



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, two 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 reimaged every aspect of cytometry hardware and software to deliver an instrument that fulfills every researcher's needs.

➤ Maximum Channels

50 channels of detection over the full emission spectra.

➤ Maximum Colors

Up to 20 colors demonstrated 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.

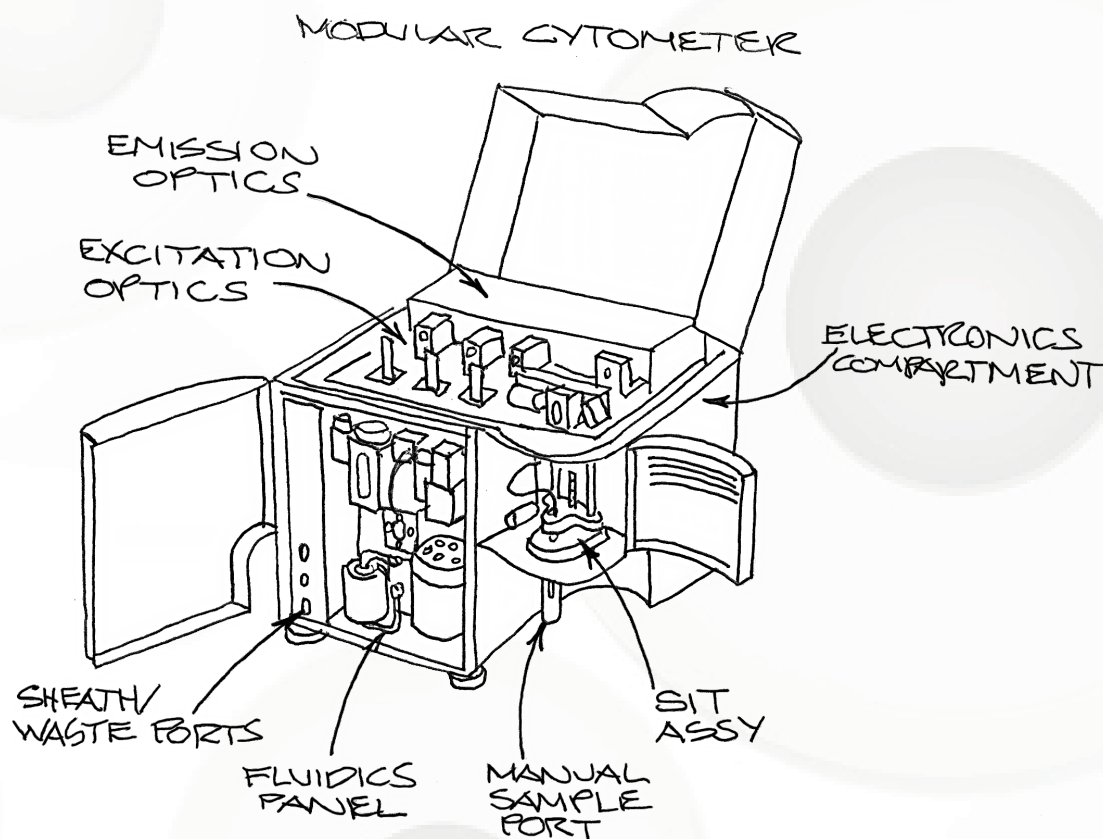
➤ Maximum Accessibility

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

Aurora's Revolutionary Technologies: From Vision to Reality

The Aurora 3-laser system is capable of up to 50 detection channels (48 fluorescent channels, FSC, and violet 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 50 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.



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
		PE-Cy™5.5	680
		PerCP	680
	B9	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
	R4	Alexa Fluor® 647	668
		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
	V4	Pacific Blue™	455
		BD Horizon™ BV480	480
	V5	Brilliant Violet 510™	510
		eFluor® 506	510
	V8	BD Horizon™ V500	510
		Pacific Orange™	550
	V9	Brilliant Violet 570™	570
	V10	Super Bright 600	600
		Brilliant Violet 605™	605
		eVolve® 605	605
		Qdot® 605	605
		Super Bright 645	645
V11	Brilliant Violet 650™	650	
	eVolve® 655	655	
	Qdot® 655	655	
V13	Super Bright 702	702	
	Qdot® 705	705	
V14	Brilliant Violet™ 711	711	
	Brilliant Violet 750™	750	
	Brilliant Violet 785™	785	
V16	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).

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®, Texas Red®, Pacific Blue™, eFluor®, eVolve®, Qdot®, 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.

