Virginia-Maryland College of Veterinary Medicine

BIOMEDICAL & VETERINARY SCIENCES GRADUATE PROGRAM

ANNOUNCES

The Doctor of Philosophy Seminar and Examination of

Tracee L. Popielarczyk

"Homing and Differentiation of Mesenchymal Stem Cells in 3D In Vitro Models"

Thursday July 27, 2017

9:00 am Heritage Room

Vita/Bio

Tracee Popielarczyk is a PhD Candidate in the Biomedical and Veterinary Sciences Program at Virginia Polytechnic Institute & State University. She received a B.S. degree in Biology from Elizabethtown College in 2006. She completed her M.S. in Cell & Developmental Biology from Thomas Jefferson University, while working as a Staff Biologist at Merck and Co. in 2011. Then, she matriculated at Virginia Tech, where she spent one year training in the STEP Laboratory in Blacksburg, and continued her work in the Regenerative Medicine Research Laboratory at the Marion DuPont Scott Equine Medical Center in Leesburg. Her current research involves understanding the cellular and molecular processes of mesenchymal stem cell behavior in 3D cell culture models towards tissue healing and stem cell-based therapies.

Funded by

Stamps Family Charitable Foundation, Inc.
Office of Research and Graduate Studies

Publications

Popielarczyk, T. L., Nain, A. S., & Barrett, J. G. (2017). Aligned Nanofiber Topography Directs the Tenogenic Differentiation of Mesenchymal Stem Cells. *Applied Sciences,* 7(1), 59.

Popielarczyk, T. L., Nain, A. S., & Barrett, J. G. (2014). 2014 TERMIS-AM Conference Washington, DC December 13–16, 2014. *Tissue Engineering Part A*, *20*(S1), S-1.

Presentations

Popielarczyk, T.L., Nain, A.S., Barrett, J.G. "The Influence of Suspended and Aligned Fibrous Topographical Environment on Mesenchymal Stem Cell Behavior" poster presentation at the Annual TERMIS-AM Conference and Exhibition, December 2014, Washington, D.C.

Popielarczyk, T.L., Nain, A.S., Barrett, J.G. "The Influence of Suspended and Aligned Fibrous Topographical Environment on Mesenchymal Stem Cell Behavior" poster presentation at the American Society for Cell Biology (ASCB)/International Federation for Cell Biology (IFCB) Meeting, December 2014, Philadelphia, PA

Honors

Iota Delta Rho (IDR), Interdisciplinary Research Honors Society at Virginia Tech, 2014
Gamma Sigma Delta, Honor Society of Agriculture

Awards and Academic Achievements

Stamps Scholarship awarded by Stamps Family Charitable Foundation, Inc.

Virginia Tech Internal Research Competition, "Study of mesenchymal stem cell homing regulation using a "Vasculature on a Chip"

Travel award for the Annual TERMIS-AM Conference and Exhibition

Lay Language Abstract

Stem cell therapy has the potential to improve tissue injury and inflammatory conditions, but to optimize such therapy, we need to study how the environment around cells influence turning them into the injured tissue and how to control their movement to these sites in order for mesenchymal stem cells (MSCs) to exert their therapeutic functions. MSCs move through and detect their environment through the material around them, including organization of the fibers they attach to and neighboring cells. Cell migration is an important cell behavior that occurs in normal and diseased processes. MSCs have great potential to improve clinical outcomes for many inflammatory and degenerative diseases whether through delivery of exogenous MSCs or through mobilization and migration of endogenous MSCs to injury sites.

Tendon damage can occur slowly over time and optimal treatment for normal function after injury remains unknown. Equine MSCs were harvested from bone marrow and subjected to scaffolds of different fiber orientation to study whether cells develop characteristics of tendon cells. Cellular responses were similar between scaffolds of aligned fiber orientation. Manipulation of equine bone marrow MSCs through the use of specifically designed nanofiber scaffolds aid in understanding the mechanisms by which the cells respond and function in tendon development, injury, and repair.

Inflammation is a necessary process after tissue injury; however, it must progress in a controlled manner and be resolved before it leads to tissue damage and dysfunction. MSCs function in regulating the effects of inflammation and immune cells; however, getting them to these sites and keeping them there remains challenging. MSCs adhere to and migrate through capillaries towards these sites, known as stem cell homing. Human bone marrow MSCs were loaded onto human synovial microvascular endothelial cells (ECs) to study migration towards an inflammatory stimulus. This stimulus acted on the ECs to produce another stimulus that attracted MSCs to the ECs. These actions resulted in complete MSC migration through the ECs and activated intracellular signals that can be used to increase the number of MSCs that reach the inflammatory sites and stimulate tissue-healing effects.

Examination Graduate Committee

Major Advisor/Chair:

Jennifer G. Barrett, DVM, PhD, Diplomate ACVS, Diplomate ACVSMR
Theodora Ayer Randolph Professor of Equine Surgery
Marion DuPont Scott Equine Medical Center
Department of Large Animal Clinical Sciences

Graduate Advising Committee Members:

Amrinder S. Nain, PhD
Associate Professor Mechanical Engineering

William R. Huckle, MS, PhD
Associate Professor, Biomedical Sciences & Pathobiology

Willard H. Eyestone, MS, PhD
Research Associate Professor, Department of Large Animal Clinical Sciences

External Examiner

Dr. Bethany Kerr, PhD
Assistant Professor
Wake Forest School of Medicine

Seminar:
"CD117 Identifies Prostate Cancer Stem Cells and Drives Metastasis"

Thursday July 27, 2017
1:30 PM
Heritage Room