Fall 2016 Bioengineering Seminar Series

Graft Technologies for Soft Tissue Repair: A Translational Approach

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Rotator cuff tears affect 40% or more of those aged older than 60 years, and repair failure rates of 20-70% remain a significant clinical challenge. Additionally, 20% of those undergoing laparotomy will develop a ventral incisional hernia, regardless of age. Both of these conditions are largely influenced by patient specific pathogenic factors. Hence, there is a need for repair strategies that can augment the repair by mechanically reinforcing it, while at the same time biologically enhancing the intrinsic healing potential of the rotator cuff tendons and abdominal fascial planes.

Tissue engineering strategies to improve soft tissue healing include the use of grafts, growth factors, and cell seeding, or a combination of these approaches. Currently, grafts derived from mammalian extracellular matrix, synthetic polymers, and a combination thereof, have been cleared by the U.S. Food and Drug Administration and are marketed as medical devices for rotator cuff or ventral hernia repair in humans. Despite the growing clinical use of grafts for soft tissue repair augmentation, there are numerous questions related to their indication, surgical application, safety, mechanism of action, and efficacy that remain to be clarified or addressed.

For the better part of a decade, we at the Cleveland Clinic have focused on developing translational strategies to address some of these issues. Through development of our own grafts, we have sought to also develop lab based and clinically relevant model systems to better understand how these grafts and repair techniques might be efficacious. This translational approach can be seen as the critical bridge between basic science research and ultimately clinical treatment. This seminar will seek to try to walk you through our efforts to invent, test, and commercialize graft technologies, specifically for the treatment of rotator cuff tendon and ventral hernia repair.

Where: SSOE Seminar Room, NI 1027
When: Friday, October 7, 2016
Time: 12:00 – 1:00 pm

Ryan completed his B.S. and M.S. degrees at University of Toledo in Chemical Engineering. He was among the first four students who helped to chart the course for the accreditation of the Department of Bioengineering. After investigating an implantable aftificial pancreas in Dr. Ron Fournier's lab, he joined a startup company in San Diego (Hepatix) developing an artificial liver. Preferring the academic environment, he returned to Ohio and joined the Cleveland Clinic, Department of Biomedical Engineering, working predominantly in comparative biomechanics, preclinical surgical model development, and translational approaches to soft tissue musculoskeletal repair, primarily in rotator cuff tendon and more recently in ventral wall hernias.