

Unlike chemical sunscreens that absorb ultraviolet light, nature provides us with titanium dioxide and zinc oxide ... two remarkable ingredients that remain on your skin to reflect and scatter away both UVA and UVB rays from your body. How do they do this?

Quite simply, they do it by forming a physical barrier, without irritating or clogging your pores.

#### Other Natural Ingredients Included in NEW Sunscreen :

**1 Sunflower oil:** Sunflower oil is a superior moisturizer. In addition, it also contains vitamins A, D and E. And this excellent ingredient is often used to moisturize dry, weathered, and aged skin.

**2 Lecithin:** Lecithin is found in the membranes of plant cells (soy.) It is widely used in cosmetics as an emollient and water-binding agent.

**3 Coconut oil:** Coconut oil has been used by the islanders for many hundreds of years to moisturize their skin. And it moisturized their skin while they attained a glowing, dark tan. Even better, if you have skin sensitivities, it is likely to be mild and gentle on your skin.

**4 Glycerine:** Used as an emollient, glycerine improves your skin's natural moisture by attracting just the right amount of water to maintain your skin's homeostasis. Furthermore, research proves the presence of glycerine in the intercellular layer.

**5 Jojoba oil:** Jojoba oil is a non-fragrant natural emollient that serves up superior moisturizing and skin conditioning properties.

**6 Tocopheryl acetate (vitamin E):** Vitamin E also acts as a natural preservative.

**7 Shea butter:** Shea butter is a natural plant lipid used as both a thickener and an emulsifier. What's more, it also has effective moisturizing properties.

**8 Eucalyptus oil:** Eucalyptus oil is an essential oil. And when it's mixed with other oils, it is more easily absorbed by your skin. Best of all, it assists other oils to be absorbed in your skin as well. This obviously supports the moisturizing process.

Bottom line, **Natural Sunscreen's** perfect blend of ingredients results in a **pleasant-smelling sunscreen lotion without any chemical fragrances or dangerous artificial chemicals.**

For this reason you can feel great about putting it on your skin, and your kids' skin too.

As with all safe sunscreen lotions, I recommend you re-apply frequently, especially after swimming, perspiring, or towel-drying.

### **Natural Sunscreen – Now Available in Three Strengths**

My **Natural Sunscreen SPF30** provides just the right amount of coverage for most activities. With a full 6% of both **Titanium Dioxide and Zinc Oxide, you know you're covered.**

But, I realize sometimes you would prefer less protection from the sun.

When you desire lighter protection – but the same safe and natural ingredients – my **Natural Sunscreen SPF15** fits the bill. Providing medium protection, **Natural Sunscreen SPF15** contains 3.5% **Titanium Dioxide and 3.5% Zinc Oxide.**

There are times when a stronger sunscreen is desirable. Perhaps for your children's delicate skin as they play in the sand and surf. Or maybe when you're out boating or playing golf. You can enjoy the added assurance of maximum protection with the same safe, active and natural ingredients that I use for my **Natural Sunscreen SPF30.**

Sometimes, you may want a stronger sunscreen for your face, your children, if you have particularly fair skin or simply to handle more intense sun exposure. But at the same time, you want all the safe active and natural ingredients found in **Natural Sunscreen.**

For those occasions demanding even greater protection, my **Natural Sunscreen SPF50 offers exceptional UVB and UVA protection.** With a higher concentration of Zinc Oxide (22.5%) and 6% Titanium Dioxide, you're getting the highest degree of protection possible. And it's safe for kids and adults alike.

### **Confident Protection -- Guaranteed**

No doubt about it, **Natural Sunscreen SPF 30 & SPF 50** remarkable products. After all, they help protect you and your family against ultraviolet A (UVA) and ultraviolet B (UVB) rays, while helping you achieve a beautiful, glowing, and healthy tan.

Many sunscreens protect against only UVB and offer no protection against UVA.

I'm so sure you'll be delighted with **Natural Sunscreen SPF 30 & SPF 50.** However, if for any reason you are dissatisfied with either one, let me know at any time. Yes, you read that right. Any time. Of course, I will give you a prompt, courteous refund. No questions asked.

How can I make such a bold guarantee? It's simple: I'm betting that once you start using **Natural Sunscreen SPF 30 & SPF 50**, you'll enjoy them so much; you and your entire family will never want to be without either one during the warm weather months.

And there's more...

I'm now offering a 1.5 ounce travel bottle with carabiner (to clip on your belt or keychain).

This travel bottle provides a convenient way to take **Natural Sunscreen SPF 30 or SPF 50** along wherever you go. See order details below.

*But read on, because sunburn isn't the only potential hazard of summer...*

# Read This Shocking Vitamin D Report or You'll Kick Yourself for the Next Decade

Posted By [Dr. Mercola](#) | March 16 2010 | 335,318 views

The *British Medical Journal* has published a remarkable paper confirming that low vitamin D levels obtained in the past are a risk factor for developing colon cancer in the future.

But the study contained an even more significant finding -- as Dr. Cannell's site has [reported before](#), vitamin A, even in relatively low amounts, can thwart vitamin D's association with reduced rates of colon cancer.

This is the largest study to date showing vitamin A blocks vitamin D's effect.

Hidden on page eight of the paper was one sentence and a small table, showing that the benefits of vitamin D are almost entirely negated in those with the highest vitamin A (retinol) intake.

And the retinol intake did not have to be that high -- only about 3,000 IU/day. Young autistic children often take 3,500 IU of retinol a day in their powdered multivitamins, which doesn't count any additional vitamin A given in high single doses.

The finding explains some of the anomalies in other papers on vitamin D and cancer -- similar studies sometimes have widely different results. This may be because the effect of vitamin A was not taken into account. In some countries, cod liver oil, which contains vitamin A, is commonly used as a vitamin D supplement, and in others it is used more rarely, causing differences in the results.

## Sources:

- » [The Natural Advocate February 28, 2010](#)
- » [Vitamin D Council](#)
- » [British Medical Journal, BMJ 2010;340:b5500](#)

Dr. Mercola's Comments:

If you already subscribe to the excellent newsletter from [The Vitamin D Council](#) then you're aware of this important information. If not, I highly recommend becoming a subscriber, as The Vitamin D Council is a great source of information on this vital topic.

In this recent article by Dr. Cannell, he discusses the [latest research published in the \*British Medical Journal\*](#), which confirms his previous assertion: that [too much vitamin A negates many of the beneficial health effects of vitamin D](#).

In his [December 2008 issue](#), Dr. Cannell explained:

*"The crux of the problem is that a form of vitamin A, [retinoic acid](#), weakly activates the vitamin D response element on the gene and perhaps blocks vitamin D's more robust activation. In fact, the authors of a [1993 study](#) state "there is a profound inhibition of vitamin D-activated...gene expression by retinoic acid."*

So what does this mean?

### Vitamin A versus Vitamin D

Well, naturally, since appropriate vitamin D levels are crucial for your health, it means that it's essential to have *the proper ratio* of vitamin D to vitamin A in your body.

This also means that vitamin A supplementation is potentially hazardous to your overall health, as vitamin D plays a significant role in a large number of common diseases and afflictions.

In a [paper published in the August 2007 issue of the \*American Journal of Clinical Nutrition\*](#), Anthony Norman, an international expert on vitamin D, identified vitamin D's potential for contributions to good health in:

- Your adaptive and innate immune systems
- The secretion and regulation of insulin by your pancreas
- Heart and blood pressure regulation
- Muscle strength
- Brain activity

There are only 30,000 genes in your body and vitamin D has been shown to influence over 2,000 of them. That's one of the primary reasons it influences so many diseases, including:

Cancer	Hypertension	Heart disease
Autism	Obesity	Rheumatoid arthritis
Diabetes 1 and 2	Multiple Sclerosis	Crohn's disease

Flu	Colds	Tuberculosis
Septicemia	Aging	Psoriasis
Eczema	Insomnia	Hearing loss
Muscle pain	Cavities	Periodontal disease
Athletic performance	Macular degeneration	Myopia
Pre-eclampsia	Seizures	Fertility
Asthma	Cystic fibrosis	Migraines
Depression	Alzheimer's disease	Schizophrenia

Vitamin A production is tightly controlled in your body. The substrate, or source of the vitamin A, are carotenoids from vegetables in your intestine. Your body converts these carotenoid substrates to exactly the right amount of retinol. However, when you take vitamin A as retinol directly, such as in cod liver oil, you bypass all the natural controls in this closed system.

Ideally, you'll want to provide all the vitamin A and vitamin D substrate your body needs in such a way that your body can regulate both systems naturally.

This is best done by eating colorful vegetables (for vitamin A) and by exposing your skin to sun every day (for vitamin D).

### **Even Low Amounts of Vitamin A Can Negate Benefits of Vitamin D**

Given that cancer, heart disease and diabetes are three of the top causes of death in the United States, ensuring that you are getting enough of this crucial vitamin should be a top priority.

A study by Dr. William Grant, Ph.D., another internationally recognized research scientist and vitamin D expert, found that about [30 percent of cancer deaths](#) -- which amounts to 2 million worldwide and 200,000 in the United States -- could be prevented each year with higher levels of vitamin D.

Knowing this, it's clearly important to avoid anything that might hamper your vitamin D production, and it appears vitamin A supplementation may indeed have this effect.

I highly recommend you [read Dr. Cannell's article](#) about this latest BMJ study, in its entirety, as he explains quite well how even the researchers themselves seem to have missed this crucial connection.

He writes:

*“Dr. Mazda Jenab and his 45 colleagues from the International Agency for Research on Cancer confirmed that low vitamin D levels are a risk for colon cancer in a dose response manner; those with the highest levels were about twice as less likely to develop colon cancer compared to those with the highest levels.*

*However, hidden on page eight is one sentence and a small table, which shows that the benefits of vitamin D are almost entirely negated in those with the highest vitamin A intake. And the retinol intake did not have to be that high in these older adults to begin to negate vitamin D's effects, about 3,000 IU/day.*

*Remember, young autistic children often take 3,500 IU of retinol a day in their powdered multivitamins, which doesn't count any additional vitamin A given in high single doses.*

*This is the largest study to date showing vitamin A blocks vitamin D's effect and explains some of the anomalies in other papers on vitamin D and cancer.”*

## **The Synergistic Effects of Vitamin A on Vitamin D**

It's highly unfortunate, but many people in developed countries are potentially sabotaging the multitude of health benefits they could receive from adequate vitamin D by taking excessive amounts of vitamin A, either in the form of multi-vitamins or cod liver oil.

I spent many hours reviewing this issue in the latter part of 2008, and as a result, I issued a [revision of my long held recommendation for cod liver oil](#). If you missed that important update, please take the time to review it now.

I had recommended cod liver oil as a source of vitamin D for quite some time, prior to this revision. My stance was based on the fact that cod liver oil contains vitamins D and A in addition to healthy omega-3 fats.

These vitamins are essential for most everyone who cannot get regular sun exposure year-round.

However, as I began reviewing the latest research, I realized there was compelling evidence that the *ratios* of these two vitamins may be of paramount importance in order to extract optimal health benefits. And this latest study appears to confirm that theory.

It's important to understand that vitamin A is essential for your immune system and a precursor to active hormones that regulate the expression of your genes just like vitamin D, and the two *work in tandem*.

For example, there is evidence that without vitamin D, vitamin A can be ineffective or even toxic. But if you're deficient in vitamin A, vitamin D cannot function properly either.

So proper balance of these two vitamins is essential. Too much or too little of either may create negative consequences.

Unfortunately, we do not yet know the optimal ratios between these two vitamins, but it is clear that nearly all cod liver oil products supply them in levels that do not appear to be ideal.

You also need to discern between various forms of vitamin A.

It is the *retinoic acid (retinol)* form of vitamin A that is problematic. Not beta carotene.

Beta carotene is not a concern because it is PRE-vitamin A. Your body will simply not over-convert beta carotene to excessive levels of vitamin A. So taking beta carotene supplements is not going to interfere with your vitamin D.

### **How Can You Ensure Proper Ratios of Vitamins A and D?**

As Dr. Cannell has stated in earlier writings on this topic, the ideal way to obtain the proper vitamin A to D ratio is to obtain it the way your body was designed to obtain it:

- Vitamin A through your diet, in the form of colorful vegetables
- Vitamin D through daily sun exposure on your skin

In addition, it is important to realize that a high quality source of chlorella is an important superfood that is loaded with natural beta carotene and can be very useful for optimizing vitamin A levels.

[Arq Bras Endocrinol Metabol.](#) 2009 Dec;53(9):1079-87.

## **[Concentration of 25-hydroxyvitamin D in postmenopausal women with low bone mineral density]**

[Article in Portuguese]

[Russo LA](#), [Gregório LH](#), [Lacativa PG](#), [Marinheiro LP](#).

Brasil Centro de Pesquisas Clínica, Rio de Janeiro, RJ, Brasil. [luis.russo@cibr.com](mailto:luis.russo@cibr.com)

### **Abstract**

**OBJECTIVES:** This study was designed to determine mean serum concentrations of 25-hydroxyvitamin D (25OHD) in postmenopausal women with low bone mineral density (BMD), to find the cutoff of parathormone (PTH) elevation, and to evaluate the correlation 25OHD with BMD, biochemical parameters and vertebral fracture presence.

**METHODS:** Transversal study, with collection of 25OHD and PTH, and determination of DMO and column radiograph.

**RESULTS:** A high incidence of inadequate serum concentrations of 25OHD (68.3%) was found and 8% of secondary hyperparathyroidism. No significant differences were found between 25OHD serum concentrations and the evaluated parameters, except for PTH, which showed a negative association. The established cutoff was 61.5 nmol/L.

**CONCLUSIONS:** The elevated incidence of hipovitaminosis D in elderly women with low BMD suggests that a systematic evaluation of 25OHD serum concentrations must be done for this population. The use of 61.5 nmol/L as a cutoff is recommended until the realization of an epidemiologic study that represents all Rio de Janeiro city (RJ, Brazil).

PMID: 20126865 [PubMed - indexed for MEDLINE]Free Article



## **Vitamin D and Cancer Prevention**

Have you heard the latest buzz in the medical community? Vitamin D may lower cancer risk.

People can get the vitamin D they need through sunlight exposure. It can also be obtained through the diet, but very few foods naturally contain vitamin D. These foods include fatty fish, fish liver oil, and eggs. Most dietary vitamin D comes from fortified foods, such as milk, juices, yogurt, bread and breakfast cereals. Vitamin D can also be obtained through supplements.

Unfortunately most people do not get adequate vitamin D from these sources and insufficiency is literally an epidemic. New statistics extracted from the National Health and Nutrition Examination Survey (NHANES) found that more than 90% of the population with pigmented skin, and 75% of the white population, have insufficient levels of vitamin D.

Mechanisms by which vitamin D may modify cancer risk are not fully understood, but laboratory studies have shown that vitamin D promotes cellular differentiation, decreases cancer cell growth, hinders angiogenesis, and stimulates apoptosis.

Several observational studies and a few prospectively randomized controlled trials have demonstrated that adequate levels of vitamin D can decrease the risk and improve survival rates for several types of cancers including breast, rectum, ovary, prostate, stomach, bladder, esophagus, kidney, lung, pancreas, uterus, non-Hodgkin lymphoma, and multiple myeloma.

The effects of vitamin D serum levels on colorectal cancer were illustrated in the EPIC (European Prospective Investigation into Cancer and Nutrition) study, a large observational study of men and women. The EPIC study enrolled more than half a million adults in 10 western European countries who were initially free of cancer; full intakes and lab work (including vitamin D levels) were performed on all participants. After several years of follow up, 1248 subjects developed colorectal cancer and these individuals were matched to 1248 study participants who did not develop colorectal cancer. The researchers report that people with the highest pre-cancer levels of vitamin D were about 40 percent less likely to develop colorectal cancer than those with the lowest levels.

It is estimated that 85,000 cases of breast cancer and 60,000 cases of colorectal cancer could be prevented in North America alone with sufficient vitamin D levels. A recent study compiled data on breast and colon cancer and vitamin D levels and found that dosages of 3500 IU/day would reduce breast cancer and 2000 IU/day would reduce colon cancer by 50%. The current median adult intake of vitamin D in the US is 230 IU/day.

Other studies relating cancer to vitamin D have shown that people living at higher latitudes are at increased risk for Hodgkin lymphoma as well as colon, pancreatic, prostate, ovarian, breast and other cancers. In addition, people living at higher latitudes are more likely to die from these cancers compared with those living at lower latitudes. Epidemiologic studies, both prospective and retrospective, have shown that individuals who have serum 25(OH)D3 levels <20ng/mL have an associated 30% to 50% greater risk of colon, prostate, and breast cancer as well as a higher mortality from these cancers.

The current recommended daily allowance of vitamin D in the United States is 200IU/day for children and adults up to 50 years of age, 400IU for 51-70 years, and 600 IU for those >70 years old. However, the emerging evidence on the non-skeletal benefits of vitamin D has made these recommendations obsolete. Doses as high as 10,000 IU/day have been shown to be safely tolerated.

People are more likely to not get enough vitamin D than to get too much. However, excessive intake of any nutrient, including vitamin D, can cause toxic effects such as hypercalcemia, hypercalciuria, hypertension, constipation, fatigue and more. Excessive sun exposure does not cause vitamin D toxicity. Monitoring therapy is important to ensure adequate, but not excessive dosage.

Whether supplemented or manufactured in the skin, cholecalciferol (D3) is hydroxylated in the liver to form 25-hydroxycholecalciferol (25(OH)D3) and this is the major circulating form of the vitamin. Though it goes through an additional hydroxylation (primarily in the kidney) to form 1,25-dihydroxycholecalciferol before it is biologically active, the 25(OH)D3 form is considered the most accurate measure of the amount of vitamin D in the body.



Labrix Clinical Services is pleased to offer a vitamin D testing kit. This inexpensive, quick and easy to use test will enable you to test and monitor vitamin D levels without the inconvenience of venipuncture. Call us to order a test kit.

We have created a patient education poster on Vitamin D (left). If you would like to request a copy of the file please email us at [education@labrix.com](mailto:education@labrix.com).

Labrix...test now and treat right!

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**Webinar:** *Vitamin D, The Forgotten Hormone*

Wed, May 12th, 2010 | 10:00 AM - 11:00 AM PDT

Hosted By: Jay H. Mead, FACP

Vitamin D, The Forgotten Hormone. It is estimated that over 1 billion people in the world are vitamin D deficient. This deficiency is associated with these common and debilitating illnesses: PCOS, Metabolic Syndrome, Depression, Cancer, Osteoporosis, Hypertension, Autoimmune Disease, Diabetes, Epilepsy, Migraine headaches, and Neurotransmitter imbalances. With easy take home testing kits and expert advice on how to replete your patients-this discussion will prepare the Practitioner for significant success.

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## What's the "skinny" on vitamin D?

Vitamin D has long been associated with bone health, and it's true that it plays an important role in regulating calcium deposition and bone formation, but recent research has also shown that Vitamin D plays an important role in cardiovascular health, immune system regulation, cancer prevention, blood sugar regulation and weight management! Yes, that's right; vitamin D can help your patients who are struggling with insulin resistance and metabolic syndrome!

The numbers of patients with insulin resistance and type II diabetes are growing at alarming numbers. Thanks to many of the diet and lifestyle choices that are prevalent in our culture, children and adults are increasingly more at risk of developing unwanted belly fat and imbalanced blood sugar levels that lead to their insulin receptors losing sensitivity. This problem is self-propagating, as increased insulin resistance will in turn cause more abdominal adipose tissue which is more insulin resistant than other tissue and the cycle continues.

Many patients who have developed insulin resistance will take medication that works on the insulin receptor and improves insulin sensitivity; the most common of these medications is metformin. Research has shown that while metformin may improve insulin sensitivity by 13%, a higher vitamin D level is correlated with a 60% improvement in insulin sensitivity and a clinical trial using 1,332 IU/day for only 30 days in 10 women with type II diabetes improved their insulin sensitivity by 23%. Another study on obese children and adolescents found that "obese children and adolescents with low vitamin D status may be at increased risk of developing impaired glucose metabolism independent of body adiposity."

Testing for and treating your patients for vitamin D insufficiency this summer may not only help protect them from carcinogenic sun exposure (through it's many anti-cancer actions), but may play a role in helping them fit into those summer clothes by controlling their blood sugar.

*Chiu KC, Chu A, Go VL, Saad MF. Hypovitaminosis D is associated with insulin resistance and beta cell dysfunction. Am J Clin Nut. 2004 May; 79(5):820-5.*

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## Labrix Vitamin D3 Blood Drop Kit

Wow! What a great response! Labrix recently introduced a new Blood Drop Test for 25 (OH) Vitamin D3 and it has sparked a flurry of interest that has kept the whole Labrix customer service team on their toes! We collated the most frequently asked questions to share with you.

**What is measured?**  
25 (OH) Vitamin D3

**What fluid is used?**  
Blood

**What is the collection method?**  
Finger Stick Blood Drop

**How many drops of blood are needed?**  
At least 4...6 is preferable

**What are the blood drops collected in/on?**  
On a special collection card designed to separate the serum from the red blood cells

**Is it as accurate as blood draw**  
You bet! You can always count on Labrix for excellent quality testing. We have run parallel testing with serum and results are comparable.

**How long does the collection card take to dry?**  
1-2 hours

**How does it compare with blood draw as a methodology?**  
If you can't order blood draws then this kit is an excellent tool for testing Vitamin D3. If you are doing a blood draw anyway - just add Vitamin D3. The kit is also very useful for ongoing monitoring without the disruption of a blood draw.

**Is the sample stable at room temperature?**  
Yes - for about 7 days

**Is return shipping included?**  
Yes - a UPS Ground label is inside the kit

**What is an optimal range for Vit D?**  
70-100 ng/ml

**Isn't Vitamin D toxic? Can you get too much?**  
It is possible to have too much Vitamin D but unlikely using the doses below:

**What is reasonable dosing?**  
200-2000 iu for Children and Adults < 50  
400-10,000 iu for Adults 51-70  
2,000-10,000 iu for Adults > 71

**Is it covered by insurance**  
Labrix does not bill insurance, but if you can order blood draws the testing is covered



### **Clinical Pearl on High Dosing**

Researchers determined that, in North America, in order to achieve a 50 percent reduction in colon cancer incidence, individuals would likely have to receive 2,000 IU per day of vitamin D. In order to halve the risk of breast cancer, women would have to receive 3,500 IU per day. The median adult intake of vitamin D in the US is 230 IU per day. With universal attainment of a serum vitamin D3 level of greater than or equal to 55 ng/ml, the researchers projected that in North America alone at least 60,000 cases of colorectal cancer could be avoided per year and another 85,000 cases of breast cancer if vitamin D3 intake were increased.

*Garland, Cedric F. et al. What is the dose-response relationship between vitamin D and cancer risk? Nutrition Reviews. 2007;65;8 (Suppl):91-95.*

Labrix...test now and treat right!

# Menopause, vitamin D, and oral health (AUGUST 2009)

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Buencamino and colleagues<sup>1</sup> reviewed the association between menopause and periodontal disease. However, they did not mention the role of vitamin D status in this setting.

Vitamin D status is usually divided into three categories based on serum 25-hydroxyvitamin D levels: “deficient” ( $\leq 15$  ng/mL), “insufficient” (15.1–29.9 ng/mL), and “sufficient” ( $\geq 30$  ng/mL). Serum 25-hydroxyvitamin D levels have been decreasing significantly for more than a decade, and as a result, a majority of the US population has a vitamin D insufficiency.

In the third National Health and Nutrition Examination Survey (NHANES III), a large US population survey, a low serum 25-hydroxyvitamin D concentration was independently associated with periodontal disease.<sup>2</sup> In particular, it was significantly associated with loss of alveolar attachment in persons older than 50 years of both sexes, independent of race or ethnicity; women in the highest 25-hydroxyvitamin D quintile had, on average, 0.26 mm (95% confidence interval 0.09–0.43 mm) less mean attachment loss than did women in the lowest quintile. Furthermore, in a randomized trial, supplementation with vitamin D (700 IU/day) plus calcium (500 mg/day) has been shown to significantly reduce tooth loss in older persons over a 3-year treatment period.<sup>3</sup>

Osteoporosis and periodontal disease share several risk factors, and it might be speculated that these pathologic conditions are biologically intertwined.<sup>4</sup> The decreased bone mineral density of osteoporosis can lead to an altered trabecular pattern and more rapid alveolar bone resorption, thus predisposing to periodontal disease. On the other hand, periodontal infections can increase

the systemic release of inflammatory cytokines, which accelerate systemic bone resorption. Indeed, vitamin D deficiency has been associated with a cytokine profile that favors greater inflammation (eg, higher levels of C-reactive protein and interleukin 6, and lower levels of interleukin 10), and vitamin D supplementation decreases circulating inflammatory markers.<sup>5</sup> This might break the vicious circle of osteoporosis, periodontal disease development, and further systemic bone resorption.

Therefore, we suggest that menopausal women should maintain an adequate vitamin D status in order to prevent and treat osteoporosis-associated periodontal disease.

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[Previous Section](#)

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# Vitamin D as possible breast cancer treatment

24 January 2013

Source: <http://www.vitamindcouncil.org/vitamin-d-as-possible-breast-cancer-treatment/>

A study published this last week in the *Journal of Cell Biology* reports that researchers have uncovered a molecular pathway that contributes to triple-negative breast cancer, a deadly and treatment resistant form of cancer that often occurs in young women. And more yet, vitamin D might be involved in this molecular pathway. A molecular pathway is a series of actions among molecules in a cell that lead to a change in that cell.

Lead author Susan Gonzalo, PhD, Assistant Professor of Biochemistry and Molecular Biology at Saint Louis University and colleagues also identified vitamin D as a possible new cancer therapy, in addition to discovering three biomarkers that will help identify patients who may benefit from the new treatment.

Triple-negative breast cancers are harder to treat than any other type of breast cancer. Women born with the BRCA1 [gene](#) are at increased risk of developing triple-negative breast and ovarian cancers. To date, chemotherapy is the most effective and commonly used treatment of triple-negative breast cancer, but it has profound side effects. The understanding of this new pathway will help develop less toxic and invasive treatment options.

The researchers found that activation of the discovered pathway allows tumor cells to continue growing unchecked. This explains why these cancers are less responsive to typical treatment. The authors report that vitamin D can play a role in turning off this pathway.

Finally, the researchers found that high levels of nuclear CTSL and low levels of 53BP1 and nuclear vitamin D receptors are markers that identify certain triple-negative breast cancers. CTSL plays a large role in tumor invasion and the spread of cancer to other areas of the body. 53BP1 is involved in DNA damage response. So, it makes sense that high levels of CTSL (indicates tumor invasion) and low levels of 53BP1 (responds to DNA damage) would suggest the existence of cancer. These biomarkers could allow doctors to customize breast cancer treatment for the patient.

Researchers are currently studying the effectiveness of vitamin D alone or in combination with different treatments in mice with breast cancer. Of course, further clinical trials will need to be conducted before recommendations are made, but nonetheless, the research is a breakthrough in the understanding of breast cancer treatment.

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# Vitamin D Expert Says More Than Half The World's Population Gets Insufficient Vitamin D

Submitted by [Drew Kaplan](#) on July 29, 2010

Vitamin D surfaces as a news topic every few months. How much daily vitamin D should a person get? Is it possible to have too much of it? Is exposure to the sun, which is the body's natural way of producing vitamin D, the best option? Or do supplements suffice?

In the July 2010 issue of *Endocrine Today*, a monthly newspaper published by SLACK, Inc., to disseminate information about diabetes and endocrine disorders, Anthony Norman, a distinguished professor emeritus of biochemistry and biomedical sciences and an international expert on vitamin D, notes that half the people in North America and Western Europe get insufficient amounts of vitamin D.

"Elsewhere, it is worse," he says, "given that two-thirds of the people are vitamin D-insufficient or deficient. It is clear that merely eating vitamin D-rich foods is not adequate to solve the problem for most adults."

Currently, the recommended daily intake of vitamin D is 200 international units (IU) for people up to 50 years old; 400 IU for people 51 to 70 years old; and 600 IU for people over 70 years old.

"There is a wide consensus among scientists that the relative daily intake of vitamin D should be increased to 2,000 to 4,000 IU for most adults," Norman says. "A 2000 IU daily intake can be achieved by a combination of sunshine, food, supplements, and possibly even limited tanning exposure."

While there is now abundant data on vitamin D and its benefits, Norman believes there is room for more study.

"The benefits of more research on the topic justifies why this field of research deserves additional governmental funding," he says. "Already, several studies have reported substantial reductions in incidence of breast cancer, colon cancer and type 1 diabetes in association with adequate intake of vitamin D, the positive effect generally occurring within five years of initiation of adequate vitamin D intake."

Because vitamin D is found in very few foods naturally (e.g. fish, eggs and cod liver oil) other foods such as milk, orange juice, some yogurts and some breakfast foods are fortified with it. The fortification levels aim at about 400 IU per day.

Norman, who holds the title of Presidential Chair in Biochemistry-Emeritus, has been researching vitamin D for nearly 50 years. In 1967, his laboratory discovered that the vitamin is converted into a steroid hormone by the body. Two years later, his laboratory discovered the vitamin D receptor (or VDR), an essential receptor for the steroid hormone form of vitamin D that is present in more than 37 target organs of the body that respond biologically to the vitamin.

"There is now irrevocable evidence that receptors in the immune, pancreas, heart-cardiovascular, muscle and brain systems in the body generate biological responses to the steroid hormone form of vitamin D," he says.

