CYTEK

TRANSCEND THE CONVENTIONAL

Cytek Aurora™

Say Hello to a New Reality

Meet Aurora:

A prodigy incorporating a unique combination of patent-pending innovative technologies that takes flow cytometry to the next level of performance and flexibility.

With three lasers, three scattering channels, and up to 48 fluorescence channels, the Aurora suits every laboratory's needs, from simple to high-complexity applications. A paradigm shifting optical design provides unprecedented flexibility, enabling the use of a wide array of new fluorochrome combinations without reconfiguring your system for each application. The optics and state-of-the-art low-noise electronics provide excellent sensitivity and resolution. Flat-Top beam profiles, combined with a uniquely designed fluidic system, translate to outstanding performance at high sample flow rates.

The end result is a system that delivers high quality data where rare and dim populations are easily resolved, regardless of assay complexity.

The new SpectroFlo™ software offers an intuitive workflow from QC to data analysis with technology-enabling tools that simplify running any application.

The Cytek team has reimagined every aspect of cytometry hardware and software to deliver an instrument that fulfills every researcher's needs.

Maximum Channels

51 channels of detection over the full emission spectra.

Maximum Colors

>20 colors including dyes with emission spectra in close proximity to each other.

Maximum Sensitivity

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

Maximum Flexibility

No changing optical filters for any fluorochrome.

Use any commercially available dye excited by the lasers onboard.

Maximum Accessibility

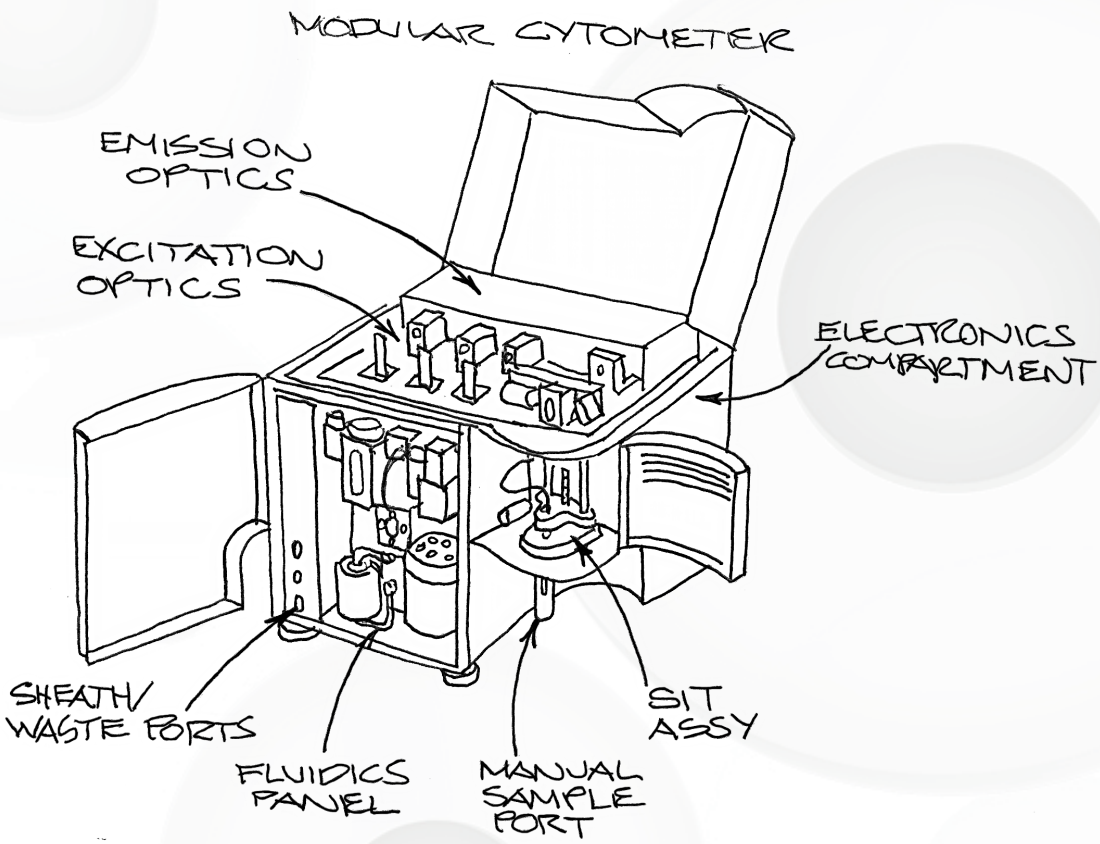
A powerful, high value system that is accessible to a wide range of users.

