

Wednesday, 24th March, 9.30am, Online

Host: Dr. Fernando López-Gallego

Organ on chip: Microfluidic devices to mimic the tissue microenvironment and some possible applications in cancer.

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Our body's tissues are complex structures made up of multiple cells and components of the extracellular matrix. Besides, each tissue has a singular biochemical and mechanical microenvironment that gives it a special uniqueness to which these tissues' cells are adapted. However, for many decades, researchers have tried to simulate these tissues using two-dimensional, non-stimulated cultures. This is one reason behind the multiple false positives that we find in preclinical in vitro results. To better simulate this tissue microenvironment, microphysiological systems (MPS) or Organ on Chips (OoC) have recently begun to be used.

An Organ-on-Chip (OoC) device is an advanced microfluidic system designed to recapitulate in vitro the microenvironment and/or some functions of a given organ or tissue. The OoC incorporates one or more specific characteristics of organs, such as the mechanical stimuli to which the tissue is subjected or the complex 3D structure, which allows modeling the function and the (patho-) physiological responses of the organs in real-time to treatments or environmental modifications.

This recently developed technology is becoming an increasingly used alternative to animal models in biomedical research since it is capable of incorporating various types of human cells (immune system, tumor, blood vessels, etc.) in environments biomimetics and can even simulate the interaction of several organs at the same time (body on chip).

The small size of the devices allows the direct use of cells from patients, thus bringing us closer to personalized medicine.

In this particular case, we are going to show some examples of possible applications in cancer.