

## Life in nano ice: Application of CryoCrate C80EZ medium for cell and tissue cryopreservation

**Xu Han**

University of Missouri, USA

Traditional cryopreservation approaches are technically problematic in either producing large ice crystals (typically on um scale) associated with equilibrium freezing process or involving extremely high concentrations (40-60% v/v) of permeating cryoprotectants to achieve vitrification. Both also require the use of liquid nitrogen and expensive facilities for long-term storage or banking. With the support of NIH SBIR, Coulter Translational Partnership Program, and University of Missouri (MU) Fast-track Award, CryoCrate (a MU spin-off) has developed an innovative cryopreservation medium, trademarked as C80EZ, and opened the door for cryopreservation with both nano scale ice formation and long-term storage in regular deep freezers at approximately -80°C. The base medium of C80EZ enables long-term storage of cells at -80°C by preventing recrystallization and the efficiency has been demonstrated by previous publications, e.g. Sci Report 2016 (nature.com). The complete C80EZ medium enables unique nano scale ice formation and the efficiency tests have been performed on cell or tissue types that survive poorly from any traditional cryopreservation method, e.g. Human corneas, primary neurons, porcine and rodent spermatozoa, and cell types that cannot be stored in deep freezers for extended periods of time, e.g. prophetal blood mononuclear cells and mouse embryos. Significant improvement of cell post-thaw viabilities and functionalities has been observed for all above cell and tissues types. For *E. coli* competent cells (routinely stored in deep freezers), our preliminary data showed that the nano ice technology can remarkably increase post-thaw transformation efficiency. Currently, the C80EZ medium doesn't improve survivability from cryopreservation for cell types with large volume of intracellular lipid components, e.g. porcine and fish embryos. The C80EZ medium is now commercially available, and the technology is patent pending (PCT filed) and exclusively licensed from MU to CryoCrate.

### Biography

Xu Han has over 10 years of experience in the field for Cryopreservation. He is the Top Reviewer of the journal of *Cryobiology*, and a winner of NIH SBIR, Coulter Translational Partnership Program Award, and MU Faculty Innovation Award. He has endeavored in improving cryopreservation methods and devices. His expertise is also in the fields of Calorimetry, Numerical Simulation, Thermodynamics and Mechanics.

hanx@missouri.edu

### Notes: