Title of the thesis	Developing a 3D dynamic microfluidic device of pancreatic beta cells and adipocytes to modelize multi-organ crosstalks during type 2 diabetes development
Acronym	Micro3DBeta
Reference number	016

Hosting institution	**Employer**
Université de Lille Website: https://www.univ-lille.fr/home/	CNRS Website: http://www.cnrs.fr/en
Hosting research unit 1	**Hosting research unit 2**
Name: European Institute Genomic for Diabetes Acronym: EGID Identification number: U1283/UMR8199 Address: Faculté de Médecine - Pôle Recherche 1 place de Verdun 59045 Lille Cedex - France Website: http://www.egid.fr/accueil/	Name: Institute of Electronic, Microelectronic and Nanotechnologies Acronym: IEMN Identification number: UMR 8520 Address: Cité Scientifique Avenue Henri Poincaré CS 60069 59 652 Villeneuve d'Ascq Cedex, France Website: https://www.iemn.fr/
Principal supervisor	**Co-supervisor**
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Thesis information

Keywords	Microfluidic, beta cells, insulin, organ on chip, diabetes
Abstract	Type 2 Diabetes (T2D) is characterized by permanent high blood glucose levels and develops due to inadequate pancreatic beta cell function (i.e. insulin secretion) and mass (i.e. decreased proliferation or increased senescence) in the face of peripheral insulin resistance. The loss of beta cell mass and function is thought to play a major role in the pathogenesis of T2D. Counteracting beta cell loss represents a new and original path towards alternative treatments for T2D. Albeit several studies have reported a deleterious effect of peripheral tissues - including adipose tissue - on beta cell mass and function, the precise and dynamic molecular mechanisms underlying organ crosstalk-related beta cell dysfunction in triggering T2D remain uncovered. It is well known that disease progression is due to the disruption of the homeostatic crosstalk of multiple organs. However, the current approaches such as animal experiments do not allow to precisely define how organs communicate and what are the consequences of such interactions in physiology and disease. Thus, there is an urgent need for the development of advanced in vitro models that can recapitulate organ crosstalks and organoid complexity with the potential to identify new paths to propose original treatments for Diabetes. The development of alternative approaches to animal testing is also strengthened by the 3Rs rule (Replace, Reduce, Refine) of the European commission (Directive 2010/63/EU) governing animal use. In the PhD project entitled "Developing a 30 dynamic microfluidic device of pancreatic beta cells and adipocytes to modelize multi-organ cross-talks during type 2 diabetes development" (Micro3OBeta), we will go beyond these challenges by developing multi-disciplinary and intersectoral approaches to implement microfluidic platforms

	dedicated to the specific analysis of the organ cross-talk in the context of T2D. This research project will be co-supervised by experts in T2D research, micro/nanotechnologies and organoid development. These studies will be conducted in the Research Unit CNRS UMR8199 at the European Genomic Institute for Diabetes, in the Institut d'Electronique, de Microélectronique et de Nanotechnologies (IEMN), and in close collaboration with our private partner HCS Pharma. Our research centers are all located in Lille (Northern France), a very active and attractive city. At the intersection of Brussels, Paris, and London, the city has a University of 70,000 students.
Expected profile of the candidate	- A Master degree with a strong background in molecular and cell biology and/or microfluidic technologies - Some experimental experience with in vivo experiments - Some experimental experience in micro machining in clean room - Experience with cell culture and pancreatic islet isolation is appreciated - Background in the area of metabolic disease and/or diabetes research - Excellent oral and written communication skills - Able to work in a team setting. - Fluency in English is required.
Application procedure	The application procedure is detailed on the European programme PEARL website www.pearl-phd-lille.eu. The funding is managed by the I-SITE ULNE foundation which is a partnership foundation between the University of Lille, Engineering schools, research organisms, the Institut Pasteur de Lille and the University hospital. The application file will have to be submitted before April 15, 2020 (10h Paris Time) and emailed to the following address : international@isite-ulne.fr.
Net salary and Lump Sum	A net salary of about €1,600 + €530 per month to cover mobility, travel and family costs.