-Diet Support Group

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Vitamin D Supplementation in the Fight Against MS.

With regard to your request for details on this subject, a UK-based practical information sheet is attached and the following is an update on the latest scientific research from Ashton Embry PhD, at Direct-MS.

On the 28th December 2007, vitamin D made Time magazine's top 10 list of medical breakthroughs for that year, after a twelve month period in which the solid scientific support for the linkage with Multiple Sclerosis grew considerably.

When this latest information, summarized below, is combined with all the previous work it essentially leaves very little doubt that MS is a long latency vitamin D deficiency disease. Once this is accepted then it becomes obvious that adequate vitamin D intake from birth onward can protect a person from MS regardless of genetic susceptibility or exposure to other environmental factors involved in MS.

A year ago researchers at Harvard University (Munger et al) compared vitamin D levels in stored, blood samples of soldiers later diagnosed with MS to vitamin D levels of matched, healthy controls. This work demonstrated that "the risk of multiple sclerosis significantly decreased with increasing levels of 25 hydroxvitamin D" (the form of vitamin D which circulates in the blood). Furthermore, the researchers found that this correlation was "particularly strong for vitamin D levels measured before age 20". Harvard researchers led by Alberto Ascherio followed up this paper with a comprehensive review article on environmental risk factors for MS and the evidence linking vitamin D to MS covered 5 pages. At the same time, George Ebers of Oxford University co-authored a major review paper on environmental causes of MS and pointed to vitamin D as one of the main factors. When researchers at two of the top universities in the world are touting vitamin D as a significant causal factor of MS in mainstream medical journals, you know that the concept is finally being taken seriously by the MS research establishment some 33 years after it was first proposed.

A study of regional differences in MS prevalence for French farmers was published in April 2007 by Vukusic et al. It is clear that the differences in MS prevalence, which are over two fold, are readily explained by variations in ultraviolet radiation/vitamin D supply over France. Such an interpretation is hard to challenge because genetics is not a confounding factor and the farmers are distributed evenly throughout the country. Additional convincing evidence of the MS/vitamin D linkage was provided by a study of childhood sun exposure and MS risk of identical twins in North America by Islam et al. The results demonstrated that "the risk of MS was substantially lower for the twin who spent more time sun tanning in comparison with the co-twin".

A third study by Kampman et al. looked at the risk of MS and differences in outdoor activities and diet of children and adolescents born and living in northern Norway. They found that increased outdoor activities in early life as well as cod liver oil supplementation were associated with a lower risk of MS. I would emphasize that these three, solid studies from different parts of the world all strongly support the concept that the higher one's supply of vitamin D, the lower the risk of MS.

Also of importance were three other studies published in 2007, all of which looked at vitamin D status and disability in persons with MS. Van der Mei et al measured vitamin D levels in persons with MS in Tasmania and found that "increasing disability was strongly associated with lower levels of 25(OH)D (circulating vitamin D) and with lower levels of sun exposure". In Finland, Soilu-Hanninen et al demonstrated that, for MS patients, there was "an inverse relationship between serum vitamin D levels and MS clinical activity". Finally, Woolmore et al in a British study found that there was an association between skin type and disability in female MS patients. Those with sun-sensitive skin types, which produce vitamin D faster, had lesser disability. These studies all point to the same conclusion that increased vitamin D, lessens disease progression and resulting disability.

Another key paper published in 2007 was that by Holmoy who came to the same conclusion I had in my 2004 paper on MS causal factors. He interpreted that adequate vitamin D in childhood prevents MS by regulating the immune system such that it does not produce myelin-sensitive immune cells during and after infections with childhood viruses such as Epstein-Barr. To me, this is by far the simplest and most reasonable explanation of how adequate vitamin D ensures MS does not develop in later life.

Perhaps the most important paper on vitamin D published in 2007 did not address MS but cancer. Lappe et al convincingly demonstrated with a 4 year, double blind, clinical trial involving over 1000 post-menopausal women that supplementing with 1000 IU of vitamin D reduced all-cancer risk by a very impressive 60%. One can only wonder what the result would have been with an adequate supplement of 4000-5000 IU. In terms of MS, cancer prevention is a welcome "side effect" of maintaining adequate vitamin D levels.

