

Vitamin D the Forgotten Vitamin

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Hello everyone. I hope all of you are keeping warm this winter. It's been a cold one here. This is a good time to spend some time indoors with your family next to a warm fire with a hot cup of tea, coffee or cocoa. This issue of the newsletter is the vitamin issue. Americans love their vitamins. We've been told since childhood that vitamins are good for you. Well, what we have learned in the past few years is that vitamin supplements have not been found to prevent any diseases. The most recent trial is the Selenium and Vitamin E prevention trial (SELECT <http://jama.ama-assn.org/cgi/content/full/301/1/39>). This trial did not demonstrate any reduction in cancers in people who took selenium or vitamin E in combination or alone. This unfortunately is the latest in a long list of trials that did not show a benefit for those taking supplemental vitamins. In fact, the American Heart Association and the American Cancer Society do not recommend taking vitamins to prevent diseases. What they do recommend is a healthy diet. Fruits and vegetables are the key to getting all the micronutrients necessary for health and disease prevention.

You'll also notice many articles on vitamin D. In many respects, vitamin D is the forgotten vitamin and it isn't even a vitamin! The breakdown product of vitamin D, calciferol, is a secosteroid hormone that targets over 200 genes in the human body (the Vitamin D Council) and vitamin D is responsible not only for bone health but for the health of our entire bodies.

The best source of vitamin D is the sun. Vitamin D₃ (cholecalciferol) is formed in the skin after sun exposure and is then transported to the liver where it is converted to 25-hydroxyvitamin D (25-(OH) D). This is the form that is measured in the blood and is a useful indicator of your vitamin D level. The 25-(OH) D is then sent to the kidney where it is converted to 1,25 hydroxy-vitamin D, the most potent form of vitamin D. Vitamin D attaches to cells at a vitamin D receptor, enters the cells, and works by turning on certain genes.

Vitamin D is responsible for bone health and calcium regulation. It regulates cell growth which is important in preventing mutations from overgrowth of cells. This is one mechanism by which it helps to prevent cancers. Vitamin D also helps to regulate insulin production and blood pressure.

The vitamin D receptor is found on most cells in the immune system including T-cells, antigen presenting cells, dendritic cells, and macrophages. It is also located in TOLL-like receptors which are responsible for the first line of defense of viruses when they come in contact with your nose or other mucous membranes. Vitamin D not only helps to improve the immune system function, but it also helps prevent an overactive immune system and auto-immune diseases such as type I diabetes and multiple sclerosis. It has been known for years that these diseases are more common in northern climates where sun exposure is less than regions near the equator.

If vitamin D is so important why are as many as ¾ of the population deficient? The main reason is our modern lifestyle. We don't spend a lot of time in the sun, and when we do, we are told to wear sun block which effectively prevents any vitamin D production. If you live in St. Louis like I do, or further north, then there is not enough sun to make vitamin D for 2-3 months each year. If you have light

colored skin, you only need 15-20 minutes of sun exposure to get 30,000 units of vitamin D. If you have darker skin, you may need 60 minutes of exposure. Many more dark skinned people are low in vitamin D. Isn't it interesting that they have higher incidences of hypertension, heart disease, diabetes, and cancer than lighter skinned people? I think the lack of vitamin D could be playing a role.

Medical conditions that lead to low vitamin D include fat cystic fibrosis, liver diseases, inflammatory bowel disease, and obesity. The first three diseases cause poor absorption of vitamin D from the diet while obesity leads to over-storage of vitamin D in fatty tissue keeping it from the rest of the body. This is a very important cause of low vitamin D because 1/3 of our population is obese.

If you can't get sun, then supplementing your diet with vitamin D is recommended. Unfortunately, Federal guidelines recommend 400 units daily of vitamin D for adults and 600 units if you are over 50 years of age. This amount is thought to be too low by many experts. One study demonstrated that 200 units daily was ineffective as raising vitamin D levels compared to higher doses of 1000 to 10,000 units daily. In these participants, even the highest dose did not cause side effects. Daily doses of 4000-5000 units daily are recommended by some experts if you are not getting sun exposure (Hollis J. Nutr. 135: 317-322, 2005).

So, enjoy this month's newsletter, eat some fruits and vegetables each day, and don't forget to get a little sun or take a vitamin D tablet when you can't get some sun.

More information about vitamin D can be found in the following references:

http://ods.od.nih.gov/factsheets/VitaminD_pf.asp

<http://lpi.oregonstate.edu/infocenter/vitamins/vitaminD/>

Bruce Hollis MD, J. Nutr. 135: 317-322,2005

http://jn.nutrition.org/cgi/content/abstract/135/2/317?ijkey=6db11468824c595c23e4cc5dbaf76edbf712c04&keytype2=tf_ipsecsha