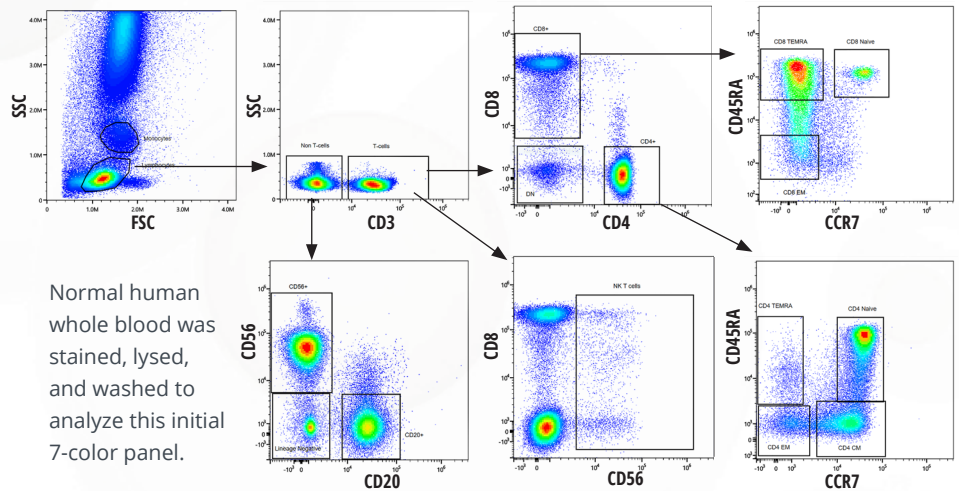
PE-Cy7: US Patent Number 4,542,104.

APC-Cy7: US Patent Number 5,714,386.

Trademarks are the property of their respective owners.

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.

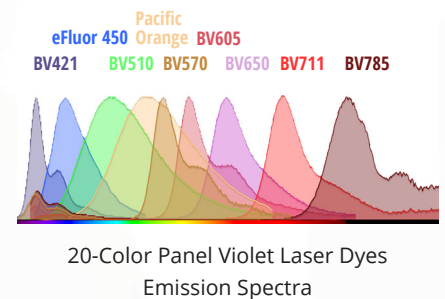
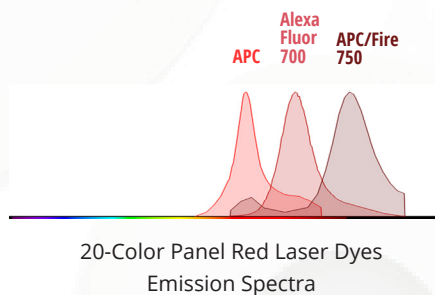
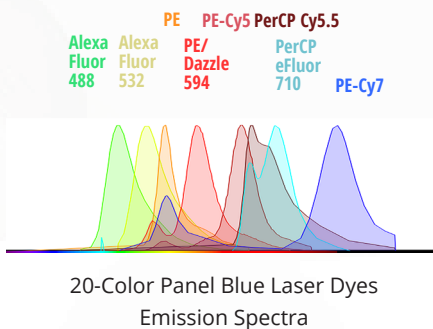


Expanding to 20 Colors: A 20-color panel preserving the original 7-color assay is summarized in the table below. Reagents shared by the 7-color and 20-color panels are shown in bold.

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:

