

Fluidic Nano-Spot Array for Protein Analysis

Ultra-sensitive Protein Detection (10fg/ml) for Reliable and Reproducible Cancer Biomarker Analysis

Joseph Z. Huang, PhD

MicroDysis, Inc., Bordentown, NJ



MicroDysis is a biotechnology instrumentation company. Based upon its patented micro- and nano-fabrication technology, the Company is developing a biochip for clinical application that for the first time enables cancer biomarker detection at a doctor's office and at a much lower cost.

Current microarray technology (Biochip):

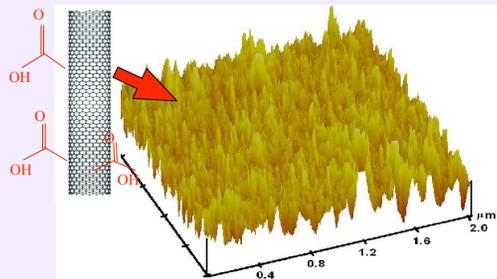
- Developed mainly for profiling and screening purpose
- Is unsuitable for clinical diagnostic application
- Requires specialized and expensive laboratories
- Is time consuming and labor intensive
- Relies on the quality of samples
- Is not ease for customization

Fluidic Nano-Spot Array is developed

- To focus on clinical applications for multiplex probes and sample test with internal controls
- To get the right answer all of the time, under stringent conditions with varying sample quality

Fluidic Nano-Spot Array

- Consist of 7 channels, fluidic interface, and nanotube spots on the wall of the channels.
- Is based on the Company's proprietary 3 dimensional micromolding and surface embedded carbon nanotube technology.



Functionlized carbon nanotubes embedded on a polymer surface vertically



Sensitivity of Protein Detection as high as 10 fg/ml

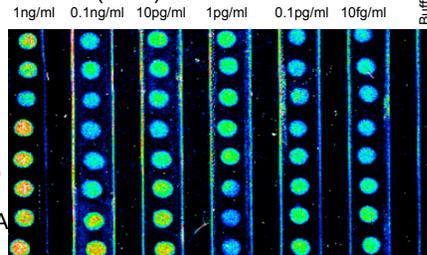
ELISA on Fluidic Nano-Spot Array

The Fluidic Array were prepared by coating nano-spots in the channels with a capture anti-body, mouse anti-GST, and then blocking with 1% BSA. **Procedure:**

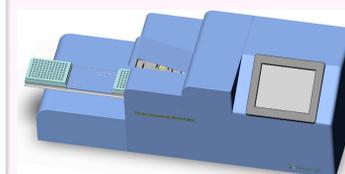
1. Antigen GST solutions with concentration from 10fg/ml to 1ng/ml were pumped forward and backward (f/b) through the channels for 60 min.
2. Primary antibody, rabbit anti-GST (1ug/ml) was pumped through the all channels f/b for 60 min.
3. Secondary antibody, goat anti-rabbit (Alex Fluor-488) was then through the channel f/b for 60 min.

Fluidic Array was read by GeneArray Scanner (G2500A Agilent)

Protein (GST) Concentration



Fluidic Workstation for Automatic Assay Operation



Competitive Advantages

- Versatile platform for analysis of protein, DNA, small molecules, ions, and
- Open platform for easy customization and flexible assay format - specially useful for protein analysis
- Rapid and fully automatic assay, 3 hours after clicking "Start"
- No human interference, no environmental requirements
- High reliability and reproducibility of testing results
- Sample test with internal controls on one single chip
- low cost

MicroDysis is presently seeking equity financing, planned to be in place in 2010.

Seed funding awarded by the NJ Commission on Science and Technology, and SBIR from NCI.