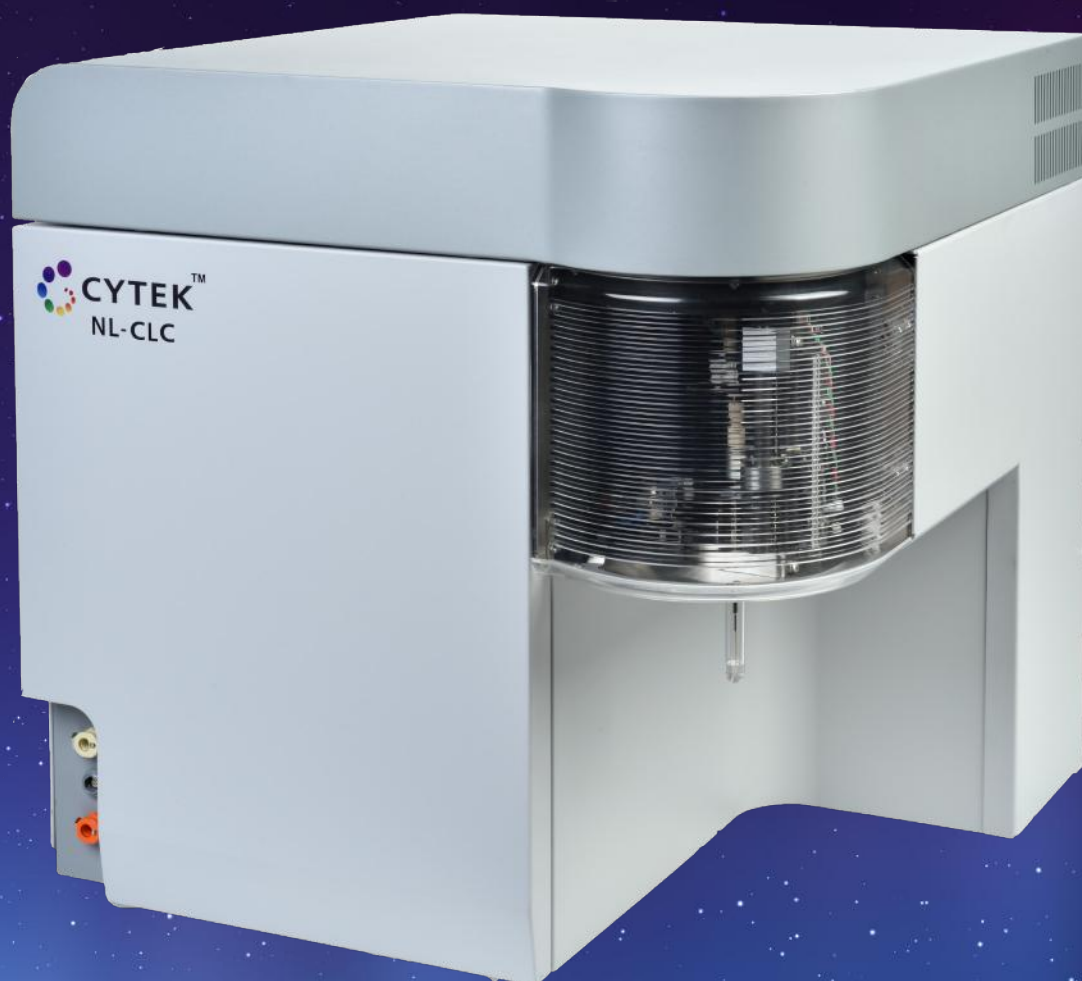




Cytek® NL-CLC

Say Hello to a New Reality

Meet the NL-CLC

A new clinical flow cytometry system that maximizes the operational efficiency of clinical laboratories across the board.

The Cytek Northern Lights-Clinical (NL-CLC) brings the same revolutionary spectral technologies found on other Cytek cytometers to the clinical environment. Its unique optical design and unmixing algorithm increases efficiency by allowing more information to be gleaned from a single tube, saving time and resources. The state-of-the-art optics and advanced electronics provide excellent sensitivity, resolution, and event rate. Flat-top laser beam profiles, combined with a uniquely designed fluidics system, translate to outstanding performance even at high sample flow rates.

The end result is a system that leverages the advantages of full spectrum technology to bring practical benefits to clinical workflows.

SpectroFlo software offers an assortment of efficiency-enhancing tools that includes portable templates, reusable reference controls, and much more.

The Cytek team has reimagined all parts of the clinical workflow paradigm to become a solutions provider for all your diagnostic needs from instrumentation to software and reagent kits.

➤ Remarkable Sensitivity and Data Quality

Sensitivity redefined using state-of-the-art optics and low-noise electronics.

Superb resolution of dim and rare populations, even in high complexity panels and at high flow rates.

Expand panel capabilities without compromising data quality.

➤ Clinical Insights With Less Sample

Reach the same conclusions with fewer tubes.

