

Agilent NovoCyte Penteon and NovoCyte Quanteon

When exceptional performance meets simplicity





A Quantum Leap In Benchtop Flow Cytometry

The Agilent NovoCyte Penteon and NovoCyte Quanteon

The NovoCyte Penteon and NovoCyte Quanteon flow cytometers build on its successful predecessor, the NovoCyte, to provide an expanded set of capabilities that accommodate today's high-end and increasingly sophisticated multi-color flow cytometry assays. You now have the flexibility to choose from up to 30 fluorescent channels utilizing up to 5 lasers with up to 30 independent detectors. The NovoSampler Q, which can be integrated into different laboratory automation platforms, efficiently processes both FACS tubes (using a 40-tube rack) and 24-, 48-, 96-, and 384-well plates. The intuitive and industry leading NovoExpress software has been further advanced, providing an exceptional user experience in data acquisition, analysis and reporting.



- Expanded flexibility with up to 30-color options using up to 5 lasers
- High sensitivity and resolution
- Intuitive and powerful software for data acquisition, analysis, and reporting
- Smart-design functionalities and walk-away operation to simplify your workflow
- Automation-ready capability for high throughput needs
- Wide, 7-log dynamic range eliminates the need for routine detector adjustments

Expand Your Capabilities

Up to 32 parameter analysis

Equipped with up to 30 fluorescence channels from up to five lasers (349, 405, 488, 561, and 637 nm) the NovoCyte Penteon and NovoCyte Quanteon offer tremendous flexibility in panel design. Optimized detector settings eliminate the need for complicated and laborious adjustments, making data acquisition as simple as load-and-go.

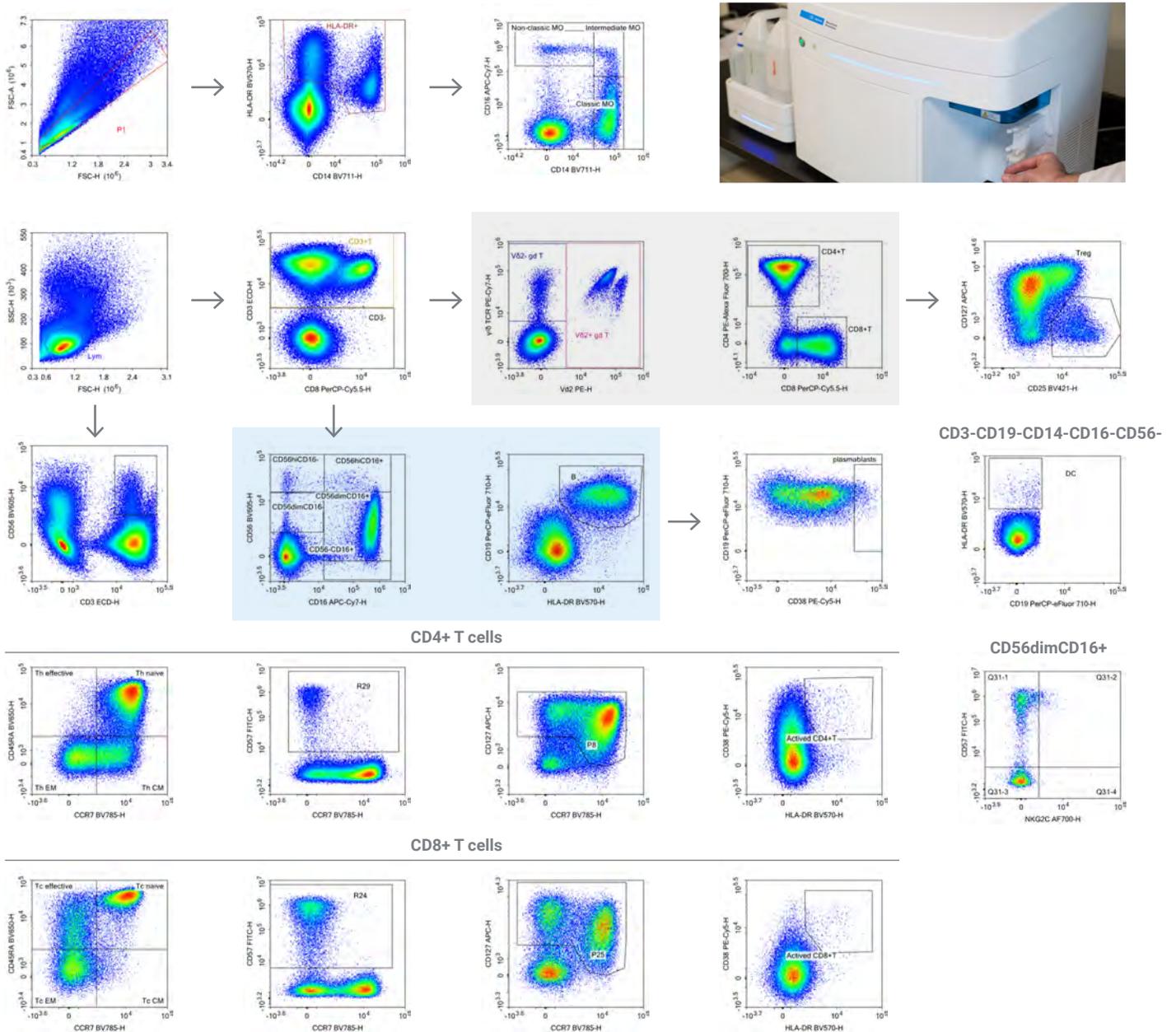
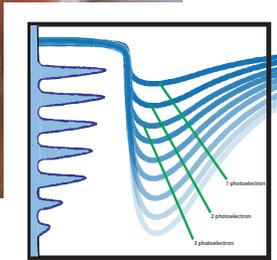
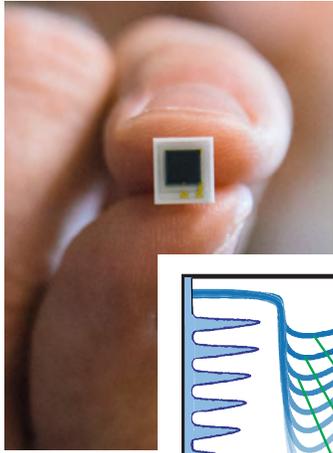


