



Thursday, November 29, 2018, 12:30 pm

Seaver Science Auditorium, Room 150

SSC Auditorium next to the library

Professor Kai Zhang

Department of Biochemistry

University of Illinois at Urbana-Champaign

Delineating Receptor Tyrosine Kinase Signaling Pathways During Cell Differentiation and Embryonic Development

Receptor tyrosine kinases (RTKs) are important in diverse physiological and diseases processes including embryonic development, body pattern formation, learning and memory, mood control, pain, and aging. Mutations in RTKs have been causally linked to developmental defects, cancers, neurological disorders, diabetes, and inflammation. Intriguingly, although the approximately 20 classes of RTKs share common structural features, bind to overlapping sets of downstream signaling proteins, and ultimately activate shared intracellular pathways, they elicit distinct signaling outcomes. Delineation of the signaling specificity of RTKs is challenging because signaling outcomes of RTKs are often complicated by co-receptors and are dependent on the kinetic profile of signaling activity. To address this challenge, my laboratory has been developing non-neuronal optogenetic systems to achieve light-mediated, ligand-independent, and reversible activation of the RTK signaling pathway. We use these optogenetic systems to delineate RTK signaling outcomes during PC12 cell differentiation and embryonic development. By controlling the timing of RTK signaling in developing *Xenopus* embryos, we observed distinct cell fate determination elicited by a developmental stage-specific RTK activation. Results from our research will help resolve intracellular mechanisms of RTK signaling during cell differentiation and embryonic development.

Hosted by Professor Peter Qin

The scientific community is invited

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