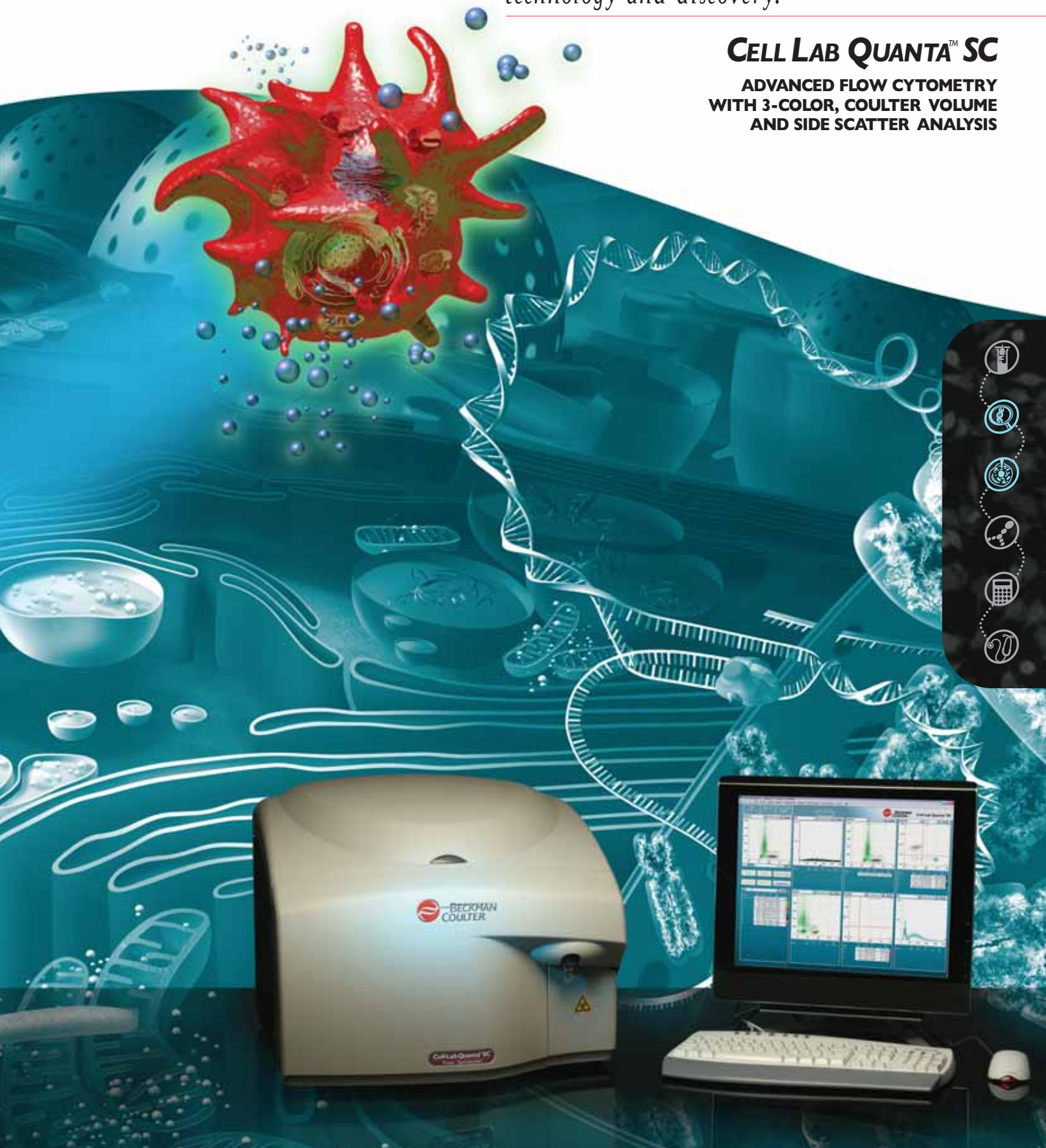
BR-10115B

BECKMAN COULTER®

Softening the interface between technology and discovery.

