Instrument Brochure

Optofluidic and Proteomic Barcoding Platforms for Multi-Omic, Single-Cell and Bulk Analysis

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Unlocking the Power of the Phenome

Bruker provides missing insights into functional biology (i.e. the phenome) of each cell to advance discovery to clinical research.

The Phenome, Defined

The phenome is the set of all phenotypic traits expressed by a cell or organism, central to all questions in biology, which can now be profiled more comprehensively with single-cell functional multi-omics.

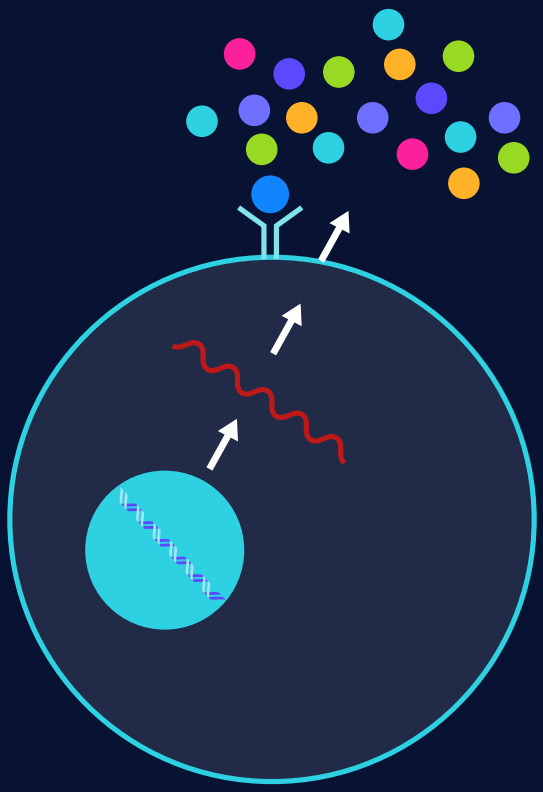
Each cell has a phenome that defines its traits and capabilities. By characterizing the phenome of individual cells, we unlock critical insights into cellular function.

Secreted Proteins
Communicate information

Transcriptome
Encode for protein information

Cell Movement
Motility and migration

Genome
Receptor Sequencing



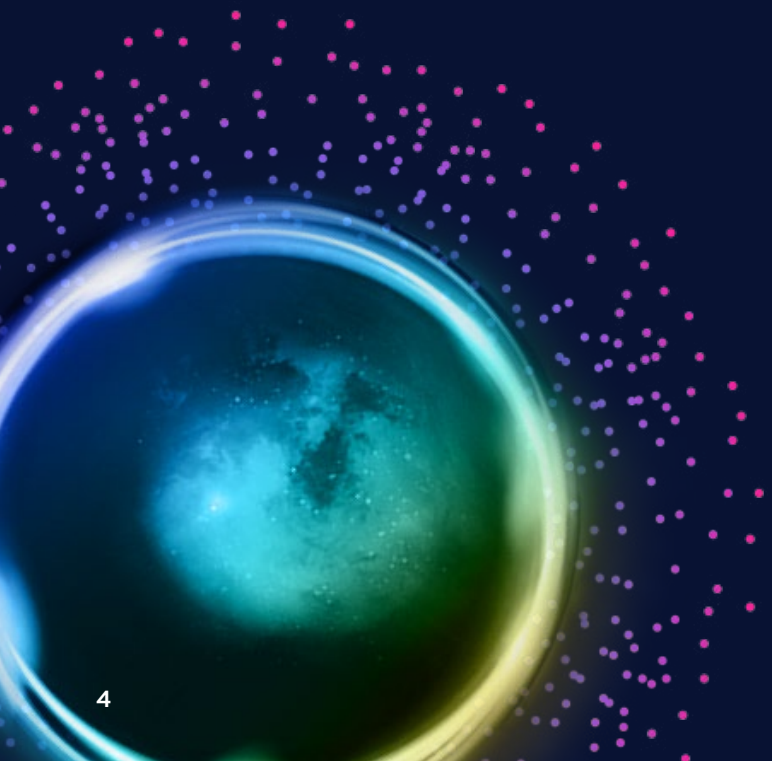
Receptor Proteins
Receive information

Cell Proliferation
Division and growth

Cell Interaction
Cell-to-cell communication

Bruker is Designed to Enable the Next Wave of Biological Breakthroughs

Our technologies uniquely capture aspects of the phenome required to accelerate biological solutions for thousands of labs for next-generation therapeutics. The Bruker Suite of discovery to clinical research technologies can capture the phenome, the collective sum of the parts of the cells, the phenotype, and the functional phenotype, and leverage that information to select the best cells and understand the fundamental biology driving the best patient responses.



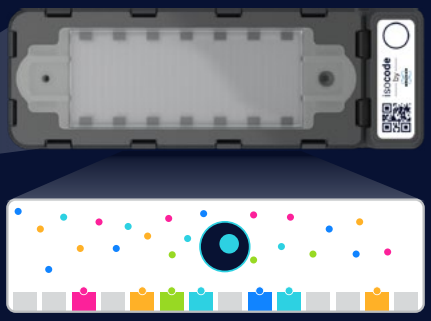
The IsoSpark™ Proteomic Barcoding System

A Personalized Functional Proteomics System for Every Lab

Accelerate personalized medicine across research areas and high-impact applications, all in one intuitive system that fits on any lab bench. Across all applications, discover direct functional profiling of single-cell and bulk population insights with walk-away automation.

18 in (45.7 cm)

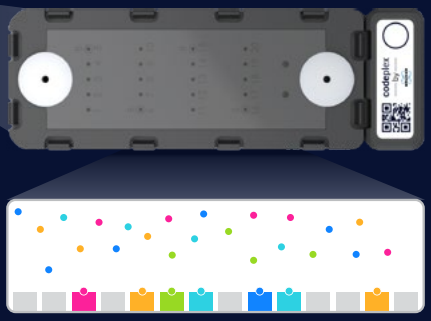
Multiplexed Single-Cell Analysis



Microchambers Capture Single Cells

Each single cell lane is exposed to proteomic barcode array of antibodies for highly multiplexed proteomic detection

Multiplexed Bulk Analysis



Macrochambers

Fully automated multiplexed bulk proteomic detection

1 Prep

2 Execute Run

3 Analyze Data

Single-Cell: Reveal a New Dimension of Behavior

The Single-Cell IsoCode® platform enables the discovery of better biomarkers and accelerated development through functional immune profiling of each immune cell, allowing for complete single-cell functional characterization. Detect rare subsets of highly functionally active cells to reveal functional biological drivers of persistence, potency, durability and more.

Single-Cell Secretome

Human Adaptive Immune

Granzyme B, IFN-γ, MIP-1α, Perforin, TNF-α, TNF-β, GM-CSF, IL-2, IL-5, IL-7, IL-8, IL-9, IL-12, IL-15, IL-21, CCL11, IP-10, MIP-1β, RANTES, IL-4, IL-10, IL-13, IL-22, TGFβ1, sCD137, sCD40L, IL-1β, IL-6, IL-17A, IL-17F, MCP-1, MCP-4

Mouse Adaptive Immune

Granzyme B, IFN-γ, MIP-1α, TNF-α, GM-CSF, IL-2, IL-5, IL-7, IL-12p70, IL-15, IL-21, sCD137, CCL11, CXCL1, CXCL13, IP-10, RANTES, Fas, IL-4, IL-10, IL-13, IL-27, TGFβ1, IL-6, IL-17A, MCP-1, IL-1β

Human Natural Killer

Granzyme B, IFN-γ, MIP-1α, Perforin, TNF-α, TNF-β, GM-CSF, IL-2, IL-5, IL-7, IL-8, IL-9, IL-12, IL-15, IL-21, CCL11, IP-10, MIP-1β, RANTES, IL-4, IL-10, IL-13, IL-22, TGFβ1, sCD137, sCD40L, IL-1β, IL-6, IL-17A, IL-17F, MCP-1, MCP-4

