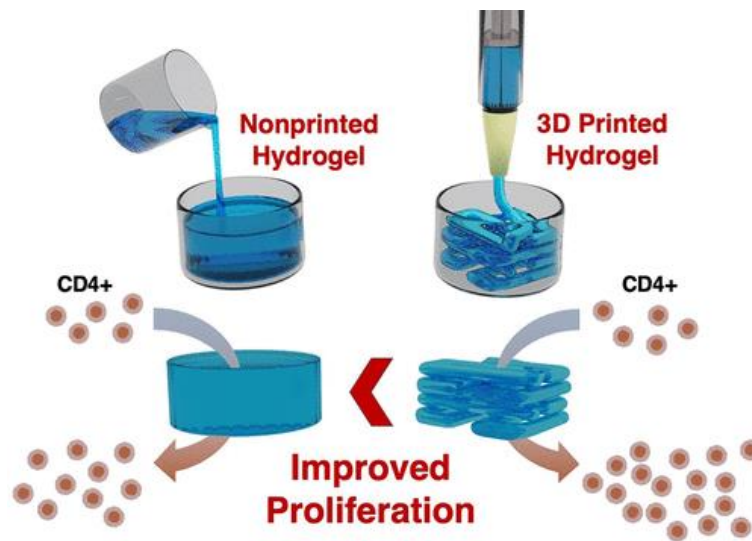


Biohybrid hydrogels and 3D printing to synthesize large amounts of cells used against cancer

A research team of ICMAB-CSIC scientists, with the participation of researchers from IBEC and universities UPC and UIC Barcelona, manages to scale-up biohybrid hydrogel matrices that improve the proliferation of human T-cells in cultures, moving closer to bringing the technique out of the laboratory.



Improved primary human T cell proliferation at the laboratory scale with lymph-node-inspired PEG-heparin 3D-printed hydrogels

Cellular immunotherapy, or in particular, adoptive cell therapy, has emerged as an efficient technique to combat cancer as well as autoimmune and infectious diseases. This treatment uses one's own immune system to eliminate cancerous cells. T-cells are part of the immune system and are particularly powerful against cancer. They are selected from the tumour or genetically modified to recognize it, cultured, and expanded *in vitro*, and finally reintroduced to the patient.

Nowadays, the method used to obtain the immune cells needed for these therapies consists of culturing the cells in liquid suspension. In previous studies, researchers from ICMAB had already proposed to add a matrix that reproduces the lymph nodes in the body, where the activation of T-cells normally occurs, as there is growing evidence about the influence of this immune microenvironment on the resulting cell products. In the multitude of natural and synthetic hydrogels used to replicate the matrix, polyethylene glycol (PEG)-heparin hydrogels have shown to enhance the human T-cell proliferation.

In this new study, researchers from ICMAB have demonstrated that PEG-heparin hydrogels can be successfully 3D printed: *"The possibility to 3D-print our lymph node-inspired hydrogels brings our technology closer to the clinics by ensuring their scalability and opens the way to new*

applications in tissue engineering.”, states Judith Guasch, Tenured Scientist at ICMAB, “next step is already to test the obtained T-cells in in vivo models”.

Reference:

3D Printing as a Strategy to Scale-Up Biohybrid Hydrogels for T Cell Manufacture

Eduardo Pérez Del Río, Sergi Rey-Vinolas, Fabião Santos, Miquel Castellote-Borrell, Francesca Merlina, Jaume Veciana, Imma Ratera, Miguel A. Mateos-Timoneda, Elisabeth Engel*, and Judith Guasch*.

ACS Applied Materials & Interfaces **Article ASAP**

DOI: [10.1021/acsami.4c06183](https://doi.org/10.1021/acsami.4c06183)

Contact:

[Judith Guasch](mailto:jguasch@icmab.es): jguasch@icmab.es.

[Dynamic Biometrics for Cancer Immunotherapy](#), ICMAB-CSIC.

ICMAB Communication: communication@icmab.es