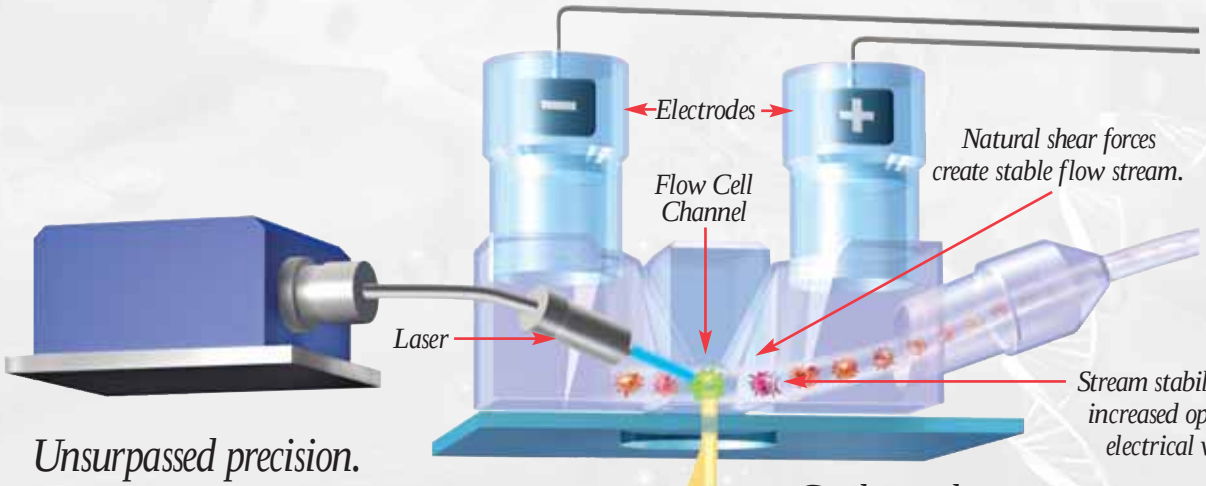
CELL LAB QUANTA™ SC

ADVANCED FLOW CYTOMETRY WITH 3-COLOR, COULTER VOLUME AND SIDE SCATTER ANALYSIS



Powerful forces are at work to change the way research is done.

Dig deeper. Developed from a unique combination of ingenuity and high-level technical resources, the Cell Lab Quanta™ SC is an advanced, yet cost effective flow cytometer with 3-color, side scatter and cell size measurements. Side scatter and Coulter volume make size analysis and fluorescence measurements more precise. Unique user features expand ease-of-use and flexibility. When all the details are added together, the sum is performance.

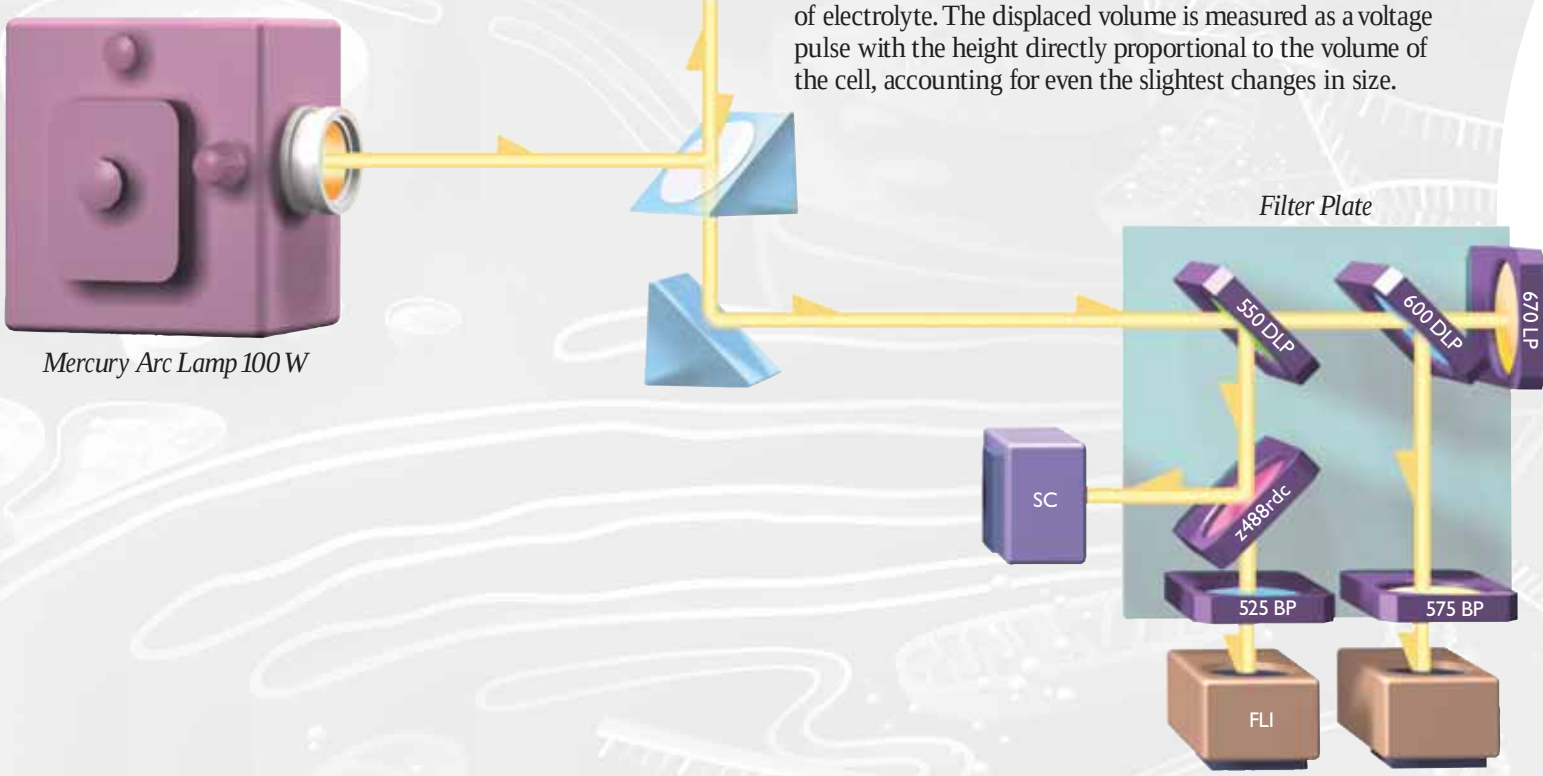


Unsurpassed precision.

