CDB SEMINAR

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16:00~17:00 A7F Seminar Room

Two types of Notch signaling cooperate in epithelial patterning during lung organogenesis

Summary

A major goal of organogenesis research is to obtain biological strategies that are employed to develop a functional organ. The unique functions of each organ are related to its specialized cell types and distinct tissue patterns. In this seminar, I will focus on the tempo-spatial regulation of the major epithelial cell types during mouse lung organogenesis. In developing lung, it is thought that the terminal buds contain a population of multipotent epithelial progenitors. As the bronchial tree extends, descendants of these cells give rise to lineage-restricted progenitors in the conducting airways. Evidence demonstrating the importance of Notch signaling in the developing respiratory system is rapidly growing. In our recent study, stepwise removal of the three Notch receptors and RBPj from developing lung epithelium revealed that Notch signaling is used reiteratively to organize three epithelial major cell types; Clara (secretary), ciliated cells and neuroendocrine (NE) cells. Further significant differences emerged between the selection of Clara/ciliated cells and size regulation of NE cell clusters. The Clara/ciliated cell fate decision is mediated exclusively by Notch2 in response to Jagged1 with negligible contributions from Notch1 and 3. In contrast, all three Notch receptors respond to Dll1 and contribute in an additive manner to regulate NE cell cluster numbers and size. Notch signals maintain a novel cell population surrounding the NE cluster and acting as a negative regulator of NE cells during development. These results define that two distinct Notch signalings, Jag1-Notch2 and Dll1-Notch123 signaling, coordinate the number and distribution of the major epithelial cell types of the conducting airway in lung organogenesis.

Host:
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