

OSTEOSCOOP

News on current events in osteoporosis and rheumatology

Fibroblast growth factor FGF23: a new hormonal inhibitor of bone formation and mineralization

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Fibroblast growth factor (FGF)23 is a circulating peptide produced primarily in bone which acts on kidney as a systemic phosphaturic factor; high levels result in rickets and osteomalacia. However, it remains unclear whether FGF23 acts locally and directly on bone formation. In order to address this question, the authors of a recent study [1] overexpressed human FGF23 in a stage-specific manner during osteoblast development in fetal rat calvaria cell cultures by using the adenoviral overexpression system and analyzed its effects on osteoprogenitor proliferation, osteoid nodule formation, and mineralization. Bone formation was also measured by calcein labeling in parietal bone organ cultures. Finally, the role of tyrosine phosphorylation of FGF receptor in mineralized nodule formation was also addressed.

Nodule formation and mineralization, but not osteoprogenitor proliferation, were independently suppressed by overexpression of FGF23 in rat calvaria cells. Increased FGF23 levels also suppressed bone formation in the parietal bone organ culture model. FGF23 overexpression enhanced phosphorylation of FGF receptor, whereas the impairment of mineralized nodule formation by FGF23 overexpression was abrogated by an inhibitor of FGF receptor tyrosine kinase activity.

These studies suggest that FGF23 overexpression suppresses not only osteoblast differentiation but also matrix mineralization independently of its systemic effects on phosphate homeostasis.

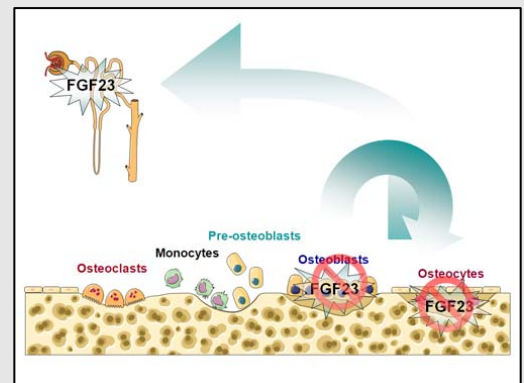
1. Wang H et al. *J Bone Miner Res.* 2008; 23:939–948.

FGF23 inhibits osteoblast differentiation and matrix mineralization

Bone is an endocrine organ which secretes circulating factors and hormones. One of them is fibroblast growth factor 23 (FGF23) which is synthesized by osteoblasts and osteocytes. FGF23 acts on the kidney where it promotes phosphaturia by inhibiting phosphate transport in the proximal tubule.

As recently shown, FGF23 is also a paracrine factor acting on bone-forming cells. Overexpression of FGF23 by osteoblasts inhibits osteoblast differentiation and matrix mineralization.

These data show that FGF23 exert a direct effect on bone to promote osteomalacia.



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