



Unraveling cell polarity dynamics with single-cell biochemistry

Cell polarity is essential for the development and homeostasis of animal tissues. The conserved PAR protein system is a major player in polarization of many different animal cell types. Many in vitro interactions between PAR proteins have been identified, but a major challenge for the field is to understand how these biochemical interactions are regulated and coordinated in vivo to produce a polarized cell. I developed a single-molecule approach that allows quantitative measurements of protein-protein interactions in a time-resolved manner in vivo. Applying this approach to *C. elegans* zygotes undergoing polarization, I identified a tightly regulated PAR protein complex - a large oligomer of the PAR-3 protein - that is essential for polarity establishment. PAR-3 oligomerization facilitates physical coupling of PAR proteins to cortical flows that polarize the cell. These results provide novel insight into how cells spatially segregate polarity determinants, and they establish experimental tools that will advance a comprehensive understanding of the signaling circuitry that mediates animal cell polarization.

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Host: Dr. Brent Derry

Date: Monday February 27, 2017

Time: 10:00 a.m.

Place: Red Seminar Room
Donnelly CCBR