Vitamin D: Are higher doses needed?

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Startling new information shows that the recommendations for Vitamin D may have been set too low. See the following review of what we now know.

What is Vitamin D?

Vitamin D is an oil soluble substance that is found in only a few foods, such as the oil from cod liver, egg yolks, butter, and other cold-water fish such as salmon, herring and mackerel. It is considered a vitamin because the body's ability to manufacture it is dependent on environmental factors, in this case, exposure of the skin to sunlight. Vitamin D is formed in the skin by the action of short-wave ultraviolet light, the so-called fast-tanning sun rays, on a form of cholesterol found in the skin called 7-dehydrocholesterol. The rays activate this and convert it into cholecalciferol, a weak form of vitamin D3, which is then transported to the liver and kidneys where enzymes convert it to 1,25-dihydroxycholecalciferol, the more potent form of vitamin D3. Although more than 10 substances belong to a group of steroid compounds that exhibit vitamin D activity, the commonly available forms are vitamin D3 (cholecalciferol), most often obtained from cod liver oil and sometimes from wool grease, and vitamin D2 (ergocalciferol). Vitamin D2 is synthesized by irradiating precursors found in plants and yeast. This is the form of the vitamin commonly added to milk. (top)

What does Vitamin D do in the body?

Vitamin D helps in the absorption and utilization of calcium and phosphorus. Vitamin D is necessary for normal growth in children. In adults it helps with any function that utilizes calcium or phosphorus, such as transmission of nerves, the beating of the heart, blood clotting, and many others. (top)

What are the benefits of sufficient Vitamin D?

In children, vitamin D will insure that the body forms healthy teeth and

bones. For everyone, it prevents rickets and osteomalacia in the absence of sunlight, and at higher doses helps prevent osteoporosis and secondary hyperparathyroidism. Other benefits of vitamin D supplementation include: prevention of certain cancers, osteoarthritis progression, multiple sclerosis, and hypertension. Animals studies show that Vitamin D is important for immune function. There is also evidence that vitamin D may not just help prevent cancer but may help in tumor regression.

Recent research with mice at Penn State has demonstrated a connection between vitamin D deficiency and two bowel diseases that occur in one out of every 1,000 people in North America and Europe, Crohn's disease and ulcerative colitis. Treatment with Vitamin D for as little as two weeks lessened the symptoms of these inflammatory bowel diseases in mice. (This was discussed in a recent Nutrient News article here. See Vitamin D and IBD.)

Other researchers have suggested that low Vitamin D levels could be a factor in sickle cell anemia and severe crises in African Americans (dark-skinned people need 3 to 6 times more sun exposure time than light-skinned ones to make ample D.) There is some indication that Vitamin D may be important for many kinds of autoimmune disorders, besides multiple sclerosis, and it has been noted that getting sufficient Vitamin D can help reduce the need to urinate at night.

Other important roles for Vitamin D come from the work of Carl Reich, MD, of Calgary. Insufficient Vitamin D prevents the ionization of calcium and thus makes calcium less able to play it's role in functions in the body. Reich found that this leads to cell energy starvation, causing fatigue, headaches, muscle cramps, allergies, gut problems and other problems. Over time, these can become more serious: asthma, hypertension, osteoporosis, arthritis, etc. Dr. Reich treated this cell energy starvation using diet and nutrients, including doses of Vitamin D of 4800 to 8800 IU (less for children), reducing the dose as patients improved. Using this program for over 30 years, Dr. Reich helped his patients recover from a variety of ailments. (top)

What is the best form of Vitamin D?
Both forms will work but Vitamin D3 (cholecalciferol) raises serum D levels more effectively than D2 (ergocalciferol). (top)

What is the best way to get Vitamin D?
Vitamin D pills: use D-3 (cholecalciferol), preferably with an oil-containing meal. A least a portion of it should be from cod liver oil pills, so that some Vitamin A and other oils fractions are included. Take Calcium-Magnesium at the same time. If taking a large daily dose of Vitamin D, divide the dose between 2 or 3 meals.

Sunlight exposure: This is the best way to get Vitamin D, as the body automatically regulates how much Vitamin D it makes from sunlight, and there is the added benefit of controlling cholesterol. Since vitamin D precursors require cholesterol for conversion into the hormone-like vitamin, without adequate sun exposure vitamin D precursors can turn into cholesterol instead of the vitamin.

