



## Seminar/Talk

# Self-organization of spermatogenic wave coordinates sustained sperm production in the mouse testis

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Spermatogenesis takes place in the testis, relying on the ordered turnover of differentiating cells supplied from stem cells. Classic histological analyses have revealed that this process shows hierarchical spatiotemporal patterning known as the spermatogenic cycle, wave, and descent of segmental order, indicative of currently underexplored mechanisms of tissue- and organ-scale homeostasis. Here, using mice, we conducted high-resolution, wide-field, and ultra long-term live imaging studies in vivo and ex vivo, combined with whole-organ mapping of differentiation stages. Such trans-scale measures demonstrate how stereotypic local cell turnover is coordinated into characteristic phase waves propagating along the seminiferous tubules, further organized into organ-scale patterning over the tubule loops. Minimal mathematical modeling shows that such higher-order dynamics can emerge from the local coupling of autonomous oscillators, which are rooted in delayed feedback interplay between stem and differentiating cells via retinoic acid signaling. These findings highlight a self-organization mechanism underpinning organ-scale homeostasis and constant sperm production.

**Wednesday, September 24, 2025 01:00pm - 02:00pm**

Sunstone Bldg / Ground floor / Big Seminar Room B / 63 seats (I23.EG.102)



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