Doctoral Dissertation Defense Announcement

“Defining the interplay between cytomegalovirus UL27 and the host proteasome in the viral lifecycle.”

Suzette Rosas-Rogers
Candidate for Doctor of Philosophy
Microbiology and Immunology
School of Graduate Studies
Medical College of Wisconsin

Date: Wednesday, December 6th, 2023
Time: 1:00 pm (CST)
Defense Location: Versiti BRI conference room
Zoom: https://mcw-edu.zoom.us/j/92005985868?pwd=NlQzL011bEU0SjFEK3l5bTVlcHhKdz09
Meeting ID: 920 0598 5868 Passcode: Ke5NlIGen
Committee in Charge:
Scott Terhune, PhD (Mentor)
Vera Tarakanova, PhD
Michelle Riehle, PhD
Carol Williams, PhD
Ravit Boger, MD

Graduate Studies:
Biochemistry of the Cell
Molecular & Cellular Biology
Techniques in Molecular & Cellular Biology
Mechanisms of Cellular Signaling
Classical & Molecular Genetics
Ethics & Integrity in Science
Research Ethics Discussion Series
Developmental and Stem cell biology
Immunology Journal Club
Cellular Microbiology
Biostatistics for Health Science
Microbiology & Immunology Seminar
Readings and Research
Doctoral Dissertation
Dissertation Abstract

“Defining the interplay between cytomegalovirus UL27 and the host proteasome in the viral lifecycle.”

Human cytomegalovirus (HCMV) is a member of the beta herpesvirus family. HCMV has the largest genome among herpesviruses at 235 kbp, encoding for hundreds of viral proteins. It has broad cellular tropism to support both lytic replication and a latent state. Infection among healthy people is typically asymptomatic. However, HCMV is an opportunistic and perilous pathogen in people with immune systems potentially leading to several disease. Additionally, HCMV is the leading cause of viral-mediated congenital birth defects. Several antivirals exist to manage infection including a viral kinase inhibitor, maribavir (MBV). We and others have previously demonstrated a mechanism for HCMV UL27 in susceptibility of infection to MBV. HCMV UL27 encodes for a 69 kDa nuclear protein with nucleolar localization detectable by 4 hpi. However, the contribution of UL27 to the viral life cycle remains unknown. With the goal of uncovering function, we evaluated the contribution of UL27 to lytic replication and latency using an endotheliotropic HCMV strain. During lytic replication, a virus lacking UL27 (d27) replicated with wild-type (wt) kinetics in human fibroblasts, epithelial and neuroepithelia cells. Similar levels of viral genome synthesis and virion production occurred suggesting UL27 plays a limited role in lytic replication. Variations in MBV-sensitivity were observed and is cell-type dependent. We extended the studies to an HCMV latency model system using CD34+ hematopoietic progenitor cells. Cells were infected using wt and d27 viruses, allowed to establish latency, and cultured for 10 days. We measured reduced production of infectious d27 virus prior to and following reactivation. This was coupled with fewer genomes upon establishment of latency, suggesting UL27 is likely contributing to establishing HCMV latency. Further, this phenotype was mimicked upon transfecting viral genomes only into fibroblasts. Previous studies led to the hypothesis that UL27 regulates transcription. However, using bulk RNA sequencing, we failed to detect changes in host gene expression between wt and d27 viruses. We and others had previously observed UL27 associating with several cellular proteasome subunits. To test their involvement, we demonstrated a likely direct interaction with Psme3 in the presence and absence of infection. Psme3 is the ubiquitin-independent cap to the nuclear proteasome. Disruption of Psme3 levels results in significantly reduced viral titers demonstrating its importance in the viral life cycle. Proteasome activity has been shown to be required at various stages of infection. Collectively, these studies demonstrated that HCMV UL27 functions in regulating viral latency and implicates the role of the nuclear proteasome in this process.
Suzette Rosas-Rogers
Curriculum Vitae
PhD Candidate - Department of Microbiology and Immunology
Medical College of Wisconsin
8701 W. Watertown Plank Rd. Milwaukee, WI 53226
srosas@mcw.edu