Figure 1. Above, we show a 19-color pan-leukocyte immunophenotyping panel on PBMCs using the NovoCyte Quanteon, adapted from OMIP-024 (Cytometry Part A, 85A:995-998, 2014). This panel was designed to monitor different immune subsets with activation and differentiation markers.

The Sensitivity You Demand

Silicon Photomultiplier (SiPM) – The ultimate photodetector



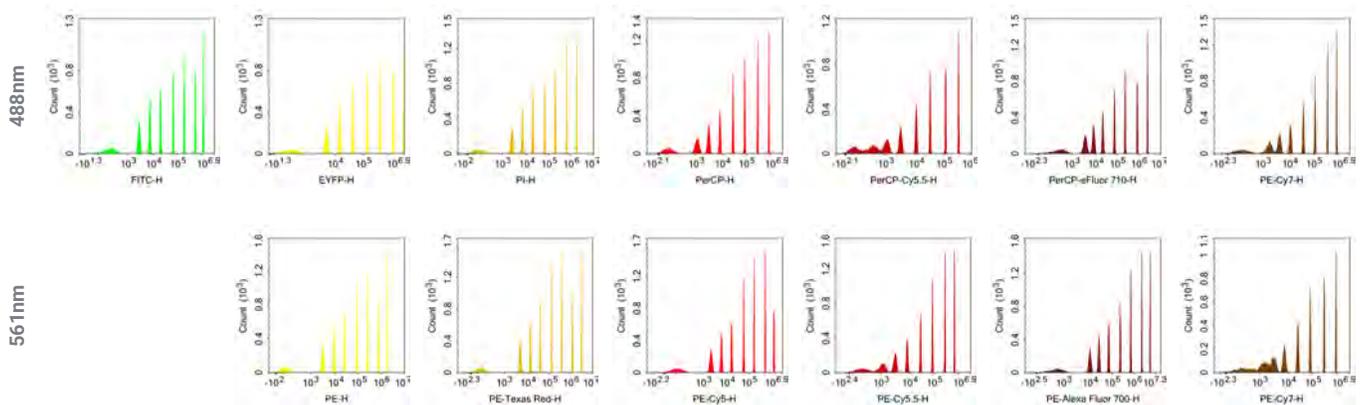
What is a SiPM?

