Bioengineering Seminar

by Faculty Candidate

James Ankrum, Ph.D.

Senior Innovation Fellow, Medical Devices Center, University of Minnesota

Microscale Engineering for Regenerative Medicine

In this seminar two platform-technologies that use microscale engineering to take advantage of biological phenomena will be presented. The first is a technology inspired by the porcupine. North American porcupines have quills with microscopic barbs. The barbs contribute to adhesion and unexpectedly, dramatically reduced penetration force. The dual functions of barbs were reproduced with synthetic quills and applied to medical devices including tissue adhesives and needles. The second platform is a technology to enhance therapeutic cells. Mesenchymal stem cells' (MSC) ability to differentiate into multiple lineages, secrete trophic factors, and modulate inflammatory processes has made them of clinical interest; however these diverse functions also pose challenges in controlling their phenotype. To address this challenge a new platform to control the cell phenotype was developed. MSCs were found to efficiently internalize microparticles. Incorporation of phenol-type altering drugs into the particles allows the platform to be tuned to specific applications. Three applications of this platform will be discussed including, controlling MSC differentiation, tracking cell location, and enhancing MSC's immune-modulatory potency.

Tuesday, March 18, 2014

1:00PM-2:00PM, Room 3507

Nguyen Engineering Building

BIOGRAPHY

James Ankrum, PhD is a Senior Innovation Fellow in the Medical Devices Center at the University of Minnesota focused on developing translatable medical technologies. He completed his undergraduate training in biomedical engineering with a focus on ergonomics and human factors at the University of Iowa. With the support of a Churchill Fellowship, he went on to complete a Masters in Engineering Design at Cambridge University focusing on the impact of design decisions on patient care. After completing his masters, James joined Harvard-MIT's Division of Health Sciences and Technology to pursue his PhD in Medical Engineering and Medical Physics. During his PhD, James worked on a wide variety of projects ranging from engineered cell-based therapies, to drug delivery, to bio-inspired medical adhesives

His research focus is on identifying unmet clinical needs and establishing collaborations between academia and industry to rapidly foster development of new technologies. Of particular interest are novel uses of engineered cell-based therapies and the design of medical devices that stimulate natural physiological processes to promote regeneration of damaged tissue.

For any questions please contact Claudia Borke at cborke@gmu.edu, (703) 993-4190