

Dear Faculty, IGERT Fellows, IGERT Associates and Students,

You are cordially invited to attend a Seminar presented by Vincent On. Please plan to attend.

Vincent On

IGERT Fellow

Date: Friday, March 14, 2014

Location: Bourns A265

Time: 11:00am

Dynamic Migration and Cell-Cell Interactions of Early Reprogramming Revealed by High-Resolution Time-Lapse Imaging, by Cynthia M Megyola

Abstract:

Discovery of the cellular and molecular mechanisms of induced pluripotency has been hampered by its low efficiency and slow kinetics. Here, we report an experimental system with multicolor time-lapse microscopy that permits direct observation of pluripotency induction at single cell resolution, with temporal intervals as short as 5 minutes. Using granulocyte-monocyte progenitors as source cells, we visualized nascent pluripotent cells that emerge from a hematopoietic state. We engineered a suite of image processing and analysis software to annotate the behaviors of the reprogramming cells, which revealed the highly dynamic cell-cell interactions associated with early reprogramming. We observed frequent cell migration, which can lead to sister colonies, satellite colonies, and colonies of mixed genetic makeup. In addition, we discovered a previously unknown morphologically distinct two-cell intermediate of reprogramming, which occurs prior to other reprogramming landmarks. By directly visualizing the reprogramming process with E-cadherin inhibition, we demonstrate that E-cadherin is required for proper cellular interactions from an early stage of reprogramming, including the two-cell intermediate. The detailed cell-cell interactions revealed by this imaging platform shed light on previously unappreciated early reprogramming dynamics. This experimental system could serve as a powerful tool to dissect the complex mechanisms of early reprogramming by focusing on the relevant but rare cells with superb temporal and spatial resolution.

