

LE Magazine June 1997

UPDATE

Selenium Is Found to Reduce Cancer Mortality by 50 Percent

By Saul Kent

Just last Christmas Eve was a memorable date for people who have been taking antioxidants to prevent disease. CNN and other networks reported on a study from the Dec. 25, 1996, issue of the Journal of the American Medical Association (JAMA) showing that selenium reduced cancer mortality in humans by 50 percent over a 10-year period of time. CNN carried a more extensive report and emphasized that Americans could buy in health food stores the selenium tablets used in the JAMA study.

In 1994, the Food and Drug Administration stated that selenium was toxic and should not be allowed to be sold freely. For the health freedom fighters who stopped the FDA from banning selenium, this report, published in the American Medical Association's own journal, is the ultimate vindication.

This study also vindicated the Life Extension Foundation's position on previous studies that failed to show that beta-carotene could prevent lung cancer in long-time smokers. The Foundation insisted that selenium in combination with beta-carotene would have lowered lung cancer risk. The new study showed a 46-percent reduction in the incidence of lung cancer in the selenium group, compared to the placebo group.

One of the unique findings of this study was that selenium reduced the risk of lung cancer to a greater degree than cessation of smoking.

THE JAMA STUDY

The doctors who conducted the JAMA study began their paper by stating that, "Selenium compounds have been shown to have anti-tumorigenic activities in animal models when the drug is administered at levels greater than those associated with nutritional needs." (Note that a selenium compound is referred to here as a "drug.") Hypotheses as to why supplemental selenium inhibits the development of cancer, including the following:

- Protection against free radicals
- Alterations in carcinogen metabolism
- Effects on hormone and immune systems
- Inhibition of cancer-causing enzymes
- Stimulation of apoptosis, i.e., programmed cancer-cell death

The doctors cited epidemiologic studies showing that human populations consuming high levels of selenium in their diet had significantly lower rates of cancer compared to human populations consuming low levels of selenium.

In the JAMA study of 1,312 randomized subjects ranging in age from 18 to 80, there were no significant differences between the treatment and placebo groups prior to the study. Subjects were given a 200 mcg selenium supplement supplied by Nutrition 21. The placebo group received an identical-looking tablet without any selenium. Within six to nine months, the treatment group experienced an average 67-percent increase in plasma selenium levels.

It was noted that plasma selenium levels in the placebo group never fell to a deficient level. This calls into question the FDA's definition of "deficiency," since those with "normal" selenium levels had twice the rate of cancer. Doctors noted that previous studies showed that greater amounts of dietary selenium are needed to prevent cancer than the amounts the FDA says are adequate.

RESULTS OF STUDY

Here are site-specific reductions in cancer incidence observed in the study:

- Prostate cancer: 63-percent reduction
- Colon-rectal cancers: 58-percent reduction
- Lung cancer: 46-percent reduction

The overall reduction in cancer incidence was 37 percent in the selenium-supplemented group, and there was a 50-percent reduction in cancer mortality. This indicates that supplemental selenium reduces the risk of getting cancer and protects cancer patients from dying.

The doctors cited previous studies showing that selenium inhibits tumor growth and stimulates apoptosis in cultured tumor cells, writing that the results "support the hypothesis that selenium supplementation inhibits late-stage promotion and progression of tumors."



The doctors concluded, "For now, it is premature to change individual behavior, to market specific selenium supplements, or to modify public health recommendations based on this one study."

The Life Extension Foundation takes a more positive stance. This "one" study was initiated because there were several hundred previously published studies indicating that selenium may help to prevent cancer. Selenium is only one component of an overall cancer-prevention lifestyle.

Those concerned about their health should include 300 to 600 mcg a day of different forms of selenium as part of their overall cancer prevention program. In addition, it appears that supplemental selenium may contribute to cancer remission as well.

