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Engineering & Scientific Consulting

Corinne Riggin, Ph.D.

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Professional Profile

Dr. Riggin's expertise focuses on the mechanical evaluation of biomedical devices, products, and explanted tissues. She has extensive experience conducting MRI compatibility testing, both in clinical scanner environments as well as RF heating simulation models. Her expertise also includes the analysis of women's health products, including designing and implementing fixtures, test methods, and validation procedures. She also has experience with cadaveric testing for both mechanical and MRI evaluation of implanted medical devices.

Dr. Riggin obtained her Ph.D. in Bioengineering at the University of Pennsylvania, where she studied soft tissue biomechanics, with a focus on assessing the healing or degeneration of tendons and ligaments. Her work involved soft tissue dissection, preparation, and testing to acquire viscoelastic, dynamic, and quasi-static mechanical properties. She has expertise in live animal ultrasound image acquisition and analysis, specifically color Doppler ultrasound, photoacoustic imaging, and contrast-enhanced ultrasound for the quantification of vascular perfusion. She is proficient in histological and immunohistochemical methods for evaluating tissue cellular and compositional properties. She has experience with biomaterial scaffold fabrication techniques, such as electrospinning polymer nanofibers, as well as in vitro cell culture and microscopy techniques.

Academic Credentials & Professional Honors

Ph.D., Bioengineering, University of Pennsylvania, 2018

B.S., Bioengineering, University of Maryland, <p>cum laude, Honors Program</p>, 2011

National Science Foundation Graduate Research Fellowship Program, University of Pennsylvania, 2013 - 2016

National Institutes of Health Rheumatology T32 Training Grant, University of Pennsylvania, 2016 - 2018

American Society of Mechanical Engineers Student Leadership Committee, 2013-2015

FDA Research Experiences for Undergraduates Fellowship, University of Maryland, 2010

Prior Experience

Graduate Researcher, McKay Orthopaedic Research Laboratory, University of Pennsylvania, 2011-2018

Penn Biotech Group Healthcare Consulting, University of Pennsylvania, 2015

Teaching Assistant, Biomechanics (BE 200), University of Pennsylvania, 2013-2014

Undergraduate Researcher, Tissue Engineering and Biomaterials Laboratory, University of Maryland, 2009-2011

Nathan Schnaper Cancer Research Internship, University of Maryland, Baltimore, 2009

Professional Affiliations

Orthopaedic Research Society

Orthopaedic Research Society Tendon Section Member

Publications

Riggin CN, Rodriguez AB, Weiss SN, Raja HA, Chen M, Schultz SM, Sehgal CM, Soslowky LJ. Modulation of Vascular Response after Injury in the Rat Achilles Tendon Alters Healing Capacity. *J Orthop Res*. 2020 Sep; Online Ahead of Print.

Riggin CN, Schultz SM, Sehgal CM, Soslowky LJ. Ultrasound Evaluation of Anti-Vascular Endothelial Growth Factor-Induced Changes in Vascular Response Following Tendon Injury. *Ultrasound Med Biol*. 2019 Jul;45(7):1841-1849.

Riggin CN, Chen M, Gordon JA, Schultz SM, Soslowky LJ, Khoury V. Ultrasound-Guided Dry Needling of the Healthy Rat Supraspinatus Tendon Elicits Early Healing Without Causing Permanent Damage. *J Orthop Res*. 2019 Sep;37(9):2035-2042.

Chen M, Shetye SS, Huegel J, Riggin CN, Gittings DJ, Nuss CA, Weiss SN, Kuntz AF, Soslowky LJ. Biceps Detachment Preserves Joint Function in a Chronic Massive Rotator Cuff Tear Rat Model. *Am J Sports Med*. 2018 Dec;46(14):3486-3494.

Riggin CN, Qu F, Kim DH, Huegel J, Steinberg D, Soslowky LJ, Mauck RL, Bernstein J. Electrospun PLGA Nanofiber Scaffolds Release Ibuprofen Faster and Degrade Slower after In Vivo Implantation. *Annals of Biomedical Engineering*, 2017, 45(10): 2348-2359.

Freedman BR, Salka NS, Morris TR, Bhatt PR, Pardes AM, Gordon JA, Nuss CA, Riggin CN, Fryhofer GW, Farber DC, Soslowky LJ. Temporal Healing of Achilles Tendons After Injury in Rodents Depends on Surgical Treatment and Activity. *J Am Acad Orthop Surg*, 2017, 25(9): 635-647.

Freedman BR, Gordon JA, Bhatt PB, Pardes AM, Thomas SJ, Sarver JJ, Riggin CN, Tucker JJ, Williams AW, Zanes RC, Hast MW, Farber DC, Silbernagel KG, Soslowky LJ. Nonsurgical treatment and early return to activity leads to improved Achilles tendon fatigue mechanics and functional outcomes during early healing in an animal model. *Journal of Orthopaedic research*, 2016, 34(12): 2172-80.

Tucker JJ, Riggin CN, Connizzo BK, Mauck RL, Steinberg DR, Kuntz AF, Soslowky LJ, Bernstein J. Effect of Overuse-Induced Tendinopathy on Tendon Healing in a Rat Supraspinatus Repair Model. *Journal of Orthopaedic Research*, 2015, 34(11): 161-6.