But how safe is it? The levels suggested are, after all, much higher than the current guidelines. Well, a study by Hathcock et al provided clear evidence that an intake of 10,000 IU of vitamin D per day is perfectly safe and that such an amount should be adopted as the safe upper limit for vitamin D intake. Kimball et al showed that up to 40,000 IU a day did not result in any adverse side effects and, further, in a dose/safety trial in Toronto, the results of which were presented at the MS World Congress in 2008, escalating doses of vitamin D, which resulted in 25D levels of over 400 nmol/l, had no adverse effects whatsoever and serum calcium levels stayed within the normal range. In this trial, the researchers also found that "A greater proportion of treatment patients had stable/improved disability scores vs. control patients ($p=0.018$). Treatment patients had fewer relapses and a greater reduction in relapse rate vs. controls." Further still, the immunological data demonstrated that high dose vitamin D resulted in much lower levels of immune cell expansion and that immune responses to myelin proteins as well as milk proteins were significantly reduced. Thus high dose vitamin D appears to be an important suppressant of autoimmune reactions.

Finally, in a paper published in July 2008, researchers at the University of Missouri confirmed findings of a previous study that vitamin d deficiency may negatively impact immune function, cardiovascular health and increase cancer risk. They were able to specifically demonstrate that such a deficiency is associated with inflammation, a negative response of the immune system, in healthy women. In particular, they showed that increased concentrations of serum TNF-α, an inflammatory marker, were found in healthy women who had insufficient vitamin D levels. This study is the first to find an inverse relationship between vitamin D levels and concentrations of TNF-α in a healthy, non-diseased population and may explain the vitamin's role in the prevention and treatment of inflammatory diseases, including heart disease, multiple sclerosis and rheumatoid arthritis. The team, whose future studies will aim to determine the effectiveness of Vitamin D in reducing disease symptoms and lowering blood glucose levels in diabetics, believe their findings support the need to re-examine the biological basis for determining the current inadequate dietary reference intake (DRI) of vitamin D.

Given all the evidence which ties vitamin D to MS onset and progression and the recent data on the safety of 10,000 and perhaps as much as 40,000 IU/d, I would strongly recommend persons with MS consider using 6000 IU/d as an adequate supplement. This will ensure their circulating 25D level will always be in the 125 -200 nmol/l range and such a level may well have significant benefit. Furthermore I would recommend that all first degree relatives of persons with MS maintain a 25D level of at least 100 nmol/l and preferably closer to 150 nmol/l.

Ashton Embry PhD
http://www.DIRECT-MS.org

Vitamin D Supplementation in the Fight Against MS

Practical Information Sheet(March 2009)

Introduction: The most reliable indicator of circulating vitamin D levels is the 25(OH)D test, (NOT the 1,25(OH)D test), and regular assessment is essential. A figure of between 125 and 150nmol/l is required to reduce the risk of autoimmune reactions developing into full-blown autoimmune disease.

Testing

- Arrange for a 25(OH)D blood test at your doctors, if possible before beginning supplementation but you should start once the blood is drawn. Your GP's ongoing support is important and, in the circumstances, perhaps you can forward the attached letter, which outlines the latest research linking MS with vitamin D deficiency, in advance of your visit.
- In the UK, this test should be available free of charge from your GP although some members have been asked to pay a nominal fee. It may be that an arrangement will be made for you to attend a nearby hospital or, instead, the blood may be drawn at the local practice but, in the latter case, there are precautions that need to be taken. It appears that, to ensure accuracy of the test, the sample needs to be protected from direct sunlight at all times, then spun and frozen within an hour. Accordingly, if the blood is drawn by the practice nurse it's important to arrange a time just prior to the regular collection of samples, and for the lab to be made aware that a sample requiring a 25(OH)D test is on its way.
- **Most important!** You should have your serum calcium levels checked at the same time. Your GP may be concerned that supplementing with vitamin d will increase your risk of a condition called hypercalcemia. However, the results of a recent trial in Toronto, where calcium levels stayed within the normal range(2.2-2.6 nmols/l), despite escalating doses of vitamin D resulting in 25D levels of over 400 nmol/l, should dispel these concerns.
- When the results are back, ask for the actual figures and the units used. You will need these to compare with future readings. A verdict of "normal" is insufficient and misleading. Different labs can use different units and, while many will give the results in nmols/l, just as many will quote ng/ml(nanogramms per millilitre) but there is a simple conversion factor between the two. When the figures are given in the latter units, just multiply by 2.5 to convert to nmols/l. (Please note that ug/l and pg/ul are the same as ng/ml and, as such, the same conversion factor applies.)

