

**BIOMEDICAL & VETERINARY SCIENCES
GRADUATE PROGRAM**



ANNOUNCES

The Doctor of Philosophy Seminar
and Examination of

Miao Chen

**“Endothelial Cell-Specific Knockout
of *Meis1* Protects Ischemic Hindlimb
Through Vascular Remodeling”**

**Tuesday, May 8, 2018
1:00 pm
VMIA Classroom 220**

Bio



Miao Chen graduated from Xi'an Jiaotong University in China with a bachelor's degree in Bioengineering in 2009. In 2012, she received her master degree in Microbiology at Nankai University. She moved to America with her husband and joined Dr. Jia-Qiang He lab in 2013 to begin her Ph.D. study in Biomedical and Veterinary Sciences Program at Virginia Tech. Her research has focused on the potential roles of *Meis1* gene in regulating vascularization and apoptosis with an induced hindlimb ischemia animal model. Her dissertation research showed endothelial cell-specific knockout of *Meis1* protected ischemic hindlimb through vascular remodeling.

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Lay Language Abstract

Limb or peripheral vascular disease (PVD) refers to a reduction or even complete occlusion of blood-flow to the legs or feet. It is usually caused by blockage of main vessels in limbs under certain diseases, such as atherosclerosis. Unfortunately, no effective and permanent treatments are available for this disease. The current medications only relieve the clinical symptoms while the surgical therapy requires grafting vessels from healthy organ to disease limb of the patient. In the present study, we aim to explore a new approach to facilitate the vessel formation in ischemic limb using *Meis1* transgenic mice. *Meis1* (myeloid ecotropic viral integration site 1) gene belongs to the three-amino-acid loop extension subclass of homeobox gene families, and it is a highly conserved transcription factor in all eukaryotes. My dissertation focused on the potential role of *Meis1* in revascularization and underneath mechanism using hindlimb ischemia model. Briefly, *Meis1* gene was deleted in the mouse endothelial cells. The mice were subject to permanent ligation of both main artery and vein of the limb to induce hindlimb ischemia. The study revealed that endothelial cell-specific knockout of *Meis1* protects ischemic hindlimb through vascular remodeling. The results may also reveal a new potential therapeutic approach leading new drug discovery and treatment of PVD.

Publications

CHEN, M., LEDFORD, B. T., SYKES, A., BARRON, C., & HE, J.Q. 2018. *Meis1* Negatively Regulates Arteriogenesis Following Hindlimb Ischemia in Endothelial Cell-Specific *Meis1* Knockout Mice. **In preparation.**

LEDFORD, B. T.*, **CHEN, M.***, SIMMONS, J., FAN, H., BARRON, C., LIU, Z., VAN DYKE, M. & HE, J. Q. 2018. Keratose Hydrogel-Derived Vascular Smooth Muscle Cells Promote Angiogenesis in Murine Hind Limb Ischemia. **In preparation.** (*These authors contributed equally to this work)

REN, J., LIAO, X., VIESON, M. D., **CHEN, M.**, SCOTT, R., KAZMIERCZAK, J., LUO, X. M. & REILLY, C. M. 2018. Selective HDAC6 inhibition decreases early stage of lupus nephritis by down-regulating both innate and adaptive immune responses. *Clin Exp Immunol*, 191, 19-31.

LEDFORD, B. T., SIMMONS, J., **CHEN, M.**, FAN, H., BARRON, C., LIU, Z., VAN DYKE, M. & HE, J. Q. 2017. Keratose Hydrogels Promote Vascular Smooth Muscle Differentiation from C-kit Positive Human Cardiac Stem Cells. *Stem Cells Dev*.

CHEN, M., FAN, H., LEDFORD, B. T., FARAH, Z., BARRON, C., LIU, Z. & HE, J. Q. 2016. Impacts of femoral artery and vein excision versus femoral artery excision on the hindlimb ischemic model in CD-1 mice. *Microvasc Res*, 110, 48-55.

CHEN, M., KAN, L., LEDFORD, B. T. & HE, J. Q. 2016. Tattooing Various Combinations of Ears, Tail, and Toes to Identify Mice Reliably and Permanently. *J Am Assoc Lab Anim Sci*, 55, 189-98.

OKYERE, B., GIRIDHAR, K., HAZY, A., **CHEN, M.**, KEIMIG, D., BIELITZ, R. C., XIE, H., HE, J. Q., HUCKLE, W. R. & THEUS, M. H. 2016. Endothelial-Specific EphA4 Negatively Regulates Native Pial Collateral Formation and Re-Perfusion following Hindlimb Ischemia. *PLoS One*, 11, e0159930.

KAN, L., THAYER, P., FAN, H., LEDFORD, B., **CHEN, M.**, GOLDSTEIN, A., CAO, G. & HE, J. Q. 2016. Polymer microfiber meshes facilitate cardiac differentiation of c-kit+ human cardiac stem cells. *Exp Cell Res*.

KWIATKOWSKI, A., PIATKOWSKI, M., **CHEN, M.**, KAN, L., MENG, Q., FAN, H., OSMAN, A. K., LIU, Z., LEDFORD, B. & HE, J. Q. 2016. Superior angiogenesis facilitates digit regrowth in MRL/MpJ mice compared to C57BL/6 mice. *Biochem Biophys Res Commun*.

KAN, L., SMITH, A., **CHEN, M.**, LEDFORD, B. T., FAN, H., LIU, Z. & HE, J. Q. 2015. Rho-Associated Kinase Inhibitor (Y-27632) Attenuates Doxorubicin-Induced Apoptosis of Human Cardiac Stem Cells. *PLoS One*, 10, e0144513.

Presentations

“Endothelial Specific *Meis1* Knockout Protects Cells from Doxorubicin-Induced Apoptosis”. (2018) **Poster Presentation**. VASCULAR DISCOVERY: From Genes to Medicine of American Heart Association, San Francisco, CA.

“*Meis1* Negatively Regulates Arteriogenesis Following Hindlimb Ischemia in Endothelial Cell-Specific *Meis1* Knockout Mice”. (2016) **Poster Presentation**. Late-Breaking Basic Science of American Heart Association, New Orleans, LA.

“Endothelial-Specific *Meis1*-KO Promotes Blood Flow Following Hindlimb Ischemia”. (2016) **Oral Presentation**. Research in Progress at College of Veterinary Medicine, Blacksburg, VA.

“Blood Vessel Formation in Mouse Limb”. (2014) **Oral Presentation**. First Annual Regenerative Medicine IGEP meeting, Pembroke, VA.

Awards and Academic Achievements

Travel award from Graduate Student Assembly (GSA) Travel Fund Program of Virginia Tech, 2016

Travel award from Interdisciplinary Graduate Education Programs-Regenerative Medicine of Virginia Tech, 2016, 2018

Examination Graduate Committee

Major Advisor/Chair

Jia-Qiang He, PhD
Assistant Professor
Department of Biomedical Sciences & Pathobiology

Graduate Advising Committee Members:

Liwu Li, PhD
Professor
Department of Biological Sciences

Michelle H. Theus, PhD
Assistant Professor
Department of Biomedical Sciences & Pathobiology

Will Eyestone, PhD
Adjunct Professor
Virginia-Maryland College of Veterinary Medicine
Senior Project Manager, Xenotransplantation
Revivacor, Inc., Blacksburg, VA

External Examiner

Yigang Wang, PhD, MD

Professor

Director of Regenerative Medicine Division

Department of Pathology and Laboratory Medicine

University of Cincinnati

Seminar:

“New strategies for cardiac regenerative medicine”

Tuesday, May 8, 2018

10:00 am

VMIA Classroom 220



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