Silicon photomultipliers (SiPM) are solid-state, semiconductor devices. Consisting of a compact array of avalanche photodiodes operating in unison, SiPM is a detector with photon counting capability. An innovative optical design in the NovoCyte Penteon and NovoCyte Quanteon incorporates up to 30 independent SiPM for collecting and processing signals for each of its fluorescence channels.

This detector with high sensitivity provides more confidence you can detect the dim signals in your samples.

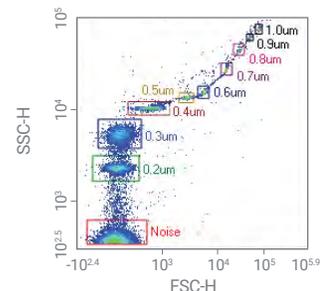
SiPM's strengths:

- Photon detection sensitivity
- High gain and high quantum efficiency
- Instantaneous warm up and fast response
- Robust and long lifespan
- High durability



FSC/SSC detection resolution

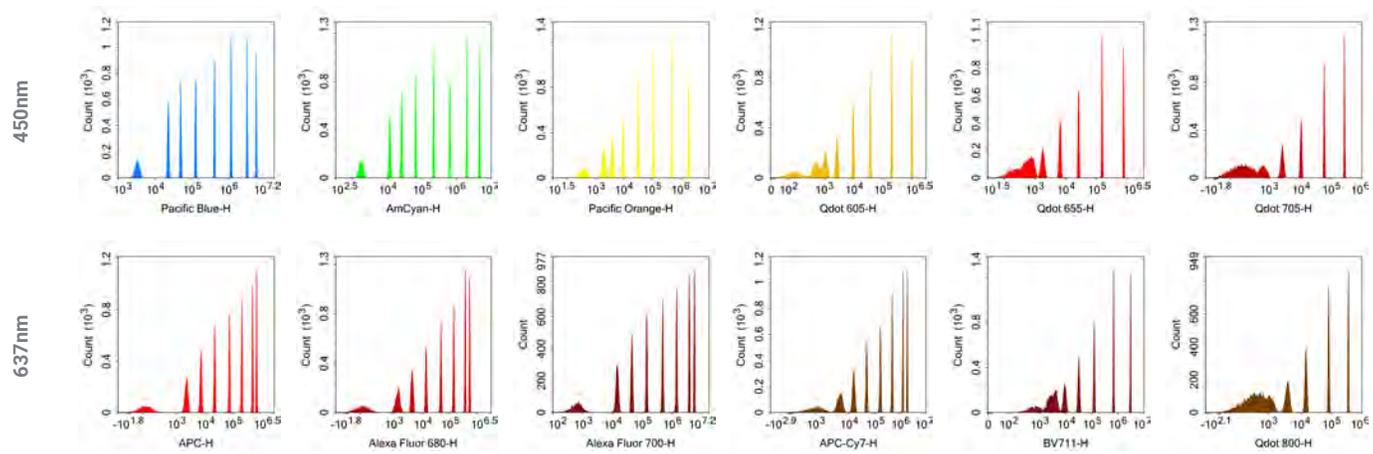
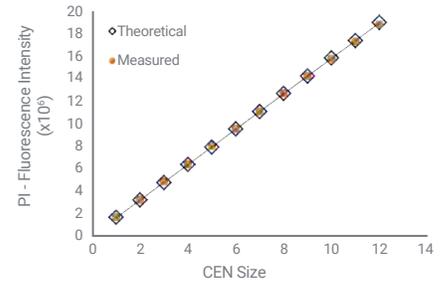
NovoCyte Penteon and NovoCyte Quanteon's FSC/SSC detection optics and signal processing electronics have been optimized to resolve particles as small as 0.1 μm . With this high resolution, platelets, bacteria, and various sub-micron particles can be readily identified and analyzed.



Confidently quantify fluorescence signals

The optical and electronic subsystems are the result of state-of-the-art engineering. This design enables the NovoCyte Penteon and NovoCyte Quanteon to deliver a highly linear detection signal response for all channels across a wide dynamic range.

