



Research Corner:

Here Comes the Sun: Vitamin D & Health

Sunlight has always been known to be a healing energy. Hippocrates, the father of modern Medicine, and Florence Nightingale, the founder of modern nursing, prescribed sunlight to heal many disorders including tuberculosis, rickets in children, and war wounds. Sunlight remains an important energy source for healing the body and mind. A recent study showed that patients assigned to bright, sunny rooms needed much less pain medication following surgery and healed more quickly.

Exposure to natural sunlight has declined in recent years, greatly accelerated by the fear of sun exposure and increased fear of skin cancer. The benefits of exposure to sunlight are once again emerging from the dark; there is simply too much evidence supporting its use to ignore.

From an evolutionary perspective, homo-sapiens likely developed in tropical and sub-tropical conditions with large exposure to UVB resulting in the synthesis of vitamin D. These ancestral environmental exposures could continue to have an influence on human physiology and requirements today. In addition, not all sunshine is alike. Sun in the winter, especially in Northern climates provide varying levels of UVB exposure. Dr. Michael Holick, an expert on Vitamin D found that in Boston, for example, people don't start getting enough sun to synthesize adequate Vitamin D until mid-March.

The recent research on Vitamin D is so compelling that many practitioners are now measuring levels as part of a routine check up.

Vitamin D

While too much sun can cause sunburn and skin damage, adequate exposure is necessary for health. Sun is the main source of vitamin D, and research clearly shows deficiencies increase the risk of certain cancers and autoimmune diseases.

Vitamin D from sunlight acts as a pro-hormone, rapidly converting into 25-hydroxyvitamin D. Many experts believe that there is no harm in the vitamin D concentrations associated with sun exposure and that such levels are probably optimal for human health. In a study published earlier this year, in the *Journal of Steroid Biochemistry and Molecular Biology*, researchers found that women with the highest blood levels of 25-hydroxyvitamin D had the lowest risk for breast cancer. The investigators found that patients with higher serum 25-hydroxyvitamin D had a 50% lower risk for breast cancer than those with low serum levels. In a recent article published in *JAMA*, Dec. 20, 2006, both epidemiological and experimental evidence suggest that high levels of vitamin D, which is also a potent immunomodulator, may decrease the risk of multiple sclerosis. Based on this research, healthcare providers are recommending 15 minutes of daily sun exposure to any part of



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the body, rotating sites to minimize repeated sun exposure to any one area. They are also prescribing supplemental Vitamin D based on blood tests of 25 hydroxyvitamin D levels.

Vitamin-D Production and Metabolism

The process by which vitamin D is produced and exerts its biological effects is complex, involving several vitamin-D-related molecules

Basically, UVB light triggers a modification of a cholesterol-related molecule located in the membrane of skin cells. The vitamin D that is created is then ejected from the membrane into our circulatory system. In the liver, it is transformed into 25-hydroxyvitamin D. The kidney, as well and other tissues, further converts this precursor into 1, 25-hydroxyvitamin D, the most physiological active vitamin-D metabolite, which is also called calcitrol. Traditionally, calcitrol is understood as a hormone that, together with parathyroid hormone, regulates blood calcium levels and, in turn, bone density. In this role, calcitrol targets the intestine, where it promotes calcium absorption; and bone, where it catalyzes calcium release to help restore depleted blood calcium levels.

Several research studies have demonstrated that Vitamin D and calcitrol exerts a plethora of biological effects on diverse tissues, implying that this sunlight-generated hormone sustains health throughout the body. Given these considerations,

the implications of preventing vitamin-D deficiency, either through sunlight, diet or supplementation is now more profound than ever.

Sunscreens Block Ultraviolet Light

Sunlight is composed of electromagnetic radiation of varying wavelengths, ranging from the long-wavelength infrared light to the short-wavelength ultraviolet. The ultraviolet light is further subdivided into UVA and the even shorter-wavelength UVB radiation. Although UVB causes sunburns, it is also the component that initiates Vitamin-D production in the skin.

Exposure to vitamin-D-producing UVB light can vary greatly depending upon many factors, including time of day and year; and the latitude, altitude, and prevailing weather conditions. Latitude is especially important. For example, if you live north of about 37° (roughly, a line from Richmond to San Francisco), you will be exposed to little UVB from at least November through February because the sun's zenith angle is so low that the atmosphere absorbs most UVB before it reaches you.

Vitamin-D Food Sources

Relatively few foods naturally contain vitamin D, the most abundant being oily fish like salmon, sardines, and mackerel, or old-fashioned, cod liver oil. Because of limited natural sources, numerous foods, such as milk, are vitamin-D fortified.



