The following are excerpts from third party sources of the information currently available on each ingredient in Geneuvax™.

Rabdosia rubescens
A clinical trial conducted in China compared Rabdosia rubescens with placebo for patients with localized esophageal cancer and compared chemotherapy with Rabdosia rubescens and chemotherapy without Rabdosia rubescens for advanced disease. In both situations, the researchers reported that the herbal lozenges improved survival.

In the past few years, several laboratory studies have shown that 2 extracts of Rabdosia rubescens, called oridonin and ponicidin, have some activity against cancer cells. Oridonin has been tested against several types of human cancer cells in laboratory dishes and in mice. Most of these studies were done in China or Japan, and all showed activity against the cancer cells. Ponicidin was tested in the laboratory against human leukemia cells in China and found to help induce cell death, or apoptosis.

Ganoderma lucidum
From the Cancer.org website, Ganoderma belongs to the Polyporaceae group of the Fungi family – Reishi and some formulas contain other mushrooms. Ganoderma works in supporting the body's natural defense against cancer because it helps to enhance liver detoxification, thus improving liver function and stimulating the regeneration of liver cells – making it a very important supplement for those who have liver cancer.

The keys agents in Ganoderma are the polysaccharides and Germanium. The polyshaccharide fraction of Ganoderma is largely responsible for its reported efficacy. Indications for Ganoderma use include supplementation a) to strengthen the bodies ability to endure the side-effects during chemotherapy or radiotherapy, b) to strengthen the body's ability to prolong survival and minimize metastasis, c) to improve quality of life, and d) to strengthen the body to prevent occurrence or recurrence.

Ganoderma can be used as a supplement during chemotherapy or radiotherapy to support the body's ability to reduce side effects such as fatigue, loss of appetite, hair loss, bone marrow suppression and risk of infection. It can also provide nutritional support helpful to the body in reducing the toxic and side effects and mitigate the pains during chemotherapy and radiotherapy, in particular to cancer patients at terminal stages for prolonging their lives and improving their living quality.

Qualities of Ganoderma that help support the body's defense against cancer that have been documented by Cancer.org are as follow:

•It enhances and helps regulate the immune and endocrine system, prevent tumors, improving the circulation and eliminating harmful free radicals.

•Inhibits DNA synthesis of the cancer cells, destroys the terminal enzyme activity of the tumor cells, promotes macrophages and regulates T and B lymphocytes, thus restraining the spread of cancer cells.

•It can also reduce the toxic and side effects and mitigate the pains during chemotherapy and radiotherapy

•Enhances liver detoxification, thus improving liver function and stimulating the regeneration of liver cells.

•Helps with cancerous ascites, increases appetite and help relieve the pain of late stage cancer.

•It is especially effective with kidney diseases.

Ganoderma Lucidum (Reishi) in Cancer Treatment Daniel Sliva, PhD (Cancer Research Laboratory, Methodist Research Institute, 1800 N Capitol Ave, E504, Indianapolis, IN 46202).

The popular edible mushroom Ganoderma lucidum (Reishi) has been widely used for the general promotion of health and longevity in Asian countries. The dried powder of Ganoderma lucidum was popular as a cancer chemotherapy agent in ancient China. The authors recently demonstrated that Ganoderma lucidum inhibits constitutively active transcription factors nuclear factor kappa B (NF-.B) and AP-1, which resulted in the inhibition of expression of urokinasetype plasminogen activator (uPA) and its receptor uPAR.

Ganoderma lucidum also suppressed cell adhesion and cell migration of highly invasive breast and prostate cancer cells, suggesting its potency to reduce tumor invasiveness. Thus, Ganoderma lucidum clearly demonstrates anticancer activity in experiments with cancer cells and has possible therapeutic potential as a dietary supplement for an alternative therapy for breast and prostate cancer.

