TECHNOLOGY

Novel microdevice for measuring protein-surface interactions

OVERVIEW

Background:

Biological and chemical sensors utilize various passivation materials to reduce non-specific binding on their sensor surface. It is difficult to know beforehand how different proteins will interact with these passivated surfaces and so there is much research performed to characterize protein-surface interactions using a variety of methods. Currently, the most common technique for measuring protein adsorption is to use a quartz crystal microbalance. Although this technique is very sensitive, it uses a single store-bought resonator for every individual measurement. Another common method is to tag the protein with some kind of label that can produce an observable signal; however, the tagging process can damage some proteins and is a non-trivial, chemically-intensive procedure. A third option is to use an optical technique, which requires expensive free-space optical equipment and difficult alignment of all the components.

Innovative Research:

Researchers at the University of Maryland have developed a novel device relating to the electrochemical impedance of the interactions between proteins and various surface chemistries. The most novel aspect of this invention is the unique electrode layout of the design, which allows for protein-surface adsorption mechanics to be characterized in an arrayed format in a microfluidic environment saving time and regent costs over performing each test individually.

Advantages

-Utilization of an inexpensive microdevice to screen multiple interactions between proteins and various functionalized surfaces
-Small size of the device reduces the amount of agents required
-Electrically connects columns of working electrodes within the array to reduce the number of outputs
-Microfluidic format reduces reagent costs as well as the length scales for binding reactions to take place, cutting down on both time and money spent

Applications

-Protein-surface screening
-Testing candidate drugs for various biological markers
-Immunoassays can be performed and will have the advantage of label free detection over typical microwell plate readers

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Additional Information

INSTITUTION

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PATENT STATUS

Patent(s) pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Microfluidics

EXTERNAL RESOURCES

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