

MIMETIC LYMPH NODES: 3D-printed hydrogels for immune cell culture

The Challenge

Immunotherapy offers a different approach than standard surgery, radiation, and chemotherapy procedures against cancer. It is based on employing and reinforcing the immune system of patients, surpassing cancer immunosuppression methods, detecting and eliminating malignant cells without damaging healthy tissues.

Adoptive cell therapy (ACT) is a personalized immunotherapy that has achieved complete remissions of advanced cancer patients. However, ACT requires large in vitro expansion steps of immune cells in order to have relevant quantities of therapeutic cells to be used as “alive drugs”. The implementation of these therapies to the clinics is limited by the current cell expansion methods.

The Asset

We have developed a new 3D scaffold that mimics the lymph nodes for the proliferation and differentiation of immune cells, such as T lymphocytes, ready for immunotherapy applications.

Our 3D hydrogel scaffold, loadable with immune-relevant molecules, provides higher cell proliferation rates and the capacity to tune cell phenotype by mimicking the lymph nodes.

The hydrogel can also be formulated as a (bio)ink that is compatible with 3D-(bio)printing.

The asset value

Hydrogels mimic the lymph nodes improving immune cell proliferation and differentiation.

Advantages of the functionalized hydrogels for 3D cell culture:

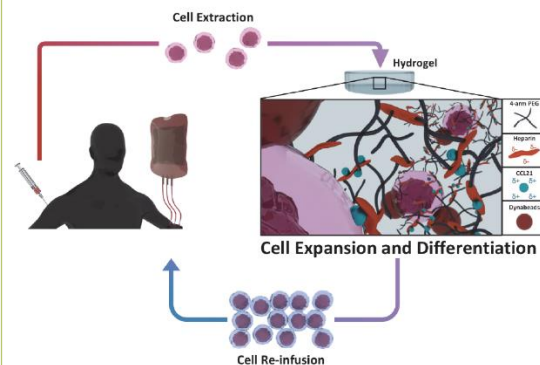
- Higher cell proliferation rates
- Tunable phenotype proportions
- Multiple combinations of immune-relevant molecules available to customize cell differentiation
- Compatible with 3D-(bio)printing

The Market

Our technology covers two large and fast-growing markets: cancer immunotherapy and 3D-bioprinting.

Cancer therapy market is one of the largest with very high growth rate and investments available. Our technology fits the adoptive cellular therapy (ACT) approach, which proved to be a successful strategy to target cancer. The global lymphoma treatment market size is expected to reach US\$ 26.4 billion by 2026, exhibiting a CAGR of 9.5%.

The 3D-(bio)printing market is projected to reach US\$ 1,647.4 million by 2024 from US\$ 651.6 million in 2019, at a CAGR of 20.4%.



Uses

- Cancer immunotherapy (lymphoma and potentially other cancer types)

Scientific Project Leader

Dr. Elisabeth Engel

<https://ibecbarcelona.eu/biomaterials>

Stage of development

TRL: 3-4

- In vitro validation of cell proliferation and differentiation on several cell lines.

Ongoing/next steps:

- In vivo validation to demonstrate efficacy and safety of an immunotherapy based on our technology.

Intellectual Property Status

PCT filed: PCT/EP2021/063643

Exploitation plan

Patent available for co-development and licensing

Contact

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