

Cellometer[®] Spectrum

Image Cytometry System
for 20 µl Cell-Based Assays

Cell Cycle
Apoptosis
Cell Mediated Cytotoxicity
Cell Counting and Viability
Interchangeable Fluorescent Modules



Advantages of Cellometer Image Cytometry

✓ Cell Imaging

- Visually check cell morphology
- Ensure only cells of interest are counted
- Archive and re-analyze cell images
- Export images for publication
- Cell health and cell-based assays are easily run in seconds

✓ Non-Fluidic Platform

- Disposable counting chambers - no washing
- Compatible with fragile cells
- Maintenance-free
- Robust optics modules and LED light sources

✓ Proprietary Pattern-Recognition Software

- Count individual cells in clusters
- Count irregular-shaped cells
- Count cells based on size
- Eliminate debris from cell counts

✓ IQ/OQ Validation and GMP/GLP Accessories

- Installation Qualification reagents/protocol
- Operational Qualification reagents/protocol
- On-site IQ or OQ Performance
- GMP/GLP Software Module

Cell Types for Many Research Areas

Optimized for primary cell analysis

PBMCs	Epithelial Cells
Stem Cells	Keratinocytes
Adipocytes	Lymphocytes
Neural Cells	Splenocytes
Hepatocytes	Monocytes
Dendritic Cells	

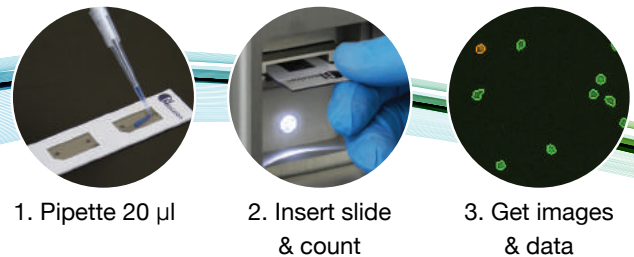
- **Clinical Immunology:** PBMCs
- **Diabetes / Obesity:** Adipocytes
- **Immunotherapy:** Leukocytes
- **Microbiology:** Yeast (Spectrum 10x)
- **Oncology:** Cell Lines
- **Regenerative Medicine:** Stem Cells
- **Toxicology:** Hepatocytes
- **Transplantation:** Nucleated Cells
- **Vaccine Development:** Splenocytes

Features of the Spectrum™ Image Cytometry System

- ✓ **Compact, Easy-to-Use System**
Basic cell counting, primary cell viability, and cell-based assays.
- ✓ **Dual-Fluorescence for Accurate Primary Cell Viability**
No interference from red blood cells. Analyze bone marrow, peripheral blood, and cord blood without lysing.
- ✓ **User Changeable Fluorescence Filters**
Choose from six color options to run two color assays
- ✓ **Unique Algorithms for Advanced Cell Analysis**
Determine concentration and viability of hepatocytes, adipocytes, and other sophisticated cell types.
- ✓ **Fast Results**
Obtain cell images, counts, size measurements and viability calculations in < 30 seconds per sample.

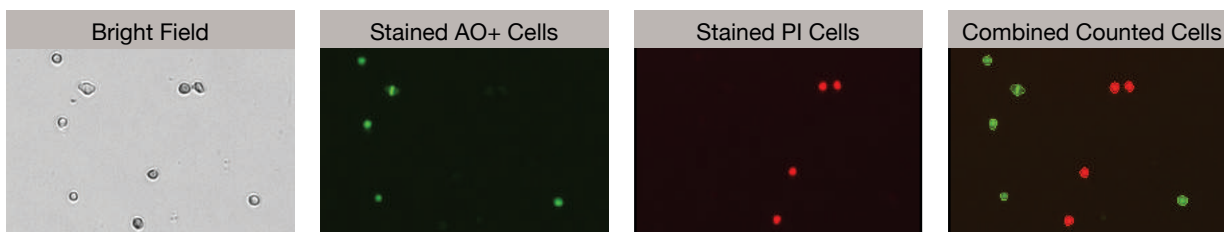
Simple 20 µl Cell-Based Assays

- Cell count, concentration and viability
- Two color antibody assays
- GFP/RFP Transfection
- Cell health and cell-based assays, including:
 - Apoptosis
 - Cell Proliferation
 - Cell Cycle
 - Mitochondrial Potential
 - Phagocytosis
 - Surface Marker Analysis

