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Vitamin D in the 21st century. Beyond osteoporosis

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Introduction

Interest in vitamin D has increased dramatically in recent years. As shown in figure 1, the number of journal articles published and indexed in the PubMed database has multiplied almost by 4 from 2000 to 2016.

Vitamin D, which maintains its name by habit or history related to its discovery, is actually a complex hormonal system[1], its structure being very similar to that of steroid hormones.

Hormone D, as it should actually be termed[2], began to be studied and related to bone mineral metabolism. It is well known that its deficiency produces a skeletal disease in children referred to as rickets and osteomalacia in adults[3]. Subsequently and already in the 20th century, it was verified that practically all the cells of the organism have receptors for this hormone. Thus our knowledge was expanding into other pathophysiological and clinical aspects, including osteoporosis[3-5] as in other bone diseases. The relationship of vitamin D to these processes has been termed "extra-bone effects of vitamin D"[3,6-9].

Nowadays we have a better understanding of vitamin D's relation with muscle and falls[1], with diabetes mellitus, both type 1 and 2[10], with arterial hypertension and ischemic heart disease[11], immune system and autoimmune diseases[12], respiratory infections[13], Bronchial asthma[14] or cancer[3,7,8,15], to name some of the relationships on which an increasing number of articles have been published.

Vitamin D has a complex, delicate and well-known regulatory system, according to whether its cutaneous synthesis or its ingestion produces vitamin D3 or cholecalciferol, which is transported to the liver where it is hydroxylated in 25-hydroxyvitamin D or calcifediol, this being the metabolite that best measures the organic reserve of vitamin D. Subsequently, in the kidney, a new hydroxylation takes place that leads to the formation of the active metabolite of the hormone that is 1.25 dihydroxicolecalciferol or calcitriol[1,16-19].

These differences should be taken into account, as there is no established bioequivalence between the different metabolites, nor are vitamin D3 or cholecalciferol, 25-hydroxyvitamin D or calcifediol[20] nor the final metabolite, 1,25 hydroxyalcalciferol, which by their potency and therapeutic limitations, its pharmacological presentation would require an inspection stamp for its prescription.

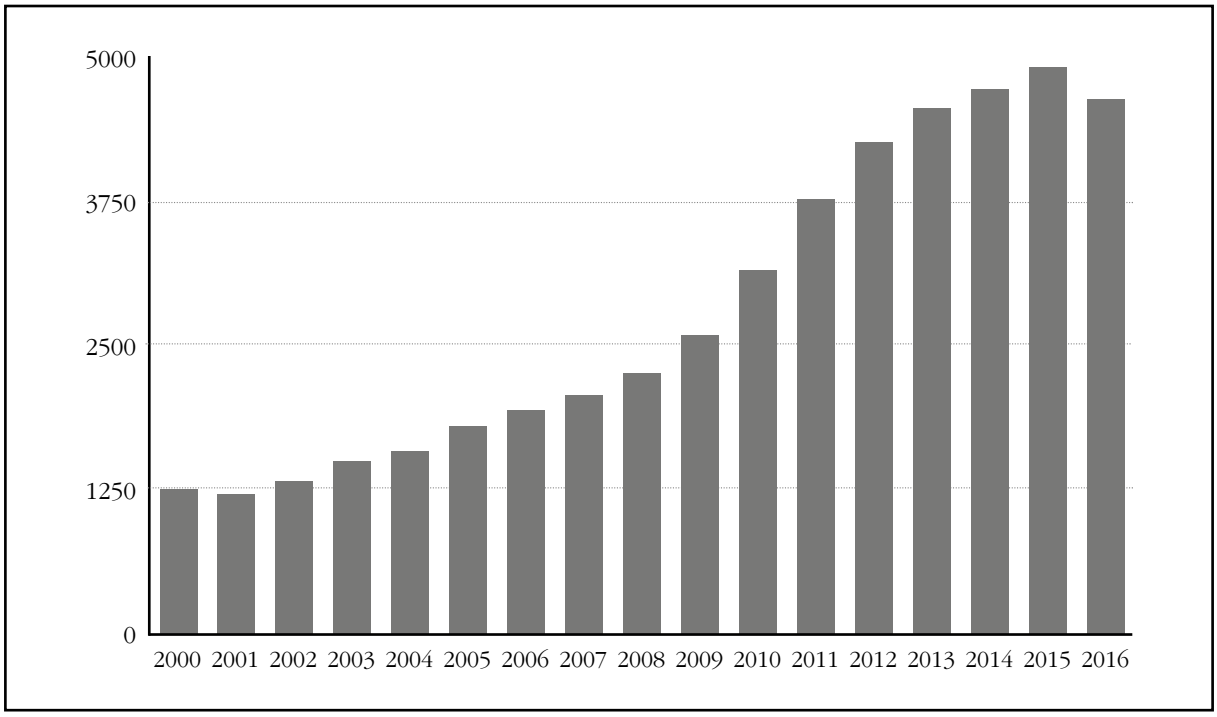
In this paper, we intend to make an update on some of the aspects that have seemed most interesting about vitamin D, such as the prevalence of vitamin D deficiency in our country, something that from a theoretical point of view would be difficult to accept in our "sunny Spain", to other less well-known aspects like vitamin D deficiency in children, as well as a different view of vitamin D in women.

We complete the paper with an update on vitamin D and its use in the prevention and treatment of osteoporosis and fractures due to fragility, and other aspects such as endocrine and rheumatic diseases.

The collaborators are all authors of recognized prestige and great experience in the field of bone mineral metabolism. We can only hope that readers find the paper useful for better treatment of patients, which is medicine's raison d'être.

Conflict of interest: The authors declare they have no conflict of interest regarding this work.

Figure 1. Publications in PubMed including only the term "vitamin D" from January 1, 2000 to December 31, 2016



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