Astragalus membranaceus
From www.pfaf.org database on herbal research Huang Qi is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. The root is a sweet tonic herb that stimulates the immune system and many organs of the body, whilst lowering blood pressure and blood sugar levels[238]. It is particularly suited to young, physically active people, increasing stamina and endurance and improving resistance to the cold - indeed for younger people it is perhaps superior to ginseng in this respect[254].

Huang Qi is used especially for treatment of the kidneys and also to avoid senility[218]. The plant is often used in conjunction with other herbs such as Atractylodes macrocephala and Ledebouriella seseloides[238]. The root contains a number of bio-active constituents including saponins and isoflavonoids[279]. It is adaptogen, antipyretic, diuretic, tonic, uterine stimulant and vasodilator[218, 254, 279]. It is used in the treatment of cancer, prolapse of the uterus or anus, abscesses and chronic ulcers, chronic nephritis with oedema and proteinuria[176, 218].

Recent research in the West has shown that the root can increase the production of interferon and macrophages and thus help restore normal immune function in cancer patients[254, 279]. Patients undergoing chemotherapy or radiotherapy recover faster and live longer if given Huang Qi concurrently[254]. The root of 4 year old plants is harvested in the autumn and dried for later use[238, 254]. The plant is antipyretic, diuretic, pectoral and tonic[218]. Extracts of the plant are bactericidal, hypoglycaemic and hypotensive[218]. Cardiotonic, vasodilator[176].

From HerbalRemedies.com.

Polysaccharides in Astragalus stimulate white blood cell production and increase the production of interferon, a natural protein that can help ward off and prevent viral infections. Scientific studies of this herb have shown it to be effective on cancer and HIV patients by restoring compromised immune cells. Chinese scientists have found that Astragalus protects the body from absorption of toxic chemicals into the liver. Other research shows that people using this herb had less angina than those given heart drugs such as nifedipine. Chinese people consider Astragalus to be a better energy tonic for young people than ginseng. This herb is also used to help ward off or treat colds, improve heart function, memory, and learning, and promote the healing of wounded skin. Astragalus works well in treating anorexia, arthritis, diabetes, hypertension, malaria, kidney inflammations, painful urination, prolapsed uterus, uterine bleeding, edema, water retention, constipation, fever, and generalized weakness.

Astragalus Safety & Interaction Information
No known medical conditions preclude the use of Astragalus. However, Astragalus is not advisable in acute infections. Do not use Astragalus without talking to your Doctor/Health Care Provider if you are taking any of the following medications:
Acyclovir, Interferon, Cyclophosphamide. Astragalus may increase the effects of these medications. Since Astragalus stimulates the immune system people should use it with caution, especially those with an autoimmune disease such as Lupus or Graves disease.

Hu Zhang (polygonum cuspidatum)
The most potent source of resveratrol. The dried root and stem of Polygonium cuspidatum – also known as Hu Zhang, Japanese Knotweed, tiger cane, kojo-kon and hadori-kon – has been used traditionally in Chinese and Japanese medicine as a circulatory tonic.

Significant recent attention has focused on the high natural concentration of a substance called Resveratrol in Polygonium cuspidatum. Resveratrol, which is also present in red grape skin and red wine, is thought to account in large part for the so called French Paradox: where the rate of coronary disease mortality in France is lower than observed in other industrialized countries. Many resveratrol-containing supplements currently marketed in the U.S. contain extracts of the root of Polygonium cuspidatum.

Much research has been done on resveratrol's ability to help the body address a number of health conditions.

Cranberry
Anticancer activities of cranberry phytochemicals: an update.
Neto CC, Amoroso JW, Liberty AM.
Department of Chemistry and Biochemistry, University of Massachusetts Dartmouth, North Dartmouth, MA 02747, USA.
Studies employing mainly in vitro tumor models show that extracts and compounds isolated from cranberry fruit (Vaccinium macrocarpon) inhibit the growth and proliferation of several types of tumor including breast, colon, prostate, and lung. Proanthocyanidin oligomers, flavonol and anthocyanin glycosides and triterpenoids are all likely contributors to the observed anticancer properties and may act in a complementary fashion to limit carcinogenesis. Possible chemopreventive mechanisms of action by cranberry phytochemicals include induction of apoptosis in tumor cells, reduced ornithine decarboxylase activity, decreased expression of matrix metalloproteinases associated with prostate tumor metastasis, and anti-inflammatory activities including inhibition of

cyclooxygenases. A review of recent studies suggests a potential role for cranberry as a dietary chemopreventive and provides direction for future research.