Cytek Biosciences, Inc. 46107 Landing Parkway, Fremont, CA 94538 1-877-922-9835 sales@cytekbio.com

Aurora's Revolutionary Technologies:
From Vision to Reality

The Aurora 3-laser system is capable of up to 51 detection channels (48 fluorescent channels, FSC, violet laser SSC, and blue laser SSC) and is empowered by revolutionary technologies, including:

- Proprietary high sensitivity Coarse Wavelength Division Multiplexing (CWDM) 16-channel semiconductor detector array for each laser, enabling more efficient spectrum capture for dyes emitting in the 400-900 nm range.
- High bandwidth electronics design scalable beyond 51 channels.
- Robust vacuum fluidics system enables ultimate flexibility in sample input formats.
- Exceptional small particle detection is enabled by violet laser scatter, narrow beam height, and proprietary flat top laser design.



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Supported Fluorochromes			
Laser (nm)	**Primary Detector**	**Fluorochrome**	**Emission Max (nm)**
488	B2	BD Horizon™ BB515	515
		Alexa Fluor® 488	520
		FITC	520
	B3	**Alexa Fluor® 532**	550
	B5	**PE**	576
	B6	BD Horizon™ PE-CF594	610
		PE/Dazzle™ 594	610
		PE-eFluor® 610	610
		PE-Texas Red®	625
		PE-Alexa Fluor® 610	630
	B8	**PE-Cy™5**	668
	B9	PE-Cy™5.5	680
		PerCP	680
		PerCP-Cy™5.5	680
		BD Horizon™ BB700	695
	B10	PE-Alexa Fluor® 700	720
		PerCP-eFluor® 710	730
	B14	**PE-Cy™7**	780
640	R2	**APC**	660
		eFluor® 660	660
		Alexa Fluor® 647	668
	R4	APC-Cy™5.5	680
	R5	BD Horizon™ APC-R700	705
		Alexa Fluor® 700	720
	R8	**APC/Fire™ 750**	780
		APC-Cy™7	780
		APC-eFluor® 780	780
		BD™ APC-H7	780
405	V1	**Brilliant Violet 421™**	421
	V2	Super Bright 436	436
	V3	eFluor® 450	450
		BD Horizon™ V450	450
		Pacific Blue™	455
	V4	BD Horizon™ BV480	480
	V5	**Brilliant Violet 510™**	510
		eFluor® 506	510
		BD Horizon™ V500	510
	V8	**Pacific Orange™**	550
	V9	**Brilliant Violet 570™**	570
	V10	Super Bright 600	600
		Brilliant Violet 605™	605
		eVolve® 605	605
		Qdot® 605	605
	V11	Super Bright 645	645
		Brilliant Violet 650™	650
		eVolve® 655	655
		Qdot® 655	655
	V13	Super Bright 702	702
		Qdot® 705	705
		Brilliant Violet™ 711	711
	V14	Brilliant Violet 750™	750
	V16	**Brilliant Violet 785™**	785
		BD Horizon™ BV786	786
		Qdot® 800	790

Aurora enables expanded dye possibilities beyond today's paradigms.

Note: This chart shows a subset of fluorochromes that be can be used with the Aurora. The technology enables the detection of any fluorescence emission in the range of 400-900 nm. Fluorochromes in bold were combined together in a 20-color panel (see pages 6-7).

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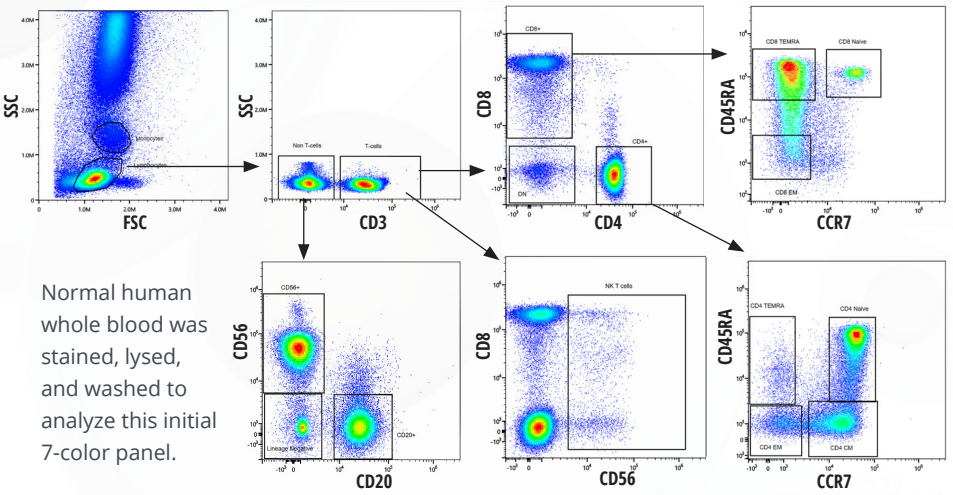
Expanding a 7-Color Panel to 20 Colors...Is it Possible?

The optical design combined with the unmixing capability in SpectroFlo software allows you to easily expand panels. The 3 laser configuration provides outstanding multi-parametric data for a wide array of applications.