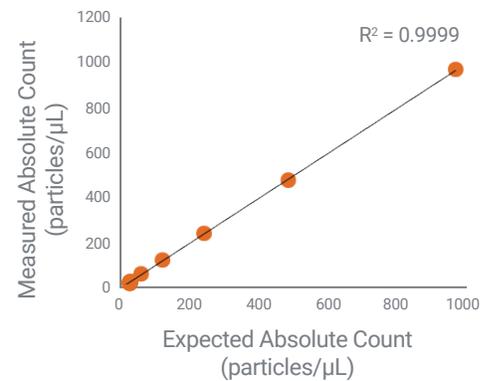
To demonstrate the detection linearity, Chicken Erythrocyte Nuclei (CEN) ploidy was measured in relation to the mean fluorescence intensity of propidium iodide (PI) staining.



Direct absolute cell count makes reference beads obsolete

NovoCyte Penteon and Novocyte Quanteon uses a high-accuracy syringe pump to directly drive the sample and provide accurate, absolute count results in every run. Why use reference beads when you don't need them?

- Volumetric absolute count is determined for each and every sample automatically
- Complicated calibration of the fluidics system is not required
- Expensive reference beads are not required



Walk-away Automation Simplifies Your Workflow

Easy startup and shut down

Quick startup with automated fluidic rinsing takes only minutes to prepare the instrument for your daily use. The configurable pre-scheduled shutdown thoroughly cleans at a specified time each day to eliminate the hassle of end of day manual cleaning with an automatic shutdown cleaning procedure.

Embedded quality control

Quickly run daily QC, automatically generate comprehensive QC reports, and conveniently track performance over time with Levey-Jennings plots. The automatic QC test ensures proper performance monitoring on not only a day-to-day basis, but also over long-term use.

Continuously monitors fluid levels

A fluidic station will sense low fluid or high waste and eliminates the need for manual inspection. Fluidics consumption is estimated before a plate runs to ensure uninterrupted sample acquisition.

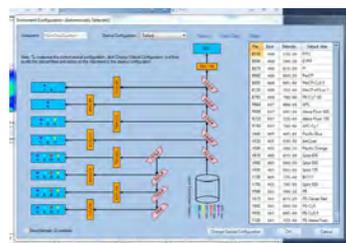


Hassle-free fluidics

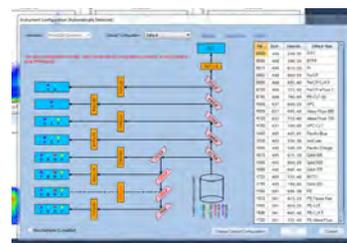
Electronically monitored valves and sensors allow for automatic clog detection and recovery. A feedback control system continuously manages sheath flow rate to maintain exceptional stability.

“Smart” optical filters

The instrument will automatically recognize the optical filters and ensure correct configuration. Once a filter is inserted, the software will recognize the change, and report a misplacement. The filter recognition software tool ensures a properly arranged optical configuration.



Correct configuration



Incorrect configuration

Figure 2. Optical configuration layout in the software shows interchangeable mirrors and filters with independent detectors for each fluorescence channel corresponding to different excitation laser.

Versatile sample injection probe (SIP)

- Tapered design minimizes dead volume
- Sample aspiration by syringe pump ensures precise absolute counting
- Automated SIP rinsing follows sample acquisition and minimizes cross-sample carryover
- Easy cleaning and maintenance
- Automated SIP collision detection and recovery

