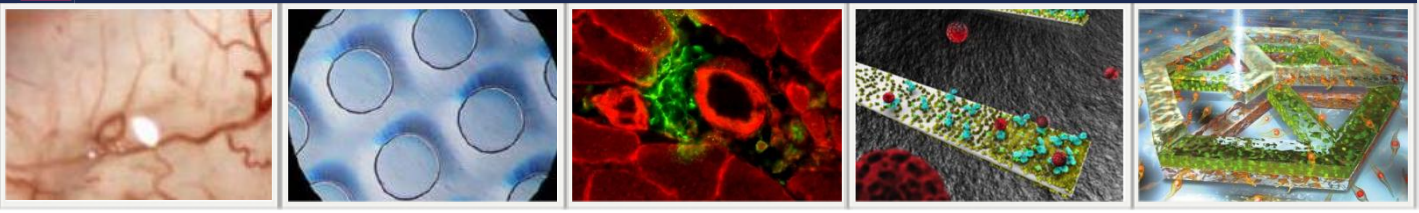
BioNanotechnology Seminar Series

Spring 2012



Fabrication and Characterization of Multi-Compartment Collagen-Glycosaminoglycan Scaffolds for Tissue Regeneration

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Date: **Tuesday, April 10, 2012**

Time: **12:00 – 12:30 p.m. CST (10:00 – 10:30 a.m. PST)**

Location: **1000 MNTL at Illinois (SSM 150 at UC Merced)**

Abstract:

We are working to create multi-compartment scaffolds as regenerative templates for multi-tissue interfaces such as the tendon to bone junction (TBJ). Collagen-glycosaminoglycan (CG) scaffolds have previously been successfully employed in a variety of soft tissue regeneration applications. Recently strategies for creating mineralized CG (CGCaP) scaffold variants along with fabrication methods to create layered osteochondral scaffolds have been demonstrated. Here I will discuss methods for the fabrication and characterization of both single and multi-compartment scaffolds targeted for the TBJ. Following production, both histology and microCT imaging approaches were employed to investigate scaffold microstructural features. In the case of the mineralized CGCaP scaffolds, mineral content as well as phase were determined via DMMB and hydroxyproline assays as well as x-ray diffraction approaches, respectively. Bulk mechanical and permeability characterization methods were applied and then compared with ultrasound elastography approaches targeting non-destructive analysis of individual scaffold compartments within the heterogeneous multi-compartment scaffolds. Finally, the biocompatibility of hMSCs within CG and CGCaP scaffold compartments was investigated using bioactivity, gene expression, and functional metrics as a precursor to both in vivo testing as well as subsequent work creating fully interpenetrating TBJ grafts that can drive multi-lineage MSC differentiation in a spatially-selective manner.

Seminar Presented by:

Center for Cellular Mechanics
University of Illinois at Urbana-Champaign

IGERT Integrative Graduate Education and Research Traineeship
Cellular and Molecular Mechanics and BioNanotechnology

M-CNTC NCI Alliance for Nanotechnology in Cancer
Midwest Cancer Nanotechnology Training Center

CNST University of Illinois Center for Nanoscale Science and Technology