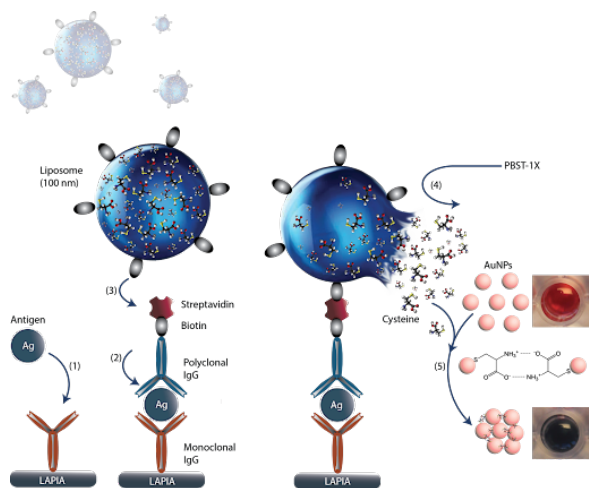




# Single-pathogen detection via liposome-amplified plasmonic immunoassay

A novel colorimetric assay with single pathogen detection capabilities.



Technology ID

20140268

Category

Life Sciences/Biomarkers

Life Sciences/Biochemicals &

Small Molecules

Life Sciences/Diagnostics &

Imaging

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**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  $6.7 \times 10^{-18}$
- **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.

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

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### **Researchers**

- [Abdenour Abbas, PhD](#) Associate Professor, Department of Bioproducts and Biosystems Engineering

### **References**

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