

# Vitamin D Deficiency: A New Risk Factor for Type 2 Diabetes?

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## Key Words

Vitamin D deficiency • Insulin resistance • Obesity

## Abstract

Recent compelling evidence suggests a role of vitamin D deficiency in the pathogenesis of insulin resistance and insulin secretion derangements, with a consequent possible interference with type 2 diabetes mellitus. The mechanism of this link is incompletely understood. In fact, vitamin D deficiency is usually detected in obesity in which insulin resistance is also a common finding. The coexistence of insulin resistance and vitamin D deficiency has generated several hypotheses. Some cross-sectional and prospective studies have suggested that vitamin D deficiency may play a role in worsening insulin resistance; others have identified obesity as a risk factor predisposing individuals to exhibit both vitamin D deficiency and insulin resistance. The available data from intervention studies are largely confounded, and inadequate considerations of seasonal effects on 25(OH)D concentrations are also a common design flaw in many studies. On the contrary, there is strong evidence that obesity might cause both vitamin D deficiency and insulin resistance, leaving open the possibility that vitamin D and diabetes are not related at all. Although it might seem premature to draw firm

conclusions on the role of vitamin D supplementation in reducing insulin resistance and preventing type 2 diabetes, this manuscript will review the circumstances leading to vitamin D deficiency and how such a deficiency can eventually independently affect insulin sensitivity.

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## Introduction

The increasing prevalence of obesity [1] is turning type 2 diabetes into one of the most frequent causes of death [2]. Similarly, vitamin D deficiency has recently been recognized as a worldwide concern [3], still linked to obesity. It is widely known that the pathophysiology of type 2 diabetes involves progressive impairment of insulin secretion associated with a coexisting insulin resistance [4]. Along with the classic role of 1,25(OH)<sub>2</sub>D in calcium homeostasis and bone metabolism [5, 6], several studies have found an association between vitamin D deficiency and a cluster of metabolic abnormalities called the ‘meta-

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