Saving reagents, precious patient sample, and acquisition time equates to **greater cost savings and improved laboratory efficiency.**

➤ Ease of Use

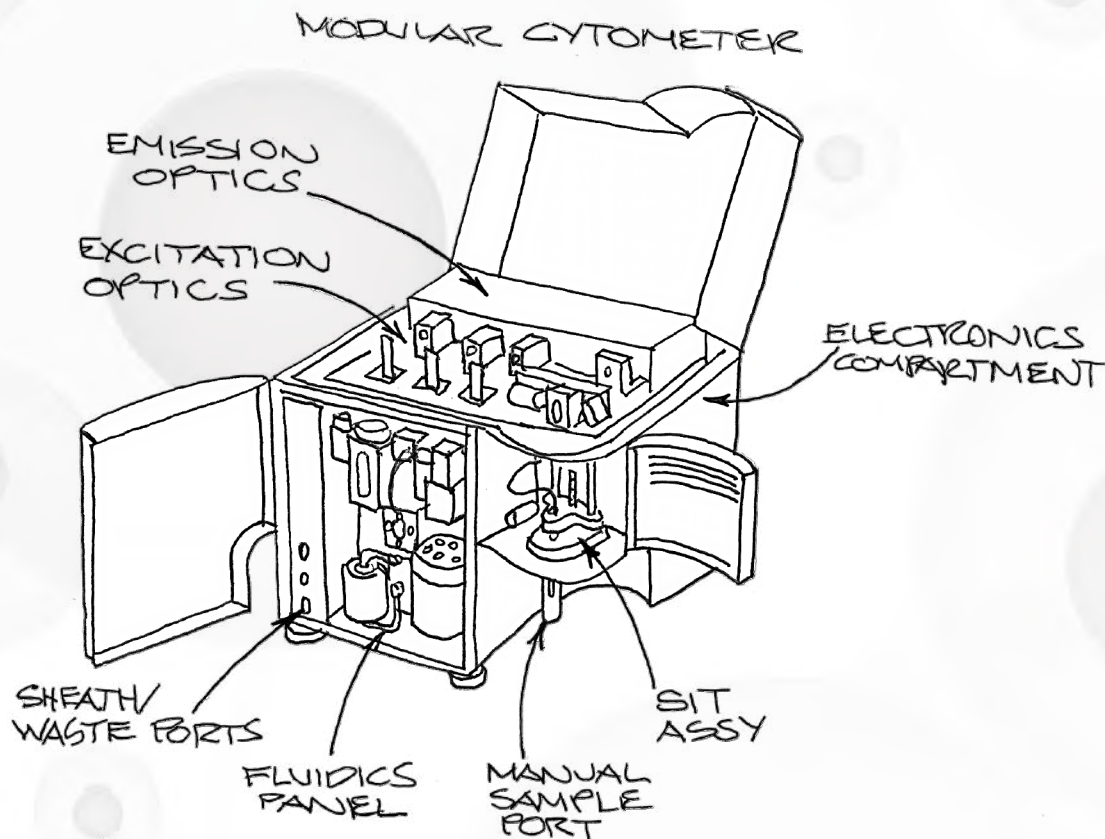
Day to day instrument standardization through the Daily QC module provides the capability to **re-use reference controls.**

Intuitive and easy to use software with capability to transfer experiment and worksheet templates across different systems.

Cytek's Revolutionary Technologies: From Vision to Reality

The NL-CLC is capable of up to 41 detection channels (38 fluorescence channels, FSC, blue laser SSC, and violet laser SSC) and is empowered by revolutionary technologies, including:

- ⊗ Proprietary high sensitivity Coarse Wavelength Division Multiplexing (CWDM) semiconductor detector arrays, enabling more efficient spectrum capture for dyes emitting in the 420-829 nm range.
- ⊗ High bandwidth electronics design scalable up to 41 channels and capable of acquiring 35,000 events per second.
- ⊗ Innovative modular design allows for easier maintenance and service.

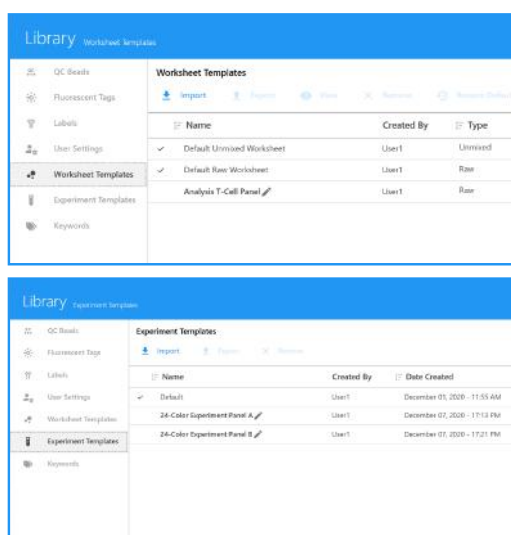


SpectroFlo® Software Guided Workflows

SpectroFlo software offers an assortment of efficiency tools, which include portable experiment and analysis templates, reusable reference controls, and much more.

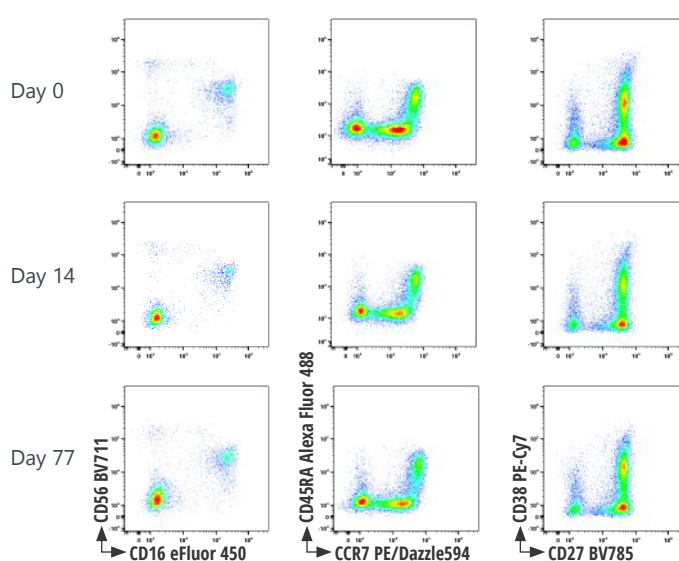
Portable Experiment and Worksheet

Experiment and worksheet templates are designed to be portable within the SpectroFlo work environment. Users can easily transfer templates to other NL-CLC workstations, ensuring consistency across labs. The software's portability makes it easier to deploy templates across global, multi-site laboratories.



