PROBING CANCER CELL RESPONSE UPON MECHANICAL CONFINMENT

LABORATORY : Institut Lumière Matière

LEVEL : M2
TEAM(S) : BIOPHYSIQUE

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KEYWORD(S) : microscopy / biophysics / cell biology

SCIENTIFIC CONTEXT :

Much evidence are indicating that mechanics is playing an important role in the malignant transformation of cells and resistance to treatment.

To analyze cell response to long-term mechanical confinement, we have developed an agarose-based microsystem submitting cells to a precise deformation, within a physiological rigidity range [1].

We recently evidenced a nuclear volume regulation upon prolonged cell squeezing, with consequences on mitosis and cell cycle progression.

We now want to analyze in depth such regulation: what are the consequences on transcription activity and protein expression? Does such long-termed adaptation to mechanical constraints play a role in the resistance of cancer cells to treatments? Is there also an adaptation of the cells to decrease the imposed mechanical constraint?

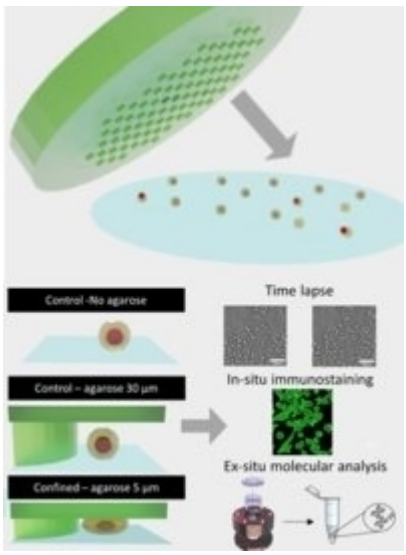

Fig.1. Soft cell confiner to analyze the role of long-term effects of mechanical. From [1].

MISSIONS :

The candidate should have a background in either physics, biophysics or cell or molecular biology. Experience in microscopy, cell culture, microfabrication or image analysis would be advantageous.

Skills learned during the internship: The candidate will learn how to master the confinement device, perform live microscopy, immunofluorescence staining and quantitative image analysis to get insights into the mechanisms involved in cell regulation to such mechanical constraint.

Scientific environment: The internship will be done within the ILM biophysic team. The biophysic team has L2 cell culture facilities, as well as environmental microscopes enabling long time-lapse experiments. For more information, you can visit the Lab website.

OUTLOOKS :

Possibility to apply for PhD funding through doctoral schools and foundations

BIBLIOGRAPHY :

[1] A. Prunet et al., A new agarose-based microsystem to investigate cell response to prolonged confinement, Lab on a Chip. 20:4016–4030 (2020)

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