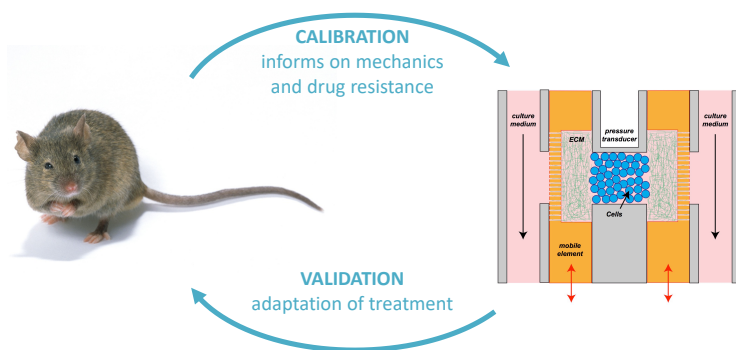


Impact of mechanical stress in the mechanisms of drug resistance: From a fundamental understanding to the clinic.

Context & Project

Mechanical stresses are ubiquitous during cancer progression and can greatly impact this process. Regrettably, they are rarely considered when designing chemotherapeutic strategies for cancer treatment, leading to situations where *in vitro* identified candidate drugs fail clinical trials *in vivo*, or perhaps accounting for the inefficacy of approved drugs. We propose that mechanical stresses participate in mechanisms of drug resistance. We wish to investigate this possibility on the aggressive and incurable pancreatic cancer by:

1. Developing novel microfluidic devices enabling the study of drug efficacy in mechanically-relevant environments. The development in the micro- and nano-fabrication lab LAAS-CNRS will be guided and validated by mouse studies in the Center for Research on Cancer of Toulouse (CRCT) (*possibility to do mouse work, but not obligatory*): The device will be used to predict the optimal treatment depending on the “mechanotype” of the tumor and tested on mouse models for pancreatic cancer.



2. Dissecting the mechanisms of drug resistance through the study of two non-mutually exclusive hypotheses: (i) mechanical stress directly triggers specific signaling cascades limiting the efficacy of a drug or (ii) mechanical stresses modify the biophysical properties of cells, for instance by increasing macromolecular crowding, which would dynamically dampen the effect of a drug.

Preferred experience

We are looking for independent researchers with experience on working at the interface between physics and biology. Preferred experience includes but is not restricted to microfabrication, microfluidic, cell culture, mouse work, modeling.

Environment

This transdisciplinary project would be held between the LAAS-CNRS, which offers 1,500m² of clean room with state-of-the-art 2D and 3D micro- and nano-fabrication facilities, microscopy and cell culture platforms, and the CRCT, attached to a hospital, with access to mouse facility and patient-derived samples. Toulouse is a vibrant life science cluster in France, but also a beautiful city in the South-West of France, ideally located close to the Pyrénées mountains (for hikers), the Atlantic Ocean (for surfers) and the Mediterranean Sea (for relaxation).

Contact information

2-3 years positions are opened as October 2018. If you are interested (or wish to learn more about the project), please send a CV and a short statement of interest to morgan.delarue@laas.fr.