

## Vitamin D and MS – An Update

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I heard today (December 28) that vitamin D made Time magazine's top 10 list of medical breakthroughs for 2007. Better late than never! I had my epiphany regarding vitamin D and health in general and MS in specific, in late 1999 when I read Reinhold Vieth's watershed paper on vitamin D and supplementation. By the time I had finished the paper I had little doubt that vitamin D was a key factor in MS and that it was the missing piece of the MS puzzle I had been struggling to put together.

In 2005 I wrote two columns on vitamin D and MS for New Pathways and I hope I was able to convince the readership that there is solid scientific support for the vitamin D/MS linkage. I also hope anyone reading this column is taking an adequate vitamin D supplement and I'll discuss what adequate means subsequently. For now I want to concentrate on all the new information which was published on vitamin D and MS over the last year. To me, this latest information when combined with all the previous work 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 suntanning 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

The last publications I'll mention deal with safety issues. 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.

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.

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