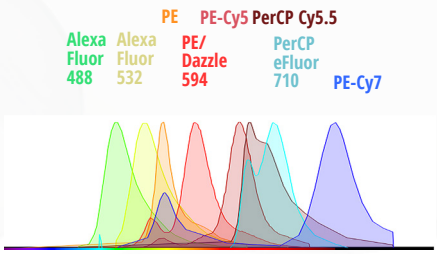
Normal human whole blood was stained, lysed, and washed to analyze this initial 7-color panel.

Expanding to 20 Colors: A 20-color panel preserving the original 7-color assay is summarized in the table below. Reagents shared by the 7-color and 20-color panels are shown in bold.

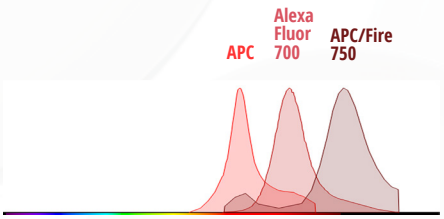
SPECIFICITY	FLUOROCHROME	SPECIFICITY	FLUOROCHROME	SPECIFICITY	FLUOROCHROME
CD45RA	**Alexa Fluor 488**	**CD56**	**APC**	IgD	BV421
CD3	**Alexa Fluor 532**	CD27	Alexa Fluor 700	CD16	eFluor 450
CCR5	PE	HLA DR	APC/Fire 750	**CD4**	**BV510**
CD127	PE/Dazzle 594			CD14	Pacific Orange
CD11c	PE-Cy5			**CD20**	**BV570**
CD123	PerCP-Cy5.5			**CD8**	**BV605**
PD-1	PerCP-eFluor710			CD25	BV650
CD38	PE-Cy7			CD11b	BV711
				CCR7	**BV785**

The 20-Color Panel Includes Many Highly Overlapping Dyes:

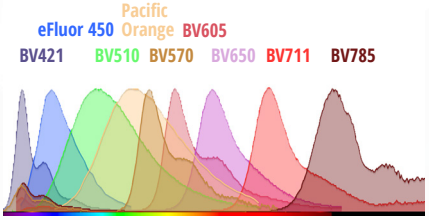
20-COLOR DATA



20-Color Panel Blue Laser Dyes Emission Spectra



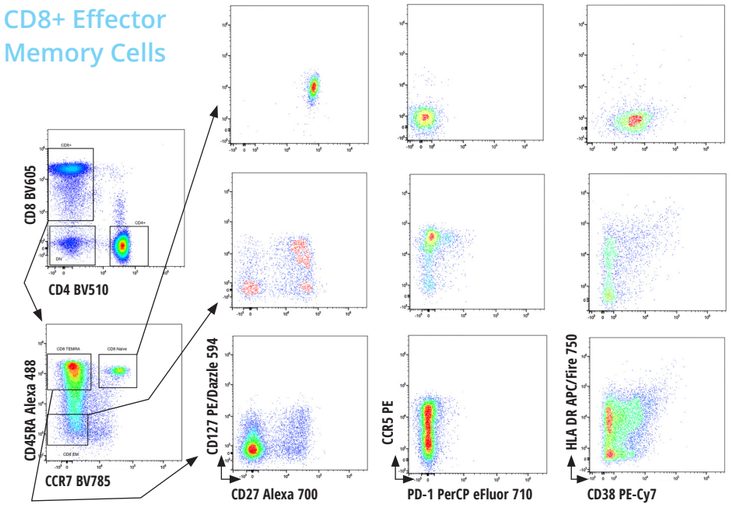
20-Color Panel Red Laser Dyes Emission Spectra



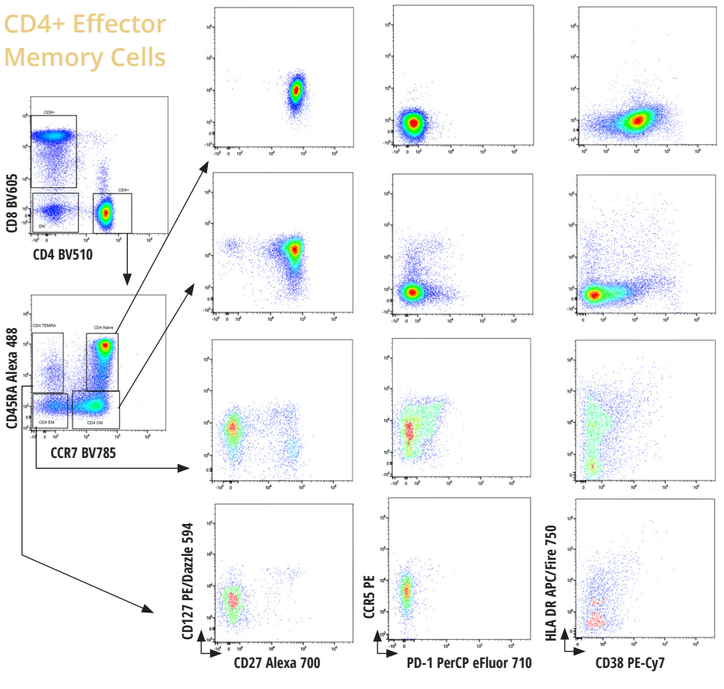
20-Color Panel Violet Laser Dyes Emission Spectra

A New Reality: 3 Lasers, 20 Colors, Unparalleled Resolution.

