Department of Aerospace and Mechanical Engineering

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Endogenous and Exogenous Alterations in Bone Composition: Influence on Bone Mechanics

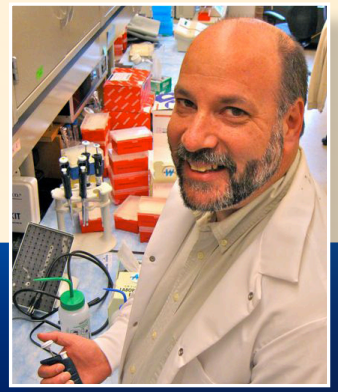
Tuesday,
November 19, 2013,
3:30P.M.

Lower Level
Auditorium,

Geddes Hall

Refreshments served
at 3:00 p.m. in the
Geddes Hall
Coffee House

Our research program focuses on two aspects of biomineralization. First, we seek to understand how the organizational hierarchy of mineralized tissues results in mechanical competence (or, conversely, increased susceptibility to fracture), and how mineralized tissues adapt in response to environmental changes (e.g. alterations in mechanical loading, implantation of a biomaterial; disease; aging). The second component of our research program utilizes principles of biomineralization as a means of designing materials to repair and/or regenerate tissues. In this presentation, 4 specific triggers of bone adaptation are highlighted, each involving an endogenous or exogenous perturbation to the skeletal system that results in compositional changes: 1) how mechanical loading of the skeletal system leads to compositional changes that increase mechanical competence and damage resistance, even in the absence of increasing bone mass; 2) how alterations in diet can affect the structure and function of the skeletal system through a combination of structural and tissue-level effects; 3) how composition is altered in the bones of genetically modified animals and how mechanical loading can modulate genetic influences on skeletal competence; and 4) how alterations in collagen cross-linking lead to changes in bone toughness. Results from these studies demonstrate the importance of bone composition or, more generally, bone quality in mediating the function of bone and provide motivation for diagnostics based on outcomes other than bone mass.



Dr. David H. Kohn
Department of Biomedical Engineering
University of Michigan

If you are interested in meeting individually with Dr. Kohn, please contact Linda at 631-5431.