Human Innate Immune

IFN-γ, MIP-1α, TNF-α, TNF-β, GM-CSF, IL-8, IL-9, IL-15, IL-18, TGF-α, IL-5, CCL11, IP-10, MIP-1β, RANTES, BCA-1, IL-10, IL-13, IL-22, sCD40L, IL-1β, IL-6, IL-12-p40, IL-12, IL-17A, IL-17F, MCP-1, MCP-4, MIF, EGF, PDGF-BB, VEGF

Human Inflammation

GM-CSF, IFN-γ, IL-2, IL-12, TNF-α, TNF-β, IL-4, IL-5, IL-7, IL-9, IL-13, CCL11, IL-8, IP-10, MCP-1, MCP-4, MIP-1α, MIP-1β, RANTES, IL-10, IL-15, IL-22, TGF-β1, IL-1β, IL-6, IL-17A, IL-17F, IL-21, Granzyme B, Perforin, sCD40L, sCD137

Mouse Innate Immune

IFN-g, TNF-a, MIP-1a, IL-15, GM-CSF, IL-5, IL-10, IL-13, IL-6, IL-17A, MCP-1, IP-10, MIP-1b, EGF, PDGF-BB, MIF

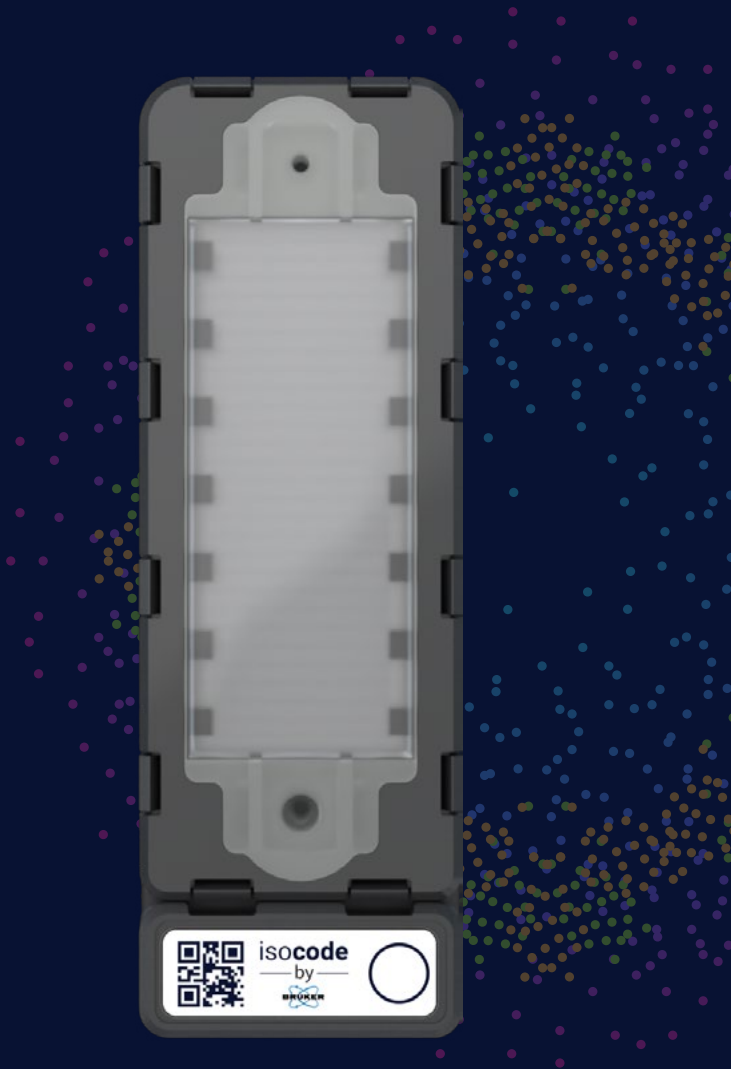
Single-Cell Signaling

Human Tumor Signaling

P-PRAS40, P-IkBα, P-NF-kβ p65, P-Met, P-p44/42 MAPK, P-S6 Ribosomal Protein, P-p90RSK, P-STAT3, P-MEK1/2, P-Stat1, P-Stat5, P-eIF4E, Alpha Tubulin

Human Adaptive Immune

TNF-a, IFN-g, PERFORIN, GRANZYME B, IL-10, MIP-1b, IL-2, GM-CSF, P-IkBA, P-NF-kB p65, P-Stat3, P-MEK1/2, P-Stat1, P-Stat5, IL-8



High-Impact Protein Screening: Access the Bulk Proteome with Ease

With high-plex walk-away immunoassays, unleash automated multiplexed proteomics in very low sample volumes to access insights right away. With a faster and more streamlined approach to generating multiplexed bulk cytokine data via a fully automated workflow, CodePlex and Meteor offer a modular solution to bulk cytokine data analysis and minimizes variability from user input.

CodePlex

Mouse Inflammation
IFN-γ, TNF-α, MIP-1α, IL-2, IL-5, IL-10, IL-13, IL-4, IL-6, IL-1β, IL-17A, IL-12, MCP-1, IP-10, KC, GM-CSF

Mouse Innate Immune
IFN-γ, TNF-α, MIP-1α, IL-15, GM-CSF, IL-5, IL-10, IL-13, IL-6, IL-17A, MCP-1, IP-10, MIP-1β, EGF, PDGF-BB, MIF

Human Adaptive Immune
GM-CSF, Granzyme B, IFN-γ, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-13, IL-15, IL-17A, IP-10, MCP-1, MIP-1α, MIP-1β, Perforin, sCD137, TNF-α, TNF-β

Mouse Adaptive Immune
GM-CSF, IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-12, IL-17A, IP-10, KC, MCP-1, MIP-1α, RANTES, TNF-α

Human Innate Immune
EGF, GM-CSF, Granzyme B, IFN-γ, IL-1β, IL-4, IL-6, IL-7, IL-8, IL-10, IL-15, IP-10, MCP-1, MIP-1α, MIP-1β, PDGF-BB, sCD137, TNF-α, VEGF

Human Cytokine Storm*
GM-CSF, IFN-γ, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-13, IL-17A, IP-10, MCP-1, MIP-1α, MIP-1β, Perforin, TNF-α

Human Stem Cell Signaling*
IL-17A, MIP-1α, IL-6, IL-4, MIP-1β, IL-8, IFN-γ, GM-CSF, IL-10, TNF-α, MCP-1, IL-2, IL-15, RANTES, IL-1α, IL-1β, CXCL5

Human Cancer Signaling*
EGF, IFN-γ, IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-13, MCP-1, MIF, PDGF-BB, RANTES, TNF-α

Meteor

Human Adaptive Immune 1
GM-CSF, IFN-g, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, IL-17A, TNF-α

* Limited Quantities

IsoSpark System Specifications

WORKING ENVIRONMENT

For indoor use only	
Operating Temperature	+15°C ~ +30° C (59°F ~ 86°F)
Humidity	20% ~ 80%, non-condensing
Altitude	< 6,500 ft (2,000 m)

DIMENSIONS

Width	18 in (45.7 cm)
Height	19.8 in (50.3 cm)
Depth	19.7 in (50.0 cm)

WEIGHT

Crated for Shipping	140 lb (63.5 kg)
Free Standing	95.5 lb (43.4 kg)

BENCH SIZE

Width	> 30 in (76 cm)
Depth	> 23.7 in (60.2 cm)

CLEARANCE

Front	> 4 in (10 cm)
Rear	> 4 in (10 cm)
Left	> 12 in (30 cm)
Right	> 12 in (30 cm)
Height	> 12 in (30 cm)

POWER SUPPLY

Voltage	100 V (min) to 240 V (max)
Current	6.3 A (max)
Frequency	50/60 Hz

GAS SUPPLY

Connection	0.25 in or 4 mm OD push to connect tubing
Pressure	30-70 PSI
Composition	Carbon dioxide (CO_2) at > 99% purity

