A New Method to Prepare Biofunctionalized-Phospholipid Nanoshell Immobilized Microarrays and the Application for Bacterial Toxin Detection

Title: A New Method for Bacterial Toxin Detection and Analysis using Immobilized Membrane Microarrays

Invention: The invention is a novel microarray fabrication approach for multiplexed detection of a wide range of membrane-interacting particles. This methodology was used to develop an array of chemically stabilized and biofunctionalized phospholipid nanoshells for bacterial toxin detection.

Background: Transmembrane proteins on the cell membrane are highly selective and specific to bind a wide variety of particles. This represents an opportunity to integrate these binding interactions into an array that allows for rapid and simultaneous quantification of multiple particles. The primary limitation of these analytical platforms is the instability of the membrane. The current solution to this is the use of phospholipid nanoshells due to the similarity of natural phospholipids supporting a cell membrane. Phospholipid nanoshells are able to encapsulate compounds with minimized diffusion restrictions, but have low mechanical stability. The invention solves this issue by fabricating the array without traditional high aspect ratio barriers.

Applications:

- Analytical Chemistry
- Environmental, Health, Safety Evaluations
- Diagnostics
- Pharmaceuticals

Advantages:

- Ability to rapidly interrogate biomolecules
- Membrane has high stability
- Membrane is flexible with surface modifications for different applications
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