

# BDR SEMINAR (Kobe & online hybrid)

Co-hosted by  
Multimodal ECM Seminar



Transformative Research Area (A)  
MULTIMODAL  
ECM

## Stefan Harmansa

Living Systems Institute, University of Exeter, UK

**Monday, November 25, 2024**

13:00-14:00

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://krs2.riken.jp/m/bdrseminarregistration> (Registration deadline: November 21)

## Shaping growing tissues by basement membrane mechanics

### Summary

Growing tissues are constantly subjected to mechanical stresses that drive deformations at the cellular and tissue levels, shaping the 3-dimensional morphology of developing organs. These stresses can originate from internal cellular activities, such as growth-driven expansion, or from mechanical interactions with surrounding structures. The basement membrane (BM), a sheet-like extracellular matrix, plays a crucial role in determining the physical properties of epithelial tissues and mediating their response to mechanical stresses. We find that in the *Drosophila* wing disc distinct dynamic growth patterns of the BM dictate epithelial morphology during epithelial growth. The planar expansion of the disc's primary tissue layer is constrained by the BM's more isotropic growth. This difference in growth anisotropy - planar for the tissue layer versus isotropic for the BM - leads to the accumulation of elastic stresses that drive tissue bending. In contrast, planar BM growth allows the flattening of the disc's manor tissue layer in response to a tissue-extrinsic tensile bending stress. These findings highlight the importance of dynamically regulated BM growth and its interaction with both intrinsic and extrinsic tissue forces in coordinating cell shape transitions during the morphogenesis of multilayered epithelia.



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