**BIOMEDICAL & VETERINARY SCIENCES**

**GRADUATE PROGRAM**

**ANNOUNCES**

The Doctor of Philosophy Seminar and Examination of

**Thomas Brickler**

**“The Role of Age and Model Severity on Cortical Vascular Response Following Traumatic Brain Injury**

**”**

**April 26th, 2017**

**11:00am**

**VMIA 220**

**Bio**

Thomas Brickler grew up in Chicago, Illinois. After completing his bachelor’s degree in biology at Bowdoin College, in Brunswick, Maine he spent two years at the Harvard University Stem Cell Institute where he trained as a stem cell biologist, specifically reprogramming somatic cells into induced pluripotent stem cells (iPS). In 2012 he entered the lab of Michelle Theus at the Virginia Maryland College of Veterinary Medicine at Virginia Tech University as part of the inaugural Regenerative Medicine Ph.D. class. In the lab, Thomas’ research has focused on blood vessel response and repair mechanisms after traumatic brain injury (TBI) in a murine model. Specifically, he is interested in age and strain related differences, later using a genetic knockout approach to better understand how these factors contribute to the pathogenesis of TBI and identifying areas of potential therapeutic intervention.

**Lay Language Abstract**

Traumatic Brain Injury (TBI) is a growing health concern worldwide that affects a broad range of the population. As TBI is the leading cause of disability and mortality in children, several pre‐clinical models have been developed using rodents at a variety of different ages; however, key brain maturation events are overlooked that leave some age groups more or less vulnerable to injury. Thus, there has been a large emphasis on producing relevant animal models to elucidate molecular pathways that could be of therapeutic potential to help limit neuronal injury and improve behavioral outcome. TBI involves a host of different biochemical events, including disruption of the cerebral vasculature and breakdown of the blood brain barrier (BBB) that exacerbate secondary injuries. A better of understanding of the mechanism(s) underlying cerebral vascular regulation will aide in establishing more effective treatment strategies aimed at improving cerebral blood flow restoration and preventing further neuronal loss. Our studies reveal an age‐at injury dependence on the Angiopoetin‐Tie2 axis, which mediates neuroprotection in a model of juvenile TBI following cortical controlled impact (CCI) that is not seen in adult mice. The protection observed was mediated, in part, by the microvascular response to CCI injury and prompted further detailed analysis of the larger arteriole network across several mouse strains and models of TBI. Our second study revealed both a model and species dependent effect on a specialized network of arterioles vessels, called collaterals after trauma. We demonstrated that a repetitive mild TBI (rmTBI) can induce collateral remodeling in C57BL/6 but not CD1 mice, however, CCI injury had no effect on collateral changes in either strain. Together, these findings demonstrate an age‐ dependent and species/model dependent effect on vascular remodeling that highlight the importance of individualized therapeutics to TBI.

**Publications**

**Thomas R. Brickler**, Kisha Gresham, Armand Meza, Sheryl Countermarsh- Ott, Tere M. Williams, Daniel E. Rothschild, Irving C. Allen, Michelle H. Theus. *Nonessential Role for the NLRP1 Inflammasome Complex in a Murine Model of Traumatic Brain Injury.* Mediators of Inflammation. 2016. Doi: 10.1155/2016/6373506

**Thomas R. Brickler**, Kisha Gresham, Alexander Winemiller, Stephanie Robel, Michelle H. Theus. *Effects of Moderate Controlled Cortical Impact and Repetitive Mild TBI on Cerebral Pial Collaterals in CD1 and C57BL/6 Mouse Strains.* In Preparation.

**Thomas R. Brickler,** Amanda Hazy, Xia Wang, Michelle H. Theus. *An age- dependent Role of the Angiopoeitin- Tie2 Axis Following Traumatic Brain Injury*. In Preparation.

Kisha Grisham, Jiang Chen, **Thomas R. Brickler**, Robert Gourdie and Michelle H. Theus. Modulation of Gap Junction-Associated Cx43 in Neural Stem/Progenitors Cells Following Traumatic Brain Injury. Brain Research Bulletin. 2016. In Review.

**Thomas Brickler**\*, Armand L. Meza\*, Sheryl Coutermarsh-Ott, Amanda Hazy, Denis Gris, Michelle H. Theus\*, and Irving C. Allen .\* *Loss of NLRX1 Exacerbates Neural Tissue Damage and NF-κB Signaling Following Brain Injury.* Journal of Immunology. In Revision.

**Presentations**

Alex Winemiller, Anroux May, **Thomas R. Brickler**, Michelle H. Theus, Stefanie Robel. The Role of GFAP after repetitive mild Traumatic Brain Injury. Poster Presentation at the Conference on Glial Biology in Medicine. Roanoke, VA. October 2016.

**Thomas R. Brickler,** Shannon Mann, Xia Wang, Michelle H. Theus. Age- Dependent Remodeling of the Cerebral Pial Collaterals Following Traumatic Brain Injury. Poster presentation at Virginia Nordic Precision Neuroscience. Roanoke, VA. October 2016.

**Thomas R. Brickler,** Shannon Mann, Xia Wang, Michelle H. Theus. Age- Dependent Remodeling of the Cerebral Pial Collaterals Following Traumatic Brain Injury. Poster presentation at The American Society for Neural Therapy and Repair (ASNTR). Clearwater, FL. May 2016.

Amanda Hazy, **Thomas R. Brickler,** Armand Meza, Irving C. Allen, Michelle H. Theus. NLRX1 Regulates Inflammatory Signaling Via Modulation of Microglia Activation following Traumatic Brain Injury. Poster at ASNTR, Clearwater, FL. May 2016.

Kisha Gresham, **Thomas R. Brickler,** Robert Gourdie, Michelle H. Theus. A Vascular Role in Regulating Gap Junction- Associated Connexin 43 in the Adult Dentate Gyrus Following Traumatic Brain Injury. Poster at ASNTR, Clearwater, FL. May 2016.Benjamin Okyere, Amanda Hazy, **Thomas R. Brickler,** Xia Wang, Michelle H. Theus. EphA4 is a Novel Negative Regulator of Collateral Formation and Remodeling Following Stroke. Poster at ASNTR, Clearwater, FL. May 2016.

**Thomas R. Brickler**, Michelle H. Theus. Eph Receptors in Traumatic Brain Injury. Oral Presentation at the 27th Annual Virginia Tech Graduate Symposium. Blacksburg, VA. March 2016. (**First Place Award)**

**Thomas R. Brickler,** Andrew Anklowitz, Shannon Mann, Xia Wang, Michelle H. Theus. Arteriogenesis as a Therapeutic Target for Traumatic Brain Injury. Poster presentation at ASNTR, Clearwater, FL. May 2015. (**Travel Award Winner)**

**Thomas R. Brickler,** Andrew Anklowitz, Shannon Mann, Xia Wang, Michelle H. Theus. Arteriogenesis as a Therapeutic Target for Traumatic Brain Injury. Poster presentation at the 26th Annual Virginia Tech Graduate Symposium. Blacksburg, VA. March 2016. (**First Place Award)**

**Thomas R. Brickler,** Irving C. Allen, Armand Meza, Tere M. Williams, Daniel E. Rothschild, Michelle H. Theus. Disruption of the NLR Inflammasome Complex has no Effect on Contusion Volume Following Traumatic Brain Injury. Poster Presentation at the NIH National Capital Area TBI Research Symposium, Bethesda, MD. March 2014 **(First Place Award)**

**Thomas R. Brickler,** Kaavya Giridhar, Xia Wang, Michelle H. Theus. The Role of Eph Signaling in Cerebral Pial Arteriole Collateral Development. Poster Presentation at Okinawa Institute of Science and Technology, Okinawa, Japan, July 2013 **(Travel Award Winner)**

**Examination Graduate Committee**

**Major Advisor/Chair:**

Michelle H. Theus, PhD

Associate Professor

Molecular and Cellular Neurobiology

Department of Biomedical Sciences and Pathobiology

**Graduate Advising Committee Members:**

Will Eyestone

Research Associate Professor

Reproductive Biology / Biotechnology

Dept. of Large Animal Clinical Sciences

John Rossmeisl

Professor

Neurology and Neurosurgery

Dept. of Small Animal Clinical Sciences

John Matson

Assistant Professor

Dept. of Chemistry

John Chappell

Assistant Professor

Center of Heart and Regenerative Medicine

VTCRI

**External Examiner**

**John R. Bethea, PhD**

Professor and Department Head

Department of Biology

Drexel University

TNF: A Tale of a Cytokine and Two Receptors in Chronic Neuropathic Pain

Thursday, July 11, 2019

9:30 am

Life Sciences 1 Room 101

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