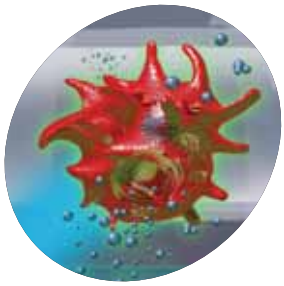
The patented triangular flow cell allows a higher degree of hydrodynamic focusing of the sample as well as even and stable illumination of the cells.

Coulter volume.

Based upon measurable changes in electrical resistance produced by cells suspended in an electrolyte, Coulter volume and Digital Signal Processing Technology measurements enable the Quanta SC to accurately count and size cells. As a cell passes through the Flow Cell aperture, its volume will displace an equivalent amount of electrolyte. The displaced volume is measured as a voltage pulse with the height directly proportional to the volume of the cell, accounting for even the slightest changes in size.

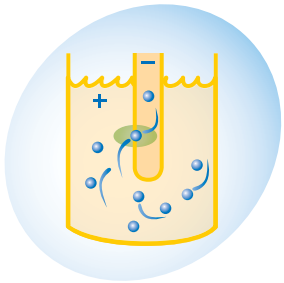


Mercury Arc Lamp 100 W



Side scatter for granularity measurements.

A 488 nm diode laser is used as the light source for fluorescence and side scatter measurements. Side light scatter generated from a cell is collected using a high sensitivity photodiode detector positioned ninety degrees from the laser beam. This measurement angle is ideal for detailing mixed cell populations with differences in granularity.



Coulter volume for accurate sizing.

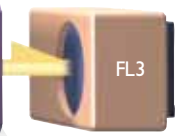
The gold-standard "Coulter Principle" for cell sizing and counting is the industry's most highly regarded technique for precision and reliability. Volume measurements are not affected by shape, color, or refractive index.

Syringe mechanism for precision enumeration.

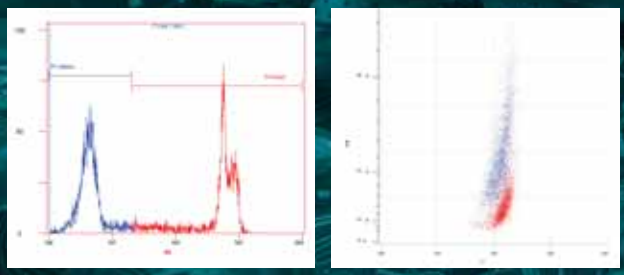
Sample cell concentration is obtained by utilizing a precise syringe mechanism for flow cell aspiration and metered delivery. A steady and stable stream of cells is created allowing accurate measurements and enumuration.

Validated reagents for optimal assay performance.

Choose from over a thousand available reagents from Beckman Coulter for your optimal assay performance using the Quanta SC system.



Easy to use digital interface provides instantaneous data acquisition and analysis control.

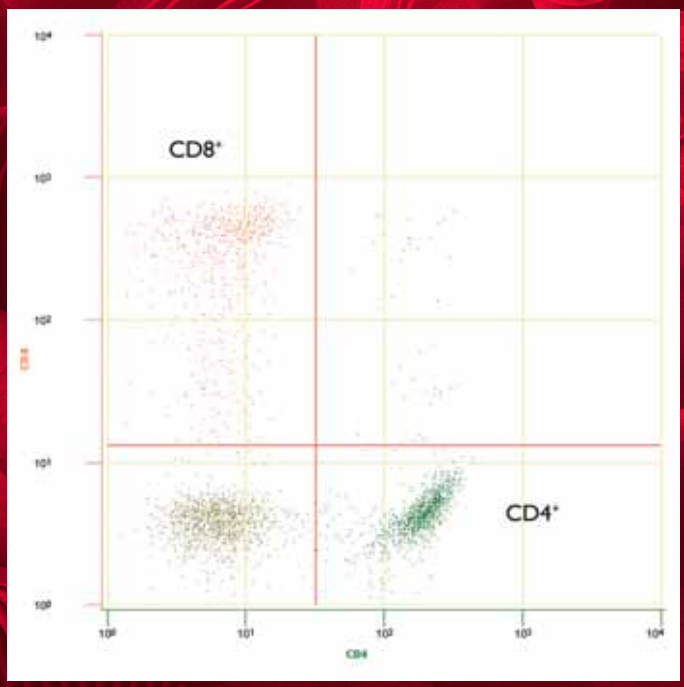


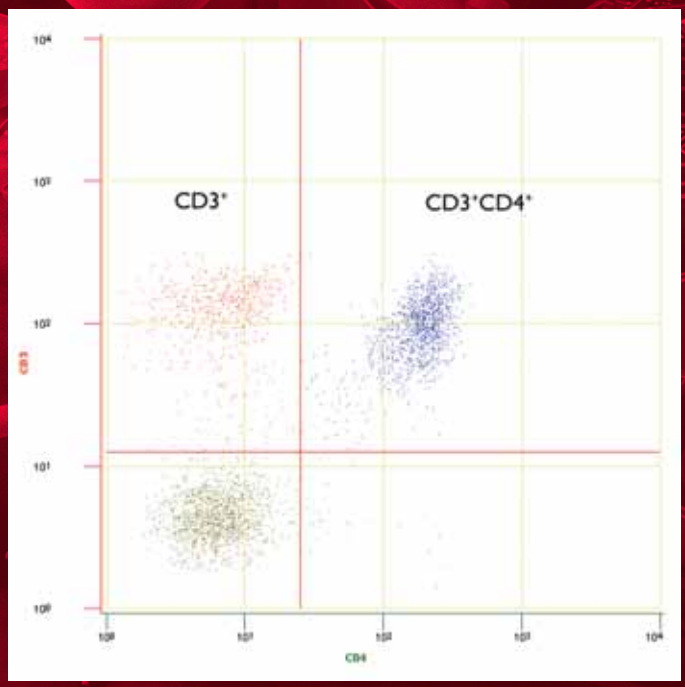
Viability.

