NAVAL RESEARCH LABORATORY

TECHNOLOGY LICENSING OPPORTUNITY

SELF-ASSEMBLING, REVERSIBLE, REAGENTLESS BIOSENSOR

Advantages/Features

Self-assembles in microtiter well plates

Requires only the presence of a target to function

Returns to baseline and is ready for reuse when washed free of analyte

Allows for the possibility of shipping and in-field use

Decreases test costs and logistical demands

Applications

Pathogen detection

Industrial and bioprocess monitoring and quality assurance

Nutrient sensing

Chemical detection

Environmental and agricultural monitoring

Healthcare and drug discovery

For more information contact:

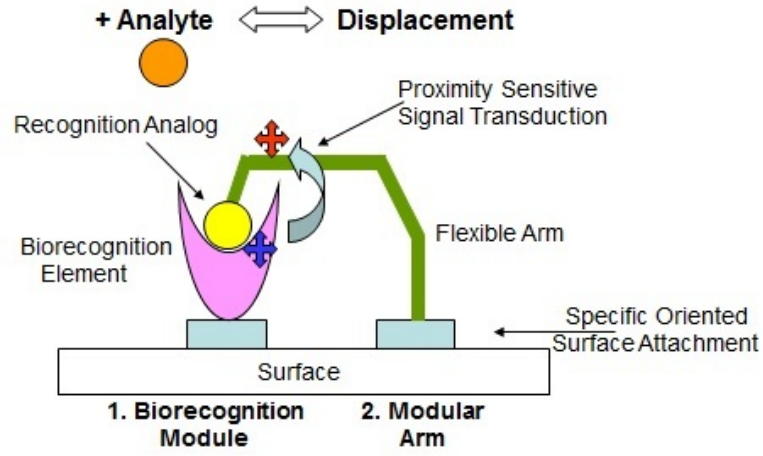
Rita Manak, Ph.D.
Head, Technology Transfer Office

202 767-3083

rita.manak@nrl.navy.mil

Identification Number:

BIO11



The Naval Research Laboratory (NRL) has developed a reusable biosensor that easily targets analytes, like toxins or hormones, with a controllable binding affinity. The sensor can be reused for subsequent sensing events once it is washed of analyte. It can be easily adapted to target other analytes due to its modular design. The biosensor is self-assembled and consists of two co-functional entities. The first entity is a surface tethered biorecognition element, such as a receptor protein. The second entity is a multifunctional tethered modular arm that contains a point of surface attachment, a flexible DNA linker, and a dye label. The dye label is attached to a recognition element (an analog of the primary analyte) that interacts with the receptor protein. These two entities are self-assembled on the surface of a microtiter well and their close proximity, when the biorecognition elements bind the analog on the modular arm, results in fluorescence resonance energy transfer (FRET) between the dyes. Detection of the targeted analyte is achieved when the analyte displaces the analog on the arm and alters FRET in a quantifiable manner. The useful sensing range is easily altered and extended through the use of different protein mutants and the addition of a DNA complement to the DNA flexible linker. The biosensor's adaptability was demonstrated by modifying the maltose-sensing prototype to target the completely unrelated explosive TNT. The reagentless biosensor answers the Naval and commercial need for reusable sensors that continuously monitor analyte concentrations without reagents.

References

"A Fluorescence Resonance Energy Transfer Sensor Based on Maltose Binding Protein." *Bioconjugate Chemistry*. 2003, 14 (5), pp. 909-918.

"Self-Assembled TNT Biosensor Based on Modular Microfunctional Surface-Tethered Components." *Analytical Chemistry*. 2005, 77 (2), pp. 365-372.

"General Strategy for Biosensor Design and Construction Employing Multifunctional Surface-Tethered Components." *Analytical Chemistry*. 2004, 76, pp. 5620-5629.

Available for License: US Patent Nos. 7,927,547 and 7,435,386.