

# OSTEOSCOOP

News on current events in osteoporosis and rheumatology

## Some light on the mystery of calcitonin and bone

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The absence of significant changes in bone mineral density caused by decline or overproduction of calcitonin (CT) in humans has raised the question of whether the pharmacological action of CT as an inhibitor of bone resorption is also of physiological relevance.

Unexpectedly, mice lacking the two gene products of the calcitonin gene, CT and alpha-calcitonin gene-related peptide (CGRP) (Calca-deficient mice), were described as having a high bone mass caused by increased bone formation with normal bone resorption. In a recent study [1], Huebner et al analyzed the age-dependent bone phenotype of two mouse models, one lacking CT and CGRP (Calca-deficient mice), the other one lacking only CGRP (CGRP-/-). Whereas CGRP-/- mice display an osteopenia at all ages analyzed, the Calca-deficient mice develop a phenotype of high bone turnover with age. Histomorphometric analysis performed at the age of 12 months revealed significant increases of bone formation with less bone resorption specifically in the Calca-deficient mice. This severe phenotype resulted in hyperostotic lesions and was not explained by obvious endocrine abnormalities other than the absence of CT.

In addition to the previously described increase of bone formation in the Calca-deficient mice, these results indicate that there is also a progressive increase of bone resorption with age. This suggests that CT acts as an inhibitor of bone remodeling, which may explain why alterations of CT serum levels in humans do not result in major changes of bone mineral density.

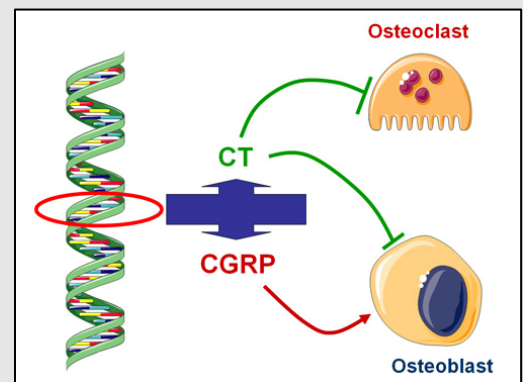
1. Huebner AK et al. *J Bone Miner Res.* 2006;21:1924–1934.

### Effect of calcitonin (CT) and calcitonin gene-related peptide (CGRP) on bone remodeling

CT and CGRP are synthesized from the same gene.

CGRP stimulates bone formation. In its absence, osteopenia occurs.

CT inhibits both formation and resorption. In the absence of CT, bone turnover is increased. When CT concentrations are modestly elevated, bone is not visibly affected. In the presence of pharmacological concentrations of calcitonin, the inhibitory effect on bone resorption predominates.



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