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12 Aug 2022 (Fri), 4pm

Hosted by: Dr YU Fengwei

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Compartmentalization of Neural Precursor Signal Responses Across the Cell Cycle

Dr Adrian MOORE
RIKEN Center for Brain Science, Japan



Dr Adrian Moore is team leader of the Laboratory for Neurodiversity at the RIKEN Center for Brain Science. He investigates, at the level of an individual nascent neuron, how differentiation pathways are initiated and directed to create diversity in neuron form and function.

Proliferating stem cells respond to signal receipt to instruct self-renewal or cell-fate transitions. In neural precursors, short pulses of Notch-driven self-renewal program induction repeat throughout the cell cycle; and also, self-renewal probability links with the G1-to-S-phase balance. One hypothesis is that signal outputs are controlled relative to cell cycle phase; this remains unexplored. Here, we reveal a transcriptional mechanism that focuses the Notch-response into late G1. In olfactory precursors, PRDM factor Mecom levels peak in late G1. It complexes with Wdr5 and RbpJ to amplify Notch-mediated target induction; and specifies self-renewal program and cell migration dynamics relative to cell cycle phase. Manipulating this program further reveals how a developmentally-programmed Notch-target amplification mechanism bypasses cell type-specific enhancer use, and that self-renewing precursors must block a high probability of proneural de-repression in late G1. Transcriptional linking of signaling output to cell cycle phase is likely to operate across proliferating stem cell types

Recent Publications:

1. Urun FR, Moore AW (2020) Visualizing Cell Cycle Phase Organization and Control During Neural Lineage Elaboration. Cells 9:e2112
2. Yoong LF, Lim HK, Tran H, Lackner S, Zheng Z, Hong P, Moore AW (2020) Atypical myosin tunes dendrite arbor subdivision. Neuron 106:452-467
3. Hohenauer T, Moore AW (2012) The Prdm family: expanding roles in stem cells and development. Development 139:2267-82.