



Vitamin D and Calcium Supplementation Accelerates Randall's Plaque Formation in a Murine Model

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Résumé en anglais
Most kidney stones are made of calcium oxalate crystals. Randall's plaque, an apatite deposit at the tip of the renal papilla, is considered to at the origin of these stones. Hypercalciuria may promote Randall's plaque formation and growth. We analyzed whether long-term exposure of Abcc6 mice (a murine model of Randall's plaque) to vitamin D supplementation, with or without a calcium-rich diet, would accelerate the formation of Randall's plaque. Eight groups of mice (including Abcc6 and wild type) received vitamin D alone (100,000 UI/kg every 2 weeks), a calcium-enriched diet alone (calcium gluconate 2 g/L in drinking water), both vitamin D supplementation and a calcium-rich diet, or a standard diet (controls) for 6 months. Kidney calcifications were assessed by 3-dimensional microcomputed tomography, μ -Fourier transform infrared spectroscopy, field emission-scanning electron microscopy, transmission electron microscopy, and Yasue staining. At 6 months, Abcc6 mice exposed to vitamin D and calcium supplementation developed massive Randall's plaque when compared with control Abcc6 mice ($P < 0.01$). Wild-type animals did not develop significant calcifications when exposed to vitamin D. Combined administration of vitamin D and calcium significantly accelerates Randall's plaque formation in a murine model. This original model raises concerns about the cumulative risk of vitamin D supplementation and calcium intakes in Randall's plaque formation.

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