USER INTERFACE

11 in LCD multi-touch screen

CONNECTION

Ethernet	1xGigE
USB	3x USB 3.0, 2 front & 1 rear cable

Performance Specifications

CONSUMABLES

Up to 4 disposable IsoCode or CodePlex Chips per run with barcode tracking

REAGENTS

Disposable one-time use reagent cartridge

CELL COUNTS

500-1500 targeted single cells per chip
2000-6000 targeted cells per run with 4 chips

THROUGHPUT

Over 30-plex functional cytokines per isolated single cell
Over 150,000 single cell, secreted protein data points per run

HANDS-ON TIME

< 3 min per sample (cell preparation time not included)

RUN TIME

< 24 hours from sample loading to results

ON-BOARD INCUBATOR

Temperature	37 ± 2°C
CO_2 Concentration	5 ± 1%

LASER

Wavelengths	405 nm, 473 nm, 638 nm
Safety	Class 1 laser product

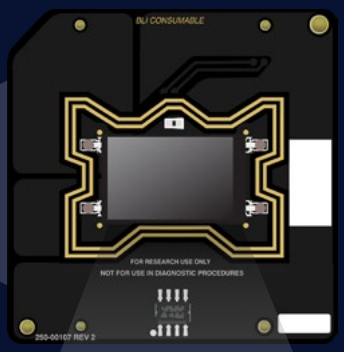
SOFTWARE SOLUTIONS

IsoSpeak® data analysis software	
Operating System	PC

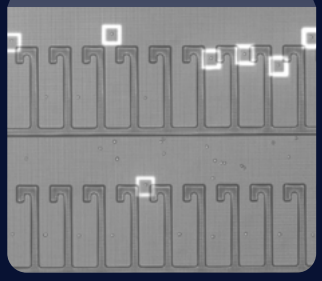
Meet the Beacon® Optofluidic System

Process and Analyze Cells in a Faster, More Insightful Way

At the core of the Beacon system is a combination of optics and nanofluidics called optofluidics. Light and semiconductor technology combine to selectively sort hundreds or thousands of single cells or individual beads into NanoPen® chambers where they can be isolated, cultured, assayed, and selectively exported.



OptoSelect® chips use light to selectively move individual cells.



Cells are cloned and assayed in individual 500 pL or 1 nL **NanoPen®** chambers. Each pen is ~100,000 times smaller than a well in a standard well-plate..

Accelerate Your Path to Live Cell Function and Recovery

Reduce Hands-On Time and Cut Costs with Cutting-Edge Technology

Antibody Discovery, Cell Line Development, Gene Editing and Cell Therapy Development – in these and other fields that depend on finding the right cell or clone, selecting the handful of cells that are most important from hundreds of thousands of cells can take 2 to 3 months or more of intensive, expensive, manual manipulation.

The Beacon® system shortens this selection process to just days and lets you bring the right biologic therapies to clinical testing faster. Identify the cells that matter much sooner. Move your work light-years ahead.

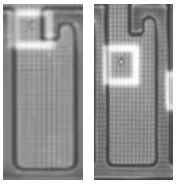
With the Beacon system's workflows, you can...

- Functionally profile individual live cells faster
- Recover live cells for linked function and downstream analysis
- Perform multiple assays on the same set of cells
- Automate your processes with increased throughput, higher resolution insights, less equipment, and less hands-on time
- Analyze multi-dimensional imaging data and mine deeper otherwise unattainable insights

1

Load

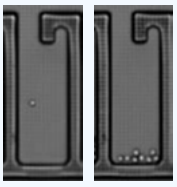
Software automatically identifies single cells and selectively sorts them into NanoPen® chambers using structured light.



2

Culture

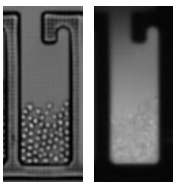
As cells expand, fresh media is perfused through channels in the chip, nutrients diffuse into the NanoPen® chambers and waste diffuses out, while the software images the NanoPen® chambers continuously – enabling cell counting, growth rate calculations, or other morphological characterization.



3

Assay

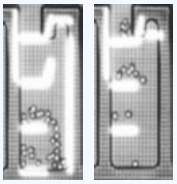
Run thousands of assays in parallel using our NanoPen® chambers that are 100,000x smaller in volume than a well in a 96 well plate – enabling phenotypic characterization of individual or populations of cells.



4

Unload

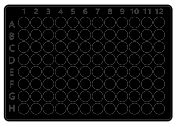
Selectively recover your best cells with phenotypes of interest from NanoPen® chambers for downstream processing including sequencing or live cell recovery.



5

Enable

Live cell recovery, downstream genomic analysis, bioinformatics and reconfirmation assay for validation.

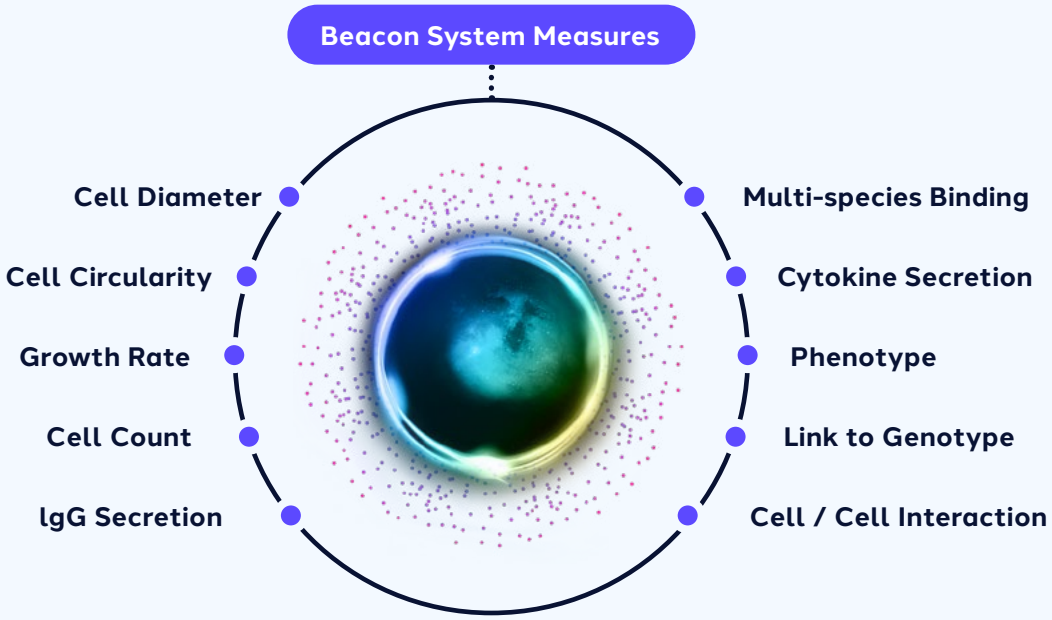


Deeper Insights from Fewer Cells

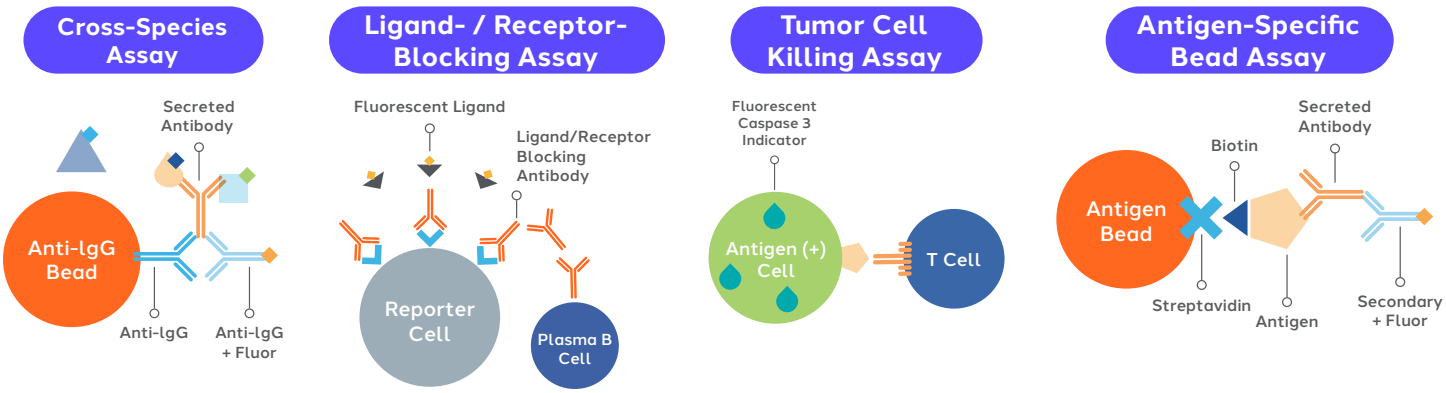
Assay 1000s of Cells to Find the Single Best Cell

NanoPen chambers are 100,000 times smaller than a well in a 96 well plate. That means that 1000s of individual live cells can be assayed within minutes or hours. There's no need to wait weeks for a large quantity of cells to assay.

