



Device for Efficiently Extracting a Fraction Containing Nucleic Acids or Other Desired Material from a Biological Sample

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WARF: P110080US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a device and method to facilitate extraction of a fraction from a biological sample using a “separation zone” device.

Overview

Effective isolation of nucleic acids from biological samples is an essential prerequisite for efficient downstream amplification, detection and quantification of specific genetic sequences via quantitative polymerase chain reaction (qPCR). The extraction process requires lysing cells with harsh extraction reagents such as detergents or enzymes, which results in a mixture of nucleic acids, cellular debris and extraction reagents. The nucleic acids are separated from the mixture using a technique such as organic solvent extraction, chromatography, centrifugation or dialysis. These techniques may be time-consuming, and often require multiple washing steps. Up to 15 percent of all molecular biology research time may be spent purifying samples. A simplified method of isolating nucleic acids from a biological sample is needed to reduce the time spent on purification.

The Invention

UW–Madison researchers have developed a device and method for extracting and purifying a desired fraction from cultured cells, tissue samples and other biological materials. A biological sample, including both non-desired material and a fraction-bound solid phase substrate, is added to an input zone. The input zone is adjacent to a separation zone that includes an isolation buffer. A force moves the fraction-bound solid phase substrate from the input zone, through the separation zone and into an output zone, leaving the non-desired material behind. The improved purification method is simple, more efficient and produces a higher throughput than prior devices and methods. The device may be configured to allow for quantification of the fraction in the biological sample via labeling of the fraction-bound solid phase substrate.

Applications

- Direct isolation of nucleic acids from a biological sample including DNA, RNA, proteins and cells from a variety of matrices

Key Benefits

- Enables simplified and more efficient sample purification
- Avoids time-consuming multiple washing steps
- Allows direct isolation of nucleic acid without transfer of the sample between platforms
- Integrates cell culture with analyte purification on a single device
- Increases throughput of extraction while reducing errors

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Additional Information

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For More Information About the Inventors

- [David Beebe](#)

Related Technologies

- [For information about a microfluidic device for simplified sample purification, see WARF reference number P100050US01.](#)
- [For information about the use of microscale surface effects to enable a “virtual wall” between fluids, see WARF reference number P01118US.](#)
- [For information about a method of pumping fluid through a microfluidic device using surface energy, see WARF reference number P02013US.](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Microfluidics](#)
- [Research Tools : DNA & RNA tools](#)

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

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