Reference Control Stability and Reusability

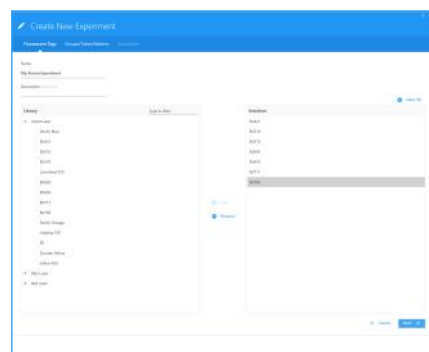
Enhanced system stability enable reference controls to be acquired, stored in the library, and reused for future assays. Stored reference controls are automatically adjusted by Daily QC to maintain consistent assay performance across time, effectively eliminating the need to run single color controls with every experiment.



Experiment Workflow:

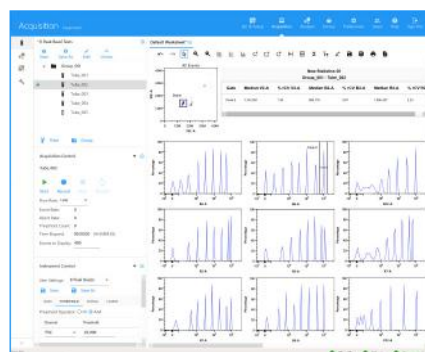
From the Acquisition menu, you can start a new experiment and begin acquiring your data in three simple guided steps.

Step 1: Create Your Experiment



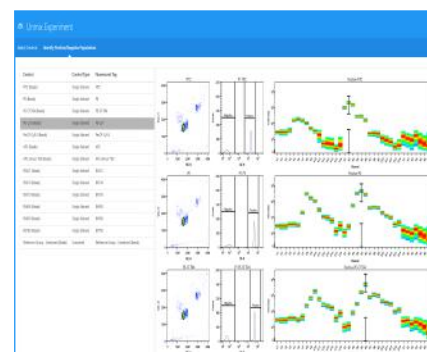
Create your experiment, choose fluorochromes, and add labels, tubes, worksheets, and stopping criteria in this guided workflow.

Step 2: Run Your Tubes



Load and record your samples.

Step 3: Unmix Your Data



Visualize your reference controls spectra using our unique unmixing wizard.

24 Colors With Three Lasers...Is it Possible?

The optical design combined with the unmixing capability in SpectroFlo® software allows greater fluorochrome choice, panel flexibility, and easy setup without having to change filters. The three laser configuration provides outstanding multi-parametric data for a wide array of applications. Markers and fluorochromes in a 24-color panel designed for identification of circulating cell subsets in human peripheral blood are summarized in the table below:

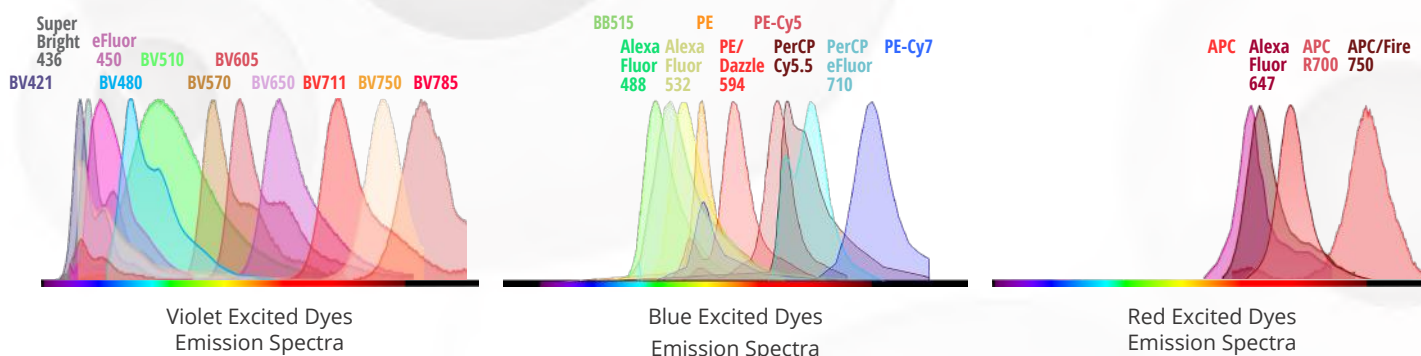
SPECIFICITY	FLUOROCROME	SPECIFICITY	FLUOROCROME	SPECIFICITY	FLUOROCROME
CCR7	Brilliant Violet 421™	CD11c	BD Horizon™ BB515	CD27	APC
CD19	Super Bright 436	CD45RA	Alexa Fluor® 488	CD123	Alexa Fluor® 647
CD16	eFluor® 450	CD3	Alexa Fluor® 532	CD127	BD Horizon™ APC R700
TCR γ/δ	BD Horizon™ BV480	CD25	PE	HLA DR	APC/Fire™ 750
CD14	Brilliant Violet 510™	IgD	PE/Dazzle™ 594		
CD8	Brilliant Violet 570™	CD95	PE-Cy™5		
CD1c	Brilliant Violet 605™	CD11b	PerCP-Cy™5.5		
PD-1	Brilliant Violet 650™	CD38	PerCP-eFluor® 710		
CD56	Brilliant Violet 711™	CD57	PE-Cy™7		
CD4	Brilliant Violet 750™				
CD28	Brilliant Violet 785™				

24-COLOR DATA



On the next page, this 24-color panel is demonstrated in a healthy donor using a whole blood lyse wash sample preparation.

