

IS EXTRACELLULAR MATRIX A MECHANO-SENSOR?

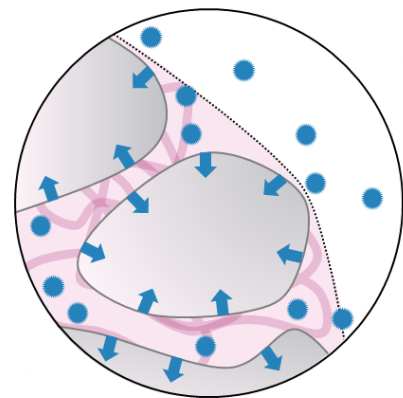
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OBJECTIVE

The project aims at describing the role of extracellular matrix in the mechano-sensation of multicellular systems.

CONTEXT

Eukaryotic cells are sensitive to the biochemical and mechanical properties of their environment. In particular, they perceive the rigidity and the mechanical stress. In a three-dimensional context, multicellular aggregates and biological tissues are composite materials, made of quasi incompressible cells, a compliant and porous extracellular matrix and the interstitial fluid. The bidirectional dialogue between cells and matrix is crucial for the self-organization of the tissue (or its pathological disorganization). We recently observed that both the rheological and biological properties of multicellular aggregates depends on the compressional state of the extracellular matrix.



INTERNSHIP

The aim of this project is to verify if cells distinguish an isotropic compression of the matrix from a uniaxial stress and from the hydrodynamic pressure in the interstitial fluid. In a poroelastic system, these parameters are mechanically coupled and the experimental difficulty is to vary them independently to understand the signature of each on the biological response of the cell. For each type of stress, the student will characterize the biomechanical state of the extracellular matrix, as well as the cellular response in terms of morphology and biochemical activity.

KEYWORDS

Physics of cancer, Biophysics, Rheologie of cellularized materials

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