



TISSUE-SPECIFIC REGULATORY EFFECTS OF VITAMIN D AND ITS RECEPTOR ON CALBINDIN-D28K AND CALBINDIN-D9K

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Abstract:

The balance between calcium and vitamin D is essential in mammalian development. Calbindin-D28K (CaBP-28K) and calbindin-D9K (CaBP-9K) are cytosolic vitamin D-dependent calcium-binding proteins that mediate the dynamic equilibrium of vitamin D and calcium, particularly in the absorption of intestinal calcium, in urinary calcium excretion, and in bone formation. However, the precise roles of CaBP-28K and CaBP-9K are not well understood. CaBP-9K/CaBP-28K double-knockout (KO) mice have a normal phenotype under conditions of normal dietary intake of calcium. Conversely, when given a calcium-deficient diet, these double-KO mice have greater reductions in serum calcium levels and bone length than do wild-type mice. In this review, we summarize and interpret the body of literature regarding the relationship of vitamin D and its receptor with CaBP-28K and CaBP-9K in mammals. Calcium is vital to the human body. Calcium ion homeostasis is necessary for cell membrane integrity, excitability of the musculoskeletal system, blood coagulation, secretion of neurotransmitters and hormones, and myocardial contraction. Maintenance of the calcium balance requires the cooperation of numerous calcium transport proteins, including transient receptor potential vanilloid type 5 (TRPV5), transient receptor potential vanilloid type 6 (TRPV6), plasma membrane Ca²⁺ ATPase (PMCA) [5], parvalbumins (PVs). Calbindin-D9K (CaBP-9K), calbindin-D28K (CaBP-28K), calretinin (CR) and sodium-calcium exchanger 1 (NCX1). Of these, CaBP-9K and CaBP-28K are the 2 so-called vitamin D-dependent calcium-binding proteins. In the modulation of calcium homeostasis, vitamin D, CaBP-9K, and CaBP-28K play important roles in the absorption of intestinal calcium, in urinary calcium excretion, and in bone formation.

Biography:

Prof. Dr. Anil Batta is presently professor & Head with senior consultant in Govt. Medical College, Amritsar. He did his M.B.B.S. and M.D. in Medical Biochemistry from Govt. Medical College, Patiala in 1984 and 1991, respectively. His research interest is mainly in clinical application especially cancer and drug de-addiction. He has supervised more than 25 M.D., M.Sc. and Doctorate researches and published more than 130 international research papers. He is the chief editor of America's Journal of Biochemistry. He is also working as advisor to



the editorial board of International Journal of Biological and Medical Research. He has been deputed member Editorial Board of numerous International & National Medical Journals of Biochemistry. He has also been attached as technical advisor to various national and international conferences in Biochemistry. He has been attached as hi-tech endocrinal, genetics and automated labs of Baba Farid Univ. of Health Sciences, Faridkot. He has chaired various sessions in the Biochemistry meets. He has been designated as member Editorial Board of various in US and other European Countries. He is also involved in various research projects at Govt. Medical, Amritsar. He has done superspecialisation in Drug-de-addiction from PGIMER, Chandigarh.

Recent Publications:

- Mitchell DM, Juppner H (2010) Regulation of calcium homeostasis and bone metabolism in the fetus and neonate. *Current Opinion Endocrinol Diab Obesity* 17: 25-30.
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- Benn BS, Ajibade D, Porta A, Dhawan P, Hediger M, et al. (2008) Active intestinal calcium transport in the absence of transient receptor potential vanilloid type 6 and calbindin-D9k. *Endocrinol* 149: 3196-3205.

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