

[IMAGE]

The Highs and Lows of Summer Sun

The Role of Vitamin D in Overall Health

By Kelly Kwiatkowski

It is well-known that vitamin D is essential in maintaining healthy bones. However, research over the past 10 years has shown that vitamin D is essential for overall health and disease prevention. In fact, several studies have linked vitamin D deficiency to many chronic diseases.

Vitamin D is a fat-soluble prohormone that helps regulate calcium absorption and bone metabolism. Evidence from cell-culture and animal studies shows that vitamin D also plays a role in regulating cell metabolism, insulin production, the immune system and inflammation - factors that contribute to a host of chronic diseases, including cancer, diabetes, high blood pressure, cardiovascular disease and many autoimmune disorders, such as MS and inflammatory bowel disease.

Sources of Vitamin D

Woman sunbathing. - Copyright â Stock Photo / Register Mark We get 90 percent to 100 percent of our vitamin D requirements from the sun. The rest comes from natural and fortified dietary sources like oily fish, vitamin D-fortified foods, such as milk and orange juice, and vitamin supplements.

Vitamin D Deficiency

Despite a generally available source (sunlight), researchers argue that vitamin D deficiency remains prevalent. Factors contributing to vitamin D deficiency include: 1) the modest amount of vitamin D in fortified foods; 2) the reduction in milk consumption; 3) socioeconomic differences in milk and fortified cereal consumption; and 4) the avoidance of sun exposure due to the great concern about skin cancer and skin damage.

Classic vitamin D deficiency results in *rickets* (in infants) and *osteomalacia* (in adults). These are painful bone diseases that can lead to growth deficiencies and fractures. Thus, dietary sources of vitamin D are especially important for individuals more at risk for vitamin D deficiency. Individuals with darkly

pigmented skin, those who are obese, elderly people, infants who are exclusively breastfed, people who get little or no sun exposure, and individuals with fat malabsorption conditions (e.g., celiac disease) are at higher risk for vitamin D deficiency.

Dietary reference intakes for vitamin D are based solely on the dietary intake that is adequate to prevent bone disease (i.e., rickets or osteomalacia), but there is overwhelming evidence that vitamin D is essential in maintaining overall cellular health and plays a role in other diseases. Based on this research, some researchers are calling for a revision of the recommended intakes for vitamin D. Experts propose that the recommended daily allowance of vitamin D be increased to 1,000 IUs per day during times when sun exposure is insufficient. Note that the *2005 U.S. Dietary Guidelines for Americans* now recommends increased intake of vitamin D of 1,000 IU for at-risk populations - older adults, people with dark skin and people exposed to insufficient UVB light. This is not yet reflected in the current dietary reference intakes for vitamin D.

Conditions Associated with Suboptimal Vitamin D Status

Autoimmune

- Multiple Sclerosis
- Systemic Lupus Erythematosus
- Crohn's Disease
- Rheumatoid Arthritis

Cardiovascular

- Hypertension
- Cardiovascular Disease

Dermatologic

- Psoriasis

Endocrine

- Diabetes Mellitus

Gastrointestinal

- Pancreatitis

Musculoskeletal

- Osteoporosis
- Osteoarthritis
- Osteopenia
- Osteomalacia
- Rickets
- Fractures
- Fibromyalgia

Neurologic

- Parkinson's Disease
- Schizophrenia
- Seasonal Affective Disorder

Oncologic

- Colon cancer
- Breast cancer
- Ovarian Cancer
- Prostate Cancer
- Cervical Cancer
- Bladder Cancer
- Endometrial Cancer

Vitamin D From the Sun

For most people, 10-20 minutes of sunshine can yield approximately 10,000 to 20,000 IUs of vitamin D each day, depending on the time of year and your geographical location. At high latitudes, sun exposure isn't enough to produce vitamin D between the months of October and April. The amount of vitamin D you

get from the sun can vary greatly, depending on other factors including time of day, pollution, cloud cover, sunscreen, skin color, age and weight. Here are some of the statistics:

- Woman applying sunscreen to her shoulder. - Copyright © Stock Photo / Register Mark Sunscreens as low as SPF 18 decrease vitamin D synthesis by 97.5 percent.
- During winter, sunlight provides no vitamin D to the skin at latitudes above 35 degrees.
- Older adults have approximately 25 percent of the capacity to produce vitamin D compared to young, healthy adults.
- African Americans require 5-10 times longer sun exposure than Caucasians to produce similar amounts of vitamin D in the skin.

Safe sun exposure is important when considering vitamin D for health. The Food and Nutrition Board recognizes the importance of sun exposure to achieve vitamin D requirements, and says that between 10-15 minutes of sun exposure (without sunscreen) per week is adequate for most individuals. It also recommends that individuals use a sunscreen with an SPF of at least 15 for any exposure beyond that time.

Adequate intake of vitamin D (based on age)		
Age	Adequate Intake	Tolerable Upper-Intake Levels
0-50	200 IU/day	2,000 IU/day
51-70	400 IU/day	600 IU/day
> 70	2,000 IU/day	2,000 IU/day

Source: Food and Nutrition Board of the Institute of Medicine.

Other Considerations

If you have a concern about getting enough vitamin D, discuss it with your doctor. Here are a few considerations when you are thinking about addressing your vitamin D requirements:

- Vitamin D₃ (cholecalciferol) is the preferred form of vitamin D for therapeutic and nutritional uses, as it generates a 70 percent higher serum vitamin D level compared to the same amount of vitamin D₂ (ergocalciferol) in humans.
- Vitamin D toxicity can cause serious health problems, so it is important to discuss your vitamin D

status and intake with your doctor.

- Although vitamin D toxicity from sun exposure has never been reported, excessive sun exposure causes skin cancer, so you should limit your sun exposure and wear protective clothing and sunscreen to avoid overexposure.

Food Sources of Vitamin D

Sushi held in chopsticks. - Copyright © Stock Photo / Register Mark

- **Fish; fatty, cold-ocean**
100-500 IU/serving
- **Milk**
400 IU/quart
- **Orange Juice**
400 IU/quart
- **Bread**
In process of being determined
- Glass of orange juice. - Copyright © Stock Photo / Register Mark **Solar UVB**
0 IU (winter in north) to 10,000 IU per day
- **Artificial UVB**
10-minute tanning session yields 2,000-4,000 IU
- **Supplements**
200-1,000 IU per pill

Table adapted from Grant WB & Holick MF. Benefits and requirements of vitamin D for optimal health: a review. *Altern Med Rev*, 2005;10(2):94-111.

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