

# OSTEOSCOOP

News on current events in osteoporosis and rheumatology

## Vitamin D depletion induces RANKL-mediated osteoclastogenesis and bone loss in a rodent model

N°81 – May 2009

The association between increased risk of hip fracture and low vitamin D status has long been recognized. However, the level of vitamin D required to maintain bone strength is controversial. In this study[1], the authors used a rodent model of vitamin D depletion to quantify the 25-hydroxyvitamin D (25D) levels required for normal mineralization. Six groups of 10-wk-old male Sprague-Dawley rats (n = 42) were fed a diet containing 0.4% calcium and various levels of dietary vitamin D3 for 4 months to achieve stable mean serum 25D levels ranging between 10 and 115 nmol/L. At 7 months of age, animals were killed, and the histomorphometry of distal and proximal femora and L2 vertebra was analyzed. Total RNA was extracted from whole femora for real-time RT-PCR analyses.

In the distal femoral metaphysis, trabecular bone mineral volume (BV/TV) showed a significant positive association with circulating 25D levels in the animals with serum 25D levels between 20 and 115 nmol/L. Osteoclast surface (Oc.S) levels were positively associated with RANKL:OPG mRNA ratio, higher in groups with lower serum 25D levels, and were independent of serum 1,25D levels. Serum 25D levels <80 nmol/L gave rise to osteopenia as a result of increased osteoclastogenesis, suggesting that levels of 25D >80 nmol/L are needed for optimal bone volume.

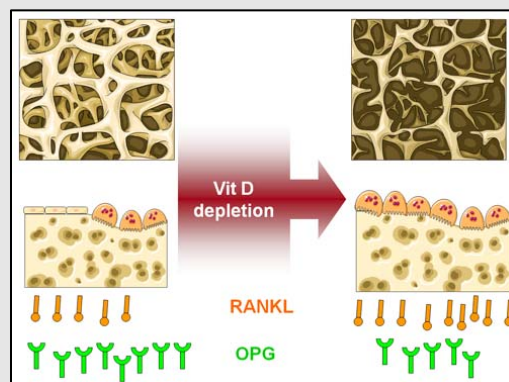
These data indicate that serum 25D levels are a major determinant of osteoclastogenesis and bone mineral volume and are consistent with the levels of 25D recommended to reduce the risk of fracture in humans.

1. Anderson PH et al. *J Bone Miner Res.* 2008;23:1789–1797.

### Vitamin D depletion induces RANKL-mediated osteoclastogenesis and bone loss in a rodent model

A rodent model of vitamin D depletion was used to quantify the 25-hydroxyvitamin D (25D) levels required for normal mineralization. For that purpose, rats were fed a diet containing various levels of dietary vitamin D3 to achieve stable various serum 25D levels. Trabecular bone mineral volume showed a significant positive association with circulating 25D levels. Osteoclast surface was higher in the groups with low vitamin D levels. Vitamin D deficiency was also associated with a higher RANKL over osteoprotegerin ratio.

These data indicate that serum 25D levels are a major determinant of osteoclastogenesis and bone mineral volume and are consistent with the levels of 25D recommended to reduce the risk of fracture in humans.



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