WHAT FORM OF SELENIUM IS BEST

The JAMA study, showing a 50-percent reduction in human cancer mortality, used 200 mcg of an organic selenium compound. There long has been a debate among scientists whether organic forms of selenium, such as selenomethionine, are better than inorganic forms, such as selenite and selenate.

In 1983, the Foundation conducted an exhaustive review of the scientific literature, and then interviewed many of the scientists who had published papers on selenium. The results of the Foundation's analysis were the following:

1. There are specific and unique advantages to using both organic and inorganic forms of selenium. Some forms of selenium protect against certain forms of cancer better than others, and certain forms of selenium may slow premature aging better than others.
2. Combining selenite with Vitamin-C would neutralize the biological activity of the selenite. The selenate form of selenium is not as vulnerable to vitamin-C neutralization as selenite.
3. The three best forms of selenium to take on a daily basis are Selenomethionine: organic selenium bound to the amino acid methionine; selenodiglutathione: organic selenium bound to the amino acid glutathione; and sodium selenate: inorganic selenium that functions differently than the organic forms and is not significantly neutralized by Vitamin-C.

PROSTATE CANCER UPDATE

Prostate cancer is the most hormone-sensitive cancer in man. While androgenic hormones (such as testosterone) secreted by the testes and adrenal glands are the most potent factors in promoting the vast majority of prostate cancer cell lines, the hormone prolactin may also contribute to the proliferation of prostate cancer cells. Studies have shown that prolactin may be involved in prostate growth, and a rising serum level of prolactin indicates progression in patients with advanced prostate cancer.

The presence of prolactin receptors in prostate cancer cells may facilitate the entry of testosterone into prostate cells. Since testosterone-blocking therapies do not completely eliminate testosterone from the blood, it is conceivable that prolactin could carry a small amount of residual testosterone into the prostate cells and cause cancer growth. Suppressing prolactin secretion with relatively safe prescription drugs thus appears to be another method of slowing the progression of prostate cancer.

In a study in the *European Journal of Cancer* (Vol 31A, No. 6, 1995), the use of a prolactin suppressing drug (bromocriptine) with flutamide and orchiectomy (surgical removal of the testes) resulted in a 61-percent suppression of primary prostate growth, compared with only a 48-percent reduction with orchiectomy and flutamide only. After 36 months, only 40 percent of the group receiving bromocriptine and orchiectomy/flutamide experienced disease progression, compared to 60 percent in the

orchiectomy/flutamide-only group. Most prostate cancer patients, understandably, prefer taking the drug Lupron instead of undergoing orchiectomy. Lupron may be more effective than orchiectomy.

Prostate cancer patients should have their prolactin levels checked via a blood test. If your prolactin levels are elevated, you should consider one of the following prescription drug regimens. Remember that this is not intended to replace the attention/advice of a physician or other health care professional.

1. Bromocriptine, 5 mg one to two times a day; or
2. Pergolide, 0.25 mg to 0.5 mg twice a day; or
3. Dostinex, 0.5 mg twice a week

Check your prolactin levels again in 30 days to make sure the drug you choose is, in fact, suppressing prolactin release from the pituitary gland into your blood.

Dostinex is the newest and cleanest drug to use. Dostinex has fewer side effects than the older drugs, is more effective in suppressing prolactin than the older drugs, and requires dosing only twice a week.

INDUCING PROSTATE CANCER CELL DEATH

Apoptosis, as noted, is programmed cell death. Cancer researchers are focusing on agents that induce apoptosis in cancer cells as the next generation of cancer drugs. Many of the nutrients in the Life Extension Foundation's cancer-treatment protocol, such as selenium, vitamin A, green tea and vitamin D-3, induce apoptosis in cancer cells.

The most effective nutrient available to induce apoptosis may be curcumin, an antioxidant extract from the spice tumeric that has a wide range of health benefits. Cancer patients should consider taking 2,000 to 4,000 mg a day of curcumin with a heavy meal. Curcumin has been shown to induce cell shrinkage, chromatin condensation and DNA fragmentation, as well as block cellular signal transduction in a wide range of cancer cells. All these actions are characteristics of apoptosis according to an article in *Nutrition and Cancer USA* (26/1 1996).

