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News on current events in osteoporosis and rheumatology

Nuclear factor- κ B inhibits osteoblastic bone formation

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An imbalance in bone formation relative to bone resorption results in the net bone loss that occurs in osteoporosis and inflammatory bone diseases. Although it is well known that RANKL/RANK stimulate bone resorption by activating nuclear factor- κ B (NF- κ B) in osteoclasts, the molecular mechanisms that mediate impaired bone formation are poorly understood.

The authors of a recent study [1] show that the time- and stage-specific inhibition of endogenous inhibitor of κ B kinase (IKK)-NF- κ B in differentiated osteoblasts substantially increases trabecular bone mass and bone mineral density without affecting osteoclast activities in young mice. Moreover, inhibition of IKK-NF- κ B in differentiated osteoblasts maintains bone formation, thereby preventing osteoporotic bone loss induced by ovariectomy in adult mice. Inhibition of IKK-NF- κ B enhances the expression of Fos-related antigen-1 (Fra-1), an essential transcription factor involved in bone matrix formation in vitro and in vivo.

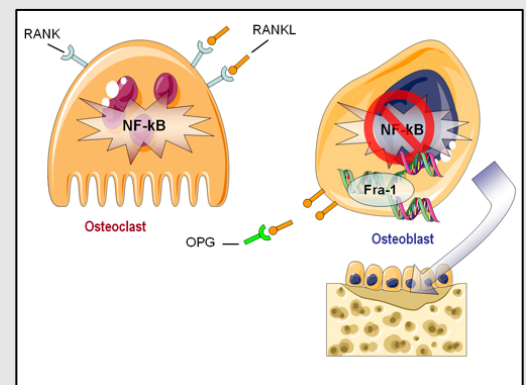
Taken together, these results suggest that targeting IKK-NF- κ B may help to promote bone formation in pathological situations such as osteoporosis and other bone diseases.

1. Chang J et al. *Nature Med.* 2009;15: 682-689.

Nuclear factor- κ B inhibits osteoblastic bone formation

In osteoclasts, activation of NF- κ B by RANKL/RANK promotes bone resorption. In osteoblasts, inhibition of IKK-NF- κ B signaling increases bone formation and bone mass. Inhibition of NF- κ B acts through enhancing the expression of Fos-related antigen-1 (Fra-1), an essential transcription factor involved in bone matrix formation in vitro and in vivo.

These results suggest that targeting IKK-NF- κ B may help to promote bone formation in pathological situations such as osteoporosis and other bone diseases



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