



Cellular and Physiological Sciences Seminar Series

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12:45 - 1:45 (LSC 3)
Host: Drs. Rideout/Kopp

"Connecting gut microbiota biogeography to function"

Cataloging membership of the gut microbiota has become routine via high-throughput -omics techniques; however, understanding the functionality of individual members in the context of their ecosystem remains challenging. Characterization of stool samples--a mainstay of microbiota studies--provides a snapshot of the gastrointestinal system that may not be representative of what is occurring within the host, and is unable to capture the variation in bacterial localization and function along the length of the digestive tract. Understanding interactions between bacteria and their environment is greatly enhanced by techniques that preserve bacteria in their context, like quantitative imaging. In this talk, I will discuss the principles governing the localization of intestinal bacteria and spatial relationships between bacteria and their hosts. I will focus on the impact of osmotic perturbation to the gut ecosystem, a common disturbance caused by food intolerance, malabsorption, and widespread laxative use. We have assessed the resilience of the gut ecosystem to osmotic perturbation at multiple length and time scales. By sequencing, we have shown that osmotic stress causes consistent, lasting changes to human and mouse microbiotas in a mouse model, leading to the extinction of highly abundant taxa and expansion of less prevalent members. Importantly, quantitative imaging has enabled us to identify how changes in the gut environment lead to disruption of the native microbiota membership and function. We show that the mucosal interface separating bacteria from the epithelium is decimated during osmotic perturbation, leading to decreases in mucin consuming bacteria and mucin glycoside hydrolase expression by commensals. Lastly, I will discuss future directions and challenges for biogeography studies of the gut microbiota.

Join us for coffee and cookies at 12:15 in LSC 1410
Contact Drs. Rideout/Kopp at <janel.kopp@ubc.ca><elizabeth.rideout@ubc.ca>