

BDR SEMINAR via Zoom

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Tuesday, April 12, 2022

15:00-16:00

Zoom meeting URL will be announced on the event day by e-mail.

※This seminar is open only to BDR members.

Challenges to recapitulate in vitro organogenesis beyond lineage specification

Summary

Over the last decades, our understanding of “lineage specification” mechanisms in early development made remarkable progress and enabled de novo organogenesis in a dish from pluripotent stem cells. However, most organoids simply recapitulate microenvironments of specific parenchymal cell types and lack higher-order organ structures. We have recently established a unique strategy that selectively induces three types of kidney progenitors, assembles in 3D structures, and enables reconstitution of proper organotypic kidney structures with progenitor niche, interconnected nephrons, and interstitial populations.

Despite this major advance, we still often lack mature function that is important to study adult common diseases. This is in part attributable to our limited knowledge of late-stage organ maturation. To address this, we used the liver as a model and focused on the cell-intrinsic regulation to identify transcriptional regulators that become activated during the “post-lineage commitment” phase. For the functional validation, we developed a high-throughput perturbation pipeline, which employs a CRISPR-activation system combined with a single cell RNA-seq readout. Here, I will show our preliminary results and discuss the possible strategies to fill the current gap between organoids and organs.



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