1068-92-289 **Bruce P. Ayati*** (bruce-ayati@uiowa.edu), Department of Mathematics, University of Iowa, Iowa City, IA 52245, and **Claire M. Edwards**, **Glenn F. Webb** and **John P. Wikswo**. *A mathematical model of bone remodeling dynamics for normal bone cell populations and myeloma bone disease.*

Background: Multiple myeloma is a hematologic malignancy associated with the development of a destructive osteolytic bone disease.

Results: Mathematical models are developed for normal bone remodeling and for the dysregulated bone remodeling that occurs in myeloma bone disease. The models examine the critical signaling between osteoclasts (bone resorption) and osteoblasts (bone formation). The interactions of osteoclasts and osteoblasts are modeled as a system of differential equations for these cell populations, which exhibit stable oscillations in the normal case and unstable oscillations in the myeloma case. In the case of untreated myeloma, osteoclasts increase and osteoblasts decrease, with net bone loss as the tumor grows. The therapeutic effects of targeting both myeloma cells and cells of the bone marrow microenvironment on these dynamics are examined.

Conclusions: The current model accurately reflects myeloma bone disease and illustrates how treatment approaches may be investigated using such computational approaches. (Received January 19, 2011)