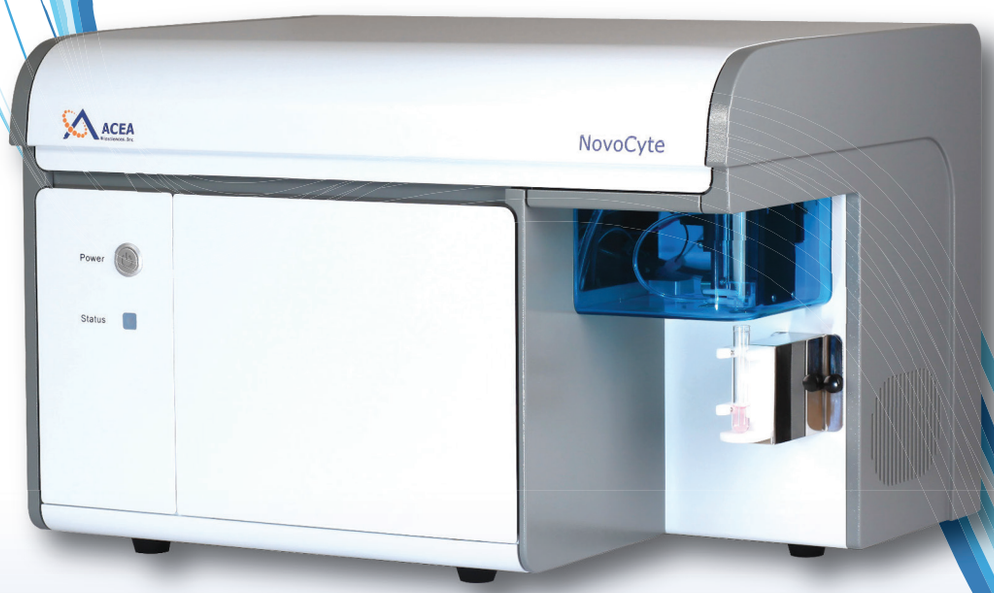
ACEA Biosciences, Inc.

NovoCyte® Flow Cytometer



The Flow Cytometer for Everyone

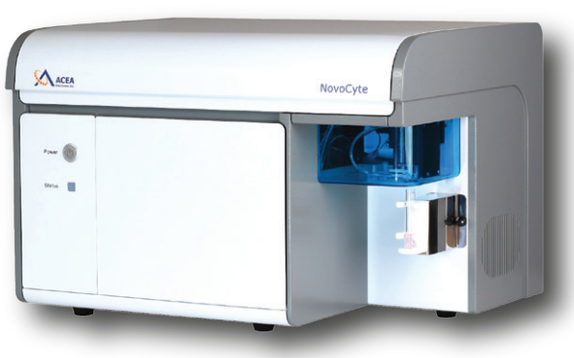
Experience the NovoCyte Advantage

Focus on advancing your research. Let the flow cytometer do the rest.

NovoCyte® Flow Cytometer
High Performance Flow Cytometer for Everyone

The ACEA NovoCyte® flow cytometer system is a high performance benchtop flow cytometer designed for all level of users and all types of laboratories. This budget-friendly instrument is capable of detecting up to 15 parameters with impressive sensitivity and resolution. The customizable laser and optical configuration of NovoCyte offers high degree of flexibility while providing complex cell analysis capabilities. The customizable laser and optical configuration of NovoCyte offers high degree of flexibility while providing complex cell analysis capabilities. The NovoExpress® software enables intuitive and easy sample acquisition and analysis. It allows switching to analysis while still in the process of acquiring other samples. The NovoSampler® Pro is an optional high throughput system that provides versatility in acquiring multiple sample formats such as single tubes, multiple tubes, 24-,48-, 96-well plates in a single, simple setup .

- **Powerful -** up to 15 parameter detection with enhanced sensitivity and resolution.
- **Intuitive –** complete acquisition and analysis software, providing high level of automation and advanced data analysis capability.
- **Customizable -** 1 to 3 laser options, exchangeable filters, multiple sampling options and flexible analysis formats.