<http://www.medicalnewstoday.com/articles/195001.php>

## Pregnant? Why You Need to DEMAND This Test...

Posted By [Dr. Mercola](#) | September 18 2010 | 15,804 views

A new study finds that women who develop a severe form of pregnancy-related high blood pressure tend to have lower blood levels of vitamin D. The condition is known as early-onset severe preeclampsia, and it contributes to about 15 percent of preterm births in the U.S. each year.

Researchers found that vitamin D levels were generally low among 50 women with early severe preeclampsia. Their average vitamin D level in the former group was a very low 18 nanograms per milliliter.

Reuters reports:

*“If vitamin D is involved in preeclampsia risk ... then it might help explain why African American women are at greater risk of the complication than other racial groups ... Vitamin D is naturally synthesized in the skin when it is exposed to sunlight. This process is less efficient in people with darker skin.”*

### Sources:

- » [Reuters August 18, 2010](#)
- » [American Journal of Obstetrics & Gynecology August 6, 2010](#)

Dr. Mercola's Comments:

If you or anyone you know is pregnant, PLEASE make sure that you get your [vitamin D levels \(25 hydroxy D\) regularly checked](#) during your pregnancy.

We know today that your levels need to be above 50 ng/ml to protect you and your baby from some of the most serious complications of pregnancy such as premature delivery and preeclampsia -- but most obstetricians will NOT automatically check your levels for you.

Please do not assume that your levels have been tested in with the routine pregnancy blood work you receive. You will need to *specifically ask to have your vitamin D tested*. It is very likely that it will be considered malpractice to not check pregnant women's vitamin D levels in the near future, but for now it is not standard practice.

Unfortunately, by the time health policy catches up with the research, many pregnant women today will have missed out on the chance to provide their unborn babies with sufficient vitamin D during pregnancy -- but this needn't happen to you or your loved ones.

## Vitamin D is Crucial for Preventing Many Serious Pregnancy Complications

Preeclampsia is a potentially deadly increase in blood pressure and fluid accompanied during pregnancy. Early-onset severe preeclampsia is especially dangerous as it occurs before the 34th week of pregnancy. Because the only “cure” for preeclampsia is to deliver the baby, it is responsible for 15 percent of preterm births in the United States.

Preeclampsia and related disorders are thought to cause [76,000 maternal and 500,000 infant deaths](#) every year -- deaths that could potentially be prevented by simply optimizing vitamin D.

According to the latest research, women with early severe preeclampsia were more likely to have low vitamin D levels than women with healthy pregnancies. In fact, the women with preeclampsia had vitamin D levels that averaged just 18 nanograms per milliliter (ng/ml) -- a serious deficiency state.

You see, vitamin D is far more than “just a vitamin.” Rather it’s the only known substrate for a potent, pleiotropic (meaning it produces multiple effects), repair and maintenance seco-steroid hormone that serves multiple gene-regulatory functions in your body, including during pregnancy.

The researchers speculated that vitamin D may affect the regulation and function of proteins in the placenta, which are believed to be involved in preeclampsia. Even a 10-ng/mL increase in vitamin D was found to lower the women’s risks of preeclampsia by 63 percent!

## **Research Shows Vitamin D Benefits for Preeclampsia, Premature Birth and More**

U.S. researchers Drs. Hollis and Wagner also found that the "core morbidities of pregnancy" -- diabetes, high blood pressure, and preeclampsia -- were reduced by 30 percent in the women who took high-dose vitamin D, amounting to 4,000 IUs of vitamin D a day (ten times the RDA of 400 IU).

Their findings were discussed at an [international vitamin D research conference](#) in Brugge, Belgium, and also included other promising benefits including:

- Mothers who took 4,000 IUs of vitamin D during pregnancy had their risk of premature birth reduced by half
- Premature babies born to women taking high doses of vitamin D were reduced by half at both 32 and 37 weeks
- There were also fewer babies who were born "small for dates"
- Women taking high doses of vitamin D had a 25 percent reduction in infections, particularly respiratory infections such as colds and flu, as well as fewer infections of the vagina and the gums
- Babies getting the highest amounts of vitamin D after birth had fewer colds and less eczema

## **Most Pregnant Women are Vitamin D Deficient**

Unfortunately, the study by Drs. Hollis and Wagner found that over 87 percent of all newborns and over 67 percent of all mothers had vitamin D levels lower than 20 ng/ml, which is a severe

deficiency state. As a result, the researchers recommended that all mothers optimize their vitamin D levels during pregnancy, especially in the winter months, to safeguard their babies' health.

This finding could also help to explain the disproportionately high numbers of poor outcomes among African American births along with the increased risk of preeclampsia among African American women, as deficiency is extremely common among people with darker skin colors.

African Americans and other dark-skinned people and those living in northern latitudes make significantly less vitamin D than other groups; the darker your skin is, the less likely it is that you will produce adequate vitamin D levels from sun exposure alone.

Again, this is why it is just so important that you get your levels tested.

Government Vitamin D Recommendations -- and Reference Ranges -- are Far Too Low

Current guidelines recommend pregnant women consume from 200 IU to 400 IU of vitamin D a day, an amount that is far too low; most adults will need from 5,000 to 10,000 units every day to reach therapeutic levels unless they are spending one or more hours a day in the sun with most of their skin uncovered.

Based on the latest research, many experts now agree you need about 35 IU's of vitamin D per pound of body weight. This recommendation is the same for adults, children, the elderly and pregnant women.

But, remember that vitamin D requirements are highly individual.

Your vitamin D status is dependent on several factors, such as the color of your skin, your location, and how much sunshine you're exposed to on a regular basis. So, although these recommendations may put you closer to the level of what most people likely need, it is virtually impossible to make a blanket recommendation that will cover everyone.

The only accurate way to determine your optimal dose is to [get your blood tested](#), and then be aware that the reference ranges from the lab may say your levels are normal when in fact they are still too low.

Ideally, you'll want to maintain a vitamin D level of at least 50 ng/ml and perhaps as high as 80-90 ng/ml year-round.

For in-depth information about safe sun exposure, dosing and other recommendations to safely and effectively optimize your vitamin D levels, please watch my [free one-hour lecture on vitamin D](#).

# Vitamin D Holds Promise in Battling a Deadly Breast Cancer

Jan. 22, 2013 — In research published in the Jan. 17 issue of *The Journal of Cell Biology*, a team led by Susana Gonzalo, Ph.D., assistant professor of biochemistry and molecular biology at Saint Louis University, has discovered a molecular pathway that contributes to triple-negative breast cancer, an often deadly and treatment resistant form of cancer that tends to strike younger women. In addition, Gonzalo and her team identified vitamin D and some protease inhibitors as possible new therapies and discovered a set of three biomarkers that can help to identify patients who could benefit from the treatment.

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In the recent breakthrough, which was funded in part by a \$500,000 Department of Defense grant, Gonzalo's lab identified one pathway that is activated in breast cancers with the poorest prognosis, such as those classified as triple-negative. These cancers often strike younger women and are harder to treat than any other type of breast cancer. Women who are born with BRCA1 gene mutations are at increased risk for developing breast and ovarian cancers within their lifetime, and the tumors that arise are frequently the triple-negative type. Although chemotherapy is the most effective treatment for triple-negative breast cancer, it has profound secondary effects. Understanding the biology of triple-negative breast cancers will help to develop less toxic therapeutic strategies.

## The Science

Experiments performed in Gonzalo's laboratory, in collaboration with the laboratories of Xavier Matias-Guiu and Adriana Duso (IRBLleida, Spain), showed that activation of this novel pathway not only allows tumor cells to grow unchecked, but also explains the reduced sensitivity of these types of tumors to current therapeutic strategies. Importantly, vitamin D plays a role in turning off this pathway, providing a safe and cost-effective strategy to fight these types of tumors.

For molecular biologists like Gonzalo who look for answers below the cellular level to discover why some people develop cancer, the search often involves tracing a chain of events to try to understand cause and effect of the behavior between several genes and the proteins which they express. In order to understand these complex pathways, researchers often turn levels of proteins on or off by expressing one gene or suppressing another. Part of a researcher's challenge is determining what the function of each component of a pathway is.

The cell employs a complex mechanism to protect genetic information and ensure that damaged DNA is not passed on to daughter cells. Cells have built in checkpoints and fail safes to ensure the accuracy of their DNA code and are able to slow or stop their own proliferation if the information is compromised. Loss of these checkpoints and the accumulation of damaged DNA often leads to cancer.

## The Pathway

BRCA1 is a well-established tumor suppressor gene. Women who carry mutations in this gene have a high risk of developing breast and ovarian cancer. Tumors that arise often lack expression

of three receptors: estrogen, progesterone and HER2 (thus, "triple-negative"), and do not respond to hormone therapy.

BRCA1 is important because it is involved in repairing DNA double-strand breaks, a kind of DNA damage that is especially dangerous for the integrity of our genome. BRCA1 also is involved in cell-cycle checkpoints after damage, which are control mechanisms during cell proliferation that make sure the DNA information has been accurately replicated and transferred to the daughter cells. Thus, BRCA1 is considered a safeguard of the genome.

Loss of BRCA1 is bad news for the information contained in a cell's genetic blueprint. It results in genomic instability characterized by unrepaired DNA breaks and chromosomal aberrations that compromise cell viability. How BRCA1-mutated cells are able to form tumors has been a long-standing question. Investigators recently showed that loss of another DNA repair factor, 53BP1, allows proliferation and survival of BRCA1-deficient cells. In addition, decreased levels of 53BP1 were observed in triple-negative breast cancers, and correlated with resistance to drugs at the forefront of cancer treatment, such as PARP inhibitors.

Gonzalo's team has found a pathway responsible for the loss of 53BP1 in breast cancers with poor prognosis, specifically BRCA1 mutated and triple-negative. It turns out that loss of BRCA1 increases the expression of a protease, known as cathepsin L (CTSL), which causes the degradation of 53BP1. Cells that have lost both BRCA1 and 53BP1 have the ability to repair DNA, maintain the integrity of the genome, and proliferate. Thus, the protease helps cells with faulty BRCA1 to survive.

### **The Fix**

If lowering the levels of 53BP1 allows BRCA1 deficient cells to thrive and do their worst, increasing the levels of the protein offers a promising strategy for treatment of breast tumors.

So, how to do this? In previous research, Gonzalo's team showed that vitamin D inhibits CTSL-mediated degradation of 53BP1 in non-tumor cells, as efficiently as specific CTSL inhibitors. This time, they found that treatment of BRCA1-deficient tumor cells with vitamin D restores high levels of 53BP1, which results in increased genomic instability and reduced proliferation. Importantly, their evidence suggests that vitamin D treatment might restore the sensitivity to PARP inhibitors in patients who become resistant. Thus, a combination of vitamin D and PARP inhibitors could represent a novel therapeutic strategy for breast cancers with poor prognosis.

So, with this chain of events, Gonzalo and colleagues demonstrated a pathway by which triple-negative breast cancers proliferate: BRCA1-deficient cells activate CTSL which minimizes levels of 53BP1 to overcome genomic instability and growth arrest.

### **The Patients**

In a final exceptionally useful discovery, Gonzalo and collaborators found that high levels of nuclear CTSL and low levels of 53BP1 and nuclear vitamin D receptor (VDR) are a clear marker that identifies certain triple-negative breast cancer patients, biomarkers that offer the potential to customize future breast cancer therapies. In particular, this triple-biomarker signature will allow

the identification of patients in whom the pathway is on and who might benefit the most from vitamin D treatment.

### **Bottom Line**

Researchers have discovered a way in which one of the deadliest and most difficult to treat breast cancers allows tumor cells to grow unchecked and how these tumors resist treatment. Specifically, they found that BRCA1-deficient cells activate CTSL which leads to lower levels of the protein 53BP1 which, in turn, allows cancer cells to grow unchecked.

- In addition, they discovered the potential for a new therapy involving vitamin D, and identified biomarkers that can help identify which patients could benefit from this therapy.
- In the future, women with triple-negative breast cancer may benefit from a treatment that includes vitamin D. As with all laboratory research, vitamin D therapy will have to be studied in a clinical trial before doctors know how safe or effective it will be.
- Researchers' next steps will be to study molecular mechanisms behind the activation of the degradation of 53BP1 by CTSL. In addition, preclinical studies with vitamin D and cathepsin inhibitors as single agents or in combination with different drugs are underway in mouse models of breast cancers.

Established in 1836, Saint Louis University School of Medicine has the distinction of awarding the first medical degree west of the Mississippi River. The school educates physicians and biomedical scientists, conducts medical research, and provides health care on a local, national and international level. Research at the school seeks new cures and treatments in five key areas: cancer, liver disease, heart/lung disease, aging and brain disease, and infectious disease.

### **Story Source:**

The above story is reprinted from [materials](#) provided by [Saint Louis University Medical Center](#).

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## **Vitamin D insufficiency and health outcomes over 5 y in older women.**

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### **Abstract**

**BACKGROUND:** Vitamin D insufficiency was shown to be associated with adverse musculoskeletal and nonskeletal outcomes in numerous observational studies. However, some studies did not control for confounding factors such as age or seasonal variation of 25-hydroxyvitamin D [25(OH)D].

**OBJECTIVE:** We sought to determine the effect of vitamin D status on health outcomes.

**DESIGN:** Healthy community-dwelling women (n = 1471) with a mean age of 74 y were followed in a 5-y trial of calcium supplementation. 25(OH)D was measured at baseline in all women. Skeletal and nonskeletal outcomes were evaluated according to seasonally adjusted vitamin D status at baseline.

**RESULTS:** Fifty percent of women had a seasonally adjusted 25(OH)D concentration <50 nmol/L. These women were significantly older, heavier, and less physically active and had more comorbidities than women with a seasonally adjusted 25(OH)D concentration > or =50 nmol/L. Women with a seasonally adjusted 25(OH)D concentration <50 nmol/L had an increased incidence of stroke and cardiovascular events that did not persist after adjustment for between-group differences in age or comorbidities. Women with a seasonally adjusted 25(OH)D concentration <50 nmol/L were not at increased risk of adverse consequences for any musculoskeletal outcome, including fracture, falls, bone density, or grip strength or any nonskeletal outcomes, including death, myocardial infarction, cancer, heart failure, diabetes, or adverse changes in blood pressure, weight, body composition, cholesterol, or glucose.

**CONCLUSIONS:** Vitamin D insufficiency is more common in older, frailer women. Community-dwelling older women with a seasonally adjusted 25(OH)D concentration <50 nmol/L were not at risk of adverse outcomes over 5 y after control for comorbidities. Randomized placebo-controlled trials are needed to determine whether vitamin D supplementation in individuals with vitamin D insufficiency influences health outcomes. This trial was registered at [www.anzctr.org.au](http://www.anzctr.org.au) as ACTRN 012605000242628.

PMID: 19906799 [PubMed - indexed for MEDLINE]

# Vitamin D Review Confirms Sufficient Intake May Be Linked to Reduced Cancer Risk

**1-10-06**

*By CP Staff*

Source: <http://www.cpmedical.net/articles/vitamin-d-review-confirms-sufficient-intake-may-be-linked-to-reduced-cancer-risk>

A new review of the literature confirms previous research that vitamin D intake is related to a lower risk of various cancers. Past studies have shown sufficient vitamin D levels are linked to a reduced risk of a variety of cancers as well as multiple sclerosis, unexplained muscle and bone pain and rheumatoid arthritis. However, because the main source of vitamin D3 (the natural form) is the sun, many people are deficient in this nutrient in the winter, especially residents of the Northeastern United States. The elderly—who have a difficult time converting vitamin D from food or sun into its useable form—overweight individuals, and African Americans may also suffer from a deficiency of this vitamin. While some food is fortified with vitamin D and it is found in food such as fatty fish, obtaining adequate quantities of the natural Vitamin D3 form from diet alone is difficult. In the current review, which appears in the online edition of the *American Journal of Public Health*, and will appear in the February 2006 print edition, researchers searched PubMed and found 63 observational studies from 1966 to 2004 of vitamin D status in relation to cancer risk. Thirty of those studies focused on vitamin D and colon cancer, 13 on breast cancer, 26 on prostate cancer, and 7 on ovarian cancer. In addition, several studies investigated whether mutations in vitamin D receptor genes are associated with an increased risk of cancer. After reviewing the studies, the researchers concluded that the majority found a protective relationship between sufficient vitamin D levels and lower risk of cancer. Most of the studies found that vitamin D could reduce cancer risk by up to 50 percent. The reviewers also confirmed that residents of the Northeast, the obese, and the elderly have low levels of vitamin D. In addition, the review found that African Americans are five times more likely to be deficient than whites. “The evidence suggests that efforts to improve vitamin D status, for example by vitamin D supplementation, could reduce cancer incidence and mortality at low cost, with few or no adverse effects,” the researchers wrote. Vitamin D helps maintain the balance of calcium and phosphorous in the blood, which is why one of its best known roles is that of protecting the bones. However, vitamin D also regulates cell growth and cell development. Consequently, a vitamin D deficiency may encourage cells to become cancerous, whereas a plentiful supply of this nutrient would guide cells along the path of healthy development.

**Reference:** Garland CF, Garland FC, Gorham ED, Lipkin M, Newmark H, Mohr SB, Holick MF. The Role of Vitamin D in Cancer Prevention. *American Journal of Public Health*. [Epub Ahead of Print]. Published in print edition February 6, 2006.

# Vitamin D 'triggers and arms' the immune system

**Vitamin D is crucial to the fending off of infections, claims new research.**

By [Richard Alleyne](#), Science Correspondent 07 Mar 2010

The so-called sunshine vitamin, which can be obtained from food or manufactured by human skin exposed to the sun, plays a key role in boosting the immune system, researchers believe.

In particular it triggers and arms the body's T cells, the cells in the body that seek out and destroy any invading bacteria and viruses.

Scientists at the University of Copenhagen have discovered that Vitamin D is crucial to activating our immune defences and that without sufficient intake of the vitamin, the killer cells of the immune system – T cells – will not be able to react to and fight off serious infections in the body.

For T cells to detect and kill foreign pathogens such as clumps of bacteria or viruses, the cells must first be 'triggered' into action and "transform" from inactive and harmless immune cells into killer cells that are primed to seek out and destroy all traces of invaders.

The researchers found that the T cells rely on vitamin D in order activate and they would remain dormant, 'naïve' to the possibility of threat if vitamin D is lacking in the blood.

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04 Jul 2010

Professor Carsten Geisler from the Department of International Health, Immunology and Microbiology, said: "When a T cell is exposed to a foreign pathogen, it extends a signalling device or 'antenna' known as a vitamin D receptor, with which it searches for vitamin D.

"This means that the T cell must have vitamin D or activation of the cell will cease. If the T cells cannot find enough vitamin D in the blood, they won't even begin to mobilise. "

The discovery, the scientists believe, provides much needed information about the immune system and will help them regulate the immune response.

This is important not only in fighting disease but also in dealing with anti-immune reactions of the body and the rejection of transplanted organs.

Active T cells multiply at an explosive rate and can create an inflammatory environment with serious consequences for the body.

After organ transplants, T cells can attack the donor organ as a 'foreign invader'. In autoimmune diseases, like arthritis or Crohns Disease, T cells mistake fragments of the body's own cells for foreign invaders, leading to the body launching an attack upon itself.

For the research team, identifying the role of vitamin D in the activation of T cells has been a major breakthrough.

“Scientists have known for a long time that vitamin D is important for calcium absorption and the vitamin has also been implicated in diseases such as cancer and multiple sclerosis, but what we didn't realise is how crucial vitamin D is for actually activating the immune system – which we know now, ” said the researchers.

The findings, continues Professor Geisler, “could help us to contain infectious diseases and global epidemics.

They will be of particular use when developing new vaccines, which work precisely on the basis of both training our immune systems to react and suppressing the body's natural defences in situations where this is important – as is the case with organ transplants and autoimmune disease.”

Most Vitamin D is produced as a natural by-product of the skin's exposure to sunlight. It can also be found in fish liver oil, eggs and fatty fish such as salmon, herring and mackerel or taken as a dietary supplement.

The findings are published in the latest edition of Nature Immunology.

Source: <http://www.telegraph.co.uk/health/healthnews/7379094/Vitamin-D-triggers-and-arms-the-immune-system.html>

LE Magazine May 2002

## COVER STORY

Does Vitamin E  
Prevent Breast Cancer?

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Since one out of every eight women is destined to develop breast cancer,[1] a tremendous amount of research has been undertaken to discover ways of preventing this common killer. One compound that has been extensively studied for its role in preventing breast cancer is vitamin E.

Up until now, however, no one has compiled and analyzed the large volume of published data about vitamin E and breast cancer. A researcher at Wake Forest University School of Medicine took on this enormous task and her comprehensive work was just published in the *Journal of Nutritional Biochemistry*. [2]

If you take vitamin E supplements, this eye-opening report reveals startling findings about what forms of vitamin E may be effective, which women are most likely to benefit, and a form of vitamin E that certain women should avoid.

As a prelude to this article, readers should know that emerging evidence is calling into question previously held concepts about how vitamins function in the body. While this new information corroborates what has been earlier cited in this publication, it is nonetheless critical to remind readers of the need to keep up with current findings. For women concerned about breast cancer, there now appear to be validated methods of reducing the risk if the proper forms of vitamin E are consumed.

by Dr. Michele Morrow, Board Certified Family Physician

Some people believe that vitamin E reduces breast cancer risk because of reports showing that severely deficient women suffer far higher rates of breast cancer.

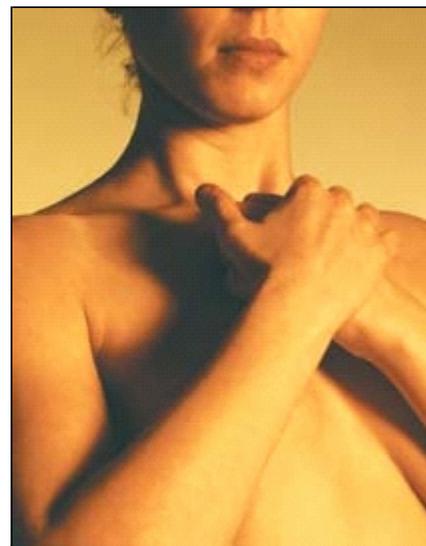
Several studies, for instance, show that premenopausal women with very low intakes of vitamin E are twice as likely to contract breast cancer compared to women who come close to meeting the minimum requirements. This statistic is relatively useless, however, since it was women who consumed less than 7 mg a day who were at a 50% greater risk of contracting breast cancer. [3-7] Other studies show no risk reduction in women obtaining greater than 8 mg a day of vitamin E. [8,9]

Since supplement users take 400 mg or more a day of vitamin E, everyone wants to know how much reduction in breast cancer incidence can be expected when potencies of 400 mg (400 IU) and higher are consumed.

Studies on total vitamin E intake show that women with a family history of breast cancer may derive an 80% risk reduction, whereas women who don't have a family history obtain a 60% risk reduction. [5] The risk reduction, however, is not consistent amongst different groups of women. When subsequent analyses of this data was conducted, more definitive information was obtained. [5] The chart on the upper right shows different categories of women and the specific risk reduction effect from foods that are high in vitamin E.

Controlled studies on alpha tocopherol

The Nurses Health Study studied 83,234 women at baseline and sought to assess incidences of breast cancer during a 14 year follow-up. This study showed that premenopausal women with a family history who consumed the highest quantity of vitamin E enjoyed a 43% reduction in breast cancer incidence compared to only a 16% risk reduction for women without a family history of



breast cancer.[11] Based on this study, vitamin E appears to protect against genetic- predisposed breast cancer better than environmental-induced breast cancer. (Note that nutrients like indole-3-carbinol may specifically protect against environmental breast carcinogens.)

Several studies reviewed the effects of standard vitamin E products (alpha tocopherol acetate) taken by themselves. The results fail to show a protective benefit, even when high doses of these alpha tocopherol supplements are consumed.[7,11-15] This indicates that other forms of vitamin E found in food (such as gamma tocopherol and tocotrienols) may be responsible for providing the dramatic protective effect against breast cancer shown in surveys that evaluate total vitamin E intake.

Patient Category	Breast cancer incidence based on comparing the highest to lowest levels of vitamin E intake
Premenopausal women with family history of breast cancer	90% risk reduction
Premenopausal women without family history of breast cancer	50% risk reduction
Postmenopausal women with a family history of breast cancer	30% risk reduction
Postmenopausal women without a family history of breast cancer	50% risk reduction
Please note that the statistics above are based on total vitamin E intake. Food-derived vitamin E contains primarily gamma tocopherol and to a lesser extent, the tocotrienols.[10]	

Another method that scientists have used to ascertain vitamin E's potential benefit is to measure frozen blood levels of vitamin E and then follow up to see how many women subsequently develop breast cancer. One study of postmenopausal women showed a modest 20% reduction in breast cancer risk in the highest quartile of serum vitamin E (alpha tocopherol) compared to the lowest. [16] Other studies based on measuring alpha tocopherol from stored blood serum do not show a protective effect.[17,18]

Some doctors believe the best way of determining vitamin E status is to test breast adipose (fat) tissue for vitamin E concentration in healthy controls as opposed to newly diagnosed breast cancer patients. One compelling study showed that newly diagnosed breast cancer patients had six times less vitamin E in their breast tissue compared to women without breast cancer.[19] The major flaw to this study was that the control group was nine years younger on average than the breast cancer patients and other confounding factors were not accounted for. Other studies seeking to assess adipose concentrations of vitamin E in breast cancer patients are inconclusive. [20,21]

Taken together, the results of the studies presented indicate that certain vitamin E fractions found in food confer a significant protective effect, but that commercial alpha tocopherol acetate supplements fail to reduce breast cancer incidence for most women. The data indicate that some other vitamin E component in food may account for the dramatic reductions in breast cancer incidence (as much as 90%) when dietary intake levels of vitamin E are measured.

(Note: 400 mg of vitamin E succinate provides 400 IU of vitamin E activity whereas 400 mg of vitamin E acetate typically provides 200 IU of vitamin E activity.)

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LE Magazine May 2002

**COVER STORY**

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Tocotrienols and breast cancer cell growth

We now know that the form of vitamin E used in most commercial preparations (alpha tocopherol acetate) has not been shown to protect against breast cancer in humans. A natural form of vitamin E called alpha tocopheryl succinate, found in more expensive supplements, may provide some protection. In test tube studies, the alpha tocopheryl succinate form of vitamin E has been shown to inhibit breast cancer cell growth. [22-35]

It is the tocotrienols, however, that have demonstrated the most significant potential to not only reduce the incidence of breast cancer, but also to inhibit existing breast cancer cell propagation.

Tocotrienols have been shown to inhibit growth of estrogen receptor positive breast cancer cells by as much as 50% in culture.[36-39] In contrast, many studies have found that alpha tocopherol does not influence proliferation.[36,38-40] Even in studies where alpha tocopherol was shown effective against some breast cancer cell lines, the amount required for 50% growth inhibition was more than 20 times higher than the growth inhibitory concentrations of the tocotrienols.[37]

Comparison of multiple studies indicates that the growth inhibitory effects of alpha tocopherol wears off,[41] whereas limited data suggest that the growth inhibitory effects of the tocotrienols on breast cancer cells is maintained or increases with duration of exposure (in culture).[39,42]

Tamoxifen interferes with breast cancer cell proliferation via several mechanisms, most notably by blocking estrogen receptor sites on the cell membrane surface so that estrogen cannot fuel hyper-proliferation. Tamoxifen is known to induce side effects, but the documented effectiveness of the drug causes many breast cancer patients to use it for two to five years (or longer).

In cell culture, tamoxifen can reduce estrogen receptor positive breast cancer cell proliferation by 50%. When palm-oil derived tocotrienols are added with tamoxifen, the dose of tamoxifen required to induce 50% cell arrest was lowered by 75%.[37]

In estrogen receptor negative cancer cell lines, tamoxifen can inhibit proliferation by 50%, but at much higher concentrations. When tocotrienols are added, the dose of tamoxifen required to inhibit cancer cell proliferation is reduced by as much as 95%![37] When alpha tocopherol is added to these breast cancer cell cultures, it increases the amounts of tamoxifen required to inhibit growth.[37]

These cell culture studies, showing that tocotrienols dramatically potentiate the effects of tamoxifen, indicate the desire to test a combination of tocotrienols and tamoxifen in both estrogen receptor positive and estrogen receptor negative breast cancer patients.

The study showing that alpha tocopherol increases the amount of tamoxifen required to induce cell arrest implies that breast cancer patients using tamoxifen may want to avoid consuming high potencies of alpha tocopherol.

(Note: Life Extension magazine has previously reported that vitamin D3 and melatonin work synergistically with tamoxifen to inhibit breast cancer cell propagation.)

#### Tocotrienols induce breast cancer cell death

The objective of any cancer therapy is to induce the cancer cells to differentiate in a way that promotes programmed cell death (apoptosis). Several studies indicate that tocotrienols induce breast cancer cell apoptosis.[41-43]

When different kinds of live breast cancer cells were injected into the mammary tissue of female mice, tocotrienols were found to be growth inhibitory on each breast cancer cell line tested. Although apoptosis could be achieved, the dose of tocotrienol needed to induce 50% apoptosis was 2-4 times higher than the dose of tocotrienol required to induce 50% growth inhibition.[42]

It is interesting to note that the growth inhibition and promotion of apoptosis occur preferentially in the cancerous part of the breast so that healthy cells remain largely unaffected.[42]

#### Can women obtain enough tocotrienols to reduce breast cancer risk?

For those seeking to use tocotrienols to reduce breast cancer risk, it is essential to quantify the optimal daily dose. In humans not consuming tocotrienol supplements, the average plasma concentration is less than 1 microgram per liter of blood.[45-47] After supplementation with a palm-oil concentrate containing about 78 milligrams of tocotrienols for four weeks, plasma tocotrienol levels increased to 8.14 micrograms per liter of blood (an eight-fold increase).[47]



In cell culture, tamoxifen can reduce estrogen receptor positive breast cancer cell proliferation by 50%. When palm-oil derived tocotrienols are added with tamoxifen, the dose of tamoxifen required to induce 50% cell arrest was lowered by 75%.

