

VITAMIN D₃ IS MORE POTENT THAN VITAMIN D₂ IN HUMANS

Robert P. Heaney¹, Robert R. Recker¹, James Grote², Ronald L. Horst³, y Laura A. G. Armas¹
J Clin Endocrinol Metab 96: E447–E452, 2011

Creighton University, 601 North 30th Street, Suite 4841, Omaha, Nebraska 68131, USA.

Background

Current unitage for the calciferols suggests that equimolar quantities of vitamins D(2) (D2) and D(3) (D3) are biologically equivalent. Published studies yield mixed results.

Objective

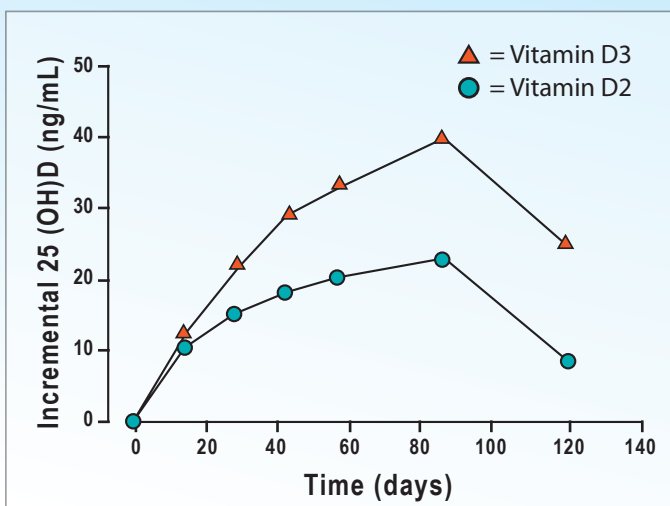
The aim of the study was to compare the potencies of D2 and D3.

Design

The trial used a single-blind, randomized design in 33 healthy adults. Calciferols were dosed at 50,000 IU/wk for 12 wk. Principal outcome variables were area under the curve for incremental total 25-hydroxyvitamin D [25(OH)D] and change in calciferol content of sc fat.

Results

Incremental mean (sd) 25(OH)D area under the curve at 12 wk was 1366 ng • d/ml (516) for the D2-treated group and 2136 (606) for the D3 (P < 0.001). Mean (sd) steady-state 25(OH)D increments showed similar differences: 24 ng/ml for D2 (10.3) and 45 ng/ml (16.2) for D3 (P < 0.001). Subcutaneous fat content of D2 rose by 50 µg/kg in the D2-treated group, and D3 content rose by 104 µg/kg in the D3-treated group. Total calciferol in fat rose by only 33 ng/kg in the D2-treated, whereas it rose by 104 µg/kg in the D3-treated group. Extrapolating to total body fat D3, storage amounted to just 17% of the administered dose.

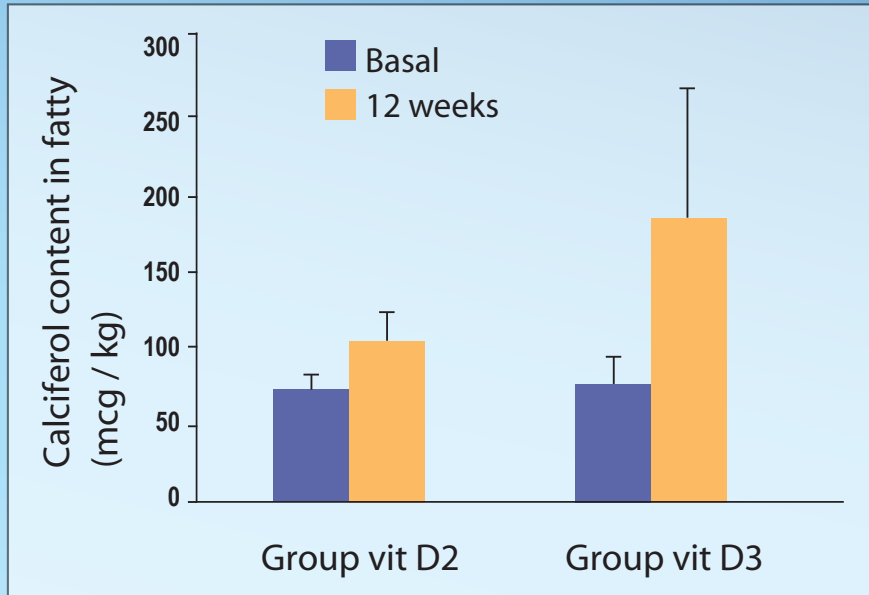


Evolution of serum 25(OH)D levels after the administration of vitamin D3 (cholecalciferol) or vitamin D2 (ergocalciferol).

Vitamin D3 has a 87% higher potency to increase and maintain the serum 25(OH)D concentrations

Adapted from Heaney R et al. *J Clin Endocrinol Metab*. 2011;96(3):E447-52

VITAMIN D_3 IS MORE POTENT THAN VITAMIN D_2 IN HUMANS



Calciferol storage variation in fatty subcutaneous tissue after administration of vitamin D3 (cholecalciferol) or vitamin D2 (ergocalciferol).

It is shown calciferol total content (D2 + D3) in the base line, and twelve-week after administration in each treatment group. Vitamin D3 produces vitamin D storages twice or thrice higher than equimolar vitamin D2 doses.

Adapted from Heaney R et al. J Clin Endocrinol Metab. 2011;96(3):E447-52

Conclusion

D3 is approximately 87% more potent in raising and maintaining serum 25(OH)D concentrations and produces 2- to 3-fold greater storage of vitamin D than does equimolar D2. For neither was there evidence of sequestration in fat, as had been postulated for doses in this range. Given its greater potency and lower cost, D3 should be the preferred treatment option when correcting vitamin D deficiency.

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