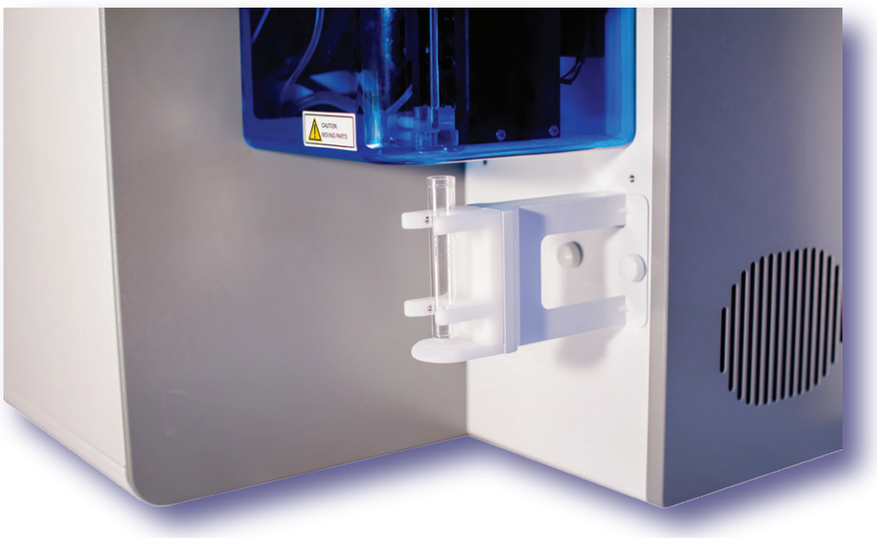


Load-and-go, without the hassle

Optimized PMT Voltage & 24 Bit Detection Dynamic Range

Provides 10^7 dynamic range for signal detection and processing, offering a broader signal range than other flow cytometers.

Wide range of fluorescence and scattering signal intensities eliminates the need for complicated and laborious PMT voltage adjustment. Data acquisition is simply load-and-go.



Volumetric Fluidics System for Increased Accuracy & Easy Maintenance

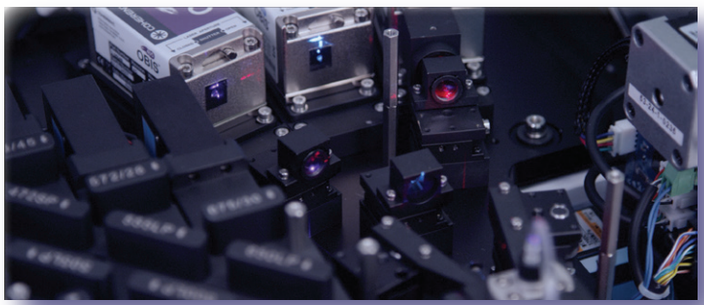
Accurate pressure sensors monitor fluidic status in real-time, providing warning messages at abnormal high pressures due to possible flow path obstruction. Automated fluidic functions maintain the instrument at an optimum status, allowing for reliable and accurate data acquisition.

Automated SIP (sample injection probe) washing following sample acquisition minimizes sample carry-over and increases capability to detect rare events.

High speed data acquisition of up to 35,000 events per second

Customize and upgrade

Configurable Fluorescence Detection Channels for Enhanced Assay Flexibility



Customizable and upgradable selection of different wavelength lasers allows for personalized, versatile choices of fluorochromes for flow cytometry assays.

User interchangeable filters and dichroic mirrors broaden available fluorescence channels to expand users' detection options.

13 Fluorescence Channel Detection: Flexibility Using Multiple Laser Options (405nm, 488nm, 561nm, 640nm)

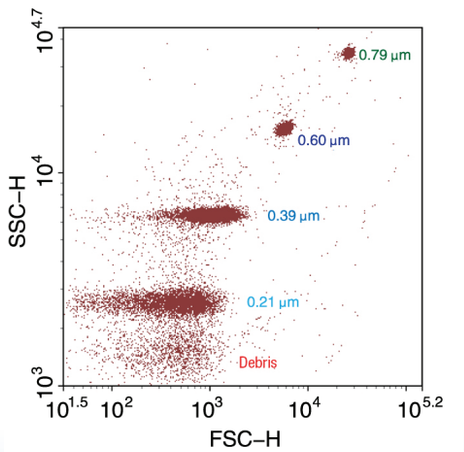
Instrument is customizable to meet detection needs with blue, red, violet and yellow lasers.

System can be upgraded as analytical requirements increase – no need to purchase another instrument.

State-of-the-art solid-state lasers provide high quality and extremely stable optical illumination.

