Vitamin D status modulates the immune response to Epstein Barr virus: Synergistic effect of risk factors in multiple sclerosis

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FROM ABSTRACT

Multiple Sclerosis (MS) risk is associated with low vitamin D status prior to disease, and Epstein Barr virus (EBV) infection seems to be a prerequisite for MS.

Vitamin D receptors are expressed on EBV infected B cells, antigen presenting cells and activated lymphocytes, and the bioactive vitamin D metabolite dihydroxyvitamin D3 suppresses antibody production and T cell proliferation and skews T cells towards a less detrimental Th2 phenotype.

EBV infected B cells constitute a constant challenge to the immune system, also during seasonal periods of relative low vitamin D status.

I propose that vitamin D modulates the immune response to EBV, and that detrimental activation of auto-reactive T cells leading to MS is more likely if the vitamin D status is suboptimal.

THIS AUTHOR ALSO NOTES:

Environmental factors are important in the etiology of MS. "Vitamin D and Epstein Barr virus (EBV) top the list of potential environmental factors associated with MS."

Primary Epstein Barr virus infections are usually clinically silent.

Epstein Barr virus can activate and expand auto-reactive T cells.

Vitamin D3 has important immunoregulatory effects.

"Vitamin D protects against MS by modulating the immune response to Epstein Barr virus, and that low vitamin D status facilitates detrimental activation of auto-reactive T cells and skews the immune response to Epstein Barr virus in a pro-inflammatory direction."

Vitamin D levels are lower during the winter.

"The epidemiological evidence linking Epstein Barr virus and MS is strong. Virtually all adult and pediatric MS patients have been infected with EBV."

Epidemiological evidence supports a role for vitamin D in MS:

- Sunshine is essential for vitamin D synthesis in the skin, and MS risk is significantly higher as one moves away from the equator.

- MS is inversely correlated with past exposure to UV irradiation.

- "Vitamin D supplementation protects against MS."

Epstein Barr virus persists in memory B cells throughout life.

Both acute and persistent Epstein Barr virus infection is controlled by a strong T cell mediated immune response.

"Epstein Barr virus has a great growth-transforming potential, and EBV infected B cells must be constantly surveilled by the immune system throughout life. Even transient perturbation of the immune response to EBV at any time during or after primary infection may therefore be relevant for induction of autoimmunity."

"Dihydroxyvitamin D3 is a potent regulator of immune responses."

Most immune system cells have (express) vitamin D3 receptors, and vitamin D3 is an important factor in the regulation of the cells immune response.

"Several airway infections, most striking influenza type A, display a marked and recurrent seasonal variability with incidence peaks during the winter, which may be attributable to seasonal variation in vitamin D status."

SUMMARY POINTS FROM DAN MURPHY

Epstein Barr virus (EBV) causes infectious mononucleosis.

Once infected, the Epstein Barr virus remains in the body throughout life.

The T cells constantly survey the body for the Epstein Bar virus, and when necessary increase production of anti-Epstein Barr virus IgG antibodies.

"Virtually all adult and pediatric MS patients have been infected with Epstein Barr virus."

These anti-EBV IgG antibodies create an autoimmune response against myelin proteins, resulting in their degradation, and a diagnosis of multiple sclerosis.

Vitamin D3 reduces the production of anti-Epstein Barr virus antibodies that react against myelin proteins, thus protecting against multiple sclerosis.

Most initial Epstein Barr infections are clinically silent, but still increase the risk for multiple sclerosis.

At times of low vitamin D status (i.e. winter), the immunological response against the Epstein Barr virus may trigger multiple sclerosis.

Anyone who has ever had mononucleosis or been infected with the Epstein Barr virus, should consume high doses of vitamin D3, especially during winter months.

The lab we use to test blood vitamin D3 [25(OH)D3] uses a finger prick analysis:
ZRT Laboratory
8605 SW Creekside Pl
Beaverton, OR 97008
866-600-1636
www.zrtlab.com
Vitamin D Testing Finger prick

The vitamin D3 my family takes is ***Complete Hi D3***, from Nutri-West (5,000 IU):
800-443-3333
The primary researcher on this product was Don Bellgrau, PhD. Dr. Bellgrau is a tenured Professor of Immunology and Medicine at the University of Colorado, Denver, where he is a Program Leader in Immunology and Immunotherapy at the Cancer Center on vitamin D3 supplementation. Dr. Bellgrau has conducted experiments with nutrients/vitamin D and immune cells. He has published in over 100 peer-reviewed articles, including the Journal of Neurooncology, Nature, Clinical Immunology, Cancer Research, Cancer Immunology and Immunotherapy, and Cell Transplantation.