ATP2-R-PancreaticCryopreservation_VB

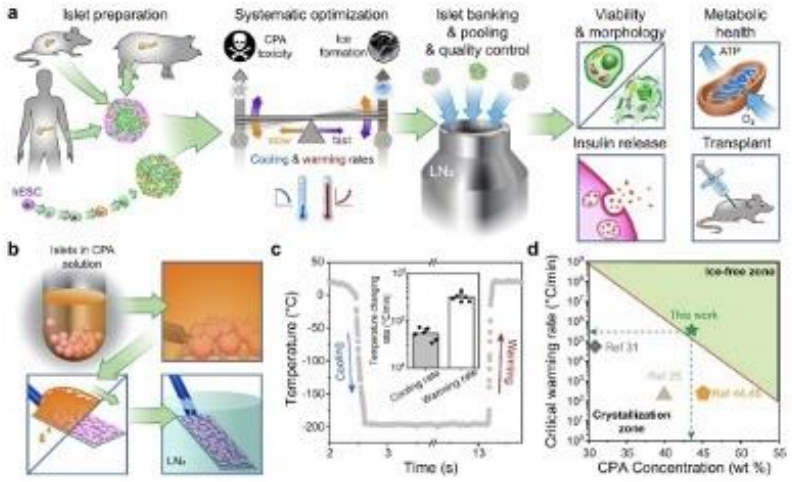
ERC Develops Innovative Cryopreservation System for Pancreatic Islets

***Outcome/accomplishment*:** The NSF-funded Engineering Research Center (ERC) for Advanced Technologies for the Preservation of Biological Systems (ATP-Bio), co-led by the University of Minnesota and Massachusetts General Hospital, has developed an innovative cryopreservation system that could facilitate the long-term cold storage of pancreatic islets for transplant in patients with diabetes.

***Impact/benefits*:** Pancreatic islet transplantation has the potential to cure diabetes by providing recipients with the cells required to produce their own insulin. However, keeping the islets viable long enough for transplant has been a challenge. This new preservation method could transform the process of isolating and storing pancreatic islets for transplant.

***Explanation/ background*:** Researchers from the University of Minnesota's Bischof Lab (mechanical engineering), Dutcher Lab (chemical engineering), Finger Lab (surgery), and other collaborators have demonstrated for the first time a method of cryopreserving pancreatic islets that achieves high viability, recovery, function, and clinical scalability.

Placing the islets on a specialized cryomesh, which removes most of the cryopreservation fluid, allows the biomaterial to be rapidly frozen in liquid nitrogen. Subsequent rapid rewarming using the cryomesh approach avoided ice formation that could damage the islets. Both pancreatic islets and stem cell-derived islets were rapidly frozen and rewarmed while also maintaining islet health and function, and the samples cured diabetes in a mouse model.



Overview of the cryomesh approach to the rapid cooling and rewarming of pancreatic islets. (Photo credit: ATP-Bio)