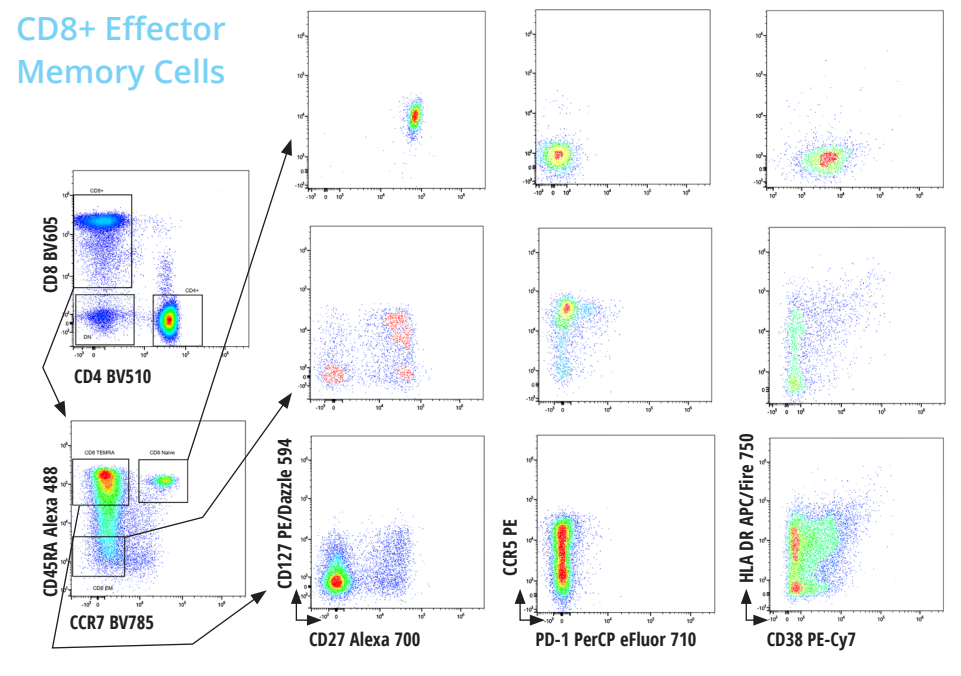
20-COLOR DATA



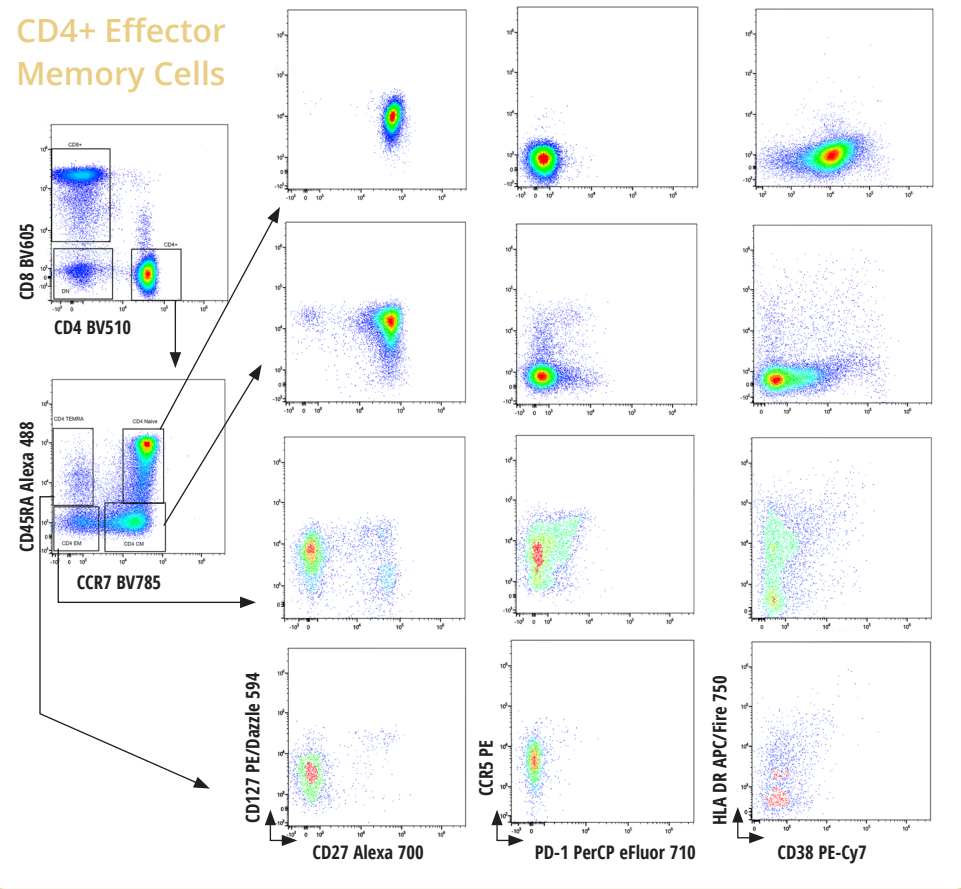
A New Reality: 3 Lasers, 20 Colors, Unparalleled Resolution.

Aurora Makes It Possible.

