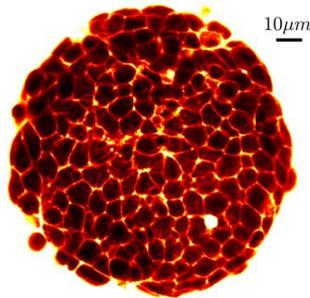


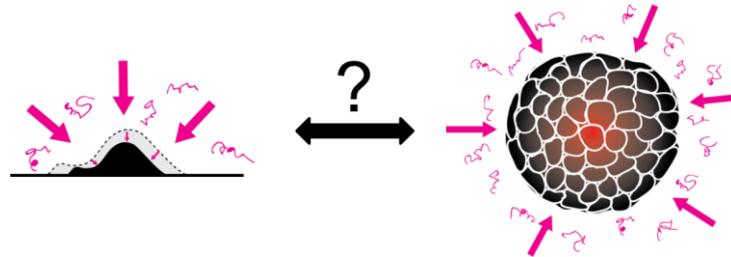
M2 internship: Cell volume control in biological tissues

Within an organism or in laboratory culture conditions, mammalian cells need to actively regulate their size. This control is required to maintain tissue homeostasis, regular development or cope with osmotic or mechanical stress applied by the environment. For example in cancer, tumor unbounded growth exerts pressure on the surrounding tissues and reciprocally within the tumor itself. How this stress affects the tumor and its microenvironment is still unclear, and the molecular mechanisms involved at the tissue level need to be unraveled.



Our lab is working on model tissues advantageously mimicking cancerous tumors in controlled laboratory conditions. We have shown recently that an aggregate made of cancerous cells compress in an abnormal manner when submitted to an osmo-mechanical stress. Indeed, this compression is several times larger for cells in the center of the aggregate compare to single cells cultured in regular 2D conditions.

The aim of this internship is to follow the volume of cells within the aggregate submitted to mechanic or osmotic stress using florescence microscopy and microfluidic devices. New probes developed in the lab will also give access to the stress within the aggregate. Drugs will be used to unravel the molecular mechanisms involved in the response to such constraint and a modelling approach can also be developed in collaboration with a team of theoreticians.



Key words: cell mechanics, tissue mechanics, volume, pressure, microfluidics, microscopy, image analysis.

Contacts: Sylvain Monnier (sylvain.monnier@univ-lyon1.fr) and H el ene Delanoe-Ayari (helene.delanoe-ayari@univ-lyon1.fr)

Lab website: <http://tinyurl.com/BiophysUCBL>



Institut lumi ere mati ere
UMR5306 CNRS
Universit  Claude Bernard Lyon 1
Domaine Scientifique de La Doua
B timent Kastler, 10 rue Ada Byron
69622 Villeurbanne CEDEX, FRANCE

<http://ilm.univ-lyon1.fr>

T +33 (0)4 72 43 29 93

FAX +33 (0)4 72 43 11 30

E-mail contact.ilm@univ-lyon1.fr