Caution: Curcumin lowers cholesterol by stimulating biliary secretion of cholesterol and bile acids from the liver into the intestine. Do not use curcumin if you suffer from a biliary tract obstruction.

DHEA and Aging

In the journal *Drugs and Aging* (Oct., 1996), there is an analysis of published studies on DHEA, which reveals the following:

1. In both humans and animals, the decline of DHEA production with aging is associated with immune depression, increased risk of several different cancers, loss of sleep, decreased feelings of well-being and increased mortality.
2. DHEA replacement in aged mice significantly improved immune function to a more youthful state.
3. DHEA replacement has shown a favorable effect on osteoclasts and lymphoid cells, an effect that may delay osteoporosis. (Note: DHEA has been shown in other studies to promote the activity of bone-forming osteoblasts.)
4. Low levels of DHEA increase the risk of heart disease and diabetes mellitus by inhibiting energy metabolism by inhibiting energy metabolism.
5. Studies in humans show essentially no toxicity at doses that restore DHEA to youthful levels.
6. DHEA deficiency may expedite the development of some diseases that are common in the elderly.

The authors of this review do not feel that DHEA prevents Alzheimer's disease. However, at the time they wrote the review they would not have been aware of the two new studies we report on below, which show that DHEA might very well play a role in protecting brain cells against the pathological changes associated with Alzheimer's disease.

DHEA PROMOTES RELEASE OF ACETYLCHOLINE

Acetylcholine is a neurotransmitter that transmits nerve impulses from one brain cell to another. Acetylcholine is crucial for short-term memory and to protect brain cells against age-associated atrophy. Aging causes a decline in the release of acetylcholine into regions of the brain where it is needed for learning and memory.

In a study in *Brain Research* (Sept. 16, 1996), DHEA was administered to rats in order to measure the effect it produced on acetylcholine release into the hippocampus region of the brain, a critical area for the storage of memory. DHEA significantly increased acetylcholine release above pre-treatment levels in all doses tested. At the highest dose, DHEA caused a fourfold

increase in the release of acetylcholine, compared to the control group.

The scientists concluded that this was the first study to demonstrate a direct effect of DHEA in promoting the release of acetylcholine from brain cells in the hippocampus. This study provides evidence to support clinical findings that DHEA enhances learning and memory, and suggests that it could help to prevent Alzheimer's disease and other types of age-associated senility.

DHEA INCREASES CELL PROTECTION AGAINST ALZHEIMER'S SENILE PLAQUES

The accumulation of beta-amyloid in brain cells is a primary structural change related to the development of Alzheimer's disease. Beta-amyloid has been defined as "insoluble brick" that accumulates in brain cells with age. Beta-amyloid literally clogs up the delicate cellular machinery and causes brain cells to become non-functional.

In a study in Life Sciences (Oct. 4, 1996), the amount of the neuro protector amyloid precursor protein (APP) and DHEA in brain cells was studied. It was found that the amount of DHEA available to these cells declined significantly with advancing age, that DHEA increased nonamyliodogenic membrane-associated APP by 24 percent, and that it increased the secretion of APP into the medium by 63 percent. The more nonamyliodogenic APP fragments that were made, the less beta-amyloid they detected.

MELATONIN AND BRAIN TUMORS

Scientists at a prestigious neurological institute have contacted the Life Extension Foundation to inquire about using melatonin to treat incurable brain tumors. The Foundation has agreed to donate the pharmaceutical-grade melatonin needed for this study. This is the same quality melatonin that members purchase through the Foundation.

The reason scientists are so excited about using melatonin as a brain cancer therapy is preliminary evidence that melatonin is effective in preventing and treating brain tumors. In a study in Neuroscience Letters (Sept. 26, 1996), melatonin was tested in a human neuroblastoma cell line. Melatonin was shown to significantly inhibit cell proliferation and to induce the neuroblastoma cells to differentiate into normal cells.

