

Cell migration on a soft substrate

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Cells are open systems that interact with their outer environment and respond to environmental changes. Among the many responses, they modify their shape and the forces they exert onto their substrate when their mechanical properties change. The force exerted by a cell onto its environment thus increases when the elastic modulus of this environment increases. These traction forces not only maintain the adhesion of the cell onto the substrate, but also allow its motion. The measurement of these forces would allow a better description of many biological phenomena, e.g. the migration of tumoral cancer cell.

In this thesis, we will measure the cell migration in a gradient of nutrient, and will measure the field of force of a stem cell onto a soft substrate. We will grow up cells onto

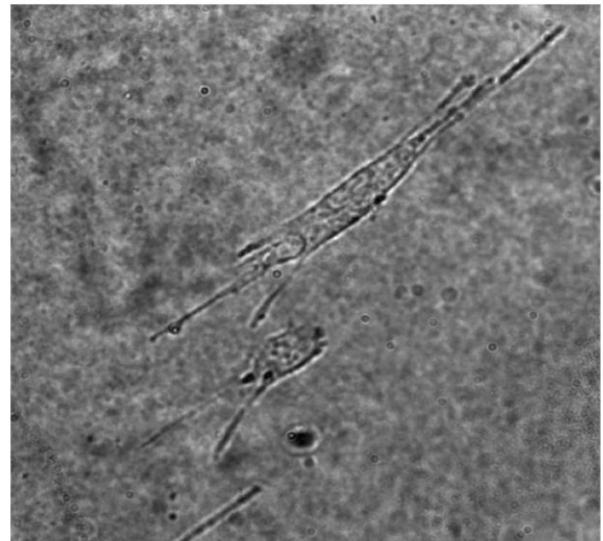


Fig. 1: Image of colon cancer cells grown onto a soft gel substrate filled with colloidal fluorescent particles.

polymer gels seeded with fluorescent colloidal particles and will use confocal and fluorescent microscopy to observe the field of deformation of the gel from which the field of forces exerted by the cell onto its substrate will be deduced.

We will in particular compare the cell migration at the surface and inside a gel whose mechanical properties mimic that of cellular tissues.