Total cranberry extract versus its phytochemical constituents: antiproliferative and synergistic effects against human tumor cell lines.

Journal of Agricultural and Food Chemistry. 2004 May 5;52(9):2512-7
The main phytochemicals in cranberries are flavonol glycosides, anthocyanins, proanthocyanidins and phenolic acids. The aim of this study was to investigate the antiproliferative effects of different fractions from cranberries on the proliferation of different cancer cell lines (oral, colon and prostate cancer cells). The researchers found that the total polyphenol fraction showed the highest antiproliferation activity against all the cancer cell lines. The individual components showed lower effect whereas the cranberry sugars showed not effect. The study concluded that the high antiproliferative activity of total polyphenols compared individual phytochemicals suggests synergistic effect of the cranberry phytochemicals.

Identification of triterpene hydroxycinnamates with in vitro antitumor activity from whole cranberry fruit (Vaccinium macrocarpon).

Journal of Agricultural and Food Chemistry. 2003 June 4;51(12):3541-5
Previous studies have shown that triterpenoid esters from cranberry inhibited tumour cell growth. The aim of this study was to identify the triterpenoid esters. The major phytochemicals are isomers of 3-O-p-hydroxycinnamoyl ursolic acid. These triterpene cinnamates showed antitumor activity in vitro tests. Quercetin and cyaniding were less active phenylboronic acid showed insignificant antitumor activity.

Blue Berry
Studies conducted by Mary Ann Lila, Ph.D., Department of Natural Resources and Environmental Sciences, University of Illinois, Urbana-Champaign, indicate that compounds in Wild Blueberries may be effective inhibitors of both the initiation and promotion stages of cancer.

Journal of Agricultural and Food Chemistry. 2004; 52(21): 6433-6442; Journal of Food Science. 2000; 65(2).
Cellular Antioxidant Activity New research shows that Wild Blueberries have the highest cellular antioxidant activity of selected fruits tested. Lead scientist Rui Hai Liu, Ph.D. used the cellular antioxidant activity (CAA) assay — a new assay developed by the Cornell University Department of Food Science — to determine antioxidant activity of antioxidants, foods, and dietary supplements. Wild Blueberries outperformed two dozen commonly consumed fruits like pomegranates, strawberries, cultivated blueberries, cranberries, apples and red grapes. Antioxidant have been linked with anti-aging, anti-cancer and heart-health benefits.

Journal of Agricultural and Food Chemistry. 2008; 56(18): 8418-8426
Journal of Agricultural and Food Chemistry. 2007; 55(22): 8896-8907
Protection Against Stroke
Animal trials conducted by Marva Sweeney Nixon and her team at the University of Prince Edward Island, PEI, Canada, indicate that consumption of Wild Blueberries confers protection to the brain against damage from ischemic stroke.

Nutritional Neuroscience. 2002; 5(6): 427-431

Wild Blueberries May Counter Cancer Cells

Anthocyanin pigments shone in a new study from the University of Illinois that tested the effects of blueberries on prostate and liver cancer cells. The results showed that various compounds in wild blueberries—including anthocyanins—possess the power to help prevent cancer in all three phases: initiation, promotion and proliferation.

Cancer is often initiated when a carcinogen causes cellular DNA damage, which will either get repaired or mutate permanently. The promotion phase also involves cellular damage by carcinogens, causing cells to suffer further, sometimes irreversible, damage.

