

BDR SEMINAR (Kobe & online hybrid)

Mechanobiology Seminar Series presents

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Tuesday, October 1, 2024

11:00-12:00

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.

Collective induction of oogenesis via long-range cytoplasmic streaming in *C. elegans*

Summary

The production of gametes is a critical prerequisite for organisms to produce offspring. During oogenesis, germ cells undergo enlargement through apoptosis of neighbouring germ cells and cytoplasmic exchange within the germ cell syncytium. The precise role of cytoplasmic exchange in oogenesis remains incompletely understood.

In this study, we found that oogenesis in *C. elegans* is stimulated by long-range cytoplasmic streaming in the germline syncytium. The germ cells establish F-actin-dependent cytoplasmic streaming and then initiate anisotropic reorganisation of the plasma membrane. Although approximately half of the germ cells undergo apoptosis, inhibition of apoptosis does not impede cytoplasmic streaming and allows the germ cells to complete anisotropic morphogenesis. Cytoplasmic streaming emerges as a promising candidate responsible for pro-oocyte enlargement. Streaming of the cytoplasm from distal to pro-oocytes is mediated by collective suction of the cytoplasm from enlarging oocytes on the outer surface of the U-shaped syncytium. In conclusion, our results support a model of non-cell-autonomous induction of oogenesis, in which long-range streaming of the cytoplasm contributes to oogenesis by promoting anisotropic expansion of pro-oocytes adjacent to enlarging oocytes.



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