H2020 PROJECT TACKLES DIABETES

The LSFM4LIFE project aims to develop clinical-grade (GMP-compliant) **Human Pancreas Organoids** (hPOs) for the cell-based therapy of Type 1 Diabetes (T1D).

This research project, funded by the European Union's Horizon 2020 Programme, involves **8 teams from 6 different European countries**. These partners are dedicated to develop tools and technologies for a cell-based therapy.

By achieving its goal, LSFM4LIFE will enable hPOs transplantation that will **relieve T1D patients from monitoring and injecting insulin**.

THE GLOBAL BURDEN OF DIABETES

Amongst the **415 million people** who are affected by diabetes **5% are concerned by T1D**, due to an autoimmune destruction of the insulin-producing pancreas cells. This incurable disease is mostly diagnosed in children and young adults, whose lives would be **in danger without a daily insulin therapy**.

The number of children in Europe and in the USA with T1D is growing by 4% each year.

Advances in healthcare and increased public awareness resulted in improved management of this disease. However, **the burden of T1D remains considerable** for the patients and those around them. Their medical expenditures are approximately **2.3 times higher than the average** and the diabetes healthcare costs (including medical and indirect costs) account for $673 billion, representing **12% of global health expenditure**.

LSFM4LIFE OBJECTIVES

- Developing **insulin-producing human pancreas organoids** (hPOs)
- **Creating an animal-free** and well-defined three-dimensional matrix for the growth of hPOs
- **Establishing industrial quality standards** for the translation of the hPO technology to clinics
- **Analyzing the growth** and differentiation of hPOs with the innovative high-throughput light sheet microscope (HT-LSFM)
- **Developing a process** for clinical-grade hPO production
- Translating conventional hPOs culture into **therapy-compatible hPOs** production

INNOVATION

WP3: Pancreas Organoid Production

hPOs are developed with stably expressing fluorescently-tagged markers

WP4: Optimization and Quality Control

LSFM multi-well plates with standard handling and automation

WP7: In vivo Testing of Pancreas Organoids

Limitless expandable hPOs requires only 1 donor for many recipients

WP5: Biomimetic Hydrogel Scaffold

Biomimetic hydrogel with well-defined chemical composition ensures the growth of the hPOs under reproductible and safe conditions

WP6: Translation to Industrial Quality Standards

hPO production is translated to GMP-compliant processes

WP1: Project Coordination

Scientific coordination and project management

WP2: Project Impact

Communication and dissemination activities

LSFM4LIFE MILESTONES

2016 — 2019

January 2016
LSF4LIFE project starts

December 2017
Quality criteria for undifferentiated and differentiated hPOs

April 2018
Optimization of differentiation protocol

August 2018
Demonstration of functional efficiacy of hPOs in vivo

December 2018
Genetic stability assessment after long-term in vitro expansion

December 2019
Upscaling strategy for extracellular matrix (ECM) production and hPO formation

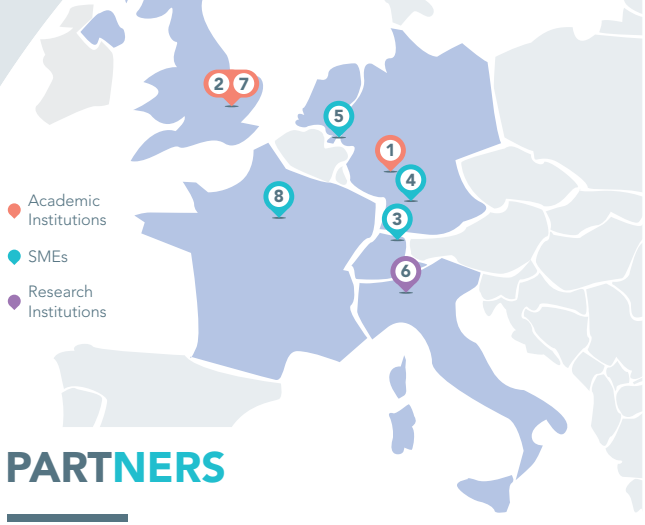
6
COUNTRIES

8
PARTNERS

4 YEARS
PROJECT DURATION

5.1 M€
FUNDING FROM THE EU

START 2016
END 2019



PARTNERS

1 GOETHE UNIVERSITÄT FRANKFURT AM MAIN
Leader of the project, optimization and quality control of hPO

2 Gurdon INSTITUTE
Pancreas organoids production and differentiation to beta-cells

3 insphero
Characterization and quality control of hPOs by standard non-imaging luminescent and fluorescent endpoint assays

4 CELLENDES Cell • Environment • Design
Biomimetic hydrogel scaffolds development for the expansion of pancreatic organoids

5 Pharma Cell Advanced Therapies
Translation of the research protocol to a regulatory-compliant GPM

6 Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico — Sistema Socio Sanitario Regione Lombardia
GPM batch of undifferentiatec hPO qualified for clinical trial

7 UNIVERSITY OF CAMBRIDGE
Implantation of hPO in vivo and functional assays procedure

8 SPARKS & CO
Communication, disseminatio and exploitation

Want to know more?

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LSFM4LIFE

Production & Characterization of endocrine cells derived from human pancreas organoids for cell-based therapy of type 1 diabetes

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