Berkeley Lights
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BERKELEY LIGHTS

Delivering digital cell biology at light speed

Berkeley Lights' innovative, optofluidics-based technology enables real-time, live, non-destructive, and iterative interrogation of thousands of single cells in integrated, end-to-end workflows for applications such as antibody discovery, cell line development, and T cell functional analytics.

Finding the most important individual cells for life science research or pharmaceutical applications requires an exorbitant amount of time, money, and effort. In fields that depend on finding the right cell or clone, selecting from hundreds of thousands of cells to the handful that are most important can take more than three months of intensive, expensive manual manipulation. Developing cell workflows that shorten the selection process can move these fields light years ahead and bring the right biologic therapies into clinical testing faster.

Founded in 2011, Berkeley Lights (BLI) is a pioneer and leader in the emerging field of digital cell biology, delivering breakthrough technology and platforms that fundamentally change research using cellular biological processes. Digital cell biology combines bioscience, technology, and information to dramatically advance how scientists study cellular interactions. BLI's platforms deliver the fastest, deepest, most complete measurements and insights across thousands of single cells in parallel.

"We believe our platforms will be transformative to multiple industries that require a dramatic step forward in the speed and scale of cell analysis in order to realize the next wave of breakthroughs," said Berkeley Lights' CEO Eric Hobbs.

Faster workflows and deeper cellular profiles

At the core of BLI's technology is optofluidics, which uses light and semiconductor technology to move individual cells so they can be isolated, cultured, assayed, and exported. The Beacon optofluidic platform replaces a roomful of equipment to deliver insights from individual cells and clones dramatically faster than any other technology.

Postage stamp-sized OptoSelect chips move thousands of cells in parallel while culturing and assaying each one. Each cell or clone is imaged and monitored in real time in a NanoPen, which is 100,000 times smaller in volume than a microwell. The Beacon platform can capture bright field and fluorescence images of each NanoPen at any time. Users can track and assay the same individual cell across multiple time points to reveal deep profiles—richly detailed fingerprints of cells and clones (**Fig. 1**).

"Our technology captures data from thousands of single cells, over time, allowing biologists to gain deeper information about populations and subpopulations than any other method can provide," Hobbs said.

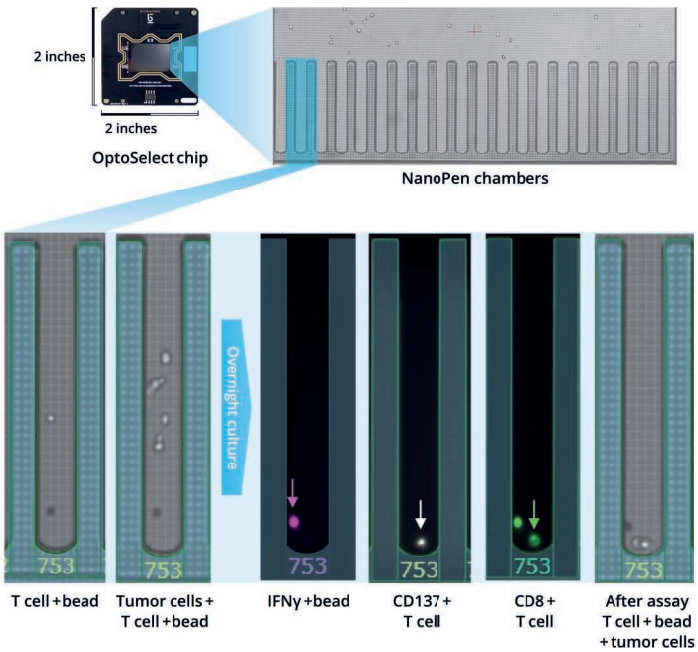

Fig. 1 | Characterizing phenotype and function of thousands of individual cells. In this example, individual T cells and cytokine capture beads were precisely placed into thousands of NanoPens on an OptoSelect chip. Tumor cells were introduced into each NanoPen and cultured overnight. Assays were scored using fluorescent and brightfield imaging to assess antigen-specific T cell activation. Cells of interest can then be recovered alive for additional analytical characterization, genotyping, or expansion.

Advancing antibody discovery, cell line development and T cell functional analytics

The Berkeley Lights B cell workflow enables direct screening of harvested plasma B cells using binding and functional assays. The automated plasma B cell workflow integrates 6 steps of a typical hybridoma workflow to accelerate antibody discovery from 12 weeks to a single day. The workflow can access the entire genetic diversity of an animal and increase the chances of finding rare functional antibodies.

BLI's technology has become Amgen's standard platform for cell line development[1]. The cell line development workflow makes it easy to screen thousands of clones at once, with in-depth characterization. It allows users to identify the highest producing, most stable clones, ten times faster than working with well plates. The end-to-end workflow enables direct measurements on the same clonal cell population that can then be recovered for downstream scale-up and production.

Berkeley Lights' new Lightning optofluidic platform enables the direct visualization of hundreds to thousands of individual T cells and cell–cell interactions. This can be applied across many types of experiment, including chimeric antigen receptor T cell construct screening and validation, antigen or T cell receptor discovery and validation, as well as investigation of regulatory T cell function.

Expanding opportunities

Berkeley Lights is also tackling emerging applications such as cell therapy manufacturing, agriculture, and synthetic biology to help customers find the fastest path from target identification to the clinic and accelerate design–build–test cycles in cell engineering.

"We're constantly working closely with our customers and partners to push the envelope," Hobbs said. "Our scientists will work with yours to take our technology wherever you need it to go."

1. Amgen. The digital cell biology revolution. *Amgen Science* https://www.amgenscience.com/features/the-digital-cell-biology-revolution/ (2019).

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