This plasma concentration of 8.14ug/l of tocotrienol is similar to the amount used to achieve an inhibitory effect on the proliferation of estrogen receptor positive breast cancer cells in vitro by 50%. The amount of tocotrienol to promote apoptosis in vitro by 50% would be approximately 24ug/liter according to this study.[2]

It is interesting to note that the body naturally concentrates tocotrienols into breast adipose tissue. Based on studies done to date, it is likely that breast adipose tissue levels of tocotrienols will be 5 to 10 times greater than plasma.[48-50] This indicates that even lower tocotrienol supplementation might be adequate to saturate breast adipose tissue with the amount of tocotrienols that have inhibited breast cancer cell proliferation and induced apoptosis in culture.

It is encouraging to know that the in vitro tests that document the anti-cancer effects of tamoxifen also show tocotrienols to have similar cell inhibitory properties. Compared to tamoxifen, however, tocotrienols are safe. Human studies have shown that daily doses of up to 240 mg of tocotrienols for 16 months produce no adverse effects.[47,51,52] Further studies will determine whether humans who saturate their breast adipose tissue with tocotrienol from supplements will achieve a reduced incidence of breast cancer. (Please note that it is the palm-oil tocotrienols, and not rice-bran tocotrienols, that have primarily demonstrated these anti-cancer effects.)

#### Summary of findings

When reviewing all the published evidence, it does not appear that alpha tocopherol vitamin E confers a protective effect against breast cancer. Yet studies show that women who consume foods high in other forms of vitamin E substantially reduce their risk of contracting breast cancer (by as much as 90%).

A cardinal feature of breast tumors are rapidly proliferating cells. Estrogen drugs promote hyper-proliferation and this is one reason why these drugs may quadruple the incidence of breast cancer. [53]

Studies of breast cancer cells in culture indicate that tocotrienols have potent effects in inhibiting proliferation and inducing apoptosis (cancer cell death). These studies show that alpha tocopherol does not have this same benefit.

Alpha tocopherol acetate is the most common supplement form of vitamin E, yet the evidence points to other forms of vitamin E as being responsible for the dramatic reduction in breast cancer incidence observed in large human studies.

We now know that the individual tocopherols and tocotrienols have different biological activities as they relate to their effects on cellular function. Gamma tocopherol, for instance, has demonstrated significant cancer prevention effects compared to alpha tocopherol.

The potential anti-cancer effects of gamma tocopherol and the tocotrienols merits aggressive human clinical research to determine if women who supplement with these unique forms of vitamin E can reduce their risk of contracting breast cancer. Further research should be conducted on breast cancer patients to see if the addition of tocotrienols to tamoxifen improves long-term survival rates.

Based on a review of all the published data, we cannot find compelling evidence to indicate that standard (alpha tocopherol) vitamin E supplements reduce breast cancer incidence. While alpha tocopherol has been shown to protect against a wide range of other diseases,[54-70] it would appear that the tocotrienols are the ideal form of vitamin E to specifically reduce breast cancer risk.

For additional information about novel adjuvant ways of preventing and treating breast cancer, refer to the Breast Cancer Treatment Protocol.

Tocotrienols should be taken with food

For oil-soluble vitamin E to be absorbed, it should be taken with some kind of food. When people take oil-based vitamin E preparations on an empty stomach, very little makes its way into the bloodstream.

It is especially important to take the tocotrienols with some form of oil or fat-containing food. One study showed that when tocotrienols are taken on an empty stomach, absorption was reduced by an average of 64%.<sup>44</sup>

When taking gamma tocopherol and/or tocotrienol vitamin E supplements, try to take them with a meal or with fatty acid capsules like fish oil (EPA-DHA), GLA, CLA etc.



## COVER STORY

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# Vitamin E

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The term vitamin E describes a family of eight antioxidants: four tocopherols (alpha-, beta-, gamma-, and delta-) and four tocotrienols (alpha-, beta-, gamma-, and delta-). Alpha-tocopherol is the only form of vitamin E that is actively maintained in the human body; therefore, it is the form of vitamin E found in the largest quantities in blood and tissues (1). Because alpha-tocopherol is the form of vitamin E that appears to have the greatest nutritional significance, it will be the primary topic of the following discussion. It is also the only form that meets the latest Recommended Dietary Allowance (RDA) for vitamin E.

## Function

### Alpha-tocopherol

The main function of alpha-tocopherol in humans appears to be that of an [antioxidant](#). [Free radicals](#) are formed primarily in the body during normal metabolism and also upon exposure to environmental factors, such as cigarette smoke or pollutants. Fats, which are an integral part of all cell membranes, are vulnerable to destruction through oxidation by free radicals. The fat-soluble vitamin, alpha-tocopherol, is uniquely suited to intercept free radicals and thus prevent a chain reaction of lipid destruction. Aside from maintaining the integrity of cell membranes throughout the body, alpha-tocopherol also protects the fats in low density lipoproteins ([LDLs](#)) from oxidation. Lipoproteins are particles composed of lipids and proteins that transport fats through the bloodstream. LDLs specifically transport cholesterol from the liver to the tissues of the body. Oxidized LDLs have been implicated in the development of cardiovascular diseases (See [Disease Prevention](#)). When a molecule of alpha-tocopherol neutralizes a free radical, it is altered in such a way that its antioxidant capacity is lost. However, other antioxidants, such as vitamin C, are capable of regenerating the antioxidant capacity of alpha-tocopherol (2, 3).

Several other functions of alpha-tocopherol have been identified that are not likely related to its antioxidant capacity. For instance, alpha-tocopherol is known to inhibit the activity of protein kinase C, an important [cell-signaling](#) molecule. Alpha-tocopherol appears to also affect the expression and activities of molecules and enzymes in immune and inflammatory cells. Additionally, alpha-tocopherol has been shown to inhibit [platelet](#) aggregation and to enhance [vasodilation](#) (4, 5).

The [isomeric](#) form of alpha-tocopherol found in foods is *RRR*-alpha-tocopherol (also referred to as "natural" or *d*-alpha-tocopherol). Synthetic alpha-tocopherol, which is labeled *all-rac*- or *dl*-alpha-tocopherol, has only one-half the biological activity of *RRR*-alpha-tocopherol (see [Supplements](#)). Often vitamin E-fortified foods contain synthetic alpha tocopherol, and the amounts are given as a percentage of the daily value of 30 IU. Throughout this article, amounts of alpha-tocopherol are expressed in both international units (IU) and milligrams (mg).

### Gamma-tocopherol

The function of gamma-tocopherol in humans is presently unclear. Although the most common form of vitamin E in the American diet is gamma-tocopherol (see [Food Sources](#)), blood levels of gamma-tocopherol are generally ten times lower than those of alpha-tocopherol. This phenomenon is apparently due to two mechanisms. 1) Alpha-tocopherol is preferentially retained in the body by the action of the alpha-tocopherol transfer protein (a-TTP) in the liver, which preferentially incorporates alpha-tocopherol into lipoproteins that are circulated in the blood (1) and ultimately delivers alpha-tocopherol to different tissues in the body (6). See the Linus Pauling Institute Newsletter for more information about [a-TTP and vitamin E adequacy](#). 2) Forms of vitamin E other than alpha-tocopherol are actively metabolized (6). Because gamma-tocopherol is initially absorbed in the same manner as alpha-tocopherol, small amounts of gamma-tocopherol are detectable in blood and tissue. Breakdown products of tocopherols, known as metabolites, can be detected in urine. More gamma-tocopherol metabolites are excreted in urine than alpha-tocopherol metabolites, suggesting less gamma-tocopherol is needed for use by the body (7). Limited research in the test tube and in animals indicates that gamma-tocopherol or its metabolites may play a role in protecting the body from free radical-induced damage (8, 9), but these effects have not been convincingly demonstrated in humans. In one [prospective study](#), increased levels of plasma gamma-tocopherol were associated with a significantly reduced risk of developing prostate cancer. In this study, increased levels of plasma alpha-tocopherol and toenail selenium were protective against prostate cancer development only when gamma-tocopherol levels were also high (10). These limited findings, in addition to the fact that alpha-tocopherol supplementation lowers gamma-tocopherol levels in blood, have led some scientists to call for additional research on the effects of dietary and supplemental gamma-tocopherol on health (11). For more information, see the article, [Which Form of Vitamin E, Alpha- or Gamma-Tocopherol, is Better?](#), in the Linus Pauling Institute Research Report. Importantly, relatively high plasma gamma-tocopherol concentrations may indicate a high level of vegetable and vegetable oil intake.

### Deficiency

Vitamin E deficiency has been observed in individuals with severe malnutrition, genetic defects affecting the alpha-tocopherol transfer protein, and fat [malabsorption syndromes](#). For example, children with [cystic fibrosis](#) or [cholestatic liver disease](#), who have an impaired capacity to absorb dietary fat and therefore fat-soluble vitamins, may develop symptomatic vitamin E deficiency. Severe vitamin E deficiency results mainly in [neurological](#) symptoms, including impaired balance and coordination (ataxia), injury to the sensory nerves (peripheral neuropathy), muscle weakness (myopathy), and damage to the retina of the eye (pigmented retinopathy). For this reason, people who develop peripheral neuropathy, ataxia, or retinitis pigmentosa should be screened for vitamin E deficiency (2). The developing nervous system appears to be especially vulnerable to vitamin E deficiency. For instance, children with severe vitamin E deficiency at birth rapidly develop neurological symptoms if not treated with vitamin E. In contrast, individuals who develop malabsorption of vitamin E in adulthood may not develop neurological symptoms for 10-20 years. It should be noted that symptomatic vitamin E deficiency in healthy individuals who consume diets low in vitamin E has never been reported (2, 12).

Although true vitamin E deficiency is rare, marginal intake of vitamin E is relatively common in the U.S. Between 1988 and 1994, the National Health and Nutrition Examination Survey III (NHANES III) examined the dietary intake and blood levels of alpha-tocopherol in 16,295 adults (over the age of 18). Twenty-seven percent of white participants, 41% of African Americans, 28% of Mexican Americans, and 32% of the other participants were found to have blood levels of alpha-tocopherol less than 20 micromoles/liter. This cutoff value was chosen because the literature suggests an increased risk for cardiovascular disease below this level (13). More recent

data from NHANES 2003-2006 indicate that the average dietary intake of alpha-tocopherol from food (including enriched and fortified sources) among Americans 2 years and older is 6.9 mg/day (14). This intake is well below the current recommendation of 15 mg/day (see RDA). In fact, at this level of dietary intake, more than 90% of Americans do not meet daily dietary recommendations for vitamin E (14).

### The Recommended Dietary Allowance (RDA)

The RDA for vitamin E was previously 8 mg/day for women and 10 mg/day for men. The RDA was revised by the Food and Nutrition Board of the Institute of Medicine in 2000 (4). This new recommendation was based largely on the results of studies done in the 1950s in men fed vitamin E deficient diets. In a test-tube analysis, hydrogen peroxide was added to blood samples and the breakdown of red blood cells, known as hemolysis, was used to indicate vitamin E deficiency. Because hemolysis has also been reported in children with severe vitamin E deficiency, this analysis was considered to be a clinically relevant test of vitamin E status. Importantly, this means that the latest RDA for vitamin E continues to be based on the prevention of deficiency symptoms rather than on health promotion and prevention of chronic disease.

The Recommended Dietary Allowance (RDA) for Alpha-Tocopherol			
Life Stage	Age	Males; mg/day (IU/day)	Females; mg/day (IU/day)
Infants (AI)	0-6 months	4 mg (6 IU)	4 mg (6 IU)
Infants (AI)	7-12 months	5 mg (7.5 IU)	5 mg (7.5 IU)
Children	1-3 years	6 mg (9 IU)	6 mg (9 IU)
Children	4-8 years	7 mg (10.5 IU)	7 mg (10.5 IU)
Children	9-13 years	11 mg (16.5 IU)	11 mg (16.5 IU)
Adolescents	14-18 years	15 mg (22.5 IU)	15 mg (22.5 IU)
Adults	19 years and older	15 mg (22.5 IU)	15 mg (22.5 IU)
Pregnancy	all ages	-	15 mg (22.5 IU)
Breast-feeding	all ages	-	19 mg (28.5 IU)

### Disease Prevention

#### Cardiovascular disease

Results of at least five large observational studies suggest that increased vitamin E consumption is associated with decreased risk of myocardial infarction (heart attack) or death from heart disease in both men and women. Each study was a prospective study that measured vitamin E consumption in presumably healthy people and followed them for a number of years to determine how many were diagnosed with or died as a result of heart disease. In two of the studies, individuals who consumed more than 7 mg/day of alpha-tocopherol in food were only approximately 35% as likely to die from heart disease as those who consumed less than 3-5 mg/day of alpha-tocopherol (15, 16). Two other large studies observed a significantly reduced risk of heart disease only in women and men who consumed at least 100 IU of supplemental RRR-alpha-tocopherol (67 mg of RRR-alpha-tocopherol) daily (17, 18). More recently, several

studies have observed plasma or red blood cell levels of alpha-tocopherol to be inversely associated with the presence or severity of carotid [atherosclerosis](#), detected using ultrasonography (19-22). A randomized, placebo-controlled, intervention trial in 39,876 women participating in the Women's Health Study found that supplementation with 600 IU of *RRR*-alpha-tocopherol (400 mg of *RRR*-alpha-tocopherol) every other day for ten years had no effect on the incidence of various cardiovascular events (myocardial infarction and stroke), but the vitamin E intervention decreased cardiovascular-related deaths by 24% (23). Analysis of data from the Women's Health Study also showed that women receiving the vitamin E intervention experienced a 21% reduction in risk of venous thromboembolism (24). However, a large RCT conducted in healthy middle-aged men (trial name: PHS II) observed that supplementation with 400 IU of synthetic alpha-tocopherol every other day for eight years had no significant effect on the risk of major cardiovascular events (25). The benefits of vitamin E supplementation in chronic disease prevention are discussed in a recent review (26). Intervention studies in patients with heart or renal disease have not shown vitamin E supplements to be effective in preventing heart attacks or death (see [Disease Treatment](#)).

## Cataracts

[Cataracts](#) appear to be formed by protein oxidation in the [lens](#) of the eye; such oxidation may be prevented by antioxidants like alpha-tocopherol. Several [observational studies](#) have examined the association between vitamin E consumption and the incidence and severity of cataracts. Results of these studies are mixed: some report increased vitamin E intake protects against cataract development, while others report no association (27). A [placebo](#)-controlled intervention trial in 4,629 men and women found that a daily antioxidant supplement containing 500 mg of vitamin C, 400 IU of synthetic vitamin E (*dl*-alpha-tocopherol acetate; equivalent to 180 mg of *RRR*-alpha-tocopherol), and 15 mg of beta-carotene did not affect development and progression of age-related cataracts over a 7-year period (28). Similarly, antioxidant supplementation (500 mg of vitamin C, 400 IU [268 mg] of *RRR*-alpha-tocopherol, and 15 mg of beta-carotene) did not affect progression of cataracts in a 5-year intervention trial (29). A 4-year randomized, placebo-controlled trial reported that supplements containing 500 IU/day of natural vitamin E (335 mg of *RRR*-alpha-tocopherol) did not reduce the incidence or progression of cataracts in older adults (30). Another intervention trial found that a daily supplement of 50 mg of synthetic alpha-tocopherol daily (equivalent to 25 mg of *RRR*-alpha-tocopherol) did not alter the incidence of cataract surgery in male smokers (31). Although results from some observational studies suggest that vitamin E may protect against cataract development, results from clinical trials do not support a preventative effect.

## Immune Function

Alpha-tocopherol has been shown to enhance specific aspects of the immune response that appear to decline as people age. For example, elderly adults given 200 mg/day of synthetic alpha-tocopherol (equivalent to 100 mg of *RRR*-alpha-tocopherol or 150 IU of *RRR*-tocopherol) for several months displayed increased formation of [antibodies](#) in response to hepatitis B vaccine and tetanus vaccine (32). However, it is not known if such alpha-tocopherol associated enhancements in the immune response of older adults actually translate to increased resistance to infections like the flu (influenza virus) (33). A randomized, placebo-controlled trial in elderly nursing home residents reported that daily supplementation with 200 IU of synthetic alpha-tocopherol (equivalent to 90 mg of *RRR*-alpha-tocopherol) for one year significantly lowered the risk of contracting upper respiratory tract infections, especially the common cold, but had no effect on lower respiratory tract (lung) infections (34). More research is needed to determine

whether supplemental vitamin E may protect the elderly against the common cold or other infections.

## Cancer

Many types of cancer are thought to result from oxidative damage to DNA caused by [free radicals](#). The ability of alpha-tocopherol to neutralize free radicals has made it the subject of a number of cancer prevention studies. However, several large [prospective studies](#) have failed to find significant associations between alpha-tocopherol intake and the incidence of lung or breast cancer (4). One study in a cohort of 77,126 men and women reported that use of vitamin E supplements over a 10-year period increased risk of lung cancer in current smokers (35). To date, most clinical trials have found that vitamin E supplementation has no effect on the risk of various cancers. A [randomized, placebo-controlled trial \(RCT\)](#) in 39,876 women participating in the Women's Health Study found that supplementation with 600 IU of *RRR*-alpha-tocopherol (400 mg of *RRR*-alpha-tocopherol) every other day for ten years had no effect on overall cancer incidence or cancer-related deaths (23). This vitamin E intervention also did not affect the incidence of tissue-specific cancers, including breast, lung, and colon cancers. Moreover, a recently published meta-analysis of 12 RCTs concluded that vitamin E supplementation was not associated with overall cancer incidence, cancer mortality, or total mortality (36).

The effect of vitamin E supplementation on prostate cancer risk has received particular attention in RCTs. A placebo-controlled intervention study that was designed to investigate the effect of alpha-tocopherol supplementation on lung cancer development (trial name: ATBC) noted a 34% reduction in the incidence of prostate cancer in smokers given daily supplements of 50 mg of synthetic alpha-tocopherol (equivalent to 25 mg of *RRR*-alpha-tocopherol) daily (37). A meta-analysis that combined the results of this study with three other RCTs associated vitamin E supplement use with a 15% lower risk of prostate cancer (35). However, two subsequent large randomized, placebo-controlled intervention trials have found either no benefit or potential harm with respect to prostate cancer risk in healthy men consuming vitamin E supplements. The Physicians' Health Study II (PHS II) followed 14,641 healthy men, aged 50 years and older, given 400 IU of synthetic vitamin E (equivalent to 180 mg of *RRR*-alpha-tocopherol) every other day for eight years (38). Vitamin E supplementation had no effect on risk of prostate or total cancer in these middle-aged and older men. A large randomized, placebo-controlled intervention study using alpha-tocopherol and selenium supplementation (trial name: SELECT), alone or in combination, was recently halted because there was no evidence of benefit in preventing prostate cancer in 35,533 healthy men aged 50 years and older (39, 40). After an average of 5.5 years of follow-up in SELECT, participants taking vitamin E (400 IU/day of *all-rac*-alpha-tocopherol) alone had a higher risk of prostate cancer, but the increase was not statistically significant (41). A subsequent analysis (median follow-up of 7 years) after the trial was halted found that men who had taken the vitamin E supplement had a statistically significant, 17% higher risk of prostate cancer compared to men who took a placebo (42).

## Disease Treatment

### Cardiovascular disease

Observational studies have suggested that supplemental alpha-tocopherol might have value in the treatment of cardiovascular disease. For example, a small [observational study](#) of men who had previously undergone a [coronary artery bypass surgery](#) found those who took at least 100 IU of supplemental alpha-tocopherol (67 mg of *RRR*-alpha-tocopherol) daily had a reduction in the progression of coronary artery [atherosclerosis](#) measured by [angiography](#) compared to those who

took less than 100 IU/day of alpha-tocopherol (43). A [randomized, placebo](#)-controlled intervention trial in Great Britain (the CHAOS study) found that supplementing heart disease patients with either 400 IU or 800 IU of synthetic alpha-tocopherol (equivalent to 180 mg or 360 mg of *RRR*-alpha-tocopherol) for an average of 18 months dramatically reduced the occurrence of nonfatal heart attacks by 77%. However, alpha-tocopherol supplementation did not significantly reduce total deaths from heart disease (44). Chronic [renal](#) dialysis patients are at much greater risk of dying from cardiovascular disease than the general population, and there is evidence that they are also under increased [oxidative stress](#). Supplementation of renal dialysis patients with 800 IU of natural alpha-tocopherol (536 mg of *RRR*-alpha-tocopherol) for an average of 1.4 years resulted in a significantly reduced risk of heart attack compared to placebo (45). In contrast, three other intervention trials failed to find significant risk reductions with alpha-tocopherol supplementation. One study (ATBC), which was designed mainly to examine cancer prevention, found that 50 mg of synthetic alpha-tocopherol (equivalent to 25 mg of *RRR*-alpha-tocopherol) daily resulted in an 11% decrease in nonfatal heart attacks in participants who had had previous heart attacks; however, this decrease was not statistically significant (46). Similarly, two other large trials in individuals with evidence of cardiovascular disease (previous heart attack, stroke, or evidence of vascular disease) found that daily supplements of 400 IU of natural alpha-tocopherol (equivalent to 268 mg *RRR*-alpha-tocopherol) or 300 mg of synthetic alpha-tocopherol (equivalent to 150 mg of *RRR*-alpha-tocopherol) did not significantly change the risk of a subsequent heart attack or stroke (trial names: HOPE and GISSI, respectively) (47, 48). A trial in patients with either vascular disease or [diabetes mellitus](#) found that daily supplementation with 400 IU of natural alpha-tocopherol for an average of seven years had no effect on major cardiovascular events (myocardial infarction or stroke) or deaths; of concern, this study noted a slightly increased risk of heart failure in subjects taking vitamin E supplements (49). Thus, the majority of clinical trials using vitamin E for the treatment of heart disease have found no beneficial effects.

In an effort to inform clinical study design, an alpha-tocopherol dose-response study was performed in a sampling of individuals at high risk for cardiovascular events (50). Thirty-five men and women (mean age, 42 years) with hypercholesterolemia and high plasma F<sub>2</sub>-isoprostanes (i.e., enhanced systemic oxidative stress) were given either placebo or a dose of natural source alpha-tocopherol (*RRR*-alpha-tocopherol) of 100, 200, 400, 800, 1,600, or 3,200 IU/day for 16 weeks. Significant reductions in plasma F<sub>2</sub>-isoprostanes only occurred at 1,600 and 3,200 IU/day after 16 weeks of administration. Notably, the minimum vitamin E dose required to decrease systemic oxidative stress in this subset of high-risk individuals (1,600 IU/day) is above the tolerable upper intake level (UL) for vitamin E (1,500 IU/day; see [Safety](#)).

A more thorough discussion of the complex issues involved in analyzing the results of clinical trials of vitamin E in heart disease can be found in the Fall/Winter 1999 issue of the Linus Pauling Institute Newsletter: [Fish Oil, Vitamin E, Genes, Diet, and CHAOS](#). For a discussion of some of the limitations of the HOPE study, see the article, [Vitamin E: Hope or Hopeless](#), in the Spring/Summer 2000 issue of the Linus Pauling Institute Newsletter.

## **Diabetes mellitus**

Alpha-tocopherol supplementation of individuals with [diabetes](#) has been proposed because diabetes appears to increase [oxidative stress](#) and because cardiovascular complications (heart attack and stroke) are among the leading causes of death in diabetics. One study found a biochemical marker of oxidative stress (urinary excretion of F<sub>2</sub>-isoprostanes) was elevated in type 2 diabetic individuals, and supplementation with 600 mg of synthetic alpha-tocopherol

(equivalent to 300 mg of *RRR*-alpha-tocopherol) for 14 days reduced levels of the biomarker (50). Studies of the effect of alpha-tocopherol supplementation on blood [glucose](#) control have been contradictory. Some studies have shown that supplemental vitamin E improves insulin action and glucose disposal in type 2 diabetic (51) and non-diabetic (52, 53) individuals, while other studies have reported minimal to no improvements in glucose metabolism of type 2 diabetics (54, 55). Increased oxidative stress has also been documented in type 1 (insulin-dependent) diabetes (51). One study reported that supplementing type 1 diabetics with only 100 IU/day of synthetic alpha-tocopherol (equivalent to 45 mg *RRR*-alpha-tocopherol) for one month significantly improved both glycosylated hemoglobin and triglyceride levels (56). This study also noted nonsignificant improvements in blood glucose levels following alpha-tocopherol supplementation (57). Although there is reason to suspect that alpha-tocopherol supplementation may be beneficial in treatment for type 1 or type 2 diabetes, evidence from well-controlled clinical trials is lacking.

### **Dementia (impaired cognitive function)**

The brain is particularly vulnerable to oxidative stress, which is thought to play a role in the pathology of neurodegenerative diseases like [Alzheimer's disease](#) (56). Additionally, some studies have documented low levels of vitamin E in cerebrospinal fluid of patients with Alzheimer's disease (58). A large placebo-controlled intervention trial in individuals with moderate neurological impairment found that supplementation with 2,000 IU of synthetic alpha-tocopherol daily for two years (equivalent to 900 mg/day of *RRR*-alpha-tocopherol) significantly slowed progression of Alzheimer's [dementia](#) (59). In contrast, a placebo-controlled trial in patients with mild cognitive impairment reported that the same dosage of vitamin E did not slow progression to Alzheimer's disease over a 3-year period (60). After Alzheimer's disease, vascular dementia (dementia resulting from strokes) is the most common type of dementia in the U.S. A [case-control study](#) examining risk factors for vascular dementia in elderly Japanese-American men found that supplemental vitamin E and vitamin C intake was associated with a significantly decreased risk of vascular and other types of dementia but not Alzheimer's dementia (61). Among those without dementia, vitamin E supplement use was associated with better scores on cognitive tests. Although these findings are promising, further studies are required to determine the role of alpha-tocopherol supplementation in the treatment of Alzheimer's disease and other types of dementia.

### **Cancer**

Cancer cells [proliferate](#) rapidly and are resistant to death by [apoptosis](#) (programmed cell death). Cell culture studies indicate that the vitamin E ester, alpha-tocopheryl succinate, can inhibit proliferation and induce apoptosis in a number of cancer cell lines (62, 63). The ester form, alpha-tocopheryl succinate, not alpha-tocopherol, is required to effectively inhibit proliferation or induce cancer cell death (64). Although the mechanisms for the effects of alpha-tocopheryl succinate on cancer cells are not yet clear, the fact that the ester form has no [antioxidant](#) activity argues against an antioxidant mechanism (65). Limited data from animal models of cancer indicate that alpha-tocopheryl succinate administered by injection may inhibit tumor growth (66-69), but much more research is required to determine whether alpha-tocopheryl succinate will be a useful [adjunct](#) to cancer therapy in humans. Certainly, administration by injection would be necessary for any benefit, because alpha-tocopheryl succinate taken orally is cleaved to form alpha-tocopherol in the intestine (70). There is currently no evidence in humans that taking oral alpha-tocopheryl succinate supplements delivers alpha-tocopheryl succinate to tissues.

## Sources

### Food sources

Major sources of alpha-tocopherol in the American diet include vegetable oils (olive, sunflower, and safflower oils), nuts, whole grains, and green leafy vegetables. All eight forms of vitamin E (alpha-, beta-, gamma-, and delta-tocopherols and tocotrienols) occur naturally in foods but in varying amounts. For more information on the nutrient content of foods, search the [USDA food composition database](#).

Food	Serving	Alpha-tocopherol (mg)	Gamma-tocopherol (mg)
Olive oil	1 tablespoon	1.9	0.1
Soybean oil	1 tablespoon	1.1	8.7
Corn oil	1 tablespoon	1.9	8.2
Canola oil	1 tablespoon	2.4	3.8
Safflower oil	1 tablespoon	4.6	0.1
Sunflower oil	1 tablespoon	5.6	0.7
Almonds	1 ounce	7.4	0.2
Hazelnuts	1 ounce	4.3	0
Peanuts	1 ounce	2.4	2.4
Spinach	½ cup, raw	0.3	0
Carrots	½ cup, raw chopped	0.4	0
Avocado (California)	1 fruit	2.7	0.4

### Supplements

#### *Alpha-tocopherol*

In the U.S., the average intake of alpha-tocopherol from food (including enriched and fortified sources) for individuals 2 years and older is 6.9 mg/day (14); this level is well below the RDA of 15 mg/day of *RRR*-alpha-tocopherol (4). Many scientists believe it is difficult for an individual to consume more than 15 mg/day of alpha-tocopherol from food alone without increasing fat intake above recommended levels. All alpha-tocopherol in food is the form of the [isomer](#) *RRR*-alpha-tocopherol. The same is not always true for supplements. Vitamin E supplements generally contain 100 IU to 1,000 IU of alpha-tocopherol. Supplements made from entirely natural sources contain only *RRR*-alpha-tocopherol (also labeled *d*-alpha-tocopherol). *RRR*-alpha-tocopherol is the isomer preferred for use by the body, making it the most [bioavailable](#) form of alpha-tocopherol. Synthetic alpha-tocopherol, which is often found in fortified foods and nutritional supplements, is usually labeled *all-rac*-alpha-tocopherol or *dl*-alpha-tocopherol, meaning that all eight isomers of alpha-tocopherol are present in the mixture. Because half of the isomers of alpha-tocopherol present in *all-rac*-alpha-tocopherol are not usable by the body, synthetic alpha-tocopherol is less bioavailable and only half as potent. To calculate the number of mg of bioavailable alpha-tocopherol present in a supplement, use the following formulas:

- ***RRR*-alpha-tocopherol (natural or *d*-alpha-tocopherol):**  
IU x 0.67 = mg *RRR*-alpha-tocopherol.  
Example: 100 IU = 67 mg
- ***all-rac*-alpha-tocopherol (synthetic or *dl*-alpha-tocopherol):**  
IU x 0.45 = mg *RRR*-alpha-tocopherol.  
Example: 100 IU = 45 mg

For more information on the [Biological Activity of Vitamin E](#), see the article by Dr. Maret Traber in the Linus Pauling Institute Newsletter.

