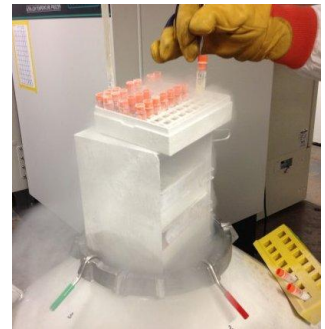


Novel Cryopreservation Technique

Warwick Ventures has available for licence a novel cryopreservation technique, without the need for vitrification, resulting in enhanced cell preservation and reduction of cell damage. This technology has many applications, but is particularly suited to the preservation of cell lines or blood for transfusion. This technology would be of interest to companies involved in sample handling and storage, or organisations involved in the collection and storage of cellular materials.



BACKGROUND

Cryopreservation is widely used to increase the storage lifetimes of biological tissues and can improve the supply of donor material for transplantation or biotechnological applications. However, its application is limited due to freezing-induced damage. Vitrification can reduce cell damage, but requires the use of cryopreservation agents which are often toxic, used in high concentrations and can take several days to remove.

Naturally occurring antifreeze proteins, from cold-acclimatised species, can improve cryopreservation. However, due to their mechanism of action, only low concentrations can be used, limiting their protective effect. Antifreeze proteins, or close structural mimics, are very challenging to obtain synthetically and so must be extracted in a process which is both expensive and time consuming; In addition these antifreeze proteins are thought to be toxic to human cells.

There is therefore a need to develop synthetic cryoprotecting agents that are easy to produce and non-toxic to human cells.

INVENTION

Researchers at the University of Warwick have developed a novel cryopreservation technique using an easily available, biocompatible chemical which is already approved for human consumption.

The chemical, which can be used without vitrification and in the absence of organic solvents, is not cell penetrative and is simple to remove. Additionally, it has been found that the agent prevents the natural recrystallisation of small ice crystals into larger ones, a major cause of cell death.

The use of this new cryoprotecting agent allows a considerable reduction in the time between thawing the material to having transplant-ready cells and avoids the use of toxic organic solvents, thus increasing the safety of the cryopreservation process. The agent may also be used at considerably lower concentrations than the previously-used organic solvents.

Key benefits of the technology include:

- ◆ Cheap, effective solution for inhibiting ice crystal growth and recrystallization.
- ◆ No vitrification agent or freezing protocol required.
- ◆ Reduced concentration of organic solvents required.
- ◆ The compound replicates the most desirable property of antifreeze but without the associated side effects.
- ◆ It is non-toxic to human cells and FDA approved for human consumption.

PATENT & PUBLICATION

This Cryopreservation Process is the subject of a PCT patent application with publication due in the following six months.

PCT/GB2013/050277 Preservation of Cells

*Ice recrystallisation inhibition by polyols: comparison of molecular and macromolecular inhibitors and role of hydrophobic units. **Biomaterials Science**, 2013, **1**, 478-485.* Robert C. Deller, Thomas Congdon, Mohammed A. Sahid, Michael Morgan, Manu Vatish, Daniel A. Mitchell, Rebecca Notman & Matthew I. Gibson

*Antifreeze (Glyco)protein Mimetic Behavior of Poly(vinyl alcohol): Detailed Structure Ice Recrystallization Inhibition Activity Study. **Biomacromolecules***
DOI: 10.1021/bm400217j Thomas Congdon, Rebecca Notman & Matthew I. Gibson

CONTACT

The invention is applicable to the cryopreservation of organs, tissues and cells, particularly red blood cells. Using this process, the researchers have seen significant recovery of erythrocyte cells and viable recovery of other cells, at low concentration and without vitrification.

The patent and associated intellectual property is available for licence through Warwick Ventures Ltd.

Further information is available on request from:
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