Contribution ID : **5** Type : **Short Talk**

Imaging Intestinal Invasion by Vibrio cholerae, and other Stories from the Gut

Wednesday, 15 August 2018 12:15 (15)

Our digestive tracts are home to trillions of microbes that immigrate, emigrate, reproduce, and compete with one another. Little is known about the physical structure and temporal dynamics of gut microbial communities, which must necessarily influence the function not only of normal, commensal communities but also community invasion by pathogens. To address this, my lab applies light sheet fluorescence microscopy to a model system that combines a realistic *in vivo* environment with a high degree of experimental control: larval zebrafish with defined subsets of commensal bacterial species. I will focus here on experiments in which a native bacterial species is challenged by the invasion of a second species, specifically *Vibrio cholerae*, the pathogen that causes cholera. Using live imaging and genetic manipulation of *Vibrio*'s Type VI Secretion System (T6SS), with which the bacterium stabs adjacent cells, we have found that *Vibrio cholerae* can displace resident bacteria through a surprising ability to induce strong mechanical contractions of the host gut [S. L. Logan, J. Thomas, J. Yan, R. P. Baker, D. S. Shields, J. B. Xavier, B. K. Hammer, and R. Parthasarathy. *Proc. Natl. Acad. Sci.* **115:** E3779-E3787 (2018)]. This suggests not only previously unknown mechanisms for bacterial manipulation of animal physiology, but also potential paths for microbiome engineering. I will also describe other experiments in which the spatial and temporal dynamics of gut microbes are key determinants of responses to such challenges as antibiotic perturbation and inhibition of motility.

Affiliation

The University of Oregon

Terms and Conditions

Yes

Primary author(s) : PARTHASARATHY, Raghuveer (University of Oregon, USA)

Presenter(s) : PARTHASARATHY, Raghuveer (University of Oregon, USA)

Session Classification : Miscellaneous applications of light sheet microscopy

Track Classification : Light sheet fluorescence microscopy