

A NEW ORGAN-ON-CHIP CELL CULTURE DEVICE FOR THE STUDY OF CHOLANGIOCARCINOMA

A research group from Leartiker S.Coop, Donostia International Physics Center, Universidad del País Vasco/Euskal Herriko Unibertsitatea, Administración General de la Comunidad Autónoma de Euskadi and Consorcio Centro de Investigación Biomédica en Red (CIBER) has developed a new cell culture device suitable as an organ-on-chip device

The Need

Cholangiocarcinoma (CCA) is a tumor with a low survival rate and a high degree of interpatient heterogeneity. The study of tumor biology and the testing of new anticancer drugs are currently carried out using animal models, which do not fully reflect the human disease due to the differences between animals and humans.

Therefore, the development of alternative devices based on **Organ-on-Chip (OoC) technology** using human-derived cell cultures could enable the generation of highly useful *in vitro* models for the study of CCA.

The Solution

The developed device is a **3D in vitro Organ-on-Chip model** for the study of cholangiocarcinoma, both to investigate its biology and to test new treatments for this heterogeneous type of cancer.

Specifically, the developed **CCA-on-Chip** device is a polymer-based device compatible with large-scale plastic manufacturing technologies. It contains a central chamber where the hydrogel serving as a scaffold for the cells is placed, enabling the generation of a 3D model. In addition, the device incorporates a microfluidic circuit comprising channels, connectors, and membranes, which enable both cell seeding and culture medium perfusion, thereby supporting cell culture.

Innovative Aspects

- The use of human-derived cells, rather than animal models, enables the system to more accurately reflect human physiology and the response of human cells to different treatments.
- The system is an open platform that allows the co-culture of different cell types and their exposure to different flow conditions through the microchannels. This enables the direct study of different cell–cell interactions.
- In the developed device, both the materials used and the simple design of the device enable its production using large-scale plastic manufacturing methods, which could facilitate its commercialization and widespread adoption..
- The cell lines used in the model were selected based on previous studies carried out prior to its development, with the aim of reproducing as closely as possible the characteristics of tumors obtained from real patients.
- Once the culture is completed, the device design allows the 3D model to be retrieved and its biology characterized without the need to disrupt or damage the device..

Intellectual Property:

- International patent (PCT) filed in December 2025

Aims

Looking for a partner interested in a license and/or a collaboration agreement to develop and exploit this asset.



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