

Case Study

How precise temperature monitoring is supporting advances in type 1 diabetes research.

Company

Biorep Technologies, Inc.

Industry

Life Sciences – Diabetes
Research Equipment

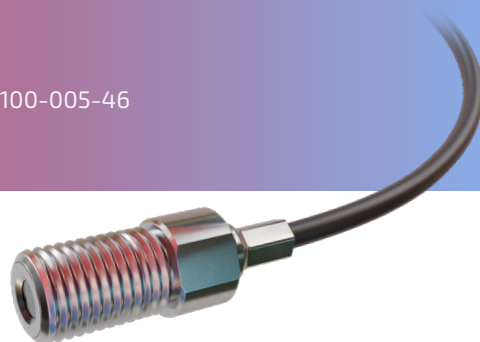
Products

CleverIR ACE-100-005-46

For patients with type 1 diabetes, islet cell transplantation offers real hope for a cure. These unique cells can be extracted from a donated pancreas using Biorep Technologies' Ricordi[®] Isolator which requires precise temperature control to operate effectively. The company relied on Exergen IRT/c sensors for many years for this essential temperature monitoring. It recently upgraded to CleverIR ACE sensors which bring additional performance benefits alongside the essential thermal precision required for optimal medical outcomes.

Challenges

The Ricordi[®] Isolator is used to dissociate donor pancreases for the isolation of Islets of Langerhans. A digestive enzyme is continuously recirculated through the Ricordi[®] Chamber containing the pancreas via silicone tubing. Precise temperature control is critical. The optimal operating range is $\pm 1.5^{\circ}\text{C}$ of body temperature (37°C). Even minor deviations can compromise enzyme performance or cause cellular damage. Contact between sensing components and the enzyme solution must be avoided to avoid cross-contamination.



Solutions

A CleverIR ACE non-contact IR sensor monitors the temperature of the fluid flowing through a silicone tube. It has been specifically calibrated to output a linear signal from 0 to 5 volts DC from 0°C to 45°C. Biorep can now connect the sensor to their analog input module rather than the thermocouple module which is easier to manage. The new sensor also has electronics that linearize the temperature, to give accurate readings across a wider range of temperatures.

Benefits

The ACE sensor enables accurate and reliable temperature measurement without any direct contact with the enzyme fluid. Fast response time means temperature fluctuations can be flagged immediately. It also offers linear output across the entire temperature range – ideal for a lifescience application. Custom calibration capability meant that the sensor could be scaled specifically for this particular usage. And, thanks to its small size it was also easy to integrate into the existing unit design.



The ACE sensor delivers the temperature precision needed to optimize enzyme performance while protecting the integrity of the isolated islets.

Felipe Echeverri, CEO, Biorep Technologies

Results

The Ricordi® Isolator, equipped with CleverIR ACE sensors, supports reliable islet cell isolation as part of research and cell processing workflows. The sensors help ensure the critical temperature range is maintained at all times during the isolation process. Once harvested, isolated islets may be further processed and evaluated in accordance with applicable regulatory frameworks. Islet transplantation has demonstrated the potential to restore insulin production in select clinical settings and remains an important area of ongoing research.

Conclusion

This application demonstrates how advanced thermal management supports breakthrough cell processing and research applications. By delivering the reliability and accuracy essential for islet cell preservation during isolation workflows, the ACE sensor helps maintain process integrity and reproducibility. The sensor's non-contact design, rapid response, and exceptional stability make it ideal for applications where sterility, precision, and reliability are non-negotiable. As cellular therapies advance and regulatory standards evolve, this collaboration highlights the importance of robust process control in life sciences research and bioprocessing environments.

Disclaimer: The Ricordi® Isolator is intended to support the manufacturing process of cell-, gene-, or tissue-based products that are exclusively used in laboratories for Research Use Only (RUO). The Ricordi Isolator is not intended for diagnosis, prevention, monitoring, prediction, prognosis, treatment, or alleviation of disease in human or animal. Any use of the Ricordi® Isolator in either clinical research or standard clinical setting would require additional legal considerations in the relevant jurisdiction.