It is estimated that for each 5% of skin surface exposed, approximately 435 IU of Vitamin D can be manufactured. But it doesn't stop with just catching a few rays. The process requires that the oil on the skin remain intact for awhile after exposure to the sun. For instance, life guards and farmers, who don't go shower immediately after sweating in the sun, have the highest serum Vitamin D levels. Try to keep the oil on your skin for at least several hours after sun exposure. (top)

"Throughout my preparation of this review, I was amazed at the lack of evidence supporting statements about the toxicity of moderate doses of vitamin D. Consistently, literature citations to support them have been either inappropriate or without substance." - Reinhold Vieth

How much Vitamin D is enough? What levels of Vitamin D are safe?
The dietary allowance set by the National Research Council is 400 IU per day for all healthy individuals who have no exposure to ultraviolet light. The Daily Reference Intake (DRI) had been set at 200 IU, and it was recently tripled for people over 70 years of age, to 600 IU per day - but for everyone else, the DRI remains at 200 IU. Reinhold Vieth's evidence suggests these levels may be dangerously low.

According to Vieth, a knowledgeable Vitamin D researcher, there is still no published data that shows that 200 IU Vitamin D/d has any effect on the concentration of calciferol in the blood of adults. This low level of D does tend to prevent osteomalacia - but osteomalacia is the last stage of a thirty year process of bone degeneration, that begins with osteoporosis.

"Except in those with conditions causing hypersensitivity, there is no evidence of adverse effects of 10000 IU/d of Vitamin D. Published cases of vitamin D toxicity with hypercalcemia, for which the 25(OH)D concentration and vitamin D dose are known, all involve intake of 40000 IU/d. Because vitamin D is potentially toxic, intake of >1000 IU/d has been avoided even though the weight of evidence shows that the currently accepted, no observed adverse effect limit of 2000 IU/d is too low by at least 5-fold." - Reinhold Vieth

Vieth now estimates the daily requirement for Vitamin D from all sources at 4,000 IU/d, and he offers compelling evidence that 10,000 IU/d is a safe and

desirable level. "From all sources" means that these levels are the result of daily intake of Vitamin D from supplements, from foods such as cold water fish, and from exposure of the skin to UVB. Although Vieth believes that 10,000 IU/d of Vitamin D is safe for most people, whether or not that level is desirable is not clear. It's also possible that some people could develop an excess of vitamin D taking these amounts. We urge caution using these high amounts, and recommend frequent blood tests for 25(OH)D levels to make sure that excess amounts are not accumulating. (top)

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How could the current government figures be so far off?
Vieth traced back how it happened. The 1989 US nutrition guidelines said that 5 times the RDA for vitamin D may be harmful - in other words, don't take more than 1000 IU/d. It cited a 1963 "expert committee report", which itself referred back to a 1938 report, in which linear bone growth in infants was suppressed in those given 1800-6300 IU vitamin D/d. But this citation is meaningless in relation to adult nutrition.

Vieth also traced back a statement from the 1987 Council Report for the American Medical Association that "dosages of 10,000 IU/d for several months have resulted in marked disturbances in calcium metabolism...and, in some cases, death." This report cited two references, and Vieth says of these: "One was a review article about vitamins in general, which gave no evidence for and cited no other reference to its claim of toxicity at vitamin D doses as low as 250 µg (10000 IU)/d . The other paper cited in the report dealt with 10 patients with vitamin D toxicity reported in 1948, for whom the vitamin D dose was actually 3750-15000 µg (150000-600000 IU)/d, and all patients recovered." He goes on to say: "If there is published evidence of toxicity in adults from an intake of 250 µg (10000 IU)/d, and that is verified by the 25(OH)D concentration, I have yet to find it."

It's hard to say if the scientists involved made an honest mistake or deliberately, for reasons unknown, set the dose of Vitamin D at just enough to prevent frank rickets and osteomalacia. My feeling is that it was due to a certain mindset, one that wants certainty, and when this is lacking, as it always is in true nutritional research, resorts to a position that could never be accused of being too "flaky" or "outrageous". "Well, we know this level will prevent rickets, so we can make an unequivocally safe statement."

Of course, some will point to the decades-old revolving door between government and the pharmaceutical industry as the motivating force behind not publicizing the benefits of a non-patentable nutrient. These conspiracy theories may sound ridiculous, yet it was recently announced by a group of supposedly disinterested scientists that any recommendations for the use of vitamin D to treat or prevent any disease should wait until patentable vitamin D analogs could be developed! You can make your own evaluation of the motivation of these "scientists". (top)

What are the contraindications for high-dose Vitamin D?
The main contraindication is the existence of primary hyperparathyroidism - but interestingly, before the occurrence of hyperparathyroidism, vitamin D is preventative because it reduces parathyroid secretion. Individuals with sarcoidosis, tuberculosis, or lymphoma may become hypercalcemic when given increased Vitamin D doses. Some rare individuals are sensitive to Vitamin D at higher doses.

What are the signs of Vitamin D toxicity?
The main signs are sudden hypercalcemia (excessive levels of calcium in the blood) and/or hypercalcinuria (excessive levels of calcium in the urine). Toxicity symptoms are headache, nausea, dizziness, vomiting, loss of appetite and dry mouth. (top)

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