MedicalXpress

Research advances potential for regeneration as a possible cure for type 1 diabetes

February 3 2010

A hormone responsible for the body's stress response is also linked to the growth of insulin-producing cells in the pancreas, according to JDRF-funded researchers at the Salk Institute for Biological Studies in California. The findings are the latest advances to underscore the potential for regeneration as a key component of a possible cure for type 1 diabetes.

The research, which was published in the Proceedings of the National Academy of Sciences, was led by Wylie Vale, Ph.D., Professor and Head of the Clayton Laboratories for Peptide Biology and Mark O. Huising, Ph.D., a postdoctoral fellow at the Clayton Foundation Laboratories. The Juvenile Diabetes Research Foundation was a funder of the study.

According to Patricia Kilian, Ph.D., Program Director for Regeneration at JDRF, the study showed that the stress hormone could increase the rate at which insulin-producing cells in the pancreas expand in animal models. These findings reinforce the potential of regeneration as a cure for diabetes and provide insights for discovering new approaches to treat people with diabetes by restoring or regenerating their ability to produce insulin.

Regeneration Research

Among the fastest-growing scientific areas JDRF supports is research

aimed at regenerating insulin producing cells in people who have diabetes (as opposed to transplanting cells from organ donors or other sources). This involves triggering the body to grow its own new insulin producing cells, either by copying existing ones - some are usually still active, even in people who have had diabetes for decades - or causing the pancreas to create new ones.

JDRF has become a leader in this new and exciting research field, funding a wide range of research projects such as the Salk Institute study and creating an innovative diabetes drug discovery and development partnership with the Genomics Institute of the Novartis Foundation (GNF), focused on regeneration approaches. With a team of 550 scientists and associates and an impressive track record of success in translational research, GNF applies innovative technologies to the discovery of new or improved therapeutics for people.

In addition to regenerating or replacing insulin producing cells, a cure for type 1 diabetes will also involve stopping the autoimmune attack that causes diabetes, and reestablishing excellent glucose control.

Role of Stress Hormones in Insulin Producing Cells

Research conducted by Dr. Vale's laboratory since the 1980s established the role of the hormone CRF (corticotropin-releasing factor) in regulating the stress response in people. With this research, the team now reports that CRF has a direct effect on how insulin producing cells in the pancreas function and grow.

"We found that beta cells in the pancreas actually express the receptor for CRF," explains Dr. Huising. "And once we had established the presence of CRF in these cells, we started filling in the blanks, trying to learn as much as we could."

These results showed that when beta cells are exposed to the hormone, and to high levels of blood sugar, they will produce and release insulin. Working in collaboration with researchers at the Panum Institute in Copenhagen, the investigators discovered that these insulin producing cells proliferate when exposed to CRF.

"Being able to stimulate beta cells to divide a little faster may be part of a solution that may ultimately, hopefully, allow management of type 1 diabetes," Dr. Vale says. "But because it is an autoimmune condition, making the cells divide won't be enough. That is why researchers are working hard to solve the problem of destruction of beta cells."

Provided by Juvenile Diabetes Research Foundation International

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