Stem Cells synergize with immune modulation for treatment of type 1 diabetes

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Technology description

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Researchers at the University of Missouri-Columbia have developed a novel method to treat type I diabetes (T1D). While insulin is necessary for survival, it does not treat the disease. The inventors had previously shown that an Ig-GAD2 regimen given to non-obese diabetic mice prevented disease progression. By accompanying their previous methods with the transfer of bone marrow cells from healthy donors, researchers were able to induce immune modulation of islet inflammation, repair islet vasculature and sustain regeneration and function of insulin-producing cells, leading to the reversal of overt T1D. While the bone marrow cells gave rise to the endothelial cells in the pancreas, the new beta-cells were of host origin. Also, the treatment ablated insulin-resistance associated with the onset of T1D. Thus, overcoming T1D requires both immune modulation and repair of the vascular niche to preserve the newly formed beta-cells.

Publications:

Wan X, Guloglu FB, VanMorlan AM, Rowland LM, Zaghouani S, Cascio JA, Dhakal M, Hoeman CM, Zaghouani H. Recovery From Overt Type 1 Diabetes Ensues When Immune Tolerance and b-Cell Formation Are Coupled With Regeneration of Endothelial Cells in the Pancreatic Islets. J of Diab 62: 2879-2889, 2013

Application area

Reduced health care costs by eliminating the need for insulin.Combinatorial approach using Ig-GAD2, GAD peptide, and donor bone marrow stem cells

Advantages

Synthesis of host beta-cells and endothelial cells derived from donor bone marrow stem cells. Restoration of beta-cells production and repair of islet endothelial niche.

Institution

University of Missouri, Columbia

Inventors

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