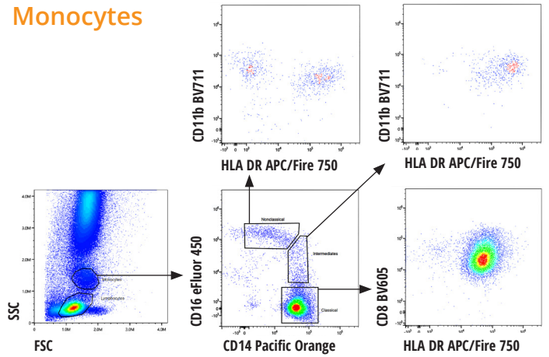
CD8+ Effector Memory Cells

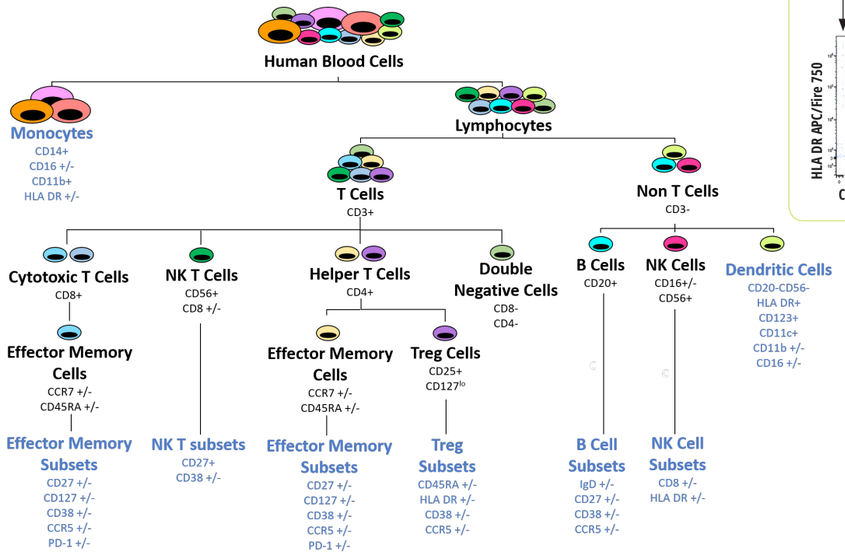


CD4+ Effector Memory Cells

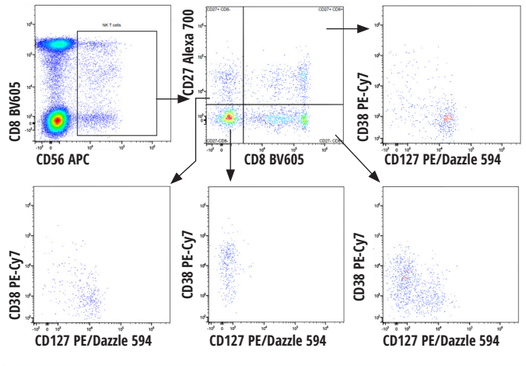


Monocytes

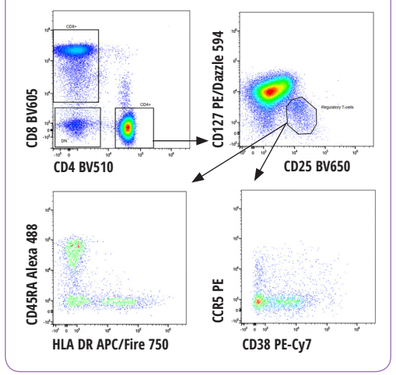




NK T Cells

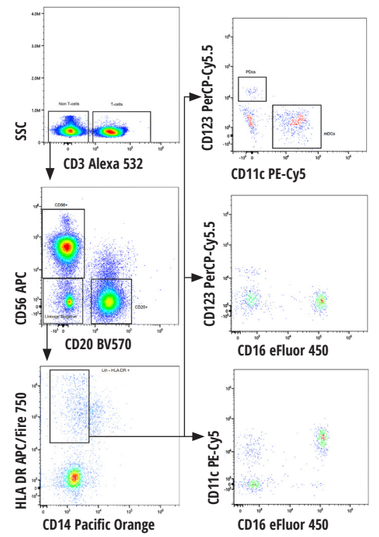


Treg Cells

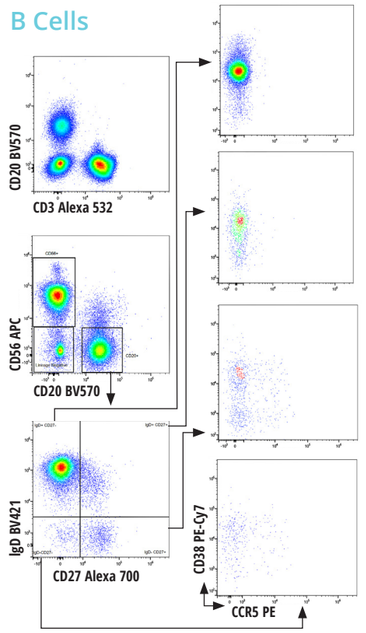


Aurora Makes It Possible.

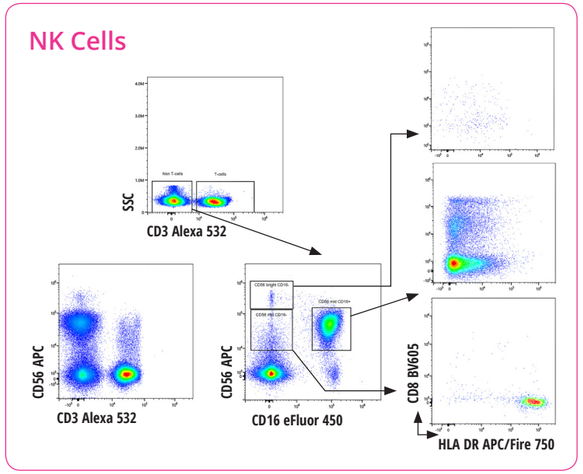
Dendritic Cells



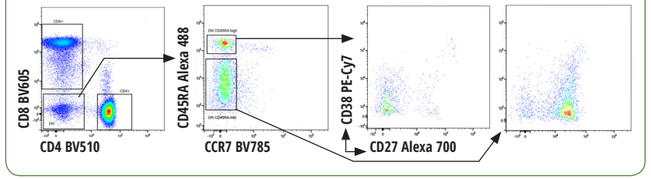
B Cells



NK Cells



Double Negative Cells



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Fluorescent Proteins and Challenging Dye Combinations

The detection of some fluorescent protein or fluorochrome combinations by conventional flow cytometry presents a challenge due to high amounts of spectral overlap (figures 1, 4). The Aurora addresses this challenge by using differences