Cell impermeant dyes, such as propidium iodide (PI) or 7-Amino Actinomycin D (7-AAD), can be used to differentiate live and dead cells. Because of loss in plasma membrane integrity, dead cells are stained positive (left panel). Differences in volume between live and dead cells can also be measured. Dead cells can be further identified with a dual parameter measurement of volume and side scatter (right panel).

3 color immunophenotyping.

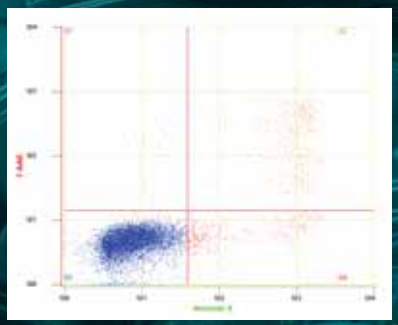
Concentration and population measurements utilizing CD markers can be performed on the Quanta SC. Isolated lymphocytes that are stained with CD4-FITC, CD8-PE and CD3-PC5 emit green, orange and red fluorescence when excited with the 488 nm laser.





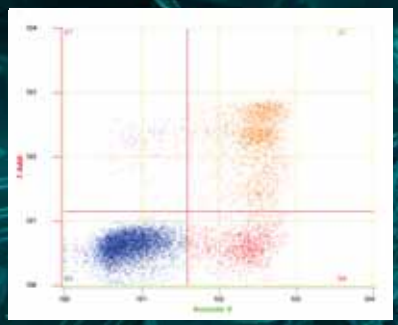
Apoptosis.

Stages of programmed cell death can be enumerated using a dual parameter staining consisting of Annexin V-FITC and 7-AAD. Phosphatidylserine (PS) resides on the inner cell membrane of healthy cells, but will externalize to the outer membrane layer when in early stage apoptosis. Annexin V-FITC binds to the exposed PS molecules and can be measured. Cells with damaged plasma membrane are stained positive with 7-AAD. Early apoptotic cells are Annexin V-FITC positive but 7-AAD negative and late apoptotic/dead cells are both Annexin V-FITC and 7-AAD positive (Q2).



Region	Cell population	% Total
Annexin-V (-), 7-AAD (+)	Dead cells	0.55
Annexin-V (+), 7-AAD (+)	Late apoptotic/dead cells	5.43
Annexin-V (-), 7-AAD (-)	Live cells	90.46
Annexin-V (+), 7-AAD (-)	Early apoptotic cells	3.56

Control

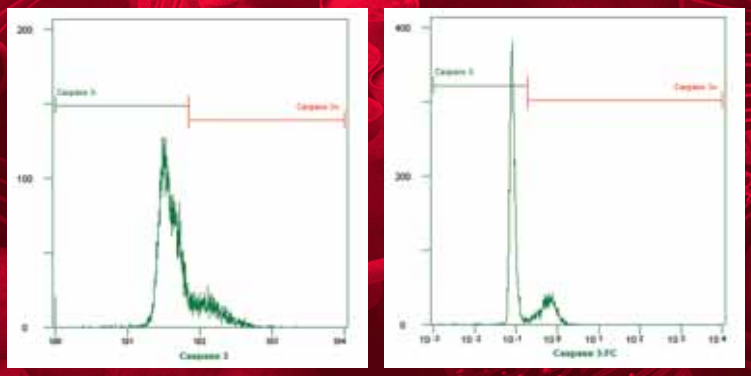


Region	Cell population	% Total
Annexin-V (-), 7-AAD (+)	Dead cells	1.97
Annexin-V (+), 7-AAD (+)	Late apoptotic/dead cells	22.58
Annexin-V (-), 7-AAD (-)	Live cells	64.01
Annexin-V (+), 7-AAD (-)	Early apoptotic cells	11.04