The 24-Color Panel Includes Many Highly Overlapping Dyes:



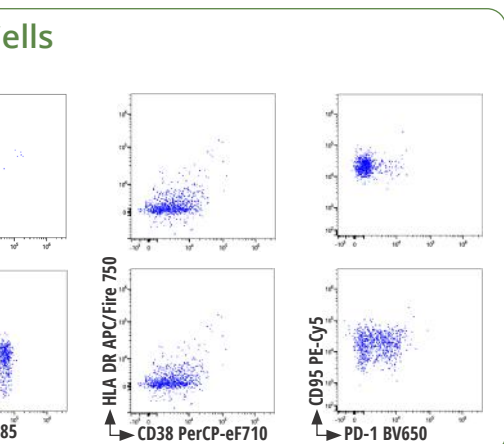
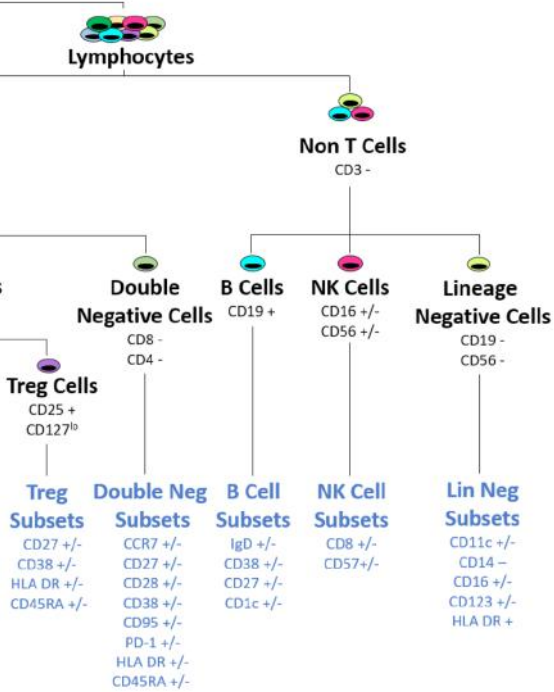
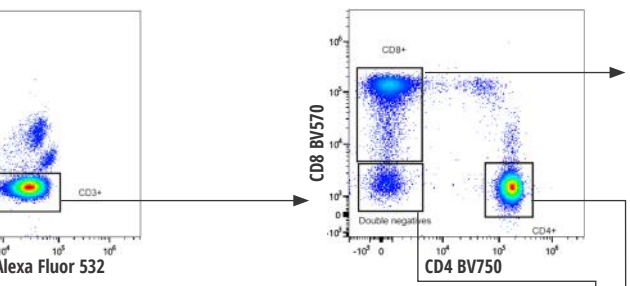
APC/Fire™ and PE/Dazzle™ are the trademarks and property of BioLegend, Inc.
Brilliant Violet™ is a trademark of Sirigen Group Ltd.
BD Horizon™ and Brilliant Blue (BB) are trademarks of BD Biosciences.
Alexa Fluor®, eFluor®, and Super Bright are trademarks of Thermo Fisher Scientific.
Cy® and CyDye® are registered trademarks of GE Healthcare

Allophycocyanin (APC) conjugates: US Patent No. 5,714,386
PE-Cy7: US Patent Number 4,542,104.
APC-Cy7: US Patent Number 5,714,386.
Trademarks are the property of their respective owners.

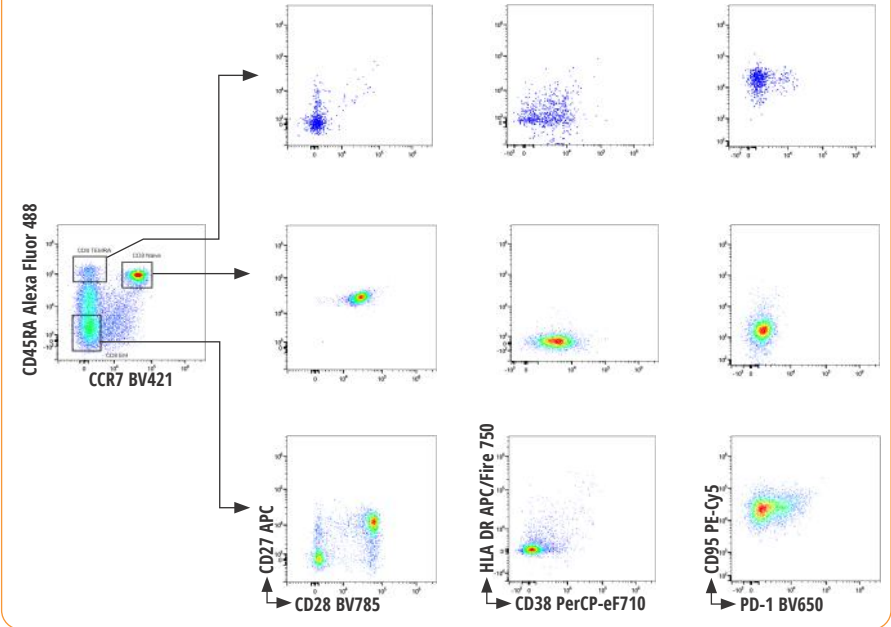
A New Reality:

