

Mouse pancreatic stem cells successfully differentiate into insulin producing cells

September 25 2012

In a study to investigate how transplanted islet cells can differentiate and mature into insulin-producing pancreatic cells, a team of Japanese researchers found that using a specific set of transcription factors (proteins that bind to specific DNA sequences) could be transduced into mouse pancreatic stem cells (mPSCs) using Sendai virus (SeV), a mouse influenza virus, as a carrier, or vector. The study is published in a recent issue of *Cell Medicine* [3(1)], now freely available on-line.

"Diabetes is one of the most serious and prevalent metabolic diseases," said study co-author Dr. Hiroshi Yukawa, Department of Advanced Medicine in Biotechnology and Robotics, Nagoya University Graduate School of Medicine. "Islet cell transplantation has proven effective, however this strategy requires sufficient organ donors."

Given the shortage of donors, the researchers investigated factors that could impact on the expansion and differentiation of pancreatic stem cells (PSCs) into insulin-producing cells using combinations of varieties of transcription factors and the SeV mouse virus to carry the cells, thus increasing the number of functional <u>islet cells</u> available for transplantation.

SeV vectors, said the researchers, are superior to conventional virus vectors because "they do not go through a DNA phase" and can introduce foreign genes without toxicity into a variety of cell types.

The combination of transcription factors that produced the greatest



impact on the differentiation of PSCs into insulin cells was Pdx-1
(Pancreatic and duodenal homeobox 1), NeuroD (neurogenic differentiation) and MafA (musculoaponeurotic fibrosarcoma oncogene A). "Our data suggest that the transduction of transcription factors using SeV vectors facilitates mPSCs differentiation into insulin producing cells and showed the possibility of regenerating B-cells by using transduced PSCs," concluded the researchers.

More information: Yukawa, H.; Noguchi, H.; Oishi, K.; Miyamoto, Y.; Inoue, M.; Hasegawa, M.; Hayashi, S. Differentiation of Mouse Pancreatic Stem Cells into Insulin-Producing Cells by Recombinant Sendai Virus-Mediated Gene Transfer Technology Cell Med. 3(1):51-61; 2012.

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

Citation: Mouse pancreatic stem cells successfully differentiate into insulin producing cells (2012, September 25) retrieved 10 May 2024 from https://medicalxpress.com/news/2012-09-mouse-pancreatic-stem-cells-successfully.html

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