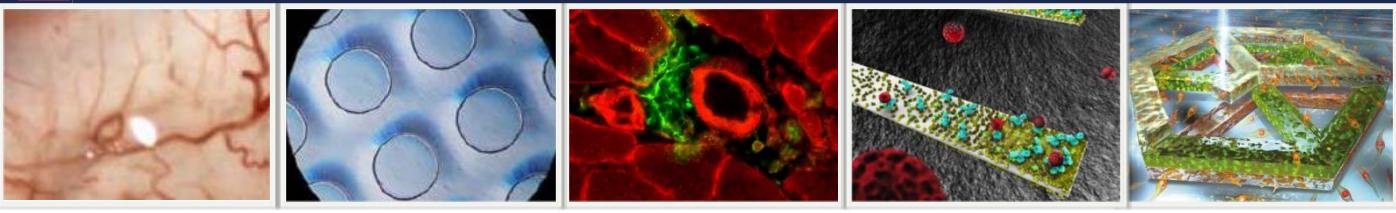
# BioNanotechnology Seminar Series

Spring 2011



## Cardiovascular Stem Cell Engineering for Regenerative Medicine


### Dr. Kara McCloskey

**School of Engineering**
**University of California, Merced**


**Date:** **Tuesday, March 8, 2011**

**Time:** **12:00 – 1:00 p.m. CST (10:00 – 11:00 a.m. PST)**

**Location:** **Illinois – 1000 MNTL (live via video conference)**
**UC Merced – Dean's Conference Suite, 270K**


## Abstract:

Stem cells could potentially lead to a variety of clinically relevant cell-based therapies, and hold promise in providing cell sources for tissue engineering. Two obstacles associated with using embryonic stem cells (ESC) for regenerative medicine applications include a) isolating homogeneous populations of differentiated cells, and b) obtaining terminally differentiated cell populations that are fully functional and retain significant expansion potential. Our laboratory has investigated the differentiation of vascular endothelial cell (EC) and smooth muscle cells (SMC) from both mouse and human ESC. We have developed serum-free methods for isolation of homogeneous differentiated cell populations of endothelial cells and thoroughly characterized these cells for both surface and functional markers. We have also demonstrated the ability of our ESC-derived EC to readily assemble into neovessels in vitro, exhibiting increased angiogenesis compared with primary EC. More recently, these studies have been expanded to include cardiac differentiation and cardiac cell alignment for generating functional cardiac tissues.


## References:


1. McCloskey, K.E., et al., *Purified and proliferating endothelial cells derived and expanded in vitro from embryonic stem cells*. Endothelium, 2003. 10(6): p. 329-36.
2. Luna, J.I., et al., *Multi-scale Biomimetic Topography for the Alignment of Neonatal and Embryonic Stem Cell-derived Heart Cells*. Tissue Eng Part C Methods, 2011.
3. Glaser D, et al., Functional Regulation of Stem Cell-Derived Endothelial Cells. Journal of Vascular Research (in press).
4. Blancas AA, et al., Induction of Endothelial Cells from Murine Embryonic Stem Cells under Serum-Free Conditions. Stem Cells and Development (accepted)
5. Sa S, et al., Highly Efficient Generation of Uniform Embryoid Bodies using Round-bottomed Honeycomb Microwells. Journal of Tissue Engineering and Regenerative Medicine (submitted)


### 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