Les mardis de L'IAB

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CURVATURE IN EPITHELIAL TISSUES: FROM DYNAMIC INTESTINAL MODELS TO CYTOKINESIS IN RENAL TUBULES

1.DECEMBER 2026 – 11 AM – LECTURE HALL

Epithelia are curved cell monolayers that form a barrier between the internal and external environments of organs, enabling essential functions such as protection, secretion, and absorption. My research focuses on two organs with folded epithelia: the intestine and the kidney.
The intestine has a complex, multiscale architecture that is constantly reshaped by muscular contractions during digestion. Severe, poorly understood conditions such as celiac disease and inflammatory bowel disease disrupt its structural integrity and mechanical function. Renal tubules wrap around a lumen to form cylinders of defined diameter (<50 µm), but curvature changes can be observed in pathologies, often leading to organ dysfunction. Far from being passive outcomes of growth, these geometries act as mechanical cues that cells sense and integrate. How epithelial cells combine molecular signaling with tissue curvature in 3D environments remains poorly understood, yet it is key to morphogenesis and disease.
We address this question with two complementary approaches. First, an engineered intestinal model based on organoid-derived cultures grown on hydrogel replicas of villi and crypts mounted on magnetically actuated membranes, probing how curvature drives stem cell differentiation. Second, substrates of controlled curvature mimicking renal tubules, showing that curvature orients cleavage furrow ingression perpendicular to the tubule axis and aligns daughter cells along it.
Together, these platforms offer new ways to unravel how curved epithelia integrate molecular and geometric cues to preserve tissue architecture, with applications for modeling intestinal and renal diseases.

Invited by : Christophe Arnoult

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Allée des Alpes, 38700 La Tronche (tram line B, stop : Grand Sablon)
The seminar is followed by discussions and exchanges with the speaker and a sandwich buffet is offered