in full emission spectra signatures across all lasers to clearly resolve these combinations, even if the populations are co-expressed (figures 2, 3, 5 and 6).

Example 1: GFP and YFP

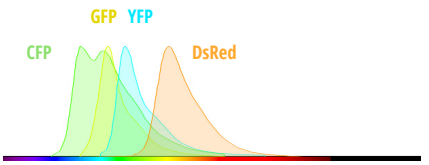

Figure 1: Spectrum plots from a conventional spectrum viewer shows heavy overlap between GFP and YFP.

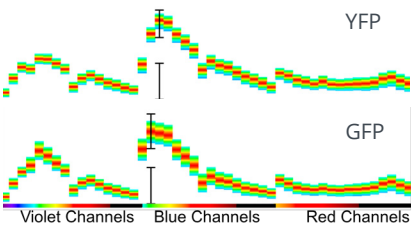

Figure 2: Spectrum plots from Aurora show distinct signatures across three lasers.

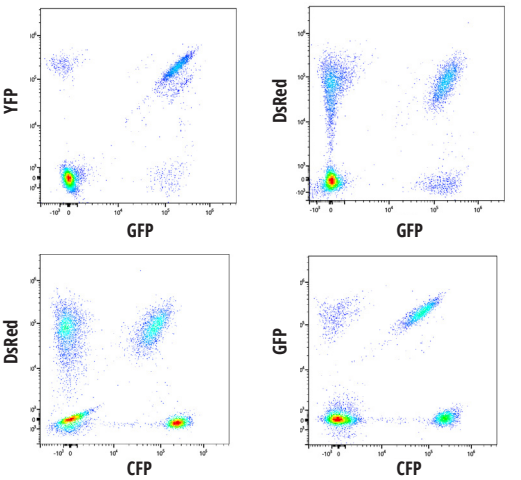

Figure 3: Sp2/0 cells were transfected with GFP, YFP, CFP and/or DsRed (alone or in combination) and run on the Aurora (plots are gated on FSC vs SSC). Each population is clearly identified.

Example 2: Qdot 705 and BV711

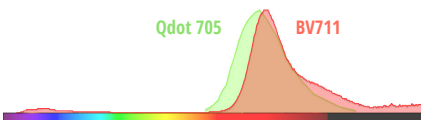

Figure 4: Spectrum plots from conventional spectrum viewer shows heavy overlap between Qdot 705 and BV711.

