

Abstract citation ID: bvac150.802

## **Diabetes & Glucose Metabolism**

***PSUN231***

***Adoptive Cell Transfer for Type 1 Diabetes Reversal***

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We have discovered a way to cure type 1 diabetes in a mouse model that closely resembles the human disease. Specifically, we are able to genetically modify blood cells from affected individuals and re-infuse them back to rescue insulin-producing beta cells being destroyed by the immune system. When autoimmune diabetes affects the youth, it is known as Juvenile or type 1 diabetes (T1D). It is named Latent Autoimmune Diabetes of Adults (LADA) when it affects adults. T1D affects about 1 million people in the USA. LADA is estimated to affect at least 10% of the type 2 diabetes population (about 30 million patients in the USA). Combined, 4 million people live with the condition. Can you imagine reversing type 1 diabetes at once? Autoimmune diabetes as a whole is a disease without a cure that is chronically managed with insulin replacement. Even under best management, diabetes complications shorten life expectancy, including blindness, amputations, and kidney failure. These are the population that will benefit from our technology. Starting with new-onset diabetes, the technology can benefit almost any patient with autoimmune diabetes. Our group has developed two currently patented technologies that achieve the goal of reversing type 1 diabetes (our value proposition). One is a new spontaneous, humanized, transgenic mouse model of human T1D (1). The other one is an adoptive cell transfer (ACT) therapeutic approach for T1D (2). A 30-day pre-clinical study in which animals with diabetes were treated with this therapeutic approach provided the proof-of-concept that diabetes CAN BE CURED. Our technology involves a standard-of-care approach already Federal Drug Administration (FDA) approved for cancer treatment (ACT of Chimeric Antigen Receptor, CAR, T cells). We have the materials and know-how needed for the large-scale pre-clinical trial we are currently running. This will generate the necessary data for Investigational New Drug, IND, FDA filing so human clinical trials can be carried out.

**References** 1. Imam, S., Alfonso-Jaume, M., Jaume, J.C. (2019). Spontaneous Autoimmune Diabetes in Humanized Mice Carrying Human Type 1 Diabetes Susceptibility and Uses Therefor. United States Application No. 16530452, Publication Number. US20200037586. <https://patentscope.wipo.int/search/en/detail.jsf?docId=US283198965&tab=NATIONALBIBLIO>

2. Imam, S., Jaume, J.C. (2020). Immunosuppressive Antigen-Specific Chimeric Antigen Receptor Treg Cells for Prevention and/or Treatment of Autoimmune and Alloimmune Disorders. International Application No. PCT/US2019/060593, Publication Number WO/2020/097546. [https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2020097546&\\_cid=P10-KHXN2B-33433-1](https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2020097546&_cid=P10-KHXN2B-33433-1)

*Presentation:* Sunday, June 12, 2022 12:30 p.m. - 2:30 p.m.