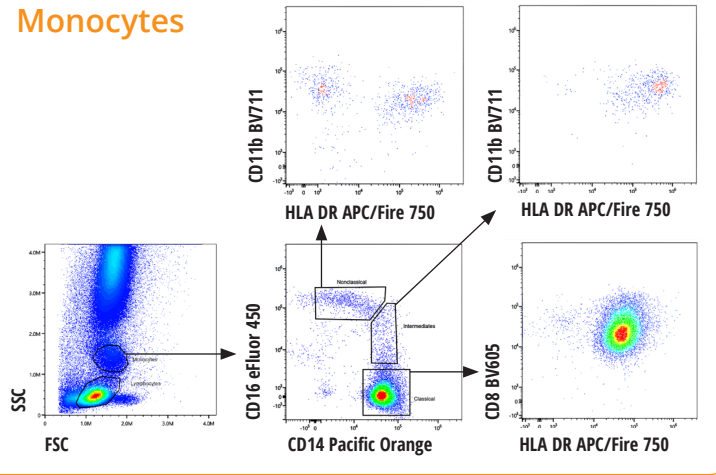
CD8+ Effector Memory Cells



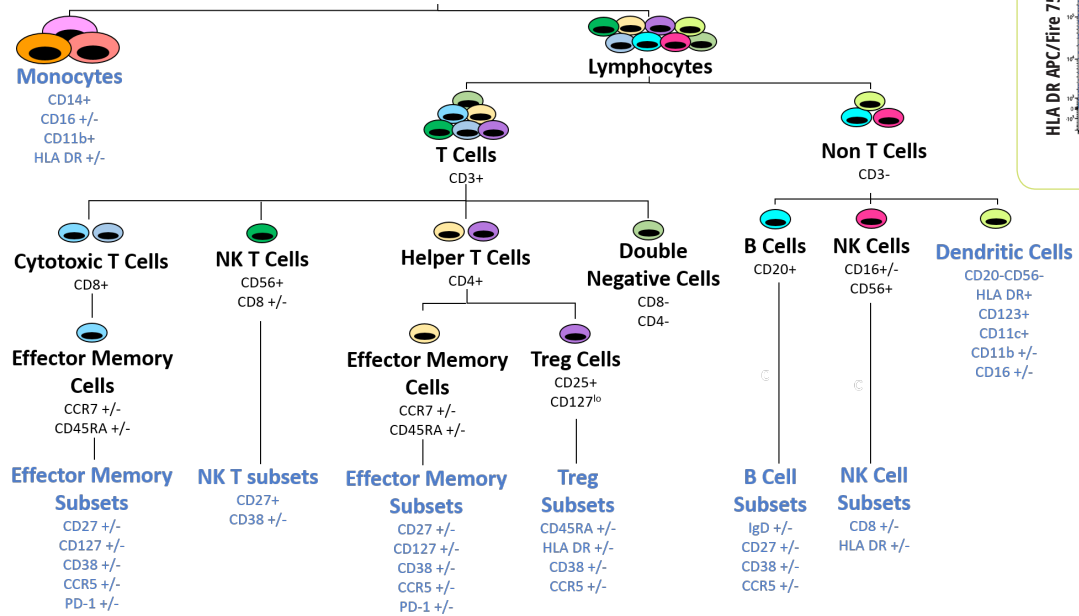
CD4+ Effector Memory Cells



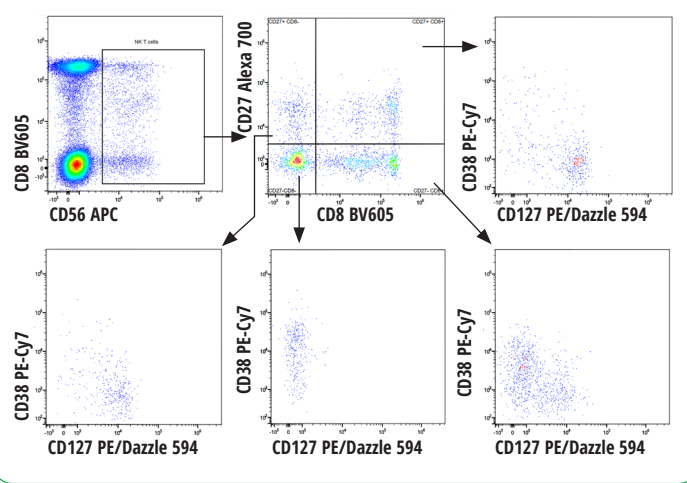
Monocytes



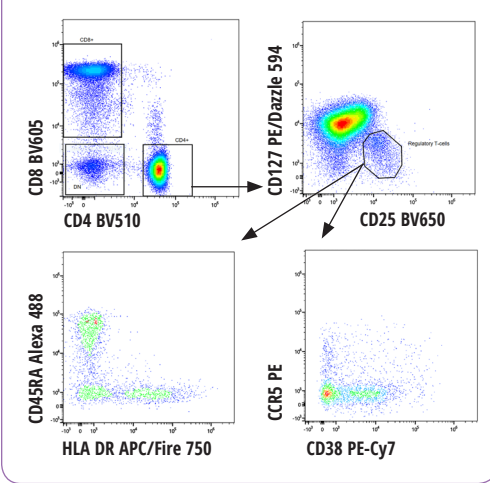
Human Blood Cells



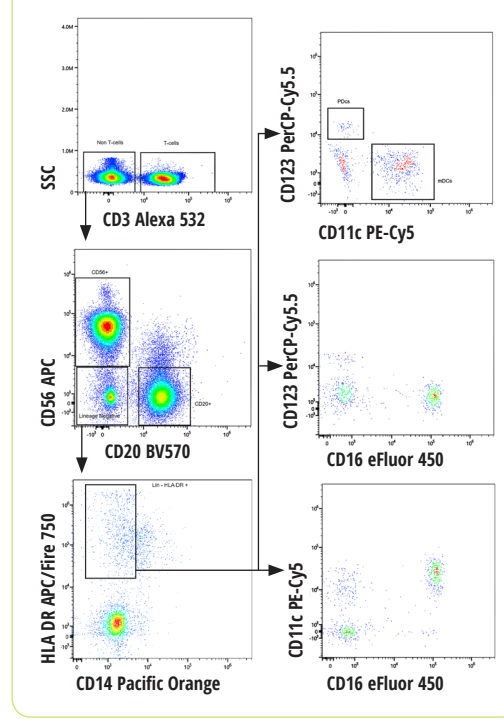
NK T Cells



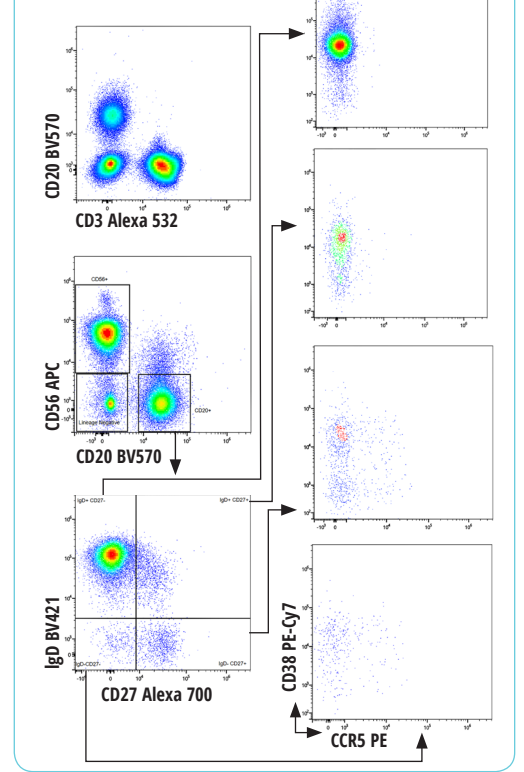
