

Title: Using Molecular Imaging to Study Immunology

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Bio

Dr. Kimberly Brewer is the Scientific Director of the Preclinical Imaging Laboratory (PCIL) at the IWK Health Centre, and an Associate Professor at Dalhousie University Halifax, Nova Scotia, Canada. Dr. Brewer's primary appointment is in the School of Biomedical Engineering and due to her diverse research interests, she also has cross-appointments in the departments of Physics, Microbiology & Immunology, and Diagnostic Radiology. Dr. Brewer did her PhD at Dalhousie University in 2010 in Physics and did two postdoctoral fellowships in molecular imaging, one at a pharmaceutical company and the other with Stanford's Molecular Imaging Program (MIPS) before returning to Nova Scotia in 2015. Dr. Brewer's research interests include multi-modal and multi-parametric molecular imaging of immunological responses in cancer and chronic viral models, and the use of MRI radiomics to identify diagnostic and prognostic image biomarkers.

Abstract

Molecular imaging can be a valuable tool for understanding biological mechanisms underlying a variety of diseases. This talk will discuss how magnetic resonance imaging (MRI) and positron emission tomography (PET) can be used to probe immunological responses in cancer and infectious diseases, in order to improve diagnoses and therapeutic development. I'll describe two unique projects – 1) Using multiparametric MR imaging alongside advanced radiomics and machine learning in a glioblastoma model, we can learn how to identify biomarkers that are linked to metrics of survival or immunological responses. This will include work done in a preclinical model of glioma and how it is now being studied in a clinical population. 2) I will also discuss how we can use molecular PET in the study of infectious diseases, particularly emerging respiratory viruses like SARS-CoV-2. I will discuss how we can model long COVID in a mouse, and how we can study both spike-induced responses, and their interactions with diseases such as breast cancer.