

The Role of Vitamin D in Multiple Sclerosis: Biology and Biochemistry, Epidemiology and Potential Roles in Treatment.

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Abstract

BACKGROUND: Multiple sclerosis (MS) is a progressive, demyelinating condition of the central nervous system, manifesting in loss or alterations in function of sensory, motor and cognitive function. Of the various environmental and behavioural risk factors identified as playing a role in MS onset and progression, perhaps none has been as consistent as vitamin D.

OBJECTIVE: In this review, we will endeavour to present a general background on the role of vitamin D in human health and particularly in MS, as well as the substantial epidemiological evidence in support of vitamin D's role in MS.

RESULTS: Initially identified via the oft-noted latitudinal gradient in MS prevalence and incidence, vitamin D has since been demonstrated to have a strong and consistent inverse association with MS risk and clinical course. Cases have much lower levels of the diagnostic metabolite of vitamin D, 25-hydroxyvitamin D (25(OH)D) compared to healthy controls, while those with more active disease have lower levels of 25(OH)D than other cases with less active disease. These case-control and cross-sectional study results led the way to cohort studies which indicated significant inverse associations between serum 25(OH)D and clinical activity in MS. The combined weight of indirect and direct observational evidence have been the impetus for completed and ongoing randomised trials of vitamin D supplementation, alone or in addition to standard immunomodulatory medications, as an intervention in MS onset and clinical course. Moreover, in addition to being a distinct factor in MS aetiology, vitamin D has been demonstrated to interact with

a variety of other risk factors, from genetic predictors like HLA-DR1 genotype to behavioural factors like smoking.

CONCLUSION: There is an abundance of epidemiological evidence, both direct and indirect, as well as significant biological plausibility substantiating a role for vitamin D in the onset and progression of multiple sclerosis.

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KEYWORDS: Multiple sclerosis; biochemistry; epidemiology; plasma membrane; randomised controlled trial; vitamin D

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