Device and Methods for Liquid Crystal-Based Bioagent Detection

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a sensitive, selective and efficient device for detecting bioagents and other biological molecules.

Overview

Currently, most schemes for detecting bioagents or other biological molecules are based on relatively complex electronic, photonic and/or electrochemical methods, or on more elegant biomolecular methods, such as ELISA. However, the engineering-based approaches demand a high level of system integration and highly sensitive circuitry, leading to issues with cost, reliability and power consumption. The more biologically-oriented approaches are simple, but typically require a costly macro-scale spectrometry system to quantify the output.

The Invention

UW-Madison researchers have developed a sensitive, selective and efficient liquid crystal-based device and method for detecting bioagents and other biological molecules. The device uses membranes that are comprised of a polymerized antigen or substrate of an enzyme, such as botulinum toxin (BoNT). A liquid crystal is in contact with one surface of the membrane. To detect a bioagent, the other membrane surface is contacted with an aqueous solution suspected of containing the antibody or enzyme. If the bioagent is present in the solution, the membrane containing the substrate degrades, leading to a detectable change in the orientation of the liquid crystal.

Applications

- Detecting bioagents or other biomolecules

Key Benefits

- Capable of detecting the presence of a particular bioagent or other enzyme or antibody
- Highly sensitive and selective
- Responds quickly
- Generates few false-positives

Stage of Development

Successfully demonstrated for several substrate/enzyme combinations, including BoNT.

Additional Information

For More Information About the Inventors

- David Beebe
- Eric Johnson

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Related Intellectual Property

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Tech Fields

- Analytical Instrumentation, Methods & Materials : Biodefense
- Analytical Instrumentation, Methods & Materials : Sensors
- Clean Technology : Monitoring, remediation & waste reduction

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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