TECHNOLOGY

Apparatus for Microarray DNA Binding Sensors Using Electronic Detection of Nucleic Acid Hybridization

OVERVIEW

DNA microarrays are powerful tools for high throughput monitoring of gene expression at the transcription level, determining genome wide DNA copy changes, identifying targets of transcription factors, sequencing and more recently for profiling of the micro RNA (miRNA) levels in cancer. Currently existing methods rely upon various combinations of enzymatic amplification of the nucleic acid and fluorescently labeling targets, hybridization, and amplification of signal followed by detection by optical sensors. These methodologies are often time consuming and sensitivity limited.

Researchers at the University of Maryland jointly with researchers at the National Cancer Institute (National Institutes of Health) are developing an electronic device for DNA hybridization, and detection that offers several advantages over currently available methodologies. This novel method does not involve a labeling step and is therefore less laborious. In absence of a chemical labeling or enzymatic manipulation step of the nucleic acid being detected, there is an increased sensitivity achieved. Additionally in the absence of labeling there is no photobleaching thus allowing for repetitions without loss of sensitivity. Finally, the application of an electric field can increase hybridization rate thus increasing the throughput of the assay.

For additional information please contact Gayatri Varma at the Office of Technology Commercialization, University of Maryland. Phone: 301-405-2555. E-mail: gayatri@umd.edu

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

CATEGORIES

- Nanotechnology + Nanoparticles + Nanomaterials

EXTERNAL RESOURCES

- US Patent 8,017,938

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