2019 Irving H. Wiesenfeld Fellow

Justin Roncaioli, UC Berkeley PhD Candidate in Molecular and Cell Biology, Vance Lab

Justin received a bachelors degree in molecular genetics from the University of Rochester. After spending time studying telomere maintenance mechanisms in cancer at the University of Pittsburgh, Justin moved to Berkeley to begin a PhD in UC Berkeley's Molecular and Cell Biology program. He now works in Russell Vance's lab, studying the interaction between enteric pathogens and the intestinal innate immune system. His thesis project focuses on understanding the innate immune components that underly species-specific differences in susceptibility to Shigella, a bacterial pathogen that infects the human colon.

Fellowship Proposal

Shigella, a gram-negative enteric bacterium, infects ~125 million people each year leading to more than 150,000 deaths. Shigellosis (i.e., *Shigella*-induced dysentery) is the predominant pediatric diarrheal disease in Asia and sub-Saharan Africa. Prevention and treatment of shigellosis is limited by the absence of a vaccine and the emergence of antibiotic resistance strains. Thus, the development of new therapeutic interventions is of critical need. Shigella pathogenesis occurs following bacterial invasion and subsequent destruction of the colonic epithelium. However, the precise molecular details of how *Shigella* colonizes the gut and promotes pathogenesis are less clear. A major hurdle to studying *Shigella*-induced pathogenesis is the lack of relevant infection models. Humans are the only known natural hosts of shigella, and conventional models rely on the infection of irrelevant tissues (e.g., guinea pig eye infections, mouse lung infections) or fail to capture essential aspects of hos biology (e.g., transformed human epithelial cell lines that lack innate immune pathways). To overcome this limitation, I am developing a new in vivo, oral route infection model for *Shigella* pathogenesis in the laboratory mouse. This proposal seeks to use this infection model to explore the role of inflammasomes in host defense against *Shigella*.