McGill UNIVERSITY

Department of Anatomy and Cell Biology

Hosted by Dr. Huy Bui

"Cellular cartography with super-resolution imaging & correlation analysis reveals dynamic coupling of membrane components with retrograde actin flows in Jurkat T cells"

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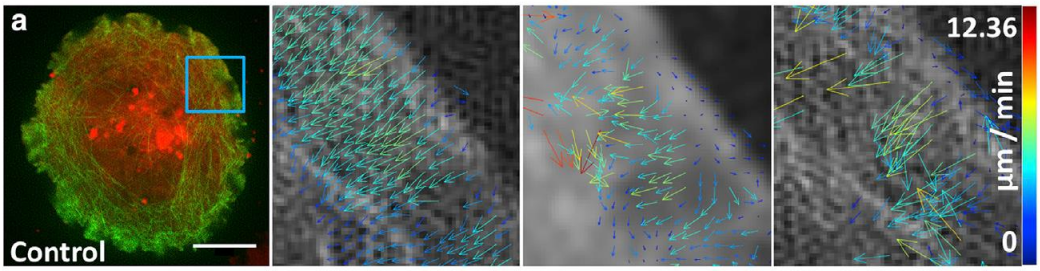

Image correlation methods are an extension of fluorescence fluctuation spectroscopy that can measure protein-protein interactions and macromolecular transport properties from input fluorescence microscopy images of living cells. These approaches are based on space and time correlation analysis of fluctuations in fluorescence intensity within images recorded as a time series using a fluorescence microscope. The amplitudes of the correlation functions measure concentrations of fluorescently labeled macromolecules present within the focus and 2-channel cross-correlation analysis reveals interaction fractions when two different macromolecules are imaged with labels of different emission colors. The time decay profiles of the correlation functions reveal transport dynamics. We previously introduced spatio-temporal image correlation spectroscopy (STICS) which measures vectors of protein flux in cells based on the calculation of a spatial correlation function as a function of time from an image time series. Here we will describe the application of time window STICS and its two color extension, spatio-temporal image cross-correlation spectroscopy (STICCS) in combination with super-resolution structured illumination microscopy to measure dynamic coupling between retrograde actin flow and plasma membrane components in Jurkat T cells plated on activating substrates. The experiments revealed □-actinin as a key mediator of the coupling between the actin and the plasma membrane. As well we will highlight how segmented image correlation analysis of neurons plated on nanoprinted arrays of netrin-1 can enhance the analysis of signal transduction associated with chemotropic guidance to spatially dissect localized receptor reorganization in response to netrin-1. intracellular pressure is controlled by actomyosin contractility in response to 3D matrix structure.

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11:30 am

Strathcona Anatomy Building
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