Treg Cells



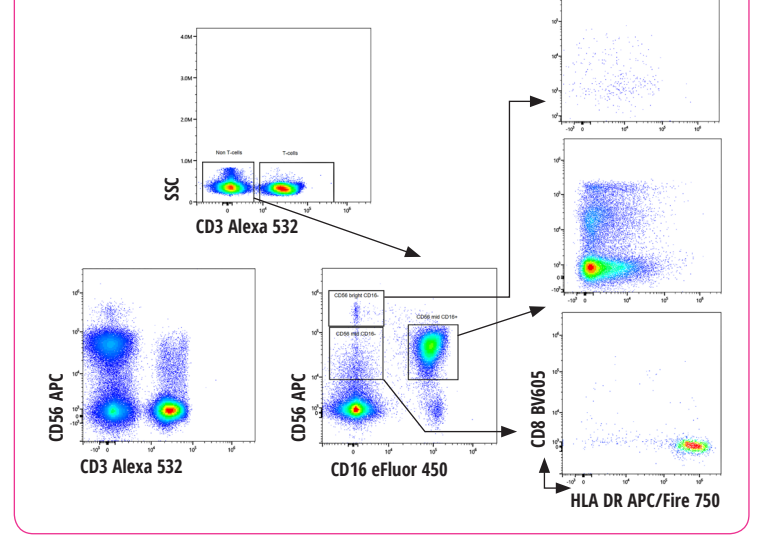
Dendritic Cells



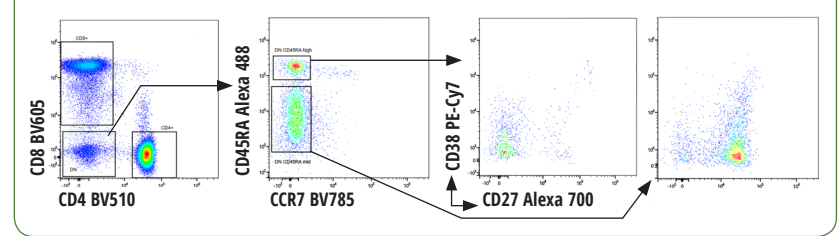
B Cells



NK Cells



Double Negative Cells



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

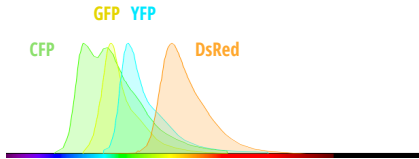


Figure 1: Spectrum plots from a conventional spectrum viewer shows heavy overlap between GFP and YFP.