The new study shows that sterol compounds in blueberries inhibit cancer in the first, or initiation stage, while their anthocyanin pigments can halt cancer in the critical promotion and proliferation stages.

As lead researcher Mary Ann Lila, Ph.D. said, "The results were very positive, adding evidence to a growing body of work coming out of our lab investigating Wild Blueberry fractions and their cancer-fighting properties at all stages: initiation, promotion and proliferation. Wild Blueberry compounds offer a multi-pronged attack against cancer."

Dr. Lila went on to say, “The natural plant compounds in Wild Blueberries may be powerful allies in the fight against oxidative stress and inflammation which can lead to cancer, heart disease as well as several other chronic health problems. While we still need in vivo work to test how much of these compounds get into the body and how they work, we do know that the potential benefit could be great."

Grape Skin

Grape skin contains resveratrol, a compound believed to explain the “French Paradox”. The “French Paradox” is that French cooking is the highest in saturated fat, (use of butter) in cooking and yet have comparatively low incidents of cancer, and congestive heart failure. Resveratrol is believed to be the compound responsible for the un-expected low incidents health problems. Grape skin is one source of resveratrol along with other helpful anti-oxidants, and nutrients.

Grape Skin Protein Kills Cancer Cells Dr. Mercola June 09 2004

Scientists have just begun to discover how drinking red wine, which contains the compound resveratrol, in moderation has contributed to controlling disease.

Marty Mayo, assistant professor of biochemistry, stated that resveratrol blocked the ability of an integral protein that fed it and by doing so aided in the prevention of cancer cells. The protein responsible for stimulating gene functions that promote cell survival is known as nuclear factor kappa B (Nf-kB) and is located inside the nucleus of all cells. Mayo recommended that one glass of wine, three or four times a week, contained the sufficient amount of resveratrol to protect the protein from thriving cancer cells. Mayo also cautioned against exceeding the recommended limit of wine consumption, because doing so could increase the risk of cancer.

Facts on Resveratrol

•It’s an antioxidant found in various types of plants, including grape skins, raspberries, mulberries and peanuts.

•In nature it functions as a preventative element to fight fungus during the rainy season.

•In the United States it is sold over-the-counter as a nutritional supplement.

Mayo theorized that the cancer cells resveratrol came in contact with died as a result of a built-up sensitivity to a compound called Tumor Nectrosis Factor alpha (TNFa).
It is also believed a process referred to as apoptosis, the self-destruction of cancer cells, was activated by the compound resveratrol.

Other studies have revealed that resveratrol could play a role in controlling diseases such as atherosclerosis, heart disease, arthritis and autoimmune disorders. Unique grape skin extract inhibits prostrate cancer cell growth in the laboratory. Laboratory experiments show that an extract of the skin of muscadine grapes can inhibit growth of prostate cancer cells in the laboratory.

Investigators from the National Cancer Institute (NCI), part of the National Institutes of Health, and their research partners also show that muscadine grape skin extract (MSKE) does not contain significant amounts of resveratrol, another grape skin component that has been widely studied and shown to be of potential benefit in preventing prostate cancer growth. The results appear in the September 1, 2007, issue of Cancer Research.

Using a series of human prostate cancer cells, representing different stages of prostate cancer progression, the researchers showed that MSKE significantly inhibits the growth of cancerous, but not normal, prostate cells, primarily by inducing a process called apoptosis, or programmed cell death. Programmed cell death is one of the mechanisms the body uses to rid itself of cells with unrepaired genetic damage before those cells can duplicate themselves. In contrast, resveratrol seems to act by blocking the cell cycle, a sequence of steps that a cell passes through when it grows and divides into two identical cells. Both mechanisms are used by the body to prevent the development of cancer.

According to Jeffrey E. Green, M.D., chief of the Transgenic Oncogenesis and Genomics Section in NCI's Center for Cancer Research (CCR), "These results show that MSKE may have potent antitumor activities in the lab that differ from the effects of resveratrol. Further studies of MSKE will be necessary to determine if this extract has potential as a chemopreventive or therapeutic agent."