Riggin CN, Tucker JJ, Soslowky LJ, Kuntz AF. Intra-Articular Tibiofemoral Injection of a Nonsteroidal Anti-Inflammatory Drug has no Detrimental Effects on Joint Mechanics in a Rat Model. *Journal of Orthopaedic Research*, 2014, 32(11): 1512-9.

Riggin CN, Sarver JJ, Freedman BR, Thomas SJ, Soslowky LJ. Analysis of Collagen Organization in Mouse Achilles Tendon Using High-Frequency Ultrasound Imaging. *Journal of Biomechanical*

Engineering, Special Issue Student Paper Competition Winner, 2014, 136(2): 021029.

Connizzo BK, Yannascoli SM, Tucker JJ, Caro AC, Riggin CN, Mauck RL, Soslowky LJ, Steinberg DR, Bernstein J. The Detrimental Effects of Systemic Ibuprofen Delivery on Tendon Healing Are Time-Dependent. *Clinical Orthopaedics and Related Research*, 2014, 472(8): 2433-9.

Shankar R, Samykutty A, Riggin C, Kannan S, Wenzel U and Kolhatkar R. Cathepsin B Degradable Star Shaped Peptidic Macromolecules for Delivery of 2- methoxyestradiol. *Molecular Pharmaceutics*, 2013, 10(10): 3776-88.

Coates EE, Riggin CN, Fisher JP. Photocrosslinked Alginate with Hyaluronic Acid Hydrogels as Vehicles for Mesenchymal Stem Cell Encapsulation and Chondrogenesis. *Journal of Biomedical Materials Research Part A*, 2013, 101(7): 1962-70.

Coates EE, Riggin CN, Fisher JP. Matrix Molecules Influence Zonal Phenotype of Alginate-Embedded Chondrocytes and Chondrogenic Differentiation of Primary Mesenchymal Stem Cells. *Journal of Orthopaedic Research*, 2012, 30(12): 1886-97.

Oral Presentations

Riggin CN, Weiss SN, Rodriguez AB, Schultz SM, Sehgal CM, Soslowky LJ. Increasing Vascular Response to Injury Improves Tendon Healing Outcome in Aged Rats. *Orthopaedic Research Society Annual Meeting*, New Orleans, LA, 2018.

Riggin CN, Houry V, Gordon JA, Schultz SM, Pardes AM, Sehgal CM, Soslowky LJ. Ultrasound-Guided Dry Needling on Healthy Rat Supraspinatus Tendon. *International Symposium on Ligaments and Tendons*, Las Vegas, NV, 2015.

Poster Presentations

Riggin CN, Rodriguez AB, Weiss SN, Raja H, Chen M, Schultz SM, Sehgal CM, Soslowky LJ. Modulation of Vascular Response after Injury in the Rat Achilles Tendon Alters Healing Capacity. *Orthopaedic Research Society Annual Meeting*, New Orleans, 2018.

Riggin CN, Schultz SM, Sehgal CM, Soslowky LJ. Effect of Pro- and Anti-Angiogenic Factors on Vascular Response in the Rat Achilles Tendon after Injury. *Orthopaedic Research Society Annual Meeting*, San Diego, CA, 2017.

Riggin CN, Schultz SM, Sehgal CM, Soslowky LJ. Aging Decreases Rat Achilles Tendon Vessel Density and Blood Flow after Injury. *Orthopaedic Research Society Annual Meeting*, San Diego, CA, 2017.

Riggin CN, Qu F, Kim DH, Huegel J, Steinberg DR, Soslowky LJ, Mauck RL, Bernstein J. Electrospun PLGA Nanofiber Scaffolds Release Ibuprofen Faster and Degrade Slower after In Vivo Implantation. *Orthopaedic Research Society Annual Meeting*, Orlando, FL, 2016.

Riggin CN, Tucker JJ, Soslowky LJ, Kuntz AF. Intra-Articular Tibiofemoral Injection of a Nonsteroidal Anti-Inflammatory Drug has no Detrimental Effects on Joint Mechanics in a Rat Model. *Orthopedic Research Society Annual Meeting*, New Orleans, LA, 2014.

Riggin CN, Sarver JJ, Freedman BR, Thomas SJ, and Soslowky LJ. Analysis of Collagen Fiber Organization in Mouse Achilles Tendon using High-Frequency Ultrasound Imaging. *ASME Summer Bioengineering Conference*, Sunriver, OR, 2013, SBC2013-14472.

Riggin CN, Coates EE, and Fisher JP. The Influence of Hyaluronic Acid on Chondrogenic Differentiation of Primary Mesenchymal Stem Cells Embedded in Photocrosslinked Alginate. *Annual Biomedical*

Engineering Society Meeting, Hartford, CT, 2011.

Book Chapters and Review Papers

Riggin CN, Morris TR, Soslowsky LJ. "Tendinopathy II: Etiology, Pathology, and Healing of Tendon Injury and Disease." Tendon Regeneration, Ed. Gomes ME, Rodrigues MT, Reis RL. Elsevier, 2015: 149-78.

Freedman BR*, Bade ND*, Riggin CN*, Zhang S*, Haines P*, Ong KL*, Janmey PA. The (Dys)Functional Extracellular Matrix. *Biochimica et Biophysica Acta*, 2015, 1853(11 Pt B): 3153-64. (*Authors contributed equally)