



NYU



# Adhesive Bandage for Rapid Pathogen Immune Response Detection

Innovative, portable, and customizable diagnostic devices for detecting an individual's anti-pathogen immune response.

## Category

COVID-19

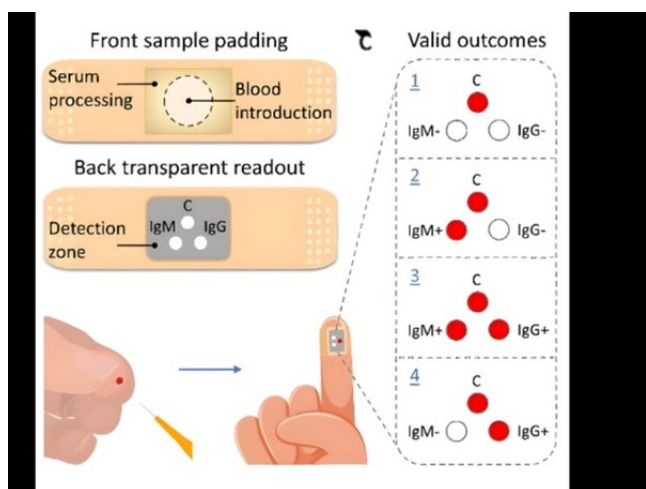
Life Sciences/Medical devices

Life Sciences/Diagnostics

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## Technology

The [Qasaimeh laboratory](#) at NYU Abu Dhabi has engineered an innovative device for the serological detection of an individual's immune response against viral, bacterial, and parasitical pathogens. This paper-based hybrid (vertical-lateral-vertical) flow assay, packaged in a bandage format, displays a colorimetric signal upon contact with blood indicating an individual's anti-pathogen immune response (see figure below). In proof-of-concept (unpublished), the Qasaimeh laboratory demonstrated the device's ability to detect IgM and IgG antibodies against SARS-CoV-2 from a pinprick of blood. Furthermore, they showed this device can return rapid and informative readouts, providing visual indications of an individual's anti-pathogen immune response: no immune response IgM-/IgG-; early immune response IgM+/IgG-; and active immune responses IgM+/IgG+ or IgM-/IgG+.

## Background

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the etiological agent of Coronavirus Disease 2019 (COVID-19), caused a global pandemic resulting in millions of deaths worldwide. In the initial phase of the pandemic, there was an obvious shortage of quick, accurate, and portable pathogen detection devices, which hindered medical progress. Similar shortages have also been observed in past epidemics and pandemics. Consequently, there is urgent need for the development of easy-to-use, inexpensive, accurate, and customizable diagnostic devices applicable to both current and future pathogen outbreaks.

## **Development Status**

A prototype of this device for anti-SARS-CoV-2 IgM/IgG detection has been conceptualized, engineered, and tested.

## **Applications**

- Detection of immune responses against SARS-CoV-2 and other viral, bacterial, and parasitical pathogens, including:
  - Monkeypox
  - HIV
  - Hepatitis B
  - Hepatitis C
  - Dengue
  - West Nile virus
  - Malaria
  - Toxoplasma gondii

## **Advantages**

- Customizable diagnostic platform: The incorporation of conjugated gold nanoparticles allows for the introduction of any pathogen-specific antigen for the detection of an individual's IgM/IgG antibodies.
- Informative readout: The device shows a spectrum of anti-pathogen immune responses allowing users and/or clinicians to pin-point the immune response stage for more appropriate treatment.
- Long shelf life: The device shows excellent functionality and reproducibility over several weeks.
- Rapid detection: Results are obtained within minutes for fast diagnosis.
- Portability: The adhesive bandage format allows for convenient application and is advantageous when traveling.

## **IP Status**

Non-provisional patent application pending