The fact that all of the cells studied, which cover the different stages of prostate cancer tumor progression, responded to MSKE suggests that the active compounds in this extract may inhibit tumor development at very early stages.

The muscadine grape (Vitis rotundifolia) is distinct from the more common red grapes used to produce red wines, a major source of resveratrol. The chemical constituents of muscadine grapes differ from most other grape varieties, as they are richer in chemicals called anthocyanins. Anthocyanins, which produce the red and purple colors of the grapes, have strong antioxidant activity and have shown several antitumor effects, including inhibition of DNA synthesis in breast cancer cells, of blood vessel growth in some tumors, and of enzymes involved in tumor spread. Muscadine grapes can be found growing wild from Delaware to the Gulf of Mexico and westward from Missouri to Texas.

While previous studies suggested that anthocyanins might suppress the cancer process, no rigorous study of the mechanisms underlying these effects has yet been done. Resveratrol, by contrast, has been widely examined. Although earlier studies showed that it can induce programmed cell death in prostate cancer cells, resveratrol did not significantly induce cell death in the prostate cell model system used for this muscadine study. The results of this study suggest that resveratrol may activate different antitumor mechanisms than MSKE.

Even though MSKE had significant inhibitory effects on the prostate cancer cells studied, it did not alter the growth rate of the normal human prostate cells in the lab, which served as controls. Ongoing studies of MSKE in animals will help to determine the underlying mechanisms of MSKE's inhibitory effects in prostate cancer cells. The researchers hope that the lab effects of MSKE will be reproducible in testing on cancerous and normal prostate cells in animals. Should MSKE move on to trials in humans, Green says that since "muscadine grape products, including grape juice and grape wine, have been used in human studies without reported side effects, they may be relatively safe for use in clinical trials."

For more information about cancer, please visit the NCI website at www.cancer.gov, or call NCI's Cancer Information Service at 1-800-4 CANCER (1-800-422-6237).

Grape seed
Article University of Maryland Medical Center http://www.umm.edu/altmed/articles/grape-seed-000254.htm

Studies have found that grape seed extracts may prevent the growth of breast, stomach, colon, prostate, and lung cancer cells in test tubes. However, there is no clear evidence yet whether it works in humans. Antioxidants, such as those found in grape seed extract, are thought to reduce the risk of developing cancer. Grape seed extract may also help prevent damage to human liver cells caused by chemotherapy medications. Talk to your doctor or pharmacist before combining antioxidants with any chemotherapy drugs to make sure they interact safely together.

Article Santosh K.Katiyar Department of Dermatology, University of Alabama at Birmingham, Birmingham, AL.
Grape seed proanthocyanidines and skin cancer prevention: inhibition of oxidative stress and protection of immune system.
Overexposure of the skin to UV radiation has a variety of adverse effects on human health, including the development of skin cancers. There is a need to develop nutrition-based efficient chemopreventive strategies. The proanthocyanidins present in grape seeds (Vitis vinifera) have been shown to have some biological effects, including prevention of photocarcinogenesis. The present communication discusses the in vitro and in vivo studies of the possible protective effect of grape seed proanthocyanidins (GSPs) and the molecular mechanism for these effects. In SKH-1 hairless mice, dietary supplementation with GSPs is associated with a decrease of UVB-induced skin tumor development in terms of tumor incidence, tumor multiplicity, and a decrease in the malignant transformation of papillomas to carcinomas.

It is suggested that the chemopreventive effects of dietary GSPs are mediated through the attenuation of UV-induced: (i) oxidative stress; (ii) activation of mitogen-activated protein kinases and nuclear factor-kappa B (NF-kappaB) signaling pathways; and (iii) immunosuppression through alterations in immunoregulatory cytokines. Collectively, these studies indicate protective potential of GSPs against experimental photocarcinogenesis in SKH-1 hairless mice, and the possible mechanisms of action of GSPs, and suggest that dietary GSPs could be useful in the attenuation of the adverse UV-induced health effects in human skin.

