**Revisiting the significance of nano-vitamin D for food fortification and therapeutic application**

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**Abstract**

**Objective:**Vitamin D (a prohormone) is an important micronutrient required by the body for skeletal homeostasis and a range of non-skeletal actions. Calcitriol, the active form of vitamin D, regulates a variety of cellular and metabolic processes through both genomic and nongenomic pathways. Often prescribed for treating rickets and osteoporosis, vitamin D deficiency can exacerbate various other medical conditions.

**Significance, methods, and results:**Despite its multifunctional uses, the sensitivity of vitamin D makes formulating an efficient drug delivery system a challenging task, which is further complicated by its poor aqueous solubility. Enhancing the oral absorption of vitamin D is vital in utilizing its full efficacy. Recent developments in encapsulation and nanotechnology have shown promising results in overcoming these constraints.

**Conclusion:**This review thus offers an insight to adequately comprehend the mechanistic pharmacology of vitamin D, its pathophysiological role, and justification of its medical indications, along with the benefits of utilizing nanotechnology for vitamin D delivery.

**Keywords:**Calcium homeostasis; drug delivery; genomic action; molecular targets; nanotechnology; osteoporosis; polymeric nanoparticles.

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