

Streamlined Single B Cell Screening for Rapid Antibody Discovery

Monoclonal antibodies (mAbs) are essential tools in biomedical research, diagnostics, and therapeutics, yet conventional antibody discovery methods such as phage display and hybridoma generation are often laborious, inefficient, and may disrupt native heavy-light chain pairing. Single B cell screening offers a more efficient alternative by recovering antibody sequences directly from B cells, which preserves native pairing and significantly accelerates discovery timelines.

CellRaft Technology offers a platform for high-throughput single B cell antibody discovery by enabling the screening of tens of thousands of antibody-secreting cells (ASCs) for antibody secretion in a single run, with automated identification and recovery of cells for downstream sequencing (Figure 1).

Key advantages of the CellRaft AIR Single B Cell Antibody Discovery Assay:

- > **Comprehensive profiling:** Antibody isotype and specificity can be screened in one assay step.
- > **High-throughput screening:** Up to 80,000 antibody-secreting cells are screened on a single CellRaft Array.
- > **Rapid identification and recovery:** From B cell seeding to integrated data analysis and automated recovery of target-specific cells for downstream sequencing, the entire workflow is performed on a single instrument in as little as 4 hours.
- > **Broad workflow compatibility:** Assay modularity enables compatibility with a broad range of isotypes, subclasses, antigen targets, and species.
- > **Verified monoclonality:** Single-cell origin is confirmed with a full imaging record.

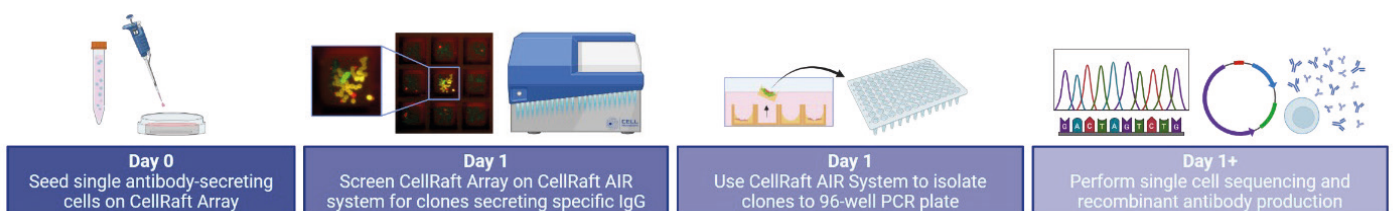


Figure 1. Single B cell screening workflow using CellRaft Technology

In the CellRaft AIR Single B Cell Antibody Discovery Assay, primary plasma B cells are seeded on a CellRaft Array (up to 80,000 cells per array in only 3mL of media) with detection reagents and optional capture beads that allow for fluorescence-based reporting for both isotype and antigen specificity of secreted antibody (Figure 2). Single ASCs exhibiting target specificity are identified using the CellRaft AIR System's companion analytical software, CellRaft Cytometry. ASCs are automatically transferred directly into 96 well plates for variable chain sequencing.

This workflow has been extensively validated, and recombinant antibodies produced from B cell sequences identified using the CellRaft workflow exhibited reactivity comparable to commercially available mAb (Figure 3).

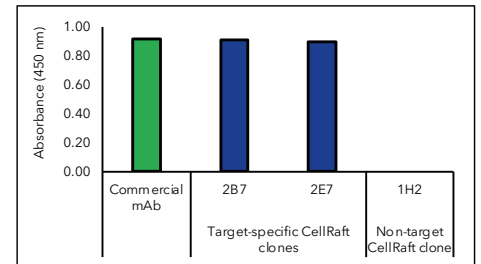
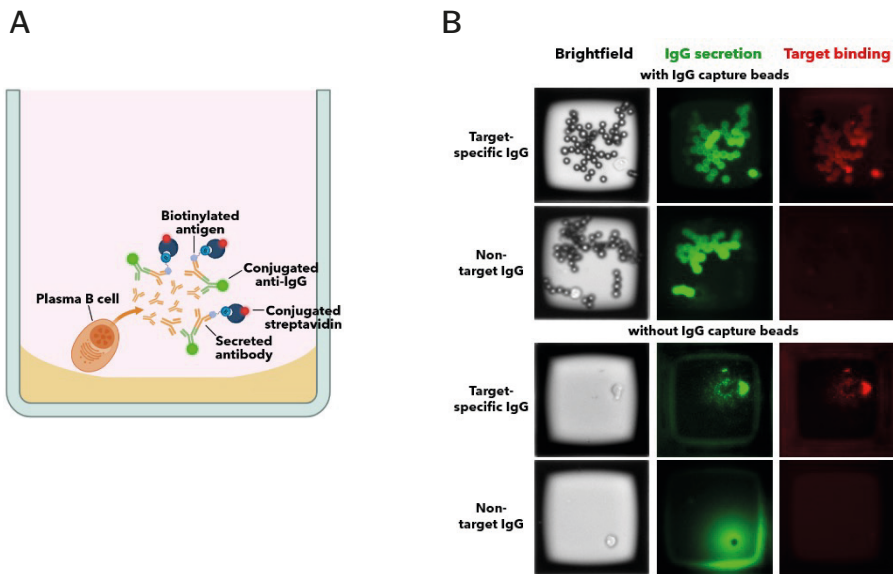


Figure 3. Recombinant mAbs generated using target-specific sequences had comparable reactivity (ELISA) to a commercial anti-target mAb (positive control), while a mAb from a plasma B cell secreting non-target IgG did not exhibit target reactivity.

Figure 2. Schematic (A) and representative (B) images of target-specific and non-target IgG-secreting single plasma B cells in individual microwells on the CellRaft Array. In these examples, IgG secretion is identified by 488 nm (green) fluorescence, and target binding is identified by 594 nm (red) fluorescence. Capture beads can be included but are not required.

For more information, visit cellmicrosystems.com