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Until recently The RDA recommended 400 IU daily and recently increased the amount to 800 IU's. Many scientists now believe we need upward of 1,200 to 2000 IU per day of vitamin D (IU = international units, a measure of vitamin potency) to avoid deficiency. For reference, a salmon serving contains about 360 IU, a glass of fortified milk about 100 IU, an egg 25 IU, and a tablespoon of cod liver oil 1300+ IU.

In comparison, full-body sunbathing for a period of time that will just make you turn pink will produce 10,000-20,000 IU of vitamin D, equivalent to 100 to 200 glasses of fortified milk. Given such copious production, relatively casual sun exposure (arms, etc) should meet vitamin-D needs.

The importance of solar-produced vitamin D was underscored in a study that evaluated vitamin-D status in a submarine crew after two months of acute sun deprivation. Although the crew consumed a vitamin-D fortified diet, their levels of this nutrient plummeted.

Vitamin D can be toxic if too much is consumed from supplements or in over-fortified foods. However, prolonged sun exposure does not generate toxic vitamin-D levels due to the body's feedback regulatory mechanisms.

At-Risk Groups

Although everyone is vulnerable to vitamin-D deficiency, especially in winter, certain groups are particularly predisposed. First, when exposed to

the same amount of sunlight, elderly individuals produce only 20% of the vitamin-D young adults do. As a result, more than half of individuals older than 65 are vitamin-D deficient.

Second, dark skin pigmentation in African Americans and Mediterranean cultures require more sun to produce the same levels of vitamin D than in fair-skinned Caucasians. As a consequence, they have a greater incidence of disorders associated with reduced sun exposure in northern latitudes. Finally, people with spinal cord injury and multiple sclerosis often have decreased vitamin-D levels.

Multiple Sclerosis

MS is influenced by multiple interacting genetic, environmental, nutritional, hormonal, immunological, and viral factors. It is strongly correlated with sunlight, which is a function of latitude, season, prevailing weather, etc. As summarized in *UV Advantage* by Dr. Michael Holick (2003), MS incidence is five times greater in North America and Europe than the tropics. In the southern US, MS prevalence is about half that of the northern part of the country. People with MS are often vitamin-D deficient. In one example of interacting factors, Norwegians who live near the ocean and consume much vitamin-D-rich seafood have a lower MS risk than those who live inland, even though both groups lack sufficient sunlight to generate vitamin D through much of the year. In another

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example, Swiss who live at lower altitudes have a greater MS risk than those who live at high altitudes with greater exposure to vitamin-D-producing UVB radiation. Recently, Harvard University investigators examined data collected from two long-term studies involving 187,000 women. The data indicated that those who consumed the most vitamin D had a substantially lower MS risk than women who consumed the least amount. Many scientists believe that vitamin D mediates its healing influence by interacting with MS's dysfunctional immune system. Through its hormonal metabolites, vitamin D profoundly influences the expression of a variety of immune cells, which possess gene-modulating, vitamin-D receptors, and immune-mediating molecules.

Evidence indicates that vitamin D prevents cancer, diabetes, arthritis, high-blood pressure, cardiovascular disease, and infections and enhances overall wellbeing.

Choosing Safe Sunscreens

In a new investigation of 1,022 name-brand sunscreens, the Environmental Working Group (EWG) found widespread evidence that many products on the market are not safe and effective, including one of every eight high-SPF sunscreens that does not protect from UVA radiation. More Americans than ever are using sunscreen to protect from sunburn and guard against skin cancer. Many products with high SPF ratings, advertise

“broad spectrum” protection. Most people trust that the claims on the bottle will ensure that the product truly protects their health and their families while nothing could be less certain.

Researchers and Dermatologists still recommend using sunscreen as it does protect against basal cell carcinoma, the most common skin cancer that is usually easy to treat, and it slows the wrinkling of aging skin. Using safe, nontoxic sun screens when you can't avoid over exposure to the sun will give the most natural and safe protection from dangerous sunburns.

The following websites can offer non toxic sunscreen product information:

- www.safecosmetic.org
- www.healthychild.com
- www.cosmeticdatabase.com/specialsun_screens/ewg_sunscreen.pdf

At Courtyard Market (www.courtyardmarket.com) you can purchase both Vitamin D and Sunscreen products that have been proven both safe and effective.

Resources

Two excellent overview books are:

- 1) *The Healing Sun* by Richard Hobday (1999)
- 2) *The UV Advantage* by Michael Holick (2003)

Research

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