EDUCATION
Medical College of Wisconsin  Milwaukee, WI
PhD Candidate  08/2017 - present
Graduate Program in Microbiology and Immunology
Advisor: Scott Terhune, PhD

Lakeland University  Sheboygan, WI
BS, Biochemistry  08/2013 - 05/2017
BA, History

RESEARCH EXPERIENCE
Medical College of Wisconsin  Milwaukee, WI
Doctoral student  05/2018 – present
Advisor: Scott Terhune, PhD
- Investigating the function of human cytomegalovirus (HCMV) protein UL27 during lytic infection and latent infection and examining pUL27 interacting host proteins and their contributions to HCMV infection

Lakeland University  Plymouth, WI
LURE Program (Lakeland Undergraduate Research Experience)  05/2015 - 05/2016
Undergraduate student
Advisor: Jered McGivern, PhD
- Developing an in vitro model system for examining the role of astrocytes in succinic semi-aldehyde dehydrogenase deficiency (SSADH). Investigated the expression of neurotransmitter receptors in induced pluripotent stem cell derived astrocytes through immunofluorescence.

Lakeland University  Plymouth, WI
Undergraduate Research Assistant, Department of Chemistry  05/2014 - 05/2017
Advisor: Brian Frink, PhD

AWARDS
MCW Graduate School Research Poster Session: poster award  2022
Who’s who among Students in American Universities & Colleges  2017
Outstanding student in Biochemistry  2017
Outstanding student in History  2017
Outstanding freshman in Chemistry  2015
Kellet Scholarship  2017
Lakeland University Presidential Scholarship  2014-2017
Kuehn Achievement Award  2014-2015
Dean’s List  2013-2017
Lakeland University Dean’s Scholarship  2013
SPEAKING ENGAGEMENTS

Lakeland University Colloquium
Guest speaker panelist
Sheboygan, WI
December 6, 2019
-Enrich the educational experience for current students, with the goal of sharing my journey, story, and insight on what it takes to be successful in life after college.

TEACHING EXPERIENCE

Medical College of Wisconsin
Mentoring:
Eva Rodriguez, MCW IDP graduate student
Andrew Sukowaty, Terhune research technology II
Lauren Prochniak, MCW IDP graduate student
Christopher Thomas, MCW IDP graduate student
Milwaukee, WI
2023
2023
2022
2021

Lakeland University
Physics laboratory Assistant, Science Department
Organic Chemistry Laboratory Instructor, Science Department
Sheboygan, WI
Summer 2017
Fall 2013

Plymouth Middle School and High school
STEM Girls Rock
Plymouth, WI
Spring 2013
- Bimonthly interactive problem-solving activities
- Encouraged critical thinking and group problem solving
- Outreach to explain unclear concepts to approximately 15 students

RELATED PROFESSIONAL EXPERIENCES

National Science Policy Network (NSPN)
National Science Policy Network (NSPN): Madison Wisconsin
Fall 2020
Fall 2019

Spotlight on Science seminar Series
Medical College of Wisconsin
Spring 2021
Spring 2019
Spring 2019
Fall 2018

Negotiation
Academic Careers
Putting your science online and ‘out there’
Moving discoveries from academia to industry
Developing respectful partnerships between mentors and mentees
Poster Presentations
Promoting Wellness and Preventing Burnout
The Importance of Clarity and the Pitfalls of Public Speaking
Science Misconduct and Policies for Handling Misconduct
Activism and Beyond: Science Policy for Early Career Scientists
Advancing the Art & Science of Community Engagement
Summer 2019
Summer 2018
Summer 2018
Spring 2018
Spring 2018
Spring 2018
Spring 2018
Spring 2018
Spring 2018

ORAL PRESENTATIONS


POSTER PRESENTATIONS


Publications