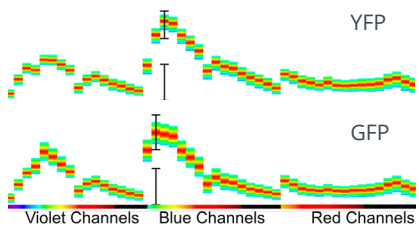


Figure 2: Spectrum plots from Aurora show distinct signatures across three lasers.

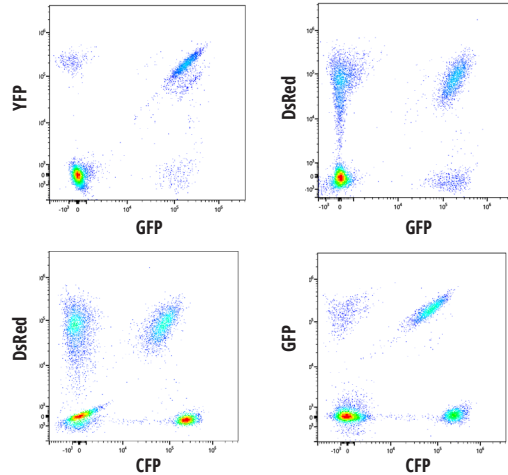


Figure 3: Sp2/0 cells were transfected with GFP, YFP, CFP and/or DsRed (alone or in combination) and run on the Aurora (plots are gated on FSC vs SSC). Each population is clearly identified.

Example 2: Qdot 705 and BV711

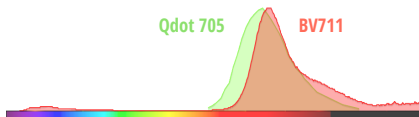


Figure 4: Spectrum plots from conventional spectrum viewer shows heavy overlap between Qdot 705 and BV711.

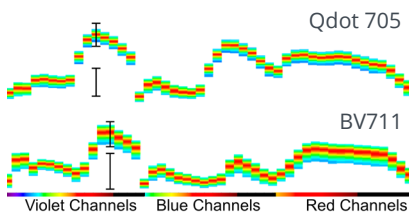


Figure 5: Spectrum plots from Aurora show distinct signatures for BV711 and Qdot 705.

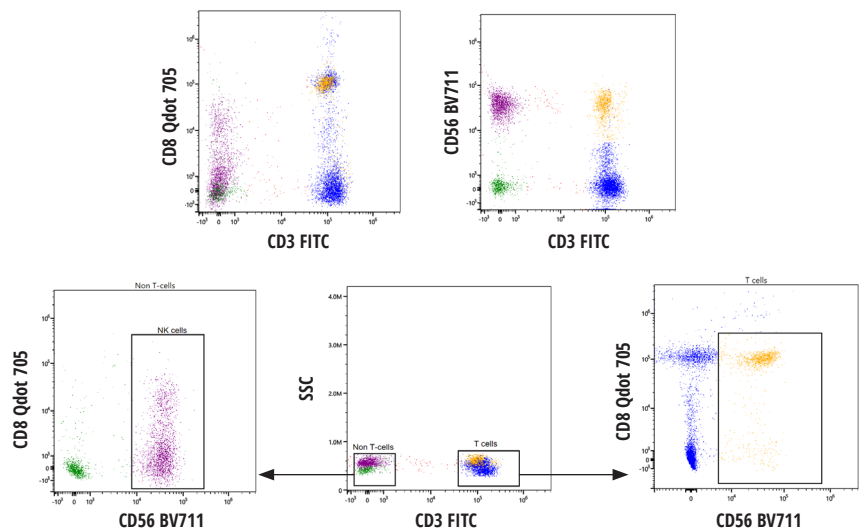
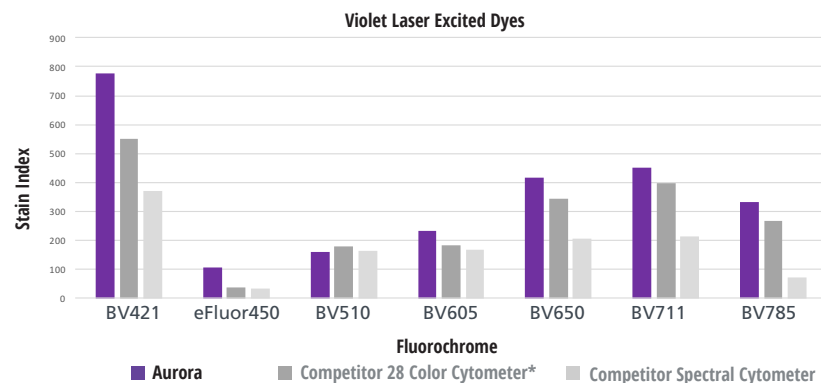
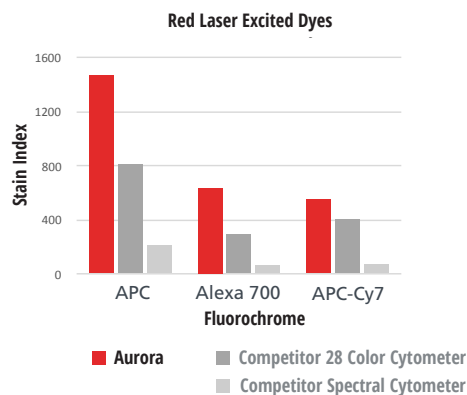
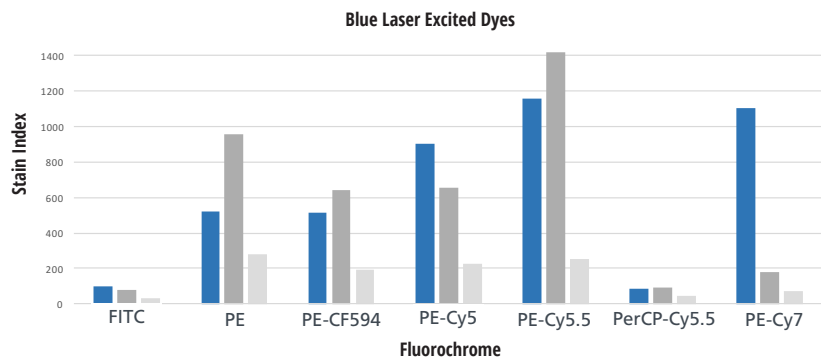


