COLLEGE OF ENGINEERING

Research Seminar Series

University of Nebraska-Lincoln
Department of Chemical and Biomolecular Engineering

Bioengineered Hydrogels for Regenerative Medicine

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Woodruff School of Mechanical Engineering
Petit Institute for Bioengineering and Bioscience
Georgia Institute of Technology
Host: Dr. Yuguo Lei

Friday, October 26, 2018

10:00 a.m. – 11:00 a.m.
Othmer Hall Room 205
**Refreshments provided*

Abstract

Hydrogels, highly hydrated cross-linked polymer networks, have emerged as powerful synthetic analogs of extracellular matrices for basic cell studies as well as promising biomaterials for regenerative medicine applications. A critical advantage of these synthetic matrices over natural networks is that bioactive functionalities, such as cell adhesive sequences and growth factors, can be incorporated in precise densities while the substrate mechanical properties are independently controlled. We have engineered poly(ethylene glycol) [PEG]-maleimide hydrogels to study epithelial morphogenesis and identified independent contributions of biophysical and biochemical properties of these materials to this developmental process. In another application, we have developed synthetic hydrogels that support improved pancreatic islet engraftment, vascularization and function in diabetic models. These studies establish these biofunctional hydrogels as promising platforms for basic science studies and biomaterial carriers for cell delivery, engraftment and enhanced tissue repair.

Biography

Andrés J. García is the Executive Director of the Petit Institute for Bioengineering and Bioscience and Regents' Professor at the Georgia Institute of Technology. He earned a B.S. in Mechanical Engineering with Honors from Cornell University (1991), and M.S.E. (1992) and Ph.D. (1996) degrees in Bioengineering from the University of Pennsylvania. He completed a post-doctoral fellowship in cell and molecular biology at the School of Medicine of the University of Pennsylvania and then joined the faculty at Georgia Tech in 1998. Dr. García's research program integrates innovative engineering, materials science, and cell biology concepts and technologies to create cell-instructive biomaterials for regenerative medicine and generate new knowledge in mechanobiology. This cross-disciplinary effort has resulted in new biomaterial platforms that elicit targeted cellular responses and tissue repair in various biomedical applications, innovative technologies to study and exploit cell adhesive interactions, and new mechanistic insights into the interplay of mechanics and cell biology. Dr. García is recognized as an international leader in bioengineering as demonstrated by his prestigious scholarly publications (>200 publications, 85 h-index, >26,300 citations), invited presentations at conferences and research programs world-wide, research funding from NIH, NSF and private foundations, and membership on the editorial boards of leading biomaterial and regenerative medicine journals. In addition, his research has generated intellectual property and licensing agreements with start-up and multi-national companies, demonstrating the translational potential and impact of this work. He has received several distinctions, including the NSF CAREER Award, Arthritis Investigator Award, Young Investigator Award from the Society for Biomaterials, Georgia Tech's Outstanding Interdisciplinary Activities Award, the Clemson Award for Basic Science from the Society for Biomaterials, and the International Award from the European Society for Biomaterials. He has been recognized as a top Latino educator by the Society of Hispanic Professional Engineers. He is an elected Fellow of Biomaterials Science and Engineering (by the International Union of Societies of Biomaterials Science and Engineering), Fellow of the American Association for the Advancement of Science, Fellow of the American Society of Mechanical Engineers, and Fellow of the American Institute for Medical and Biological Engineering. He currently serves as President for the Society for Biomaterials.