Perform secretion assays with both soluble or membranebound targets and run fully-automated assays, sequentially or simultaneously, as frequently as you choose.



Some Typical Beacon Assays



Beacon Specifications

CAPABILITIES

Applications	• Cell Line Development • Antibody Discovery • TCR Sequencing • OptoSeq® RNAseq • Other R&D Workflows
Assays	• Antigen Specificity • Quantitative Secretion Assay • Multiplexed Fluorescent Assays • Lead Selection Assays • Custom Assay Development
Cell Types	CHO, plasma B cells, memory B cells, T cells, hybridoma cells, primary cells, adherent cells, others

FEATURES

Features	• Four optofluidic chip capacity. Supports a variety of • OptoSelect® chip types • Automated sample import/export • System-driven, on-board culturing, imaging, assay, and • OEP™ capabilities • Six color channels including brightfield imaging for assay development • Patented Bruker Software Suite that provide automation and analysis software tools, including Cell Analysis Suite (CAS®) and Assay Analyzer

SPECIFICATIONS

Import	• **Recommended input density:** 1e5 – 7e6 cells/mL • **Formats:** 1.5 mL Eppendorf tubes, 0.2 mL PCR tubes • Std. height (up to 16 mm) 96-well microtiter plates
Fluorescence Capabilities	• Brightfield • Up to 5 colors • **Standard configuration:** **DAPI:** Ex: 370 – 410 nm / Em: 429 – 475 nm **FITC:** Ex 450 – 500 nm / Em: 515 – 565 nm **PE:** Ex 540 – 557 nm / Em: 576 – 596 nm **TxRed:** Ex: 542 – 582 nm / Em: 604 – 644 nm **Cy5:** Ex: 608 – 648 nm / Em: 672 – 712 nm
Culture	• Customer defined media • Per chip temperature control: 10°C to 40°C

ATTRIBUTES

Dimensions	• **Width:** 46 in/116.8 cm • **Depth:** 34 in/86.4 cm • **Height:** 71.5 in/181.6 cm
Weight	• **Crated for shipment:** 1,700 lb (770 kg) • **Free-standing:** 1,260 lb (571 kg)

INPUTS

Power	Dedicated 110 – 240 V AC, 50 – 60 Hz, 20A circuit
Gas Supply	• CDA: 20 – 120 psi, 6 mm push-to-connect fitting* • >99% CO2: 20 – 120 psi, 6 mm push-to-connect fitting* ** Other NPT compatible fitting options available*
Sterility	• Integrated BSC Class II, A1 compatible airflow • Dual ULPA filtration. Exceeds Cleanroom Class 100, ISO Class 5
Recommended Clearance	• **Front:** 36–48 in (90–120 cm) • **Rear:** 24 in (60 cm) • **Left/Right Sides:** 24 in (60 cm)
Other Connections	Ethernet, USB
Working Environment	• **Temperature:** 64 – 79°F (18 – 26°C) • **Humidity:** 20 – 60% • **Altitude:** <6,500 ft (2,000 m)

SUPPORTING INSTRUMENTS AND COMPONENTS

Name	Description	Part Number
Beacon® Optofluidic System, positive pressure**	6-color, standard nest lid	110-08004
Beacon® Optofluidic System, negative pressure**	6-color, import well lid	110-08014
Culture Station™ Instrument	4-culture modules	110-08001

*** Available access options: Capital purchase and Subscription Programs (2, 3, 5 year)*

Chips	Part Number
OptoSelect® 1750 Chip	750-00018
OptoSelect® 3500 Chip	750-00012
OptoSelect® 11k Chip	750-08106
OptoSelect® 20k Chip	750-00019

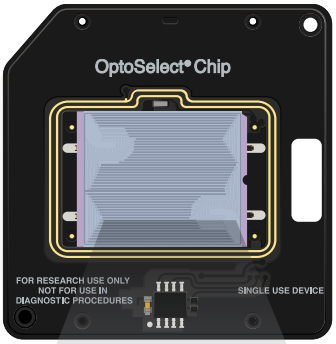
Beacon Quest™

Assay Thousands of Cells Simultaneously

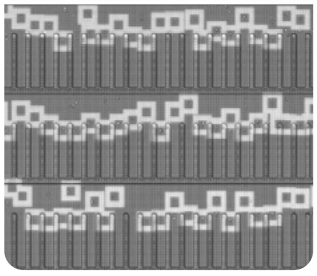
Simultaneous Incubation and Screening of Thousands of Single Cells on a Chip

Process and Analyze Cells in a Faster, More Insightful Way

The core of the system is the OptoSelect® chip, which combines nanofluidics and opto-electropositioning technology.



OptoSelect® chips use light to automatically move individual cells.



Cells are assayed in individual 0.25 – 1.7 nL **NanoPen®** chambers.

Single Cell Resolution at the Population Scale

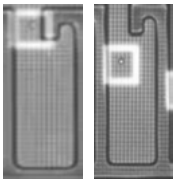
Cutting-Edge Optofluidic Platform Designed for Academic, Non-Profit and Government Research

Steps to Access Your Best Cells

1

Sort

Our software automatically detects individual cells and then uses patterned light to selectively direct single cells into NanoPen® chambers.



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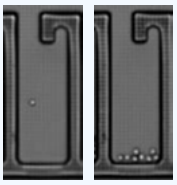
Culture

As cells expand fresh media is perfused through channels in the chip, nutrients diffuse into the NanoPen® chambers and waste diffuses out, while the software images the NanoPen chambers continuously – enabling cell counting, growth rate calculations, or other morphological characterization.



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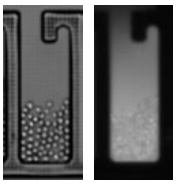
Assay

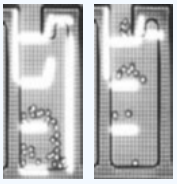
Run thousands of assays in parallel using our NanoPen® chambers that are 100,000 times smaller in volume than a well in a 96 well plate – enabling phenotypic characterization of individual or populations of cells.



4

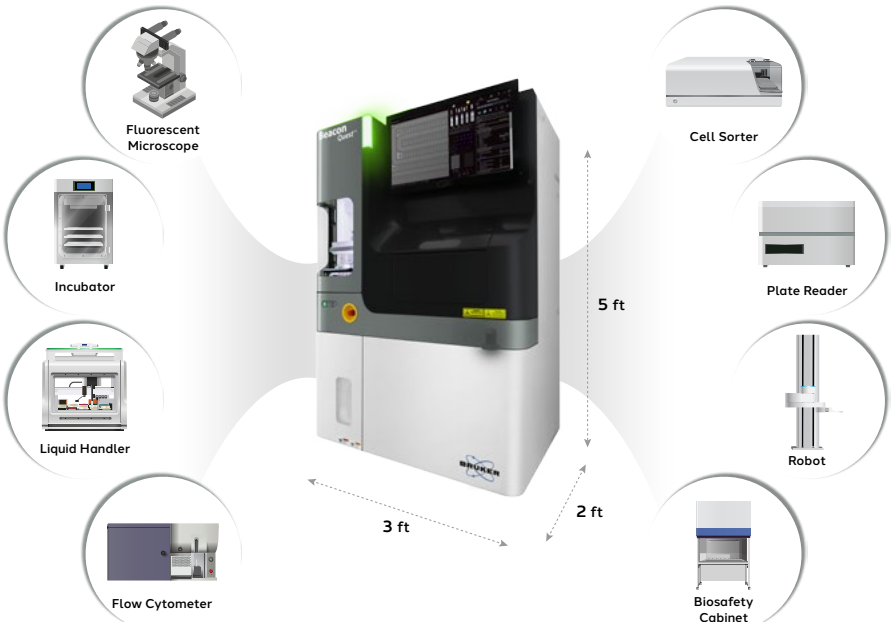
Recover

Selectively recover your best cells with phenotypes of interest from NanoPen® chambers for downstream processing including sequencing or live cell recovery.