### ***Alpha-tocopheryl succinate and alpha-tocopheryl acetate (alpha-tocopheryl esters)***

Alpha-tocopherol supplements are available in the ester forms: alpha-tocopheryl succinate and alpha-tocopheryl acetate. Tocopherol esters are more resistant to [oxidation](#) during storage than unesterified tocopherols. When taken orally, the succinate or acetate [moiety](#) is removed from alpha-tocopherol in the intestine. The [bioavailability](#) of alpha-tocopherol from alpha-tocopheryl succinate and alpha-tocopheryl acetate is equivalent to that of free alpha-tocopherol. Because international units (IU) for alpha-tocopherol esters are adjusted for molecular weight, the conversion factors for determining the amount of bioavailable alpha-tocopherol provided by alpha-tocopheryl succinate and alpha-tocopheryl acetate are not different from those used for alpha-tocopherol (see [formulas](#)) (4). The ester alpha-tocopheryl succinate, not alpha-tocopherol, is required to effectively inhibit growth and induce death in cancer cells grown in culture (see [Disease Treatment: Cancer](#)). However, there is currently no evidence in humans that taking oral alpha-tocopheryl succinate supplements delivers alpha-tocopheryl succinate to tissues.

### ***Alpha-tocopheryl phosphates (Ester-E<sup>®</sup>)***

There is currently no published evidence that supplements containing alpha-tocopheryl phosphates are more efficiently absorbed or have greater bioavailability in humans than supplements containing alpha-tocopherol.

### ***Gamma-tocopherol***

Gamma-tocopherol supplements and mixed tocopherol supplements are also commercially available (71). The amounts of alpha- and gamma-tocopherol in mixed tocopherol supplements vary, so it is important to read the label to determine the amount of each tocopherol present in supplements.

## **Safety**

### **Toxicity**

Few side effects have been noted in adults taking supplements of less than 2,000 mg of alpha-tocopherol daily (*RRR*- or *all-rac*-alpha-tocopherol). However, most studies of toxicity or side effects of alpha-tocopherol supplementation have lasted only a few weeks to a few months, and side effects occurring as a result of long-term alpha-tocopherol supplementation have not been adequately studied. The most worrisome possibility is that of impaired blood clotting, which may increase the likelihood of [hemorrhage](#) in some individuals. The Food and Nutrition Board of the Institute of Medicine established a tolerable upper intake level ([UL](#)) for alpha-tocopherol supplements based on the prevention of hemorrhage (see [table](#) below). The Board felt that 1,000 mg/day of alpha-tocopherol in any form (equivalent to 1,500 IU/day of *RRR*-alpha-tocopherol or

1,100 IU/day of *all-rac*-alpha-tocopherol) would be the highest dose unlikely to result in hemorrhage in almost all adults (4). Although only certain [isomers](#) of alpha-tocopherol are retained in the circulation, all forms are absorbed and metabolized by the liver. The rationale that any form of alpha-tocopherol (natural or synthetic) can be absorbed and thus could be potentially harmful is the basis for a UL that refers to all forms of alpha-tocopherol.

Some physicians recommend discontinuing high-dose vitamin E supplementation one month before elective surgery to decrease the risk of hemorrhage. Premature infants appear to be especially vulnerable to adverse effects of alpha-tocopherol supplementation, which should be used only under controlled supervision by a pediatrician (71). Supplementation with 400 IU/day of vitamin E has been found to accelerate the progression of retinitis pigmentosa that is not associated with vitamin E deficiency (72).

### ***Vitamin E Supplementation and All-Cause Mortality***

A [meta-analysis](#) that combined the results of 19 clinical trials of vitamin E supplementation for various diseases, including heart disease, end-stage renal failure, and Alzheimer's disease, reported that adults who took supplements of 400 IU/day or more were 6% more likely to die from any cause than those who did not take vitamin E supplements (73). However, further breakdown of the risk by vitamin E dose and adjustment for other vitamin and mineral supplements revealed that the increased risk of death was statistically significant only at a dose of 2,000 IU/day, which is higher than the [UL](#) for adults. Additionally, three other meta-analyses that combined the results of [randomized controlled trials](#) designed to evaluate the efficacy of vitamin E supplementation for the prevention or treatment of cardiovascular disease found no evidence that vitamin E supplementation up to 800 IU/day significantly increased or decreased cardiovascular disease mortality or all-cause mortality (74-76). Additionally, a more recent meta-analysis of 57 randomized controlled trials found that vitamin E supplementation, up to doses of 5,500 IU/day, had no effect on all-cause mortality (77). Furthermore, a meta-analysis of 68 randomized trials found that supplemental vitamin E, singly or in combination with other antioxidant supplements, did not significantly alter risk of all-cause mortality (78). At present, there is no convincing evidence that vitamin E supplementation up to 800 IU/day increases the risk of death from cardiovascular disease or other causes.

<b>Tolerable Upper Intake Level (UL) for Alpha-Tocopherol</b>	
<b>Age Group</b>	<b>mg/day (IU/day <i>d</i>-alpha-tocopherol)</b>
Infants 0-12 months	Not Possible to Establish*
Children 1-3 years	200 mg (300 IU)
Children 4-8 years	300 mg (450 IU)
Children 9-13 years	600 mg (900 IU)
Adolescents 14-18 years	800 mg (1,200 IU)
Adults 19 and older	1,000 mg (1,500 IU)

\*Source of intake should be from foods or formula only.

### **Drug interactions**

Use of vitamin E supplements may increase the risk of bleeding in individuals taking anticoagulant drugs, such as warfarin (Coumadin); antiplatelet drugs, such as clopidogrel

(Plavix) and dipyridamole (Persantine); and non-steroidal anti-inflammatory drugs (NSAIDs), including aspirin, ibuprofen, and others. Also, individuals on anticoagulant therapy (blood thinners) or individuals who are vitamin K deficient should not take alpha-tocopherol supplements without close medical supervision because of the increased risk of hemorrhage (4). A number of medications may decrease the absorption of vitamin E, including cholestyramine, colestipol, isoniazid, mineral oil, orlistat, sucralfate, and the fat substitute, olestra. Anticonvulsant drugs, such as phenobarbital, phenytoin, or carbamazepine, may decrease plasma levels of vitamin E (4, 71).

### ***Antioxidants and HMG-CoA reductase inhibitors (statins)***

A 3-year [randomized controlled trial](#) in 160 patients with documented [coronary heart disease](#) (CHD) and low [HDL](#) levels found that a combination of simvastatin (Zocor) and niacin increased HDL2 levels, inhibited the progression of coronary artery stenosis (narrowing), and decreased the frequency of cardiovascular events, such as [myocardial infarction](#) and stroke (79). Surprisingly, when an antioxidant combination (1,000 mg of vitamin C, 800 IU of alpha-tocopherol, 100 mcg of selenium, and 25 mg of beta-carotene daily) was taken with the simvastatin-niacin combination, the protective effects were diminished. However, in a much larger randomized controlled trial of simvastatin and an antioxidant combination (600 mg of vitamin E, 250 mg of vitamin C, and 20 mg of beta-carotene daily) in more than 20,000 men and women with coronary artery disease or diabetes, the antioxidant combination did not adversely affect the cardioprotective effects of simvastatin therapy over a 5-year period (80). These contradictory findings indicate that further research is needed on potential interactions between antioxidant supplementation and cholesterol-lowering agents like HMG-CoA reductase inhibitors (statins).

### **Linus Pauling Institute Recommendation**

The Recommended Dietary Allowance (RDA) for vitamin E for adult men and women is 15 mg (22.5 IU) per day. Notably, more than 90% of individuals 2 years of age and older in the U.S. do not meet the daily requirement for vitamin E from food sources alone, but there is inconclusive evidence that high-dose supplemental vitamin E reduces chronic disease risk. Therefore, LPI recommends that generally healthy adults (aged 19 years and older) take a daily multivitamin/mineral supplement, which usually contains 30 IU of synthetic vitamin E, or 90% of the RDA. There is no conclusive evidence that supplementation with high-dose vitamin E lowers chronic disease risk, and a few studies have reported harmful effects in some subpopulations.

### **Older adults (50 years and older)**

The Linus Pauling Institute's recommendation to take a daily multivitamin/mineral (MVM) supplement containing vitamin E is also appropriate for generally healthy older adults. MVMs typically contain 30 IU of synthetic vitamin E, or 90% of the RDA.

## References

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## **Specially Fermented Vegetables and Fennel are More Effective Than Calcium to Prevent Bone Loss by Dr. Mercola**

Source: [http://articles.mercola.com/sites/articles/archive/2012/11/19/fennel-plant-prevents-bone-loss.aspx?e\\_cid=20121125\\_SNL\\_US\\_MV\\_1](http://articles.mercola.com/sites/articles/archive/2012/11/19/fennel-plant-prevents-bone-loss.aspx?e_cid=20121125_SNL_US_MV_1)

In most people, sometime during your 30s your bone mass will start to gradually decline (there are steps you can take to slow, or stop, this from occurring, which I'll discuss below).

For women, that bone loss speeds up significantly during the first 10 years after menopause, which is the period when osteoporosis often develops.

Many are under the mistaken impression that a prescription drug combined with megadose calcium supplements is the answer to strong and healthy bones.

In reality, as new research has once again revealed, nature has provided some of the best substances for preventing bone loss right in the foods you eat. Fermented vegetables using special starter culture designed to optimize vitamin K2 is one of your best strategies for maintaining healthy bones and preventing bone loss, in combination with vitamin D.

But before I get to that, recent research also suggests that one often-overlooked vegetable in particular can be of benefit, and if you've never had fennel, now might be a good time to give it a try.

### **Fennel May Prevent Post-Menopausal Bone Loss and Osteoporosis**

Scientists looking for natural compounds to counteract postmenopausal bone loss believe they may have found the answer in fennel, a much under-appreciated vegetable that is native to southern Europe and the Mediterranean area.

In a study published in the *International Journal of Molecular Medicine*,<sup>1</sup> it was found that eating the seeds of the plant had a beneficial effect on loss of bone mineral density, as well as bone mineral content.

Healthy bones maintain their strength through a continual process of bone breakdown and bone rebuilding. Osteoclasts are the cells that break down weakened bone, and osteoblasts are the cells that build it back up. The fennel appeared to work by reducing osteoclast differentiation and function, thereby slightly decreasing bone turnover markers and offering a protective effect on the bones.

Researchers indicated that fennel seeds show potential in preventing bone loss in postmenopausal osteoporosis. This vegetable, which has a celery-like base topped with feathery green leaves, has a long history of medicinal use, and has been valued since ancient times as a breath freshener, digestive aid, and for helping expel phlegm from the lungs.

It's now known that the plant is a treasure trove of nutrients, including vitamin C, folate (the natural form of folic acid), calcium, magnesium, and more, as well as phytonutrients and antioxidants that may help reduce inflammation, boost immune function, and even help prevent cancer.

## Eating Plenty of Vegetables is Key for Bone Health

Fennel is just one example of a veggie that's excellent for your bones. High vegetable intake has been associated with positive effects on bone mineral status for years.<sup>2</sup> Eating high quality, organic, biodynamic, locally grown veggies will naturally increase your bone density and strength, and will decrease your risk of developing a fracture at virtually any age.

One reason why this is so important is because it supplies your body with nutrients that are essential for bone health, like vitamin K1 and potassium.

Your body needs potassium to maintain proper pH levels in your body fluids, and optimize your sodium to potassium ratio which also affects your bone mass. If you eat a diet loaded with processed foods, there's a good chance your potassium to sodium ratio is far from optimal, which is typically done by consuming a diet of processed foods, which are notoriously low in potassium while [high in sodium](#).

An imbalanced sodium to potassium ratio can contribute to a number of diseases, including osteoporosis. To ensure you get these two important nutrients in more appropriate ratios, simply ditch processed foods, which are very high in processed salt and low in potassium and other essential nutrients.

Also eat a diet of whole, unprocessed foods, ideally organically grown to ensure optimal nutrient content. This type of diet will naturally provide much larger amounts of potassium in relation to sodium, which is optimal for your bone health, and your overall health. If you find it difficult to eat the recommended amount of vegetables you need daily, give [vegetable juicing](#) a try.

## Vitamin K2 is Critical for Bone Health

Vitamin K2, also called menaquinone, is made by the bacteria that line your gastrointestinal tract. The biological role of vitamin K2 is to help *move calcium* into the proper areas in your body, such as your bones and teeth. It also plays a role in removing calcium from areas where it shouldn't be, such as in your arteries and soft tissues. It's critical for keeping your bones strong and works in conjunction with a number of other nutrients, most important of which are vitamin D, calcium and magnesium.

The optimal amounts of vitamin K2 are still under investigation, but it seems likely that 180 to 200 micrograms of vitamin K2 should be enough to activate your body's K2-dependent proteins to shuttle the calcium where it needs to be, and remove it from the places where it shouldn't.

As I've discussed on numerous occasions, vitamin D is a critical nutrient for optimal health and is best obtained from sun exposure or a safe tanning bed. However, many are taking oral vitamin D, which can actually be problematic unless you're also getting sufficient amounts of vitamin K2. In fact, this is a really crucial point that has not been emphasized enough in the past: *If you opt for oral vitamin D, you need to also consume in your food or take supplemental vitamin K2.*

Why?

Because when you take vitamin D, your body creates more vitamin K2-dependent proteins—the proteins that help move the calcium around in your body. But you need vitamin K2 to *activate* those proteins. If they're not activated, the calcium in your body will not be properly distributed and can lead to weaker bones and hardened arteries.

In short, vitamin K2 ensures the calcium is deposited and removed from the appropriate areas. By taking vitamin D, you're creating an *increased demand* for K2. And vitamin D and K2 work together to strengthen your bones and improve your heart health.

## How Can You Tell if You're Lacking in Vitamin K2?

There's no way to test for vitamin K2 deficiency. But by assessing your diet and lifestyle, you can get an idea of whether or not you may be lacking in this critical nutrient. If you have osteoporosis, heart disease or diabetes, you're likely deficient in vitamin K2 as they are all connected to K2.

If you do not have any of those health conditions, but do NOT regularly eat high amounts of the following foods, then your likelihood of being vitamin K2 deficient is still very high:

- Grass-fed organic animal products (i.e. eggs, butter, dairy)
- Certain fermented foods such as natto, or vegetables fermented using a starter culture of vitamin K2-producing bacteria. Please note that most fermented vegetables are not really high in vitamin K2 and come in at about 50 mcg per serving. However, if specific starter cultures are used they can have ten times as much, or 500 mcg per serving.
- Goose liver pâté
- Certain cheeses such as Brie and Gouda (these two are particularly high in K2, containing about 75 mcg per ounce)

Fermented vegetables, which are one of my new passions, primarily for supplying beneficial bacteria back into our gut, can be a great source of vitamin K if you ferment your own using the proper starter culture. They're definitely FAR better than fennel for counteracting bone loss.

We recently had samples of high-quality fermented organic vegetables made with our specific starter culture tested, and were shocked to discover that not only does a typical serving of about two to three ounces contain about *10 trillion* beneficial bacteria, but it also contained 500 mcg of vitamin K2. Note that not every strain of bacteria makes K2. For example, most yogurts have almost no vitamin K2. Certain types of cheeses are very high in K2, and others are not. It really depends on the specific bacteria. You can't assume that any fermented food will be high in K2, but some fermented foods are very high in K2, such as natto.

## Why Nutritional Interventions are Superior to Drugs

Your bones are made up of minerals in a collagen matrix. The minerals give your bones rigidity and density, but the collagen gives your bones flexibility. Without good flexibility, they become brittle and break easily. So bone strength is MORE than just bone density -- which is why drugs such as biphosphonates have failed so miserably. Drugs like Fosamax build up a lot of minerals and make the bone LOOK very dense on an x-ray called a DEXA scan, which specifically measures bone density, or the degree of mineralization of your bones. But in reality, they are extremely brittle and prone to fracture, which is why there have been so many [cases of hip fracture](#) among people taking these damaging drugs.

Biphosphonate drugs are poisons that destroy your osteoclasts, which interferes with your normal bone-remodeling process. You are much better off building your bones using exercise and nutritional therapies, hormones like progesterone and vitamins D and K.

## Natural Strategies for Preventing Age-Related Bone Loss

You need a combination of plant-derived minerals for strong bones. Your bones are actually composed of at least a dozen minerals. If you just focus on calcium, you will likely *weaken* your bones and increase your risk of osteoporosis as Dr. Robert Thompson explains in his book, [The Calcium Lie](#).

It's more likely your body can use calcium correctly if it's *plant-derived* calcium. Good sources include raw milk from pasture-raised cows (who eat the plants), leafy green vegetables, the pith of citrus fruits, carob, sesame seeds and wheatgrass, to name a few. But you also need sources of silica and magnesium, which some researchers say is actually enzymatically "transmuted" by your body into the kind of calcium your bones can use. This theory was first put forth by French scientist Louis Kevran, a Nobel Prize nominee who spent years studying how silica and calcium are related.

Good sources of silica are cucumbers, bell peppers, tomatoes, and a number of herbs including horsetail, nettles, oat straw, and alfalfa. The absolute best source of magnesium is raw organic cacao. Yes, healthy high quality chocolate is extremely rich in magnesium!

A great source of trace minerals, which are important for many of your body's functions, is Himalayan Crystal Salt, which contains all 84 elements found in your body. In addition, you need to make sure you're eating plenty of vitamin K2, which is found in fermented foods like

[homemade sauerkraut](#). Osteocalcin is a protein produced by your osteoblasts (cells responsible for bone formation), and is utilized within the bone as an integral part of the bone-forming process. However, osteocalcin must be "carboxylated" before it can be effective. Vitamin K functions as a cofactor for the enzyme that catalyzes the carboxylation of osteocalcin.

Vitamin K2 has been found to be a far more effective "activator" of osteocalcin than K1 because your liver preferentially uses vitamin K1 to activate clotting factors, while most of your other tissues preferentially use K2. Further, vitamin D, which your body produces in response to sun exposure, is another crucial factor in maintaining bone health as you age.

The bottom line?

One of the best ways to achieve healthy bones is a diet rich in fresh, raw whole foods that maximizes natural minerals so that your body has the raw materials it needs to do what it was designed to do. In addition, you need healthy sun exposure along with regular, weight-bearing exercise.

To sum it up:

- [Optimize your vitamin D](#) either from natural sunlight exposure, a safe tanning bed or an oral vitamin D3 supplement. Check your blood levels regularly to make sure you're within the optimal range.
- Optimize your vitamin K through a combination of dietary sources (leafy green vegetables, fermented foods like [homemade sauerkraut](#) and a K2 supplement, if needed. Remember, if you take supplemental vitamin D, you need to also increase your intake of vitamin K2.)

The optimal amounts of vitamin K2 are still under investigation, but it seems likely that 180 to 200 micrograms of vitamin K2 might be enough to activate your body's K2-dependent proteins to shuttle calcium to the proper areas. If you're taking high doses of supplemental vitamin D, Dr. Kate Rheaume-Bleue, a naturopathic physician and author of *Vitamin K2 and the Calcium Paradox*, suggests taking 100-200 micrograms (mcg) of vitamin K2 for every 1,000 IU's of vitamin D you take. The latest vitamin D dosing recommendations, which call for about 8,000 IU's of vitamin D3 per day if you're an adult, means you'd need in the neighborhood of 800 to 1,000 micrograms (0.8 to 1 milligram/mg) of vitamin K2.

- Make sure you do weight-bearing exercise, which has profound benefits to your skeletal systems. My favorite is Peak Fitness but it is also very important to do [strength-training exercises](#) to produce the dynamic piezoelectric forces in your bones that will stimulate the osteoblasts to produce new bone.
- Consume a wide variety of fresh, local, organic whole foods, including vegetables, nuts, seeds, organic meats and eggs, and raw organic unpasteurized dairy. The more of your diet you consume RAW, the better nourished you will be. Minimize sugar and refined grains.

# A Special Interview with Dr. Cees Vermeer

## By Dr. Mercola

**DV: Dr. Cees Vermeer**

**DM: Dr. Joseph Mercola, DO**

**DM:** We're just delighted to have today Dr. Vermeer, who is one of the top researchers in the world in Vitamin K2. This is an emerging powerful nutrient that is really falling shortly behind Vitamin D as a leading nutrient with so many beneficial actions. We'll go into those in more details with Dr. Vermeer.

Dr. Vermeer, can you introduce yourself and explain to our listeners some of your training and what your specific experience are?

Where are you located? You're overseas, in Europe.

### BACKGROUND OF DR. VERMEER

**DV:** I'm living in Maastricht, The Netherlands. That is a small town in the south of the country.

I got my education in Leiden, the oldest university of The Netherlands. As the youngest one, I have helped start up this university in Maastricht.

In 1975, I founded my Vitamin K research group, which I have continuously enlarged. We started with two, and now we have 12 persons. We are only working on Vitamin K. And to my knowledge, this is, by far, the largest research group on Vitamin K.

I'm a biochemist by training.

I did my PhD in Leiden. I have in my group several PhD post docs. I have a clinical person, along with highly trained technicians. We're collaborating and working on Vitamin K and Vitamin K-dependent proteins. When you say Vitamin K then it's one thing, but Vitamin K has a certain action in the body – that is, it helps activate certain proteins, and you have to be able to measure those proteins to quantify them and see how active they are.



**DM:** We'll definitely go into that because that's one of the areas that I really want to explore with you, the way to measure your Vitamin K2 and such.

Is your focus of research primarily on Vitamin K1 and K2 or almost exclusively on Vitamin K2?

**DV:** We started on K1. It was 12 years ago, I think.

Then we discovered the superb effects of Vitamin K2. That was in a collaborative study together with Rotterdam University, where we differentiated between intake in K1 and in K2.

And there we saw that those who had a high K1 intake had normal health. But if the high K2 intake was just selected, then you saw major advantages for cardiovascular health. So those with a high K2 intake had lower cardiovascular mortality, lower coronary calcification and the kind.

**DM:** Were there any other organ systems that you notice improvements in other than the cardiovascular system?

**DV:** Yes, of course.

There is also the bone, which very much benefits from high Vitamin K intake and especially again, Vitamin K2. But recently, a German group has discovered that Vitamin K2 also protects substantially against prostate cancer.

**DM:** That's exciting because that's one of the leading causes of cancer in men in the U.S. at least.

**DV:** Yes, it has been published, I think, earlier this year. It has a massive effect. I think that the highest quartile for intake of K2 had 50% lower prostate cancer, so that is substantial.

**DM:** From a theoretical perspective, are there any other benefits that you're speculating or you're suspicious of?

Many times, it just takes a while to tease out the details and actual studies, but you've got a really good idea that there may be some other benefits that are emerging but haven't been really quantified.

**DV:** Oh yes.



Now emerging is osteoarthritis and diseases of the cartilage. The first publication was from Sarah Booth from Boston. And it shows that again, high Vitamin K intake has a lower risk for osteoarthritis.

There is one maybe very far-fetched item: the brain. I don't know what these things are in the brain--maybe something linked to dementia or something else. But we are tracking the brain.

## **IS VITAMIN K THE NEXT "VITAMIN D"? TOOLS IN DEVELOPMENT FOR MEASURING VITAMIN K STATUS**

**DM:** That's excellent.

Vitamin D has gotten quite a lot of attention in the media and, certainly, the scientific community. I've had an opportunity to interview Dr. Robert Heaney; I don't know if you're familiar with him, but he is regarded as certainly one of the major researchers and pioneers in this field.

He specifically told me that 99% of what we learned about Vitamin D was in the last 10 years, and we can relate that to the fact that we had an assay to measure Vitamin D just relatively recently, in the late 90s--it became commercially available.

I'm wondering if you could comment on the state of the field at this point with respect to developing some type of quantitative titer or measure of someone's Vitamin K2 status.

It seems to me that you have all the best compelling information in the world, but unless you are able to measure it in people in a practical level, it's going to be difficult to implement and monitor.

**DV:** Yeah, it's very good that you come up with this.

Vitamin K measurements in blood plasma or so can be done quite accurately, but the question is whether it's helpful because it mainly reflects what you have eaten yesterday.

**DM:** That's interesting.

**DV:** There is another way you can do this. You can measure the activity of the Vitamin K-dependent proteins.

### **Matrix GLA Protein (MGP)**

Again, we are coming to the area of the vessel wall, which has only one tool to protect itself against calcification: Matrix Gla Protein (MGP).

There are two forms: the active MGP and the inactive MGP.

The active form is made in Vitamin K sufficiency, and inactive MGP is made when you have insufficient Vitamin K intake. If you want to know your Vitamin K status in the vasculature, then you have to measure the circulating level of inactive MGP. We have a patent on the method to do that.

This patent has been also granted in the United States, and this is a very accurate and good method that protects the risk of your arteries getting calcified.

**DM:** That's very exciting.

Are there any companies that have commercially made this kit, this assay that you patented, available so that the big labs like Quest or LabCorp can actually make it available to patients?

**DV:** There are several labs with high interest in this technique.

But, of course, you can imagine that there is a vast amount of money at play here, and we are now trying to select the correct strategy to commercialize this.

Suppose you have a method to screen the whole population for risk of artery calcification!

Another option of this test that's a little bit different application is that you can more or less quantify the amount of calcium already present in the arteries. So you can do a pre-selection of those who need very expensive techniques like electron beam computed tomography and that kind. You can just take a drop of blood and you can record how much calcium is in the arteries.

That's unbelievable, but it works.

**DM:** That's very exciting.

Do you have any estimates, ideas and projections as to what the cost of this test would be? Will it be something under a hundred, five hundred, a thousand?

**DV:** The test itself can be made with just like what I call a microtiter plate assay or an automated clinical lab assay. And then we are speaking about, say, prices between 20 and 50 dollars or so. Maybe less, if it scales up.

### **Lab Test That Predicts Your Cardiac Mortality is on the Horizon**

**DM:** Okay, that's very exciting.



Do you suspect that the accuracy of this measurement would be comparable to some of the techniques that we have now to measure coronary calcification or arterial calcification, such as stress EKGs or the typical heart scanning that people are using to quantify that?

**DV:** The technique was applied to a group of cardiovascular patients, and we compared those with normal levels of inactive MGP and those with high levels of inactive MGP. It turned out that there was a tenfold difference in life expectancy, mortality or survival, whatever you call it.

So there is a very high potential in this technique.

**DM:** Is that overall life expectancy related to cardiac disease?

**DV:** This is life expectancy to cardiac mortality. In some cases, we have also one cohort where we see, I think, 40% or so overall mortality. It was stunning that it was so large, this difference.

**DM:** Yeah, that's shocking.

**DV:** Yeah, really.

But whether you can measure, say, coronary calcification as comparably accurate with computer tomography, I doubt it. I think you should use this test as a pre-selection. This leaves the very expensive techniques to those who don't, and you can help the people much better at a lower price.

**DM:** Yeah, certainly with this economy and worldwide challenges, we're going to look for far more cost-effective methods to take care of people.

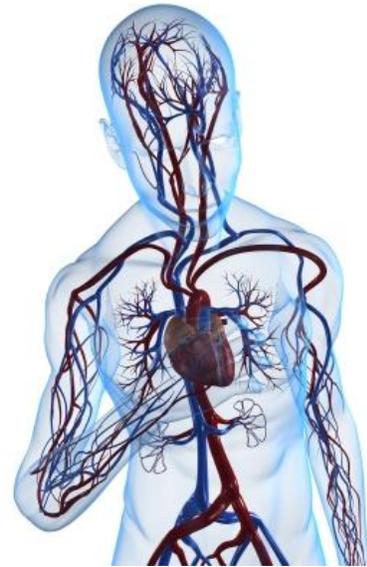
I'm wondering what your projections are as to when this assay might be available. Are you looking into next year or a few years down the road?

**DV:** Between one and two years.

**DM:** That's so exciting.

With that, I can assure you that we will popularize that test. I think I'm probably, singlehandedly responsible for maybe 50% of the increase in the Vitamin D testing in the U.S. They're doing a lot of that because it's such a useful measure. I love these tests that are simple, relatively inexpensive, and can help you really take control of your health. It's a simple intervention and you can monitor how effective it is.

**DV:** Yeah.



We are also now heading to a home test, so that people can just go to the drugstore and buy it. That should not be too expensive.

And the nice thing here is that you can just make a paper strip or so and see whether it stains red when you add a little bit of blood. If it works with saliva, we still have to see. If you don't take extra Vitamin K2 that is, of course, the other part of our activity, then you can improve this marker for cardiovascular disease. That means that after two, three weeks of extra Vitamin K2, you directly see with this home assay that you are in a better condition. And that's important.

**DM:** Just to clarify: at this point in time – in the United States, at least – there's really no commercial assay other than the one you've patented to measure this MGP.

**DV:** That's true.

**DM:** I thought that was the case; I just wasn't sure.

**DV:** There is a method at the University of California, I think, but that's in a university and not for diagnostic purposes. It's just an investigator who has this assay, and that is not differentiating between the active and the inactive form. So, it is an all-over test.

Of course, the principle of our test is that you compare active and inactive MGP.