High Sensitivity & High Resolution Detection

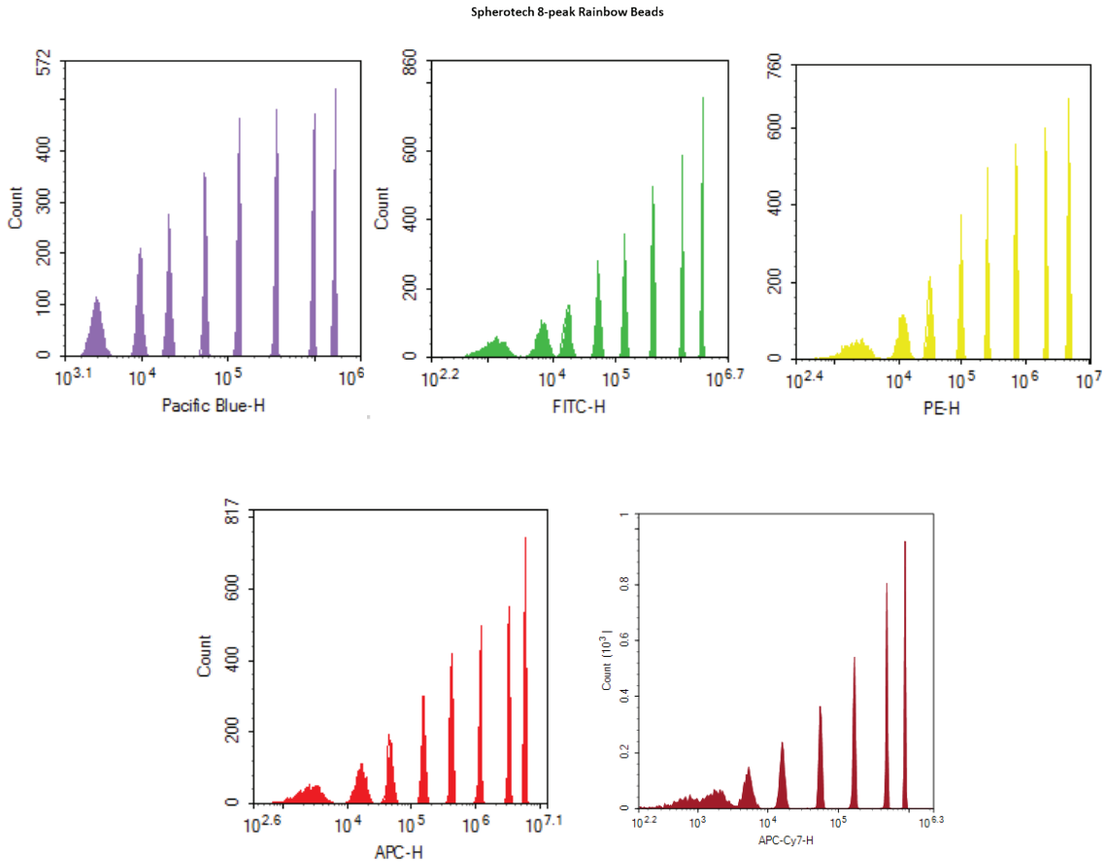
Highly efficient light collection ensures reliable detection of sub-micron particles and dim signals. Using innovative optical design for light collection and high quality PMTs, fluorescence signals are efficiently detected with an exceptionally high signal-to-noise ratio, ensuring a high detection sensitivity for dim markers and small particles.



Bangs Laboratories NIST Traceable Particle Size Standards

High Fluorescence Signal Resolution Improves Detection Accuracy

Advanced optical and fluidic system design, premier quality components, and innovative signal processing algorithms collectively ensure accurate extraction of detection parameters with consistently low variation.



Novel Optical Design & Enhanced Signal Detection

Patent pending independent beam shaping optics and light collection system maximizes signal detection efficiency, increasing sensitivity and resolution for each fluorescence channel.

Fixed optical alignment removes need for daily setup and adjustment of optical system, saving time and complicated training effort.

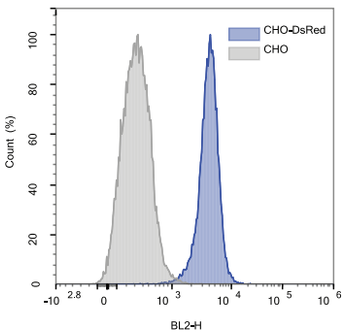
Optimized forward scatter obscuration bar increases sensitivity to enhance small particle detection and resolution as a result of the obscuration bar design.

Enhanced excitation using 561nm laser

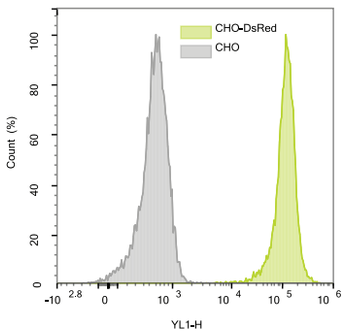
With the ever increasing availability of antibodies, fluorescent proteins, and fluorescent dyes, the number of applications continues to expand the field of flow cytometry and there is an increased need to efficiently detect these markers. We have incorporated multiple laser configurations within the NovoCyte flow cytometer to accommodate the varying needs of researchers. One such excitation laser that is very useful in the detection of fluorescent proteins and PE or PE tandem fluorochromes is the yellow-green 561nm laser. Using the 561nm laser for excitation allows us a higher stain index compared to 488nm laser excitation.

