The Biological and Biomedical Joint Seminar Series

(Hosted by the departments of Molecular & Cellular Biology, Chemistry & Biochemistry, Cellular & Molecular Medicine, and Plant Sciences)

"A Cell-Intrinsic Timer generates spatiotemporal pattern within the Vertebrate Segmentation Clock"

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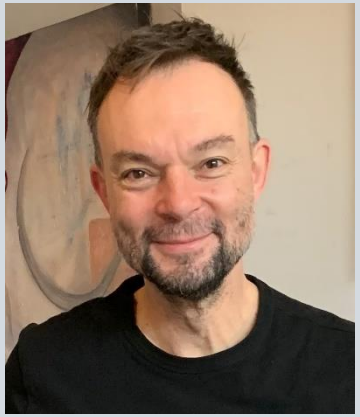
Zoom Meeting @ 11AM

Hosted By: Ingmar Riedel-Kruse (MCB)



Vertebrate bodies successively segment according to the rhythmic segmentation clock. This multi-cellular oscillating genetic network in the embryo manifests as waves of gene expression travelling through the unsegmented tissue until arrest at each newly forming segment. How spatiotemporal information is generated within the clock, producing this hallmark pattern, is an open question. Although extrinsic signals influence the clock, it remains to be tested whether cell-intrinsic information controls the pattern of cellular oscillations underlying the tissue-level waves and arrest. Here we compare cellular-resolution clock patterns in the embryo to those generated intrinsically by individual cells cultured without cell-cell coupling, added morphogens, serum, or small molecule inhibitors. We find striking similarity between the intrinsic program and patterns in the intact embryo, albeit with greater variability in arrest of the intrinsically-timed clock. Our simple physical description of a clock controlled by a noisy intrinsic timer captures the observed dynamics. Control of the segmentation clock pattern thus likely balances an intrinsic timer-driven oscillatory program with extrinsic spatiotemporal cues that regulate the timer's duration.

Oates Lab: https://www.epfl.ch/labs/oateslab/

Zoom Link: https://arizona.zoom.us/j/85848818129

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