WAKATE INITIATIVE SPECIAL WINE AND CHEESE SEMINAR

演題: **Cellular Cartography: Mapping Protein Transport & Interactions in Living Cells with Image Correlation Spectroscopy**

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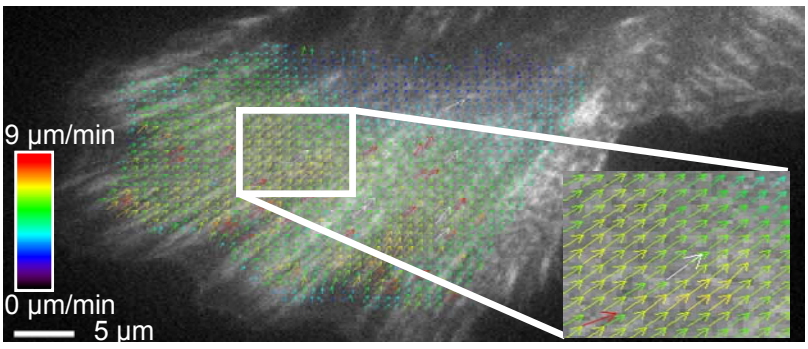
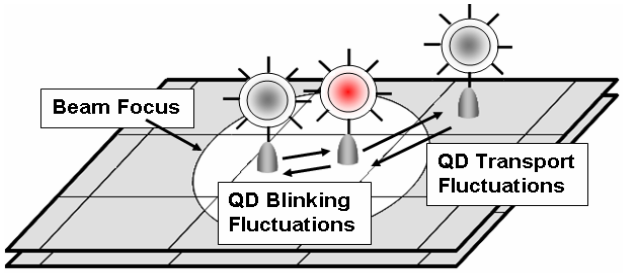
日時：2009 年 6 月 10 日（すいよび） 7:00pm – 8:00pm

会場：Room 311, Sogo-kenkyu (Building D)

要旨： Image correlation methods provide a new window of analysis for measurement of protein-protein interactions and macromolecular transport properties from fluorescence 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 on a laser scanning or TIRF microscope. We recently 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 STICS and its two color extension, spatio-temporal image cross-correlation spectroscopy (STICCS), for measuring transport maps of adhesion related macromolecules such as integrin, alpha-actinin, paxillin, talin, and vinculin within, or associated with the basal membrane in living fibroblast and CHO cells. These measurements have allowed us to propose a model for the molecular clutch that regulates connections between the extracellular matrix, integrins in the membrane and the cytoskeleton during cell protrusion and migration. We will also highlight recent advances we have made with a new form of reciprocal space ICS, called kICS, that allows us to measure unbiased transport coefficients of fluorescently labeled membrane proteins even if there is complex photophysics (such as nanoparticle emission blinking) of the probe. We will describe kICS measurements of the transport properties of quantum dot labeled receptors in the cell membrane as well as determination of clustering properties of QD labeled receptors based on kICS correlation studies of changes in the nanoparticle blinking



Velocity map of retrograde transport of alpha-actinin/EGFP in an MEF cell. Measured by TIRF microscopy and STICS analysis.



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