

Radical new technology prevents 'freezer burn' in cells, tissues

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GlycoNet network investigators Dr. Jason Acker (left), Faculty of Medicine and Dentistry / Canadian Blood Services and Dr. Robert Ben, University of Ottawa.
Credit: GlycoNet

Everyone knows that freezing things is an imperfect process. Take frozen food, for example - most have experienced those frozen ice

crystals that change the texture and taste of their favourite meal.

The medical field experiences a similar problem when freezing [cells](#) (stem cells) and tissues, except the result is cellular death and decreased quality.

Two GlycoNet researchers have founded a startup company, PanTHERA CryoSolutions, to commercialize a revolutionary product for the cryopreservation, or freezing, of cells and tissues, resulting in better cell quality for cellular therapies and superior products.

"Cryopreservation is a common strategy, but the technology that was developed to do it is 70 to 80 years old," explains Dr. Robert Ben (University of Ottawa), who co-founded PanTHERA CryoSolutions with Dr. Jason Acker (University of Alberta & Canadian Blood Services).

"With current technology, when you freeze something, you get a large amount of cell death that occurs, so you don't recover all those cells. In addition, we're actually adversely affecting the functional capacity of those cells."

The process that causes the majority of this cellular damage and death is called ice recrystallization. PanTHERA CryoSolutions has discovered a small molecule inhibitor that prevents ice recrystallization - something that none of the current cryoprotectants available on the market can do - making it a unique technology.

"Our technology uses small molecular structures that have the ability to inhibit the ice recrystallization process," explains Ben. "They actually prevent that damage from occurring, so when we thaw that product, it's a superior product and it's also functional."

"The results have clearly indicated that this ice recrystallization inhibitor technology really works and makes a superior product where we get

faster engraftment and increased incidence of engraftment, which is exactly what you want in a clinical setting," Ben says.

PanTHERA CryoSolutions aims to have a product commercially available in 2018 for a specific therapy, but Ben sees the potential to apply this technology to many areas, including cellular therapies, regenerative medicine, and 3-D bioprinting applications.

"A technology like this can radically change the entire cryopreservation industry," adds Network Investigator Jason Acker, a professor in the Faculty of Medicine and Dentistry, University of Alberta. "There is a large market for immune cell therapies to target diseases like cancer, modify the immune system to reduce organ rejections and treat neurological diseases like dementia and Parkinson's."

Ben and Acker say Ottawa and Edmonton are the perfect locations to launch this startup. Acker says the combination of Edmonton's cryobiology expertise, equipment and knowledge along with Ben's world class lab expertise and knowledge in medicinal chemistry and toxicity studies make it the perfect partnership.

"In Edmonton, we focus on product and protocol development for cell therapy while in Ottawa, Dr. Ben's group will focus on manufacturing, synthesis of the compound and packaging," says Acker.

"We've seen tremendous medical advances in the last 10 years or so, but in many of these areas there's no real shelf life to the products, because it's been observed that you can't effectively freeze them. It's truly a bottleneck in this area, and so the only way to move forward is to have a better cryopreservation strategy," Ben says.

"The time is right to fix this problem, and imagine how that's going to change the landscape. It has the potential to have a large impact, which is

really exciting for us - to be able to take a [technology](#) that starts out in an academic laboratory and then translate that out," Ben adds.

Provided by Canadian Glycomics Network

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