DsRed Excitation

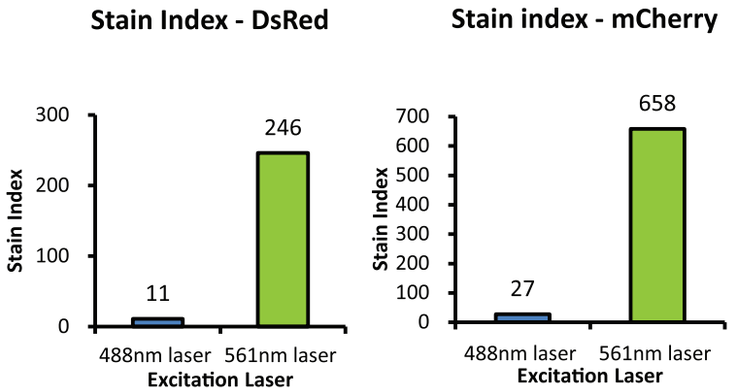
488nm laser

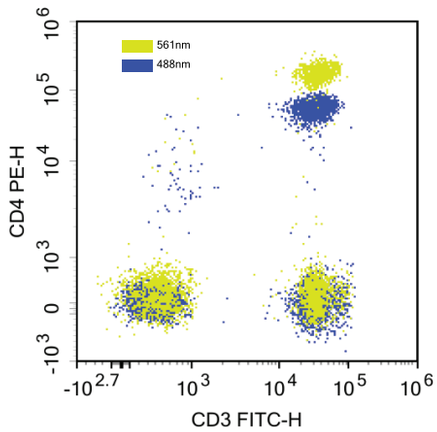


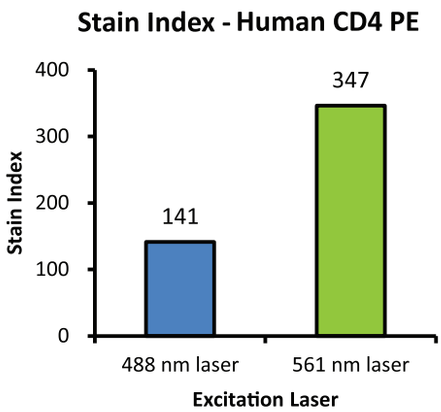
561nm laser



Stain Index - Fluorescent Proteins

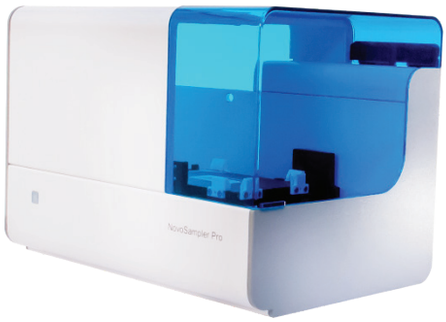






The figures above represent the stain index of two fluroscent proteins and a PE conjugated antibody, excited by the 488nm or 561nm laser on the NovoCyte flow cytometer. Stain index is represented for each in the bar charts highlighting the improved efficiency for excitation of these fluorescent molecules by the 561nm laser.

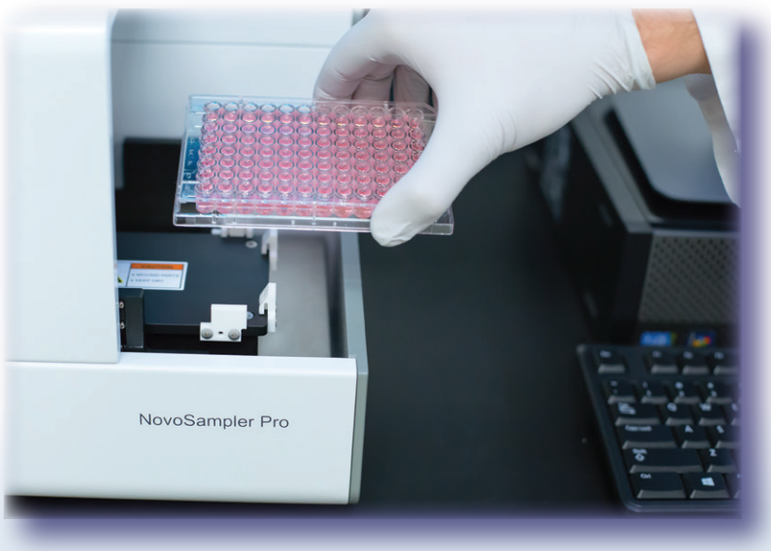
High Throughput capability with NovoSampler Pro



ACEA's NovoSampler Pro is an automatic sample loading system that fulfills the requirements on high-throughput and automated sample acquisition. The NovoSampler Pro seamlessly integrates with the NovoCyte flow cytometer, making it very easy to operate, delivering high-speed analysis and processing performance.

