ENGINEERING SEMINAR ANNOUNCEMENT

Engineering Biomaterials for Improving Cell Therapy in Type 1 Diabetes

Fri, Sep. 15
11:00 a.m.
Engineering B-221

Cherie Stabler, PhD
J. Crayton Pruitt Family Professor
and Chair of Biomedical Engineering
University of Florida

FAMU-FSU College of Engineering

This event sponsored by FAMU-FSU Department of Chemical & Biomedical Engineering

Dr. Cherie Stabler is the J. Crayton Pruitt Family and UF Foundation Preeminence Term Professor and Departmental Chair in the Department of Biomedical Engineering, College of Engineering at the University of Florida. She also is an Affiliate Member of the UF Diabetes Institute. She received her B.S. in Chemical Engineering from the FAMU-FSU College of Engineering. She received her Ph.D. in Biomedical Engineering from The Georgia Institute of Technology & Emory University and conducted her postdoctoral work in the Department of Surgery at Emory University. Dr. Stabler has established an internationally recognized research and educational program focused on the generation of translational biomaterial platforms for cellular implants, with a particular emphasis on cell-based therapies for type 1 diabetes. Her novel bioactive materials are targeted at enhancing graft survival and utilizing local and translational approaches to dampen host immunological responses. Her work spans from designing new biomaterials to seeking FDA clearance for combinatory products. Her transdisciplinary research has been published across a spectrum of journals and generated numerous patents. She is an inducted fellow of the BMES and the AIMBE and is the recipient of the NIH NIDDK Type 1 Diabetes Pathfinder DP2 Award. She is the President-Elect of the international Tissue Engineering and Regenerative Medicine (TERMIS) Americas Chapter and is a current member of the JDRF Encapsulation Consortia and the NIH Human Islet Research Network.

Clinical islet transplantation, the intrahepatic infusion of allogeneic islets, has the potential to provide physiological blood glucose control for insulin-dependent diabetics. The success of clinical islet transplantation, however, is hindered by the location of the implant site, which is prone to mechanical stresses, inflammatory responses, and exposure to high drug and toxin loads, as well as the strong inflammatory and immunological responses to the transplant in spite of systemic immunosuppression. To address these challenges, our research has focused on three primary strategies: the development of scaffolds to house islets at alternative transplant sites; the fabrication of encapsulation protocols for the immuno-camouflage of the transplant; and the production of bioactive biomaterials for the local delivery of oxygen and immunomodulatory drugs and/or cells. Three-dimensional scaffolds can serve to create a more favorable islet engraftment site, by ensuring optimal distribution of the transplanted cells, creating a desirable niche for the islets, and promoting vascularization. Encapsulation can substantially decrease the need for systemic immunosuppression of the recipient, by preventing host attack. Finally, localization of supportive agents to the site of the transplant can serve to enhance efficacy, while minimizing the side effects commonly observed with systemic delivery. Success in these strategies should increase the efficacy of islet transplantation for the treatment of Type 1 Diabetes, whereby the long-term survival and engraftment of the transplanted islets are significantly improved.