Figure 6: Normal human whole blood was stained, lysed, washed, and analyzed on the Aurora. Subsets of NK and NK T-cells that co-express CD56 BV711 and CD8 Qdot705 were easily identified.

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
Spatially separated lasers	Yes	Yes	Yes	Yes	No
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

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:

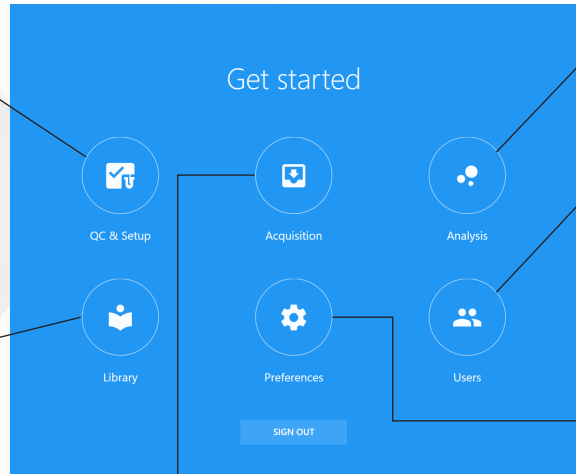
Run Daily QC to monitor instrument performance and add reference controls. Controls are normalized during QC so you can reuse them. Minimize the number of reference controls by using the built-in reference library.

Library:

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

Experiment Workflow:

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



Analysis:

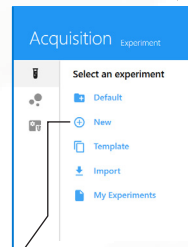
Unmix data and view sample spectra.

Users:

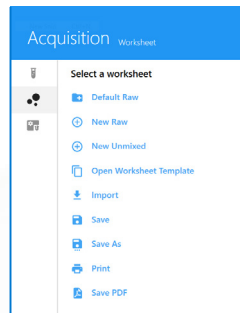
For administrative controls.

Preferences:

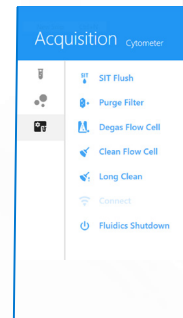
Customize your software appearance. Set default plot sizes, text sizes and fonts, gate colors, print layout, statistics table options, and more.



