Freezing cells made safer thanks to new polymer

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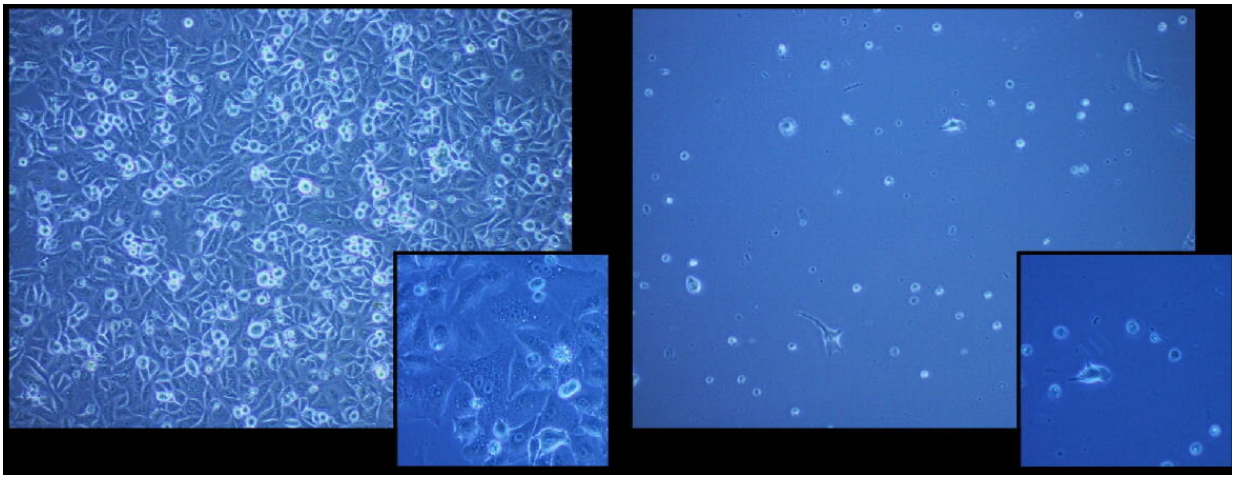

The cells frozen with the polymer (left) and without the polymer (right). Credit: University of Warwick

Cell freezing (cryopreservation)—which is essential in cell transfusions as well as basic biomedical research—can be dramatically improved using a new polymeric cryoprotectant, discovered at the University of Warwick, which reduces the amount of 'anti-freeze' needed to protect cells.

The ability to freeze and store cells for cell-based therapies and research has taken a step forward in the paper "A synthetically scalable poly(ampholyte) which dramatically Enhances Cellular

Cryopreservation." published by the University of Warwick's Department of Chemistry and Medical School in the journal *Biomacromolecules*. The new polymer material protects the cells during freezing, leading to more cells being recovered and less solvent-based antifreeze being required.

Cryopreservation of cells is an essential process, enabling banking and distribution of cells, which would otherwise degrade. The current methods rely on adding traditional 'antifreezes' to the cells to protect them from the cold stress, but not all the cells are recovered and it is desirable to lower the amount of solvent added.

The new Warwick material was shown to allow cryopreservation using less solvent. In particular, the material was very potent at protecting cell monolayers—cells which are attached to a surface, which is the format of how they are grown and used in most biomedical research.

Having more, and better quality cells, is crucial not just for their use in medicine, but to improve the quality and accessibility of cells for the discovery of new drugs for example.

Cell-based therapies are emerging as the "fourth pillar" of chemo-therapy. New methods to help distribute and bank these cells will help make them more accessible and speed up their roll-out, and this new material may aid this process.

Professor Matthew Gibson who holds a joint appointment between the Department of Chemistry and Warwick Medical School comments:

"Cryopreservation is fundamental to so much modern bioscience and medicine, but we urgently need better methods to meet the needs of advanced cell-based therapies. Our new material is easy to scale up, which is essential if this is to be widely used, and we found it to be very

protective for several cell lines. The simplicity of our approach will hopefully help us translate this to real applications quickly, and make an impact in healthcare and basic research."

More information: Trisha L. Bailey et al. Synthetically Scalable Poly(ampholyte) Which Dramatically Enhances Cellular Cryopreservation, *Biomacromolecules* (2019). DOI: 10.1021/acs.biomac.9b00681

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