Title

Developmental mechanisms of lung cellular heterogeneity

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Abstract

The healthy adult lung is a highly complex organ that contains approximately 60 cell-types with distinct characteristics and functions which all contribute to its main role, the gas exchange between circulation and breathed air.

In my seminar, I will give an overview about our efforts to understand how lung cellular heterogeneity gets initially established. Focusing on first trimester of gestation, we used state-of-art methods to identify 83 cell-types and states and "draw" developmental trajectories, with a strong spatial component. We predicted communication patterns based on cell proximity and spatially validated them. We also developed an interactive viewer with all our analyses, creating the first topographic atlas of early human lung development.

I will also talk about SCRINSHOT, a multiplex RNA in situ hybridization method that we developed in our laboratory. We experimentally validated its high sensitivity and specificity and utilized it for the spatial analysis of cell-types and states with cellular resolution.

Finally, I will present our unpublished data about the characterization of lung airway epithelial heterogeneity in time and space, which suggests topology-related gene expression patterns and functions and provides mechanistic information about the dynamic nature of their regulation.