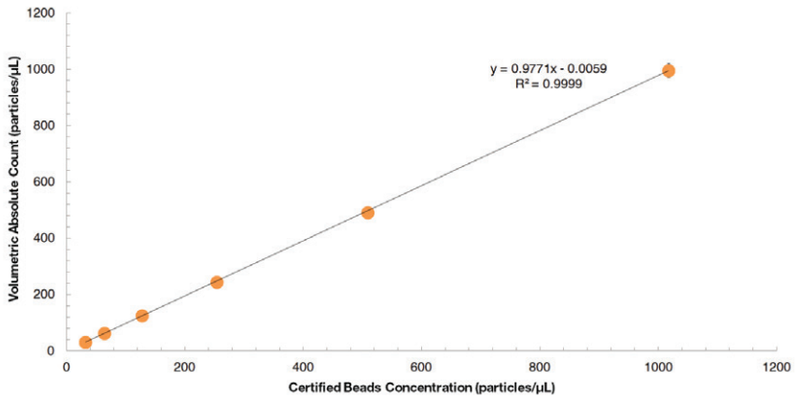
- Walk-away automation and increased productivity
- Maintains homogeneity and integrity of biological samples
- Simple installation, easy operation, and superior performance
- Programmable vortex-mixing mechanism
- Compatible with various sample formats:

  - 96 well plate (U, V, flat bottom)
  - 48 well plate
  - 24 well plate
  - 24 tube rack
  - Customized plates, tubes, racks



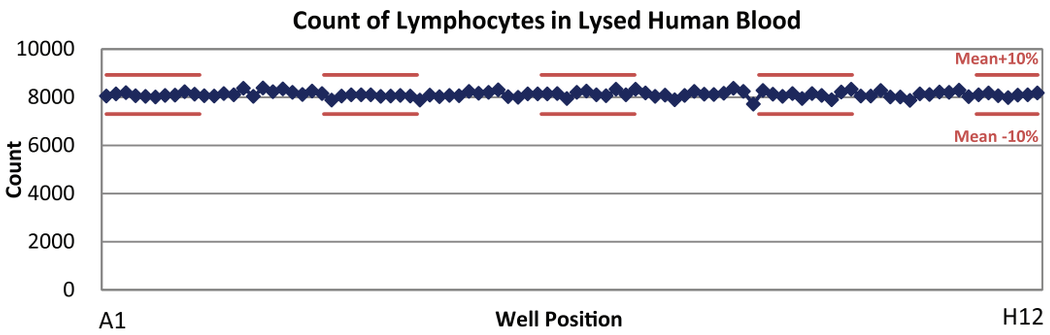
Volume-Based Direct Absolute Counting, No Additional Counting Beads Required

With a high accuracy syringe pump controlling the injected sample volume and minimal cell loss in the fluidics, the NovoCyte flow cytometer achieves accurate direct cell counting without the need for expensive counting beads.



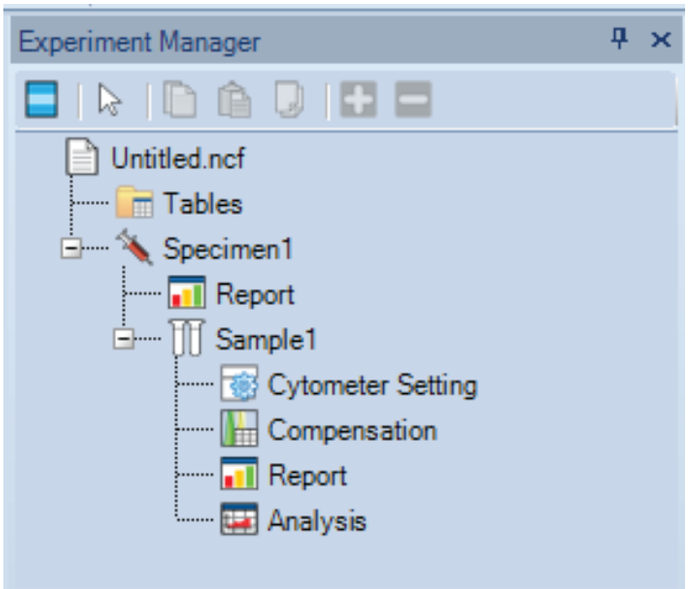
The NovoSampler Pro ensures thorough sample mixing with default parameter settings and customized options for high performance acquisition. Users can adjust the vortexing speed, duration, and acceleration to optimize mixing efficiency depending on sample type.

We observe consistent counts for AccuCount Fluorescence Particles (not shown, Jurkat cells (not shown), and lysed PBMCs with CVs of 1.9%, 3.1% and 1.5% using 96-well plates on the NovoSampler Pro.



Normal human peripheral blood samples stained with CD45 / CD3/ CD4 / CD8 cocktail were loaded onto a 96-well plate, and process with a loading settings of: 1200rpm, 15s, stop condition of 30uL, high flow rate.

