

The Vitamin D Newsletter July 2009

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More Vitamin D Questions and Answers

Showering After Sunbathing

Dr. Cannell: Does showering after sunbathing wash off the Vitamin D? Sarah, Oklahoma

Yes, but how much of the skin's total production? Agnes Helmer and Cornelius Jensen published a remarkable human/animal study in 1937, showing that significant amounts of Vitamin D are made on the surface of human skin. Reverend Jensen, the senior author, was a professor of biophysics at St. Thomas Aquinas, the precursor of the University of Dayton. The authors collected surface oils from young men before showering, irradiated the oils, and showed those oils contained large amounts of Vitamin D, enough to cure rickets in animals. Then, they tested a very practical question; can those oils be removed by washing? Indeed they found washing, even with plain water, removed much of the Vitamin D from the surface of human skin. Helmer AC, Jensen CH. **Vitamin D precursors removed from the skin by washing**. *Studies Inst. Divi Thomae*, 1937, 1:207–216.

Holick, *et al's*, landmark 1980 study showing most human Vitamin D production occurs in the deep [epidermis](#) was incomplete. It was based on surgically obtained (and assumedly surgically prepped) skin samples that had any remaining surface oils removed by washing with hot water. Indeed, to accurately address the question of where Vitamin D is made, one would need to obtain unwashed human skin, difficult to do even from cadavers. [Holick MF, MacLaughlin JA, Clark MB, Holick SA, Potts JT Jr, Anderson RR, Blank IH, Parrish JA, Elias P. Photosynthesis of previtamin D3 in human skin and the physiologic consequences. Science. 1980 Oct 10;210\(4466\):203–5.](#)

It appears to me that the percentage of Vitamin D made on the surface of the human skin, compared to that made inside the skin, is unknown at this time and in need of additional and careful research. Furthermore, as the percentage made of the surface is significant, studies of cutaneous Vitamin D production in modern humans—unless from skin that went unwashed for several weeks—will not give accurate estimates of Vitamin D production in early man. Thus, these studies cannot give an accurate estimate of the "natural" [25\(OH\)D](#) levels present when the human [genome](#) evolved in Northeast Africa.

Magnesium and Vitamin D

Dr. Cannell: Is it important to take magnesium with vitamin D? Judith, New York

Yes, it is important to have adequate [magnesium](#) intake and most Americans do not. A number of people have written about muscle cramps after they start sunbathing or taking Vitamin D. This is likely caused from the neuromuscular hyperexcitability of magnesium deficiency that is somehow unmasked by higher Vitamin D levels. [Abbott LG, Rude RK. Clinical manifestations of magnesium deficiency. Miner Electrolyte Metab. 1993;19\(4–5\):314–22.](#)

The latest survey of magnesium (Mg) intakes of Americans ([NHANES](#)) indicates the majority of Americans have Mg intakes below the Recommended Daily Allowance (RDA) in all age and race groups tested. In fact, the daily intakes were: 70 mg/day less than recommended in Caucasian men; 130 mg/day less in African American men; 60 mg/day less in Caucasian women; and 120 mg/day less than recommended in African American women. (The RDA is 320 mg/day for women and 420 mg/day for men.) Also, one statistic—called the standard error of the mean—was quite low. For example, +/- 6 for Caucasian men, raising the possibility that the vast majority of Americans are Mg deficient.

Even more interesting were some of the top ten contributors for American Mg intake: coffee, 3.7% of intake; milk, 2.2%; beer, 1.8%; French fries, 1.1%. Not a word about Americans eating many seeds and nuts, the foods loaded with Mg. Dr. Earl Ford of the [CDC](#), the lead author, concluded, "Because magnesium has many potential health benefits, increasing the dietary intake of magnesium in the U.S. population should be an important public health goal." [Ford ES, Mokdad AH. Dietary magnesium intake in a national sample of US adults. J Nutr. 2003 Sep;133\(9\):2879–82.](#)

Apparently, Mg is better absorbed from foods than from supplements and Mg absorption varies with the degree of Mg deficiency. Mg is at the heart of the [chlorophyll](#) molecule, which is why green vegetables are a good Mg source. Other good sources are nuts, seeds, whole grains, dried fruit, and some fish. The richest source by far on a per gram basis is dried seeds, like pumpkin, sunflower, and sesame seeds, containing between 340–535 mg per 100 gram serving. High Mg foods were probably staples of

Paleolithic man. [Magnesium](#). Office of Dietary Supplements, NIH Clinical Center, National Institutes of Health.

