Infectious Diseases Labs
A*STAR IDL

MICROFLUIDICS · BIOLOGICS DISCOVERY

Microfluidic screening platform for biologics discovery & functional antibody research

A droplet microfluidic screening platform that identifies and isolates cells producing functionally neutralising antibodies within an integrated, high-throughput, chip-based system.

// TECHNOLOGY OVERVIEW

Existing antibody-discovery approaches force a trade-off between scale and functional relevance. Binding-based screens can interrogate large cell populations, but do not directly establish whether antibodies neutralise infection. Conventional neutralisation assays measure functional activity but are typically low throughput and do not readily link activity back to the individual antibody-secreting cell. This leaves a critical gap: the inability to efficiently identify and recover, at scale, the cells producing antibodies with desired neutralising activity.

We have developed a droplet microfluidic platform that screens and isolates cells producing neutralising antibodies at single-cell resolution. Individual cells are encapsulated in droplets, where their secreted antibodies accumulate. Virus and reporter host cells are then introduced into each droplet on-chip, allowing the platform to distinguish droplets in which infection is prevented from those in which infection occurs.

The technology offers a high-throughput, function-first approach to antibody discovery, linking single-cell antibody secretion, viral neutralisation and cell retrieval in one integrated workflow.

// OUR INNOVATION

- ✓ **Functional neutralisation screening**
  Selects antibodies based on their ability to neutralise viral infection, rather than antigen binding alone
- ✓ **Single-cell resolution**
  Assesses antibodies secreted by individual cells without prior cell expansion or cloning
- ✓ **Integrated on-chip workflow**
  Combines cell encapsulation, antibody secretion, virus delivery, infection readout and droplet sorting
- ✓ **High-throughput format**
  Enables efficient screening of large antibody-secreting cell populations
- ✓ **Direct cell recovery**
  Enriches and retrieves cells associated with neutralising activity for downstream development

// OUR VALUE PROPOSITION

Identifies functional candidates early
Prioritises neutralising antibodies before extensive downstream characterisation

Reduces discovery bottlenecks
Integrates screening, functional assessment and cell recovery in a single workflow

Resolves single-cell information
Links neutralising activity directly to the antibody-secreting cell of origin

Scales across targets
adaptable to different viral targets

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POTENTIAL APPLICATIONS: THERAPEUTIC ANTIBODY DISCOVERY | FUNCTIONAL ANTIBODY CHARACTERISATION | VACCINE HOST RESPONSE RESEARCH

// TECHNOLOGY DEVELOPMENT STATUS

TRL 4 — Early-stage validation

BASIC RESEARCH — DEPLOYMENT

PATENT

Patent family pending in US, EP and CN (US20250353012A, EP4533086A1, CN119816731A)

PUBLICATION

WN Li et al., Lab on a Chip (**2022**)

CATEGORIES

Microfluidics · Biologics discovery · Antibody research

Interested in this technology?

Connect with the A*IDL Tech-Biz team to explore licensing, co-development and translational opportunities. Available for licensing, co-development & translational research, and preclinical & clinical development partnerships.

Contact Us

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