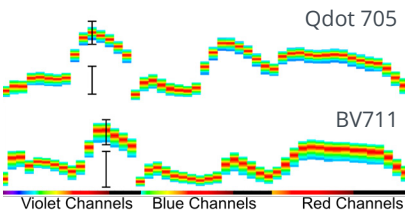

Figure 5: Spectrum plots from Aurora show distinct signatures for BV711 and Qdot 705.

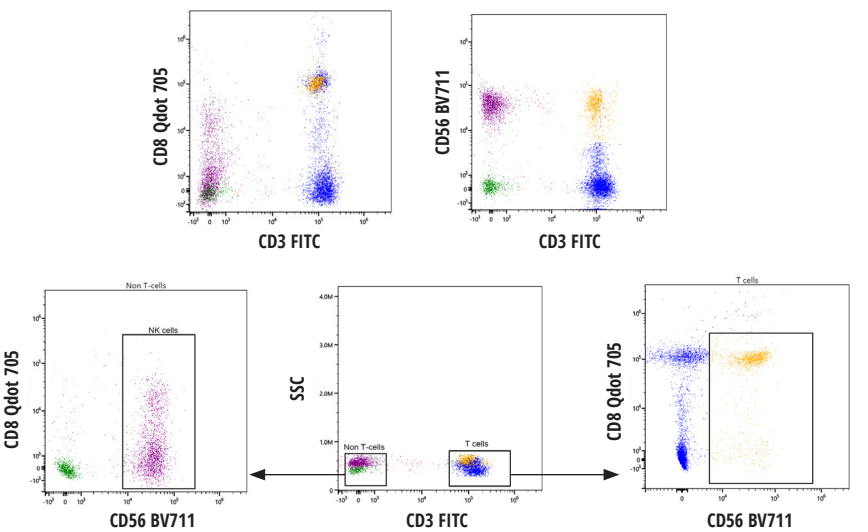

Figure 6: Normal human whole blood was stained, lysed, washed, and analyzed on the Aurora. Subsets of NK and NK T-cells that co-express CD56 BV711 and CD8 Qdot705 were easily identified.

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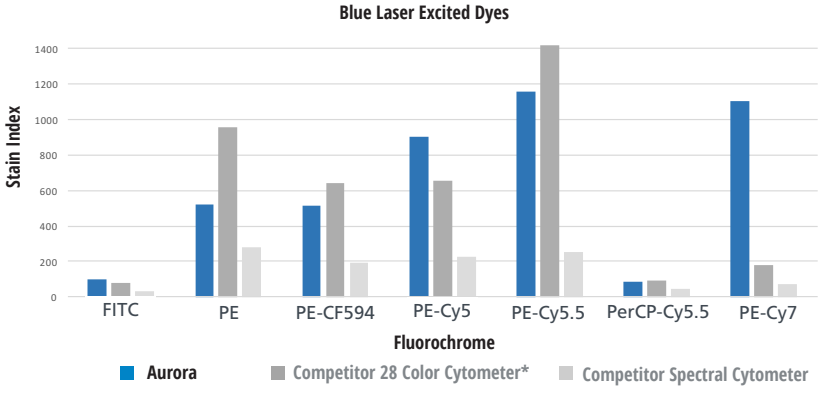
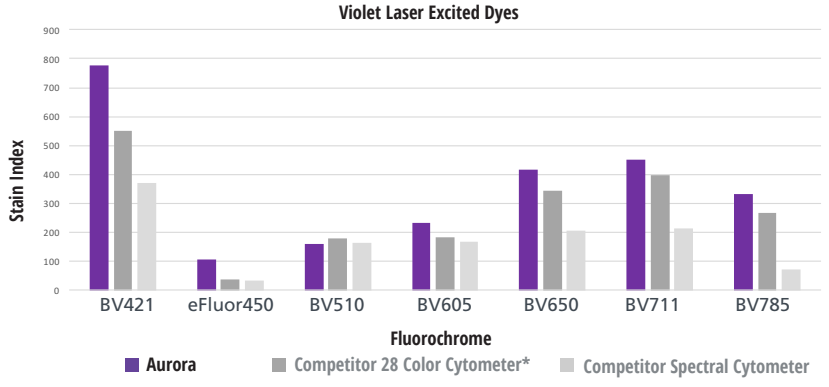
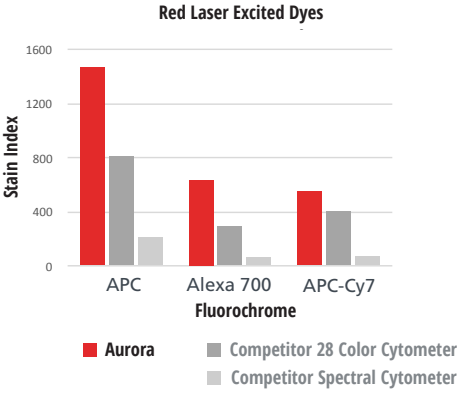
Why Choose Aurora?

