

Raul Sun Han Chang

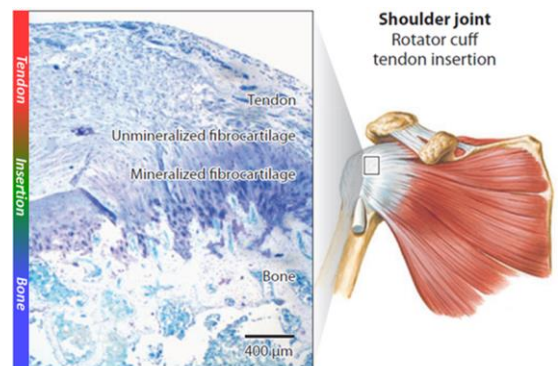
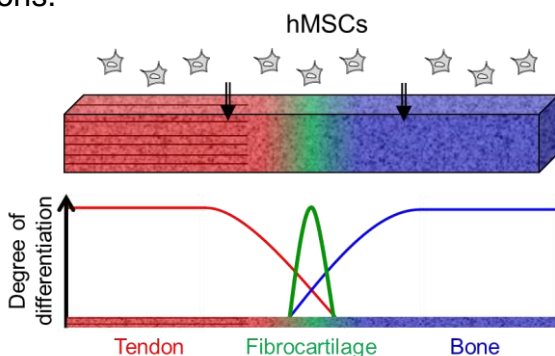
Developing a triphasic biomaterial for osteotendinous tissue regeneration

Ph.D. candidate, Chemical and Biomolecular Engineering
B.A., Chemistry, Pomona College

Hometown: Huacho, Perú

ABSTRACT:

Orthopedic injuries are widespread sources of pain and discomfort, and can drastically deteriorate mobility and quality-of-life. These injuries commonly occur across the enthesis, a fibrocartilage insertion that integrates tendon into bone. The clinical standard for insertion repair is surgical reattachment, however, direct mechanical fixation of damaged tendon to bone does not regenerate an enthesis. The absence of an enthesis post-treatment results in insufficient functional reintegration of tendon into bone and re-tear rates of up to 94%. Indeed, next-generation clinical treatments for osteotendinous injuries will focus on regenerating the critical tendon-bone interface in addition to injured tendon and bone compartments. Our research group has recently developed a multi-compartment collagen-GAG (CG) scaffold capable of inducing regionally-controlled pro-tenogenic and osteogenic human mesenchymal stem cell (hMSC) differentiation as a first-generation osteotendinous repair biomaterial. However, efforts to regenerate the enthesis between tendon and bone compartments remain challenging due to the compositional and structural heterogeneity of the interfacial tissue. I propose to address the critical need to incorporate an enthesis-specific biomaterial zone at the interface between tendinous and osseous CG scaffold regions.



AWARDS/PUBLICATIONS:

- NSF Graduate Research Fellow (2017)
- UIUC College of Engineering SURGE Fellow (2016)
- ChBE Hanratty Travel Award



HARLEY LAB

engineering cellular microenvironments and microstructures

www.harleylab.org