American Diabetes Association.

85TH SCIENTIFIC SESSIONS
CHICAGO, IL | JUNE 20–23, 2025

Embargoed until June 20, 2025 at 6:30pm CT

Stem Cell-Derived Islet Therapies Shown to Reduce the Need for Injectable Insulin

Breakthrough Studies Demonstrate Stem Cell-Based Technologies as a Potential Alternative Treatment for Type 1 Diabetes

CHICAGO, IL (JUNE 20, 2025) – Findings from two studies reveal advancements in stem cell-derived treatment options to treat type 1 diabetes. Results from the FORWARD study, also simultaneously published in the *New England Journal of Medicine* (*NEJM*), evaluating the first and only allogeneic, stem-cell derived, islet cell therapy and a study of genetically modified stem cells were unveiled as an oral presentation and late-breaking poster, respectively, at the 85th Scientific Sessions of the American Diabetes Association® (ADA) in Chicago.

Since the 1920s, the standard of care for type 1 diabetes was insulin replacement therapy—requiring millions of Americans to administer insulin via a pump or injection multiple times a day. There is a growing body of research for alternative treatment solutions including allogenic therapies, where stem cells are used to regenerate damaged or impaired tissues as well as insulin production.

"Stem cell therapy is showing tremendous promise in transforming type 1 diabetes care, offering real hope for insulin independence," said Marlon Pragnell, the ADA's vice president of research and science. "With advances in genetic engineering, these therapies may one day also evade immune attack—eliminating the need for immunosuppressive drugs."

First-of-Its-Kind Allogenic, Stem Cell Treatment Reduces Injectable Insulin Use in All Participants

Findings from the Phase 1/2 FORWARD clinical study—evaluating the safety and efficacy of the stem cell-derived islet product VX-880 for improving glycemic control and reducing the need for exogenous insulin in adults with type 1 diabetes—were presented as an oral presentation at this year's Scientific Sessions and simultaneously published in the *NEJM*.

The Phase 1/2, open-label three-part study enrolled 12 adult participants with type 1 diabetes and impaired awareness of hypoglycemia complications to assess the implementation of VX-880, the first and only allogeneic, stem-cell derived, fully differentiated insulin-producing islet cell therapy on glycemic control in pivotal

development. Participants received a full dose of VX-880 islets, transplanted into the liver via a portal vein infusion under a standard immunosuppression drug regime.

All 12 participants demonstrated restoration of endogenous insulin secretion (measured as C-peptide), elimination of severe hypoglycemia events, and achievement of recommended glycemic control targets (A1C <7% and time in range >70%). The treatment reduced exogenous insulin use in all patients (mean reduction of 92%) and eliminated exogenous insulin use in 10 patients. Adverse events related to the use of VX-880 were consistent with typical islet infusion procedures and existing immunosuppressive drug regimens, and no additional adverse symptoms were observed in any of the participants.

“Hypoglycemia remains a dangerous risk for individuals with type 1 diabetes who are dependent on exogenous insulin administration,” shared Michael Rickels, MD, MS, Willard and Rhoda Ware professor in diabetes and metabolic diseases, Division of Endocrinology, Diabetes & Metabolism, University of Pennsylvania Perelman School of Medicine and presenting investigator. “These findings indicate the potential for a novel cellular therapy that restores endogenous insulin secretion to improve outcomes for type 1 diabetes patients who have been struggling to achieve glycemic control.”

The FORWARD study is now in phase 3 which aims to complete enrollment and dosing of approximately 50 participants throughout 2025. Additionally, they plan to launch a VX-880 islet-after-kidney study involving around 10 adults with type 1 diabetes who are already receiving immunosuppressive therapy following a prior kidney transplant.

Stem Cell-Based Treatment with Safety Switch Shows Potential for Patients with Type 1 Diabetes

Findings demonstrating the early-stage success of genetically modified stem cell-derived islet (SC-islet) replacement therapies for the treatment of type 1 diabetes, leveraging a novel safety feature, were presented as a late-breaking poster.

Researchers used genetically engineered human embryonic stem cell (hESC) lines to develop specialized cells designed to evade immune system attacks with the integration of eight added protective genes to the SC-islets. The treatment included an inducible kill switch as a safety feature designed to eliminate unwanted or fast-growing cells when activated, using a common, Food and Drug Administration (FDA)-approved antiviral drug (Ganciclovir).

Results showed the specialized cells effectively produced insulin and showed strong and consistent immune evasion while in the cell culture phase of testing. The genetically

engineered hESC lines efficiently differentiated into insulin-secreting SC-islets in vitro. When co-cultured with various immune cell types, the SC-islets suppressed immune cell activation and were resistant to immune cell-mediated killing, meaning they successfully evaded immune system attacks. The added safety switch effectively destroyed unwanted cell growth.

“Lab-grown insulin-producing cells show great potential for treatment of type 1 diabetes, but immune system attacks to implanted cells pose an ongoing challenge,” said Jia Zhao, PhD, postdoctoral researcher, University of British Columbia and presenting investigator of the study. "These early results show potential for safer, longer term cell therapy for diabetes as we look to provide patients with solutions without the need for harmful immune-suppressing drugs.”

Researchers are now testing these cells in animals to see if they can avoid immune attacks and if the safety switch works as expected in the body.

Research presentation details:

Dr. Rickels will present the findings as an oral presentation during the regular abstract session:

- Innovation and Progress in Stem Cell-Derived Islet-Cell Replacement Therapy
    - *Durable Glycemic Control and Elimination of Exogenous Insulin Use with VX-880 in Patients with Type 1 Diabetes (T1D)—VX-880-101 (FORWARD)*
- Presented on Friday, June 20 at 6:15 p.m. CT

Dr. Zhao will present the findings at the late-breaking poster session presentation sessions:

- *Immune-Shielded Islets from Engineered Human Pluripotent Stem Cells for Potential Allogeneic Therapy*
- Presented on Sunday, June 22 at 12:30 p.m. CT

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About the ADA’s Scientific Sessions

The ADA's 85th Scientific Sessions, the world's largest scientific meeting focused on diabetes research, prevention, and care, will be held in Chicago, IL, on June 20–23. Thousands of leading physicians, scientists, and health care professionals from around the world are expected to convene both in person and virtually to unveil cutting-edge research, treatment recommendations, and advances toward a cure for diabetes. Attendees will receive exclusive access to thousands of original research presentations

and take part in provocative and engaging exchanges with leading diabetes experts. Join the Scientific Sessions conversation on social media using #ADASciSessions.

About the American Diabetes Association

The American Diabetes Association (ADA) is the nation's leading voluntary health organization fighting to end diabetes and helping people thrive. This year, the ADA celebrates 85 years of driving discovery and research to prevent, manage, treat, and ultimately cure—and we're not stopping. There are 136 million Americans living with diabetes or prediabetes. Through advocacy, program development, and education, we're fighting for them all. To learn more or to get involved, visit us at diabetes.org or call 1-800-DIABETES (800-342-2383). Join us in the fight on Facebook (American Diabetes Association), Spanish Facebook (Asociación Americana de la Diabetes), LinkedIn (American Diabetes Association), and Instagram (@AmDiabetesAssn). To learn more about how we are advocating for everyone affected by diabetes, visit us on X (@AmDiabetesAssn).