The NovoExpress Experience: Simple and Easy



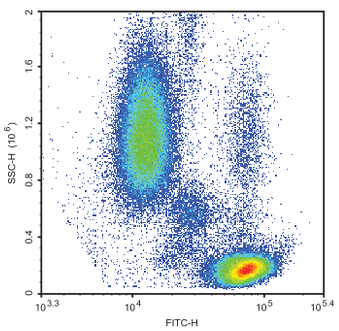
Experiment Analysis Design

Experiment Manager provides a schematic view of the sample analysis being performed. This allows for access to cytometer settings, compensation matrix, report generation and data analysis. Multiple samples can be analyzed with the same settings by a simple drag-and-drop template function.

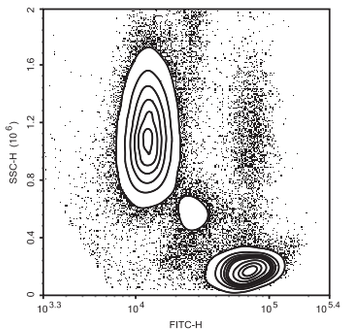
Automated & Versatile Data Analysis Functions

Powerful NovoExpress software allows efficient data acquisition, data analysis and report generation. NovoExpress software provides flexible analysis templates and plotting tools, offering enhanced data analysis efficiency.

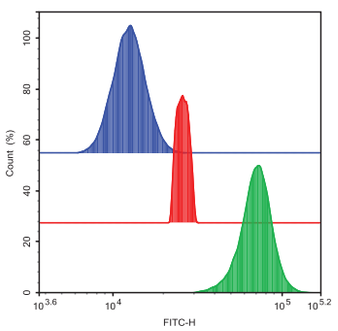
Density



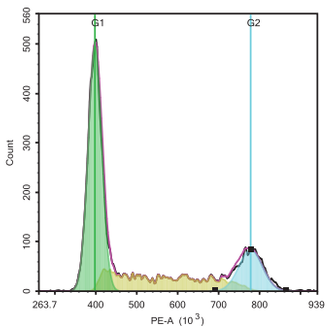
Contour with outliers



Histogram Overlay

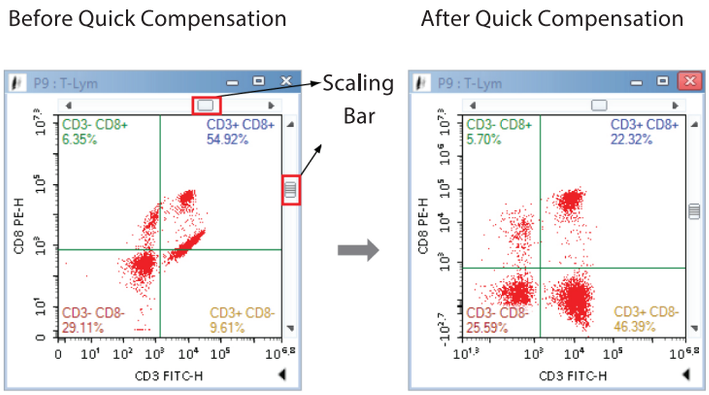


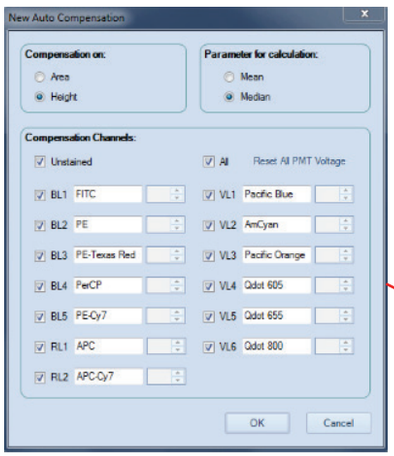
Cell Cycle

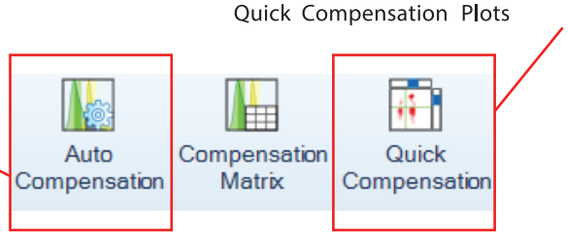


Pre & Post Acquisition Compensation

In addition to automated compensation, instantaneous compensation results can be simply achieved by adjustment of the compensation scaling bar on the plot, allowing rapid and accurate compensation, thus eliminating tedious trial and error adjustments of compensation matrix coefficients.



