Analytical Instrumentation, Methods & Materials

Improved Self-Loading Microfluidic Device for Determining Effective Antibiotic Dose and Other Chemical and Biological Assays

View U.S. Patent No. 9,050,593 in PDF format.

WARF: P110347US01

Inventors: Douglas Weibel, Nathaniel Cira

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a microfluidic device and method for determining the minimum inhibitory concentration of an antibiotic.

Overview

The minimum inhibitory concentration (MIC) of a compound is the lowest dose that prevents the growth of a cell during a set time interval. Because of the increase in antibiotic-resistant bacteria and the slowdown in discovery of new antibiotics, determination of the MIC or susceptibility of antibiotics against microbes has become very important for increasing the longevity of clinical antibiotics. Determining the MIC of antibiotics against bacteria generally is performed using diffusion or dilution methods; however, diffusion-based assays are slow and insensitive and dilution-based assays, although accurate, are very slow and labor intensive. Microfluidic technology addresses some of these drawbacks, but also brings its own disadvantages. Alternative microfluidic devices and methods of using these devices to determine the MIC and susceptibility of antibiotics and for identifying bacterial strains are needed.

The Invention

UW–Madison researchers have developed a portable, self-loading microfluidic device and method for determining therapeutically effective amounts of agents, MICs and toxicity levels. It can be used to identify bacterial strains and for performing chemical and biological assays. The device comprises a porous organic polymer, a reaction well, an inlet port, a vacuum well, a main channel and a side channel.

Applications

- Determining MIC and antibiotic susceptibility
- Identification of pathogenic strains of bacteria and other microbes
- Various chemical and biological assays

Key Benefits

- Reduces the number of steps for determining MICs and antibiotic susceptibility
- Reduces the cost and time of the assay
- Improves sensitivity/resolution
- Does not require external instruments

Stage of Development

MIC, susceptibility and bacterial identification measurements have been obtained using this microfluidic device.

Additional Information

Related Intellectual Property

- View Divisional Patent in PDF format.

Publications

- Cira N.J., Ho J.Y., Dueck M.E. and Weibel D.B. 2011. A Self-Loading Microfluidic Device for Determining the Minimum Inhibitory Concentration of Antibiotics. Lab Chip. DOI: 10.1039/c2lc20887c

Tech Fields

- Analytical Instrumentation, Methods & Materials : Microfluidics

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