

Case ID:M21-076L

Published: 10/28/2021

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Colorimetric Assay for Rapid COVID-19 Antibody Detection

-SARS-CoV-2, the novel coronavirus that causes COVID-19, has spread globally into a full-blown pandemic, resulting in over 4 million deaths worldwide. With new and more contagious variants circulating, identification, surveillance, isolation and research are still vital to minimize spread and improve containment. Serology tests for detecting SARS-CoV-2 antibodies (Abs) have emerged as a valuable tool for surveillance, assessing infection risks, evaluating convalescent plasma donations and studying immune response post-infection. Current Ab tests primarily include lateral flow assays (LFAs) and ELISAs. While LFAs are simple and useful for POC settings, they are unable to identify the amount, type or function of the Abs. ELISA provides better quantification, but isn't suitable for rapid testing.

Researchers at Arizona State University have developed novel colorimetric sensors and assays for the rapid and sensitive detection of SARS-CoV-2 antibodies, including different immunoglobulin types (IgG, IgM, IgA, etc.), as well as virus neutralizing antibodies (nAbs). Digital readout occurs within a few minutes and can be visualized with the naked eye. The sensors are inexpensive and highly portable, providing precise quantification for clinical and field settings. Complex laboratory equipment or trained personnel are not required, further adding to the utility of these sensors.

These sensors and assays have the ability to substantially promote the availability of serology tests and assist in surveillance, vaccine development and research of SARS-CoV-2.

Potential Applications

- Detection of SARS-CoV-2 antibodies
 - POC COVID-19 detection
 - Sero-surveillance of population-based immunity
 - Research on immunity duration post-infection or post-vaccination
 - Estimating efficacy of donated convalescent plasma
 - Evaluating efficacy, strength and duration of vaccines in development

Benefits and Advantages

- Rapid results – just a few minutes
- Simple sample preparation
- Electronic readout
- Useful in resource-limited and remote or rural regions
- Highly portable
- Does not require trained technicians or complex machinery
- Inexpensive

For more information about this opportunity, please see

[Chen et al - bioRxiv - 2021](#)

For more information about the inventor(s) and their research, please see

[Dr. Wang's departmental webpage](#)

[Dr. Wang's Biodesign webpage](#)