Measuring notch signaling range during bristle patterning in drosophila

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Abstract

In nature, animals commonly exhibit regularly organized elements such as spots or stripes at their body surface. How cell assemblies generate these patterns in a collective and reproducible manner within a given species is a key question in developmental biology.

The adult Drosophila melanogaster flies exhibit regularly spaced and aligned sensory organs (bristles) which emerge during development from sensory organ precursor cells (SOPs). In the dorsal thorax, SOP patterning relies on self-organized Delta-Notch signaling to first produce a pattern of five stripes of cells endowed with the competence to acquire the SOP fate, and to then single out SOPs via the progressive decimation of these stripes (1). During this process, cells becoming SOPs send a strong inhibitory signal to neighboring cells which activate Notch receptor and prevent them from adopting the SOP fate (2). Thus, the proper spacing of SOPs depends on the signaling range of the inhibitory Delta signal, which appears to extend beyond immediate neighbors (1). However, since Notch receptor activation involves a force-dependent mechanism that requires direct cell-cell contact, it is unclear how Delta can signal beyond immediate neighbors.

Here, I will address how far Delta can signal in vivo at the time of SOP emergence and provide direct evidence that Delta can signal beyond immediate neighbors to determine the spacing of sensory structures.

Keywords: *Drosophila bristle patterning, Notch, cell fate decision, signaling range*

References

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