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Case ID:M22-056L^
Published: 7/11/2022

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Simple, Portable, Low-cost, Viral Antigen Detection Method

-Recent infectious diseases, such as SARS-CoV-2, have caused massive and widespread global health and economic problems. One of the most effective tools in the early stages of a disease outbreak is testing and isolation of the infected. However, it takes time to develop a new diagnostic, particularly with novel pathogens. By the time a new test is ready to be deployed, the disease outbreak is often well underway and more difficult to control.

Researchers at the Biodesign Institute of Arizona State University in collaboration with researchers at University of Washington, Seattle, have developed a novel method for detecting SARS-CoV-2, Ebola and potentially other viral antigens. Using nanobody functionalized nanoparticles, viral antigens can be rapidly detected with colorimetric, spectrometric and electronic read-outs. This method does not require fluorescent labelling, complicated or expensive equipment, washing, or enzymatic amplification; however, it provides about 10 times better sensitivity than ELISA and can be used in clinics, at home or in remote locations. Further, it's quite simple, and can be made available at very low costs.

This technology can be adapted to provide a rapid, accessible antigen diagnostic within a few weeks of pathogen identification to help successfully control emerging infectious diseases.

Potential Applications

- SARS-CoV-2 detection
- Ebola detection
- Could be adapted for other viral antigens

Benefits and Advantages

- Ease of use – portable read out systems and digital data output
- Simplicity
- Cost effective
- Sensitivity and specificity with a large dynamic range
- Rapid – can provide results in a few minutes
- The electronic readout capability can be extended to automate data collection,

storage and analysis
    - Reduces workload for healthcare workers and speeds up surveillance responses
- Allows multivalent antigen sensing for enhanced antigen binding

For more information about this opportunity, please see

Chen et al - Biosens. Bioelectron - 2022

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

Dr. Wang's Biodesign webpage

Dr. Wang’s Departmental webpage