

BDR SEMINAR in Kobe

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Monday, May 27, 2019

11:00-12:00, 7F Seminar Room, DB Building A

Exploring cell cycle dynamics in embryonic stem cells at the single cell level

* This seminar is a part of the Epigenetics Seminar Series 2019-2020.

Summary

Pluripotent embryonic stem cells (ESCs) differentiate to give rise to all different cell types in the organism. The unique ESCs cell cycle and gene expression program facilitates lineage commitment and scaling cell numbers during development. Here, I'll present our past and ongoing work investigating cell cycle dynamics using FUCCI fluorescent reporter. Combining flow cytometry (FACS) with single-cell transcriptomics (scRNA-seq), we profiled ~700 single ESCs throughout cell cycle and across two culture conditions. Integrating quantitative FACS measurements with scRNA-seq, we assess how cell cycle and cellular features (volume, DNA, cell cycle FUCCI sensor etc.) affect individual gene dynamics at single-cell level. We reconstruct gene expression profiles over cell cycle and predict gene contribution to cell cycle, cell fate (ESC differentiation) and in maintaining cellular homeostasis. Alongside a resource, our work predicts genes important for cell cycle transition and gene expression regulation in ESCs. I'll also briefly highlight our computational single cell efforts including benchmarking platforms and technologies.



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