**DM:** Excellent.

The major reason to get excited about having a test that can serve as a predictor is that we have a relatively inexpensive intervention. And you've mentioned that for over three decades, you've been focusing on your research, and clearly you are one of the leading experts in the world in this area.

## THE MULTIPLE TYPES OF VITAMIN K AND BENEFITS OF EACH

**DM:** So I'm wondering if you can help our listeners understand some of the benefits of the vitamin K2 that we mentioned and maybe go into a little more detail.

But before you do, let me preface to say that this is an area that most people don't understand clearly. It's really the astute student of natural medicine that will recognize that there is a difference between vitamins K1 and K2.

And that's about as far as they get.

But when you get to K2, there is another even more important differentiation, which is between the types of K2: MK7 and MK4, the two big ones. I really want to get your opinions on this, and I'd like to focus most of the attention on it so that we can develop a

better understanding and appreciation of a therapeutic intervention to change this MGP protein.

**DV:** MK4, in fact, is a synthetic product. It's very similar to K1. That means it has a short half-life.

After being taken to the intestines, it goes to deliver to and stays most of the time in the liver, where it is useful in synthesis of blood-clotting factors. The MK7 is in a supplement that is extracted from a Japanese food called *natto*, while MK8 and MK9 are from dairy--cheese mainly.

These things are incorporated in what is known as LDL or low-density lipoproteins.

LDL is carried from the liver to the vessel wall, where there are receptors to take it up. So this MK7 is very efficiently transported from the liver to the place where it has its beneficial activity.

You also have to know that the half-life of MK4 is about one hour.



The half-lifetime of MK7 is three days.

That means that there is a much better chance to build up a constant relatively high level of MK7, compared to MK4 or K1.

### **Vitamin K Dosing**

**DM:** Just from a cursory review of the literature, it seems that most of the initial research was done on MK4. Then the newer stuff is MK7, which you or your co-workers probably did a lot of research on.

From your perspective as the expert, is it reasonable – even though there is a much shorter half life – to give someone MK4 on a more frequent basis, three or four or five times a day and expect to get similar results as MK7? Or is it that MK4 is really much closer to Vitamin K1 and you're not going to see those benefits?

**DV:** I think that K1 (MK4) can, of course, do the same trick as MK7, MK8, and MK9. It's only a matter of dosage. You have to apply very high doses of K1 and MK4 to see effects comparable to MK7.

In experimental animals, for instance, we see that they calcify when you give them 1500 mcg of K1, whereas they really don't calcify with only one microgram of MK7. That shows the huge difference. But, of course, the Japanese give their patients 45 mg of MK4. You load the body with this.

All these K vitamins have the same function, which means that in the end, you will have a comparable effect. It's just a matter of dose--but then you use the vitamin as a drug and not as a vitamin.

We try to stay in the nutritional ranges.

**DM:** Physiological ranges.

This is a very important question because it's really a philosophical approach, and I'm glad you brought out the distinction.

From your perspective, obviously, it seems like you're going to get similar benefits.

But are there any dangers or concerns with going to something that's so outside the typical dose that one would experience in nature? To me, it's intuitively common sense, and you would expect that that there might be. I'm wondering if you have some concerns, or if you've seen any observations in the literature that address this.

**DV:** It is very clear that Vitamin K has no harmful effects, whether you give it to healthy people or to patients.

### **Cautions With Coumadin**

There's only one exception, and that is the patients on Coumadin. Coumadin is a drug that's meant to keep your blood thin and to anticoagulate patients. Coumadin is an anti-Vitamin K, so if you give extra Vitamin K, then you counteract the effect of the drug. So you shouldn't do it with MK7 and with K1 and MK4.

You can imagine that if you give those huge doses to patients on anticoagulants, then you run into problems.

But there is a possibility to give the MK7 in relatively low doses so that it is beneficial to the general population and not harmful for those who are on oral anticoagulant treatment. In fact, there have been publications saying that you get a much more stable way of anticoagulation if you would combine MK7 with the Coumadin therapy.

**DM:** Interesting.

So by combining it – and perhaps you can mention the doses that you recommend to someone on Coumadin – you're not going to impair the lowering or the elevating of the prothrombin time to prevent the clotting ability. But you'll still get the benefits of the Vitamin K2 on preventing osteoporosis and cardiovascular disease.

**DV:** I don't know at this time if during anticoagulation or Coumadin use you will have the same preventive effect against cardiovascular calcification.



I do know that if you use a dose of about 45 mcg a day of MK7, you don't seriously interfere with the therapy. So, those people may not benefit from it. Anyhow, they are not at risk of harm. There's no any harmful effect.

**DM:** I just want to make sure that I understand what you said completely on an earlier question.

Because of the relative innocuous or benign nature of Vitamin K – even at these huge physiological doses that seem to be far outside what one would experience in a normal environment, and from your understanding and review of the literature – there's really not any harm that you are aware of, outside of Coumadin therapy?

**DV:** Exactly.

### **Vitamin K and Osteoporosis**

You have to realize that in Japan, menaquinone 4 is used 45 mg per day as a drug in tens of thousands of osteoporotic women. It is their drug against osteoporosis.

**DM:** Is it more commonly used than the –

**DV:** I would say bisphosphonate. I think you should use bisphosphonates maybe in combination with MK4, but not MK4 alone. I think bisphosphonates are far more powerful. But we have done a similar study as the Japanese with also a very high-dose regimen and for three years among 350 women. We have not seen any adverse effects.

**DM:** What type of doses were you using?

**DV:** 45 mg a day. Also at a very high dose. We have specifically investigated blood clotting, and there is really no deviation in it. It's harmless.

**DM:** And that's the total dose per day? So it would be like 15 mg three times a day that you're using?

**DV:** Yeah, that's it exactly.

**DM:** Excellent.

You mentioned the study in osteoporosis and your use of MGP as a Vitamin K parameter or index. Another functional protein that Vitamin K2 affects is the osteocalcin. Besides MGP, is there an assay that looks at that to measure Vitamin K status?

**DV:** You measure the Vitamin K status of the bone, and this assay is commercially available. It's from a Japanese company Takada, and they send it out for research purposes only. It's not for –

**DM:** It's not commercial.

**DV:** It is commercial, but only for investigators and not for the routine doctors.

**DM:** It would seem intuitively that there should be a correlation between a sufficient osteocalcin level and an MGP, because it's due to the same factor--Vitamin K2 status.

**DV:** It just depends, of course, at how efficiently the tissue can take up the Vitamin K. It could be that bone takes up Vitamin K more efficiently than vessel wall. Maybe that sounds a bit strange, but it's true. The vessel wall doesn't have so many capillaries that supply it with blood itself. It guides the blood clots. But it's just like a pipe, and when you look at the tissue, it is completely white and it doesn't contain so many small blood vessels for its own benefit.

So the uptake by the blood vessels is not that easy, I think.

### Two Forms of Vitamin K Compared: MK4 and MK7

**DM:** I'd like to go deeper with the MK7 versus the MK4 again.

It seems the biggest issue is this absorption. Can you explain why you need such a large dose of the MK4?

Is it that the MK4 isn't absorbed well and the MK7 is?

Is it solubility? What do you think is going on there?



**DV:** In food, you have the food matrix that can have a major difference. But if you compare the pure compound – the salt and oil or whatever – and you take or ingest it, then you get absorption, which is comparable for K1, for MK4 and for MK7.

I think that in the liver, you will see comparable levels of all three at the start.

But then the liver will start secreting the MK7 and retaining the K1 and MK4. MK7 is more lipophilic; it is more in the fat fraction. It is incorporated into LDL, and K1 is not incorporated so well. So, that is the transport vehicle.

And I think the liver just uses the MK7, MK8, and MK9 to supply what we say are extrahepatic tissues with vitamin K.

**DM:** You mentioned these other forms of the MK7, MK8, and MK9, and probably others, too. Is there a danger of using an isolated extract?

I think you have actually been instrumental in developing some of these MK7 preparations, but is the MK7 exclusively MK7? Is it isolated extract, or does it have

these other components that are part of what is also seen in its natural form, like the MK9?

## SAY CHEESE!

**DV:** It's bound to carrier. So it's not pure, but it contains MK7 almost exclusively.

There is a little bit of MK6 in it because it is produced by *Bacillus subtilis natto*, and that is a bacteria growing on soybeans. This bacterium makes MK7 for its own benefit. It uses it but also makes a little bit of MK6 that is a little bit smaller but has the same active group.

So it's very comparable.

That's what's in the MK7 preparations. The MK8 and MK9 are very interesting for the dairy industry, mainly for those who make cheese and curd cheese. You know what this curd cheese is, cottage cheese?

**DM:** Sure, absolutely.

**DV:** Okay. These products contain a relatively high amount of menaquinone 8 and 9. That's also vitamin K2.

**DM:** Really? Interesting.

**DV:** Oh yes.

If you take 100 gm of cheese, you eat the same quantity of Vitamin K2 as what you get from a supplement pill normally marketed as the 45 mcg. So, 45 mcg is normally what is present in 100 gm of cheese or curd cheese.

**DM:** Is that the major source – other than natto – of the Vitamin K2?

**DV:** Yeah.

Well, it's not extracted, of course, from cheese.

**DM:** Right. It's part of the food product.

**DV:** And if people don't want to buy the supplement pills because they say, "I don't need pills. I eat healthy," then I say, "You should eat curd cheese because regular cheese is pretty fatty. It contains a high amount of animal fat; it's saturated fat. That component is not so healthy. If you take curd cheese, even the food fat curd cheese has is much less fat than regular cheese."



These days you have skimmed curd cheeses, which are very good, tasty, and creamy when you taste it. So, I prefer the skimmed curd cheese, and that contains a high level of K2.

***If you take 100 gm of curd cheese every day,  
then you get your Vitamin K2 supply to the same extent as what we found  
prevents 50 percent of the cardiovascular mortality.***

**DM:** That is just a shocking observation.

I don't think I've ever seen, heard or read that. Maybe it's just my negligence, but that is a really powerful observation. That's amazing!

**DV:** It's by combining two of our papers and you see (1) the food content and (2) the observation about Vitamin K2 in those who experience a lot of cardiovascular mortality and those who survived.

**DM:** Just a few questions on it because it's such an important point.

What is it in the production of curd that doesn't really occur in the manufacturing or the production of traditional cheeses?

**DV:** Both in traditional cheese and in curd cheese, it is to the same level that you grow your K2. And that is because of the starter ferment. It contains certain bacteria – lactococci and propionic acids bacteria – that produce the K2. Again to their own benefits, but when we eat those bacteria, we ingest what they have made. And that is K2.

**DM:** Oh, that is excellent. That is just really good.

**DV:** Yeah.

This is very important for the dairy industry because you can imagine that they are willing to improve the K2 production by the ferments. So, they want to have better ferments.

### **Mum's the Word**

**DM:** Have you investigated as to which specific species are the most potent at producing this K2?

**DV:** No.

Well, we do some of that work, but I cannot talk too much about this.

**DM:** Okay. So, you've got a product in development.

**DV:** Yeah.

**DM:** Well, that's exciting.

Is this product going to be something that the commercial dairies use, or is it designed for the consumer who is going to be taking this as a supplement?

**DV:** No.

We have the supplements on one hand, and then we have the functional foods on the other. The supplements are mainly MK7, while the functional foods will also be MK7 that is mixed with MK7 powder or so.

The other part is then the MK8 and MK9, and that is the curd cheeses. Of course, they will also find bacteria in yogurts, for instance. That will make yogurt K2-rich.

**DM:** Wow. That is just amazing.

So when do you project to have that product available?

**DV:** I don't have the product available. That's the dairy industry, and that's why I can't talk too much about it. But I expect that these products will come on the market maybe next year or in the year after that.

**DM:** So, relatively soon.

**DV:** Yeah. I think so.

**DM:** Probably in conjunction with the time that the MGP test will be available.

**DV:** Could be, yes.



## VITAMIN K ABSORPTION

**DM:** It's a nice coincidence.

Is there anything that can be done from a supplement perspective to actually improve the absorption--like nanosize these particles so that they will absorb more efficiently and you need less of a dose? I'm just not familiar with the physical biochemistry of it.

Is it a large molecule, or are there some other variables that prevent it from being absorbed?

**DV:** No.

Vitamin K is a rather small molecule, only it is not soluble in water. So you need fat in the meal.

Capsules are always in certain oils (sunflower seed oil) so you can easily dissolve your Vitamin K. You also need in the intestines a certain bile excretion. Of course, when you eat or ingest a meal, it is a little bit fatty. There, you have sufficient bile production. In the intestines, you have myocytes in which this Vitamin K is incorporated pretty easily.

Then it is just transported through the wall of the intestines into the lymph and into the blood stream, until it reaches the liver.

## THE IMPORTANCE OF VITAMIN K TO YOUR BONES AND HEART

**DM:** Excellent.

At the beginning, you reviewed the benefits of the Vitamin K2 and talked about the cardiovascular and bone benefits and the likelihood that there are some emerging brain benefits that we're just beginning to explore.

Could you be more specific on that?

**DV:** No. The brain?

I cannot be more specific on that.

**DM:** You may pick out the other ones like the cardiovascular and bone-related ones, and maybe put into a proper perspective your understanding of the benefits of K2 versus other similar interventions such as lowering cholesterol or doing exercise to increase bone density.

This is just to give the listeners a perspective on the relative importance of Vitamin K2 as intervention. They need a barometer to assess that.

### The Dancing Trio: Calcium, Vitamin D and Vitamin K

**DV:** Okay.

I think that the Vitamin K2 will never do the work alone. You also need other health measures.

One of them is Vitamin D. The two collaborate; there is a synergistic effect of Vitamin D and Vitamin K.



This MGP is synthesized in the vessel wall, but its synthesis is increased by Vitamin D and its activity is increased by Vitamin K. So, those two work together, and that's also inborn. So, if you're working on bone health, never do Vitamin D and calcium alone; take in Vitamin K as well.

There is another aspect in that respect.

If you give a high dose of calcium to, for instance, post-menopausal women, then you give an extra calcium load to the body. There is a publication about a pretty large cohort of women taking extra calcium and getting a lot of cardiovascular mortality.

I think that increasing the calcium load in the body is good for the bones. It is demonstrated to be good for the bones, but it's also bad for the blood vessels because they get calcified. You have to protect the blood vessels, again, with extra Vitamin K so that you can give the MGP the maximum activity in its calcification inhibitory activity.

**DM:** Well, thank you for explaining that.

I'm still curious about the K2 benefit that you observed.

Let's assume that a person is taking Vitamin D, has a healthy lifestyle, is doing strength training exercise, and taking all the other accessory micronutrients that we know from a bone health. What type of benefit do you see in two groups doing that – one is taking K2 and the other isn't?

Can they even get close to maximum bone density without the K2?

**DV:** This is a difficult question at this stage of the research.

What was calculated in what we call the Rotterdam Study (the first study demonstrating the beneficial effect of Vitamin K2) was that the life expectancy of those who had 45 mcg of K2 intake was seven years longer than those in the lowest quartile, and that was 12 mcg per day.

So, you can live longer.

In a subsequent study that came later (the Prospect Study) and was from people we did not collaborate with, there was an independent study of 16,000 subjects who were followed for more than 10 years. They calculated how much benefit you have from 10 mcg K2.

It turned out that each extra 10 mcg K2 in the diet gave 9% less cardiovascular events.

**DM:** Yeah. It is a very significant benefit.

**DV:** If you have 45 mcg in your supplement, it means almost 40% less risk for cardiovascular events.

## **COST AND QUALITY CONSIDERATIONS FOR VITAMIN K SUPPLEMENTS**

**DM:** That is a profound benefit.

My personal bias is to take a nutritional approach, and I think there is probably, generally speaking, less risk and perhaps more benefit because you get the whole supplement and its other accessory nutrients.

But if one chooses to use supplements, can you just give our listeners an idea of the cost of choosing MK7 even at the high doses with the 45 mg that you and the Japanese looked at, versus the MK7?

**DV:** Okay, 45 mg of MK4.

I do not know if it is available in the United States. Not in Europe, anyhow. This is so high. I think it is only in Japan that you can buy it in that way.

**DM:** Okay.

**DV:** What I can say the cost of MK7 here at a drugstore is around \$20 for 60 capsules for 60 days. Two months is \$20, so that is \$10 per month.

**DM:** So, relatively inexpensive.

**DV:** Yeah.

Well still, they regard this as pretty expensive if compared with Vitamin D, for instance, which is very inexpensive. Here there's a vitamin that is coming into the market, and there is a huge amount of research, which also has to be paid, of course.

Our research has to be paid; it is paid by the company, NattoPharma, who is marketing this material. So, it is more expensive than Vitamin D.

**DM:** And NattoPharma is a company that you are working with to produce the MK7?

**DV:** They import it from Japan.

**DM:** Yes.

Is that the only company that is producing MK7 in the world?



**DV:** No, that's not true. There are others, but I do not know about the quality. We have checked the quality of the NattoPharma product regularly because we use that product in our studies. The others we have no idea about.

**DM:** Okay. You haven't looked at them, so some others might be good but you just have not had the opportunity or the chance to see.

**DV:** No.

**DM:** Do you have any suspicions?

Is there anything that NattoPharma is doing that would make their product better, or is it just that they were the first to market?

**DV:** First, I think they have a good source.

The Japanese know how to make it. Of course, after you have extracted it and you have put it in a capsule or whatever, is it better than others?

You proceed to the contaminants. The NattoPharma product is checked for whatever contaminants or bacteria there might be. I do not know if that's how it is with the others. I am not in the product quality control of all these.

### **Are All Vitamin K Supplements Equal?**

**DM:** Sure.

We'll stick to the biochemistry then.

I know that with Vitamin D, there really isn't a major difference between most of the manufacturers.

We have Vitamin D3. Vitamin D3 is Vitamin D3. It does not really matter whom you get it from. It is really inexpensive.

Since it is a similar vitamin, I am wondering if it is the same situation there. With a lot of other supplements, that is not the case, and you do not pay attention to many of these different variables. You are going to have one that's grossly inferior to the other.

**DV:** Yeah.

At this time, the product from the market is only a natural product extracted from all kinds of biological materials. Then you can expect, of course, some differences in terms of purity or contaminants or whatever. At the end, I expect that MK7 will also be produced as a synthetic form, and then we come up with 100% purity.



**DM:** Interesting.

**DV:** Then you can add it as a pure compound, and you don't have to have all those other things. But it will take some time before you have synthetic menaquinone 7. It's not so easy to synthesize.

**DM:** Yeah.

What are your projections: 5 years, 10 years?

**DV:** I think 5 years.

**DM:** 5 years.

**DV:** I do not know how it is with the regulatory aspect. When you have a synthetic product, maybe you have to go through a whole dossier and file it to the FDA, do toxicology studies and whatever.

I am not familiar with that so much.

**DM:** It may be a bit longer. So it's just a rough guide.

Now, you mentioned earlier that MK4 is completely synthetic. Was there ever a natural form of MK4? Is it just something that was created in the lab to replicate Vitamin K2 activity?

**DV:** No.

In fact, MK4 is present in our bodies also as a natural product to a very small extent. The body is capable of converting K1 into MK4. We don't understand why it is done, but it is done. We have a rough understanding of how it is done.

Most of the MK4 in our body comes from animal products.

In animal feed, you have a product called menadione. That is a very synthetic, strange form of Vitamin K. It is a bit toxic, but for animals, it's not so bad; many have poultry or pigs getting a little of that. They use it to protect these animals against breaking the bones.

This is especially important for poultry so they don't break the bones during transport. They get menadione, and these animals can synthesize menaquinone 4 from the menadione. Then you eat the animals, and you get and ingest a bit of the MK4 that is already in the animal.



## VITAMINS A AND K...ONE LAST QUESTION

**DM:** Okay. I will ask you one last question.

I'll respect your time and hopefully, we can talk again. You had mentioned the synergism between Vitamin D and Vitamin K. Those are both water-soluble vitamins. The other primary one, of course, is Vitamin A, and I am wondering if you have noticed any similar synergies between the A and the K?

**DV:** No, definitely not.

**DM:** Really?

**DV:** No.

**DM:** Interesting.

**DV:** Completely different.

**DM:** Because there seems to be a profound interaction between the A and D, and I thought it just seems like there might have been one with A and K.

**DV:** No.

With Vitamin K, we know so exactly the place where it works on enzymes. It is co-enzyme--a very definite enzyme--and we just know exactly how it works. It does not interfere with Vitamin A.

**DM:** Excellent.

Well, I want to thank you for all that you're doing. I will definitely connect with you to have some follow-up questions when our schedules coincide. You've been most gracious with your time, and you've done tremendous research that is going to benefit large amounts of people.

One of the purposes of our site is to speed up the time at which this useful information could be applied at a broader level, so people can benefit and not have to wait for decades before the life's work of brilliant researchers like you reaches them.

**DV:** Yeah. We in The Netherlands have a proverb. We say, "*Our noses are pointed at the same direction.*" So, we are collaborating together to get these things as a benefit for the people.

**DM:** Absolutely. I thank you for your time, and we will be in touch at a later date.

[END]

## The Cancer-Preventing Vitamin Your Doctor Is Likely Completely Clueless About

Posted By [Dr. Mercola](#) | July 17 2010 | 226,454 views

In this interview, Dr. Cees Vermeer, one of the world's top vitamin K researchers discusses the importance of this largely ignored and oft-forgotten vitamin.

Vitamin K, just like vitamin D, is crucial for preventing cancer, osteoporosis, and heart disease, and nearly everyone is deficient.

For those who are interested in getting a supply of vitamin K2 we do have it in our store.

### Sources:

» [Cees Vermeer Transcript \(PDF\)](#)

Dr. Mercola's Comments:

Vitamin K may be "the next vitamin D" if research continues to illuminate the growing number of benefits to your health.

Dr. Cees Vermeer, one of the world's top researchers in the field of vitamin K, founded a vitamin K research group in 1975, which is now the largest group investigating this area of nutrition science.

How many people have adequate vitamin K... care to guess?

*Just about zero*, according to Dr. Vermeer and other experts in the field.

Most people get just enough K from their diets to maintain adequate blood clotting, but NOT enough to offer protection against the following health problems—and the list is growing:

- [Prostate cancer, lung cancer, liver cancer and leukemia](#)
- [Arterial calcification, cardiovascular disease and varicose veins](#)
- [Osteoporosis](#)
- [Brain health problems](#), including dementia, the specifics of which are still being studied

Vitamin K comes in two forms, and it is important to understand the differences between them before devising your nutritional plan of attack.

## Two Basic Types of Vitamin K

Vitamin K can be classified as either K1 or K2:

1. **Vitamin K1:** Found in green vegetables, K1 goes directly to your liver and helps you maintain a healthy blood clotting system. (This is the kind of K that infants need to help prevent a serious bleeding disorder.)

It is also vitamin K1 that keeps your own blood vessels from calcifying, and also helps your bones retain calcium and develop the right crystalline structure.

2. **Vitamin K2:** Bacteria produce this type of vitamin K. It is present in high quantities in your gut, but unfortunately is not absorbed from there and therefore most of it is passed out in your stool.

K2 goes straight to vessel walls, bones, and tissues other than the liver. It is present in fermented foods, particularly cheese and the Japanese food [natto](#), which is by far the richest source of K2.

Vitamin K2 can convert to K1 in your body. As a supplement, K1 is less expensive, which is why it's [the form used for neonates](#).

Making matters even more complex, there are several different forms of vitamin K2.

MK8 and MK9 come primarily from dairy products. MK4 and MK7 are the two most significant forms of K2, and act very differently in your body:

- **MK4** is a synthetic product, very similar to vitamin K1, and your body is capable of converting K1 into MK4. However, MK4 has a very short half-life of about one hour, making it a poor candidate as a dietary supplement. After reaching your intestines, it remains mostly in your liver, where it is useful in synthesizing blood-clotting factors.
- **MK7** is a newer agent with more practical applications because it stays in your body longer; its half-life is three days, meaning you have a much better chance of building up a consistent blood level, compared to MK4 or K1. MK7 is extracted from the Japanese food called *natto*.

For those who are interested in getting a supply of vitamin K2 we do have it in our store.

## Vitamin K Research is Clearly Impressive

In 2008, a German research group discovered that [vitamin K2 provides substantial protection against prostate cancer](#), which is one of the most common types of cancer among men in the United States. According to Dr. Vermeer, men taking the highest amounts of K2 had about 50 percent less prostate cancer.

Research results are similarly encouraging for the benefits of vitamin K to your cardiac health.

In 2004, [the Rotterdam Study](#), which was the first study demonstrating the beneficial effect of vitamin K2, showed that those who consumed 45 mcg of K2 daily lived seven years longer than those getting 12 mcg per day.

In a subsequent study called [the Prospect Study](#), 16,000 people were followed for 10 years. Researchers found that each additional 10 mcg of K2 in the diet resulted in 9 percent fewer cardiac events.

There is also research emerging that vitamin K can help protect against brain disease. However, it is too early to say exactly what types of damage it prevents, and how, but it is an area of intense interest to vitamin K scientists right now.

## Getting More Vitamin K into Your Diet

Eating lots of green vegetables will increase your vitamin K1 levels naturally, especially kale, spinach, collard greens, broccoli, and Brussels sprouts.

For vitamin K2, cheese and especially cheese curd is an excellent source. The starter ferment for both regular cheese and curd cheese contains bacteria—lactococci and propionic acid bacteria—which both produce K2. You get the benefits of these bacteria when you consume them.

Both types of cheese have the same amount of K2, but curd cheese has less fat. If you eat 100 grams of cheese daily, you get 45 mcg of vitamin K2, which will lower your risk for heart attack by 50 percent, according to existing studies.

You can obtain all the K2 you'll need (about 200 micrograms) by eating 15 grams of natto daily, which is half an ounce. It's a small amount and very inexpensive. It'll only shrink your wallet by about two dollars a month.

If you don't care for the taste of natto, the next best thing is a supplement. Remember you must always take your vitamin K supplement **with fat** since it is fat-soluble and won't be absorbed without it.

You need not worry about overdosing on K2—people have been given a thousand-fold increase over the recommended dose over the course of three years have shown no adverse reactions (i.e., no increased clotting tendencies).

Although the exact dosing is yet to be determined, Dr. Vermeer recommends between 45 mcg and 185 mcg daily for adults. You must use caution on the higher doses if you take anticoagulants, but if you are generally healthy and not on these types of medications, **I suggest 150 mcg daily.**

It is quite likely that doses of several times that amount are safe for the average person, but we just lack the research to confirm it at this time.

## **Vitamin D is Vitamin K's Best Friend**

Dr. Vermeer makes the point that vitamin K will never be able to do its work alone. It needs collaborators—and vitamin D is an important one.

There is a synergistic effect between vitamins D and K.

These two agents work together to increase MGP, or Matrix GLA Protein, which is the protein responsible for protecting your blood vessels from calcification. In fact, MGP is so important that it can be used as a laboratory measure of your vascular and cardiac status.

If you are concerned about your bones, you must balance a nutritional triad:

1. vitamin D
2. vitamin K
3. calcium

Increasing calcium is good for your bones but not so good for your arteries, which can become calcified. Vitamin K protects your blood vessels from calcifying when in the presence of high calcium levels. So you really must pay attention to the synergism of all three of these nutrients if you want to optimize your benefits.

## **Laboratory Testing for Vitamin K is in its Infancy**

Vitamin K measurements in blood plasma can be done accurately, but the results are really not helpful because they mainly reflect "what you ate yesterday," according to Dr. Vermeer.

Because there are no good laboratory assessments, he and his team have developed and patented a very promising laboratory test to assess vitamin K levels indirectly by measuring circulating MGP. Their studies have indicated this to be a very reliable method to assess the risk for arterial calcification—hence cardiac risk.

They are hoping to have this test available to the public within one to two years for a reasonable price, and several labs are already interested.

Additionally, they are working on developing a home test that would be available at your neighborhood drug store.

At this time, however, there is really no commercial test that would give you meaningful information. But since nearly 100 percent of people don't get sufficient amounts of vitamin K from their diet to reap its health benefits, you can assume you need to bump up your vitamin K levels by modifying your diet or taking a high quality supplement.

# Vitamin K by Jane Higdon, Ph.D.

Linus Pauling Institute Oregon State University

Source: <http://lpi.oregonstate.edu/infocenter/vitamins/vitaminK/>

Vitamin K is a fat-soluble vitamin. The "K" is derived from the German word "koagulation." Coagulation refers to the process of blood clot formation. Vitamin K is essential for the functioning of several proteins involved in blood clotting (1). There are two naturally occurring forms of vitamin K, vitamin K<sub>1</sub> and vitamin K<sub>2</sub>. Vitamin K<sub>1</sub>, also known as phylloquinone, is synthesized by plants and is the predominant form in the diet. Vitamin K<sub>2</sub> comes from animal sources and synthesis by intestinal bacteria. Vitamin K<sub>2</sub> includes a range of vitamin K forms, collectively referred to as menaquinones, with repeating 5-carbon units in the side chain of the molecule. These forms of vitamin K are designated menaquinone-n (MK-n), where n stands for the number of 5-carbon units (2).

## Function

Vitamin K functions as a [cofactor](#) for an [enzyme](#) that [catalyzes](#) the [carboxylation](#) of the [amino acid](#), glutamic acid, resulting in its conversion to gamma-carboxyglutamic acid (Gla) (3). Although vitamin K-dependent gamma-carboxylation occurs only on specific glutamic acid residues in a small number of vitamin K-dependent proteins, it is critical to the calcium-binding function of those proteins (4, 5).