This study showed that the therapeutic dose of melatonin for this type of brain cancer was very narrow, suggesting that anyone attempting to use melatonin to treat brain cancer should start off with low doses (1 to 3 mg), and have its effect on brain cancer growth measured through MRI testing and symptomatic evaluation before increasing the dose. The study showed that the vitamin-A derivative retinoic acid also produced significant cancer cell differentiation.

The problem with many lethal brain cancers is that their rapid progression does not provide enough time to monitor the effectiveness of melatonin-vitamin therapy, and there are no blood tests that monitor brain cancer cell activity. For those unfortunate enough to become afflicted with an aggressive primary brain tumor, multiple-treatment modalities should be initiated and frequent MRI scans used to monitor efficacy under the care of a qualified physician.

Monthly blood tests to measure liver enzyme and serum calcium levels should be done to guard against vitamin A and D toxicity. In addition to these blood tests, cancer patients taking high doses of vitamin A should know the symptoms of vitamin-A toxicity.

VITAMIN-A TOXICITY

Vitamin-A analogs are among the hottest "cancer drugs" being investigated as potential new therapies. Vitamin A and its analogs induce cancer cells to differentiate into normal cells and directly inhibit cancer cell proliferation.

For certain forms of mouth cancer, vitamin A has shown an incredibly high "cure" rate. In certain forms of leukemia, vitamin-A analogs are becoming an effective first-line therapy. Even in difficult-to-treat pancreatic cancer, vitamin-A analogs have been shown to inhibit cancer cell growth.

Based upon hundreds of published studies, the Life Extension Foundation has been recommending vitamin-A analogs to cancer patients. For the many cancer patients who cannot gain access to vitamin-A analogs because the FDA classifies them as "unapproved new drugs," the Foundation recommends the use of water-soluble vitamin-A liquid drops.

The dosage range that cancer patients have been using for vitamin-A liquid drops is between 100,000 IU and 200,000 IU a day. The Foundation has cautioned that these high doses could produce toxicity if taken over extended periods of time, yet cancer patients often are forced to risk some degree of toxicity to obtain an effective dose of vitamin-A therapy.

Among the symptomatic effects that a vitamin-A overdose can produce in some cases, and which should be watched for in cancer patients taking high doses of any vitamin-A product, are headache, dizziness, blurred vision, joint pain, dry lips, scaly-dry

skin, excessive hair loss and neurological disorientation.

Blood tests showing elevated liver enzymes also are potentially indicative of vitamin-A overdose. If any of these symptoms appear, please discontinue vitamin-A therapy until the symptoms disappear, and then resume a much lower dosage schedule.

Cancer patients face a challenge in attempting to use the maximum dose of vitamin A to fight their cancer while trying to avoid toxic side effects. One strategy that cancer patients should consider is using vitamin A only five days a week, thus giving the body a chance to remove excess accumulations of vitamin A before they cause adverse symptoms. Please call 1-800-226-2370 if you have any questions about vitamin A and cancer.

The Foundation regularly updates its innovative Cancer Treatment Protocols; an updated version will be mailed to any Foundation member free. Call 1-800-841-5433.

SOY EXTRACT INHIBITS BREAST CANCER CELL GROWTH

Genistein is a naturally occurring isoflavone in soy that appears to help prevent many forms of cancer and inhibits cancer cell proliferation. A low rate of breast and prostate cancer has been observed in Asian populations that consume high amounts of soy in their diet.

Soy inhibits cancer by several known mechanisms. The most well-defined anti-cancer effect of soy has been to inhibit the enzyme tyrosine protein kinase. Cancer cells need tyrosine protein kinase activity to proliferate.

In *Cell Growth and Differentiation* (Oct., 1996), genistein was shown to inhibit the proliferation of human breast cancer cells, but via mechanisms different than those that have been previously identified. This study showed that the genistein component of soy is clearly the most effective inhibitor of breast cancer cell growth.