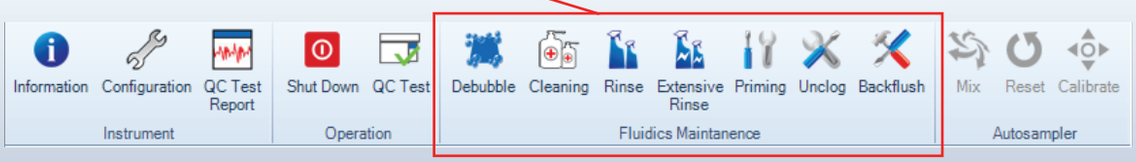




Automatic fluidic monitoring and maintenance

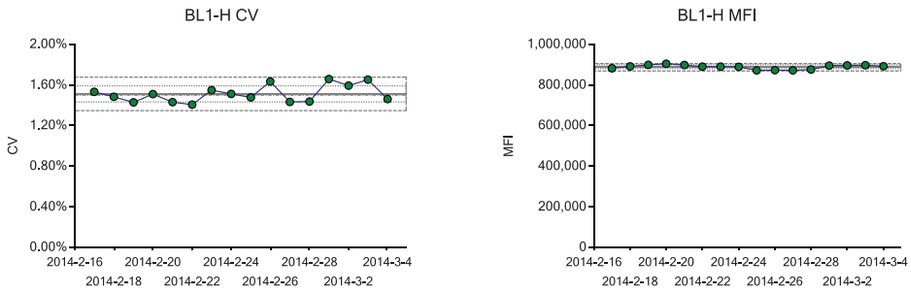
Adding to the user-friendliness of the NovoCyte system is the automatic fluidic monitoring station and easy to use maintenance icons. There is no need to manually check whether the cleaning or sheath fluids are low or the waste container is full, these levels are automatically monitored and the system will notify the user when action is required. Similarly, routine fluidic cleaning and maintenance procedures can be accessed within the NovoExpress software with a simple click of the icon.

Fluidic maintenance toolbar



QC test & QC reports

Embedded within the NovoExpress software is the automatic quality control evaluation. By running one drop of QC particles, every user can determine proper instrument performance and track this performance over time using the automatically generated QC reports. Each time the QC test is run, QC reports are automatically generated and saved for future reference. This ensures proper performance monitoring on not only a day to day basis, but also over long-term use.



Low Carryover between samples

Flow cytometry allows for the sequential processing and quantitative analysis of many samples. Limiting sample carryover is important not only when acquiring multiple samples, but also during the analysis of rare events as carryover from previous samples can substantially effect the quantitation of rare event detection. Therefore, it is important for a flow cytometer to limit sample carryover without manual intervention. Here we show the low sample carryover on the NovoCyte flow cytometer.

ACEA NovoSampler Pro carryover is less than 0.1%

Sample	Count		Sample	Count		Sample	Count
ACBP 1-1	102,841		ACBP 2-1	100,370		ACBP 3-1	103,205
ACBP 1-2	99,320		ACBP 2-2	101,635		ACBP 3-2	104,101
ACBP 1-3	99,993		ACBP 2-3	103,289		ACBP 3-3	104,237
PBS 1-1	24		PBS 2-1	17		PBS 3-1	16
PBS 1-2	2		PBS 2-2	5		PBS 3-2	5
PBS 1-3	3		PBS 2-3	3		PBS 3-3	4
Carryover*	0.021%		Carryover*	0.014%		Carryover*	0.012%