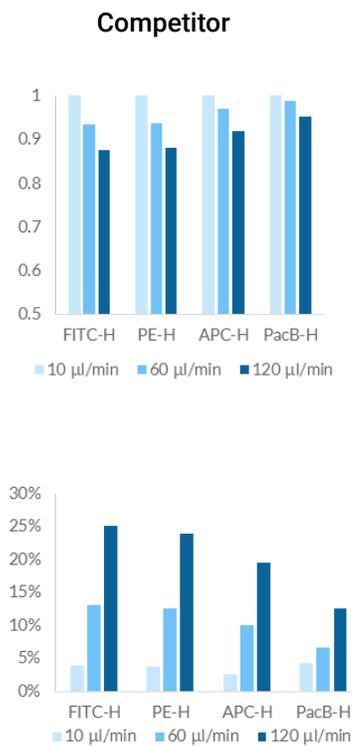
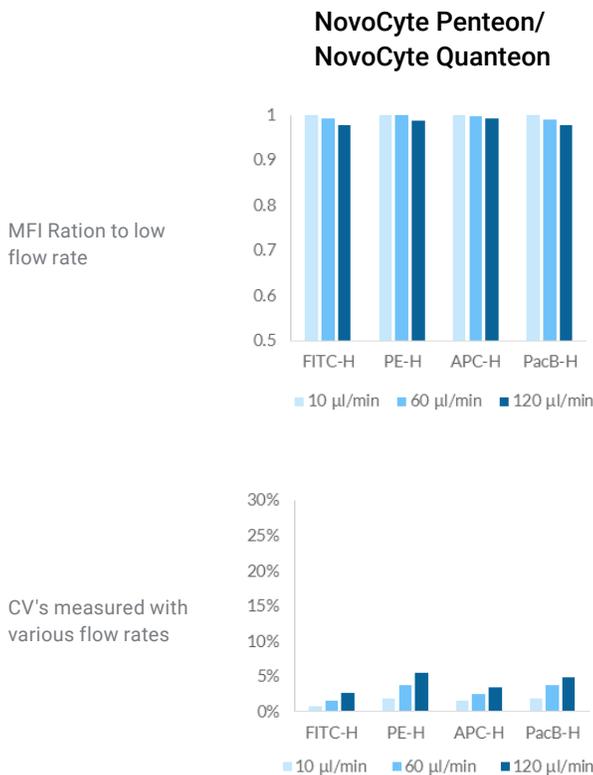


A Flow Cytometer with Exceptional Reliability

Consistent results, reliable performance



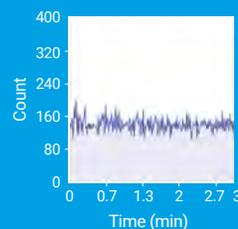
The NovoCyte Penteon and NovoCyte Quanteon are equipped with high-quality lasers, optical filters, and detectors to ensure consistent signal detection. The fluidic feedback control mechanisms maintain steady flow conditions providing stability across a wide range of flow rates. The NovoCyte Penteon or NovoCyte Quanteon is the flow cytometer you can rely on to provide consistent results under variable operating parameters.



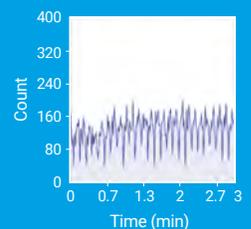
High reproducibility and stability

The NovoCyte Penteon and NovoCyte Quanteon's fluidic system is designed to deliver high performance. When compared to other flow cytometers, the fluidic consistency and stability of the NovoCyte Penteon and NovoCyte Quanteon is unmatched. Other instruments utilizing peristaltic pumps are often subject to fluidic pulsation, causing inconsistency and inaccuracy in absolute cell counts.

NovoCyte Penteon/ NovoCyte Quanteon

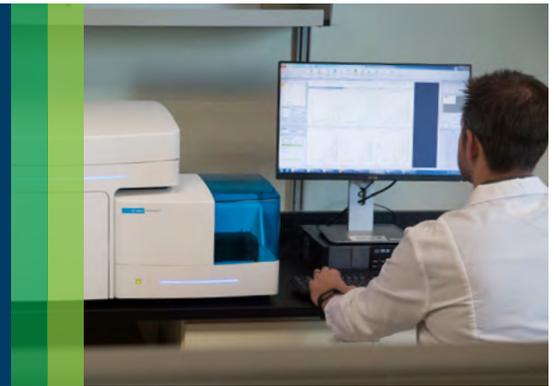


Competitor



Streamline Your Sample Acquisition & Data Analysis with the NovoExpress Software

Improved Versatility & Ease Of Operation



- One software interface for all: combining sample acquisition and data analysis
- Analyze acquired data in real time during flow experiment to maximize productivity and efficiency
- Customizable statistical parameters with live updates when running samples
- Powerful compensation tools and convenient adjustments allow accurate pre- and post-acquisition compensation
- Batch analysis and reporting
- Easily create publication-quality figures with customizable plot scale, font, and legend
- Export as FCS (3.0, 3.1) or CSV files, import FCS files for analysis



