Consistent and successful islet isolations offer diabetes hope

June 3 2010

A team of researchers from several collaborating Baylor University research centers and from Japan's Okayama Graduate School of Medicine have found a way to more consistently isolate pancreatic islet cells from brain dead donors using ductal injection (DI), a process that immediately cools donor islet cells at the injection site. The more successful islet isolation process resulted in the three type 1-diabetes patients, who received islet cell transplants, becoming insulin independent.

Their study is published in issue 19(3) of *Cell Transplantation* and it is now freely available on-line at http://www.ingentaconnect.com/content/cog/ct/ .

"Inconsistent islet isolation is one of the important issues in clinical islet transplantation," said Dr. Shinichi Matsumoto, the research team's lead author. "Failure of donor islet isolation often results from the loss of the donor pancreas. Our simple modification of the retrieval process appears valuable for assuring greater success in islet transplantation."

Ductal injection is a procedure that modifies the islet isolation process using a cooling solution on the pancreatic islet cells derived from brain-dead donors. The cooling solution, applied at the donor's pancreatic ductal site, aids the viability of the islet cells.

The team successfully isolated islet cells in the DI group seven times while only three out of eight islet cell groups were isolated in the

nonductal injection group. When islets from the DI group were transplanted into three type 1 diabetic patients, all three became insulin independent.

"DI significantly improved the quantity and quality of isolated islets and resulted in a high success rate of clinical islet transplantation," said Dr. Matsumoto.

According to the research team, a fifty percent success rate for clinical islet isolation has been standard; they were able to achieve a better than 80 percent success rate using DI.

The team reported that there were no significant demographic or clinical differences in the two patient groups receiving islet transplants, nor were there significant differences in the donated pancreata. All donor pancreata were preserved for less than six hours. Each patient received two islet preparations.

"In the DI group, the fasting blood glucose of all three patients improved after a single islet transplantation, and improved further after the second transplantation," commented Dr. Matsumoto. "None of these patients experienced subsequent hypoglycemia, and all three became insulin independent."

The team had recently shown that the DI process was successful in animal models because DI prevented tissue and cell death, suggesting that DI improved the quality and quantity of the isolated islet cells destined for transplantation.

"The number of islets isolated from donor pancreata continues to be quite variable and many times are not sufficient for clinical transplantation" said Dr. Rodolfo Alejandro, section editor for Cell Transplantation and Professor of Medicine at the University of Miami

Miller School of Medicine. "This paper describes a novel approach to improve islet isolation yields. These are promising results that need to be confirmed in a randomized concurrent protocol".

Provided by Cell Transplantation Center of Excellence for Aging and Brain Repair