

Multiplexed full-spike serology platform: Next-generation SARS-CoV-2 antibody detection and immune profiling

A full-spike SARS-CoV-2 serology platform designed to improve the detection and characterisation of COVID-19 antibodies.

// TECHNOLOGY OVERVIEW

The most widely deployed commercial assays to detect COVID-19 antibodies share a critical blind spot: they target only the receptor-binding domain (RBD) of the spike protein, capturing just a fraction of the antibody repertoire. Leading rapid diagnostic tests and surrogate neutralisation assays detect as few as 32–35% of pre- or asymptomatic infections, leaving the vast majority of immune individuals misclassified.

We have developed the Spike Full-length protein-Based (SFB) assay, a flow cytometry serology platform that presents the complete, native-conformation spike protein on living HEK293T cells. By exposing patient serum to the full-length, cell-surface-expressed spike, the assay simultaneously profiles six antibody isotypes (IgM, total IgG, IgG1, IgG2, IgG3 and IgG4) in a single two-hour test.

It delivers what no existing lateral-flow or ELISA-based test can: the type of protective immune response, disease severity risk and variant cross-reactivity.

// OUR INNOVATION

✓ Full-spectrum COVID-19 serology

Detects a broader range of antibodies than existing commercial tests.

✓ Highly sensitive for asymptomatic cases

97% detection vs. only 32–35% for leading commercial tests.

✓ Pandemic-ready, variant-adaptable

Re-programmable for emerging variants and future viral threats.

✓ 6-in-1 multiplex in a single 2-hour run

Simultaneously measures six antibody types, unlike conventional tests.

✓ Immune profiling beyond detection

Uniquely distinguishes protective immune responses.

// OUR VALUE PROPOSITION

Resolves what other tests miss

Confirms serology for borderline or undetected cases.

Lower cost, time and sample volume

For labs and clinical trial sponsors.

Rapidly adaptable

To new variants or pathogens without rebuilding the assay.

Serves three key markets

Clinical labs for confirmation of serology, pharma for vaccine monitoring, and public health agencies for seroprevalence screening

POTENTIAL APPLICATIONS:

ANTIBODY DRUG DISCOVERY

VACCINE RESPONSE MONITORING

RESEARCH & ASSAY-DEVELOPMENT REAGENTS

// TECHNOLOGY DEVELOPMENT STATUS

TRL
4

Early-stage validation

BASIC RESEARCH

DEPLOYMENT

- SFB assay displaying full-length, native-conformation spike protein on living HEK293T cells
- Multiplexed immune profiling of six antibody isotypes in a single ~2-hour flow-cytometry test
- Expanded diagnostic readout to assess protective immune response, disease-severity risk, and variant cross-reactivity

PATENT

National phase in US, EP and CN.
Priority SG PCT/SG2021/050572 (Sep 2020).

PUBLICATION

YS Goh *et al.*, *STAR Protocols* (2021); YS Goh *et al.*, *Cell Reports Medicine* (2021).

CATEGORIES

Diagnostics · Serology & immunoassays · Biotechnology · SARS-COV-2

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