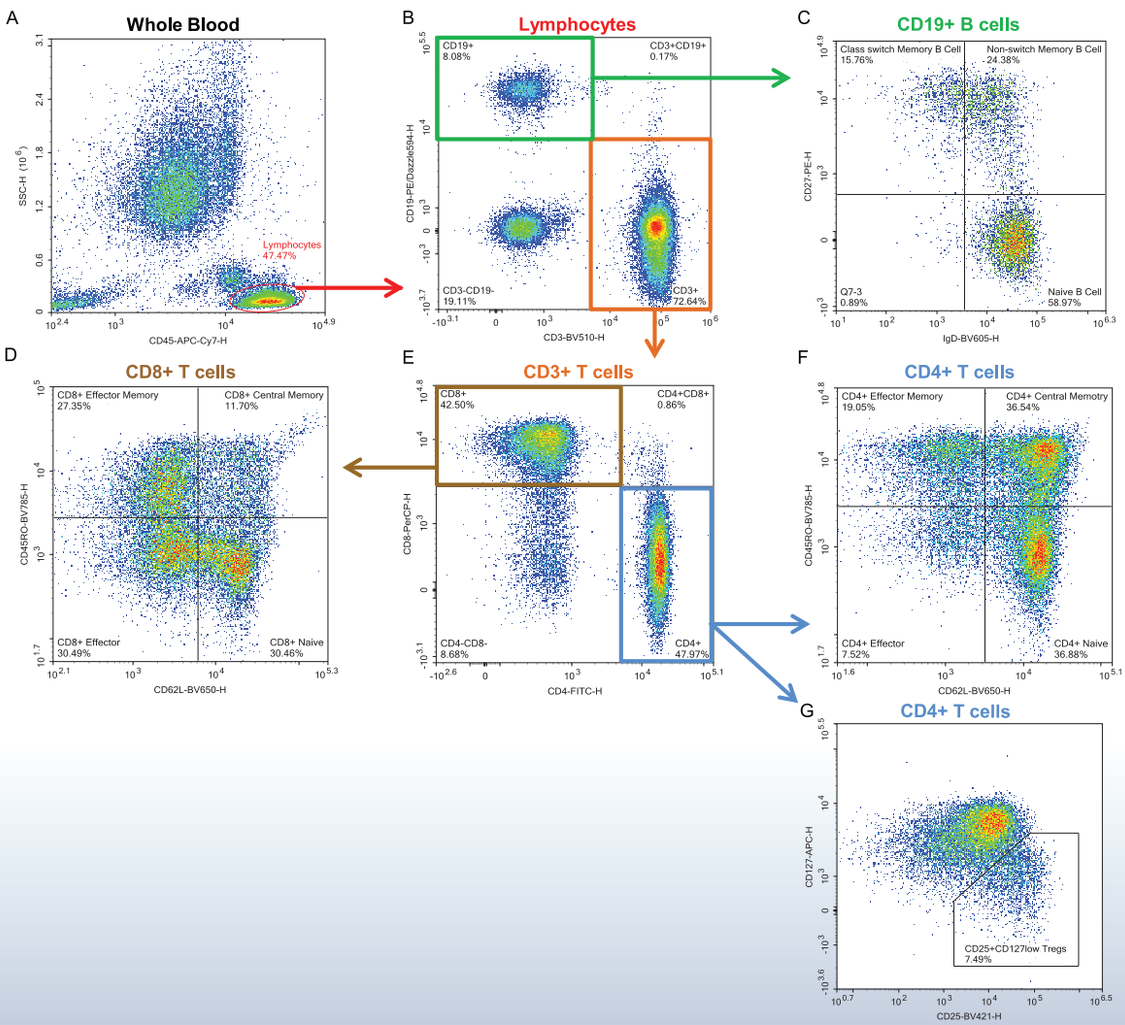
The carryover of 3 automatic mixing groups were 0.021%, 0.014% and 0.012%.

*Carryover assay methods: The samples were laid out by 3 wells of Accucount Blank Particles (Spherotech, ACBP-50-10) and 3 wells of PBS at 150μL per well. The samples were loaded using NovoSamplerTM Pro, and the carryover was calculated using the acquired sample counts. Sample loading settings: automatic mixing settings, one mix and one wash per well, stop condition of 100uL, sample flow rate 35 μL/min.

Outstanding Performance in Broad Applications

Immunophenotypic analysis of human blood leukocyte subsets using a 13-color antibody panel

Identification and analysis of specific sub-populations of cells is one of the many essential uses of flow cytometry, especially in terms of its ability to multiplex and identify several markers in one sample. As such, immunophenotyping of blood samples is one of the more popular uses of multi-color flow cytometry. In certain applications, using multiple markers simultaneously for immunophenotyping is more powerful and efficient than using multiple samples with fewer markers. However, to accomplish this task, what is needed is a powerful flow cytometer that has the ability to both detect and analyze the plethora of colors that is utilized in such an experiment. Here we demonstrate immunophenotypic analysis of a human blood sample utilizing 13 fluorescent markers on the NovoCyte 3000, In this staining, subsets of T cells, B cells, were identified and analyzed using the NovoExpress acquisition and analysis software. The data clearly demonstrate that using the NovoCyte benchtop flow cytometer allows for performance of high-quality, complex flow cytometry with a 13-color antibody panel.



ACEA Biosciences is fully committed to providing high performance products as well as reliable service and support to customers.

ACEA NovoCyte Flow Cytometer Service and Warranty

In order to ensure customer's long term success with the NovoCyte line of flow cytometers, ACEA is standing by with a technical service and support team, who will provide the knowledge and experience needed for operational excellence of the system.

Preventive Maintenance and Extended Service Warranty

It is always a good idea to ensure optimal performance of the ACEA NovoCyte flow cytometer even beyond the original manufacturing warranty period. ACEA offers a variety of service contracts for your peace of mind. Preventive maintenance and extended warranty and service agreements can be offered for periods of up to 7 years. The services and support provided for Extended Warranties are identical to the one-year warranty.

Technical Application Support and Training

ACEA's technical application support scientists are at your immediate reach to provide applications and instrumentation technical or troubleshooting assistance. Highly capable ACEA support team members can provide different level of training packages to ensure smooth operational transition for laboratory staff and users.

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