

Fluidic Biomolecular Array

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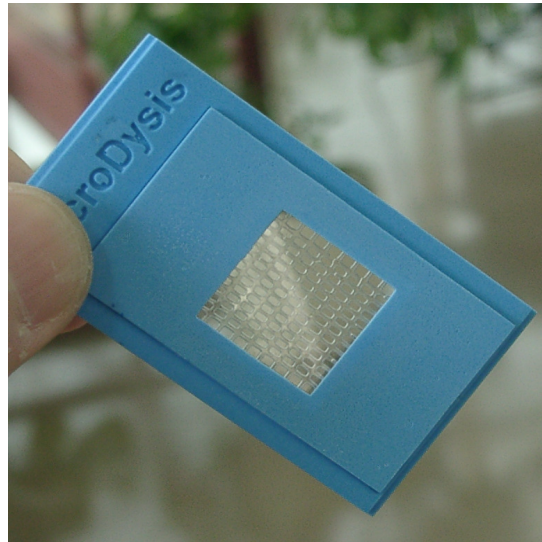
This paper presents a fluidic biomolecular array (FBA) technology for rapid, flexible, and reliable clinical genetic analysis and diagnosis.

Microarray technology provides parallel analysis of thousands of genes, proteins, or cells on a single assay. It has become a powerful tool for research and is now finding a role in biomolecular diagnostics. While it has matured in recent years, there are still some lingering concerns about data consistency and reproducibility from different technology platforms and experiments. Additionally, microarray can only test one biological sample at a time. This feature is idea for genome and protein wide expression profiling or drug screening. However, it is not suitable for applications where only limited numbers of genes are sufficient for diagnostic purposes, but testing multiple clinical samples simultaneously is preferable.

The FBA consists of a sophisticated fluidic channel network and an array of microspots. For genetic analysis, microspots can be configured with cDNA probes through probe channels. DNA samples can be loaded into the chip and delivered to the microspots automatically through the sample channels. Dynamic hybridization reactions between the probes and samples occur at the microspots.

Detection of cystic fibrosis transmembrane conductance regulator gene mutations and glutathione S-transferase protein on the FBAs are presented.

The FBA technology will provide a highly robotic and flexible platform for clinical genetic analysis and diagnosis. It will make genetic testing widely available in a decentralized mode for physician's practices and in tertiary care centers with large central laboratories.



This R&D project is supported by New Jersey Commission on Science and technology.