

BDR SEMINAR via Zoom

Naoya Hino

Institute of Science and Technology Austria

Tuesday, September 30, 2025

15:30-16:30

Meeting URL will be announced on the event day by e-mail.

※This seminar is open only for BDR Members

Stretch-dependent apical mechanotransduction drives epithelial tissue spreading in zebrafish embryos

Summary

Cells sense mechanical stretch and modulate their behavior. Yet, the molecular mechanism of the cellular mechanoresponse and its significance in tissue morphogenesis remain largely unknown. During early zebrafish development, the enveloping layer (EVL), a surface epithelial monolayer, undergoes extensive spreading over the large yolk cell. This movement is driven by a contractile actomyosin ring within the yolk cell, which applies pulling forces on the EVL margin. We show that mechanical stretch of EVL cells activates atypical protein kinase C (aPKC) within the apical domain by dissolving microvilli and Kibra protein condensates, which restrain aPKC activity. This aPKC activation promotes EVL cell spreading by regulating cell contractility and exocytosis. Our findings identify an apical mechanoresponsive signaling module, highlighting an active role for epithelial cells in force-driven tissue morphogenesis during early zebrafish development.