

# Vitamin D

## for Bones & More

### Introduction

Not really a vitamin! That's right. Around 1920 in wintry England, a dog loving researcher concluded that his dogs were developing rickets (bone deformation) due to a missing nutrient because when fed cod liver oil, they recovered. He named the nutrient vitamin D.

It wasn't until a decade later that scientists learned that vitamin D could be synthesized in the skin with adequate exposure to sunlight. They thus determined that lack of sunlight caused the D deficiency and subsequent rickets. Vitamin D earned the nickname "the sunshine vitamin" but lost its "essential" status since vitamins are defined as nutrients essential to life that cannot be produced in our bodies.



**What is D, then?** About a decade ago, scientists and researchers discovered that D's activity fell more in line as a hormone after they isolated the vitamin D receptor (VDR) and saw how different cells were influenced. As a hormone, D's benefits extend beyond its accolades as a bone builder to impact Alzheimer's, autoimmune diseases, cancer, diabetes, heart disease, immunity and musculoskeletal pain.

**The Facts.** Structurally related to cholesterol, vitamin D<sub>3</sub> (cholecalciferol) is produced in the body with the help of the liver and kidneys to the active hormone form, *calcitriol*. All you need, as we learned, is adequate exposure to ultraviolet sunlight. In its bone role, vitamin D regulates body levels of calcium and phosphorous to affect bone buildup and breakdown. According to the National Osteoporosis Foundation, "vitamin D plays a major role in calcium absorption and bone health... similar to that of a locked door and a key. Vitamin D is the key that unlocks the door and allows calcium to leave the intestines and enter the bloodstream. Vitamin D also works in the kidneys to help reabsorb calcium that otherwise would be excreted".

Vitamin D's role in bone health is solidly established. An estimated 10 million adults have osteoporosis, a loss of bone density, and another 34 million have low bone mass or are osteopenic, putting them at risk for fractures. Several studies have shown a direct link between vitamin D, stronger bones and reduced falling and fractures in the elderly.

Although this article cannot explain all the benefits, D<sub>3</sub>'s influence on pain is worth mentioning. A 12-week clinical study looked at the relationship of active D<sub>3</sub> to widespread musculoskeletal pain in 56 patients with fibromyalgia, headaches, spinal arthritis and failed spinal surgery. Moderate to severely low levels were found in over half of the patients, regardless of age (26-80 years). Similarly, low levels of D<sub>3</sub> are found in arthritis, diabetes, heart disease and multiple sclerosis.

**Are you getting enough D?** Ideally, only 10-15 minutes of sunlight three times a week should be enough time to "make" vitamin D. However, the time of day, amount of sunlight available, the season and latitude, and even the fairness of your skin affect the outcome. Sunblock, pollution, clothing, age, and darker skin color also decrease the skin's ability to make vitamin D. Your health also plays a factor. Disorders of the parathyroid, kidneys and intestines will adversely affect your ability to maintain D levels. Any problem with fat absorption or synthesis also puts a person at risk since D is a fat soluble vitamin.



You can also get vitamin D in food sources: Cod liver oil, saltwater fish (salmon, mackerel, tuna, sardines), egg yolks and beef liver. Due to an epidemic of rickets in school age children in the 1930s, vitamin D was added to milk, a practice which is still continued today. But D is also advertised on bread and cereal labels,

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## Vitamin D *continued*

orange juice cartons and in other foods where D is not typically found. Unfortunately, it may not be the active form of vitamin D or in such small quantities that it would be hard to obtain your daily quota without supplementing.

Supplementing with oral vitamin D, especially in cases of deficiency, seems to be the easiest and fastest way to increase or maintain healthy levels. According to *Health Points* advisor, Dr. Michael Smith, “The exact form of vitamin D is quite important. Oral vitamin D<sub>3</sub> results in a 70% higher level of vitamin D in the bloodstream when compared to dosing with oral D<sub>2</sub>”.

**Dosages.** The Institute of Medicine, which sets vitamin daily values “determined that there was insufficient scientific information to establish an RDA for vitamin D”. Instead, the recommended intake is listed as an Adequate Intake (AI) to maintain normal calcium metabolism in healthy people. The 400 IU commonly cited is based on the amount found in a teaspoon of cod liver oil, a daily dose of which prevents rickets in children. The dose does not account for adult age, size and deficiencies. According to Dr. Smith, if deficient, “a person needs at least 1000-2000 IU per day to double the vitamin D<sub>3</sub> level in plasma”.

**Toxicity.** Reports of 400-800 IU intake daily as “massive” and “toxic” are old news. In fact, in a 2006 published paper, Dr. Michael Holick of the Mayo Clinic states, “Vitamin D toxicity has not been reported from long term exposure to sunlight and has only been observed from dietary intake when daily doses exceed 10,000 IU. Doses of 4,000 IU for 3 months and 50,000 IU/wk for 2 months have been administered without toxicity”. The real issue seems to be in getting enough, not too much.

**Vitamin D Testing.** Active vitamin D<sub>3</sub> can remain in the bloodstream for several days at a time, making a blood test a fairly accurate way of checking for deficiency. With osteoporosis on the rise as the population ages (and increased pollution, bad diet prevail), most insurances cover costs of and most doctors are willing to order this simple blood test.

**Summary.** Although the role of vitamin D's influence on bone health is well documented, its impact on other disease processes is just beginning. Whether you think of D as a vitamin or a hormone, you'll want to check your levels as its benefits are unquestionable. Look for more articles and headlines on this “non” essential vitamin!

### Resources

- 1 National Osteoporosis Foundation [www.nof.org](http://www.nof.org)
- 2 Office of Dietary Supplements, NIH (8/5/05 Update). Vitamin D Fact Sheet.

3 Gostine ML, David FN. *Vitamin D deficiencies in pain patients*. Practical Pain Management J/A 2006.

4 Holick, MF. *High prevalence of vitamin D inadequacy and implications for health*. Mayo Clin Proc 2006;81:353-373.

*Caution: Consult your doctor before supplementing with vitamin D if you are planning a pregnancy or are pregnant; have elevated calcium levels, and/or disorders of parathyroid, GI tract or liver.*

## Vitamin D may play a role in preventing and/or treating these disorders

Alzheimer's  
Cancer (Breast, colon, prostate, skin)  
Chronic pain  
Depression  
Diabetes  
Epilepsy  
Fibromyalgia  
Heart Disease  
Hypertension  
Inflammatory Bowel Disease  
Kidney & Liver disease  
Mental Illness  
Multiple Sclerosis  
Muscle Weakness  
Obesity  
Osteoarthritis  
Osteoporosis  
Periodontal Disease  
Pre-eclampsia  
Psoriasis  
Tinnitus  
Ulcerative Colitis

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