Project Id	97
Project Title	The impact of bone remodeling on capillary growth and bone health
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Additional Faculty	
Faculty Department	Biomedical & General Engineering
Project Description	The goal of this project is to develop a better understanding of how the growth of new capillaries impacts bone remodeling and bone strength. The eventual application for this line of research is the development of more effective therapies for diseases or conditions resulting in bone loss (such as osteoporosis or space flight) and bone injury (such as fracture). There are three main components of the project, with each component likely requiring one student (although students may participate in multiple aspects of the project). In the first component of the project, students will employ an experimental protocol of cyclic loading on the tibia of anesthetized mice to induce bone remodeling. In the second component of the project, students will utilize microscopy to measure the capillaries in remodeled and normal mouse tibias and use a numerical model to determine how the growth of new capillaries impacts blood flow. In the third and final component of the project, students will perform strength testing on the mouse tibias to determine how the growth of new capillaries and bone remodeling impact bone strength. Through the completion of this project, students will have the opportunity to gain experience in animal experimentation, microscopy, numerical modeling, materials testing, experimental design, and data analysis. The truly interdisciplinary nature of the project will allow diverse groups of students to work together towards the development of better treatments for bone disease and injury by developing a better understanding of the vascular aspects of bone remodeling.
Interdisciplinary Nature Description	This project involves efforts on biology/physiology, mathematics, and engineering directed towards creating knowledge for the betterment of medicine. The biology/physiology aspects of the project include the animal experiments and assessment of bone capillaries. The mathematics aspects of the project include the modeling of blood flow based on the bone capillaries. The engineering aspects of the project include the mechanical testing of bone following a remodeling event.
Links	
Number of Honors Students Requested	3
Applicable Majors	ASCI, BIO, BMED, KINE, ME, MATE, GENE
desired_res	Laboratory experience in biology/chemistry, laboratory experience in materials/mechanical testing, or coursework in mathematics.
Date Added	2008-10-16 12:57:21
Active	1