



MMI 291 Seminar Series

Winter Quarter 2021 – CRN 33700

Exit Seminar – 12:10-1 p.m. (Hybrid)

Genome & Biomedical Sciences Facility, auditorium & Zoom

*“Cowpox Viruses: A Zoo Full of Viral
Diversity and Lurking Threats”*

Rothenburg Lab

Among the members of the *Orthopoxvirus* genus one viral species: *Cowpox virus* (CPXV) has exhibited the broadest known host range infecting approximately 57 unique mammalian species and is increasingly of concern due to recent lethal outbreaks in various zoo animals, pets, and humans across 12 Eurasian countries and well as modern orthopoxvirus outbreaks such as the global mpox outbreak caused by *Monkeypox virus*. Modern phylogenetics has revealed CPXV to be at least five major clades, with species-level genetic differences that remain functionally uncharacterized, highlighting the dire need for more research to understand what was once thought of as a monophyletic species. A major component of understanding these viruses is characterizing how they antagonize host immune responses against them such as innate immune pathways. One such pathway is protein kinase R (PKR), a key antiviral checkpoint that halts translation in the cells in response to viral double stranded RNA, stopping viruses from hijacking cellular host translation machinery for protein synthesis and subsequent viral replication. In poxviruses such as CPXV, there are two antagonists of PKR: E3L and K3L, known as host range genes for their role in determining cellular host tropism. The focus of my work is on K3L orthologs, which act as a pseudosubstrate inhibitors of PKR. The diversity of and functionality of CPXVs' K3L orthologs remain uncharacterized in this manner. In this presentation, I discuss our work revealing the diversity of CPXV K3Ls ability to inhibit over 20 mammals' unique PKRs and describe our results investigating the importance of this interaction in in vitro cell line infections, providing a foundation for further exploration of CPXVs K3Ls.

Publications

Bruneau RC, Tazi L, Rothenburg S. Cowpox Viruses: A Zoo Full of Viral Diversity and Lurking Threats. *Biomolecules*. 2023; 13(2):325.
<https://doi.org/10.3390/biom13020325>

Yu H, Bruneau RC, Brennan G, Rothenburg S. Battle Royale: Innate Recognition of Poxviruses and Viral Immune Evasion. *Biomedicines*. 2021; 9(7):765.
<https://doi.org/10.3390/biomedicines9070765>

February
17



Ryan Bruneau
Ph.D. Candidate
Rothenburg Lab
Immunology Graduate Group
UC Davis

February 17, 2023
12:10 – 1 p.m.
Hybrid
In-Person/ZOOM Meeting

Medical Microbiology
& Immunology
School of Medicine

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We hope to see you there!