	Cytek Aurora	Competitor Top 13 Color Cytometer	Competitor 28 Color Cytometer	Competitor 30+ Color Cytometer	Competitor Spectral Cytometer
Maximum number of detectors per laser	**16**	5	10	10	32
20-color assay sensitivity	**Excellent**	N/A	Average	Average	Sub-optimal
Supported fluorescent tags	**All existing dyes**	Limited by optical filters provided	Limited by optical filters provided	Limited by optical filters provided	Limited: red and violet lasers are co-linear
Detection emission wavelength range	**400-900nm**	400-800nm	400-800nm	400-800nm	500-800nm, 430nm, 460nm
Special fluorochromes needed for 20 color assay	**None**	N/A	None, but limited fluorochrome choices	Yes, but limited to exclusive fluorochromes	None, but limited fluorochrome choices
Ability to test new dyes excited by supported lasers	**Yes**	Requires new filters	Requires new filters	Requires new filters	Yes
Instrument setup to optimize sensitivity	**Automatic**	Manual	Manual	Manual	Manual
Unmixing capability for overlapping dyes	**Yes**	No	No	No	Yes
Able to remove cell autofluorescence	**Yes**	No	No	No	Yes
Footprint	**Small**	Very Small	Medium	Large	Medium
Affordability	**$**	$	$$	$$$	$$

Stain Index Comparison







Lysed washed whole blood from a healthy donor was stained with anti-CD4 mAbs labeled with different fluorochromes. Each sample was acquired in parallel and analyzed on the Aurora and two other competitor cytometer platforms: a 28 Color Cytometer and a Spectral Cytometer.

*PE and PE Tandems were excited by a Yellow-Green laser on the 28 Color system.

SpectroFlo Software Guided Workflows

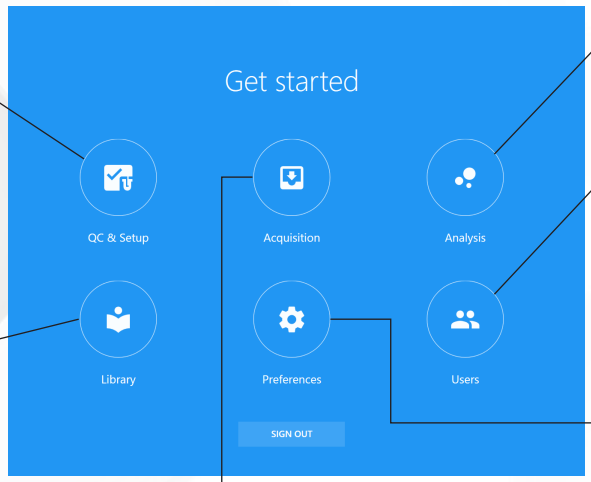
The new SpectroFlo software offers an intuitive workflow from QC to data analysis with technology-enabling tools that simplify running any application.

QC and Setup:

Run Daily QC to monitor instrument performance and add reference controls. Controls are normalized during QC so you can reuse them. Minimize the number of reference controls by using the built-in reference library.

Library:

Add or remove experiment templates, worksheet templates, fluorochrome information, QC bead information, and more.



Analysis:

Unmix data and view sample spectra.

Users:

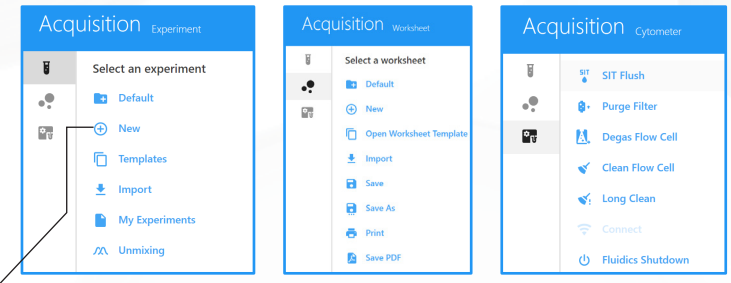
For administrative controls.

Preferences:

Customize your software appearance. Set default plot sizes, text sizes and fonts, gate colors, print layout, statistics table options, and more.

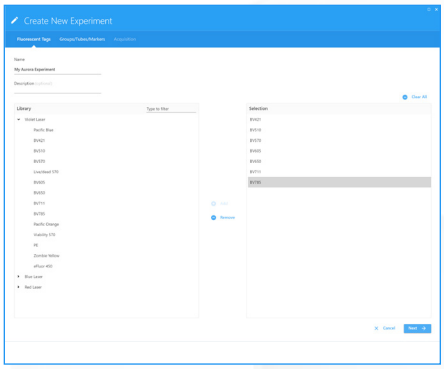
Experiment Workflow:

