

Seminar Talk

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3:00 p.m. KH 224

Title: Gene Electrotransfer Mediated Gene Delivery And Therapeutic Applications

Abstract:

Gene therapy is gaining intense interest as a treatment approach for the leading cause of heart failure, atherosclerosis induced myocardial infarction (MI). Gene electrotransfer (GET) can improve plasmid DNA delivery in vivo, with enhanced safety and minimal immunogenicity compared to viral approaches. However, GET has yet to be translated to cardiac applications. Thus, we developed animal models, specialized electrode designs, novel electrode configurations and pulsing parameters to assess GET of potential therapeutic genes, such as vascular endothelial growth factor B (VEGF-B). VEGF-B is a well-studied angiogenic and cardiomyogenic growth factor, hypothesized to remediate the effects of MI. We show GET to the left ventricular myocardium to be safe and feasible in both rat and pig animal models. GET of pVEGF-B to ischemic rodent myocardium shows significant infarct reduction and cardiac muscle restoration. GET thus shows great potential long-term benefit in myocardial repair and regeneration.

Bio:

Anna Bulysheva earned her B.S. in Biology at the University of North Carolina at Chapel Hill, where she researched real-time 3D radiofrequency ablation visualization. She earned her Ph.D. in Biomedical Engineering at the Virginia Commonwealth University, developing nanofiber image processing programs and pioneering electrospun 3D head and neck carcinoma culture systems to study drug resistance mechanisms. As a postdoc and Research Assistant Professor at the Frank Reidy Research Center for Bioelectrics, Dr. Bulysheva developed preclinical animal models and tissue engineered culture systems for gene electrotransfer in dermal and cardiovascular disease models. Her current research interests focus on gene therapy, gene delivery, and regenerative medicine with wound healing, musculoskeletal and cardiovascular applications.