3 Lasers, 24 Colors, Unparalleled Resolution

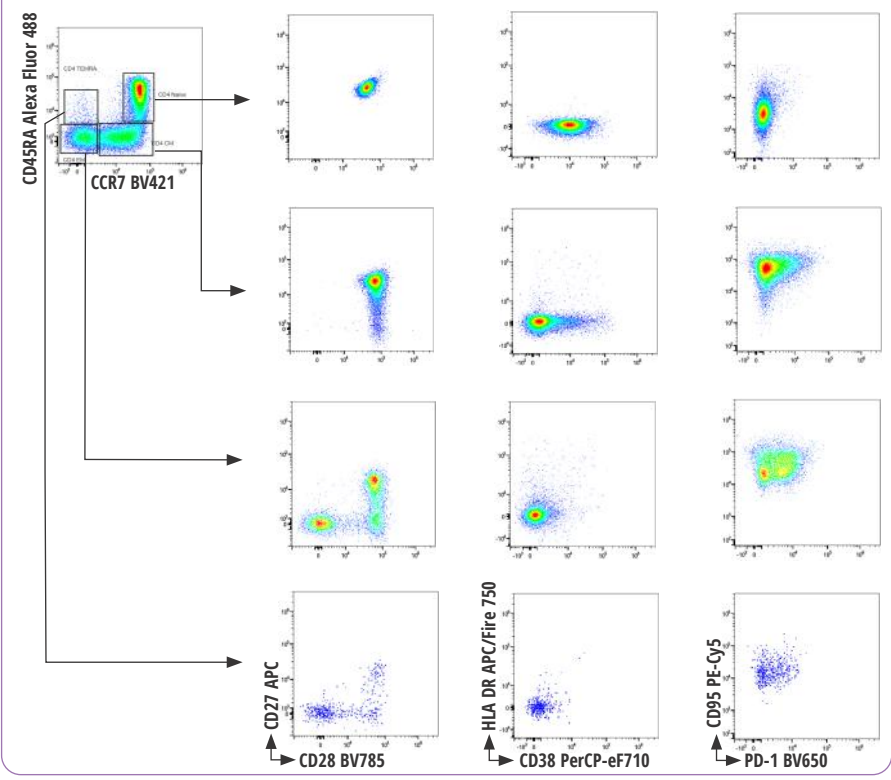




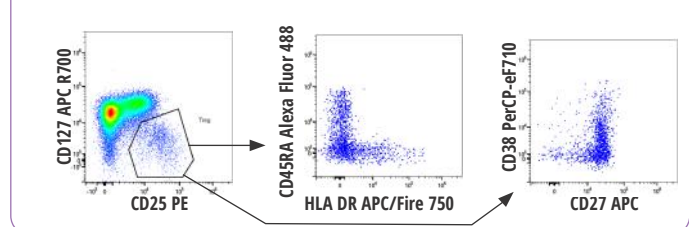
CD8+ Effector Memory Cells



CD4+ Effector Memory Cells



Treg Cells



Increase Efficiency With Full Spectrum Cytometry

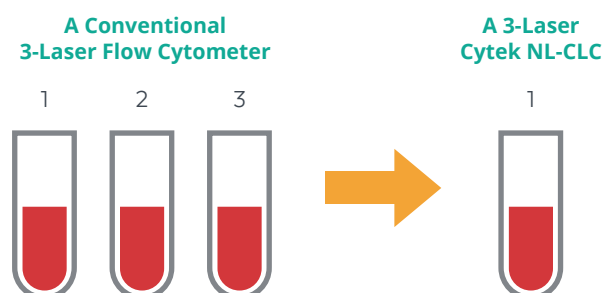
By enabling deeper biological insights from each sample, the NL-CLC platform improves efficiencies across the entire sample-to-answer workflows for immunophenotyping, hematology, and more.

- Additional Cost Savings
 - Less sample needed** to obtain the same amount of information as conventional systems.
 - Reduced** reagent and consumable costs.
- Faster time to results
 - Decreased** time for sample preparation and acquisition.

Example 1: Evaluating Minimum Residual Disease (MRD)

To demonstrate these efficiencies, let's look at a very well-established 3 tube acute myeloid leukemia (AML) MRD assay¹ created for a conventional 3-laser (405, 488, and 638 nm) system. To complete the assay, 3 separate tubes must be prepared and acquired. With Cytek's NL-CLC, that same information can be obtained from a single tube. Shown here is a comparison of the panels. On the next page, a side-by-side comparison of data from the original 3 tube assay, and Cytek's single tube assay, acquired with the NL-CLC for a fresh bone marrow sample from a healthy donor. The plots displayed follow the gating strategy used in Wood, B.L. (2020)¹.

1 - Wood, B. L. (2020). Acute Myeloid Leukemia Minimal Residual Disease Detection: The Difference from Normal Approach. *Current Protocols in Cytometry*, 93(1). doi:10.1002/cpcy.73



3-Tube Assay*			1-Tube Assay	
Tube	Specificity	Fluorochrome	Specificity	Fluorochrome
1	CD13	PC7	CD13	PE-Cy7
1	CD15	FITC	CD15	FITC
1	CD19	PE-CF594	CD19	Brilliant Violet 750
1	CD33	PE	CD33	PE
1	CD34	APC	CD34	APC
1	CD38	A594	CD38	Brilliant Violet 510
1	CD45	APC-H7	CD45	APC-H7
1	CD71	APC-A700	CD71	APC-A700
1	CD117	PC5	CD117	PE-Cy5
1	HLA-DR	Pacific Blue	HLA-DR	Pacific Blue
2	CD4	ECD	CD4	Brilliant Violet 570
2	CD13	PC7		
2	CD14	PC5.5	CD14	PE-Cy5.5
2	CD16	APC-A700	CD16	Pacific Blue
2	CD34	APC		
2	CD38	A594		
2	CD45	APC-H7		
2	CD64	FITC	CD64	Brilliant Violet 605
2	CD123	PE	CD123	Brilliant Violet 421
2	HLA-DR	Pacific Blue		
3	CD5	PC5	CD5	PE/Dazzle 594
3	CD7	PE	CD7	Brilliant Violet 786
3	CD33	PC7		
3	CD34	APC		
3	CD38	A594		
3	CD45	APC-H7		
3	CD56	A488	CD56	Brilliant Violet 711
3	HLA-DR	Pacific Blue		

