



UNIVERSITY OF MINNESOTA

Driven to Discover<sup>SM</sup>

# Microfluidic Cell Processing Device Removes Cryopreservation DMSO During Cell Recovery (20120069, Dr. Allison Hubel)

Technology No. 20120069

**IP Status:** Issued US Patent; **Application #:** 14/394,693

## Microfluidic Cell Processing Device Can Recover Cryopreserved Cells

The microfluidic device can increase recovery and viability of cells, as well as increase extraction of the cryopreservation agent dimethyl sulfoxide (DMSO), all at a low cost. Freezing cells such as cord blood, bone marrow, and stem cells require DMSO, but this cryopreservation agent needs to be removed before the cells are used in clinical applications. While current methods of extracting DMSO result in high cell loss, are labor intensive, and highly operator dependent, the Microfluidic Cell Processing Device overcomes these challenges. The microfluidic device's closed system also reduces the risk of contamination from outside sources.

**Note:** The Microfluidic Cell Processing Device technology has been exclusively licensed. If you have questions, please contact the University of Minnesota's Office for Technology Commercialization.

## Extraction of Cryopreservation Agent DMSO

The Microfluidic Cell Processing Device uses three streams that flow vertically in parallel through a rectangular channel, allowing the DMSO cryopreservation agent to flow through the middle stream, diffuse into the wash, and be removed as the sample is collected. The diffusion process causes a gradual change in concentration, reducing the osmotic stresses for the cell. Using this device, the cell recovery rate is greater than 95%, which is a 25% improvement from standard cell-washing techniques. The vertical microfluidic cell processing device utilizes a specialized inlet and outlet to process large volumes of cells. The Microfluidic Cell Processing Device processes samples at flow rates on the order of milliliters per minute, as opposed other

microfluidic technologies which process microliters per minute.

## **FEATURES OF MICROFLUIDIC CELL PROCESSING DEVICE**

- Vertical orientation allows processing of larger sample volumes in less time.
- Specialized inlet and outlet produces significantly lower cell loss compared to today's technologies, and handles comparable processing volumes.
- Closed system reduces risk of contamination from outside sources.
- Simple to use, does not require specialized training.

### **Researchers**

Allison Hubel, PhD

Professor, *Mechanical Engineering*

[External Link](http://www.me.umn.edu) (www.me.umn.edu)

<https://license.umn.edu/product/microfluidic-cell-processing-device-removes-cryopreservation-dmso-during-cell-recovery>