

**BIOMEDICAL & VETERINARY SCIENCES
GRADUATE PROGRAM**



ANNOUNCES

The Doctor of Philosophy Seminar
and Examination of

Qinghui Mu

**“The Role of Gut Microbiota in
Systemic Lupus Erythematosus”**

Monday, March 19, 2018

2:00 pm

Phase II, Classroom 121

Bio



Qinghui Mu grew up in Penglai, a historic town in east of China. In 2012, he graduated from China Agricultural University in Beijing with a bachelor's degree in Veterinary Science. In Spring 2013, he joined Dr. Xin M. Luo's lab to begin his Ph.D. study in Biomedical and Veterinary Sciences at Virginia Tech. His research has focused on understanding the role of gut microbiota in regulating autoimmunity and pathogenesis in systemic lupus erythematosus. Specifically, his dissertation research indicated that there were both pathogenic and beneficial bacteria co-existing in the gut microbiota and his work explained the immunological mechanisms by which the gut bacteria exert the effects. He hopes to pursue an academic career in immunology and microbiome in the future.

Funded by

The American Association of Immunologists (AAI)
National Institutes of Health (NIH)
VMCVM Office of Research and Graduate Studies

Lay Language Abstract

Systemic lupus erythematosus (SLE) is a multi-system autoimmune disease with no known cure. SLE affects over 5 million people worldwide, especially women of childbearing age. Lupus nephritis is a manifestation of SLE occurring in the kidney which affects more than 50% of SLE patients and is a major cause of morbidity and mortality in SLE. Current treatments for lupus nephritis are primarily nonselective immunosuppressants, which can cause a higher incidence of severe infections. There is an imperative need for the development of new therapeutic strategies against SLE. Our research team was the first to describe the dynamics of gut microbiota in a mouse model of SLE. My dissertation research studying the role of gut microbiota in the pathogenesis of lupus-like disease in mice showed that there were both pathogenic and beneficial bacteria co-existing in the gut microbiota. The studies revealed not only the effects of different bacteria on lupus pathogenesis, but also the immunological mechanisms by which they exert the effects. My results suggest that modulation of the gut microbiota through diet, probiotics, and/or prebiotics to selectively enhance the abundance and activity of beneficial bacteria may be an attractive strategy for disease prevention and treatment of SLE patients. Nevertheless, studies on human samples and clinical trials are required to confirm the translational application of this strategy.

Publications

Mu Q, Zhang H, Liao X, Lin K, Liu H, Edwards MR, Ahmed SA, Yuan R, Li L, Cecere TE, Branson DB, Kirby JL, Goswami P, Leeth CM, Read KA, Oestreich KJ, Vieson MD, Reilly CM, Luo XM. Control of lupus nephritis by changes of gut microbiota. *Microbiome*. 2017 Jul 11;5(1):73. IF: 8.496

Mu Q, Tavella V, Kirby J, Cecere T, Chung M, Lee J, Li S, Ahmed SA, Eden K, Allen I, Reilly CM, Luo XM. Antibiotics ameliorate lupus-like symptoms in mice. *Scientific Reports*. 2017 Oct 20;7:13675. IF: 4.259

Mu Q, Kirby J, Reilly CM, Luo XM. Leaky gut as a danger signal for autoimmune diseases. *Front in Immunology*. 2017 May 23;8:598. IF: 6.429

Mu Q, Zhang H, Luo XM. SLE: another autoimmune disorder influenced by microbes and diet? *Front in Immunology*. 2015 Nov 30;6:608. IF: 5.695

Mu Q, Tavella V, Luo XM. Roles of *Lactobacillus reuteri* in health and disease. *Frontiers in Microbiology*, under review.

