

Neural stem cell transplant may tackle diabetes

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Researchers in Japan have discovered how a patient's neural stem cells could be used as an alternative source of the beta cells needed for a regenerative treatment for diabetes. The research, published in *EMBO Molecular Medicine* today, reveals how harvesting stem cells could overcome a lack of beta cell transplants from donors.

Diabetes is caused by a lack of insulin production by the pancreas and affects more than 200 million people worldwide. There is currently no cure, leaving patients to rely on external supplies of insulin or treatments to alter levels of blood glucose.

The research, led by Dr Tomoko Kuwabara from the AIST Institute in Tsukuba, Japan, focus on developing methods for defining human [stem cell differentiation](#), the process through which cells can be adapted to a specialized role, for use in cell replacement treatments.

"As diabetes is caused by the lack of a single type of cell the condition is an ideal target for cell replacement treatments," said Kuwabara.

"However donation shortages of [pancreatic beta cells](#) are a major hurdle to advancing this treatment. So a safe and easy way of using stem cells for obtaining new beta cells has been long awaited."

The hippocampus and olfactory bulb, at the front of the brain provide an easily accessible tissue source for cells that could be transplanted directly into the pancreas. Normally [neuronal cells](#) do not produce high levels of insulin, [pancreatic cells](#) do.

However, once they had been transplanted into diabetic rats the cells not only started to express several key characteristics of pancreatic beta cells, but insulin production was increased and [blood glucose levels](#) were reduced. The removal of the transplant increased levels of blood glucose, revealing that transplanting [neural stem cells](#) into the pancreas could be an effective treatment for diabetes.

"The discovery of stem cells which have virtually unlimited self-renewal raises great expectations for their use in regenerative medicine. The isolation and cultivation of stem cells as a renewable source of beta cells would be a major breakthrough," wrote Onur Basak and Hans Clevers, from the Hubrecht Institute for Development Biology and Stem Cell Research, in their close up paper, published in the same issue of *EMBO Molecular Medicine*.

"Dr Kuwabara's team found that transplanting neural stem cells directly into the pancreas can unleash their intrinsic ability to act as critical regulators of [insulin production](#), and most importantly they demonstrated that the cells could be gained from a patient without the need for genetic manipulation."

"Our findings demonstrate the potential value of neural stem cells for treating diabetes without gene transfer," concluded Kuwabara. "This presents an original strategy to overcome the donor shortage which has hindered cell replacement therapy."

Provided by Wiley

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