

## ORIGINAL ARTICLES

### Activity of Vitamine D on Canser and Hypertension( a review)

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#### ABSTRACT

Vitamin D is an important fat-soluble vitamin that is necessary for the human body. Vitamin D helps an individual stay healthy and aids in absorption of other nutrients. According to the National Institute of Health's Office of Dietary Supplements, vitamin D is a fat-soluble vitamin that does not occur naturally in many foods. Vitamin D is often added to foods and is also available in supplement form. The body is able to make vitamin D itself when the skin is exposed to the ultraviolet rays of sunlight. While excessive exposure to sun can be dangerous, a little can actually be beneficial. Vitamin D plays multiple roles in the human body. Adequate amounts of vitamin D in the body reduce the risk of an individual developing colon cancer. Vitamin D appears to have a protective characteristic in regards to the cancer. It is also suspected vitamin D can reduce the risk of an individual developing prostate or breast cancers.

**Key words:** Vitamin D, Helth, Anti aging, Hypertansion, Cancer

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#### Introduction

Vitamin D is an important fat-soluble vitamin that is necessary for the human body. Vitamin D helps an individual stay healthy and aids in absorption of other nutrients. According to the National Institute of Health's Office of Dietary Supplements, vitamin D is a fat-soluble vitamin that does not occur naturally in many foods. Vitamin D is often added to foods and is also available in supplement form. The body is able to make vitamin D itself when the skin is exposed to the ultraviolet rays of sunlight. While excessive exposure to sun can be dangerous, a little can actually be beneficial. Vitamin D plays multiple roles in the human body. Vitamin D is a secosteroid molecule which, in its active 1,25 di-hydroxylated form, has hormone activities in humans. Most cells and tissues in the body have vitamin D receptors that stimulate the nuclear transcription of various genes to alter cellular function or provide a rapid response in cellular membranes. Vitamin D appears to have an effect on numerous disease states and disorders, including chronic musculoskeletal pain, diabetes (types 1 and 2), multiple sclerosis, cardiovascular disease, osteoporosis, and cancers of the breast, prostate, and colon. According to many researchers there is currently a worldwide vitamin D deficiency in various populations, including infants, pregnant and lactating women, the elderly, individuals living in latitudes far from the equator, persons who avoid the sun or ultraviolet radiation in the blue spectrum, and populations with dark skin pigmentation. Vitamin D in the food supply is limited and most often inadequate to prevent deficiencies. Supplemental vitamin D is likely necessary to avoid deficiency in winter months; however, all forms of vitamin D supplementation may not be equal in efficacy for maintaining optimal blood levels.

#### *Longevity/Anti-Aging:*

A recent meta-analysis of 18 randomized controlled trials examining data from 57,311 participants over a mean follow-up period of 5.7 years revealed a relative risk of mortality from any cause to be 0.93 (95% CI: 0.87-0.99) in the study groups that took supplemental vitamin D (mean daily dose was 528 IU) compared to groups without supplementation. (Autier *et al.*, 2007) Researchers studying serum values of vitamin D in 2,160 twins found higher vitamin D levels may alter telomere length of leukocytes. "The difference between the highest and lowest tertiles of vitamin D was 107 base pairs (p=0.0009), which is equivalent to 5.0 y of telomeric aging." The authors go on to state that this finding "underscores the potentially beneficial effects of this hormone on aging and age-related diseases." (Richards *et al.*, 2007)

**Hypertension:**

Key aspects of hypertension, including endothelial cell function, (Merke *et al.*, 1989) proliferation of vascular smooth muscle cells, (Zehnder *et al.*, 2002; Somjen *et al.*, 2005) and regulation of the renin-angiotensin pathway (Zehnder *et al.*, 1999) are affected by vitamin D. In 613 men from the Health Professionals Follow-Up Study and 1,198 women, researchers found lower serum 25(OH) D levels (<15 ng/mL compared to 30 ng/mL) increased the relative risk for hypertension in the men to 6.13 (95% CI: 1.00-37.8) and the women to 2.67 (95% CI: 1.05-6.79). An eight-week randomized, double-blind, parallel group study examined the effects of a single 100,000-IU dose of vitamin D2 on endothelial function and blood pressure in type 2 diabetics. Flow-mediated dilation improved 2,3 percent and systolic blood pressure decreased 14 mm/Hg compared with placebo when average baseline 25(OH)D level of 15.3 ng/mL was raised to an average of 21.4 ng/mL. (Sugden *et al.*, 2008) When compared to taking a 1,200-mg calcium supplement daily, 145 women age 70 or older taking an additional 800 IU vitamin D3 along with the calcium supplement showed a 72-percent increase in 25(OH) D, a 17-percent decrease in serum PTH, a 9.3-percent decrease in systolic blood pressure, and a 5.4-percent decrease in heart rate. In the eight weeks of the study, 25(OH)D levels in the subjects increased (on average) from 10.3 ng/mL to 26 ng/mL. (Pfeifer *et al.*, 2001)

**Cancer:**

More than 200 human genes that contain a vitamin D response element have been identified. Beyond mineral homeostasis, it is known that vitamin D regulates gene expression in many cell processes including apoptosis, proliferation, differentiation, and a host of immune-modulating effects that may be directly or indirectly associated with cancer. (Heaney, 2006; De Wever O, Mareel, 2003) As early as 1940, Apperly et al observed an association between the prevalence of skin cancer and a decrease in other cancers. A article published in *Cancer Research* states, "It is suggested that we may be able to reduce our cancer deaths by inducing a partial or complete immunity by exposure of suitable skin areas to sunlight or the proper artificial light rays of intensity and duration insufficient to produce an actual skin cancer. A closer study of the action of solar radiation on the body might well reveal the nature of cancer immunity." (Apperly, 1941) Investigators publishing in *Breast Journal*, March 2008, confirmed the 1940 hypothesis by demonstrating a decrease in breast cancer risk in 107 countries with increased UVB irradiance and higher 25(OH)D levels. (Mohr *et al.*, 2008) Observational studies highlight an inverse association between serum 25(OH)D levels and the risk of breast and colorectal cancers. In a recent review article, Garland et al looked at the dose-response gradient between the risk of these two common cancers and serum levels of 25(OH)D. The authors estimated a 50-percent decreased incidence of colorectal and breast cancer with a maintenance of serum 25(OH)D levels at  $\geq 34$  ng/mL (colorectal cancer) and  $\geq 52$  ng/mL (breast cancer).[1] Many other cancer types have been associated with decreased UVB exposure and/or serum 25(OH) D levels, including recent studies examining Hodgkins lymphoma and lung and prostate cancer. (Porojnicu *et al.*, 2007; Li *et al.*, 2007)

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