## Coagulation (clotting)

The ability to bind calcium [ions](#) (Ca<sup>2+</sup>) is required for the activation of the seven vitamin K-dependent clotting factors, or [proteins](#), in the coagulation cascade. The term, coagulation cascade, refers to a series of events, each dependent on the other, that stop bleeding through clot formation. Vitamin K-dependent gamma-carboxylation of specific glutamic acid residues in those proteins makes it possible for them to bind calcium. Factors II (prothrombin), VII, IX, and X make up the core of the coagulation cascade. Protein Z appears to enhance the action of thrombin (the activated form of prothrombin) by promoting its association with [phospholipids](#) in [cell membranes](#). Protein C and protein S are [anticoagulant](#) proteins that provide control and balance in the coagulation cascade; protein Z also has an anticoagulatory function. Control mechanisms for the coagulation cascade exist, because uncontrolled clotting may be as life threatening as uncontrolled bleeding. Vitamin K-dependent coagulation factors are synthesized in the liver. Consequently, severe liver disease results in lower blood levels of vitamin K-dependent clotting factors and an increased risk of uncontrolled bleeding (hemorrhage) (6).

Some people are at risk of forming clots, which could block the flow of blood in arteries of the heart, brain, or lungs, resulting in heart attack, stroke, or pulmonary embolism, respectively. Some oral anticoagulants, such as warfarin (Coumadin), inhibit coagulation through antagonism of the action of vitamin K. Although vitamin K is a fat-soluble vitamin, the body stores very little of it, and its stores are rapidly depleted without regular dietary intake. Perhaps, because of its limited ability to store vitamin K, the body recycles it through a process called the vitamin K cycle. The vitamin K cycle allows a small amount of vitamin K to function in the gamma-carboxylation of proteins many times, decreasing the dietary requirement. Warfarin prevents the recycling of vitamin K by inhibiting two important reactions and creating a functional vitamin K deficiency (see [diagram](#)). Inadequate gamma-carboxylation of vitamin K-dependent coagulation

proteins interferes with the coagulation cascade, which inhibits blood clot formation. Large quantities of dietary or supplemental vitamin K can overcome the anticoagulant effect of vitamin K antagonists, so patients taking these drugs are cautioned against consuming very large or highly variable quantities of vitamin K in their diets (see [Drug interactions](#)). Experts now advise a reasonably constant dietary intake of vitamin K that meets current dietary recommendations (90-120 mcg/day) for patients on vitamin K antagonists like warfarin [\(7\)](#).

### **Bone mineralization**

Three vitamin-K dependent proteins have been isolated in bone: osteocalcin, matrix Gla protein (MGP), and protein S. Osteocalcin (also called bone Gla protein) is a protein synthesized by [osteoblasts](#) (bone-forming cells). The synthesis of osteocalcin by osteoblasts is regulated by the active form of [vitamin D](#), 1,25(OH)<sub>2</sub>D<sub>3</sub> or calcitriol. The mineral-binding capacity of osteocalcin requires vitamin K-dependent gamma-carboxylation of three glutamic acid residues. The function of osteocalcin is unclear but is thought to be related to bone mineralization. MGP has been found in bone, cartilage, and soft tissue, including blood vessels. The results of animal studies suggest MGP prevents the calcification of soft tissue and [cartilage](#), while facilitating normal bone growth and development. The vitamin K-dependent anticoagulant protein S is also synthesized by osteoblasts, but its role in bone metabolism is unclear. Children with inherited protein S deficiency suffer complications related to increased blood clotting as well as decreased bone density [\(5, 8, 9\)](#).

### **Cell growth**

Gas6 is a vitamin K-dependent protein that was identified in 1993. It has been found throughout the nervous system, as well in the heart, lungs, stomach, kidneys, and cartilage. Although the exact mechanism of its action has not been determined, Gas6 appears to be a cellular growth regulation factor with [cell-signaling](#) activities. Gas6 appears to be important in diverse cellular functions, including cell adhesion, cell proliferation, and protection against apoptosis [\(4\)](#). It may also play important roles in the developing and aging nervous system [\(10, 11\)](#). Further, Gas6 appears to regulate platelet signaling and vascular homeostasis [\(12\)](#).

## **Deficiency**

Overt vitamin K deficiency results in impaired blood clotting, usually demonstrated by laboratory tests that measure clotting time. Symptoms include easy bruising and bleeding that may be manifested as nosebleeds, bleeding gums, blood in the urine, blood in the stool, tarry black stools, or extremely heavy menstrual bleeding. In infants, vitamin K deficiency may result in life-threatening bleeding within the skull (intracranial hemorrhage) [\(6\)](#).

### **Adults**

Vitamin K deficiency is uncommon in healthy adults for a number of reasons: 1) vitamin K is widespread in foods (see [Food sources](#)); 2) the vitamin K cycle conserves vitamin K; and 3) bacteria that normally inhabit the large intestine synthesize menaquinones (vitamin K<sub>2</sub>), although it is unclear whether significant amounts are absorbed and utilized. Adults at risk of vitamin K deficiency include those taking vitamin K antagonist [anticoagulant](#) drugs and individuals with significant liver damage or disease [\(6\)](#). Additionally, individuals with disorders of fat malabsorption may be at increased risk of vitamin K deficiency [\(4\)](#).

## Infants

Newborn babies who are exclusively breast-fed are at increased risk of vitamin K deficiency, because human milk is relatively low in vitamin K compared to formula. Newborn infants, in general, have low vitamin K status for the following reasons: 1) vitamin K is not easily transported across the placental barrier; 2) the newborn's intestines are not yet colonized with bacteria that synthesize menaquinones; and 3) the vitamin K cycle may not be fully functional in newborns, especially premature infants (4). Infants whose mothers are on [anticonvulsant](#) medication to prevent seizures are also at risk of vitamin K deficiency. Vitamin K deficiency in newborns may result in a bleeding disorder called vitamin K deficiency bleeding (VKDB) of the newborn. Because VKDB is life-threatening and easily prevented, the American Academy of Pediatrics and a number of similar international organizations recommend that an injection of phyloquinone (vitamin K<sub>1</sub>) be administered to all newborns (13).

### *Controversies around vitamin K administration and the newborn*

**Vitamin K and childhood leukemia:** In the early 1990s, two [retrospective studies](#) were published suggesting a possible association between vitamin K injections in newborns and the development of childhood [leukemia](#) and other forms of childhood cancer. However, two large [retrospective studies](#) in the U.S. and Sweden that reviewed the medical records of 54,000 and 1.3 million children, respectively, found no evidence of a relationship between childhood cancers and vitamin K injections at birth (14, 15). Moreover, a pooled analysis of six [case-control studies](#), including 2,431 children diagnosed with childhood cancer and 6,338 cancer-free children, found no evidence that vitamin K injections for newborns increased the risk of childhood leukemia (16). In a policy statement, the American Academy of Pediatrics recommended that routine vitamin K prophylaxis for newborns be continued because VKDB is life-threatening and the risks of cancer are unproven and unlikely (17). See the full text of the [AAP policy statement on vitamin K and the newborn](#).

**Lower doses of vitamin K<sub>1</sub> for premature infants:** The results of two studies of vitamin K levels in premature infants suggest that the standard initial dose of vitamin K<sub>1</sub> for full term infants (1.0 mg) may be too high for premature infants (18, 19). These findings have led some experts to suggest the use of an initial vitamin K<sub>1</sub> dose of 0.3 mg/kg for infants with birth weights less than 1,000 g (2 lbs, 3 oz), and an initial dose of 0.5 mg would probably prevent hemorrhagic disease in newborns (18).

### **The Adequate Intake (AI)**

In January 2001, the Food and Nutrition Board (FNB) of the Institute of Medicine established the adequate intake (AI) level for vitamin K in the U.S. based on consumption levels of healthy individuals. The AI for infants was based on estimated intake of vitamin K from breast milk (20).

<b>Adequate Intake (AI) for Vitamin K</b>			
<b>Life Stage</b>	<b>Age</b>	<b>Males (mcg/day)</b>	<b>Females (mcg/day)</b>
Infants	0-6 months	2.0	2.0
Infants	7-12 months	2.5	2.5
Children	1-3 years	30	30
Children	4-8 years	55	55
Children	9-13 years	60	60
Adolescents	14-18 years	75	75
Adults	19 years and older	120	90
Pregnancy	18 years and younger	-	75
Pregnancy	19 years and older	-	90
Breast-feeding	18 years and younger	-	75
Breast-feeding	19 years and older	-	90

## **Disease Prevention**

### **Osteoporosis**

The discovery of vitamin K-dependent proteins in bone has led to research on the role of vitamin K in maintaining bone health.

#### ***Dietary vitamin K and osteoporotic fracture***

[Epidemiological studies](#) have demonstrated a relationship between vitamin K and age-related bone loss ([osteoporosis](#)). The Nurses' Health Study followed more than 72,000 women for ten years. In an analysis of this cohort, women whose vitamin K intakes were in the lowest quintile (1/5) had a 30% higher risk of hip fracture than women with vitamin K intakes in the highest four quintiles ([21](#)). A study in over 800 elderly men and women, followed in the Framingham Heart Study for seven years, found that men and women with dietary vitamin K intakes in the highest quartile (1/4) had a 65% lower risk of hip fracture than those with dietary vitamin K intakes in the lowest quartile (approximately 250 mcg/day vs. 50 mcg/day of vitamin K). However, the investigators found no association between dietary vitamin K intake and [bone mineral density](#) (BMD) in the Framingham subjects ([22](#)). Other studies have not observed a relationship between dietary vitamin K intake and measures of bone strength, BMD, or fracture incidence ([23, 24](#)). Because the primary dietary source of vitamin K is generally green leafy vegetables, high vitamin K intake could just be a marker for a healthy diet that is high in vegetables ([25](#)).

### ***Vitamin K-dependent carboxylation of osteocalcin and osteoporotic fracture***

Osteocalcin, a bone-related protein that circulates in the blood, has been shown to be a sensitive marker of bone formation. Vitamin K is required for the gamma-carboxylation of osteocalcin. Undercarboxylation of osteocalcin adversely affects its capacity to bind to bone mineral, and the degree of osteocalcin gamma-carboxylation has been found to be a sensitive indicator of vitamin K nutritional status (26). Circulating levels of undercarboxylated osteocalcin (ucOC) were found to be higher in postmenopausal women than premenopausal women and markedly higher in women over the age of 70. In a study of 195 institutionalized elderly women, the relative risk of hip fracture was six times higher in those who had elevated ucOC levels at the beginning of the study (27). In a much larger sample of 7,500 elderly women living independently, circulating ucOC was also predictive of fracture risk (28). Although vitamin K deficiency would seem the most likely cause of elevated blood ucOC, investigators have also documented an inverse relationship between measures of vitamin D nutritional status and ucOC levels, as well as a significant lowering of ucOC by vitamin D supplementation (5). It is also possible that an increased ucOC level is a marker for poor overall nutritional status, including vitamin D or protein.

### ***Vitamin K antagonists and osteoporotic fracture***

Certain oral [anticoagulants](#), such as warfarin, are known to be [antagonists](#) of vitamin K. At least two studies have examined the chronic use of warfarin and risk of fracture in older women. One study reported no association between long-term warfarin treatment and fracture risk (29), while the other found a significantly higher risk of rib and vertebral fractures in warfarin users compared to nonusers (30). Additionally, a study in elderly patients with atrial fibrillation reported that long-term warfarin treatment was associated with a significantly higher risk of osteoporotic fracture in men but not in women (31). A [meta-analysis](#) of the results of 11 published studies found that oral anticoagulation therapy was associated with a very modest reduction in bone density at the wrist and no change in bone density at the hip or spine (32).

### ***Vitamin K supplementation studies and osteoporosis***

Vitamin K supplementation of 1,000 mcg/day of phylloquinone (Vitamin K<sub>1</sub>) for two weeks (more than ten times the AI for vitamin K) resulted in a decrease of ucOC levels in postmenopausal women, as well as increases in several biochemical markers of bone formation. In Japan, intervention trials in [hemodialysis](#) patients and osteoporotic women using very high [pharmacologic doses](#) (45 mg/day) of menatetrenone (MK-4) have reported significant reductions in the rate of bone loss (33, 34). MK-4 is not found in significant amounts in the diet, but it can be synthesized in small amounts by humans from phylloquinone. A recent [meta-analysis](#) of seven Japanese [randomized controlled trials](#) associated menatetrenone-4 supplementation with increased [BMD](#) and reduced fracture incidence (35), but this meta-analysis did not include data from an unpublished study that reported no effect on fracture risk (36). Nevertheless, the meta-analysis reported that MK-4 supplementation lowered risk for vertebral fractures by 60%, hip fractures by 77%, and nonvertebral fractures by 81%; all associations were statistically significant. Six of the individual trials employed 45 mg of menatetrenone daily, while one trial used 15 mg of menatetrenone daily (35). The 45 mg/day dose of menatetrenone was also used in a more recent 3-year [placebo](#)-controlled intervention trial in 325 postmenopausal women. This study found that supplemental menatetrenone improved measures of bone strength compared to placebo (37). The doses used in most of the cited studies are about 500 times higher than the [AI](#)

for vitamin K. Some experts are not sure whether the effects of such high doses of MK-4 represent a true vitamin K effect.

Long-term clinical trials of phylloquinone supplementation at doses attainable by dietary intake (200-1,000 mcg/day) have reported mixed results with respect to effects on bone mineral density (38-40). Phylloquinone supplementation at these levels does not appear to benefit older individuals who are also taking vitamin D and calcium supplements (40). Thus, evidence of a relationship between vitamin K nutritional status and bone health in adults is considered weak. Further investigation is required to determine the physiological function of vitamin K-dependent proteins in bone and the mechanisms by which vitamin K affects bone health and osteoporotic fracture risk (5).

### **Vascular calcification and cardiovascular disease**

One of the hallmarks of [cardiovascular disease](#) is the formation of [atherosclerotic](#) plaques in arterial walls. Calcification of atherosclerotic plaques occurs as the condition progresses, resulting in decreased elasticity of the affected vessels and increased risk of clot formation, the usual cause of a heart attack or stroke. A [prospective cohort study](#) in 807 men and women, aged 39 to 45 years, did not find a correlation between dietary vitamin K<sub>1</sub> intake and coronary artery calcification, as measured by electron-beam computed tomography (41). Additionally, vitamin K<sub>1</sub> intake was not associated with calcification of breast arteries in a cross-sectional study of 1,689 women, aged 49 to 70 years (42). A population-based study of postmenopausal women, aged 60-79 years, found that women aged 60-69 with aortic calcifications had lower vitamin K intakes than those without aortic calcifications, but this was not true for older women (43). The mechanism by which vitamin K may promote mineralization of bone, while inhibiting mineralization (calcification) of vessels, is not entirely clear. One hypothesis is based on the function of matrix Gla protein (MGP). MGP has been found to inhibit the calcification of [cartilage](#) and bone during early embryonic development. Some investigators have hypothesized that high levels of MGP found in calcified vessels may represent a defense against vessel calcification, but that inadequate vitamin K nutritional status results in inadequate carboxylation and, presumably, inactive MGP. Thus, insufficient dietary vitamin K may increase the risk of vascular calcification (44). Support for this hypothesis comes from a small human study that employed conformation-specific antibodies against MGP to examine whether impaired carboxylation of this protein possibly contributes to arterial calcification. In healthy subjects, undercarboxylated MGP (ucMGP) was not detected in the innermost lining of the carotid artery; in contrast, the majority of MGP in the carotid arterial lining of patients with atherosclerosis was undercarboxylated (45). [Serum](#) ucMGP may be decreased in those at risk of cardiovascular calcification due to deposition of ucMGP in local areas of vascular calcification (46). Further investigations are necessary to establish the nature of the role of bone proteins like MGP in human atherosclerotic plaque calcification.

## Sources

### Food sources

Phylloquinone (vitamin K<sub>1</sub>) is the major dietary form of vitamin K. Green leafy vegetables and some vegetable oils (soybean, cottonseed, canola, and olive) are major contributors of dietary vitamin K. Hydrogenation of vegetable oils may decrease the absorption and biological effect of dietary vitamin K (47). If you wish to check foods for their nutrient content, including vitamin K, search the [USDA food composition database](#) or view a [list of foods containing a specific nutrient](#). A number of good sources of vitamin K are listed in the table below along with their vitamin K content in micrograms (mcg).

Food	Serving	Vitamin K (mcg)
Olive oil	1 Tablespoon	8.1
Soybean oil	1 Tablespoon	25.0
Canola oil	1 Tablespoon	16.6
Mayonnaise	1 Tablespoon	3.7
Broccoli, cooked	1 cup (chopped)	220
Kale, raw	1 cup (chopped)	547
Spinach, raw	1 cup	145
Leaf lettuce (green), raw	1 cup (shredded)	62.5
Swiss chard, raw	1 cup	299
Watercress, raw	1 cup (chopped)	85
Parsley, raw	1/4 cup	246

### Intestinal bacteria

Bacteria that normally colonize the large intestine synthesize menaquinones (vitamin K<sub>2</sub>), which are an active form of vitamin K. Until recently it was thought that up to 50% of the human vitamin K requirement might be met by bacterial synthesis. However, research indicates that the contribution of bacterial synthesis is much less than previously thought, although the exact contribution remains unclear (48).

### Supplements

In the U.S., vitamin K<sub>1</sub> is available without a prescription in multivitamin and other supplements in doses that generally range from 10-120 mcg per supplement (49). A form of vitamin K<sub>2</sub>, menatetrenone (MK-4), has been used to treat osteoporosis in Japan and is currently under study in the United States (50).

## Safety

### Toxicity

Although allergic reaction is possible, there is no known toxicity associated with high doses of the phylloquinone (vitamin K<sub>1</sub>) or menaquinone (vitamin K<sub>2</sub>) forms of vitamin K (20). The same is not true for synthetic menadione (vitamin K<sub>3</sub>) and its derivatives. Menadione can interfere with the function of glutathione, one of the body's natural [antioxidants](#), resulting in oxidative damage to [cell membranes](#). Menadione given by injection has induced liver toxicity, [jaundice](#), and hemolytic [anemia](#) (due to the rupture of red blood cells) in infants; therefore, menadione is no longer used for treatment of vitamin K deficiency (4, 6). No tolerable upper level (UL) of intake has been established for vitamin K (20).

### Nutrient interactions

Large doses of vitamin A and vitamin E have been found to antagonize vitamin K (6). Excess vitamin A appears to interfere with vitamin K absorption, whereas a form of vitamin E (tocopherol quinone) may inhibit vitamin K-dependent carboxylase enzymes. One study in adults with normal [coagulation](#) status found that supplementation with 1,000 IU of vitamin E for 12 weeks decreased gamma-carboxylation of prothrombin, a vitamin K-dependent protein (51). A vitamin E-vitamin K interaction has also been reported in patients taking anticoagulatory drugs like warfarin. [Hemorrhage](#) (excessive bleeding) was reported in a man taking 5 mg of warfarin and 1,200 IU of vitamin E daily (52).

### Drug interactions

The [anticoagulant](#) effect of vitamin K antagonists (e.g., warfarin) may be inhibited by very high dietary or supplemental vitamin K intake. It is generally recommended that individuals using warfarin try to consume the [AI](#) for vitamin K (90-120 mcg), while avoiding large fluctuations in vitamin K intake that might interfere with the adjustment of their anticoagulant dose (7). When given to pregnant women, warfarin, anticonvulsants, rifampin, and isoniazid can interfere with fetal vitamin K synthesis and place the newborn at increased risk of vitamin K deficiency (13). Other drugs can interfere with endogenous synthesis of vitamin K or with vitamin K recycling. Prolonged use of broad spectrum antibiotics may decrease vitamin K [synthesis](#) by intestinal bacteria. Cephalosporins and salicylates may decrease vitamin K recycling by inhibiting vitamin K epoxide reductase ([diagram](#)). Further, cholestyramine, cholestipol, orlistat, mineral oil, and the fat substitute, olestra, may decrease vitamin K absorption (49).

## Linus Pauling Institute Recommendation

Although the [AI](#) for vitamin K was recently increased, it is not clear if it will be enough to optimize the gamma-carboxylation of vitamin K-dependent proteins in bone (see [Osteoporosis](#)). Multivitamins generally contain 10 to 25 mcg of vitamin K, while vitamin K or "bone" supplements may contain 100 to 120 mcg of vitamin K. To consume the amount of vitamin K associated with a decreased risk of hip fracture in the Framingham Heart Study (about 250 mcg/day), an individual would need to eat a little more than 1/2 cup of chopped broccoli or a large salad of mixed greens every day. Though the dietary intake of vitamin K required for optimal function of all vitamin K dependent proteins is not yet known, the Linus Pauling

Institute recommends taking a multivitamin-mineral supplement and eating at least 1 cup of dark green leafy vegetables daily. Replacing dietary saturated fats like butter and cheese with monounsaturated fats found in olive oil and canola oil will also increase dietary vitamin K intake and may also decrease the risk of [cardiovascular diseases](#).

### **Older adults (65 years and older)**

Because older adults are at increased risk of osteoporosis and hip fracture, the above recommendation for a multivitamin-mineral supplement and at least 1 cup of dark green leafy vegetables/day is especially relevant.

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# This Could Be Even BIGGER than the Vitamin D Discovery...

By Dr. Mercola

Vitamin K may very well be “the next vitamin D” as research continues to illuminate a growing number of benefits to your health.

It is probably where vitamin D was ten years ago with respect to its appreciation as a vital nutrient that has far more benefits than was originally recognized.

And, according to Dr. Cees Vermeer, one of the world’s top researchers in the field of vitamin K, nearly everyone is deficient in vitamin K – just like most are deficient in D.

Vitamin K measurements in blood plasma can be done accurately, but the results are not necessarily helpful because they mainly reflect what you ate yesterday. Because of this, we will have to trust Dr. Vermeer on his assessment that most are too deficient to reap all of its health benefits. Vitamin K researchers across the world will acknowledge him as a leader in this field.

Most people get enough K from their diets to maintain adequate blood clotting, but NOT enough to offer protection against the following health problems—and the list is growing:

- Arterial calcification, cardiovascular disease and varicose veins
- Osteoporosis
- Prostate cancer, lung cancer, liver cancer and leukemia
- Brain health problems, including dementia, the specifics of which are still being studied

Vitamin K comes in two forms, and it is important to understand the differences between them before devising your nutritional plan of attack.

## The Two Basic Types of Vitamin K

Vitamin K can be classified as either K1 or K2:

1. **Vitamin K1:** Found in green vegetables, K1 goes directly to your liver and helps you maintain a healthy blood clotting system. (This is the kind of K that infants need to help prevent a serious bleeding disorder.) It is also vitamin K1 that keeps your own blood vessels from calcifying, and helps your bones retain calcium and develop the right crystalline structure.
2. **Vitamin K2:** Bacteria produce this type of vitamin K. It is present in high quantities in your gut, but unfortunately is not absorbed from there and passes out in your stool. K2 goes straight to vessel walls, bones, and tissues other than your liver. It is present in fermented foods, particularly cheese and the Japanese food natto, which is by far the richest source of K2.

Vitamin K2 can convert to K1 in your body, but there are some problems with this, which I will discuss shortly. As a supplement, K1 is less expensive, which is why it's [the form used for neonates](#).

Making matters even more complex, there are several different forms of vitamin K2.

MK8 and MK9 come primarily from dairy products. MK4 and MK7 are the two most significant forms of K2, and act very differently in your body:

- MK4 is a synthetic product, very similar to vitamin K1, and your body is capable of converting K1 into MK4. However, MK4 has a very short half-life of about one hour, making it a poor candidate as a dietary supplement. After reaching your intestines, it remains mostly in your liver, where it is useful in synthesizing blood-clotting factors.
- MK7 is a newer agent with more practical applications because it stays in your body longer; its half-life is three days, meaning you have a much better chance of building up a consistent blood level, compared to MK4 or K1. MK7 is extracted from the Japanese fermented soy product called natto. You could actually get loads of MK7 from consuming natto as it is relatively inexpensive, and is available in most Asian food markets. Few people, however, tolerate its smell and slimy texture.

Let's take a look at what scientific studies are showing us about vitamin K2.

## Vitamin K Research has Come a Long Way

In 2008, a German research group discovered that vitamin K2 provides substantial protection from prostate cancer<sup>[1]</sup>, which is one of the leading causes of cancer among men in the United States. According to Dr. Vermeer, men taking the highest amounts of K2 have about 50 percent less prostate cancer.

Research results are similarly encouraging for the benefits of vitamin K to your cardiac health:

- In 2004, the Rotterdam Study, which was the first study demonstrating the beneficial effect of vitamin K2, showed that people who consume 45 mcg of K2 daily live seven years longer than people getting 12 mcg per day<sup>[2]</sup>.
- In a subsequent study called the Prospect Study<sup>[3]</sup>, 16,000 people were followed for 10 years. Researchers found that each additional 10 mcg of K2 in the diet results in 9 percent fewer cardiac events.

Preliminary findings also suggest that vitamin K can help protect you from brain disease. However, it is too early to say exactly what types of damage it prevents—and how—but it is an area of intense interest to vitamin K scientists right now.

# Vitamin K2 is CRUCIAL in Preventing Osteoporosis

The evidence suggests that vitamin K2 is essential for your bone health, but it is a nutrient the vast majority of you do not get in adequate amounts from your diet.

How does vitamin K lead to bone health?

Osteocalcin is a protein produced by your osteoblasts (cells responsible for bone formation), and is utilized within the bone as an integral part of the bone-forming process. However, osteocalcin must be “carboxylated” before it can be effective. Vitamin K functions as a cofactor for the enzyme that catalyzes the carboxylation of osteocalcin.

Vitamin K2 has been found to be a far more effective “activator” of osteocalcin than K1.

There has been some remarkable research about the protective effects of vitamin K2 against osteoporosis:

- A number of Japanese trials have shown that vitamin K2 completely reverses bone loss and in some cases even increases bone mass in people with osteoporosis<sup>[4]</sup>.
- The pooled evidence of seven Japanese trials show that vitamin K2 supplementation produces a 60 percent reduction in vertebral fractures and an 80 percent reduction in hip and other non-vertebral fractures<sup>[5]</sup>.
- Researchers in the Netherlands showed that vitamin K2 is three times more effective than vitamin K1 in raising osteocalcin, which controls the building of bone<sup>[6]</sup>.

Although your body can convert K1 into K2, studies show that the amount of K2 produced by this process alone is insufficient. Even if you are consuming enough K1, your body uses most of it to make clotting factors, leaving little remaining for your bones.

In other words, your liver preferentially uses vitamin K1 to activate clotting factors, while most of your other tissues preferentially use K2.

Vitamin K2 has also been found to offer you other benefits—besides your bones!

## Vitamin K2 Lowers Your Cancer Risk

As mentioned earlier, we are also learning that vitamin K2 has a major role in preventing cancer.

The recent European Prospective Investigation into Cancer and Nutrition (EPIC) study<sup>[7]</sup>, published in the March 2010 issue of the *American Journal of Clinical Nutrition*, found high intake of vitamin K2—not K1—leads to reduced cancer risk, as well as a thirty percent lower risk of dying from cancer<sup>[8]</sup>.

A study funded by the National Cancer Institute found that vitamin K2 might help reduce the risk for non-Hodgkin lymphoma. Mayo Clinic researchers discovered that people with the highest intake of vitamin K2 had a 45 percent lower risk for this type of cancer, compared to those with the lowest vitamin K2 intake<sup>[9]</sup>.

Scientists attribute this to the important role that vitamin K2 plays in inhibiting inflammatory cytokines, which are related to this type of lymphoma, and vitamin K's role the lifecycle of your cells.

## Are You Getting Enough Vitamin K from Your Diet?

Eating lots of green vegetables will increase your vitamin K1 levels naturally, especially:

- Kale
- Spinach
- Collard greens
- Broccoli
- Brussels sprouts

You can obtain all the K2 you'll need (about 200 micrograms) by eating 15 grams of natto daily, which is half an ounce. However, natto is generally not pleasing to the Westerner's palate, so the next best thing is a vitamin K2 supplement.

But remember, you must always take your vitamin K supplement **with fat** since it is fat-soluble and won't be absorbed without it.

Although the exact dosing is yet to be determined, Dr. Vermeer recommends between 45 mcg and 185 mcg daily for adults. You must use caution on the higher doses if you take anticoagulants, but if you are generally healthy and not on these types of medications, **I suggest 150 mcg daily**.

Fortunately, you don't need to worry about overdosing on K2—people have been given a thousand-fold “overdose” over the course of three years, showing no adverse reactions (i.e., no increased clotting tendencies).

## The Synergistic Effects Between Vitamin K and Vitamin D

It's important to realize that vitamin K does not work alone. It needs collaborators—and vitamin D is an important one.

These two agents work together to increase MGP, or Matrix GLA Protein, which is the protein that is responsible for protecting your blood vessels from calcification. In fact, MGP is so important that it can be used as a laboratory measure of your vascular and cardiac status.

The results of human clinical studies suggest that concurrent use of vitamin K2 and vitamin D may substantially reduce bone loss.

If you are concerned about your bones, you must balance this nutritional triad:

1. Vitamin D
2. Vitamin K
3. Calcium

Increasing calcium is good for your bones but not so beneficial for your arteries, which can become calcified, but *vitamin K protects your blood vessels from calcifying when in the presence of high calcium levels.*

So you really must pay attention to the synergism of all three of these nutrients if you want to optimize your benefits.

I am convinced we are seeing just the tip of the iceberg when it comes to vitamin K and its many valuable functions in your health. It's truly an exciting area in nutritional science today.

In the meantime it is my STRONG encouragement to make sure you find some regular source of vitamin K2. This will mean eating about four ounces of fermented cheese a day (preferably raw) or taking a high quality vitamin K2 supplement.

It is my strong belief that in ten years time there will be as much passion and appreciation for this stealth vitamin as we have for vitamin D today.

