Researchers prove that insulin-producing cells can give rise to stem-like cells in-vitro

July 21 2008

The question of whether insulin-producing cells of the pancreas can regenerate is key to our understanding of diabetes, and to the further development of regenerative therapies against the disease. Dr Rosenberg from the McGill University Health Centre (MUHC) and McGill University together with Dr Bernard Massie from the Centre hospitalier de l'Université de Montréal (CHUM) have just concluded that they can. The results of their study have been published in the July issue of the journal *Laboratory Investigation*.

The researchers have shown in vitro that insulin-producing β-cells (beta cells) can return to a more primitive developmental state called stem-like cells. This process is known as "dedifferentiation" and highlights the plasticity of this cell type. This same result has also been validated for the three additional types of cells that – along with β-cells – make up the islets of Langerhans. Together, these islet cells produce insulin and other hormones in the pancreas.

"The potential for dedifferentiation of all the different cells that make up the islets of Langerhans is a totally new finding," Dr. Rosenberg said.

"At this stage, we can't confirm whether the cells' ability to turn into stem-like cells occur naturally in a healthy pancreas, but the results are very encouraging for the development of regenerative therapies to fight diabetes," he continued. The cell's in-vitro plasticity opens up totally new avenues of investigation into the underlying causes of diabetes, and will validate the development of innovative treatments.

This study is the latest step in an extensive regenerative therapies research program based on a peptide called Islet Neogenesis Associated Protein, or INGAP. Dr. Rosenberg and his colleagues have demonstrated INGAP's potential to induce new islet formation in the pancreas. Clinical trials with INGAP have already demonstrated that it is possible to regrow new functional insulin-producing cells in diabetic patients.

"We know that the peptide works, but we are still lacking certain theoretical bases to explain its mechanism," said Dr. Rosenberg. "This finding will allow us to move ahead on firmer ground."

Source: McGill University