

BDR SEMINAR (Yokohama & Virtual)

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Tuesday, April 18, 2023

13:00-14:00

Koryu-to Hall, Main Office Bldg., Yokohama & Broadcast online via Zoom

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

※This seminar is open only to BDR members.

Molecular mechanisms regulating mechanotransduction at cell-cell adhesions

Summary

Cells in tissues are physically coupled to each other through intercellular junctions known as cadherin-mediated adhesions, where forces are transmitted between cells to define tissue homeostasis in response to mechanical challenges. However, the underlying molecular architecture that maintains and orchestrates complex regulation of cadherin-mediated cell adhesions was largely unknown. By using superresolution microscopy, combined with engineered biomimetic substrates, we mapped the blueprint of the spatial distribution of key proteins of cadherin-mediated adhesion complex. Furthermore, we unveiled the molecular clutch mechanism regulating mechanotransduction of the complex. Herein, the conformational switch of the mechanosensitive protein vinculin could differentially engage with the actin cytoskeleton and the ER in response to biochemical and mechanical signals. Finally, we proposed a novel model of the molecular clutch and how its alternative conformational arrangements can provide cell-cell adhesion with the strength and plasticity seen in tissue homeostasis and regeneration, as well as during transformative events such as development and cancer.



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