NOT TO BE MISSED

Clinical and Basic Research Papers – June 2005 Selections

Ego Seeman, Clinical Editor
Gordon J. Strewler, Editor

Bone Modeling and Remodeling


This is a lovely study of morphology that lays to rest the notion that bone is somewhere between a rock and a hard place. The average of 10 osteocytes was 52.7 processes, and the point-to-point distance between the centers of the osteocytes was 24.1 µm. Each osteocyte spanned an average of 4180 µm² of bone volume. The average total length of the processes, average surface area, and average volume of one osteocyte were 1070 ± 145 µm, 1509 ± 113 µm², and 394 ± 49 µm³, respectively. —ES

Diagnosis


This is an important paper because it implies that screening works. The problem is that the lower hip fracture rate in the two cities providing a screening service, compared with the two cities that did not, may not necessarily be the result of the densitometry service. This point is discussed in an incisive editorial by Cummings. (Cummings SR. Ann Intern Med 2005;142[3]: 217-9) —ES

Epidemiology


This is one of the most intellectually honest and forthright reviews of this topic I have read. It was a refreshing pleasure to read an article in which the data were interpreted as is, not with the twists and turns spun by the advocates of calcium supplementation. In essence, in clinical, longitudinal, retrospective, and cross-sectional studies, neither increased consumption of dairy products nor total dietary calcium consumption show even a modestly consistent benefit for bone health in children or young adults. —ES

Genetics

This study is a nice illustration of what seems to be adaptive modeling and remodeling. In the face of cathepsin K overexpression producing high turnover osteopenia of metaphyseal trabecular bone, mice homozygous for the transgene locus (UTU17<sup>+</sup>) had increased cortical thickness and BMD, and increased porosity of diaphyseal cortical bone. The increased cortical thickness and BMD in diaphyses demonstrate the different nature and reactivity of trabecular and cortical bone in mice and suggest that the biomechanical properties of cortical bone are preserved through adaptation. —ES

**Physiology and Metabolism**

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  <li>Advancing age is associated with a decline in everything, including sex steroids in men. The significance of this work, and other work by this group, is to drive home the importance of estrogen in men, as well as women, and that free estrogen is the most consistent predictor of volumetric density and several geometric variables. —ES</li>
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*Estrogen may prevent bone loss through nongenomic events. These two papers provide convincing evidence that the G protein-coupled transmembrane receptor GPC30 is a nongenomic estrogen receptor that activates different downstream signaling pathways than nuclear estrogen receptor α. Revankar et al. identify the plasma membrane as the home of GPC30; Thomas et al. find it in the endoplasmic reticulum. Both groups report the presence of endogenous GPC30 mainly in cancer cells. What role does GPC30 play in estrogen signaling in bone and other normal tissues? —GJS

**Reviews, Perspectives, and Editorials**

<ul>
  <li>Ebeling PR. Defective osteoblast function may be responsible for bone loss from the proximal femur despite pamidronate therapy. J Clin Endocrinol Metab. 2005 Jul;90(7):4414-6. [Full Text]</li>
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Kobayashi T, Soegiarto DW, Yang Y, Lanske B, Schipani E, McMahon AP, Kronenberg HM. Indian hedgehog stimulates periarticular chondrocyte differentiation to regulate growth plate length independently of PTHrP. J Clin Invest. 2005 Jul;115(7):1734-42. [Abstract] [Full Text]

Kuehn BM. Evidence-based guidelines needed for osteoporosis screening and treatment. JAMA. 2005 Jul 6;294(1):34. [Info]


Other Studies of Potential Interests


Eijken M, Hewison M, Cooper MS, de Jong FH, Chiba H, Stewart PM, Uitterlinden AG, Pols HA, van Leeuwen JP. 11beta-Hydroxysteroid dehydrogenase expression and glucocorticoid synthesis


