

Statins and Bone Morphogenetic Proteins: New Pathways in Bone Formation

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Abstract

Introduction: Osteoporosis is a major public health problem leading to morbidity and mortality in many individuals. Treatment for osteoporosis has generally relied on mechanisms that decrease osteoclastic bone resorption. This review outlines new evidence that the cholesterol synthetic pathway may be important in bone metabolism and that 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitors or statins may increase bone formation. **Results:** An experimental observation reported that statins increase bone formation in rodents and that statins have an important role for the cholesterol synthetic pathway in bone formation. This may be via potent bone-forming growth factors, the bone morphogenetic proteins (BMPs). Subsequent epidemiological studies (including a meta-analysis of 8 studies) have suggested that statin use may be associated with increased bone mineral density (BMD) and decreased fracture risk in humans. However, more recently published studies have challenged the effect on fracture risk. **Conclusion:** The effect of statins on bone mineral density and fracture risk in retrospective studies suggests an exciting new direction for research in bone formation that may lead to advances in the therapy of osteoporosis.

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