Recording

- We would ask that you remember to tell us your 25(OH)D, and serum calcium results, each time for our records. If you have signed up for the QUEST Worldwide Research Project, we will already know your "latitude of residence" and "lifestyle assessment" and, if you can now provide us with your test results and an assessment of your daily vitamin d3(cholecalciferol) supplementation(IU's), during the intervening period between tests, we will be in a position to track your progress within the appropriate members' subset. You will also have been allocated a unique Membership Number and Password and it would assist us greatly if you could quote this at the time. For those with internet access, simply email the information to info@MS-Diet.org and it would help if you included your membership number in the message "subject". Those without internet access, simply call **(0)1506 495391**.
- If you have children and intend to use vitamin D as a protection against them developing the condition, it is important to discuss this with your doctor as well and have their levels of 25(OH)D and serum calcium checked BEFORE starting the process. Once again, we would ask that you let us know their figures for our study.

Vitamin D Supplementation in the Fight Against MS

Practical Information Sheet(March 2009)

Supplementation

- The aim is to raise your 25(OH)D levels to the range 125-150 nmols/L as quickly as possible and the current advice is that a daily supplement of 6000iu vitamin d3(cholecalciferol) is both perfectly safe and needed to maintain the level within the desired range.
- **MEGA important!!** It is essential, to prevent osteoporosis(porous bones), for those on the Best Bet Diet which, of course, excludes dairy products, to ensure an adequate intake of calcium and magnesium while supplementing with vitamin D3(cholecalciferol). Please understand that vitamin D increases the body's absorption of calcium and, if you have insufficient calcium in your diet, it will "leach" it from your bones, leaving you with reduced bone mineral density and increased risk of fracture. This is of particular importance for post-menopausal women because the lack of estrogen compounds the problem. Make no mistake, osteoporosis is a serious condition which can have a significant effect on quality of life and, in extreme cases, even life expectancy. You MUST ensure you have an adequate intake of both calcium and magnesium and the current advice is to supplement with 1200mg elemental calcium and between 600-1200mg magnesium.
- **MEGA important!!** In general, calcium supplements may be taken at any time of day but it's important to note that calcium is absorbed most efficiently when it's taken in amounts of 500 milligrams(mg) or less. In other words, it is best to take the 1,200 mg of elemental calcium, and the magnesium of course, split into three dozes over the course of the day. It's also important to consider other medications. Because calcium supplements can impair the absorption of some medications, including certain antibiotics and blood pressure drugs, you may need to take your calcium supplements separately. Ask your doctor or pharmacist about possible interactions between calcium supplements and other medications you're taking.
- **MEGA important!!** Most of the pills on the market provide calcium in the form of calcium carbonate(40% elemental), which is alkaline-based and requires extra stomach acid for maximum absorption and, as such, is best taken after meals or with an acidic beverage such as orange juice. For some, intestinal distress in the form of gas or constipation can occur with and, if so, try upping your dietary fiber intake, and drink more water. If this doesn't help, switch to the next option. Calcium Citrate(21% elemental), is the best absorbed supplemental form of calcium and it does not require extra stomach acid for absorption, hence can be taken anytime of the day, even on an empty stomach. However, it is more expensive and provides less elemental calcium per pill, so more will be needed.

Product Recommendation

A high potency product made by a company called Life Extension, from lanolin(lambs wool fat), provides 5000iu of vitamin d3(cholecalciferol) in one capsule(00713), and the company assure us that their product is free from dairy, gluten and soya. Incidentally, they also make a 1000iu product(00215) but tell us it contains soybeans in some form and so is unsuitable for our needs. They are sold, here in the UK, by the retailer Nutricentre(www.nutricentre.com – **0845 602 6744**), where group members receive a 25% discount and free delivery on orders over £25 by quoting the code MSD197.