ID: MSCA-19-Heimberg01

Discipline: Medicine and Pharmacy

Title: Mechanisms behind generation of beta cells in injured pancreas

Abstract: Diabetes is a major health problem worldwide that is reaching pandemic dimensions. The disease is treated by drugs that support or partially replace beta cell function but can’t be cured at presence. A true regenerative therapy would greatly improve the quality of life for diabetes patients and could avert its costly long-term complications. One of the major challenges towards cure is well controlled generation of beta cells.

We developed experimental models that allow the investigation of mechanisms that increase the number of beta cells. One of these models, partial duct ligation (PDL), is based on a micro-surgical intervention that ligates the exocrine duct that drains the tail part of the pancreas and results in a doubling of the beta cell mass (Xu et al, Cell 2008; Van de Casteele et al, Diabetes 2013). The increase in cell number is caused by activation of facultative progenitor cells as well as by proliferation of pre-existing and newly formed beta cells.

We currently elaborate on the identification of the facultative progenitor cells and the cellular and molecular mechanisms that drive beta cell generation in the injured mouse pancreas using state of the art facilities for cell imaging, like light sheet microscopy and single cell gene expression profiling. Our aim is to apply the essential signals to cells of the human pancreas to induce progenitor cell activation and beta cell proliferation.

Supervisors: Nico De Leu, Nico.De.Leu@vub.ac.be, Harry Heimberg, Harry.Heimberg@vub.ac.be

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