MECACHIPS: a New Technology TO IMPROVE CELL CULTURE

In vitro cell culture is widely used for research on biology as well as for pharmaceutical development. Whether cells are being grown for fundamental research or to develop new drugs and health products, current dishes used to culture them have limitations that impact their potential efficiency. The MECACHIPS project recently began its incubation at SATT Linksium in order to bring to market a new technology that overcomes this challenge.

#Fundamental Research — #Health — #Technology Management

GIANT EFFECT

This project is a hallmark for multidisciplinary collaboration. We've united the LTM's knowledge of microelectronic substrates with the expertise found in various laboratories at the Biosciences and Biotechnology Institute of Grenoble. Our technology was only made possible by a very close-knit collaboration that continues to this day.

ALICE NICOLAS
LTM Associate Researcher

In vitro cell culture is used to grow cells taken from biological tissues. Cell culture is used in fundamental research to analyze and understand cell mechanisms. It is also widely used by the pharmaceutical industry as it is the first step in the development of new drugs. However, current technology generally relies on plastic or glass dishes. *"These dishes have an important drawback: They're a million times more rigid than the natural biological environment in which a cell would normally grow,"* explains Alice Nicolas, an associate researcher at the LTM (Laboratory for Microelectronic Technology).

THE IMPORTANCE OF RIGIDITY

Scientists know that cells respond not only to their chemical environment but also their physical environment. Given their rigidity, the mechanical properties of plastic or glass dishes are very different from the physiological characteristics of a natural tissue environment. *"The growth of cells does not accurately mimic real-life situations. And the result is inefficient in vitro samples. For example, the drug development process has an 89% fail rate between the in vitro identification of a molecule and its registration as a potential medicine. Several studies have demonstrated that the success of lead molecules identified in vitro is in part dependent on the rigidity of the growth environment,"* underlines Alice Nicolas.

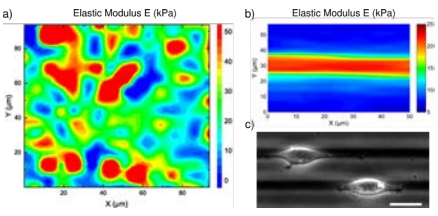
A HYDROGEL THAT PROVIDES MODULABLE RIGIDITY

In response to this issue, the scientists at the LTM developed the MECACHIPS production process which enables them to create hydrogels on the bottom of standard culture dishes. This enables scientists to adjust rigidity to better mimic real-life tissue environments. *"This technology's ability to biomimic a natural environment answers a growing demand in three markets: academic biology, cell preparation and the pharmaceutical industries,"* adds Alice Nicolas.

TRANSFER OF TECHNOLOGY WITH SATT LINKSIUM

The project, which is supported by the CEA and CNRS, recently finished its technological maturation at SATT Linksium. *"We've now entered the SATT Linksium incubation program in order to prepare the launch of a startup. Our technology is ready for market and we have a product catalog. We've started building a team and have signed our first contracts,"* highlights Alice Nicolas.

The SATT Linksium provided the scientists with fundamental support in terms of training to understand various aspects of the startup process: business strategy, HR, marketing and intellectual property rights. *"The SATT Linksium also provides us with important legal support, which helps us protect our intellectual property and set up fair contracts with a variety of business partners,"* concludes Alice Nicolas.



Our tissues are 1 million times softer than the plastic of culture dishes: here, human pituitary gland demonstrates rigidities around order of kPa, with micron-scaled heterogeneities.