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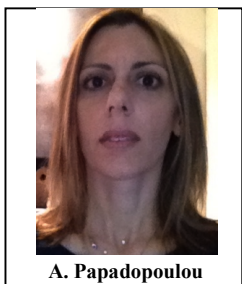
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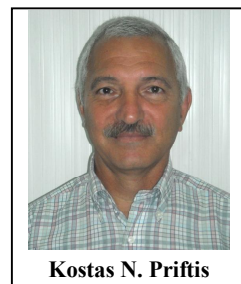
Vitamin D and Vitamin D Receptor in Asthma and Allergy



A. Papadopoulou

The reemergence of Vitamin D deficiency in the last decades raised many questions on the consequences of this pandemic. The extrarenal synthesis of the active form of vitamin D (1,25(OH)₂D), the wide tissue distribution of Vitamin D Receptor (VDR) as well as the identification of a plethora of VDR-related regulatory elements throughout the human genome, initiated a series of epidemiological and experimental studies on the non skeletal actions of Vitamin D [1].

The fast rising number of publications in the last five years indicates the increasing interest in the role of vitamin D in the early life origins of asthma, atopic dermatitis and, more recently, food allergy. Although most studies



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report an association between lower vitamin D levels with the development of immune diseases, the evidence base is still weak due to the methodological heterogeneity. Both vitamin D deficiency and asthma/allergy constitute two multifactorial entities regarding their etiology with various genetic/epigenetic and environmental factors interfering in a complex manner, difficult to define in accuracy. Experimental *in vivo* and *in vitro* studies show that vitamin D and its metabolites control immune responses by affecting cytokine expression patterns and gene signaling in different immune cell types. Furthermore, the local synthesis of 1,25(OH)₂D by placental monocytes and its implication in lung structure and function put maternal vitamin D at the forefront [2]. What makes things more complicated is the issue of normal range of Vitamin D as the currently recommended optimal levels of circulating serum 25(OH)D refer to bone health, whereas the optimal levels for immune system function and treatment of allergic diseases are still unknown.

In this special issue, we seek to outline the evidence that defines the effects of vitamin D in the immune system, particularly in asthma and allergy.

Kolokotroni *et al.* [3] present evidence on the association reported between vitamin D deficiency in childhood and prevalence of asthma, allergic sensitization and atopy through a systematic search in the literature of all available observational studies and their limitations. The following article by Papadopoulou *et al.* [4] discusses the determinants of vitamin D status in pregnancy and its role in the development of asthma and allergies in early childhood. The current evidence of genetic variations of vitamin D pathway genes on the development of asthma and allergy is presented by Morales *et al.* [5], while Trochoutsou *et al.* [6] summarize the recent genomic and non-genomic effects of vitamin D with a focus on immune-mediated diseases.

A higher prevalence of inflammatory skin disease in childhood has been associated with low vitamin D serum levels. Pacheco-Gonzales *et al.*, present the current knowledge on the effect of vitamin D in children with atopic dermatitis [7]. Recent *in vivo* data suggest that vitamin D supplementation may also reduce the severity of atopic dermatitis. Furthermore, there is emerging data showing that vitamin D can enhance the anti-inflammatory effects of glucocorticoids and potentially be used as adjuvant therapy in steroid-resistant asthma. This is discussed in detail by Benetti *et al.* [8]. Finally, Molloy *et al.* [9], argue on the participation of vitamin D in the development of food allergy and the synergic action of genetic and/or environmental factors on the potential influence of vitamin D on food allergy risk.

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