

How Cell Collectives make Decisions

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Regulating the emergence of leading individuals is a central problem to collectively migrating biological entities. For example, leaders in the mobile animal groups arise through collective decision making of the followers. However, the fundamental control of leader selection remains unclear in the physiologically relevant collective migration of epithelial cells. Here we present that the selective emergence of leader cells at the epithelial wound-margin depends on the dynamics of the follower cells and is spatially limited by the length-scale of collective force transduction. Owing to the dynamic heterogeneity of the monolayer, cells behind the prospective leaders manifest locally increased traction and monolayer stresses much before these leaders display any phenotypic traits. Once formed, the territory of a leader can extend only to the length up-to which cells can pull on their neighbors. These findings provide a novel mechanobiological-insight into the hierarchy in cell collectives during epithelial wound healing.