

TZIELD® Phase 3 data presented at ISPAD shows potential to slow the progression of Stage 3 type 1 diabetes in newly diagnosed children and adolescents; full data simultaneously published in [The New England Journal of Medicine](#)

- TZIELD met the study's primary endpoint, significantly slowing the decline of C-peptide levels, compared to placebo
- Numerical trends favoring TZIELD were seen in key secondary endpoints, whilst statistical significance was not achieved
- PROTECT builds on the existing body of evidence on TZIELD's potential to slow the progression of type 1 diabetes
- TZIELD fits at the intersection of Sanofi's growth in immune-mediated diseases and disease modifying therapies, and the company's expertise in diabetes

Paris, October 18, 2023. New data from TZIELD's (teplizumab-mzwv) PROTECT Phase 3 trial were presented today at the 49th Annual ISPAD Conference, in Rotterdam, The Netherlands. PROTECT studied the efficacy and safety of TZIELD, compared to placebo, to slow the loss of beta cells and preserve beta cell function as measured by C-peptide, in children and adolescents aged 8-17 years diagnosed in the preceding 6 weeks with Stage 3 autoimmune type 1 diabetes (T1D). The full data set has been simultaneously published in [The New England Journal of Medicine](#).

TZIELD met the study's primary endpoint, demonstrating superior beta cell preservation assessed by significantly slowing the decrease in mean C-peptide levels (area under the curve [AUC] after a 4-hour mixed meal tolerance test) at trial completion, compared to placebo. C-peptide is a biomarker for beta cell function. This significant difference indicates the potential of TZIELD to slow the progression of Stage 3 type 1 diabetes in this population. While the study's key secondary endpoints did not meet statistical significance, numerical trends favoring TZIELD were seen in relevant clinical parameters. On average, people on TZIELD required numerically fewer insulin units and had numerically higher time in range, compared to those on placebo. HbA1c reductions and the overall rates of clinically important low blood sugar (hypoglycemic) events were similar among both study groups.

Kevan Herold, MD

C.N.H. Long Professor of Immunobiology and of Medicine (Endocrinology), Yale School of Medicine and Primary Investigator of PROTECT.

"Type 1 diabetes is a chronic autoimmune disease, driven by the destruction of the insulin-producing beta cells, and as such, beta cell preservation remains a meaningful unmet need for all patients with diabetes. These new results build on the findings from multiple studies across different stages of the disease process, further supporting TZIELD's potential to modulate the progression of T1D."

Jose Eduardo Neves, M.D.

Senior Vice President, Global Head of Medical Affairs, General Medicines, Sanofi
“The PROTECT results are encouraging, as we believe they showcase the potential for TZIELD to slow down the progression of Stage 3 T1D in this population, as well as pointing towards favorable trends in relevant aspects for clinicians and people living with type 1 diabetes. We look forward to discussing this new data with the scientific community and regulatory authorities around the world.”

The availability of the PROTECT data represents a key early milestone for Sanofi on TZIELD, following the acquisition of Provention Bio (a Sanofi Company) in April 2023. TZIELD is a strategic fit for Sanofi at the intersection of our growth in immune-mediated diseases and disease modifying therapies, and our company’s expertise in diabetes.

Key Results

The PROTECT clinical trial was a randomized, double blind, placebo-controlled, multi-national trial. From baseline and through the trial’s completion at 78 weeks, the following was observed for TZIELD vs placebo:

Primary endpoint

- **Significantly less decrease in mean C-peptide levels (area under the concentration curve [AUC], following a 4-hour mixed-meal tolerance test [MMTT]):** difference in least-squares means (LSM) of 0.13 pmol/mL; (95% CI: 0.09, 0.17; P<0.001).
 - 94.9% of participants in the TZIELD group maintained peak C-peptide levels ≥ 0.2 pmol/mL, compared with 79.2% of those who received the placebo (P<0.001).

Secondary endpoints

- **Numerically lower mean insulin dose in favor of TZIELD at Week 78:** the least-square mean (LSM) for insulin dose at week 78 was 0.46 U/Kg/day (TZIELD) and 0.59 U/kg/day (placebo), difference -0.13 U/kg/day (95% CI: -0.28, 0.02).
- **Comparable change in mean HbA1c:** LSM change of -1.98% (TZIELD) vs -1.89% (placebo), difference -0.09 (95% CI: -0.42, 0.24)
- **Numerically higher mean time in range at week 78 in favor of TZIELD (>70 but ≤ 180 mg/dL):** 68.7 \pm 19.6% (TZIELD) vs 64.6 \pm 22.4% (placebo). Difference of 4.71% (95% CI: -1.72, 11.15).
- **Similar mean rates of overall clinically important hypoglycemic events:** estimated rates of 4.68 (TZIELD) (95% CI: 3.70, 5.91) vs 4.24 (placebo) (95% CI: 3.06, 5.89) events/patient-year, with an estimated rate ratio of 1.10 (95% CI: 0.74, 1.64).