Features and Benefits

- Patterned light is used to sort individual cells into NanoPen® chambers with volumes ranging from 0.25 nL to 1.7 nL
- High-throughput miniaturized assays are run in parallel to identify phenotypes of interest
- Single cells with phenotypes of interest can then be recovered for downstream processes
- Lower cost instrument designed to accelerate the pace of academic discovery

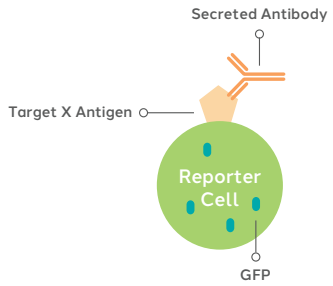


Microfluidics Meets Microscopy and Flow Cytometry

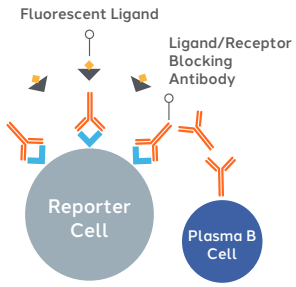
NanoPen® chambers are 100,000 times smaller in volume than a well in a 96 well plate. Isolate and assay a single cell within minutes. You won't need to wait weeks for a larger quantity of cells. You have complete flexibility to run fully-automated assays, sequentially or simultaneously to unlock new discoveries and insights on a single platform.

Assay Types

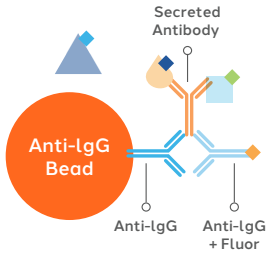
- IgG secretion
- Multiple antigen screening
- Cross-reactivity
- Growth rate
- Surface markers
- Reporter gene assays
- Ligand-blocking assay
- Cell/cell interaction
- Multiplexed cytokine assays
- Cytotoxicity assays
- Bead-based assays
- Bulk fluorescence assays
- Link phenotype to genotype
- Other functional assays



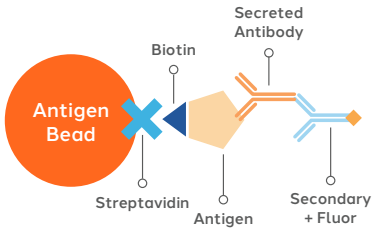
Functional Assay



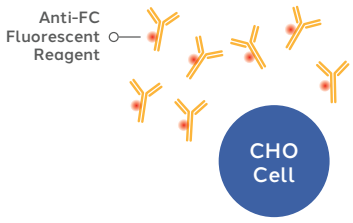
Ligand-Blocking Assay



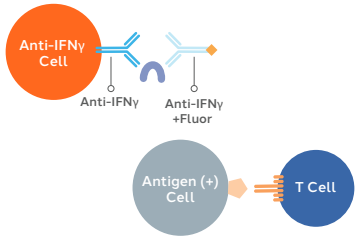
Cross-Reactivity Assay



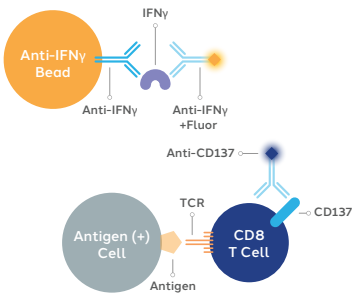
Antigen-Binding Assay



Bulk Fluorescence Assay



Cytokine Secretion Assay



Cytotoxicity Assay

Beacon Quest Specifications

CAPABILITIES

Applications	• Antibody Discovery • T Cell Profiling • TCR Sequencing • RNAseq with OptoSeq® 3' mRNA • Cell Line Development • Other R&D workflows
Assays	• Antigen Specificity • Quantitative Secretion Assay • Multiplexed Fluorescent Assays • Lead Selection Assays • Custom Assay Development
Cell Types	CHO, plasma B cells, memory B cells, T cells, hybridoma cells, primary cells, adherent cells, others

FEATURES

Features	• Two optofluidic chip capacity; supports a variety of OptoSelect® chip types • Automated sample import/export • System-driven, on-board culturing, imaging, assay, and OEP™ capabilities • Five color channels plus brightfield imaging for assay development • Patented Bruker Software Suite that provide automation and analysis software tools, Cell Analysis Suite (CAS®), Image Analyzer, and Assay Analyzer

SPECIFICATIONS

Import	• **Recommended input density:** 1e5 – 7e6 cells/mL • **Formats:** 1.5 mL Eppendorf tubes, 0.2 mL PCR tubes • Std. height (up to 16 mm) 96-well microtiter plates
Fluorescence Capabilities	• Brightfield • Up to 5 colors • **Standard configuration:** **DAPI:** Ex: 370 – 410 nm / Em: 429 – 475 nm **FITC:** Ex 450 – 500 nm / Em: 515 – 565 nm **PE:** Ex 540 – 557 nm / Em: 576 – 596 nm **TxRed:** Ex: 542 – 582 nm / Em: 604 – 644 nm **Cy5:** Ex: 608 – 648 nm / Em: 672 – 712 nm
Culture	• Customer defined media • Per chip temperature control: 10°C to 40°C

ATTRIBUTES

Dimensions	• **Width:** 46 in/116.8 cm • **Depth:** 34 in/86.4 cm • **Height:** 71.5 in/181.6 cm
Weight	• **Crated for shipment:** 1,700 lb (770 kg) • **Free-standing:** 1,260 lb (571 kg)

INPUTS

Power	Dedicated 110 – 240 V AC, 50 – 60 Hz, 20A circuit
Gas Supply	• CDA: 20 – 120 psi, 6 mm push-to-connect fitting* • >99% CO2: 20 – 120 psi, 6 mm push-to-connect fitting* ** Other NPT compatible fitting options available*
Sterility	• Integrated BSC Class II, A1 compatible airflow • Dual ULPA filtration. Exceeds Cleanroom Class 100, ISO Class 5
Recommended Clearance	• **Front:** 36–48 in (90–120 cm) • **Rear:** 24 in (60 cm) • **Left/Right Sides:** 24 in (60 cm)
Other Connections	Ethernet, USB
Working Environment	• **Temperature:** 64 – 79°F (18 – 26°C) • **Humidity:** 20 – 60% • **Altitude:** <6,500 ft (2,000 m)

SUPPORTING INSTRUMENTS AND COMPONENTS

Name	Description	Part Number
Beacon Quest™ Optofluidic System, negative pressure	5-color plus brightfield, import well lid	110-08044
Culture Station™ Instrument	4-culture modules	110-08001

Chips	Part Number
OptoSelect® 1750 Chip	750-00018
OptoSelect® 3500 Chip	750-00012
OptoSelect® 11k Chip	750-08106
OptoSelect® 14k Chip	750-00021
OptoSelect® 20k Chip	750-00019

Beacon Select™ Antibody Discovery

Fast, Powerful System for Antibody Discovery (AbD)

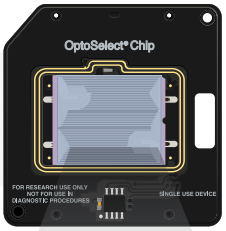
Import, Assay, and Recover Rare, Lead Candidates in a Single Run on a Single Platform

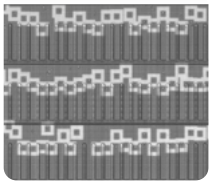
The negative pressure Beacon Select™ optofluidic system cuts the time and cost to get the best antibody lead candidates by using Opto® B Discovery workflows. By combining massive screening throughput for more shots on goal, function-first assays to funnel to only the best B cells, and high recovery rates of antibody sequences, users can obtain validated antibody sequences against even the hardest targets within 1-2 weeks.

