BDR SEMINAR (Kobe & online hybrid)

Fu-Lai Wen

Department of Science Education
National Taipei University of Education

Tuesday, July 11, 2023

15:00-16:00

1F Auditorium, DB Building C, Kobe / Broadcast online via Zoom
Zoom meeting URL will be announced on the event day by e-mail.

※Non-BDR members: Please register from the following link.
https://krs1.riken.jp/m/bdrseminarregistration (Registration deadline July 7)

Mechanical waves decode positional information to calibrate wound healing response in adult zebrafish

Summary

Highly regenerative animals can regrow lost appendages and the rate of regrowth is proportional to the amount of appendage loss. This century-old phenomenon prompted us to investigate whether the mechanism of wound healing, as the first stage of regeneration, is responsible for discerning the amputation position. In vitro studies have revealed significant insights into the mechanics of the wound-healing process, including the identification of mechanical waves in collective epithelial cell expansion. It has been suggested that these mechanical waves may also be involved in positional sensing. Here we perform live-cell imaging on adult zebrafish tailfins to monitor the collective migration of basal epithelial cells on tailfin amputation. We observed a cell density wave propagating away from the amputation edge, with the maximum travelling distance proportional to the amputation level and cell proliferation at later stages. We developed a mechanical model to explain this wave behaviour, including the tension-dependent wave speed and amputation-dependent travelling distance. Together, our findings point to an in vivo positional sensing mechanism in regenerative tissues based on a coupling of mechanical signals manifested as a travelling density wave.

Host: Tatsuo Shibata (Laboratory for Physical Biology, BDR)
Contact: satoko.kinoshita@riken.jp

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