

## **New Research Challenges Concept of Vitamin D Deficiency**

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Low blood levels of vitamin D have long been associated with disease, and the assumption has been made that vitamin D supplements may protect against disease. In the light of new knowledge that hundreds of genes are dependent on vitamin D, this assumption needs to be reconsidered.

In a report published in the current issue of the journal *BioEssays*(1), Trevor Marshall, Ph.D., professor at Australia's Murdoch University School of Biological Medicine and Biotechnology, explains how increased vitamin D intake affects much more than just nutrition or bone health. The paper explains how the Vitamin D Nuclear Receptor (VDR) acts in the repression or transcription of hundreds of genes, including genes associated with diseases ranging from cancers to multiple sclerosis.

"The VDR is at the heart of innate immunity, being responsible for expression of most of the antimicrobial peptides, which are the body's ultimate response to infection," Marshall said. "Molecular biology is now forcing us to re-think the idea that a low measured value of vitamin D means we simply must add more to our diet. Supplemental vitamin D has been used for decades, and yet the epidemics of chronic disease, such as heart disease and obesity, are just getting worse."

"Our disease model has shown us why low levels of vitamin D are observed in association with major and chronic illness," Marshall added. "Vitamin D is a secosteroid hormone, and the body regulates the production of all it needs. In fact, the use of supplements can be harmful, because they suppress the immune system so that the body cannot fight disease and infection effectively."

Marshall's research has demonstrated how ingested vitamin D can actually block VDR activation, the opposite effect to that of Sunshine. Instead of a positive effect on gene expression, Marshall reported that his own work, as well as the work of others, shows that quite nominal doses of ingested vitamin D can suppress the proper operation of the immune system. It is a different metabolite, a secosteroid hormone called 1,25-dihydroxyvitamin D, which activates the VDR to regulate the expression of the genes. Under conditions that exist in infection or inflammation, the body automatically regulates its production of all the vitamin D metabolites, including 25-hydroxyvitamin D, the metabolite which is usually measured to indicate vitamin D status.

Vitamin D deficiency, long interpreted as a cause of disease, is more likely the result of the disease process, and increasing intake of vitamin D often makes the disease worse.

"Dysregulation of vitamin D has been observed in many chronic diseases, including many thought to be autoimmune," said J.C. Waterhouse, Ph.D., lead author of a book chapter on vitamin D and chronic disease (2). "We have found that vitamin D supplementation, even at levels many consider desirable, interferes with recovery in these patients."

"We need to discard the notion that vitamin D affects a disease state in a simple way," Marshall said. "Vitamin D affects the expression of over 1,000 genes, so we should not expect a simplistic cause and effect between vitamin D supplementation and disease. The comprehensive studies are just not showing that supplementary vitamin D makes people healthier."

Trevor Marshall is currently executive director of Autoimmunity Research, Inc., a 501(c)(3) non-profit organization chartered in California. Its mission is to conduct scientific research into the cause and cure of disease, and to educate physicians and the public on science related to disease. More information can be obtained from <http://AutoimmunityResearch.org>

#### **Citations:**

1. Marshall TG. Vitamin D discovery outpaces FDA decision making. Bioessays. 2008 Jan 15;30(2):173-182 [Epub ahead of print] Online ISSN: 1521-1878 Print ISSN: 0265-9247 PMID: 18200565

Available from publisher's website at URL

<http://www3.interscience.wiley.com/cgi-bin/abstract/117885976/ABSTRACT>

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<http://www.ncbi.nlm.nih.gov/pubmed/18200565>

2. Waterhouse JC, Marshall TG, Fenter B, Mangin M, Blaney G, Vitamin D Metabolism in Chronic Disease. In Vitamin D: New Research, Nova Science Publishers, NY, 2006. ISBN: 1-60021-000-7

#### **Additional Resources for Journalists:**

1. A pre-print full-text of Prof. Marshall's paper is available from the author's website at URL

<http://TrevorMarshall.com/BioEssays-Feb08-Marshall-Preprint.pdf>

2. American Academy of Dermatology fact sheet: "Myths and Realities of Vitamin D and Sun Exposure," at URL

[http://www.aad.org/media/background/news/skincancer\\_2004\\_05\\_03\\_myths.html](http://www.aad.org/media/background/news/skincancer_2004_05_03_myths.html)

3. "Rickets .. is not due to vitamin D deficiency but is caused by not having enough calcium in the diet." U.S. Dept of Agriculture, Agricultural Research Service, Available from URL

[http://www.ars.usda.gov/research/publications/publications.htm?SEQ\\_NO\\_115=169216](http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=169216)

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