Features and Benefits

- Find antibody sequences against rare targets where others can't (*Customer Spotlight: Genovac*)
- Tailor your lead candidate discovery to any target and function, including functional blockers and the high affinity molecules (*App Note: Identify Lead Candidates*)
- Discover up to 10-fold more hits, access 50-fold greater sequence diversity, and reduce costs by 20-fold in a matter of days, not weeks (*App Note: Lead Molecules for Difficult Targets*)

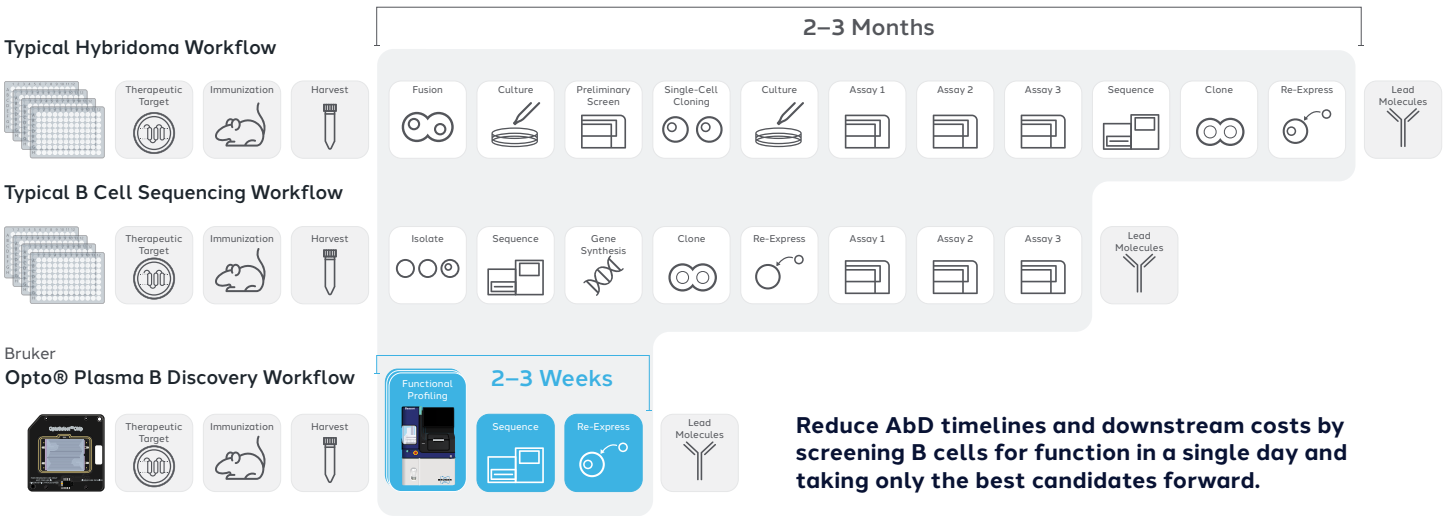
OptoSelect® chips use light to automatically move individual cells.





Cells are cloned and assayed in individual 0.25–0.32 nL **NanoPen®** chambers, which are ~100,000 times smaller than a well in a well in a 96 well plate.

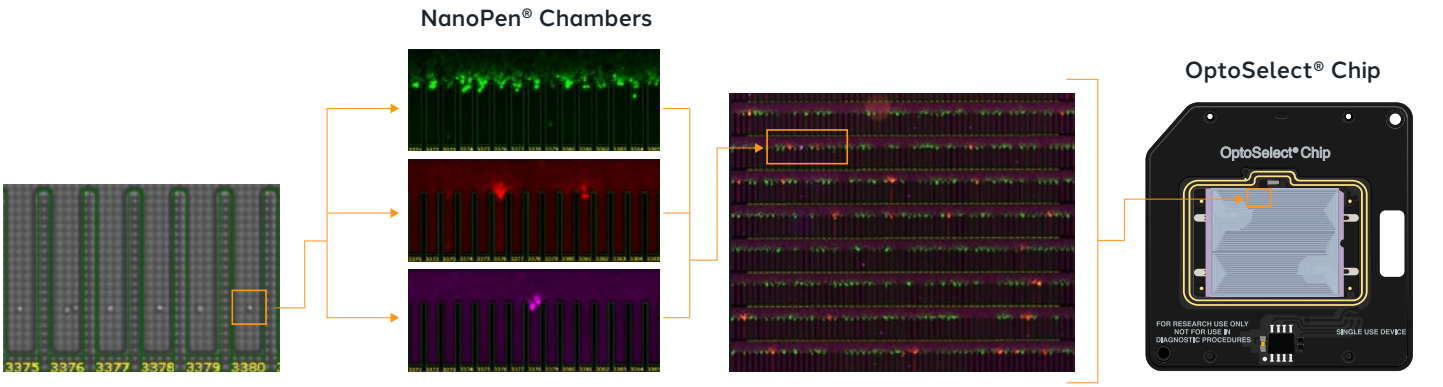
Comparison of Typical vs. Beacon Select™ Opto® B Discovery Workflows



Reduce AbD timelines and downstream costs by screening B cells for function in a single day and taking only the best candidates forward.

AbD Workflows Find Winners Quickly and Flexibly

Functionally Screen Tens of Thousands of B Cells on a Chip Simultaneously

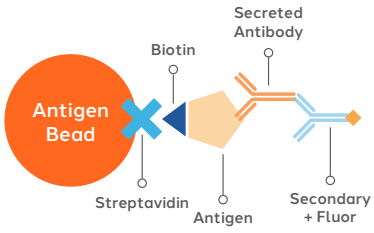


Single B cells are positioned into individual NanoPen® chambers.

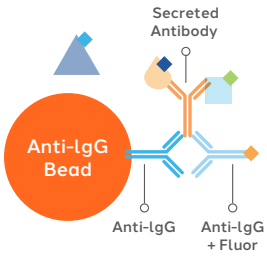
Assays are performed sequentially and/or in multiplex across all pens simultaneously to find the best antibodies, within minutes, that suit your needs.

Increase the odds of finding rare antibodies with OptoSelect chips containing tens of thousands of NanoPen chambers.

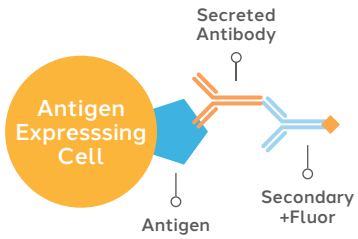
Customize Your Assays to Find Your Best Antibodies



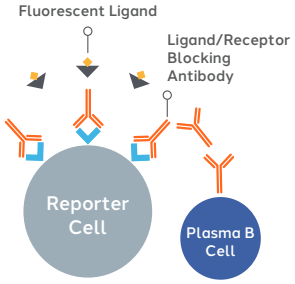
Antigen Specificity Assay



Cross-Reactivity Assay



Membrane-Bound Antigen Cell-Binding Assay



Ligand-Blocking Assay

Beacon Select AbD Specifications

CAPABILITIES

Applications	• Antibody Discovery
Assays	• Soluble Antigen Binding • Membrane-bound Antigen Binding

FEATURES

Features	• Two optofluidic chip capacity. Supports a variety of OptoSelect chip types • Automated sample import/export • Import Well nest lid for precious import volumes (<8 µL) • System-driven, on-board culturing, imaging, assay, and OEP capabilities • Five-color channels plus brightfield imaging for assay development • Patented Bruker software suite that provide automation and analysis software tools, including Cell Analysis Suite (CAS), Image Analyzer, and Assay Analyzer

