PROJECT FACTSHEET

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IMPROVE-STEM

INSPIRATION

The project stems from a fact: stem cells are a major step forward in medicine but usual cell cultures methods (t-flasks) do not provide sufficient amounts for clinical studies nor clinical application.
Upscaling and automation of the process will be required in the near future to ensure reproductibility and quality of the cell acquisition process. So far, the most promising technique is based on the use of microbeads that provides a large adhesion surface. Those microbeads are suspended in a stirred bioreactor allowing stem cells to grow at their surface. this technique, already use for animals cell culture (vaccine production), presents special issues for stem cells that need to be harvested without being damaged.

INNOVATION

The aim of the project Improve-Stem is to develop an integrated set of tools required for mesenchymal stem cells amplification (MSC) to promote their application in clinical cell therapy. Those tools will be based on the development of microcarriers with optimised surface design allowing the control of cell adhesion alongside to the design of an adapted bioreactor with operating conditions adjusted for stem cell culture on microcarriers. Cell behavior will be monitored to ensure quality, homogeneity and purety of the cells.
To conduct this research project, the multidisciplinary consortium brings together advanced skills in materials science, bioprocess engineering and cell biology.

IMPACT

On the medium term, IMPROVE- STEM should provide an original solution to facilitate the large scale production of MSC in a controlled culture medium, according to pharmaceutical Good Manufacturing Practice (GMP) standards.
In parallel, the regrouping of the partner provides, at the level of the Greater Region, a solid basis for the setting-up a platform of excellence in the field of mesenchymal stem cells culture.

Partners
Leibniz Institute for New Materials (DE) , Technische Universität Kaiserslautern (DE) , University of Liège (BE) , Université de Lorraine (FR) , National Center for Scientific Research - CNRS (FR)

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