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Role of zinc in bone metabolism

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Summary

We previously reported that basic fibroblast growth factor (FGF-2) activates stress-activated protein kinase/*c-Jun* N-terminal kinase (SAPK/JNK) and p44/p42 mitogen-activated protein (MAP) kinase resulting in the stimulation of vascular endothelial growth factor (VEGF) release in osteoblast-like MC3T3-E1 cells. In the present study, we investigated whether zinc affects the VEGF release by FGF-2 in MC3T3-E1 cells. The FGF-2-induced VEGF release was significantly enhanced by ZnSO₄ but not Na₂SO₄. The enhancing effect of ZnSO₄ was dose-dependent between 1 and 100 μM. ZnSO₄ markedly enhanced the FGF-2-induced phosphorylation of p44/p42 MAP kinase while having little effect on the SAPK/JNK phosphorylation. PD98059 significantly reduced the amplification by ZnSO₄ of the bFGF-stimulated VEGF release. Taken together, our findings strongly suggest that zinc enhances FGF-2-stimulated VEGF release resulting from up-regulating activation of p44/p42 MAP kinase in osteoblasts.