Treated

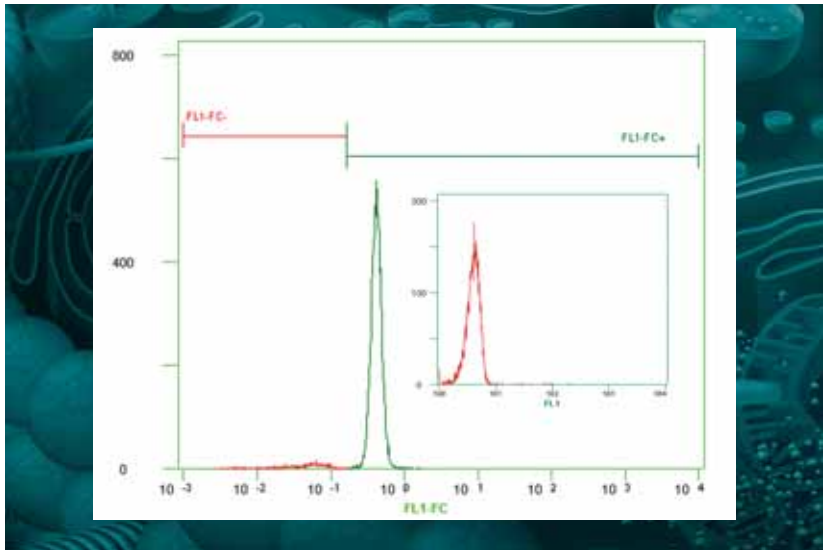
Fluorescence concentration and surface density measurement.

The Quanta SC is unique in that it can precisely measure the diameter and volume of a cell by utilizing NIST traceable beads to calibrate the instrument. Combining diameter measurement with fluorescence allows the fluorescence density to be measured and shown. Using volume measurement with fluorescence intensity, the fluorescence concentration (FC) can be calculated and displayed. Measuring FC can eliminate the effect of cell size. In this example, due to the high level of size heterogeneity in apoptotic cells, the positive population of active caspase 3 in those cells was clearly identified with FC measurement (right panel) comparing to measure signal intensity along (left panel).



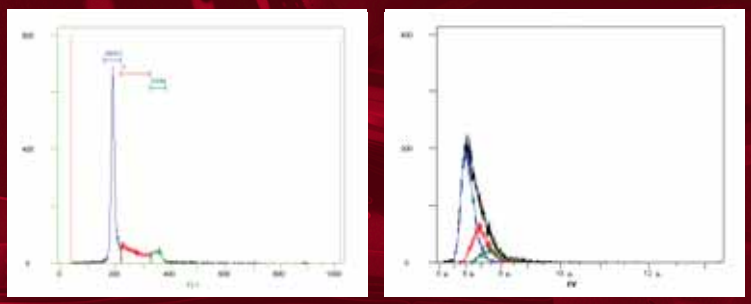
CFP expression.

CFP expression can be detected using the UV light source of the Quanta SC (422/39 exciter and a 480/30 BP filter). The exciter includes both 405 nm and 435 nm of the UV light source. Expression of CFP stable transfected yeast was identified with these excitation and emission settings compared to the control (the inserted histogram).



Cell cycle analysis using UV.

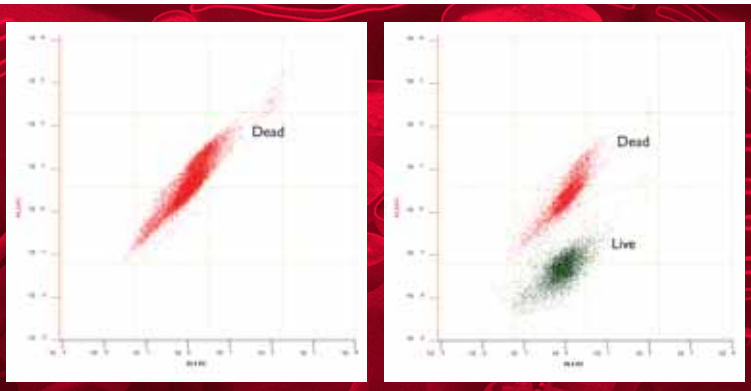
Enumeration of the various phases of a cell cycle is easily determined using a DNA stain such as DAPI or Hoechst. The Quanta SC utilizes a Mercury arc lamp that produces an ideal 365 nm excitation line. G_0/G_1, S and G_2/M population can be measured using fluorescence and contrasted against cell volume.



Region	Diameter	MCV	Count	Pct	FLI Mean	FLI HPCV	FLI CV	Color
G_0/G_1	6.22	125.7	10,901	62.21%	191.4	2.78%	4.86%	
S	7.06	183.9	4,313	24.61%	265.3	6.07%	11.71%	
G_2/M	7.58	228.4	1,664	9.50%	351.1	4.30%	3.79%	

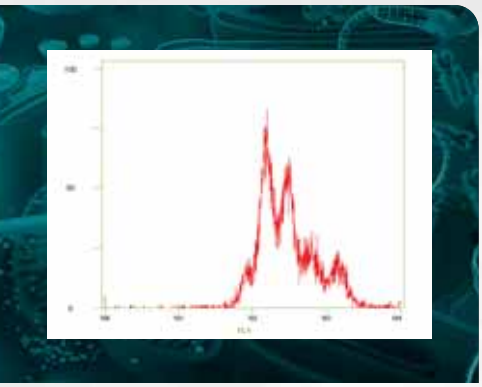
Bacterial viability and enumeration.

Count live and dead bacterial populations using a double color staining consisting of Syto9 and PI. Syto9, a cell permeable dye, binds to DNA of all the cells. PI stains only cells with damaged or compromised membrane integrity. Concentration and percentage of live and dead cells are calculated with accuracy.