Article on Grape Seed. http://www.cellhealthmakeover.com/grape-seed-antioxidant.html

Studies suggest grape seed may help improve blood circulation, prevent atherosclerosis (clogging of the arteries), lower blood pressure and improve blood cholesterol levels. Some research shows that consumption of grape seed and grape skin in combination, such as in red wine, grape juice or a commercially available vitamin supplement than grape seed alone. Further research is needed.

Grape seed extract and cancer saturday January 3, 2009
Researchers from the University of Kentucky have discovered that grape seed extract causes cancer cells to die. The extract activates a protein which causes leukemia cells to self destruct by initiating apoptosis or programmed cell death.

Not only does the extract cause lab leukemia cells to commit suicide, but it also causes no harm to normal cells. This study gives hope to the idea that natural compounds may one day be used to treat blood related and other types of cancers.

Grape Seed Extract Halts Cell Cycle, Checking Growth Of Colorectal Tumors In Mice ScienceDaily (Oct. 29, 2006) — Chemicals found in grape seeds significantly inhibited growth of colorectal tumors in both cell cultures and in mice, according to researchers who have already demonstrated the extract's anti-cancer effects in other tumor types.

Their study, published in the October 18 issue of Clinical Cancer Research, documented a 44 percent reduction of advanced colorectal tumors in the animals, and also revealed, for the first time, the molecular mechanism by which grape seed extract works to inhibit cancer growth. The authors found that it increases availability of a critical protein, Cip1/p21, in tumors that effectively freezes the cell cycle, and often pushes a cancer cell to self destruct.

"With these results, we are not suggesting that people run out and buy and use grape seed extract. That could be dangerous since so little is known about doses and side effects," said Rajesh Agarwal, Ph.D., professor in the Department of Pharmaceutical Sciences at the University of Colorado Health Sciences Center in Denver.
"The value of this preclinical study is that it shows grape seed extract can attack cancer, and how it works, but much more investigation will be needed before these chemicals can be tested as a human cancer treatment and preventive," he said.

The skin and seeds of grapes are a rich source of proanthocyanidins, a class of antioxidant flavonoids that remove harmful free oxygen radicals from cells. Grape products (juice and red wine) are known for their heart healthy effects, especially in lowering levels of blood cholesterol, Agarwal said, and because grape seeds contain higher concentrations of these chemicals, they are widely marketed as a dietary supplement.

Agarwal and his team of investigators were first to report, in 1999, that grape seed extract also has chemopreventive activity against skin cancer. Their subsequent preclinical work has shown that the extract also retards growth of prostate cancer cells.

In this study, Agarwal tested the extract on colorectal cancer, the second most common malignancy in Americans as well as the second leading cause of cancer deaths in this country. They exposed two different human colon carcinoma cells to the extract, and found a dose- and time-dependent inhibition of cell growth.
"Beneficial effects were correlated with how much extract was used and how long it was used for," Agarwal said. The number of live cells decreased by 92 percent in one cell line when the highest dose was given for the longest time period, which was two days, he said.

The researchers then performed a cell cycle distribution analysis, looking to see specific growth inhibitory effects. They found that the longer the extract was used, the more cells were "arrested" in the G1 phase of the cell cycle, the time when the cell is preparing to duplicates its DNA before dividing, and, correspondingly fewer cells had advanced to the "S" phase, when DNA is being actively duplicated.

They then studied the extract's effect on the molecular regulators that control the cell cycle, and found a strong dose-dependent increase in Cip1/p21 protein. In fact, the amount of Cip1/p21 protein within the cells increased by more than 150 times after 12 hours of treatment, Agarwal said. The researchers also noted a corresponding decrease in a number of different cyclin proteins and associated cyclin-dependent kinases (CDKs).

