Vitamin D and Multiple Sclerosis

10

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Introduction

Multiple sclerosis (MS) is the most common demyelinating disease of the central nervous system and the most common cause of nontraumatic disability among young adults [1, 2]. The incidence and prevalence of MS are increasing, and the medical, social, and economic burden of the disease is significant [3]. While the precise etiology of MS remains to be completely elucidated, it appears to arise from a combination of genetic and environmental factors. Vitamin D, "the sunshine vitamin," and sunlight have been implicated among several other environmental factors thought to contribute to an individual's risk of developing MS, others including smoking, obesity, and Epstein-Barr virus infection. The interaction between vitamin D and MS has been the subject of significant investigative efforts, and much has been learned. This chapter will discuss the role of vitamin D in the pathophysiology of MS and review the evidence related to clinical outcomes in patients with MS who have vitamin D deficiency.

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Background

Source and Metabolism of Vitamin D

Vitamin D is technically a prohormone that is synthesized in the skin from 7-dehydrocholesterol as a result of exposure to solar ultraviolet-B radiation (UVB) or obtained through ingestion. UVB radiation photolysis of 7-dehydrocholesterol to pre-vitamin D3 which is subsequently isomerized by a nonenzymatic membrane enhanced catalysis to vitamin D3 [4]. Although sun exposure is capable of yielding substantial amounts of vitamin D, a number of individual factors (e.g., age, increased skin pigmentation, use of sunscreen, time spent indoors) and environmental factors (e.g., time of day, latitude, climate) limit sunlight as a source of vitamin D [5]. Dietary sources of vitamin D such as salmon, tuna, egg yolk, shiitake mushrooms, and other mushrooms exposed to sunlight for UVB radiation as well as fortified milk, orange juice, and some cereals can provide modest amounts (between 100 and 200 international units (IU) per day) of vitamin D in the form of vitamin D3 (cholecalciferol, animal sources) or vitamin D2 (ergocalciferol, yeast, mushrooms, and plant sources) [6–8] (Fig. 10.1).

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Part III

Other CNS inflammatory Disorders