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Postdoc Research Activities

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Microencapsulation and differentiation of iPS for extracorporeal liver supply

Workplan Overview

“I am working in WorkPackage 3 and the target of the project is the development and the optimization of the encapsulation process of human pluripotent stem cells (hiPS) in order to improve their differentiation into a specific hepatic lineage. Specifically, iPS cells will be encapsulated in hydrogel beads in order to allow their growth in 3D biological surroundings where cell-cell interaction will take a primary role, mimicking a more native environment and protecting them from stresses sources.”

The first important step to carry out the project is the **growth and maintenance of the iPS pluripotency in culture** in order to guide their differentiation towards endoderm progenitors. Then, once encapsulated, the **differentiation into the hepatic lineage** will be performed. Using a 2D system as term of comparison, the expression of selected marker for the hepatic differentiation will be evaluated and specific products of liver metabolism will be quantified.”

The bigger Picture

“I believe that the possibility of contributing to the research for developing innovative (bio)artificial devices for treatment of kidney and liver disease is an exciting prospective.”

The future perspectives of the project are numerous, such as the further cultivation and evaluation of the encapsulated iPS under dynamic system in bioreactors, where through the medium inflow and outflow, the fluid-dynamic properties of the system play the major role in reproducing the physiologic conditions of a native tissue.

Furthermore, the differentiated encapsulated cells could be further used as biological components in extracellular circuit, for the development of new bio-artificial liver systems or implanted in relevant pre-clinical models.”