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# What You Need to Know About Vitamin K2, D and Calcium

By Dr. Mercola

December 16, 2012

Source: [http://articles.mercola.com/sites/articles/archive/2012/12/16/vitamin-k2.aspx?e\\_cid=20121216\\_SNL\\_Art\\_1](http://articles.mercola.com/sites/articles/archive/2012/12/16/vitamin-k2.aspx?e_cid=20121216_SNL_Art_1)

Vitamin K is a fat-soluble vitamin most well known for the important role it plays in blood clotting. However, many do not realize that there are different kinds of vitamin K, and they are completely different.

The health benefits of vitamin K2 go far beyond blood clotting, which is done by vitamin K1, and vitamin K2 also works synergistically with a number of other nutrients, including calcium and vitamin D.

Dr. Kate Rheaume-Bleue, a naturopathic physician with a keen interest in nutrition, has authored what I believe is one of the most comprehensive books on this important topic, titled: *Vitamin K2 and the Calcium Paradox: How a Little Known Vitamin Could Save Your Life*

*"I tuned in to the emerging research about K2 early in 2007," she says. "Not long before, I had read Nutrition and Physical Degeneration by Weston A. Price. When I learned about vitamin K2, I thought:*

*"Hey, you know what? I'm sure Price talked all about this in his book." I went to the book, looked through it, and didn't find any reference to vitamin K2. I was really stumped.*

*A little bit later in 2007, I read a brilliant article by Chris Masterjohn that links vitamin K2 to Price's work on Activator X.*

*Once I realized that link, the light bulb went on about how important this nutrient is, and how overlooked it's been for so long. It really provides the missing piece to the puzzle of so many health conditions, and yet it was being completely overlooked, despite the overwhelming amounts of modern-day research."*

## What's So Special About Vitamin K2?

Vitamin K is actually a group of fat-soluble vitamins. Of the two main ones, K1 and K2, the one receiving the most attention is K1, which is found in green leafy vegetables and is very easy to get through your diet. This lack of distinction has created a lot of confusion, and it's one of the reasons why vitamin K2 has been overlooked for so long.

The three types of vitamin K are:

1. **Vitamin K1**, or phylloquinone, is found naturally in plants, especially green vegetables; K1 goes directly to your liver and helps you maintain healthy blood clotting
2. **Vitamin K2**, also called menaquinone, is made by the bacteria that line your gastrointestinal tract; K2 goes straight to your blood vessel walls, bones, and tissues other than your liver
3. **Vitamin K3**, or menadione, is a synthetic form I do not recommend; it's important to note that toxicity has occurred in infants injected with this synthetic vitamin K3

Vitamin K1 exclusively participates in blood clotting — that's sole purpose. K2 on the other hand comes from a whole different set of food sources, and its biological role is to help *move calcium* into the proper areas in your body, such as your bones and teeth. It also plays a role in removing calcium from areas where it shouldn't be, such as in your arteries and soft tissues.

*"K2 is really critical for keeping your bones strong and your arteries clear,"* Rheaume-Bleue says.

Now, vitamin K2 can be broken into two additional categories, called:

1. MK-4 (menaquinone-4), a short-chain form of vitamin K2 found in butter, egg yolks, and animal-based foods
2. MK-7 (menaquinone-7), longer-chain forms found in fermented foods. There's a variety of these long-chain forms but the most common one is MK-7. This is the one you'll want to look for in supplements, because in a supplement form, the MK-4 products are actually *synthetic*. They are not derived from natural food products containing MK-4.

The MK-7 – these long-chain, natural bacterial-derived vitamin K2 – is from a fermentation process, which offers a number of health advantages:

- a. It stays in your body longer, and
- b. It has a longer half-life, which means you can just take it once a day in very convenient dosing

## How Much Vitamin K2 Do You Need?

The optimal amounts of vitamin K2 are still under investigation, but it seems likely that 180 to 200 micrograms of vitamin K2 should be enough to activate your body's K2-dependent proteins to shuttle the calcium where it needs to be, and remove it from the places where it shouldn't.

*"The most recent clinical trials used around those amounts of K2,"* Rheaume-Bleue says. *"The average person is getting a lot less than that. That's for sure. In the North American diet, you can see as little as maybe 10 percent of that or less. Certainly, not near enough to be able to optimize bone density and improve heart health."*

She estimates that about 80 percent of Americans do not get enough vitamin K2 in their diet to activate their K2 proteins, which is similar to the deficiency rate of vitamin D. Vitamin K2 deficiency leaves you vulnerable for a number of chronic diseases, including:

Osteoporosis	Heart disease	Heart attack and stroke
Inappropriate calcification, from heel spurs to kidney stones	Brain disease	Cancer

*"I talked about vitamin K2 moving calcium around the body. Its other main role is to activate proteins that control cell growth. That means K2 has a very important role to play in cancer protection," Rheaume-Bleue says.*

*"When we're lacking K2, we're at much greater risk for osteoporosis, heart disease, and cancer. And these are three concerns that used to be relatively rare. Over the last 100 years, as we've changed the way we produced our food and the way we eat, they have become very common."*

Researchers are also looking into other health benefits. For example, one recent study published in the journal *Modern Rheumatology*<sup>1</sup> found that vitamin K2 has the potential to improve disease activity besides osteoporosis in those with rheumatoid arthritis (RA). Another, published in the journal *Science*<sup>2</sup>, found that vitamin K2 serves as a mitochondrial electron carrier, thereby helping maintain normal ATP production in mitochondrial dysfunction, such as that found in Parkinson's Disease.

According to the authors:

*"We identified Drosophila UBIAD1/Heix as a modifier of pink1, a gene mutated in Parkinson's disease that affects mitochondrial function. We found that vitamin K(2) was necessary and sufficient to transfer electrons in Drosophila mitochondria. Heix mutants showed severe mitochondrial defects that were rescued by vitamin K(2), and, similar to ubiquinone, vitamin K(2) transferred electrons in Drosophila mitochondria, resulting in more efficient adenosine triphosphate (ATP) production. Thus, mitochondrial dysfunction was rescued by vitamin K(2) that serves as a mitochondrial electron carrier, helping to maintain normal ATP production."*

## **The Interplay Between Vitamin K2, Vitamin D, and Calcium**

As I've discussed on numerous occasions, vitamin D is a critical nutrient for optimal health and is best obtained from sun exposure or a safe tanning bed. However, many are taking oral vitamin

D, which may become problematic unless you're also getting sufficient amounts of vitamin K2. Dr. Rheaume-Bleue explains:

*"When you take vitamin D, your body creates more of these vitamin K2-dependent proteins, the proteins that will move the calcium around. They have a lot of potential health benefits. But until the K2 comes in to activate those proteins, those benefits aren't realized. So, really, if you're taking vitamin D, you're creating an increased demand for K2. And vitamin D and K2 work together to strengthen your bones and improve your heart health.*

*... For so long, we've been told to take calcium for osteoporosis... and vitamin D, which we know is helpful. But then, more studies are coming out showing that increased calcium intake is causing more heart attacks and strokes. That created a lot of confusion around whether calcium is safe or not. But that's the wrong question to be asking, because we'll never properly understand the health benefits of calcium or vitamin D, unless we take into consideration K2. That's what **keeps the calcium in its right place.**"*

## **IMPORTANT: If You Take Vitamin D, You Need K2**

This is a really crucial point: **If you opt for oral vitamin D, you need to also consume in your food or take supplemental vitamin K2.**

*"There are so many people on the vitamin-D-mega-dose bandwagon, taking more and more of vitamin D. And it could absolutely be causing harm if you are lacking the K2 to complete the job to get the calcium where it's supposed to be," Rheaume-Bleue warns.*

*"We don't see symptoms of vitamin D toxicity very often. But when we do, those symptoms are inappropriate calcification. That's the symptom of vitamin D toxicity. And it is actually a lack of vitamin K2 that can cause that..."*

While the ideal or optimal ratios between vitamin D and vitamin K2 have yet to be elucidated, Rheaume-Bleue suggests that for every 1,000 IU's of vitamin D you take, you may benefit from about 100 micrograms of K2, and perhaps as much as 150-200 micrograms (mcg).

The latest vitamin D dosing recommendations, which call for about 8,000 IU's of vitamin D3 per day if you're an adult, means you'd need in the neighborhood of 800 to 1,000 micrograms (0.8 to 1 milligram/mg) of vitamin K2.

*"My earlier recommendation was not taking into account people who were doing high dose of vitamin D supplementation," Rheaume-Bleue says. "That's where it gets a little bit more technical. It seems that for the average person, around 200 to 280 micrograms will activate your K2 proteins and do a lot of good for your bones and your heart. If you're taking high levels of vitamin D... then I would recommend taking more K2."*

The good news is that vitamin K2 has no toxicity. No toxic effects have ever been demonstrated in the medical literature.

*"The reason why K2 doesn't have potential toxic effect is that all vitamin K2 does is activate K2 proteins. It will activate all the K2 proteins it finds. And if they're all activated and you take extra K2, it simply won't do that. That's why we don't see a potential for toxicity the way we do with vitamin A or D," she says.*

## **If You Need Calcium, Aim for Calcium-Rich Foods First**

For those who are calcium deficient, Rheaume-Bleue recommends looking to food sources high in calcium, before opting for a supplement. This is because many high calcium foods also contain naturally high amounts of, you guessed it, vitamin K2! Nature cleverly gives us these two nutrients in combination, so they work optimally. Good sources of calcium include dairy, especially cheeses, and vegetables, although veggies aren't high in K2.

Additionally, magnesium is far more important than calcium if you are going to consider supplementing. Magnesium will also help keep calcium in the cell to do its job far better. In many ways it serves as nutritional version of the highly effective class of drugs called calcium channel blockers. If you do chose to supplement with calcium, for whatever reason, it's important to maintain the proper balance between your intake of calcium and other nutrients such as:

- Vitamin K2
- Vitamin D
- Magnesium

## **The Importance of Magnesium**

As mentioned previously, magnesium is another important player to allow for proper function of calcium. As with vitamin D and K2, magnesium deficiency is also common, and when you are lacking in magnesium and take calcium, you may exacerbate the situation. Vitamin K2 and magnesium complement each other, as magnesium helps lower blood pressure, which is an important component of heart disease.

Dietary sources of magnesium include sea vegetables, such as kelp, dulse, and nori. Few people eat these on a regular basis however, if at all. Vegetables can also be a good source, along with whole grains. However, grains **MUST** be prepared properly to remove phytates and anti-nutrients that can otherwise *block* your absorption of magnesium. As for supplements, Rheaume-Bleue recommends using magnesium citrate. Another emerging one is magnesium threonate, which appears promising primarily due to its superior ability to penetrate the mitochondrial membrane.

## **How Can You Tell if You're Lacking in Vitamin K2?**

There's no way to test for vitamin K2 deficiency. But by assessing your diet and lifestyle, you can get an idea of whether or not you may be lacking in this critical nutrient. If you have any of the following health conditions, you're likely deficient in vitamin K2 as they are all connected to K2:

- Do you have osteoporosis?
- Do you have heart disease?
- Do you have diabetes?

If you do not have any of those health conditions, but do NOT regularly eat high amounts of the following foods, then your likelihood of being vitamin K2 deficient is still very high:

- Grass-fed organic animal products (i.e. eggs, butter, dairy)
- Certain fermented foods such as natto, or vegetables fermented using a starter culture of vitamin K2-producing bacteria. Please note that most fermented vegetables are not really high in vitamin K2 and come in at about 50 mcg per serving. However, if specific starter cultures are used they can have ten times as much, or 500 mcg per serving.
- Goose liver pâté
- Certain cheeses such as Brie and Gouda (these two are particularly high in K2, containing about 75 mcg per ounce)

*"An important thing to mention when it comes to cheese (because this becomes an area of confusion), [is that] because cheese is a bacterial derived form of vitamin K2, it actually doesn't matter if the cheese came from grass-fed milk. That would be nice, but it's not the milk that went into the cheese that makes the K2. It's the bacteria making the cheese, which means it doesn't matter if you're importing your brie from France or getting it domestically. Brie cheese, the bacteria that makes brie cheese, will make vitamin K2," she says.*

Fermented vegetables, which are one of my new passions, primarily for supplying beneficial bacteria back into our gut, can be a great source of vitamin K if you ferment your own using the proper starter culture. We recently had samples of high-quality fermented organic vegetables made with our specific starter culture tested, and were shocked to discover that not only does a typical serving of about two to three ounces contain about *10 trillion* beneficial bacteria, but it also contained 500 mcg of vitamin K2.

Note that not every strain of bacteria makes K2. For example, most yoghurts have almost no vitamin K2. Certain types of cheeses are very high in K2, and others are not. It really depends on the specific bacteria. You can't assume that any fermented food will be high in K2, but some fermented foods are very high in K2, such as natto. Others, such as miso and tempeh, are not high in K2.

## **Pregnant? Make Sure You're Getting Enough Vitamin K2**

Last but not least, while vitamin K2 is critical for the prevention of a number of chronic diseases listed above, it's also vital for women who are trying to conceive, who are pregnant, and for growing healthy children. "K2 plays a very important role throughout pregnancy (for the development of teeth for both primary and adult teeth, the development of proper facial form,

healthy facial form, as well as strong bones), then again throughout childhood to prevent cavities, and through adolescence as the skeleton is growing," Rheume-Bleue says.

Vitamin K2 is needed throughout pregnancy, and later while breastfeeding. It may be particularly important during the third trimester, as most women's levels tend to drop at that time, indicating there's an additional drain on the system toward the end of the pregnancy. Since vitamin K2 has no toxicity issues, it may be prudent to double or even triple — which is what Rheume-Bleue did during her own recent pregnancy — your intake while pregnant.

ANTI INFLAMMATORY NATURAL/ HERBAL APPROACHES  
FOR PAIN MANAGEMENT

Glucosamine Sulfate (Comes from crab shells. Do not use if allergic to shellfish)  
Helps rebuild the cartilage of joints, good for knees, shoulders, elbow, hips and back  
500mg one tablet three times per day (when has a lot of pain) or  
1,000mg one tablet daily for maintenance of joint pain

Bromelain (Comes from pineapple, may also eat fresh pineapple. Used as an anti-inflammatory for pain also used for sports injuries for bruises and for sinus infections and chest colds).

500mg capsules one to two capsules /day Best taken between meals

Ginger (Comes from fresh ginger root. Helps with morning pain and stiffness. Ginger also works for morning sickness, motion sickness and nausea from chemotherapy). Wonderful as a tea: put ginger root in a zip lock bag and freeze and then grate on a cheese grater and put ½ to ¾ teaspoon in boiling water. Steep for 2-3 minutes. Honey is nice to sweeten the tea if you wish. Also good as an iced tea. May also grate into stir fry, put in pancake batter or other foods.

500mg to 1,000mg capsules/day. Take with food.

Curcumin or Turmeric (Used in cooking as a spice for curry).

400-600mg take 3 times a day with food

Cayenne Pepper (Capsicum/ Red Pepper) (Can be used as a spice as an anti-inflammatory or it also comes in a cream to be applied to joints that are painful.)

Capsicum Cream use on painful areas several times per day. It makes the skin feel hot. Avoid use on face and wash hands after applying so you do not get the cream in your eyes. Do not use on children because they may get this in their eyes by accident.

## Calcium plus Vitamin D Supplementation and the risk of incident diabetes in Women

### [Calcium plus vitamin D supplementation and the risk of incident diabetes in the Women's Health Initiative.](#)

Diabetes Care. 2008 Apr;31(4):701-7

Authors: de Boer IH, Tinker LF, Connelly S, Curb JD, Howard BV, Kestenbaum B, Larson JC, Manson JE, Margolis KL, Siscovick DS, Weiss NS,

**OBJECTIVE:** Experimental and epidemiologic studies suggest that calcium and vitamin D may reduce the risk of developing diabetes. We examined the effect of calcium plus vitamin D supplementation on the incidence of drug-treated diabetes in postmenopausal women.

**RESEARCH DESIGN AND METHODS:** The Women's Health Initiative Calcium/Vitamin D Trial randomly assigned postmenopausal women to receive 1,000 mg elemental calcium plus 400 IU of vitamin D<sub>3</sub> daily, or placebo, in a double-blind fashion. Among 33,951 participants without self-reported diabetes at baseline, we ascertained by treatment assignment new diagnoses of diabetes treated with oral hypoglycemic agents or insulin. Effects of the intervention on fasting measurements of glucose, insulin, and insulin resistance were examined among a subset of participants.

**RESULTS:** Over a median follow-up time of 7 years, 2,291 women were newly diagnosed with diabetes. The hazard ratio for incident diabetes associated with calcium/vitamin D treatment was 1.01 (95% CI 0.94-1.10) based on intention to treat. This null result was robust in subgroup analyses, efficacy analyses accounting for nonadherence, and analyses examining change in laboratory measurements.

**CONCLUSIONS:** Calcium plus vitamin D<sub>3</sub> supplementation did not reduce the risk of developing diabetes over 7 years of follow-up in this randomized placebo-controlled trial. Higher doses of vitamin D may be required to affect diabetes risk, and/or associations of calcium and vitamin D intake with improved glucose metabolism observed in nonrandomized studies may be the result of confounding or of other components of foods containing these nutrients.

PMID: 18235052 [PubMed - indexed for MEDLINE]

[Eur J Cancer](#). 2010 Apr;46(6):1079-85. Epub 2010 Jan 28.

# Dietary carotenoids and risk of hormone receptor-defined breast cancer in a prospective cohort of Swedish women.

[Larsson SC](#), [Bergkvist L](#), [Wolk A](#).

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## Abstract

Carotenoids have antioxidant and antiproliferative properties and may reduce the risk of breast cancer. We examined the association between dietary carotenoids and risk of invasive breast cancer in the Swedish Mammography Cohort, a population-based cohort of 36,664 women who completed a questionnaire in 1997. During a mean follow-up of 9.4 years, 1008 women were diagnosed with incident breast cancer. Dietary carotenoids were not significantly associated with the risk of breast cancer overall or with any subtype defined by oestrogen receptor (ER) and progesterone receptor (PR) status. However, dietary alpha-carotene and beta-carotene were inversely associated with the risk of ER-PR-breast cancer among ever smokers. Among ever smokers, the multivariable relative risks of ER-PR-breast cancer comparing the highest with the lowest quintile of intake were 0.32 (95% confidence interval (CI): 0.11-0.94; P(trend)=0.01) for alpha-carotene and 0.35 (95% CI: 0.12-0.99; P(trend)=0.03) for beta-carotene. The risk of breast cancer also decreased with increasing intakes of alpha-carotene (P(trend) = 0.02) and beta-carotene (P(trend)=0.01) among women who did not use dietary supplements. These findings suggest that dietary alpha-carotene and beta-carotene are inversely associated with the risk of breast cancer among smokers and among women who do not use dietary supplements.

PMID: 20116235 [PubMed - indexed for MEDLINE]

# Grape Seed Extract Offers Many Benefits

Monday, July 19, 2010 by: Luella May, citizen journalist

(NaturalNews) Used throughout Europe to prevent and treat a variety of health conditions, grape seed extract is a powerful antioxidant that can be used to benefit the body in many ways. Grape seed has antioxidant, antiallergenic, antihistamine, anti-inflammatory and immune boosting properties and it can be instrumental in helping the body fight viruses, allergens, and carcinogens.

Because of its antioxidant properties, grape seed extract is considered an anti-aging wonder. Antioxidants are the most important nutrients for the skin. The bioflavonoids in grape seed extract help strengthen and protect cell membranes from oxidative damage caused by free radicals. Its antioxidant properties are considered to be stronger than those of vitamin C and Vitamin E. It helps to repair connective tissue while promoting skin enzyme activity. Grape seed extract aids wound healing by helping to regenerate damaged blood vessels and clearing harmful bacteria from the wound.

Wrinkles and sagging skin, a common age old concern, particularly in women, is caused by harmful free radical activity. Aging is caused by years of physical wear and tear on the body and it can be hastened by poor lifestyle choices, such as a poor diet, smoking and the use of drugs and alcohol. Changing to a healthy lifestyle, including proper diet and supplementation, can ward off and even reverse aging. Grape seed extract contains one of the richest sources of oligomeric proanthocyanidins (OPC's), which makes it one of the most powerful antioxidants available. The use of grape seed extract, together with implementing a healthy lifestyle, can make it possible to reverse much of the damage that has caused lines and wrinkles in the skin.

The body can benefit in many other ways from using grape seed extract. It can be used to prevent health problems which include cardiovascular disease, varicose veins, edema, and arthritis. Grape seed extract also acts as a natural anti-histamine, moderating allergic responses by reducing histamine production and boosting the immune system.

Another important area that grape seed extract can help is eye health. Grape seed extract is frequently recommended to combat macular degeneration, cataracts, and eye strain. Studies have shown that 300 mg daily reduces eye strain from prolonged computer use in 60 days.

Grape seed extract can also be effective in treating conditions such as ADD, as it aids in regulating the neurotransmitters in the brain and inhibits the breakdown of norepinephrine and dopamine. Grape seed extract is one of the few antioxidants that can help to protect nerve and brain tissue by penetrating the blood brain barrier.

Some additional benefits which it provides are:

- \*Prevents formation of plaque in arteries.
- \*Improves mental alertness and may help to prevent senility.
- \*Prevents tooth decay
- \* Helps to prevent osteoporosis
- \*May interfere with cancer cell growth and proliferation
- \*May inhibit virus expression and replication in individuals with HIV
- \*Aids in poor circulation
- \*Addresses complications due to diabetes
- \*Relieves constipation
- \*It is water and oil soluble, delivering antioxidant protection by penetrating cell membranes throughout the body.

These are just some of the benefits that one can derive from grape seed extract, a powerful supplement that should not be overlooked.

NOTE: Individuals allergic to grapes should not use grape seed extract. It may also interfere with the use of blood thinners, causing excessive bleeding.

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## About the author

Luella May is a natural health advocate helping people to heal naturally. Luella is in the midst of editing her ebook, "The 8 Invisible Stains of Our Souls" which will be available in the next few months. She partners with Tony Isaacs, who authors of books and articles about natural health including "[Cancer's Natural Enemy](#)" and "[Collected Remedies](#)" Luella contributes to [The Best Years in Life](#) website for baby boomers and others wishing to avoid prescription drugs and mainstream managed illness and live longer, healthier and happier lives naturally. Luella co-moderates the CureZone "[Ask Tony Isaacs](#)" forum as well as the Yahoo Health Group "[Oleander Soup](#)" and hosts her own yahoo group focusing on the natural wellbeing of pets "

# Indole-3-Carbinol (I3C): safe & natural alternative to breast cancer drug

*By CP Staff*

Source: <http://www.cpmedical.net/articles/indole-3-carbinol-i3c-safe-and-natural-alternative-to-breast-cancer-drug>

Mothers everywhere tell their daughters to eat their vegetables so they'll grow up to be strong and healthy. If current research is on the mark, this could be better stated as: Eat your vegetables, so you don't get breast cancer. At issue is the remarkable plant extract, indole-3-carbinol, or I3C, a hard-working phytonutrient found in the Brassica genus of vegetables, including broccoli, cabbage, brussels sprouts and cauliflower.

Studies show that I3C is a powerful remover of estrogen that does double-duty as an effective weapon against breast, cervical and skin cancer as well as respiratory papillomas. Estrogen is the common link between most breast cancer risk factors, i.e., genetic, reproductive, dietary, lifestyle and environmental. It stimulates the division of breast cells — healthy as well as cancerous — in some cases actually increasing the risk of breast cancer.

For more than 20 years, the antiestrogen drug **Tamoxifen** has been the drug of choice to treat breast cancer. But Tamoxifen has a dark side. Virtually all users become resistant to the drug within five years, and the majority of cancer patients who take it live no longer than those who do not take it. Furthermore, some breast cancers actually learn how to use Tamoxifen to stimulate their growth. In fact, in 1995 the state of California's Carcinogen Identification Committee voted unanimously to add Tamoxifen to its list of known cancer-causers!

Curiously, the profit-minded, bumbling FDA originally approved it as a birth control pill, but it was later proven to induce rather than inhibit ovulation. I3C outperforms Tamoxifen in clinical trials.

In one study at UC Berkeley, I3C posted a 90 percent DNA synthesis inhibition rate compared to 60 percent for Tamoxifen. In another study, researchers compared mice on a control diet to those fed an I3C-supplemented diet. 19 of 25 mice in the control group developed cancer compared to only two of 24 mice in those taking I3C. I3C is sold by Complementary Prescriptions which designs and manufactures high-quality, research-backed nutritional formulas sold in physicians' offices worldwide and direct to consumers by catalog. The company may be contacted by calling 800.877.2447, or on the internet at [www.CP.com](http://www.CP.com).

# Indole-3-Carbinol (I3C) - A Powerful Anticarcinogen

By Kimberly Pryor

Source: <http://www.cpmedical.net/articles/indole-3-carbinol-i3c-a-powerful-anticarcinogen>

Indole-3-Carbinol (I3C) is one of the most important weapons in the anticancer arsenal. A phytonutrient derived from the cruciferous vegetables of the Brassica genus (cabbage, broccoli, cauliflower and brussels sprouts), I3C initiates a series of reactions in the body that culminates in the elimination of estrogen.

**Antiestrogen** To understand why I3C is such a potent anticarcinogen, we must first look at the process involved in removing estrogen from the human body. Metabolism of the natural estrogen estradiol occurs via one of two pathways. The tumor enhancer metabolic pathway, 16 alpha-hydroxylation, is elevated in patients with breast and endometrial cancer and in those at increased risk of such cancers. This increased 16 alpha-hydroxylation activity has been shown to precede clinical evidence of cancer, and it represents a significant risk factor for developing estrogen-dependent tumors.

1 H. Leon Bradlow, Ph.D. has conducted numerous studies on I3Cs effect on estrogen metabolism pathways. He has observed that 16-alpha hydroxylation was 4.56 fold higher in patients undergoing mastectomy for cancer than in patients who did not have cancer.

2 Conversely, when estrogen veers away from the 16-alpha pathway and takes another route out of the body, the incidence of cancer decreases. This alternate route, which acts as a tumor suppressor metabolic pathway, is called 2-hydroxylation, a process which transforms estrogen into 2-hydroxyestrone (2OHE1), an antiestrogen. Healthy individuals not at risk for breast or endometrial cancer bypass the 16-alpha route and instead metabolize estrogen through this preferable pathway.

3 The process begins when I3C is ingested. Stomach acid converts it into a variety of products that ultimately induce the enzyme cytochrome P450, which signals the body to metabolize estrogen via the 2-hydroxylation pathway. By funneling estrogen into this tumor suppressor pathway, I3C essentially vacuums away the estrogen.

4 Indole-3-Carbinol stimulates the rate at which the body expels estrogen through 2-hydroxylation. Bradlow and a group of researchers investigated the effects on humans of short-term oral exposure to I3C, administering 400 mg of I3C daily to test subjects for one week. After I3C was consumed, the extent of 2-hydroxylation jumped from 29.3 percent to 45.6 percent. In another study, 12 healthy volunteers ingested 6 - 7 mg of I3C per kg of body weight, per day over one-week. After exposure to I3C, the rate of 2-hydroxylation in the subjects increased by 50 percent.

5-6 As I3C works to sweep the estrogen away from the tumor enhancer to the tumor suppressor pathway, it acts as an effective weapon against breast, cervical and skin cancer and respiratory papillomas. **Breast Cancer** The potent, anticarcinogen effects of I3C have been documented in a number of studies. Researchers at the University of California at Berkeley injected I3C directly into human breast cancer cells, then observed its effect on the cell cycle, the process by which cells divide. I3C halted the cell cycle process before it jumped into full gear, inhibiting the growth of the cancer cells and preventing cell division by blocking DNA duplication.

7 Due to its ability to halt the cell cycle, I3C is being looked upon as a possible adjunct therapy to breast cancer. For more than 20 years, the antiestrogen Tamoxifen has remained the drug of choice to treat breast cancer sufferers. But Tamoxifen has been a double-edged sword. Although it has extended the life of many women, only half of the two-thirds of breast cancer patients with estrogen dependent tumors respond to Tamoxifen therapy. Furthermore, after 12 - 18 months of treatment, users develop a resistance to the drug, and it has been shown to stimulate the growth of breast cancer cells after prolonged use.

8-11 Research documents the effectiveness of combining I3C with Tamoxifen to eliminate the drugs potentially harmful effects and to create an even more effective antiestrogen. University of California at Berkeley researchers injected three groups of human breast cancer cells, one group with I3C, another with Tamoxifen and a third with the two substances combined. The cells injected with Tamoxifen alone experienced a 60 percent inhibition in DNA synthesis, while the cells injected with I3C experienced a 90 percent inhibition during the same time period. The combination of I3C and Tamoxifen yielded a more effective suppression of the cancer cells than either substance alone, resulting in a 95 percent inhibition after 96 hours of treatment.

12 Lower doses of Tamoxifen, when combined with I3C treatment, inhibited cancer cell growth to the same extent as higher doses of either substance added individually. These results indicate that patients on a combined Tamoxifen-I3C treatment program can substantially reduce their dosage of Tamoxifen, decreasing the likelihood of resistance to the drug.

13 **Cervical, Vaginal and Skin Cancer** I3C plays an important role in the prevention of cervical-vaginal and skin cancer. Human papilloma virus (HPV) infection is associated with an increased risk of cervical cancer, the second most common cancer in women and the seventh most common form of cancer worldwide, and an increased likelihood of developing skin cancer. HPV, however, is not the sole culprit behind cervical or skin cancer, and only a small percentage of women infected with HPV develop invasive cervical cancer. The evolution of HPV into cancer is triggered by estrogen, which increases the risk of HPV-infected cells becoming precancerous and malignant.