SPECIFICATIONS

Import	• **Recommended input density:** 1e5 – 7e6 cells/mL • **Formats:** 1.5 mL Eppendorf tubes, 0.2 mL PCR tubes • Std. height (up to 16 mm) 96-well microtiter plates
Fluorescence Capabilities	• Brightfield • Up to 5 colors • **Standard configuration:** **DAPI:** Ex: 370 – 410 nm / Em: 429 – 475 nm **FITC:** Ex 450 – 500 nm / Em: 515 – 565 nm **PE:** Ex 540 – 557 nm / Em: 576 – 596 nm **TxRed:** Ex: 542 – 582 nm / Em: 604 – 644 nm **Cy5:** Ex: 608 – 648 nm / Em: 672 – 712 nm
Culture	• Customer defined media • Per chip temperature control: 10°C to 40°C

ATTRIBUTES

Dimensions	• **Width:** 46 in/116.8 cm • **Depth:** 34 in/86.4 cm • **Height:** 71.5 in/181.6 cm
Weight	• **Crated for shipment:** 1,700 lb (770 kg) • **Free-standing:** 1,260 lb (571 kg)

INPUTS

Power	Dedicated 110 – 240 V AC, 50 – 60 Hz, 20A circuit
Gas Supply	• CDA: 20 – 120 psi, 6 mm push-to-connect fitting* • >99% CO2: 20 – 120 psi, 6 mm push-to-connect fitting* ** Other NPT compatible fitting options available*
Sterility	• Integrated BSC Class II, A1 compatible airflow • Dual ULPA filtration. Exceeds Cleanroom Class 100, ISO Class 5
Recommended Clearance	• **Front:** 36–48 in (90–120 cm) • **Rear:** 24 in (60 cm) • **Left/Right Sides:** 24 in (60 cm)
Other Connections	Ethernet, USB
Working Environment	• **Temperature:** 64 – 79°F (18 – 26°C) • **Humidity:** 20 – 60% • **Altitude:** <6,500 ft (2,000 m)

SUPPORTING INSTRUMENTS AND COMPONENTS

Name	Description	Part Number
Beacon Select System, negative pressure**	5-color plus brightfield, import well lid	110-08042

** Available access options, Capital purchase, Reagent Rental and Lease (2 year)

Chips	Part Number
OptoSelect 11k Chip	750-08090
OptoSelect 14k Chip	750-00021
OptoSelect 20k Chip	750-00019

Beacon Select™ Cell Line Development

Single, Integrated System for Cell Line Development (CLD)

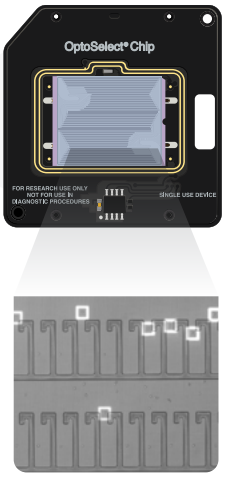
Clone, Culture, Assay and Select Top Clones in a Single Run on a Single Platform

The Beacon Select™ optofluidic system enables high throughput cloning, screening and selection of top-performing CHO cell lines in just days using the Opto® CLD workflow. In addition, the Opto® Assure quality assays enable users to select clones with favorable product quality attributes within 5 days of cloning to reduce overall costs, improve the probability of success, and further shorten timelines by selecting top clones for scale up.

Features and Benefits

- Select clones with higher titers than traditional methods (*Customer Spotlight: Catalent*)
- Increase throughput by 2x while reducing cell line development timelines by up to 50% (*Customer Spotlight: Mycenax*)
- Achieve cloning efficiencies 5x greater than FACS and 10x greater than limiting dilution, while recovering clones with >99% monoclonality assurance[1] (*App Note: FDA Accepted IND*)

OptoSelect® chips use light to automatically move individual cells.



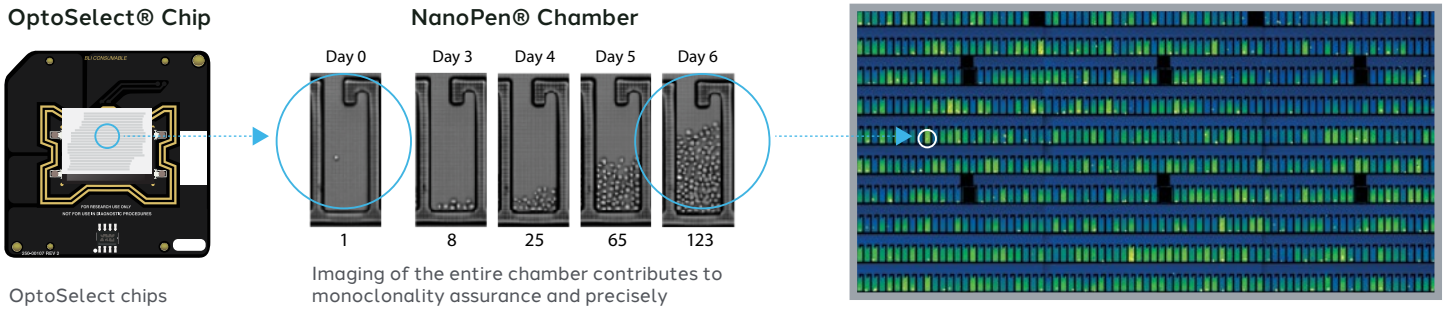
Cells are cloned and assayed in individual 1.7 nL **NanoPen®** chambers, which are ~100,000 times smaller than a well in a 96 well plate.

Comparison of Typical vs. Beacon Select™ Opto® Cell Line Development Workflows

Selective Cell Cloning can be used to reduce CLD timelines, by gently sorting a pool of cells 2.5 weeks post transfection when cell viabilities are as low as 30%.[2]

Enabling Simple, Yet Powerful CLD Workflows

Simultaneous Incubation and Screening of Thousands of Clones on a Chip

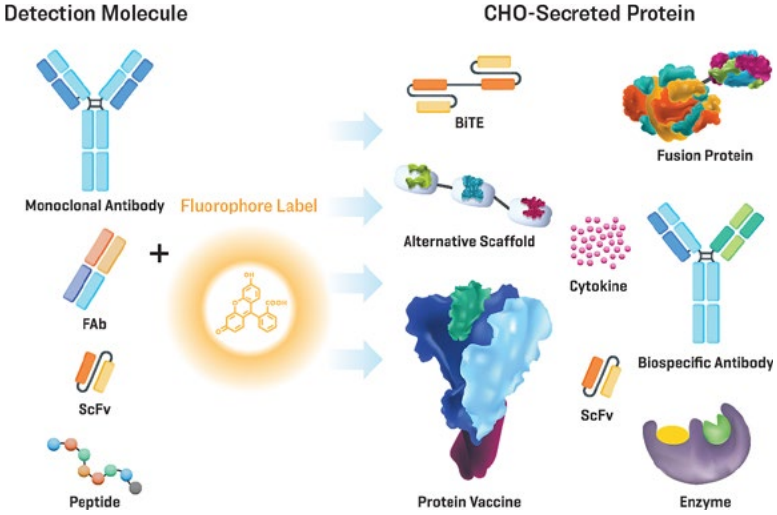


OptoSelect chips contain thousands of NanoPen chambers.

Imaging of the entire chamber contributes to monoclonality assurance and precisely controlled chamber environment ensures optimal growth conditions.

Non-destructive fluorescent assays, performed at microscale within 5 days of cloning, pinpoint the best clones.