Foundation members use economical Soy Power tablets or powder for cancer prevention and fat loss. Soy Power is a soy extract that contains a standardized concentration of genistein, other isoflavones and other soy constituents such as the saponins that also have been demonstrated to help prevent cancer. Cancer patients are advised to use the more expensive Super Soy Extract that contains a higher concentration of genistein. As always, please remember that this information is not intended to replace the attention or advice of a physician or other health care professional.

VITAMIN D-3 KILLS PROSTATE CANCER CELLS

As prostate cancer patients know, testosterone hormone-blocking therapy provides only a temporary remission (four or more years). Eventually, the prostate cancer cells mutate to a form that does not need the testosterone metabolite (dihydrotestosterone or DHT) to proliferate. Once prostate cancer cells no longer need DHT (that is, become androgen-independent), they grow out of control and the patient is considered "terminal" by mainstream medicine.

Vitamin D-3 and its analogs are being extensively studied as potential anti-cancer drugs. Vitamin D-3 induces cancer cells to differentiate into normal cells and inhibits cancer cell proliferation.

In a study in the *International Journal of Cancer* (Sept. 27, 1996), vitamin D-3 was shown to directly kill androgen-independent prostate cancer cells. The mechanism of inducing cancer cell death was to block the normal progression of the cancer cell division cycle. This study showed that prostate cancer cells that become refractory to hormone blocking therapy can still be killed by another relatively non-toxic therapy.

The Life Extension Foundation recommends that all prostate cancer patients take 3,000 IU to 4,000 IU a day of vitamin D-3 on an empty stomach. Monthly blood tests to measure serum calcium and parathyroid hormone levels help protect against vitamin-D toxicity.

The Foundation also recommends that prostate cancer patients take two heaping tablespoons a day of Super Soy Extract, four to 10 decaffeinated green tea extract capsules a day and four to eight capsules a day of standardized saw palmetto extract. Prostate cancer patients undergoing complete hormone blocking therapy should use intermittent dosing based on studies showing that prostate cancer cells maintain their need for testosterone longer when hormone blocking therapy is given intermittently rather than continuously.

The Foundation suggests that complete hormone blocking therapy be administered for nine to 12 months, and then discontinued. Monthly PSA tests then can monitor how long to stay off hormone blocking therapy. In many cases the PSA levels stay low in response to the high intake of soy extract, vitamin D-3, green tea and other innovative cancer therapies.

VITAMIN-C AND THE COMMON COLD

The government's attempt to suppress the truth about the effectiveness of vitamin-C in alleviating the symptoms of the common cold has been exposed in several recent studies.

The most recent study in the Journal of Clinical Epidemiology (Oct., 1996) attacks the conclusions of the 1975 National Institutes of Health report that vitamin-C has no effect on the common cold. This new article states that the NIH study really showed that high doses of the vitamin (up to six grams a day) had a substantial therapeutic effect in alleviating common cold symptoms.

Ever since Linus Pauling published findings that vitamin-C could prevent and shorten the duration of the common cold, numerous studies have been undertaken to duplicate Dr. Pauling's work. The majority of these studies show that vitamin-C produces a lessening in the severity and duration of cold symptoms.

In the Journal of the American College of Nutrition (April, 1995), a review of the negative 1975 NIH study on vitamin C found some serious shortcomings:

- The 1975 report did not consider the amount of vitamin C used . In one study cited in the 1975 report, only 25 to 50 mg a day of vitamin-C was administered to test subjects.
- In other studies cited in the 1975 report, the values used were inconsistent with the original published papers showing therapeutic value for vitamin-C.
- Using the 1975 study data, it was determined that vitamin-C administered in the dose of one to six grams a day decreased the duration of cold episodes by 21 percent. The 1995 review concludes, "The current notion that vitamin-C has no effect on the common cold seems to be based in large part on a faulty review written two decades ago."

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