UCMERCED
UNIVERSITY OF CALIFORNIA
School of Natural Sciences

QSB SEMINAR SERIES 291

How Bacteriophages Protect Themselves from CRISPR-Cas Immunity

Joseph Bondy Denomy
Department of Microbiology & Immunology
UCSF

Date: 3/22/19
Time: 1:30 PM
Location: SSB 130

For more information contact:
Kirk Jensen
kjensen5@ucmerced.edu

ABSTRACT

Bacterial CRISPR-Cas systems utilize sequence-specific RNA-guided nucleases to defend against bacteriophage (phage) infection. As a counter-measure, numerous phages produce proteins to block the function of the Class 1 CRISPR-Cas systems, which utilize multi-subunit protein complexes to enact immunity. Our group recently developed and utilized novel bioinformatics strategies to identify Class 2 (e.g. Cas9 and Cas12) anti-CRISPR proteins. We have identified anti-CRISPR proteins encoded by phages and mobile genetic elements from many organisms, including Pseudomonas aeruginosa, Listeria monocytogenes, Moraxella bovoculi, and Streptococcus pyogenes, suggesting widespread and common CRISPR-Cas inactivation. More recently, we have identified a phage with a novel mechanism of CRISPR evasion that does not rely on anti-CRISPR proteins, but instead physically segregates its genome from nucleases. I will discuss our progress towards understanding these mechanisms that phages deploy to avoid destruction by CRISPR-Cas and how this work benefits CRISPR-Cas technologies.