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TEMASEK LIFESCIENCES LABORATORY

28 March 2019 (Thursday), 4pm
The Auditorium (Level 1)

Hosted by: Dr Yu Fengwei

Atypical myosin tunes dendrite arbor subdivision

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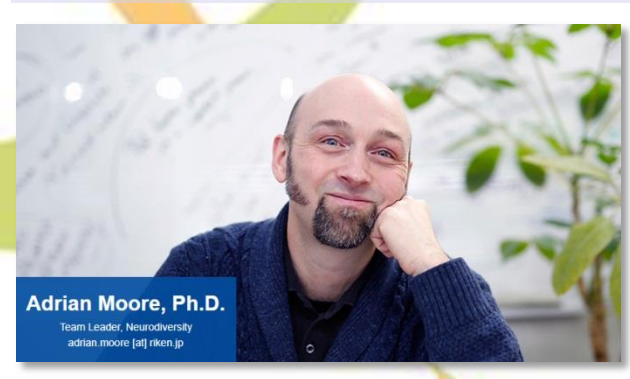

Adrian Moore graduated with a B.A. in Natural Sciences (Genetics), from Girton College, the University of Cambridge UK. During this study he developed a strong interest in understanding how embryonic development occurs and in trying to isolate genes important in this processes. To follow up that interest he moved to the laboratory of Nick Hastie at The Medical Research Council UK (MRC) Human Genetics Unit. In Prof Hastie's laboratory he studied the regulation and function of the Wilms' Tumor 1 gene WT1. In partnership with Andreas Schedl he used YAC transgenic mice to show essential functions for WT1 in kidney, heart and adrenal gland development. Following this work he graduated with a Ph.D. from the University of Edinburgh. He then switched focus to neural development and moved the laboratory of Yuh-Nung Jan at the University of California, San Francisco. As a post-doctoral fellow in this lab, he learnt to use Drosophila genetics to study neuron development and function. Presently he is team leader of the Laboratory for Neurodiversity at the RIKEN Center for Brain Science.

Dendrite arbor pattern determines the functional characteristics of a neuron. It is founded on primary branch structure, and defined through cell intrinsic and transcription factor-encoded mechanisms. Developing arbors have extensive acentrosomal microtubule dynamics, and here we report an unexpected role for the atypical actin motor Myo6 in creating primary branch structure by specifying the position, polarity, and targeting of these events. We carried out *in vivo* time-lapse imaging of *Drosophila* adult nociceptive neuron differentiation, integrating machine learning based quantification of arbor patterning with molecular-level tracking of cytoskeletal remodeling. This revealed that Myo6 and the transcription factor Knot regulate transient surges of microtubule polymerization at dendrite tips; they drive retrograde extension of an actin filament array that specifies anterograde microtubule polymerization, and guides these microtubules to subdivide the tip into multiple branches. Primary branches delineate functional compartments; this tunable branching mechanism is key to define and diversify dendrite arbor compartmentalization.

Recent Publications:

1. Stages and transitions in dendrite arbor differentiation. Yoong LF, Pai YJ, **Moore AW.** Neurosci Res. 2019 Jan;138:70-78.
2. Centrosomin represses dendrite branching by orienting microtubule nucleation.
Yalgin C, Ebrahimi S, Delandre C, Yoong LF, Akimoto S, Tran H, Amikura R, Spokony R, Torben-Nielsen B, White KP, **Moore AW.** Nat Neurosci. 2015 Oct;18(10):1437-45 Neuron. 2007 Dec 20;56(6):963-78
3. Knot/Collier and cut control different aspects of dendrite cytoskeleton and synergize to define final arbor shape. Jinushi-Nakao S, Arvind R, Amikura R, Kinameri E, Liu AW, **Moore AW**.