Webb CR, den Bakker H, Kovoziyev I, Jones-Hall Y, Kottapalli KR, Ostanin D, Furr KL, **Mu Q**, Luo XM, Grisham M. (2018) Differential susceptibility to T cell-induced colitis in mice: role of the intestinal microbiota. *Inflammatory Bowel Diseases*. 2018 Jan 18. IF: 4.525

Luo XM, Edwards MR, **Mu Q**, Yu Y, Vieson MD, Reilly CM, Ahmed SA, Bankole AA. Gut microbiota in human SLE and a mouse model of lupus. *Applied and Environmental Microbiology*. 2017 Dec 1. IF: 3.807

Edwards MR, Dai R, Heid B, Cecere T, Khan D, **Mu Q**, Cowan C, Luo XM, Ahmed SA. Commercial rodent diets differentially regulate autoimmune glomerulonephritis, epigenetics, and microbiota in MRL/lpr mice. *Int Immunol*. 2017 Jun 1;29(6):263-276. IF: 3.748

Sun Y, Sun S, Ma J, Tan Y, Du L, Shen Y, **Mu Q**, Pu J, Lin D, Liu J. Identification and characterization of avian-origin H3N2 canine influenza viruses in northern China during 2009–2010. *Virology*. 2013 Jan 20;435(2):301-7. IF: 3.353

Luo XM, Edwards MR, Reilly CM, **Mu Q**, Ahmed SA (2017). Diet and microbes in the pathogenesis of lupus, *Lupus*, Dr. Wahid Khan (Ed.), InTech.

Presentations

Maternal microbiota educates neonatal IgA response. The American Association of Immunologists Annual Meeting, Washington DC, USA, May 2017. Oral presentation.

Gut microbiota regulates lupus-like disease in mice. 33rd Virginia Tech Graduate School Annual Research Symposium, Blacksburg, VA, April 2017. Oral presentation.

Antibiotics ameliorate lupus-like disease in mice. 28th Vet Med Annual Research Symposium, Blacksburg, VA, March 2017. Oral presentation.

Maternal microbiota educates neonatal IgA response. 18th International Congress of Mucosal Immunology, Washington DC, USA, July 2017. Poster presentation.

Control of lupus nephritis by changes of gut microbiota. Edward Via College of Osteopathic Medicine Research Day, Blacksburg, USA, March 2017. Poster presentation.

Disease stage-dependent response of lupus-prone mice to antibiotics. The American Association of Immunologists Annual Meetings, Seattle, USA, May 2016. Poster presentation.

Gut microbiota regulates lupus-associated kidney disease. Cell Symposia, Human Immunity and the Microbiome in Health and Disease, Montreal, Canada, September 2015. Poster presentation.

Genetic engineering of stem cells as a novel immunotherapeutic approach against systemic lupus erythematosus. The American Association of Immunologists Annual Meeting, Pittsburg, USA, May 2014. Poster presentation.

Awards and Academic Achievements

The American Association of Immunologists Careers In Immunology Fellowship, 2017-2018

The American Association of Immunologists Trainee Abstract Award, May 2017

Examination Graduate Committee

Major Advisor/Chair:

Xin M. Luo, Ph.D.

Assistant Professor of Immunology

Department of Biomedical Sciences & Pathobiology

Graduate Advising Committee Members:

Tanya LeRoith, DVM, Ph.D., Diplomate ACVP

Clinical Associate Professor of Anatomic Pathology

Department of Biomedical Sciences & Pathobiology

Christopher M. Reilly, Ph.D.

Research Associate Professor

Department of Biomedical Sciences & Pathobiology

Professor and Chairman for Cellular and Molecular Physiology

Via Virginia College of Osteopathic Medicine

S. Ansar Ahmed, Ph.D.

Professor of Immunology

Department of Biomedical Sciences & Pathobiology

Associate Dean for Research and Graduate Studies

Virginia-Maryland College of Veterinary Medicine

External Examiner

Gary S. Gilkeson, M.D.

Professor

Associate Dean for Faculty Affairs and Faculty Development

Department of Medicine

Medical University of South Carolina

Mesenchymal Stem Cells as Therapy in Autoimmune Diseases

Monday, March 19, 2018

10:00 am

VMIA 220



VIRGINIA TECH™