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



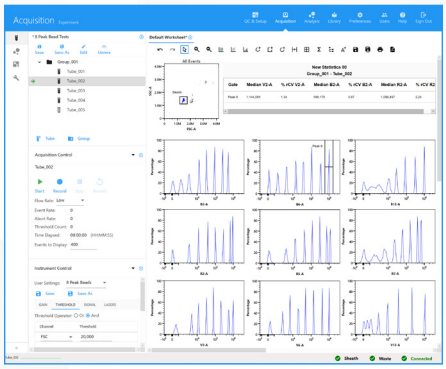
Experiment Menu | Analysis Worksheet Menu | Fluidics Menu

Step 1: Create Your Experiment



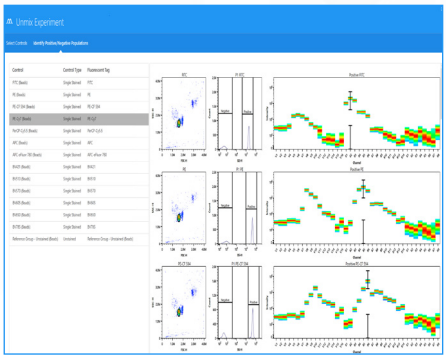
Define your experiment, fluorochromes, labels, tubes, worksheets, and stopping criteria in this guided workflow.

Step 2: Acquire Your Tubes



Load and acquire your samples.

Step 3: Unmix Your Data



Use the unmixing algorithm to visualize your data (in real time or post acquisition).

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Specifications

Optics

EXCITATION OPTICS

OPTICAL PLATFORM
Aurora contains a fixed optical assembly configured with three spatially separated laser beams. Laser delays are automatically adjusted during instrument QC.

LASERS
405nm: 100mW, 488nm: 50mW, 640nm: 50mW

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 488nm bandpass filter.

Violet SSC: high-performance semiconductor detector with 405nm bandpass filter.

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

FLUORESCENCE DETECTORS
Proprietary high sensitivity Coarse Wavelength Division Multiplexing (CWDM) 16-channel semiconductor detector array per laser enabling more efficient spectrum capture for dyes emitting in the 400-900 nm range. No filter changes required for any fluorochrome excited by the 405nm, 488nm, and 640nm lasers.

STANDARD OPTICAL CONFIGURATION

Violet detector module: 16 channels uneven spaced bandwidth from 420nm-830nm

Blue detector module: 14 channels uneven spaced bandwidth from 500-890nm standard. Up to 16 channels available.

Red detector module: 9 channels uneven spaced bandwidth from 650-890nm standard. Up to 16 channels available.

Fluidics

SAMPLE FLOW RATES
Low: 12 µL/min, Medium: 30µL/min, High: 60 µL/min

Continuous flow rate from 10µL-60µL/min

FLUIDIC MODES
Long clean, SIT flush, Purge filter, Degas flow cell, 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.

PLATE LOADER OPTION
96- or 384-well microtiter plate capability starting in December 2017.

SAMPLE DEAD VOLUME
5µl for 12x75mm tube

Performance

FLUORESCENCE SENSITIVITY
FITC: 100 MEFL, PE: 30 MEFL, APC: 15 MEFL, Pacific Blue: 200 MEFL

*measurements performed using SPHERO Rainbow Calibration Particle (RCP-30-5A) based on its single peak detection channel.

FLUORESCENCE LINEARITY
FITC R^2 ≥0.995 / PE R^2 ≥0.995

FORWARD AND SIDE SCATTER SENSITIVITY
Enables separation of fixed platelets from noise.

FORWARD AND SIDE SCATTER RESOLUTION
Performance is optimized for resolving lymphocytes, monocytes, and granulocytes.

SIDE SCATTER RESOLUTION
Capable of resolving 0.2µm beads from noise.

CARRYOVER
<0.1%

DATA ACQUISITION RATE
35,000 events/s.

Software

SPECTROFLO™ SOFTWARE

Live unmixing during acquisition

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

Automated QC module

Auto-fluorescence extraction

48 unmixed parameters

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™ i7-6700T processor, 3.0 GHz

RAM
16GB, 16000 MHz DDR4 SO-DIMM

HARD DRIVE
500GB SATA 3.0Gb/s

VIDEO PROCESSOR
Intel® HD Graphics 530

MONITOR
28" UHD

Installation Requirements

Dimensions (W x D X H)

INSTRUMENT DIMENSIONS
54 x 52 x 52 cm

INSTRUMENT WEIGHT
61 kg

COMPUTER DIMENSIONS
3.45 x 18.29 x 17.9 cm

RECOMMENDED WORKSPACE
152.4 x 61 x 132 cm

Room Requirements

POWER
100-240V, 50/60 Hz, 2A max

HEAT DISSIPATION
500W with all solid-state lasers

TEMPERATURE
15–30°C

HUMIDITY
20%-85% relative non-condensing

AIR FILTERING
No excessive dust or smoke

LIGHTING
No special requirements

Regulatory Status

For Research Use Only. Not for use in diagnostic or therapeutic procedures.

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