Mechanobiology in Epithelial 3D Tissue Constructs

ME3T LECTURES

GRK 2415

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IFOM - the FIRC Institute of Molecular Oncology

Milan

Tissue fluidification in invasive breast cancer

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9:15 a.m.

Zoom-Link:
https://rwth.zoom.us/j/91504326004?pwd=R2dvWEcyQmpCenNNZDRYWHMzVExLUT09
Meeting-ID: 915 0432 6004
Password: 334655

Host: Jacopo Di Russo
Interdisciplinary Centre for Clinical Research (IZKF)

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More information

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Abstract

The process in which locally confined epithelial malignancy progressively evolves to become invasive cancer cells is associated with the acquisition of cell motility, fostered by a mechanical shift from a solid-like to a liquid-like state, known as unjamming. The biomolecular machinery behind unjamming have only begun to be unraveled, while whether the perturbations associated with this tissue-level mechanical transition impact on phenotypes during carcinoma progression remains unclear. Using a combination of physical approaches, ex vivo and in vivo model systems, we will address these issues and discuss whether an endocytic-driven transition between “solid” and “liquid” states of cell collectives is a complementary gateway to cell migration in pathology, focusing specifically on the progression of early breast cancer lesions that become locally invasive. We will show how these dynamic changes featuring the coexistence of long range coordinated motion and local cell re-arrangement are sufficient to promote matrix remodeling, local invasion and exert mechanical stress on individual cell nuclei. This is accompanied by profound transcriptional rewiring, with the unexpected activation of inflammatory response, change in cell state, and the emergence of malignant traits.