DEVELOPMENT

Mechanical forces linked to organ growth

A clear molecular understanding of how mechanical forces might be linked to organ growth has been missing. Irvine and colleagues now find that Ajuba LIM protein (Jub) couples cytoskeletal tension to wing growth in *Drosophila melanogaster* by modulating Hippo signalling.

The Hippo pathway is a crucial regulator of organ growth across species. In *D. melanogaster*, this pathway includes the protein kinase Warts (Wts; the counterpart of mammalian LATS1) and its substrate, the transcriptional co-activator Yorkie (Yki; the counterparts of mammalian YAP1 and TAZ). Wts inhibits Yki by promoting its cytoplasmic localization. As recent studies have suggested that Yki, YAP1 and TAZ are regulated by mechanical forces, the authors studied how this link is achieved in developing wing imaginal discs.

First, they showed that cytoskeletal tension promotes disc growth *in vivo*, as increasing actin cytoskeleton tension through the manipulation of Rho kinase (Rok) activity resulted in flies with larger wings. Next, the authors showed that decreased cytoskeletal tension increased Yki phosphorylation and reduced Yki target gene expression, whereas increased tension led to increased Yki activity.

So, how are growth and Yki activation coupled to mechanical tension? RNAi-mediated *jub* knockdown and analysis of *jub* mutants revealed that the Jub protein, which binds and inhibits Wts, was required for tension-induced Yki activation. The authors found that high levels of Jub localized to adherens junctions at the periphery of imaginal discs, where the cytoskeletal tension is highest. Moreover, Jub recruited Wts to adherens junctions in a tension-dependent manner.

Thus, this work indicates that tension-induced localization of Jub to adherens junctions promotes Wts recruitment and inhibition, which enables Yki activation and Hippo-mediated growth signalling. Furthermore, as α-catenin was required for localization of Jub to adherens junctions and its binding to Jub increased with cytoskeletal tension, the authors propose that a tension-induced change in α-catenin conformation may modulate Jub localization.

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