Figure 3. Instrument toolbar showing quick access to QC and fluidic maintenance functions

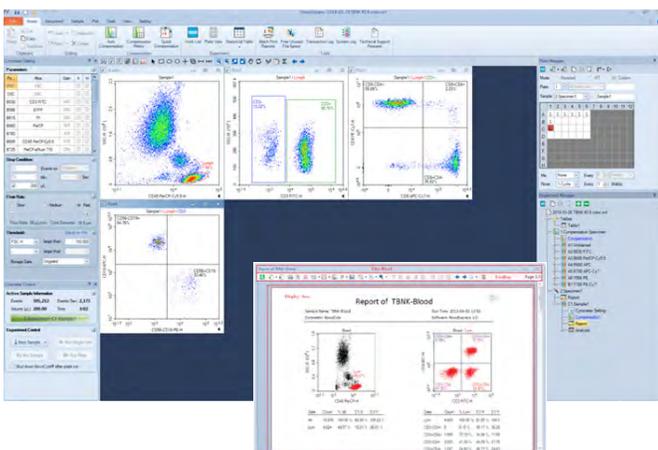
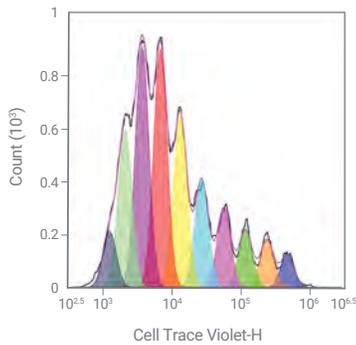


Figure 4. NovoExpress user-friendly interface for easy access to settings, analysis, reports, and plates/sample layout.

“This software is straightforward, and the software interface is easy to handle. The implemented auto compensation and hierarchic tree structure is a highlight for effective organization of experimental data.”

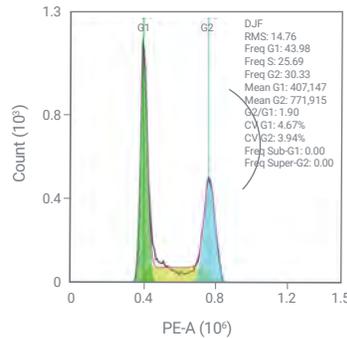
- **Matthias Schiemann,**
Technische Universität München

Advanced Data Analysis Is Made Easy with NovoExpress



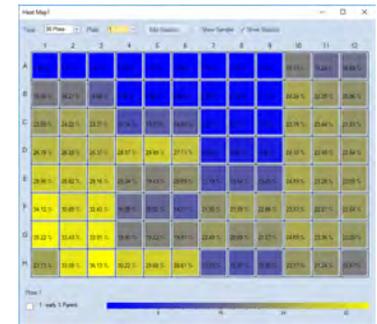
Cell proliferation modeling

Automatic analysis of cell proliferation to quickly identify generations of cell division and calculate the proliferation index for easy quantitation.



New cell cycle analysis module

Dean Jett Fox (DJF) and Watson Pragmatic algorithms are both incorporated in the NovoExpress cell cycle analysis module. This provides additional flexibility for your cell cycle analysis and quantitation of G1, S, and G2/M transitions, as well as other parameters such as CV's and G2/G1 ratio.

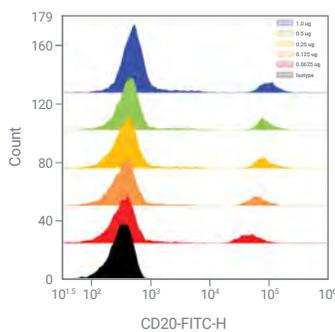


Heat-map

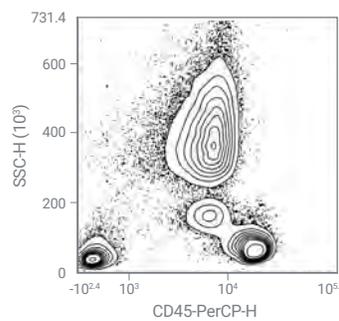
Color representation of user-defined parameters allow quick visualization and comparison of many samples simultaneously.

