



The Centre for Blood Research Seminar Series



Dr. William Mohn

Professor, Department of Microbiology & Immunology, UBC
Faculty, Centre for Microbial Diversity & Evolution, UBC

Wednesday, April 10th, 2013

LSC 3 - Life Sciences Centre

2350 Health Sciences Mall

12-1pm

“Vicious cycles: interactions between the immune system and microbiota during the course of disease”

Recent methodological advances in microbial ecology have provided a dramatic new perspective on the human microbiota. This perspective has led us to understand humans as superorganisms with a very substantial and functionally important microbial component. In particular, the microbiota now appears to be an integral part of the immune system. From studies we have conducted on colitis and chronic obstructive pulmonary disease (COPD) a picture is emerging in which changes to the microbiota, driven by the immune system, occur in tandem with changes to the immune system, driven by the microbiota. Injection of naïve T cells into immunodeficient mice shifted microbial community structure in the gut within two weeks, most notably increasing the dispersion (variability) of the community. Subsequently, these mice began to exhibit symptoms of colitis, weight loss and gut inflammation. Co-injection of Tregs with the naïve T cells reduced the gut community shift and delayed the onset of colitis. Overall, there was great variability in gut community structure among individual mice, but particular populations were strongly associated with each of the experimental treatments (control, T cell injected and co-injected). Until recently, the healthy lung was considered to be sterile, but it is now clear that the lung has an associated microbiota of very low population density. We studied the microbiota associated with human lung tissue and found that a unique bacterial community exists in the lungs of patients with very severe COPD. The progression of COPD involves reduction in lung surface area, which corresponded to a decrease in the diversity of the microbiota. Despite large variability in microbiota among individual lung donors, a subset of populations was strongly associated with the inflammatory response and tissue remodeling characteristic of COPD. In both a mouse model of colitis and human COPD, our results provide evidence that perturbations of the immune system drive changes in the microbiota. These changes appear to be integral to the progression of each disease. It is possible that these changes, including expansion or reduction of key populations, help drive the inflammatory response, which is the critical outcome of each disease. It remains to understand the mechanisms by which the immune system shapes microbial communities and by which those communities modulate immune responses.



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA



Canadian Blood Services
Société canadienne du sang

Sponsored by **CSI Behring**