This all makes sense, according to Agarwal. One of the hallmarks of cancer is rampant cell growth due to loss of control of the cell cycle, and CDKs help push the cycle from a quiet state through to cell division. The Cip1/p21 protein, however, is powerful enough to inhibit the activity of CDKs and can also control apoptosis, or programmed cell death, he said.
"This protein physically interacts with CDKs," Agarwal said. "In normal cells, it attaches to CDKs to inhibit growth, but if a cell wants to grow, as it does in cancer, levels of Cip1/p21 are reduced, or non-functional."

Indeed, further experimentation demonstrated that grape seed extract increased the level of Cip1/p21 protein, allowing it to bind to and shut down the CDKs driving the cell cycle. The investigators also found that the extract can do that even if a cancer cell is missing p53 function (which also helps controls the cell cycle).
"That is good news, because most cancers are missing p53," Agarwal said.

Finally, the researchers tested the extract in mice. They implanted the animals with advanced human colorectal cancer cells and at the same time, gave the mice grape seed extract through a feeding tube. They tested only one dose, which was larger than a human would comparatively use, Agarwal said, and after eight weeks, tumor volume in treated mice were reduced by 44 percent and tumor weight by percent, compared to control animals. No toxic side effects were observed in treated mice, despite the high doses.

Similar to the cell culture studies, Cip1/p21 protein levels increased in tumors in mice treated with grape seed extract, Agarwal said. As a first step toward translating their findings into the clinic, the research team now plans to determine the lowest effective, as well as the highest non-toxic doses, by which grape seed extract can offer anticancer benefit in mice.
The study was funded by grants from the National Cancer Institute.

Vitamin D
A large number of scientific studies of many types have provided evidence suggesting that vitamin D may have a role in cancer prevention. The first evidence came from epidemiologic studies known as geographic correlation studies. In these studies, an inverse relationship was found between sunlight exposure levels and the rates of incidence and death for certain cancers. Individuals living in southern latitudes were found to have lower rates of incidence and death for these cancers than those living at northern latitudes. Because sunlight/UV exposure is necessary for the production of vitamin D3, researchers hypothesized that differences in vitamin D levels accounted for the observed relationships.

Evidence of a possible cancer-protective role for vitamin D was also found in laboratory studies of the effect of vitamin D treatment on cancer cells in culture. In these studies, vitamin D promoted the differentiation and death (apoptosis) of cancer cells, and it slowed their proliferation.

Randomized clinical trials designed to investigate the effects of vitamin D intake on bone health have also provided evidence that higher vitamin D intakes may reduce the risk of cancer. One study involved nearly 1,200 healthy postmenopausal women who took daily supplements of calcium and vitamin D (28 µg vitamin D, or 1,100 IU, a relatively large dose) or a placebo for 4 years. The women who took the supplements had a 60 percent lower overall incidence of cancer (6); however, the study did not include a vitamin D-only group. Moreover, the primary outcome of the study was fracture incidence; it was not designed to measure cancer incidence. This limits the ability to draw conclusions about the effect of vitamin D intake on cancer incidence.

The following are excerpts from http://www.vitamindcouncil.org on vitamin D's effect on cancer.

Bladder Cancer
Data suggest that VDR (Fok-1) polymorphism is associated with the risk of bladder cancer and that UVB radiation is inversely related to bladder cancer risk.

Brain Cancer
Research shows 1,25(OH)2D3 induces glioma cell death, making the hormone of potential interest in the management of brain tumors. Evidence also shows that vitamin D analog 1 alpha-hydroxyvitamin D2 inhibits growth of human neuroblastoma and that solar UV irradiance is inversely related to brain cancer risk.

Breast Cancer
Studies show women with low levels of vitamin D have a 222% increased risk for developing breast cancer. Ecologic studies have shown an inverse correlation between breast cancer mortality and sun exposure and dietary vitamin D intake. Blood levels of vitamin D at the time of diagnosis of breast cancer accurately predict a woman's survival. The cancer is much more aggressive in those with low serum vitamin D levels: they are 94% more likely to have the cancer metastasize and 73% more likely to die within 10 years of diagnosis.

