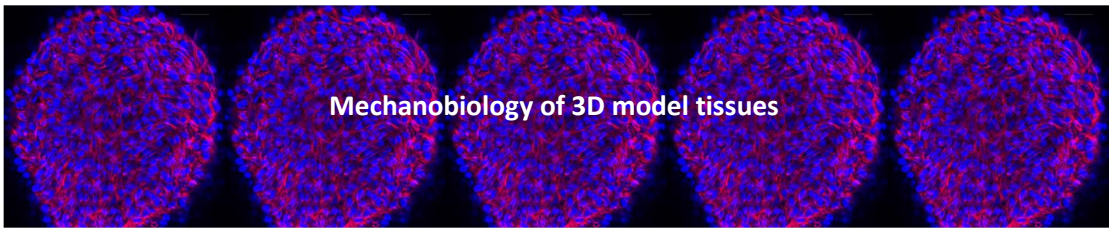

Mechanics of tumor tissues across epithelial-mesenchymal transition

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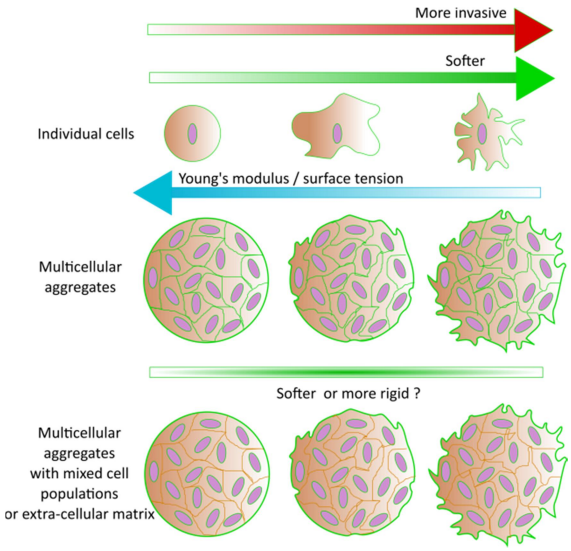
Primordial cell function such as cell division, migration and adhesion are deeply affected in tumorigenesis. All these processes are directly related to cell mechanics. From the past decades, these conclusions drive the emergence of numerous studies on single tumor cells that reveal that tumor cells are softer than normal cells. Conversely, when detected by palpation, solid tumour appears more rigid. We would like to explore this apparent paradox by looking at 3D model tissues and by measuring their mechanical properties.



Over the past few years, we developed an original approach based on the use of magnetic nanoparticles [1,2,3]. Magnetic nanoparticles penetrate inside cells to endow them with magnetic properties so that they can be remotely stimulated by a magnet. These magnetic properties are used to form multicellular aggregates of control size, shape and content and to deform them in order to access their mechanical properties.

We would like to investigate a model of breast tumor with unprecedented hybrid state of epithelial-mesenchymal transition (EMT). A first study demonstrates that surface tension of multicellular aggregates changed during EMT and we would like to look at more dynamical parameters [4].

This project is part of a synergical project on mechanobiology of tumoral cells at different scales from the supracellular to the tissue scale. It will use a variety of techniques including two-photons microscopy, mechanical manipulation, magnetic forces.

The Laboratory Complex Systems (MSC-UMR7057) in Paris is a renowned interdisciplinary research centre, where you will find excellence both in life science, physics, chemistry and technology. This subject is in close collaboration with the research Center of Saint-Antoine Hospital.

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