Experiment Menu

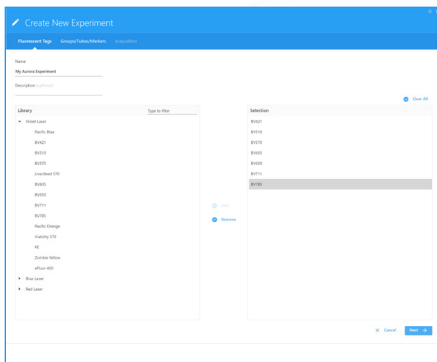


Analysis Worksheet Menu



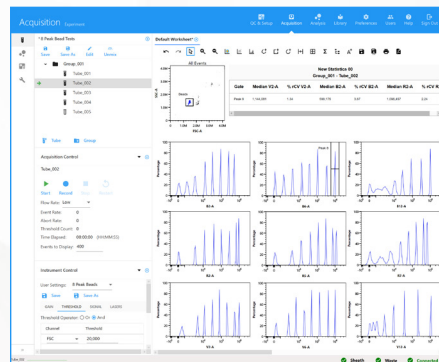
Fluidics Menu

Step 1: Create Your Experiment



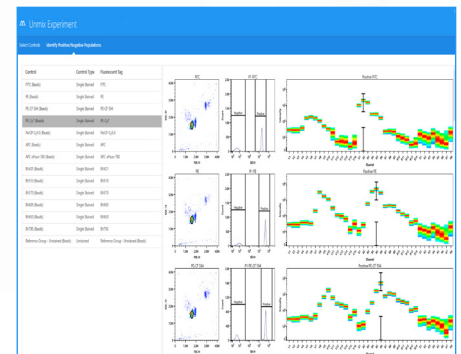
Define your experiment, fluorochromes, labels, tubes, worksheets, and stopping criteria in this guided workflow.

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).

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: 80mW

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.

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: 8 channels uneven spaced bandwidth from 650-890nm standard. Up to 16 channels available.

Fluidics

SAMPLE FLOW RATES

Low: 15 μ L/min, Medium: 30 μ L/min, High: 60 μ L/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.

PLATE LOADER OPTION

96-well microtiter plate capability available in 2018.

SAMPLE DEAD VOLUME

5 μ l for 12x75mm tube

Performance

FLUORESCENCE 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.

FLUORESCENCE LINEARITY

FITC $R^2 \geq 0.995$ / PE $R^2 \geq 0.995$

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 0.2 μ m 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

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, 3.0 GHz

RAM

16GB, 2400 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

15-28°C

HUMIDITY

20%-85% relative non-condensing

AIR FILTERING

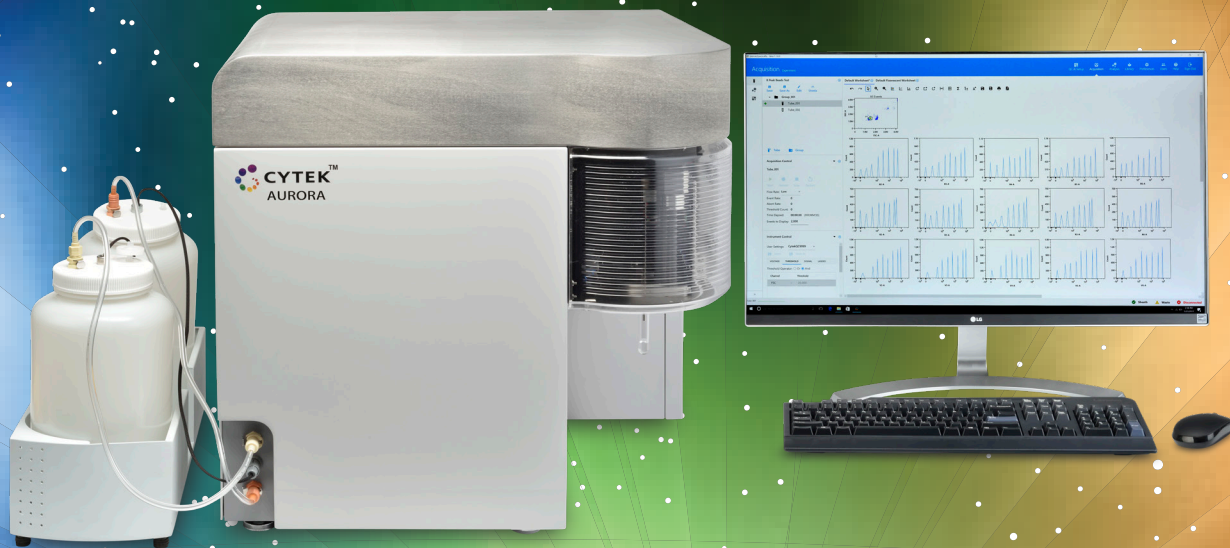
No excessive dust or smoke

LIGHTING

No special requirements

Regulatory Status

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



Cytek Biosciences is dedicated to enhancing our customers' user experience. The Aurora 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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Fremont, CA 94538-6407
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