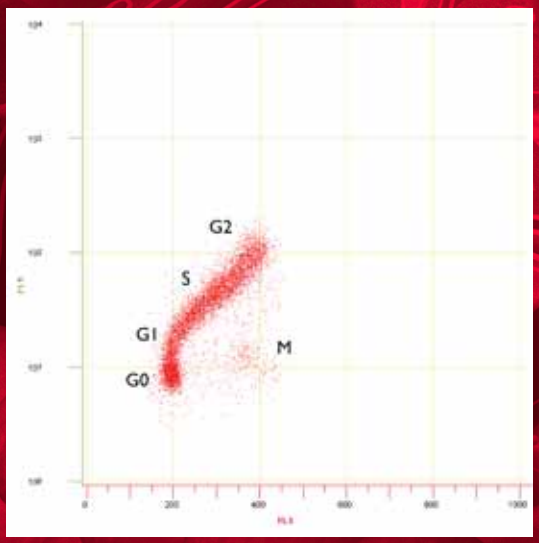
100% dead
(treated with 70% ethanol)

50% dead



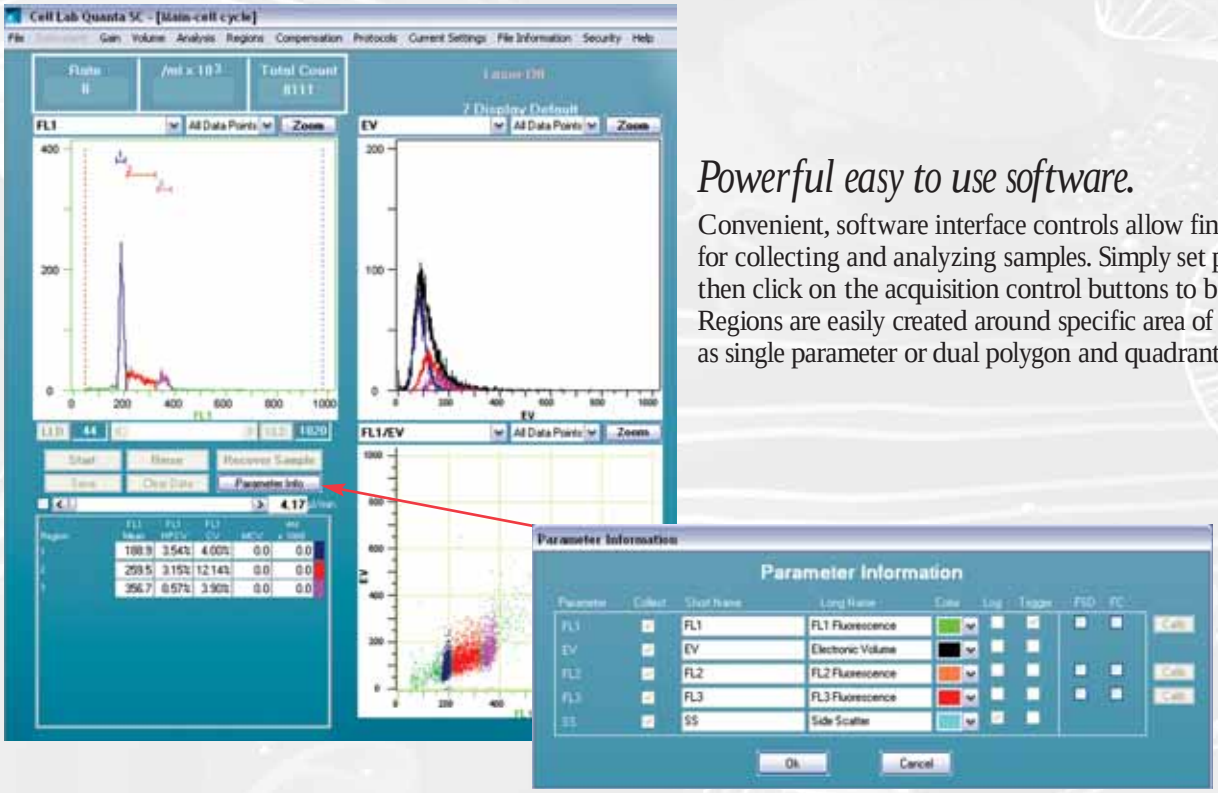
Cell proliferation.

Carbosyfluorescein diacetate succinimidyl ester (CFSE) is a cell permeable dye that enters cells, covalently binds to intracellular amines and yields fluorescence after cleaved by intracellular esterases. Once the cell divides the dye remains in the two daughter cells at a lower concentration. A cell stained with CFSE can be kept in culture for several days. Each fluorescence peak represents another round of cell division. The area of each peak is the number of cells in that particular cycle.



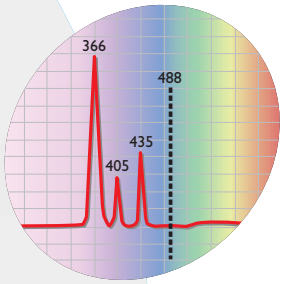
Two color cell cycle.

Cyclin A2-FITC and 7-AAD can be used together to further interrogate the various G1, S, G2 and M phases of the cell cycle. Cyclin A2 is expressed at very low level in G_0 and G_1 cells. Its expression gradually increases as cells enter the S phase. Maximal expression of cyclin A2 is found in G2 cells. Measurement of cyclin A2 expression can be used to distinguish mitotic cells (cyclin A2 negative) from G_2 cells (cyclin A2 positive).



