



QUANTITATIVE & SYSTEMS BIOLOGY SEMINAR: Host-Virus Interactions Across Domains of Life: Archaeal Fuselloviruses and Human Roseolaviruses

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About The Speaker:

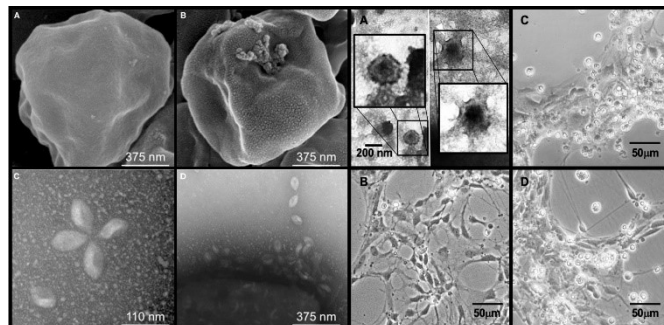
Dr. Ruben Michael Ceballos is a faculty member in the Department of Biological Sciences at the University of Arkansas (UA) in Fayetteville, Arkansas, USA. He also is affiliated with the UA Cell and Molecular Biology (CEMB) and the Space and Planetary Science (SPAC) interdisciplinary graduate programs. Dr. Ceballos has over 20 years of experience in academia first serving as master's degree-prepared community college and tribal college science instructor and then later as a doctorate-prepared faculty member within major university systems. He is a life-time member of the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) and a life-time Sequoyah fellow of the American Indian Science and Engineering Society (AISES).



Dr. Ceballos has served for more than a decade as the principal investigator on an international NSF Research Experiences for Undergraduates (REU) program, which has provided international research opportunities for students from historically underrepresented groups in Mexico, India, Malaysia, Vietnam, and Thailand. He is also the director of the Minority Institution Research Collaborative (MIRC), a network of more than 20 minority-serving and majority institutions from across the nation dedicated to providing robust and career-enhancing research experiences to students from historically underrepresented groups in science. More recently, Dr. Ceballos became the principal investigator and director of the Host-Virus Evolutionary Dynamics Institute (HVEDI), which is supported by a Biology Integration Institute (BII) grant from the U.S. National Science Foundation. Dr. Ceballos was born in San Diego, California and graduated from El Camino High School in Oceanside, CA. He completed a bachelor's degree in Physics and Math from the University of Alabama in Huntsville, a master's degree in Neuroscience from the University of Alabama at Birmingham, and a PhD in Integrative Microbiology and Biochemistry from the University of Montana (Missoula, MT).

Abstract:

Although the number of times that viruses and virus-like elements emerged during the evolutionary history of life and the taxonomy of viruses are subjects of ongoing research, two things are clear. First, double-stranded (ds) DNA viruses are ubiquitous across domains of life and are found in all well-studied eukaryotes, bacteria, and archaea. Second, dsDNA viruses across domains of life exhibit clear differences in terms of: morphological diversity; mechanisms of cellular attachment and entry; and mechanisms of virion assembly. Such differences drive virus properties such as virulence, transmission rate, proclivity for recombination, propensity for species jump, transmission rates, and other virus-host dynamics. A hyperthermophilic archaeal virus system, namely the Sulfolobus Spindle-shaped Viruses (SSVs) of the family Fuselloviridae, and a neurotropic eukaryotic virus system, namely the human roseolaviruses (i.e., HHV-6A and HHV-6B) of the Family Herpesviridae, highlight the differences and commonalities between dsDNA viruses from two distinct domains of life. In this presentation, fusellovirus and roseolavirus systems will be examined with focus on how related viruses interact with related hosts within each domain of life and how there are commonalities and differences with respect to dsDNA virus-host interactions between domains of life. Properties such as selective infectivity/susceptibility, relative virulence/resilience, and other virus properties will be discussed. Elucidating universal "rules of life" to which all or, at least, large sets of viruses adhere can facilitate the development of models that allow predictions of potential species jump events, the emergence of virulent or attenuated strains, and the underlying genetics and -omics substrates that may drive virus-host dynamics.



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