

# BDR SEMINAR (Kobe & online hybrid)

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**Tuesday, December 17, 2024**

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.

※This seminar is open only to BDR members.

This seminar is a part of the BDR Stage Transition Project Seminar Series for 2024-2025.

## Asymmetry of the basement membrane guides anterior-posterior body axis specification in mammals

### Summary

Establishing the body axis is a key event in patterning embryos for early embryonic development in metazoan. In mice, the direction of migration of the distal visceral endoderm (DVE) is crucial for anterior-posterior (AP) axis formation. However, the regulation of the unidirectional and collective migration of the DVE remains poorly understood. Here, we demonstrate that the remodeling of the basement membrane guides this symmetry-breaking process. We find that spatially biased expression of matrix metalloproteinases at embryo implantation results in uneven perforations in the basement membrane prior to DVE migration. Utilizing in toto morphometrics and physical modeling, coupled with perturbations of cultured embryos, we discover that heterogeneity in the basement membrane directs DVE migratory trajectories by creating an asymmetry in tissue mechanics within the visceral endoderm. Furthermore, we observe similar patterns of basement membrane perforations in cultured pre-gastrulation human embryos, which correspond with anterior hypoblast localization. Overall, our results point to a mechanical asymmetry that guides AP axis specification in mammals.