CDB SEMINAR

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16:00~17:00 A7F Seminar Room

Local increases in mechanical tension guide cell sorting at compartment boundaries by constraining junctional dynamics

Summary

The subdivision of tissues into compartments plays important roles for growth and patterning during animal development. Maintaining compartments separated by straight and sharp boundaries requires mechanisms to counteract cell rearrangements and cell mixing caused by cell division and tissue reshaping. Locally increasing mechanical tension along cell junctions has recently emerged as an important process in separating cell populations, yet how mechanical forces influence cell rearrangements to maintain straight and sharp compartment boundaries and to prevent cell mixing remains poorly understood. Here, using live imaging, we quantitatively analyzed cellular dynamics during the formation and maintenance of the anteroposterior compartment boundary in pupal *Drosophila* histoblasts. We show that locally increased mechanical tension makes cell junctions resistant to bending and constrains the dynamics of cells along this compartment boundary. Constrained cellular dynamics maintains a straight compartment boundary and precludes cell mixing by biasing cell rearrangements and preventing the establishment of large contacts between cells from adjacent compartments. This control of contact dynamics identifies a novel cellular mechanism to establish and maintain a common interface between cell populations and at the same time prevents cell mixing. Our data provides new insights into the mechanisms by which force generation influences the dynamics at the cellular scale to drive tissue-level morphogenesis.

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