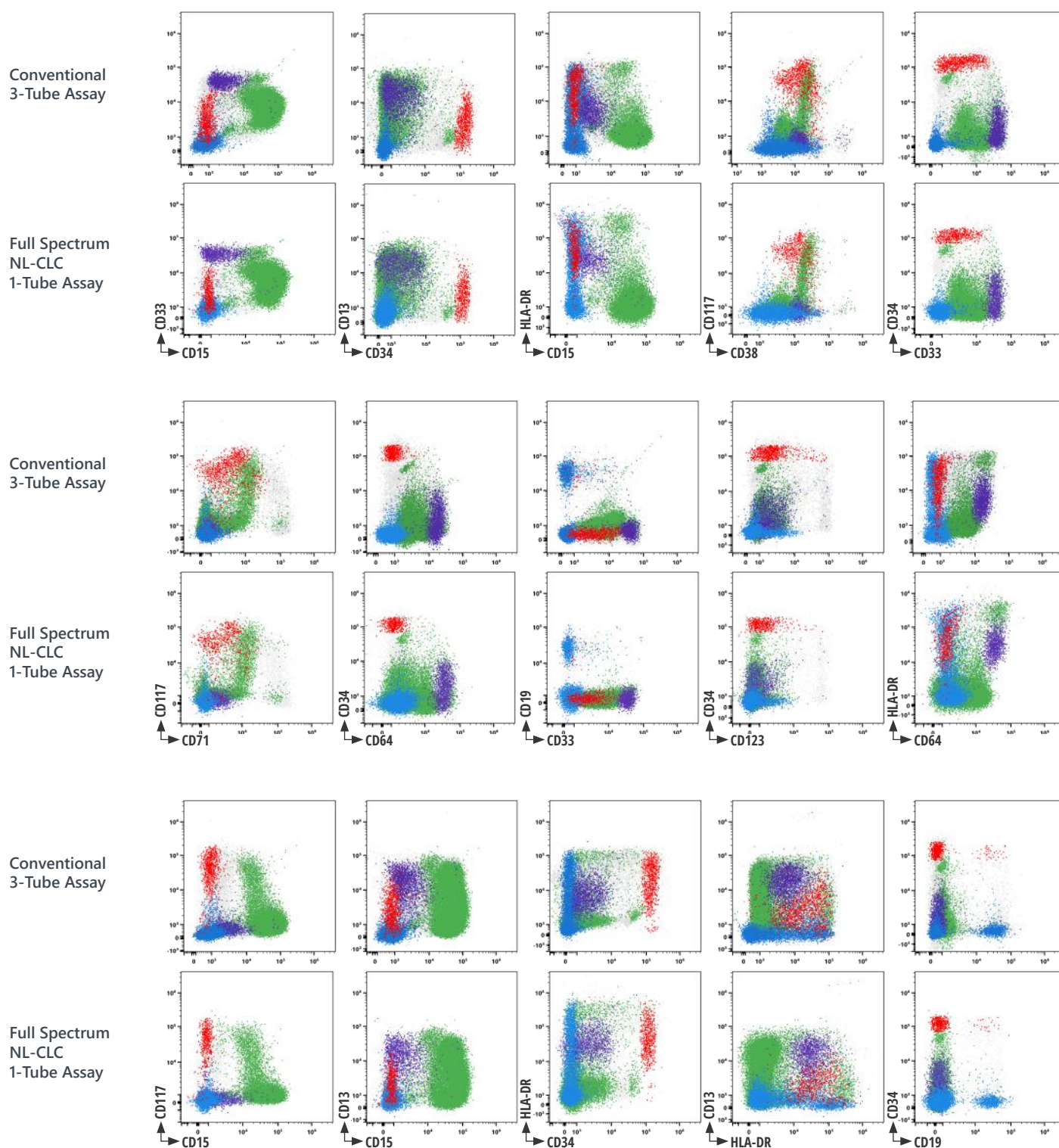
Note: for non-fresh samples, Zombie NIR was added to all tubes to exclude dead cells from downstream analyses.

*Fluorochromes names in 3-tube assay are copied verbatim from the reference paper for consistency

Figure 1: Comparable Performance Between 1-Tube and 3-Tube Assays

Legend:

