

The Department of Mechanical Engineering presents:

Tamim Diab, Ph.D.

Rensselaer Polytechnic Institute (RPI)
Biomedical Engineering and Mechanical Engineering

Friday, April 8, 2011

10:30AM-11:30AM

Bourns Hall A265

Faculty Only: 11:30AM-12:00

An Interdisciplinary Approach to Assess and Restore Bone Function

Abstract:

There is a clear need for better understanding of how to restore bone function following disease and injury. This talk will be divided into three parts. In the first part, the effects of microdamage morphology (linear microcracks and diffuse damage) on bone fragility will be addressed. Using a combined fatigue and fracture mechanics approach, we have shown that the propensity of bone to form a particular damage morphology is subject to change with age and that the propensity of young individuals to form diffuse damage over linear microcracks plays a critical role in the ability of bone to dissipate energy and resist a catastrophic fracture. In the second part, the additive effects of combining two different osteoporosis drugs (raloxifene and alendronate) on the biomechanical properties of bone will be assessed. Our results show that the combination of raloxifene and alendronate increases bone volume more than either agent administered alone, resulting in an improvement of the extrinsic biomechanical properties of vertebral bone. In the third part, the efficiency of human mesenchymal stem cells to regenerate bone will be discussed. Our data suggest that the delivery of angiogenic or/and osteogenic factors may be necessary to fully restore bone function.

About the Speaker:

Tamim Diab received his Ph.D. in Biomedical Engineering and M.Eng. in Mechanical Engineering from Rensselaer Polytechnic Institute (RPI), and received his B.S. in Mechanical Engineering from Damascus University. After receiving his PhD, he did a postdoctoral fellowship at Indiana University School of Medicine in the area of bone remodeling. Afterwards, he did a postdoctoral fellowship at Georgia Institute of Technology in the area of bone tissue engineering. Following his postdoctoral fellowship at Georgia Institute of Technology, Dr. Diab was promoted to a research faculty position. His current research is focused on developing therapeutics for osteoporosis and nonunion bone fractures. He has received a Young Investigator Award from the American Society of Bone and Mineral Research (ASBMR) to investigate the additive effects of two different osteoporosis drugs (raloxifene and alendronate) on the biomechanical properties of bone.

Refreshments Served 15 minutes in advance of Colloquium

**Colloquium
Mechanical Engineering**