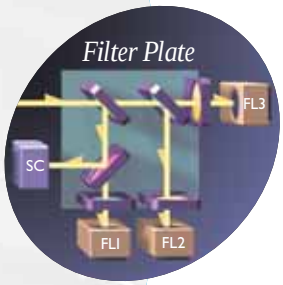
Powerful easy to use software.

Convenient, software interface controls allow fingertip access for collecting and analyzing samples. Simply set parameters then click on the acquisition control buttons to begin collection. Regions are easily created around specific area of data interest such as single parameter or dual polygon and quadrant parameters.



Multicolor excitation for application flexibility.

Multiple excitation wavelengths (nm), including UV from a Mercury (Hg) arc lamp and laser, provide flexible fluorochrome selection enabling applications typically only possible through expensive complicated systems. The Quanta SC system is optimized for excitation at 366, 405, 435, and 488 nm.



Interchangeable filters for optimum performance.

3 high sensitivity PMT detectors suitable for fluorescence measurements from the violet to the far red. Easily accessible and interchangeable emission and dichroic filters allow for measurement of a wide variety of dyes such as DAPI, Hoechst, FTIC, PI, 7-AAD, LDS751, PE, PC5 and PC7 as well as fluorescence proteins such as CFP, GFP, and YFP.

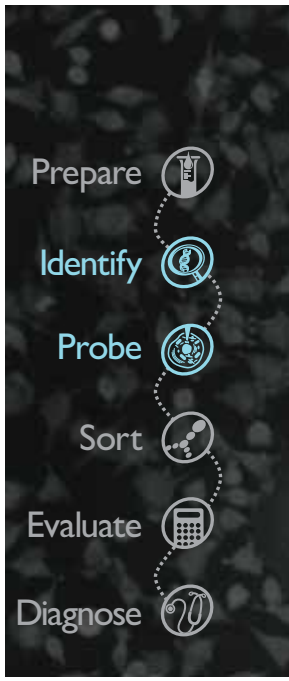
Automated compensation.

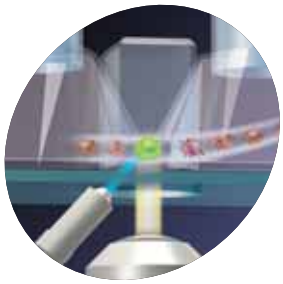
The Quanta SC comes equipped with easy to use software-assisted automated compensation to accurately separate overlapping fluorochrome emissions. Compensation can be performed for 3 fluorescence detection channels. Display is visualized using the hyperlog function allowing for improved functionality.

Advanced digital signaling processing.

The latest in advanced DSP technology is incorporated allowing all parameters including electronic volume, side scatter, sample concentration and 3-fluorescence to be collected simultaneously.

The Cell Lab Quanta SC is an important part of a comprehensive set of interrelated solutions specifically designed to accelerate Systems Biology research. By encompassing virtually every step of the process, our flexible and highly efficient systems function as an extension of your thinking, helping you make important research decisions faster and with more confidence than ever before.



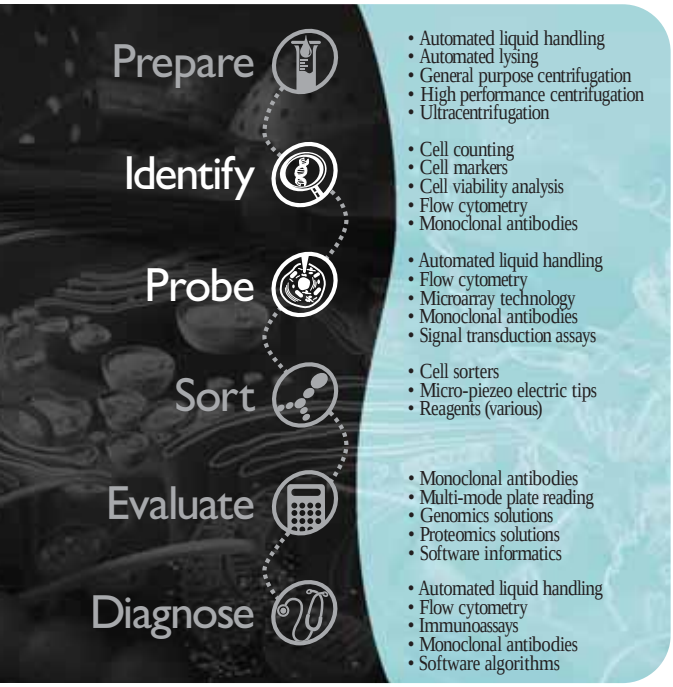


Innovative flow cell design.

The system utilizes a unique triangular flow cell for superior hydrodynamic focusing and stable fluorescence measurements.

World-class support, online, on-site or on the phone.

Across the globe, a network of technical experts is available to help with all your system support needs. Wherever you are, our world-class customer service and support is dedicated to making sure your Beckman Coulter flow cytometer functions at peak efficiency throughout its lifetime.