Magnesium (Mg) is the forgotten mineral, an "orphan," as Professor Robert Heaney of Creighton University says. It is the fourth most abundant mineral in the body, for it is involved in more than 300 biochemical reactions. All the enzymes that metabolize Vitamin D require Mg. It is also required in each of the steps concerned with replication, [transcription](#), and translation of genetic information, and thus it is also needed for the genetic mechanism of action of Vitamin D. [Zofková I, Kancheva RL. The relationship between magnesium and calciotropic hormones. Magnes Res. 1995 Mar;8\(1\):77-84.](#) [Carpenter TO. Disturbances of vitamin D metabolism and action during clinical and experimental magnesium deficiency. Magnes Res. 1988 Dec;1\(3-4\):131-9.](#)

Besides these two reviews, any scientist interested in Vitamin D and the immune system should read [Interactions between magnesium and vitamin D: possible implications in the immune system](#).

Two interesting cases of Mg dependent Vitamin D-resistant rickets appeared in the *Lancet* in 1974. Two children, one age two and the other age five, presented with classic rickets. 600,000 IU of Vitamin D daily for ten days did not result in any improvement in six weeks—in either x-rays or [alkaline phosphatase](#)—and the doctors diagnosed Vitamin D-resistant rickets. Almost by accident, serum Mg levels were then obtained, which were low in both children. After the treatment with Mg, the rickets rapidly resolved. [Reddy V, Sivakumar B. Magnesium-dependent vitamin-D-resistant rickets. Lancet. 1974 May 18;1\(7864\):963-5.](#)

What does that mean? How can one treat rickets with Mg? Remember, these children took a total of 6 million units, that's a total of 6,000,000 IU of vitamin D over ten days (it was given as injections so we know the children actually took it). Thus, they had plenty of vitamin D but, in their cases, the vitamin D needed Mg to work.

In 1976, Dr. Ramon Medalle and colleagues at the Washington University School of Medicine described five patients with Mg deficiency and low blood [calcium](#) whose calcium blood levels would not return to normal after [Vitamin D treatment](#), a condition known as Vitamin D resistance. However, serum calcium promptly returned to normal in all five patients after treatment with Mg, raising the possibility that such Vitamin D resistance may be caused from simple, but severe, Mg deficiency. [Medalle R, Waterhouse C, Hahn TJ. Vitamin D resistance in magnesium deficiency. Am J Clin Nutr. 1976 Aug;29\(8\):854-8.](#)

What is not known is how mild to moderate Mg deficiencies (like most Americans apparently have) affect Vitamin D [metabolism](#). The safe thing to do is to eat green leafy vegetables and a handful of sunflower seeds every day (Trader Joe's sells a variety of seeds). If you can't, won't, or don't end up doing that, then take a Vitamin D supplement with added Mg.

In fact, there are now supplements on the market that contain all the co-factors vitamin D needs to work properly (including magnesium): zinc (the base of the fingers of the [Vitamin D Receptor](#) each contains a zinc molecule), Vitamin K2 (Vitamin K helps direct Vitamin D to calcify the proper organs and prevents calcification of improper organs), boron (boron is involved in the rapid, non-[genomic](#) action of Vitamin D on the cell wall), a small amount of genestein (about one-half the amount the average Japanese consumes every day) which helps [activated Vitamin D](#) stay around longer at the receptor site, and a tiny amount of Vitamin A. Again, the wisest thing to do is to eat green leafy vegetables and a handful of seeds every day as that combination contains the co-factors Vitamin D needs, the co-factors many Americans are deficient in.

Vitamin D and Pulmonary Function

Dr. Cannell: Last winter, I was having trouble breathing and fever and chills. It hurt when I breathed on the left side. My family doctor found a collection of fluid on the left lung and wanted to drain some of the fluid but I refused. After some research, I determined my problem was most likely pleurisy. From my research, the primary method of treatment is antibiotics. I didn't like that idea, so I started 50,000 IU of Vitamin D per day. My pain was gone within two weeks and my chest x-ray was normal in four weeks. Should I continue taking 50,000 IU per day?

