

Vitamin D as an immune modulator in multiple sclerosis, a review

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Received 14 August 2007; received in revised form 20 November 2007; accepted 21 November 2007

Abstract

The role of vitamin D in calcium homeostasis is well known. More recently vitamin D has become a topic of interest in immune regulation and multiple sclerosis. The main reason for this is the observed geographical distribution of multiple sclerosis. Areas with high sunlight exposure, the principal inducer of vitamin D synthesis, have a relatively low prevalence of multiple sclerosis and vice versa. Furthermore, low levels of the principal vitamin D metabolite (25-hydroxy vitamin D) in the circulation are associated with a high incidence of multiple sclerosis. Other epidemiological evidence also supports the view that vitamin D metabolites have an immune and disease modulating effect in multiple sclerosis. Experimental research *in vitro* and in animal models has further clarified the interaction of vitamin D metabolites with the immune system. The evidence obtained from these studies strongly supports a model in which vitamin D mediates a shift to a more anti-inflammatory immune response, and in particular to enhanced regulatory T cell functionality. In the current review we link the basic knowledge on vitamin D and immune regulation with the vitamin D related observations in multiple sclerosis. We conclude that there is a sound basis on which to initiate double-blind placebo-controlled trials that not only address the effect of vitamin D on the clinical outcome of multiple sclerosis, but also on the regulatory T cell compartment.

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Keywords: Multiple sclerosis; Experimental allergic encephalomyelitis; Vitamin D; Calcitriol; Immune system
