



Handheld Cell Maintenance and Assay Device with Functional Microfluidic Lid

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an accessible, low-cost microfluidic platform with a practical lid design enabling the freezing, storing, shipping and thawing of cell suspensions while maintaining their viability and facilitating subsequent assays.

Overview

The cellular-scale engineering that undergirds microfluidic systems has provided researchers with efficient tools for the analysis and manipulation of cells *in vitro minisculo*. Methods and devices refined within the maturing field of microfluidics continue to challenge the labor and environmental control limitations of traditional techniques.

Existing devices, while offering a significant improvement in the ability to study fundamental aspects of cell biology, have been slow to be adopted in clinical and other settings. Technical expertise and external equipment requirements, like the tubing and pumps necessary to perform a full cell assay, deter broad implementation.

Given microfluidics' tremendous potential—from cancer drug development to HIV screening—these barriers must be addressed. A faster, flexible and more accessible platform capable of performing assays and diagnostics is essential.

The Invention

UW–Madison researchers have developed a new design for the handling, freezing, thawing and subsequent study of microliter volumes of cell suspensions. Requiring no additional equipment and adaptable to a wide range of conditions, the device is inexpensive to manufacture and preserves the integrity of cells for research.

The platform employs a functionalized lid, enclosed by a microporous membrane and comprising multiple reservoirs into which cell suspensions are loaded. The addition of cryopreservation fluid permits storage. Another flexible membrane encloses the lid's bottom side and contains a pinhole. Protective tape seals the reservoirs for shipping and containment.

An assay can be performed readily by peeling away the tape on the top side and placing the device in a thawing bath that removes the preservation fluid via dialysis. The tape on the underside then is taken off and pressure on the pinhole membrane dispenses the fluid into another microfluidic platform containing the specific test components.

Applications

- Pre-loaded, frozen kits for live cell assays
- Toxicity screening
- Water and food safety testing
- Point-of-care blood diagnostics
- Expanded mammalian cell-based experimentation

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Key Benefits

- Eliminates the need for typical cell culture equipment
- Easily incorporated by all labs
- Reduces processing time
- Small sample volume with minimal excess

Stage of Development

The researchers have successfully tested the device and method using HeLa, human bone marrow, human breast cancer and other cells.

Additional Information

For More Information About the Inventors

- [David Beebe](#)

Related Technologies

- [See an example of how the KOALA technology could be used.](#)

Related Intellectual Property

- [View Divisional Patent in PDF format.](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Microfluidics](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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