Melanoma
An inability to tan is the number one risk factor for melanoma. Those who tan easily or who have darker skin are far less likely to develop the disease. A new theory is that melanoma is actually caused by sunlight (vitamin D) deficiency and that safe sun exposure actually helps prevent the deadly disease.
Vitamin D ScienceVitamin D ResearchVitamin D is one of the oldest hormones, having been produced by life forms for over 750 million years. Phytoplankton, zooplankton, and most animals that are exposed to sunlight have the capacity to make vitamin D. In humans, vitamin D is critically important for the development, growth, and maintenance of a healthy body, from gestation until death.
We invite you to browse the various studies to be found in the sections below and see for yourself the scientific evidence of just how vital vitamin D is to life. To view listing of studies for an area of interest, click on corresponding heading below. Note: Lists are not all-inclusive.

Colon and Rectal Cancer
Both circulating 25(OH)D and vitamin D intake are inversely associated with colorectal adenoma incidence and recurrent adenomas. Recent studies suggest that women who are vitamin D deficient have a 253% increased risk for developing colorectal cancer.Commentaries and Editorials
ommentaries and editorials written by vitamin D scientists and experts as published in the medical journals.

Endometrial Cancer
In an ecological study of 107 countries, an inverse association was found between ultraviolet B irradiance and endometrial cancer, indicating the role of UVB and vitamin D in risk-reduction of endometrial cancer.

Eye Cancer
Eye cancer includes intraocular melanoma and retinoblastoma. In athymic mice in both a large-tumor study and a long-term study, vitamin D analog 1alpha-OH-D(2) was effective in inhibiting retinoblastoma tumor growth compared with controls.

Liver Cancer
Studies indicate that Seocalcitol, a vitamin D analog, is an effective growth inhibitor of hepatocellular cancer tumors and that calcitriol (activated vitamin D) inhibits the growth of MHCC-97 heptocellular cell lines.

Liver Function
Diseases of the liver can impact the metabolism of vitamin D to its circulating form, 25(OH)D. Research shows that VDR is expressed in human hepatocytes and may play a critical role in the inhibition of bile acid synthesis, thus protecting liver cells during cholestasis.

Lung Cancer
In vitro studies, performed with lung cancer cell lines, have shown an inhibitive effect of vitamin D derivatives on cell-growth and proliferation. In one prospective cohort study, women with the highest vitamin D blood levels were 84% less likely to develop lung cancer. Young participants with the highest levels were 66% less likely to have the disease.

Lymphoid Cancer
Lymphoid cancer includes lymphoma, myeloma, and leukemia. Studies suggest sunlight has a protective effect against non-Hodgkin lymphoma. Epidemiological data indicate season of diagnosis is a strong prognostic factor for Hodgkin's lymphoma, with approximately 20% lower case fatality for patients diagnosed during autumn (as opposed to winter) and an autumnal survival rate higher than 60% for patients younger than 30 years. This may be the result of higher endogenous levels of vitamin D in autumn.

Ovarian Cancer
Epidemiological data indicate a positive association between higher latitude and ovarian cancer incidence and mortality rates, suggesting that vitamin D insufficiency may contribute to ovarian cancer development.

Pancreatic Cancer
Ecological studies associate sun exposure with lower death rates for pancreatic cancer. In two United States cohort studies, higher intakes of vitamin D were associated with lower

risks for pancreatic cancer, indicating a potential role for vitamin D in the pathogenesis and prevention of pancreatic cancer.

Prostate Cancer

Research shows that men with higher vitamin D levels are 50% less-likely to develop aggressive forms of prostate cancer than those with lower levels. Calcitriol, the active form of vitamin D, significantly limits the ability of prostate cancer cells to invade healthy cells. In one study, patients with the highest vitamin D levels (>32 ng/mL) were 7 times less-likely to die from their prostate cancer over the 3.5 years of the study.