Simple, Single-step Porous Polymer Monolith Formation for DNA Extraction

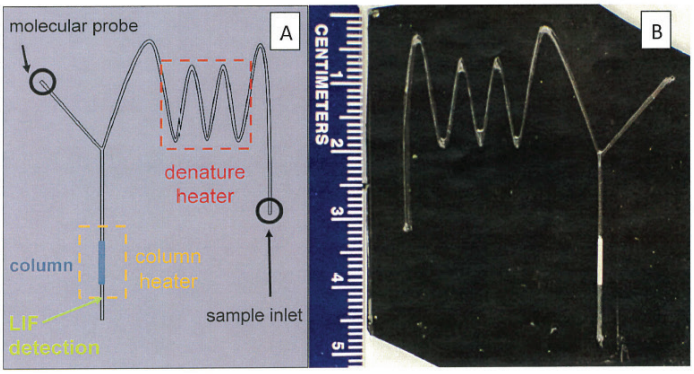
BYU #2018-014

DESCRIPTION

Researchers at BYU developed a single-step process for creating porous polymer monoliths for DNA extraction. This invention enables large-scale construction of capture supports for DNA (e.g., in microfluidic devices).

PROBLEM SOLVED

Fast determination of antibiotic resistance is crucial in sepsis patients for selecting appropriate treatment. Although current methods based on blood culture provide complete information about the resistance profile, they are time consuming. This technology enables fast monolith preparation in a microfluidic channel using UV photopolymerization. BYU inventors have demonstrated the use of these monoliths for selective extraction of DNA related to sepsis.



MICROFLUIDIC DEVICES

(A) Schematic indicating inlets, placement of heaters and LIF (laser-induced fluorescence) detection point

(B) Photograph of a microfluidic device made from black polypropylene having a porous polymer column

KEY ADVANTAGES

- ***The monoliths have a threefold higher DNA binding capacity than the ones made by the slower, conventional multistep process***
- ***Allows for large-scale fabrication of many devices in parallel for DNA extraction***
- ***Prepared monoliths are suitable for flow-based operations with pressures tested up to 100 psi***

APPLICATIONS

These monoliths should be useful for a wide range of experiments where sequence-selective capture of DNA is needed. The invention shows great promise for application in an integrated microfluidic diagnostic system that combines upstream blood sample preparation and downstream single-molecule counting detection.

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Patent Pending

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BYU TECHNOLOGY transfer

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