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The Role of Osteocyte Estrogen Receptor Beta (ER β) in Regulating the Skeletal Response to Mechanical Loading

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ABSTRACT

Estrogen's biological functions are mediated by estrogen binding to estrogen receptors (ER). Understanding what role both ER α and ER β have in bone maintenance and formation can contribute to possible treatment of osteoporosis. This study examined osteocyte specific deletion of ER β in mice. The cross of ER β -floxed mice with DMP1-8kb-Cre mice provided both experimental knockout mice as well as littermate control mice. At 24 weeks of age the left tibiae of all mice were mechanically loaded five days per week for two weeks to induce bone formation. Analysis of cortical bone was conducted using microcomputed tomography (microCT) to measure load-induced changes in bone density and architecture of both loaded and non-loaded limbs. We found a significant effect of load on cortical bone geometry in both male and female knockout and control mice at 37% and 50% bone length. Based on our findings, osteocyte ER β appears to play a minor role in determining cortical bone geometry in 24 week old mice. We are still investigating the effect of load and genotype on cancellous bone.

KEYWORDS

Estrogen Receptor, ER β , Mechanical Loading, Osteocyte, Skeleton, Bone