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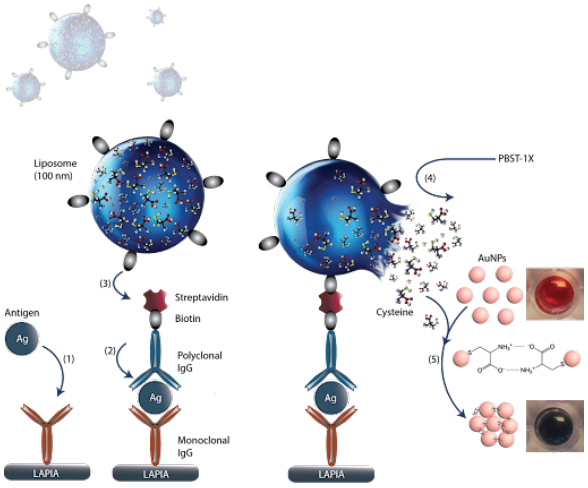
Single-pathogen detection via liposome-amplified plasmonic immunoassay

A novel colorimetric assay with single pathogen detection capabilities.



IP Status: US Patent Issued; Issued Patent No. 10,006,906

Applications

- Point-of-care diagnostics
- Food safety
- Environmental monitoring
- Biodefense

Key Benefits & Differentiators

- **Extremely low detection limit:** 1 million times more sensitive than ELISA. Limit of detection 6.7 x 10-18
- **Colorimetric results:** Color change can be seen with the naked eye and does not require special equipment
- **Broadly applicable:** Assay can be applied to a variety of pathogens including bacteria and viruses

Technology Overview

Detecting pathogens at ultralow concentrations is critical for food safety, biodefense, and clinical diagnostics. In many cases, the key requirement is simply identifying the presence of a specific pathogen or toxin, while quantification is less critical. Conventional immunoassay methods, such as enzyme-linked immunosorbent assay (ELISA), suffer from sensitivity limits without the aid of sophisticated instrumentation. While ELISA can be paired with spectroscopic equipment or imaging systems to enhance detection, these methods sacrifice the simplicity and convenience of a straightforward, naked-eye readout.

Technology ID

20140268

Category

Life Sciences/Biomarkers
Life Sciences/Biochemicals & Small Molecules
Life Sciences/Diagnostics & Imaging

Learn more

Researchers at the University of Minnesota have developed a novel colorimetric immunoassay for single pathogen detection with the naked eye. The presence of a single pathogen in the sample results in a chemical cascade reaction leading to a colorimetric shift from red to blue that is visible to the naked eye without specialized instrumentation. The immediate and amplified response is initiated by a triggered breakdown of cysteine-loaded nanoliposomes and subsequent aggregation of plasmonic gold nanoparticles.

Phase of Development

TRL: 3-4
Proof of concept. Demonstrated detection of listeria, salmonella, and E.coli O157.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- **Abdennour Abbas, PhD** Associate Professor, Department of Bioproducts and Biosystems Engineering

References

1. Minh-Phuong Ngoc Bui, Snober Ahmed, Abdennour Abbas(2015) , https://pubs.acs.org/doi/10.1021/acs.nanolett.5b02837, Nano Letters