Live Single Cells Myeloid Cells Monocytes Mature Lymphocytes CD34+ Blast Cells

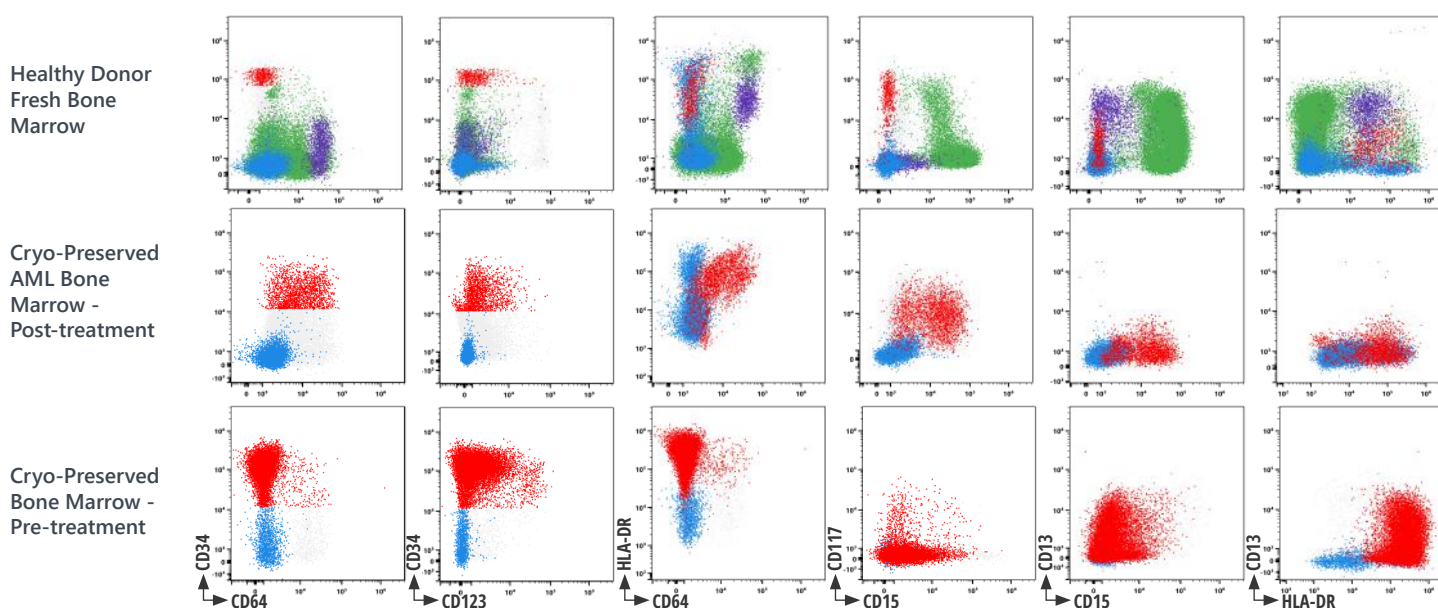
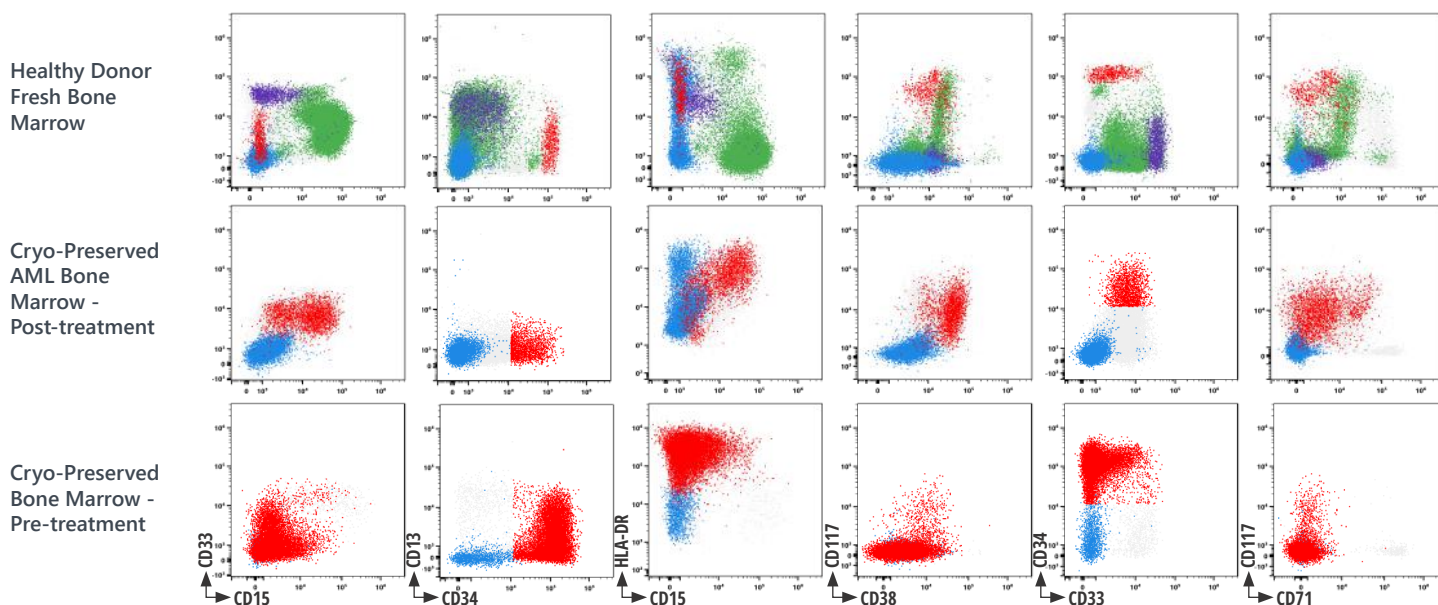


Example 2: High Quality, Full Spectrum NL-CLC Single Tube Patient Data

On this page, witness for yourself the stunning resolution and clarity attained with full spectrum data from the NL-CLC. The full spectrum 1-tube assay is demonstrated in 3 different samples: 1) fresh bone marrow from a healthy donor; 2) cryo-preserved bone marrow from a patient in remission from AML; and 3) cryo-preserved bone marrow from a patient recently diagnosed with AML.

Legend:

Live Single Cells Myeloid Cells Monocytes Mature Lymphocytes CD34+ Blast Cells



Specifications

Optics

EXCITATION OPTICS

OPTICAL PLATFORM

The Cytek Northern Lights (NL)-CLC contains a fixed optical assembly configured with one to three spatially separated laser beams. Laser delays are automatically adjusted during instrument QC.

LASERS

One laser configuration: 488 nm: 50 mW

Two laser configuration: 488 nm: 50 mW,
640 nm: 80 mW

Three laser configuration: 405 nm: 100 mW,
488 nm: 50 mW, 640 nm: 80 mW

BEAM GEOMETRY

Flat-Top laser beam profile with narrow vertical beam height optimized for small particle detection.

EMISSION OPTICS

EMISSION COLLECTION

Fused silica cuvette coupled to high NA lens for optimum collection efficiency to optical fibers.

FORWARD AND SIDE SCATTER DETECTION

FSC: high-performance semiconductor detector with 488 nm bandpass filter.