The safety results of the trial were consistent with previous data from TZIELD’s currently approved FDA indication to delay the onset of Stage 3 type 1 diabetes in adults and children 8 years and older diagnosed with Stage 2 T1D, as well as other prior clinical studies with TZIELD. No new safety signals were identified.

Adverse events of special interest (AESI) were prespecified and occurred in 29% of those on TZIELD vs 21.6% on placebo, the most frequent one being hypoglycemia (TZIELD: 13.4%; placebo: 16.2%). Other common adverse events (AEs) were headache, nausea, rash, lymphopenia and vomiting. Serious adverse events (SAEs) were reported by 5.5% of participant who received TZIELD vs 5.4% on placebo; the most common SAEs were cytokine release syndrome (TZIELD: 1.4%; placebo 0%) and infections (TZIELD: 0%; placebo: 2.7%).

The use of TZIELD in the PROTECT population is investigational, and its safety and efficacy in this population has not been evaluated by any regulatory authority.

About PROTECT

PROTECT ([NCT03875729](#)) is a Phase 3, randomized, double blind, placebo-controlled, multinational clinical trial. It enrolled 328 children and adolescents (TZIELD n=217, placebo n=111) aged 8-17 years diagnosed with clinical, Stage 3 T1D in the preceding 6 weeks; randomization ratio of TZIELD:placebo was 2:1. Participants received a first course of 12 daily infusions (of either TZIELD or placebo) at randomization, followed by a second course of 12 daily infusions after 26 weeks (approx. 6 months). All participants received standard-of-care as required.

The primary objective of PROTECT was to determine whether TZIELD can slow down beta cell loss and preserve beta cell function measured by C-peptide, compared to placebo. This was assessed via the trial's primary endpoint, which measured the difference in mean change of C-peptide level (area under the time-concentration curve [AUC] measured after a 4-hour mixed meal tolerance test) from baseline to Week 78 between both groups.

Key secondary endpoints included HbA1c, time in range (TiR) as measured with a CGM, clinically important low blood sugar (hypoglycemia) events and exogenous insulin use. Time in range was defined as: >70 but ≤ 180 mg/d. Clinically relevant hypoglycemic events were defined: level 2 hypoglycemia (<54 mg/dL / 3.0 mmol/L) and level 3 hypoglycemia as episodes of severe cognitive impairment requiring external assistance for recovery, even in the absence of a blood glucose reading.

Other secondary endpoints were adverse events and overall safety aspects, as well as pharmacokinetics (PK) and immunogenicity of TZIELD. An observational extension study following participants for a further 42 months is ongoing.

About TZIELD

TZIELD (teplizumab-mzwv) is a CD3-directed monoclonal antibody. TZIELD is the first and only disease modifying therapy in autoimmune type 1 diabetes (T1D); it was approved by the U.S. FDA in November 2022 to delay the onset of Stage 3 type 1 diabetes in adults and children 8 years and older diagnosed with Stage 2 T1D.

About autoimmune, type 1 diabetes (T1D)

T1D is a chronic autoimmune condition where the body's ability to regulate blood sugar levels is impacted due to the gradual destruction of insulin producing beta cells by one's own immune system.

There are 3 stages to the progression of T1D:

- In Stage 1, the autoimmune attack to the beta cells has started, and this can be detected by the presence of 2 or more T1D-related autoantibodies in the blood. During Stage 1, blood sugar levels are in a normal range. At this stage, T1D is asymptomatic.
- In Stage 2 (also asymptomatic), in addition to the presence of 2 or more T1D-related autoantibodies, blood sugar levels are now abnormal (dysglycemia) due to the progressive loss of beta cells / beta cell function. People diagnosed with Stage 2 T1D have a near 100% lifetime chance of progression to Stage 3 T1D, with 75% of them progressing to it within five years.

- Stage 3 (also known as clinical stage) comes once a significant portion of the beta cells have been destroyed. At this point, rising blood sugar levels reach the point of clinical hyperglycemia (which defines diabetes), and many people will experience the classic symptoms that come with the onset of Stage 3 T1D: increased thirst, frequent urination, unexplained weight loss, blurred vision and generalized fatigue. Management of Stage 3 T1D requires daily and burdensome insulin replacement therapy.

About Sanofi

We are an innovative global healthcare company, driven by one purpose: we chase the miracles of science to improve people's lives. Our team, across some 100 countries, is dedicated to transforming the practice of medicine by working to turn the impossible into the possible. We provide potentially life-changing treatment options and life-saving vaccine protection to millions of people globally, while putting sustainability and social responsibility at the center of our ambitions.

Sanofi is listed on Euronext: SAN and Nasdaq: SNY

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