I hope you continue your website. Your articles are touching so many people. Thanks again for all you do! Peter, North Dakota

You took a chance with your life. Fluid collection in the pleural space can be caused from lots of things, including [cancer](#), blood clots, heart disease, and tuberculosis; that's why the doctor wanted to get some of the fluid, to make an accurate diagnosis. Be sure you have repeat chest X-rays and a thorough medical examination. Stop the 50,000 IU per day and go down to 5,000 IU per day and have a [25\(OH\)D blood test](#) in about four months.

That said, you will love reading this 1946 paper. It is available for free [PDF](#) download in its entirety: [Vitamin D—Its Bactericidal Action](#).

Vitamin D Testing Standards

Dr. Cannell: I understand the federal government is going to come out with some new standards for Vitamin D testing. What are they? Robert, Florida

Actually, the National Institute of Standards and Technology (NIST) are coming out with [standards](#) that were supposed to allow reference laboratories to check the accuracy of their Vitamin D techniques. Unfortunately, NIST's standards dilute with horse serum for their low samples and spike (adding extra [25\(OH\)D](#)) for their high standards and that will cause problems for some measurement

techniques. It is unclear how the big reference labs will compensate for NIST's procedures.

Vitamin D Testing and the AMA

Dr. Cannell: I understand the American Medical Association now recommends Vitamin D blood tests? Peter, Idaho

Yes, and no. They said testing was indicated in those likely to be low but added the usual more research is needed until such testing becomes routine. What is needed is mass testing, screening on a wholesale level. However, the AMA's action is a step in the right direction. Did you ever wonder just how effective President Obama's public sector option in his health care plan would be if Vitamin D were a routine part of its prevention program? For that matter, when are insurance companies going to realize how much money they could save by encouraging physicians to screen and supplement their patients with Vitamin D? [Elliott, V. AMA meeting: Vitamin D checks urged. American Medical News. 2009 June 29.](#)

Food and Nutrition Board Meeting on Vitamin D

Dr. Cannell: Are you going to the August 4th meeting of the Food and Nutrition Board on Vitamin D in Washington DC? Bruce, Maryland

No, it is not in the Council's budget. But, the meeting is free, and the public can register to make a 5 minute verbal comment. I encourage anyone who can go to attend the meeting in Washington D.C on August 4: [Meeting 2: Committee to Review Dietary Reference Intakes for Vitamin D.](#)

While we are on the subject of Vitamin D meetings, the big one, the week long one, the one that only occurs every two years, with lots of new exciting [Vitamin D research](#), is in Brugge Belgium in October. This is the one I am saving to go to: [14th Vitamin D Workshop](#), October 4–8, 2009, Brugge, Belgium.

Vitamin D Test Results and Quest

Dr. Cannell: I thought you got Quest to fix their Vitamin D test. On 3/12/09 my vitamin D,25 hydroxy test at Quest Labs came out as 62 ng/mL Whereas on 3/29 at Lab Corps the same test showed 44.2 ng/mL. What's up? Nancy, Rhode Island

Remember, to compare the technique Quest uses to the technique Lab Corp uses you must divide Quest's result by 1.3. So your Quest result was really 48 ng/mL, which is close to Lab Corp's results.

Thank You Carole Baggerly

Dr. Cannell: I see things changing very quickly, the AMA, the American Public Health Association, and the American Pediatric Association. They have all changed their Vitamin D positions in the last year. Thank you for all that you do. Jeanne, California

I am certainly not the one who lobbied these organizations for change. The person who did that has lots of friends and knows lots of people. Her name is Carole Baggerly and her organization is GrassrootsHealth. Even the Skin Cancer Foundation, backed by dermatologists and the cosmetic industry, is now recommending 1,000 IU/day. Thank Carole and her friends and network and people skills. Carole is going on a Canadian tour this summer, talking about [breast cancer and Vitamin D](#). You may [contact her](#) for more information.

[John Jacob Cannell MD](#) Executive Director

*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.