

Vitamin D3 and cancer

Source: <http://sci.tech-archive.net/Archive/sci.med.nutrition/2007-02/msg00340.html>

- *From:* GMCarter <fiar@xxxxxxxxxxxx>
 - *Date:* Sat, 10 Feb 2007 17:08:21 GMT
-

Two New Studies Back
Vitamin D for Cancer Prevention
Vitamin D Affects the Immune System & Healing Wounds on Skin

Researchers Report Levels Needed To Cut Breast, Colon Cancer Risk

February 7, 2007

By Nancy Stringer
ucsdnews

Two new vitamin D studies using a sophisticated form of analysis called meta-analysis, in which data from multiple reports is combined, have revealed new prescriptions for possibly preventing up to half of the cases of breast cancer and two-thirds of the cases of colorectal cancer in the United States. The work was conducted by a core team of cancer prevention specialists at the Moores Cancer Center at University of California, San Diego (UCSD), and colleagues from both coasts.

The breast cancer study, published online in the current issue of the Journal of Steroid Biochemistry and Molecular Biology, pooled dose-response data from two earlier studies – the Harvard Nurses Health Study and the St. George's Hospital Study – and found that individuals with the highest blood levels of 25-hydroxyvitamin D, or 25(OH)D, had the lowest risk of breast cancer.

The researchers divided the 1,760 records of individuals in the two studies into five equal groups, from the lowest blood levels of 25(OH)D (less than 13 nanograms per milliliter, or 13 ng/ml) to the highest (approximately 52 ng/ml). The data also included whether or not the individual had developed cancer.

"The data were very clear, showing that individuals in the group with the lowest blood levels had the highest rates of breast cancer, and the breast cancer rates dropped as the blood levels of 25-hydroxyvitamin D increased," said study co-author Cedric Garland, Dr.P.H. "The serum level associated with a 50 percent reduction in risk could be maintained by taking 2,000 international units of

Vitamin D3 and cancer

vitamin D 3 daily plus, when the weather permits, spending 10 to 15 minutes a day in the sun."

The colorectal cancer study, published online February 6 in the American Journal of Preventive Medicine, is a meta-analysis of five studies that explored the association of blood levels of 25(OH)D with risk of colon cancer. All of the studies involved blood collected and tested for 25 (OH)D levels from healthy volunteer donors who were then followed for up to 25 years for development of colorectal cancer.

As with the breast cancer study, the dose-response data on a total of 1,448 individuals were put into order by serum 25(OH)D level and then divided into five equal groups, from the lowest blood levels to the highest.

"Through this meta-analysis we found that raising the serum level of 25-hydroxyvitamin D to 34 ng/ml would reduce the incidence rates of colorectal cancer by half," said co-author Edward D. Gorham, Ph.D. "We project a two-thirds reduction in incidence with serum levels of 46ng/ml, which corresponds to a daily intake of 2,000 IU of vitamin D 3. This would be best achieved with a combination of diet, supplements and 10 to 15 minutes per day in the sun."

Vitamin D 3 is available through diet, supplements and exposure of the skin to sunlight, or ultraviolet B (UVB). In the paper, the researchers underscored the importance of limiting sun exposure such that the skin does not change color (tan) or burn. For a typical fair-skinned Caucasian individual, adequate vitamin D could be photosynthesized safely by spending 10 to 15 minutes in the noontime sun on a clear day with 50 percent of skin area exposed to the sun. Darker skinned individuals may require more time in the sun, such as 25 minutes. For people with photosensitivity disorders, or anyone with a personal or family history of nonmelanoma skin cancer, any amount of extra sun exposure would be inadvisable.

The meta-analysis on colorectal cancer includes data from the Women's Health Initiative, which had shown in 2006 that a low dose of vitamin D did not protect against colorectal cancer within seven years of follow-up. However, the researchers wrote, the meta-analysis indicates that a higher dose may reduce its incidence.

"Meta-analysis is an important tool for revealing trends that may not be apparent in a single study," said co-author Sharif B. Mohr, M.P.H. "Pooling of independent but similar studies increases precision, and therefore the confidence level of the findings."

The authors recommend further research to study individuals for the effect of vitamin D from sunlight, diet and supplements on the risk of cancer.

Vitamin D3 Provides Skin with
Protection from Harmful Microbes
Deficiency in D3 may impact wounds' ability to heal

February 9, 2007

By Debra Kain
ucsdnews

A study by researchers at the UCSD School of Medicine shows that fluctuations in Vitamin D3 levels control the body's innate immune response, affecting a skin wound's ability to heal.

Richard L. Gallo, M.D., Ph.D., professor of medicine and chief of UCSD's Division of Dermatology and the Dermatology section of the Veterans Affairs San Diego Healthcare System, says that several unexpected associations between fluctuations of the body's vitamin D3 and infectious disease have emerged in recent investigations.

In a study appearing online February 8 in advance of publication in the March issue of the *Journal of Clinical Investigation*, Gallo and his colleagues look at how the innate immune system is controlled in the skin, and find that genes controlled by active vitamin D3 play an essential role in the process.

"Our study shows that skin wounds need vitamin D3 to protect against infection and begin the normal repair process," said Gallo.
"deficiency in active D3 may compromise the body's innate immune system which works to resist infection, making a patient more vulnerable to microbes."

Gallo's lab discovered that an antimicrobial peptide called cathelicidin is produced by wounds and is necessary to fight infections. Recently, several studies have begun to link vitamin D to cathelicidin. Researchers focused on white blood cells called macrophages that work to destroy invading bacterial microbes. Macrophages contain toll-like receptors that identify the invaders; when the receptors sense the presence of bacteria, they trigger cathelicidin production.

Gallo's team has now discovered that injury stimulates skin cells called keratinocytes, which surround the wound, to increase the production of vitamin D3 and that this in turn increases the expression of genes (CD14 and TLR2) that detect microbes. These genes, together with active vitamin D3, called 1,25D3, then lead to more cathelicidin. In both mice and humans, a deficiency in cathelicidin allows infections to develop more readily.

Our finding – that multiple, diverse genes controlled by 1,25D3 are increased after injury to the skin – suggests that the availability of D3 is essential to the wound. These responses are a previously

Vitamin D3 and cancer

unrecognized part of the human injury response," said Gallo.

Lower concentrations of 1,25D3 in African Americans, likely due to a decreased ability to absorb vitamin D from sunlight, correlate with increased susceptibility to infection. In addition, 1,25D3 has been suggested to be an immune-modifying agent in pulmonary tuberculosis.

As a result of this and previous studies, Gallo and his colleagues are beginning clinical trials at UCSD Medical Center with both oral and topical vitamin D3. Normal volunteers, and patients with disorders in antimicrobial peptide production such as atopic dermatitis and acne, are being studied to determine if vitamin D3 can improve their natural immune defenses.

Additional contributors to the paper include Jorgen Schaubert, Robert A. Dorschner, Alvin B. Coda, Amanda S. Bachau and David Kiken of UCSD's Division of Dermatology and VA San Diego Healthcare System; Philip T. Liu and Robert L. Modlin, Division of Dermatology, David Geffen School of Medicine, UCLA; Yolanda R. Helfrich and Sewon Kang Department of Dermatology, University of Michigan; Hashem Z. Alalieh and Daniel D. Bikle, Department of Medicine, VA Medical Center, UCSF; Andreas Steinmeyer and Ulrich Ziegler, Schering AG, Berlin, Germany

The research was sponsored by the National Institutes of Health and the Veterans Administration.

.