SSC: Two high-performance semiconductor detectors with 405 nm and 488 nm bandpass filter. Note: 405 nm side scatter applies to three laser configurations only.

FLUORESCENCE DETECTORS

Proprietary high sensitivity Coarse Wavelength Division Multiplexing (CWDM) semiconductor array per laser enabling more efficient spectrum capture in the 420-829 nm range. No filter changes required for any fluorochrome excited by the 405 nm, 488 nm, and 640 nm lasers.

STANDARD OPTICAL CONFIGURATION

Violet detector module (only available in three laser configurations): 16 channels uneven spaced bandwidth from 420-829 nm.

Blue detector module: 14 channels uneven spaced bandwidth from 498-829 nm.

Red detector module: 8 channels uneven spaced bandwidth from 652-829 nm.

Fluidics

SAMPLE FLOW RATES

Low: 15 µL/min, Medium: 30 µL/min, High: 60 µL/min,

FLUIDIC MODES

Long clean, SIT flush, Purge filter, Clean flow cell

MANUAL SAMPLE INPUT FORMATS

12x75mm polystyrene and polypropylene tubes

STANDARD FLUIDIC RESERVOIRS

4L fluid container set with level-sensing provided. Compatible with 20L sheath and waste cubitainers.

VOLUMETRIC SENSOR

Volumetric measurement during sample recording enables calculation of counts per µL for any gated population.

Performance

FLUORESCENT SENSITIVITY

FITC: <110 MEFL, PE: <35 MEFL, APC: <15 MEFL, Pacific Blue: <200MEFL

*Measurements based on an average from three systems and performed using SPHERO Rainbow Calibration Particle (RCP-30-5A) based on its peak emission channel.

FORWARD AND SIDE SCATTER

RESOLUTION

Performance is optimized for resolving lymphocytes, monocytes, granulocytes and platelets from red blood cells.

SIDE SCATTER RESOLUTION

Capable of resolving 0.2µm beads from noise.

CARRYOVER

<0.1%

DATA ACQUISITION RATE

35,000 events/s*

*Three-laser system

Software

SPECTROFLO® SOFTWARE

Live unmixing during acquisition

Developed specifically to streamline assay setup, data acquisition, and file export

Automated QC module

Autofluorescence extraction

Raw and Unmixed FCS 3.1 files

Electronics

SIGNAL PROCESSING

Digital signal processing with automatic window gate adjustment.

22-bit 6.5 log decades.

Threshold using any single parameter or combination of parameters.

PULSE SHAPE PARAMETERS

Pulse Area and Height for every parameter. Width for scatter parameters and one fluorescence parameter for each laser.

Workstation

OPERATING SYSTEM

Windows® 10 Pro 64-bit

PROCESSOR

Intel® Core™ i7 processor

RAM

16GB

HARD DRIVE

500GB SSD and 1TB SATA

VIDEO PROCESSOR

NVIDIA® HD GeForce

MONITOR

32" UHD 4K Monitor

Installation Requirements

Dimensions (W x D x H)

INSTRUMENT DIMENSIONS

54 x 52 x 52 cm

INSTRUMENT WEIGHT

Instrument weight: 61 kg

RECOMMENDED WORKSPACE

165 cm x 76 cm x 132 cm

Room Requirements

POWER

110-140 VAC, 15A / 200-250 VAC, 10A

HEAT DISSIPATION

500W with all solid-state lasers

TEMPERATURE

15–28°C

HUMIDITY

20%-85% relative non-condensing

AIR FILTERING

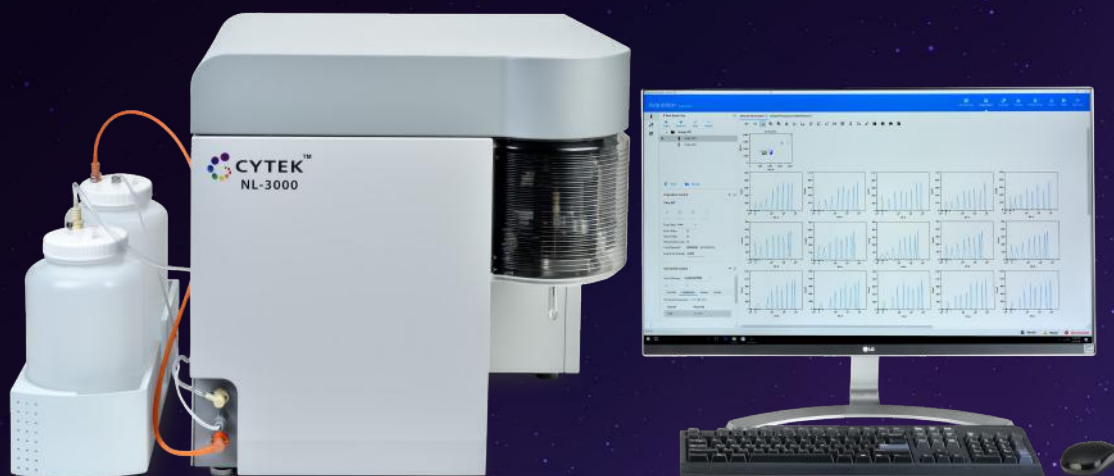
No excessive dust or smoke

LIGHTING

No special requirements

Regulatory Status

The Cytek Northern Lights (NL)-CLC flow cytometer system is intended for use as an in vitro diagnostic device for the identification and enumeration of human cells in suspension. It is intended for use in flow cytometric applications.



Cytek Biosciences is dedicated to enhancing our customers' user experience. The NL-CLC system is backed by our world-class service and support team that can provide phone or field based assistance. Various levels of maintenance options are available to meet your needs now, and in the future.

For more information, email us at:
sales@cytekbio.com or call 1-877-922-9835

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