Advanced Data Analysis Is Made Easy with NovoExpress

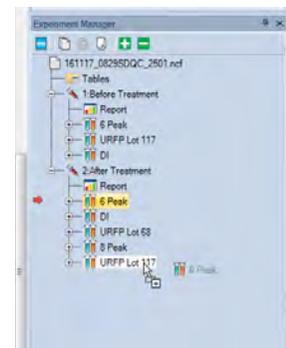
The industry-leading NovoExpress software allows intuitive data acquisition, data analysis, and report generation. It provides flexible analysis templates and plotting tools, offering enhanced data analysis efficiency. Multitask and analyze sample data while simultaneously acquiring your remaining samples to maximize your productivity.



Histogram overlay (half-offset)

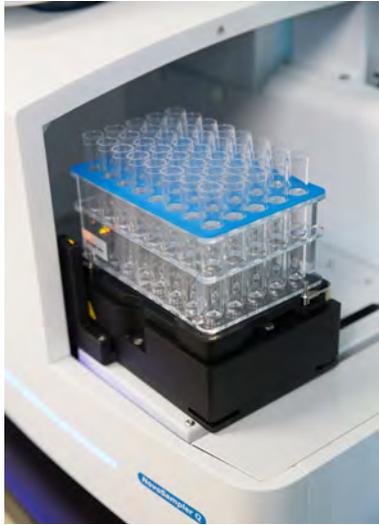


Contour plot with outliers



Drag-and-drop functionality to copy settings/analysis

Automate Sample Loading For Your Versatile Sampling Needs



The NovoSampler Q

The NovoSampler Q is an automatic sample loading system for high-throughput and automated sample acquisition. Seamlessly integrated with the NovoCyte Penteon and NovoCyte Quanteon flow cytometers, the NovoSampler Q is very easy to operate, delivering high-speed analysis and processing performance.

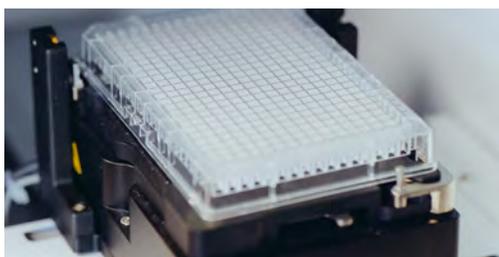
- Automated plate calibration eliminates the needs for manual alignment and calibration
- Versatile loading mode and increased throughput using various sample formats (40-tube rack, well plates) including customizable plates
- Rapid and high-throughput reading as fast as under 20 minutes for a 96-well plate and under 80 minutes for a 384-well plate
- Lab automation friendly with open architecture and developer-ready API
- Reliable orbital shaking keeps samples in suspension throughout the process

Minimize sample carryover

A wide range of flow cytometry applications require sequential processing and quantitative analysis of sample groups. Minimizing sample carryover is important when acquiring multiple samples and during the analysis of rare events. Carryover from previous samples can substantially affect rare event detection. An automated fluidics system eliminates manual intervention and allows for less than 0.1% sample carryover.

Barcode for rapid sample ID and tracking

The barcode reader automatically and instantaneously identifies plate information in high throughput experiments.

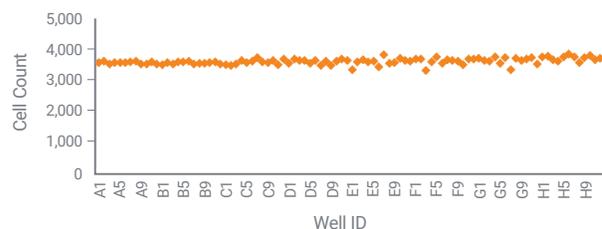


Flexible run time

Maximize your productivity with optional large sheath and large waste fluid containers that allow 100 96-well plate processing before replenishment. Up to 15 L of waste capacity ensures continuous instrument operation with large sample batches.

Uniform mixing ensures high reproducibility

The NovoSampler Q ensures thorough sample mixing with default parameter settings and customized options. Easily adjust the mixing speed, duration, and acceleration to optimize mixing efficiency for your sample type. The orbital shaker maintains cells in suspension while running the plate and allows for consistent and reproducible results.



Absolute cell count in individual wells of a 96-well plate

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