

DeLuca H F. The vitamin D system in the regulation of calcium and phosphorus metabolism. *Nutr. Rev.* 37:161-93, 1979.

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A review of the major discoveries concerning the metabolism of vitamin D required for its function is presented. Vitamin D produced in skin by a chemical photolysis reaction is converted in the liver to the major circulating form, 25-hydroxyvitamin D₃, and subsequently in the kidney to the final hormone, 1,25-dihydroxyvitamin D₃. The metabolism, function, and mechanism of action of vitamin D as understood in 1979 is presented together with disturbances in the vitamin D system resulting in disease. [The SC1® indicates that this paper has been cited in over 165 publications.]

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This review article is actually an expanded version of a lecture associated with the Atwater Award given by the American Institute of Nutrition at the 1979 Federation of American Societies for Experimental Biology meetings. This review represents over a decade and a half of investigation into the function of vitamin D and summarizes in a concise way the great strides that were made in understanding the vitamin D system and in setting the stage for investigations into the molecular mechanism of action of this important vitamin.¹ It spans the work from a time when vitamin D was

not even considered essential for adults to the point now where it is recognized as being essential for a large variety of functions beyond building bone in the young.

The review describes the work that demonstrated that vitamin D is converted in a series of metabolic steps to a final hormone that regulates calcium and phosphorus metabolism and hence mineralization and turnover of the skeleton. This work encompassed not only organic chemistry, *in vivo* and *in vitro* metabolism, but also endocrinology, physiology, pharmacology, and enzymology. The vitamin D hormone (1,25-dihydroxyvitamin D₃) and its analogs are important new therapeutic agents currently utilized to treat metabolic bone diseases worldwide. The review also appeared in a highly visible review journal utilized by a large number of professionals.

The vitamin D endocrine system has since come to represent a major system that is involved not only in the regulation of calcium but now appears to play an essential role in differentiation of certain cell types, in unexpected functions, for example, in the islet cells of the pancreas, the parathyroid cells, skin cells, and cells of the reproductive organs.²⁻⁴

The popularity of this article is likely because it represents a convenient reference point for anyone utilizing information concerning the vitamin D system, the biological effects of the final vitamin D hormone, and the uses of the new vitamin D compounds to treat disease. It also serves as a jumping-off point for investigations into new functions and biological activities of the secosteroid series known as vitamin D.

1. DeLuca H F. Vitamin D: the vitamin and the hormone. *Fed. Proc.* 33:2211-9, 1974. (Cited 225 times.)
2. ———. The transformation of a vitamin into a hormone: the vitamin D story. *Harvey Lect.* 75:333-79, 1981.
3. ———. The vitamin D-calcium axis—1983. (Rubin R P, Weiss G B & Putney J W, eds.) *Calcium in biological systems*. New York: Plenum, 1985. p. 491-511.
4. ———. The vitamin D story: a collaborative effort of basic science and clinical medicine. *FASEB J.* 2:224-36, 1988.

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