Ordering Information

Cell Lab Quanta™ SC Flow Cytometry System
System includes Quanta Flow Cytometer with 125 µm flow cell, computer, software, monitor, and cables

Part No.	
771917	*Cell Lab Quanta SC with 488 nm Laser & Arc Lamp*
629966	*Isodiluent, 20 L*
629967	*Isodiluent, 10 L*
6605359	*Flow-Check™ fluorospheres*
629968	*Shutdown Solution, 5 L*
629969	*Cleaning Solution Kit, 4 x 50 mL*
629972	*DNA Reference Calibrator*
731085	*Nuclear Isolation and Stain NIM-DAPI, 250 mL*
731086	*Nuclear Isolation Media (NIM), 50 mL*
731087	*30 micron filter tips, 100 tips*
383721	*Vi-Cell Sample Cups, 4 x 120*
373661	*Tube, Rack, holds 24 Vi-Cell Cups*
6607055	*DNA Prep Kit, Cell Cycle analysis (Propidium Iodide)*
IM3422	*7-AAD Viability dye*
IM3614	*Annexin V-FITC/7-AAD Kit*
IM2375	*Annexin V-FITC Kit (includes PI)*

Specifications

Absolute Count Performance*
Accuracy: ±5%
Reproducibility (CV): <5%
Concentration: 3×10^4 to 2×10^6 particles per mL
**These specifications were validated with an internal 10 µm bead that had an assigned count value. Your results may vary depending on your application and/or sample type.*

Fluorescence Performance Specifications
Data acquired using Digital Signal processing and displayed on user selectable linear or 4 decade logarithmic scales.
Resolution: Fluorescence HPCV of <2.5% for TRBC Calibration Standard stained with DAPI and utilizing the mercury arc lamp. Fluorescence HPCV* <3.0% for Flow-Check™ Fluorospheres utilizing the 488 nm diode laser*
**Half Peak Coefficient of Variation.*

Sizing Performance
Electronic impedance with a measurement range of 3 to 40 microns diameter with the standard 125 µm flow cell.

Optics Performance

Excitation	*Mercury arc excitation optimized at 366, 405, and 435 nm* *488 nm laser diode excitation, 2-22 mW user adjustable*
Fluorescence Detectors	*3 broad range ultra sensitive photomultiplier tubes*
Optical Alignment	*Computer assisted and controlled*
Optical Coupling	*1.25 NA oil immersion objective*
Emission Filters	*Standard Set 460 BP, 525 BP, 575 BP and 670 LP*
Parameters	*Electronic Volume, side scatter, time, and 3 color detection with log/linear and FC/FSD options*
Software	*Cell Lab Quanta SC Software for Instrument Control, Data Acquisition and Data Analysis*
Fluidics Specifications	*Flow Cell Patented 125 µm triangular flow cell (standard)*
Sample Rate	*4.17 µL to 100 µL per minute for 125 µm flow cell*
Delivery System	*Vacuum pump/motorized syringe pump*
Minimum Sample Size	*150 µL*
Maximum Sample Size	*2 mL*

Installation Requirements

Power	*100 V, 120 V, or 220 V, 50/60 Hz*
Wattage Consumed	*500 watts (total system)*
Operating Temperature	*60° F to 84° F (16° C to 29° C)*
Physical Dimensions	*22 W x 28D x 18 H (in) 56W x 71D x 45H (cm)*
Instrument Weight	*77 lbs (34.9 kg)*

The Cell Lab Quanta SC – and all our Cell Lab offerings – are an important part of a broad continuum of Beckman Coulter products, including automated liquid handling, capillary electrophoresis, centrifugation, ultracentrifugation, DNA sequencing, electrochemistry, flow cytometry, fragment analysis, HPLC, integrated core systems, microarrays, particle characterization, scintillation counting, and spectrophotometry.

For information on our comprehensive line of systems, please contact your local Beckman Coulter representative or visit our web site at
www.beckmancoulter.com/cell-lab

All trademarks are the property of their respective owners.
Covered under patents.

BECKMAN COULTER®

Developing innovative solutions in Systems Biology.

Innovate SIMPLIFY Automate

Africa/Middle East/Eastern Europe: Switzerland, Nyon (41) 22 994 0707. **Australia, Gladesville** (61) 2 9844 6000. **Brazil** (011) 5511) 4154-5815 **Sao Paulo;** (011) (5521) 2445-2358 **Rio de Janeiro. Canada, Mississauga** (1) 905 819 1234. **China, Beijing** (86) 10 6515 6028. **France, Villepinte** (33) 1 49 90 90 00. **Germany, Krefeld** (49) 2151 33 35. **Hong Kong** (852) 2814 7431, 2814 0481. **Italy, Milan** (39) 02 953921. **Japan, Tokyo** (81) 3 5404 8424. **Latin America** (1) (305) 380 4709. **Mexico, Mexico City** (011) (5255) 5605-7770. **Netherlands, Mijdrecht** (31) 297 230630. **Puerto Rico** (1) 787-747-3335 **Singapore** (65) 6339 3633. **South Africa, Johannesburg** (27) 11 805 2014. **Sweden, Bromma** (46) 8 564 85 900. **Switzerland, Nyon** 0800 850 810. **Taiwan, Taipei** (886) 2 2378 3456. **Turkey, Istanbul** (90) 216 309 1900. **UK, High Wycombe** (44) 01494 441181. **USA, Miami, FL** (1) 800 526 3821, Option 7.

©2006 Beckman Coulter, Inc.
Printed in U.S.A. on recycled paper.