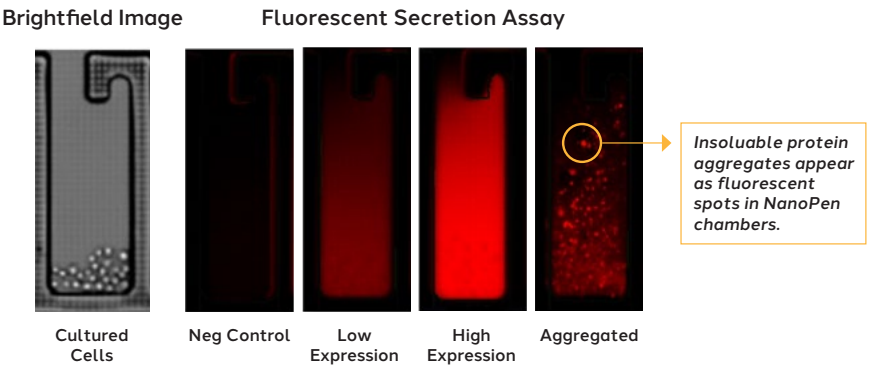
Customize your assays to find your best antibodies



Custom Productivity Assay enables selection of clones secreting a wide variety of non-antibody molecules. The Custom Productivity Assay uses labeled detection molecules to measure a wide range of secreted proteins, including antibodies, protein-based vaccines[3], enzymes, fusion proteins, antibody fragments and cytokines.

Selection Based on Product Quality, Not Just Productivity

The Opto® Assure assays minimize the risk of costly late stage failures by identifying top producing clones with desirable product quality attributes early on. The Opto Assure assay for aggregation enables direct detection of product aggregates within days of single-cell cloning. This lets you confidently identify and select clones that secrete high-quality complex molecules and develop better production cell lines faster.



Beacon Select CLD Specifications

CAPABILITIES

Applications	• Cell Line Development
Assays	• Quantitative Secretion Assay • Custom Assay Development

FEATURES

Features	• Two optofluidic chip capacity. Supports a variety of OptoSelect chip types • Automated sample import/export • System-driven, on-board culturing, imaging, assay, and OEP capabilities • Six-color channels including brightfield imaging for assay development • Patented Bruker software suite that provide automation and analysis software tools, including Cell Analysis Suite (CAS) and Assay Analyzer

SPECIFICATIONS

Import	• **Recommended input density:** 1e5 – 7e6 cells/mL • **Formats:** 1.5 mL Eppendorf tubes, 0.2 mL PCR tubes • Std. height (up to 16 mm) 96-well microtiter plates
Fluorescence Capabilities	• Brightfield • Up to 5 colors • **Standard configuration:** **DAPI:** Ex: 370 – 410 nm / Em: 429 – 475 nm **FITC:** Ex 450 – 500 nm / Em: 515 – 565 nm **PE:** Ex 540 – 557 nm / Em: 576 – 596 nm **TxRed:** Ex: 542 – 582 nm / Em: 604 – 644 nm **Cy5:** Ex: 608 – 648 nm / Em: 672 – 712 nm
Culture	• Customer defined media • Per chip temperature control: 10°C to 40°C

ATTRIBUTES

Dimensions	• **Width:** 46 in/116.8 cm • **Depth:** 34 in/86.4 cm • **Height:** 71.5 in/181.6 cm
Weight	• **Crated for shipment:** 1,700 lb (770 kg) • **Free-standing:** 1,260 lb (571 kg)

INPUTS

Power	Dedicated 110 – 240 V AC, 50 – 60 Hz, 20A circuit
Gas Supply	• CDA: 20 – 120 psi, 6 mm push-to-connect fitting* • >99% CO2: 20 – 120 psi, 6 mm push-to-connect fitting* ** Other NPT compatible fitting options available*
Sterility	• Integrated BSC Class II, A1 compatible airflow • Dual ULPA filtration. Exceeds Cleanroom Class 100, ISO Class 5
Recommended Clearance	• **Front:** 36–48 in (90–120 cm) • **Rear:** 24 in (60 cm) • **Left/Right Sides:** 24 in (60 cm)
Other Connections	Ethernet, USB
Working Environment	• **Temperature:** 64 – 79°F (18 – 26°C) • **Humidity:** 20 – 60% • **Altitude:** <6,500 ft (2,000 m)

SUPPORTING INSTRUMENTS AND COMPONENTS

Name	Description	Part Number
Beacon Select System, positive pressure**	5-color plus brightfield, import well lid	110-08039
Culture Station Instrument	2-culture modules	110-08003

** Available access options, Capital purchase, Reagent Rental and Lease (2 year)

Chips	Part Number
OptoSelect 1750b-2N CLD chip	750-08298

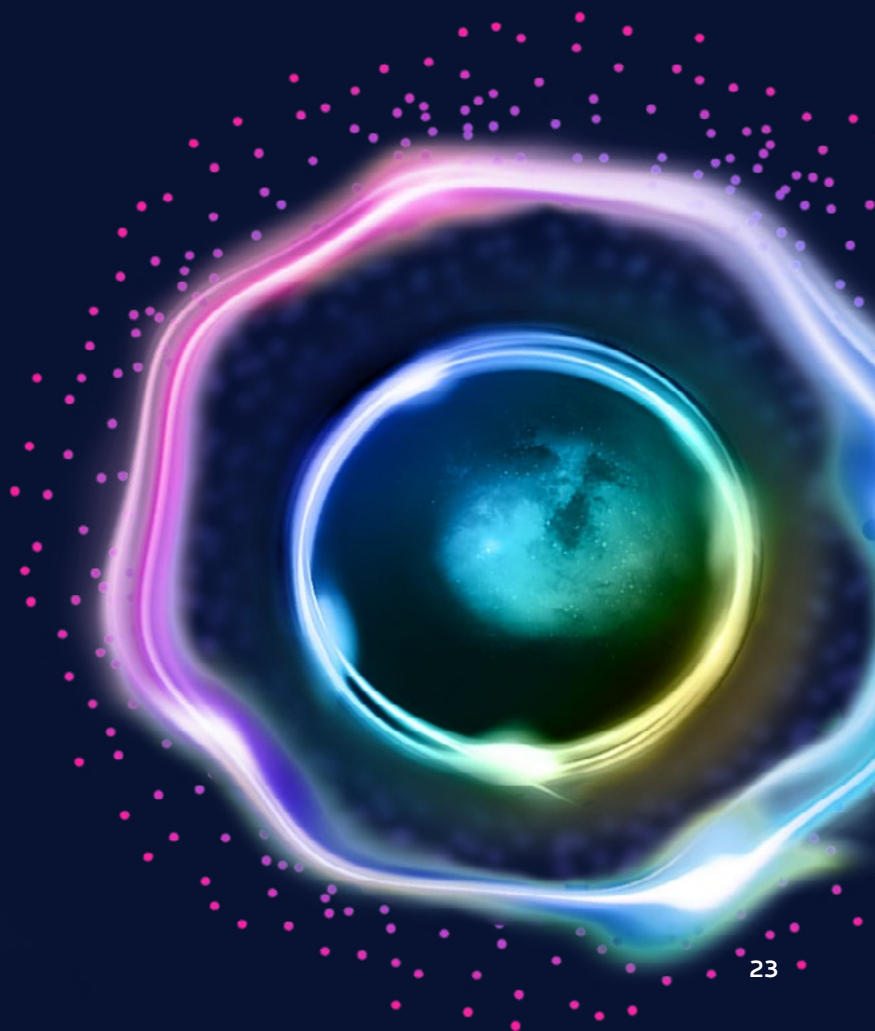
Reference

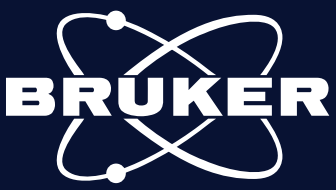
Le, Kim, et al. Assuring clonality on the Beacon® digital cell line development platform. Biotechnology Journal. 2020 15.1: 1900247. *https://doi.org/10.1002/biot.201900247*

Diep, J, Le, H, Le, K, et al. Microfluidic chip-based single-cell cloning to accelerate biologic production timelines. Biotechnol Progress. 2021;e3192. *https://doi.org/10.1002/btpr.3192*

Watterson, D, et al. Preclinical development of a molecular clamp-stabilised subunit vaccine for severe acute respiratory syndrome coronavirus 2. Clin Transl Immunology. 2021 5;10(4):e1269. *https://doi.org/10.1002/cti2.1269*

Multi-Omic Cellular Analysis for Every Lab





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