14-17 To determine whether I3C could be an effective anticarcinogen in HPV-related cases, researchers administered excessive estrogen to mice bred with HPV genes. The researchers compared mice fed a control diet with those fed a diet supplemented with 2000 ppm I3C. In the control group, 19 of 25 mice developed cervical-vaginal cancer within six months, compared to only 2 of the 24 mice in the I3C-supplemented group. In addition, researchers observed a reduction in skin cancer in the I3C-fed mice.

**18 Other Benefits** Besides altering estrogen metabolic pathways, I3C guards against the carcinogenic effects of two amines (IQ and PhIP) formed during the cooking process of proteinaceous foods. These amines are carcinogenic in several strains of rats, inducing mammary and liver tumors in the animals. Once activated by enzymes, PhIP and IQ yield cancer-causing DNA adducts. Indole-3-Carbinol inhibits this adduct formation by as much as 89 percent.

**19 Recurrent Respiratory Papillomatosis (RRP)** Recurrent Respiratory Papillomatosis (RRP) is a viral-caused disease characterized by soft tissue warts, or papillomas, that form on the larynx and vocal chords. Benign tumors which grow in clusters, the papillomas travel throughout the respiratory tract. Therefore, they can become extremely complicated to treat.

**20** In RRP patients, there appears to be a linear relationship between the ratio of estrogen metabolism pathways and the severity of the disease, based upon urine analysis of patients participating in a Long Island Jewish Medical Center study. Ratios of less than one of the 2-hydroxylation antiestrogen byproduct 20HEI were associated with a more aggressive form of RRP. Ratios of 20HEI that were 3 or greater were connected with a milder form of the disease.

**21** Because of I3C's ability to alter the estrogen metabolism pathways, research suggests it may be effective in reducing the severity of RRP or wiping out the papillomas altogether, with many RRP patients reporting either a partial or complete recovery.

**22-23 Vegetables Arent Enough** For those who appreciate the anticarcinogenic effects of I3C, is it enough to increase your intake of broccoli or cabbage? According to researchers, the answer is no. In order to consume enough cruciferous vegetables to have a positive effect, research suggests that a pound or more of cabbage or cauliflower per day would be the required dosage, more than most people would like to consume. Bradlow recommends consuming at least 300 mg of I3C daily, the minimum dose his studies have found to be effective in human subjects. The other disadvantage of deriving I3C directly from consumption of cruciferous vegetables is that the concentration of I3C varies greatly depending on the seed strain, climate and soil. Cabbage grown in Israel, for instance, has been found to contain virtually no I3C. Consequently, it is difficult to achieve therapeutic levels of I3C by diet alone.

**24 Synergistic Effect** I3C is a powerful anticarcinogen in and of itself, but studies have shown that certain substances taken in conjunction with I3C boost its effects. Some investigators have suggested that taking ascorbic acid (Vitamin C) along with I3C will produce ascorbigen, an even more crucial anticarcinogen than I3C.

**25** Because the digestive process assists with the breakdown of I3C, antacids are one substance that should not be taken in conjunction with this phytonutrient.

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## Magnesium Baths

Carolyn Dean MD ND | Friday, December 14, 2012

When doctors say that “[magnesium is just a fad](#)” or that “[magnesium is toxic](#)” you know that they haven’t done their homework. They obviously haven’t read the 1,000 magnesium research studies produced by Drs. Burton and Bella Altura. And they don’t know that magnesium has been used safely and successfully for over 300 years.

Morley Robbins just wrote the following on his Facebook site, [The Magnesium Advocacy Group](#):

“Here’s something for us to reflect on: ‘The first published account of the efficacy of Magnesium in management of a variety of nervous complaints, including anxiety, depression, hypochondria, anorexia, headache, and cramps, among other disturbances, was in a 17th century booklet by N. Grew (1697), entitled “Treatise on the Nature and Use of the Bitter Purging Salt Contained in Epsom and Such Other Water.’”

For those new to the magic of Magnesium, Epsom Salts are MgSO<sub>4</sub> and actually date back to Roman times. It would appear that our ancestors from 300+ years ago were afflicted by many of the same conditions that plague our society today. One major difference: they chose to use a vital, natural & restorative mineral (Maggie) to bring their bodies back into metabolic balance. So how “advanced” are we really?”

Epsom salt is magnesium sulfate and that’s important because bathing in it gives you a healthy supply of sulfur along with the magnesium. Sulfur is another important mineral that we may be lacking. To investigate this mineral, you can view a [power point by Dr. Stephanie Senhoff on taurine](#), an important sulfur-based amino acid. I recommend the amino acid taurine if magnesium and potassium (in broth form) don’t completely eliminate heart palpitations.

According to Dr. Norm Shealy, bathing in magnesium salts is also an important way to stimulate the DHEA receptors lying under your skin.

So, I recommend [various forms of magnesium by mouth](#), as well as magnesium baths. Magnesium baths supply magnesium but also act as a detoxifier. For an even better detox, blend up some [Magnetic Clay](#) and pour it into your bath water.

To give you more minerals besides magnesium, you can add sea salt to your bath. Go half-and-half Epsom salts and [Natural Calm Sports Bath](#), which combines magnesium and sea salt.

Children especially benefit from magnesium baths. Most kids love their baths and adding magnesium salts just makes sense. For kids and adults, 1-2 cups in a bath is sufficient. However, I’ve used up to 8 cups when I’ve had a severe muscle spasm or injury.

I know I may sound like a broken record about magnesium. And I, personally, never wanted to “specialize” in any one thing. But I’ve come to realize that magnesium is not a specialist nutrient, it is a generalist and it may be affecting up to 80% of all biological processes in the body, so it’s well worth harping on!!

[J Nutr](#). 2010 Sep;140(9):1661-8. Epub 2010 Jun 30.

# Plasma folate concentrations are positively associated with risk of estrogen receptor beta negative breast cancer in a Swedish nested case control study.

[Ericson U](#), [Borgquist S](#), [Ivarsson MI](#), [Sonestedt E](#), [Gullberg B](#), [Carlson J](#), [Olsson H](#), [Jirström K](#), [Wirfält E](#).

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## Abstract

Folate's role in breast cancer development is controversial. Not only estrogen receptor (ER) alpha status, but also ERbeta status of tumors may have confounded results from previous epidemiological studies. We aimed to examine associations between plasma folate concentration and postmenopausal breast cancer defined by ER status. This nested case-control study, within the Malmö diet and cancer cohort, included 204 incident breast cancer cases with information on ERalpha and ERbeta status determined by immunochemistry on tissue micro-array sections. Plasma folate concentration was analyzed for the cases and 408 controls (matched on age and blood sample date). Odds ratios (OR) for ER-defined breast cancers in tertiles of plasma folate concentration were calculated with unconditional logistic regression. All tests were 2-sided. Women in the third tertile of plasma folate concentration (> 12 nmol/L) had higher incidence of ERbeta- breast cancer than women in the first tertile (OR: 2.67; 95% CI: 1.44-4.92; P-trend = 0.001). We did not observe significant associations between plasma folate concentration and other breast cancer subgroups defined by ER status. We observed a difference between risks for ERbeta + and ERbeta- cancer (P-heterogeneity = 0.003). Our findings, which indicate a positive association between plasma folate and ERbeta- breast cancer, highlight the importance of taking ERbeta status into consideration in studies of folate and breast cancer. The study contributes knowledge concerning folate's multifaceted role in cancer development. If replicated in other populations, the observations may have implications for public health, particularly regarding folic acid fortification.

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## [Publication Types, MeSH Terms, Substances](#)

### Publication Types:

- [Research Support, Non-U.S. Gov't](#)

## MeSH Terms:

- [Aged](#)
- [Breast Neoplasms/etiology\\*](#)
- [Case-Control Studies](#)
- [Estrogen Receptor beta/genetics\\*](#)
- [Female](#)
- [Folic Acid/blood\\*](#)
- [Humans](#)
- [Middle Aged](#)
- [Odds Ratio](#)
- [Polymorphism, Genetic](#)
- [Postmenopause](#)
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- [Sweden/epidemiology](#)

## Substances:

- [Estrogen Receptor beta](#)
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## Medical:

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## Molecular Biology Databases:

- [FOLIC ACID - HSDB](#)

# The Calcium Lie

## The Calcium Lie

Carolyn Dean MD ND | Monday, May 28, 2012

[www.drcarolyndean.com](http://www.drcarolyndean.com)

I recently did an [Audio Interview](#) for The Nutritional Magnesium Association (NMA) with Kathleen Barnes, coauthor of “The Calcium Lie”.

This interview has a very timely message since we’re now being warned that taking calcium supplements can double the risk of heart attack for women. Yes, that’s right...I did tell you so. You can google my name and calcium and find out why I hate this insoluble mineral.

While your at the NMA website, watch the video called [A Look Inside the Cell](#) which is about the importance of calcium magnesium balance. It’s on the same page as the Kathleen Barnes interview.

Then read the press release I wrote for the NMA in March 2012: [High Calcium – Low Magnesium Consumption Poses Health Risk](#).

If you want to get maximized your magnesium intake from foods just beware of taking in too much oxalic acid. Here is an [attack on green smoothies](#) that explains the problem but unfortunately is designed for shock and awe.

I asked my foster-daughter, Shakaya Breeze to be the voice of reason in this debate. Shakaya said this warning against green smoothies isn’t a valid concern for people who are educated in the most nutritious foods on earth- greens and seaweeds. She said oxalates are higher in spinach than kale so she always recommends rotating greens (also for the micro amounts of toxic/poison/alkaloid that make our immune system stronger. For example, there are homeopathic amounts of arsenic in parsley and clover, and nicotine and opium in romaine lettuce.

Putting things into perspective, Shakaya also reminds us that there are far more oxalates in coffee and people drink way more coffee than green smoothies!

The Benefits of Green Smoothies:

1. Convenient- takes 3 minutes to make
2. Clean up is a breeze

3. Very economical- moreso than juicing
4. Easily digested nutrition
5. Easier than changing one's diet, adding green smoothies helps people STOP craving junk food and they start craving greens and healthy food
6. Reverse low HCL because of deficiency in zinc and greens blended have absorbable zinc
7. Our digestive system is rested and heals on blended foods/greens with high nutrition

You can find out more about raw food and green smoothies and much more on Shakaya's [Earth Empress Website](#).

RECOMMENDATIONS: To get well and stay well, join my 2-year online wellness program called [Completement Now!](#) The various types of magnesium to take are on my website under [Resources](#). However, the most commonly used magnesium, Natural Calm available at [VitaCost](#) and most health food stores. Under books you'll find my eBooks: [How to Change Your Life with Magnesium, Future Health Now Encyclopedia and Death by Modern Medicine](#). For Angstrom Minerals go to [HealthShop](#). For Detoxing I recommend [LL's Magnetic Clay and Magnesium Flakes](#). For treating yeast overgrowth, IBS and digestive disorders, I recommend [Prescript Assist](#). For Coconut products, whey powder and green powders go to [Tropical Traditions](#). For food-based supplements [Grown by Nature](#) offers my readers a 20% discount on your purchases. At checkout, just enter the code: gbn123. For psychological and emotional issues I recommend [EFT](#), the [Linden Method](#) (for anxiety) and [The Healing Codes](#). For everything and everything else take [RnA Drops](#) and read my [Blog about RnA Drops](#).

NOTE: Only you can know if something is helping you. If you don't feel well on a supposed beneficial product, listen to your body and stop taking it! Knowing when to Not take something is a big part of taking responsibility for your health.

WARNING: I cannot answer personal health questions by email. However, please send general questions that I may be able to answer in my blog. But first, google my name with the condition you are inquiring about and see if I've already addressed it somewhere on the web.

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## The Miracle of Magnesium

August 07, 2004

By Carolyn Dean, MD, ND

Magnesium deficiency triggers or causes the following 22 conditions; the introduction of magnesium, either by a high-magnesium diet, with green drinks, or magnesium supplements, can help alleviate these conditions:

1. Anxiety and panic attacks
2. Asthma
3. Blood clots
4. Bowel disease
5. Cystitis
6. Depression
7. Detoxification
8. Diabetes, Syndrome X, and Metabolic Syndrome
9. Fatigue
10. Heart disease
11. Hypertension
12. Hypoglycemia
13. Insomnia
14. Kidney Disease
15. Liver Disease
16. Migraine
17. Musculoskeletal conditions
18. Nerve problems
19. Obstetrics and Gynecology--premenstrual syndrome, dysmenorrhea (cramping pain during menses), infertility, premature contractions, preeclampsia, and eclampsia in pregnancy, lessens the risk of cerebral palsy and Sudden Infant Death Syndrome (SIDS)
20. Osteoporosis
21. Raynaud's Syndrome
22. Tooth decay

Science and medicine have both turned their backs on magnesium. Science opts out because the scientific methodology is defined by being able to test one thing at a time ending up with one result. Science finds magnesium too difficult to corral, partly because it is responsible for the correct metabolic function of over 350 enzymes in the body. The creation of ATP (adenosine triphosphate) the energy molecules of the body, the action of the heart muscle, the proper formation of bones and teeth, relaxation of blood vessels, and the promotion of proper bowel function are all under the guidance of magnesium.

## Why Don't We Hear More About Magnesium?

Medicine has turned its back on magnesium because most of the funding for medical research now comes from drug companies. Magnesium is not a patented drug and therefore will not be studied by drug companies, except to try to disprove its action.

While researching my book, "[The Miracle of Magnesium](#)," I found that doctors have been prescribing magnesium for heart disease since the 1930s. A review of seven major clinical studies showed that IV magnesium reduced the odds of death by more than half in patients suffering acute myocardial infarction (heart attack). One study, LIMIT-2, developed a protocol for giving magnesium as soon as possible after onset of the heart attack and before any other drugs. If those criteria were followed, heart muscle damage was greatly reduced, and neither hypertension nor arrhythmia developed.

## Magnesium and the Heart

During and after a heart attack, people can suffer the following:

- Extension of the area of heart damage as calcium floods into the muscle
- Blood clotting, which blocks blood vessels in the heart muscle
- Decreased blood flow as blood vessels go into spasm
- Arrhythmia as the areas where muscle contraction in the heart originate are damaged

Magnesium is able to:

- Dilate blood vessels
- Prevent spasm in the heart muscle and blood vessel walls
- Counteract the action of calcium, which increases spasm
- Help dissolve blood clots
- Dramatically lessen the site of injury and prevent arrhythmia
- Act as an antioxidant against the free radicals forming at the site of injury <sup>14</sup>

One of the main reasons that heart drug digoxin becomes toxic is because there is not enough magnesium in the body.<sup>5</sup>

A drug trial called ISIS sought to disprove the effects of magnesium. In the ISIS trial the protocol was not followed in that magnesium was not the first drug given, and often it was not given for many hours or days after a heart attack was well established, causing widespread damage and blood clotting. Yet, drug reps can dutifully tell their doctor clients that ISIS proved that magnesium is worthless for heart disease! <sup>6</sup> Since the LIMIT-2 and ISIS trials, another smaller trial with only 200 people who were given IV magnesium at the onset of a heart attack, experienced a 74 percent lower death rate. <sup>7</sup>

In spite of the fact that heart drugs, mainly diuretics, have the bad habit of depleting magnesium--along with potassium and even though magnesium is absolutely required for stabilizing heart muscle activity--magnesium is not utilized properly by conventional medicine.

## **Magnesium's Role in a Healthy Body**

A small group of international magnesium researchers, however, have continued, against all odds, to prove the importance of magnesium not only as a nutrient for thousands of body processes but also as a medicine to treat magnesium-depleted health conditions. Drs. Bella and Burton Altura are two hard-working magnesium heroes! They have performed laboratory research and clinical research to the tune of about 1,000 studies over the past 40 years. The Alturas personally confirmed that the 22 magnesium-related conditions, listed at the beginning of this article, have a solid basis in science.

Dr. Burton Altura said that during his 40 years of research he was appalled at the lack of attention given to this life-saving nutrient. He has all but given up on conventional medicine recognizing the need for magnesium in its protocols for dozens of diseases and welcomed books such as mine to help spread the word. Without million-dollar marketing budgets that drug companies have for their latest drugs, nutrient research plods along--proving over and over again their worth but never being able to get that information out to the public.

## **Up to 80 Percent of Americans are Magnesium-Deficient**

Another reason that Dr. Altura felt magnesium was not given its due is because there has been no lab test that will give an accurate reading of the magnesium status in the tissues. Only one percent of magnesium of the body is distributed in the blood, making a simple sample of magnesium in the blood highly inaccurate. That's why most doctors who rely on blood tests for magnesium and not magnesium deficiency signs and symptoms and realization that up to 80 percent of the population is deficient, will miss an important diagnosis.

There's even more to the actual way magnesium works. It exists in the body either as active magnesium ions or as inactive magnesium complexes bound to proteins or other substances. A magnesium ion is a group of atoms that is missing an electron, which makes it excitable as it searches to attach to something that will replace its missing electron.

Magnesium ions constitute the most physiologically active fraction of magnesium in the body; they are free to join in biochemical body processes and are not attached to other substances.<sup>8</sup> Most clinical laboratories only assess total "serum" magnesium, which mixes up both active and inactive types.

The Alturas took it upon themselves to develop and research a method that would test specifically for magnesium ions. It came about in 1987 and is called the Blood Ionized Magnesium Test. Its accuracy has been confirmed countless times with sensitive digital imaging microscopy, atomic absorption spectroscopy and the magnesium fluorescent probe. With this test it is now possible to directly measure the levels of magnesium ions in whole blood, plasma and serum using ion-selective electrodes.<sup>8</sup> The Alturas have used the ionized magnesium test in hundreds of research trials on dozens of different conditions proving, for example, that the 22 conditions listed above are related to magnesium deficiency.<sup>9-15</sup>

Unfortunately, I'm not able to tell you that the ionized magnesium test is readily available. The Alturas do ionized magnesium tests at their laboratory at SUNY in New York and the testing equipment is available through an outside manufacturer to interested labs. (I've included the Altura contact information, below.)

## **How to Get Enough Magnesium**

How do I get enough magnesium is a question that I'm frequently asked. If there is enough magnesium in the soil where green leafy vegetables, nuts, and seeds are grown then we have a chance to obtain magnesium from our diet. Organic foods may have more magnesium, but only if farmers replenish their soil with magnesium-rich fertilizers. Most fertilizer used on factory farms relies heavily on nitrogen, phosphorous, and potassium to make plants grow and appear healthy.

However, if magnesium and other minerals and micronutrients are not introduced the plants may look good but are not packed with the nutrition we need. Growers should be required to use top-quality fertilizers and should test their crops for the long list of nutrients we need to stay healthy.

In general, to get as much magnesium as possible in the diet, eat plenty of organic leafy green vegetables, nuts and seeds every day. Adding green drinks to your menu will help you achieve a higher magnesium status. However, if you are suffering from the following symptoms you may need supplemental magnesium:

muscle twitches, tics, or spasms	"Charlie horse" (the muscle spasm that occurs when you stretch your legs)	insomnia or restless sleep	stress	back pain
headaches, cluster headaches, migraines	stiff and aching muscles	bones and joints that need continued chiropractic treatment	weakness	hypoglycemia
diabetes	nervousness	hyperactivity	high blood pressure	osteoporosis
PMS	constipation	angina	kidney stones	aging
depression	heart attack	irregular heartbeat	attention deficit disorder	aggressive behavior
chronic fatigue syndrome	stroke	anxiety	confusion, muscle weakness	hiccups
	high-strung	exhaustion from exercise	seizures	

## The Calcium-to-Magnesium Ratio

Supplementing with magnesium must also take into account the balance between calcium and magnesium. Finland, which, from 1973 to 1999 had the highest recorded incidence of heart attack in middle-aged men in the world, also has a high calcium-to-magnesium ratio in the diet at 4 parts calcium to 1 part magnesium. <sup>16-17</sup> Americans in general have a high calcium-to-magnesium ratio in their diet and consequently in their bodies; the U.S. ratio is 3.5-to-1. Our dietary emphasis on a high calcium intake without sufficient

magnesium and because of the excessive emphasis on women taking high doses of calcium for osteoporosis, we are creating more imbalance between the two minerals.

Some researchers predict that the American ratio of calcium to magnesium is actually approaching 6-to-1, yet, the recommended dietary ratio of calcium to magnesium in the United States is 2-to-1. Current research on the paleolithic or caveman diet shows that the ratio of calcium to magnesium in the diet that our bodies evolved to eat is 1-to-1. <sup>18</sup> In order to offset the deficiency magnesium induced by excess calcium and to treat the above 22 conditions, people may find it necessary to ingest one part magnesium to one part calcium in supplement form for a period of months to a year. Stabilization on a healthy diet including green drinks may be possible after that time.

The most common sources of magnesium are oxide, citrate, glycinate, and malate. People use oxide and citrate if they suffer from constipation to take advantage of magnesium's laxative effect. Glycinate seems to cause little diarrhea and is the best choice for people who already have loose stools. Magnesium malate has been promoted for people with fibromyalgia to help break up lactic acid that seems to be part of the fibromyalgia picture.

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## **Resources**

Blood Ionized Magnesium Test

Drs. Bella and Burton Altura. State University of New York, Health Science Center at Brooklyn, New York, New York 11203, USA.  
(718) 270-2194 or (718) 270-2205.

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## By Dr. Mercola

Since this article was originally written, there have been many more studies documenting the benefits of magnesium for your cardiovascular health. Magnesium has been shown to reduce your risk for cardiovascular disease, [hypertension](#), diabetes, atherosclerosis, arrhythmias, congestive heart failure, and even improve your outcome after coronary artery bypass surgery by preventing atrial fibrillation. And this is just your *heart health*—as the article states, magnesium is beneficial for many other systems of your body.

In February 2011, a [study](#) published in the *American Journal of Clinical Nutrition* found that women with higher levels of magnesium in their blood were at lower risk for sudden cardiac death. This might be related to a recently discovered link between low magnesium levels and [left ventricular hypertrophy](#), which can significantly decrease your life expectancy.

It is also extremely important to make sure you are not taking excess calcium in supplement form, and if you take a calcium supplement, that it's *plant-derived* calcium. Calcium supplements have been linked to increased risk of breast cancer and heart attacks, as some forms of calcium are not processed correctly by your body and end up in the wrong tissues.

Food is your BEST source of calcium, which is why I generally don't recommend calcium supplements. For more information, please refer to my [calcium](#) article. For both bone and cardiac health, don't overlook the importance of [vitamin K](#) and [vitamin D](#), which act synergistically with calcium and magnesium.

## What to do if You're Magnesium Deficient

Unfortunately, there's no lab test that will give an accurate reading of the magnesium status in your tissues. Only one percent of the magnesium in your body is distributed in your blood, which makes a simple blood sample highly inaccurate. That's why most doctors who rely on blood tests for magnesium, as opposed to looking for signs and symptoms of magnesium deficiency, will frequently miss an important diagnosis.

If you suspect you are low in magnesium, the best way to obtain this mineral is by consuming organically bound magnesium, found in green, leafy vegetables. Foods high in magnesium include:

Rice, wheat or oat bran	Spinach	Artichokes	Dried herbs	Squash pumpkin and watermelon seeds
Dark chocolate cocoa powder	Flax and sesame seeds	Brazil nuts	Sunflower seeds	Sunflower seeds Almonds, mixed nuts, pine nuts

Organic foods may contain more magnesium, particularly if the farmer replenishes his soil with magnesium-rich fertilizers. (Factory farms tend to use fertilizers rich in nitrogen, phosphorous, and potassium to make plants grow and appear healthy.) However, if magnesium and other minerals and micronutrients are not introduced through the soil, the plants may look healthy but will not be packed with the nutrition you need.

As a general rule, to get as much magnesium as possible in your diet, eat plenty of organic leafy green vegetables, nuts and seeds *every day*. [Juicing](#) your vegetables is an excellent option to ensure you're packing enough of them into your diet.

You can also try a high-quality magnesium supplement, such as magnesium citrate or magnesium malate. If you experience loose stools when taking it, it's an indication it's not being absorbed. If this occurs, try varying your dosage or try a magnesium supplement that is chelated to an amino acid, such as magnesium taurate or magnesium glycinate. Alternatively, you can actually absorb magnesium via your skin by soaking in a bath with Epsom salts, which are made of magnesium sulfate.

# Too Much Calcium is Bad for Your Heart

## Too Much Calcium IS Bad for Your Heart

Carolyn Dean MD ND | Friday, February 8, 2013

Link: [http://drCarolynDean.com/2013/02/too-much-calcium-is-bad-for-your-heart/?utm\\_source=0302-1&utm\\_medium=Email](http://drCarolynDean.com/2013/02/too-much-calcium-is-bad-for-your-heart/?utm_source=0302-1&utm_medium=Email)

Fox News puts it in question form, “[Could too much calcium be bad for your heart?](#)” citing an analysis from the National Institutes of Health. A survey of almost 400,000 men who took calcium tablets showed that they were more likely to die of heart disease than those who didn’t.

Specifically, men who took 1,000 mg (or more) of calcium per day were 20 percent more likely to die of heart-related causes than those who took none. Oddly enough, the researchers said there was no link between calcium supplements and heart disease deaths in women.

But Morley Robbins and I reported on a more thorough set of studies in a Natural News article: [The Calcium Wars: Magnesium deficiency causes heart disease](#) showing that women are at risk for heart disease when they take supplemental calcium.

What the researchers are not covering is the tremendous amount of calcium in our diet. For example, calcium-fortified orange juice gives you 300 mg of calcium. Three cups is like taking the 1,000 mg supplements described in this study.

I keep telling people to look at the food in their diet and see how much calcium they are already getting. Follow the RDA for the UK and the WHO, which is 500-700 mg per day and you will see how easy it is to get enough calcium to keep your bones happy. What makes bones and your body even happier is enough magnesium along with daily exercise.

Food .....Amount of Calcium in milligrams (mg)

1 cup of milk.....	300
6 oz of yogurt.....	350
1 oz hard cheese (cheddar).....	240
2 slices processed cheese.....	265
1/4 cup cottage cheese.....	120
1/2 cup soft serve frozen yogurt.....	100
1/2 cup ice cream.....	85
1/2 cup tofu.....	258
1 Tbsp sesame seeds.....	90
1 Tbsp Tahini.....	63

8 medium sardines (canned).....	370
3 oz salmon.....	180
1 cup kale.....	94
1 cup broccoli.....	178
10 medium dried figs.....	269
1 cup calcium-fortified orange juice.....	300
1 cup enriched soy milk.....	300
1 cup enriched rice milk.....	300

The end stage of fatalities from heart disease is the focus of this study, which misses the point of the soft tissue damage done to many other parts of the body by the overuse of calcium. As I've said in previous posts, our body holds onto calcium much more than magnesium. That appears to be because human beings grew up near the ocean where seawater contains three times more magnesium than calcium which meant much more magnesium in their diet. Thus we evolved mechanisms that grabbed and stored calcium but released excess magnesium (the laxative effect). Without understanding those processes we've decided in our unfailing stupidity that we all need to be calcified.

And the results are treated with magnesium-wasting drugs. Here's one brief example. A new drug has been released by the FDA to treat an "overactive bladder." It's called Oxybutynin and it acts as a bladder muscle relaxant.

Here is a partial list of side effects: hives; difficult breathing; swelling of your face, lips tongue, or throat; hot, dry skin and extreme thirst; severe stomach pain or constipation; blurred vision, eye pain, or seeing halos around lights; pain or burning when you urinate; or urinating less than usual or not at all; dry mouth; dry eyes, blurred vision; mild constipation; diarrhea; nausea, mild stomach pain or upset; dizziness, drowsiness, weakness; headache; sleep problems; or runny nose.

What did I say Oxybutynin is? A muscle relaxant? Do you know any natural muscles relaxants?

That's right. Magnesium.

# Nutritional Supplements – Resources

## Books

1. What Your Doctor May Not Tell You About Breast Cancer by Dr. John Lee, MD and Dr. David Zava
2. The Magnesium Miracle by Dr. Carolyn Dean, MD, ND

Dr Dean explains why it's difficult to determine whether you might suffer from magnesium deficiency, and gives some symptoms that might indicate you are magnesium deficient.

## Website/Links:

Vitamin C – Linus Pauling Institute

<http://lpi.oregonstate.edu/infocenter/vitamins/vitaminC/>

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Vitamin D

[www.vitamindcouncil.org](http://www.vitamindcouncil.org)

## Harvard School of Public Health

<http://www.hsph.harvard.edu/nutritionsource/vitamin-d/#new-vitamin-d-research>

Research from Great Britain shows Caucasian women have a high likelihood of not being able to store vitamin D properly due to a gene mutation

<http://www.sciencedaily.com/releases/2011/08/110803092027.htm>

[http://www.eurekalert.org/pub\\_releases/2011-08/udod-pmi080111.php](http://www.eurekalert.org/pub_releases/2011-08/udod-pmi080111.php)

<http://edrv.endojournals.org/content/20/2/156.full>

<http://www.bbc.co.uk/news/health-16086004>

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## Probiotics and Digestive Enzymes

<http://www.sciencedaily.com/releases/2010/10/101004101534.htm>

<http://www.sciencedaily.com/releases/2012/01/120131102521.htm>

<http://www.sciencedaily.com/releases/2011/03/110328151732.htm>

<http://www.sciencedaily.com/releases/2010/03/100329093617.htm>

<http://www.sciencedaily.com/releases/2008/12/081224215544.htm>

<http://www.sciencedaily.com/releases/2012/06/120612101340.htm>

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## Co-Q10 -Ubiquinal

<http://www.sciencedaily.com/releases/2008/02/080212165429.htm>

**There are 4 other references papers at this location that are fantastic and should be read.**