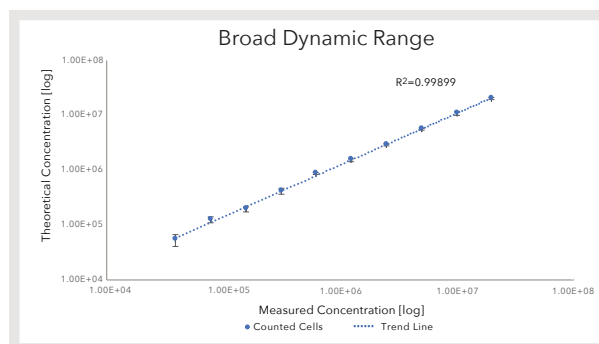
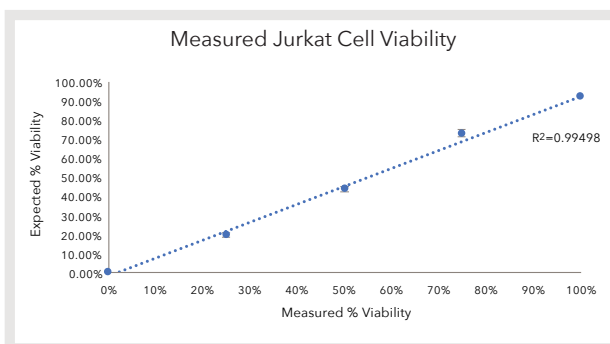


Accurate Cell Counting, Concentration and Viability

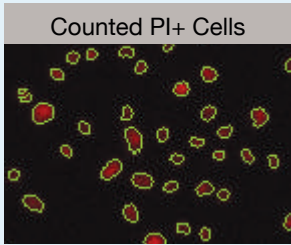
- Determine cell viability, for cell lines or primary samples, using AO/PI in seconds
- Accurately measure cell samples with varying viability (0 - 100%)
- Image and count up to 2×10^7 cells/mL



Accurately count Live (AO) versus Dead (PI) cells.

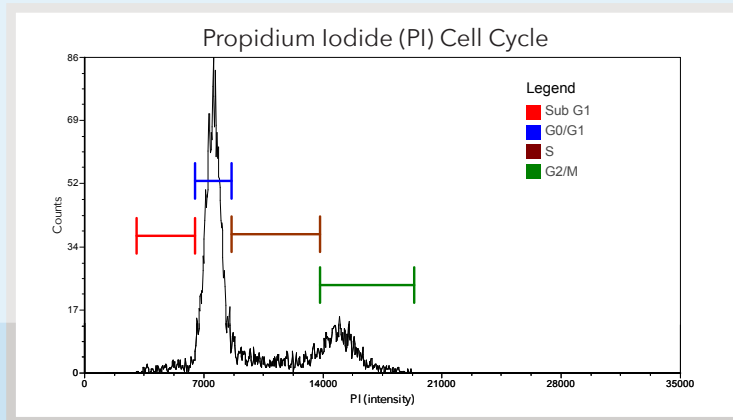


Versatile Platform Performs Cell-based Assays



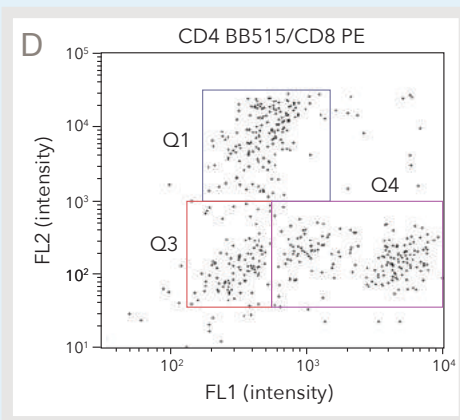
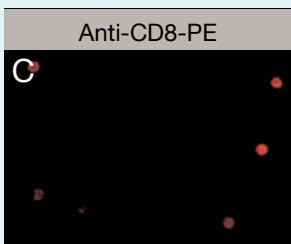
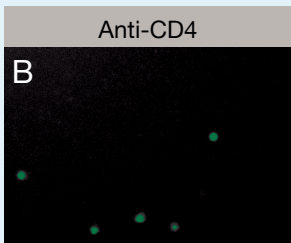
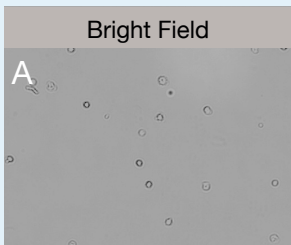
Cell Population	% of Gated Cells	Concentration (10 ⁶ cells/mL)
Total	100	3.18
Sub G1	3.8	0.12
G0/G1	61.9	1.97
S	15.3	0.49
G2/M	19	0.60

- Perform low-volume (20 µl), cell-based assays
- Export image data into flow cytometry software: FCS Express™*
- Simple work flow: No fluid-stream, No PMT voltages, No forward/side scatter
- Easily perform data analysis using pre-designed templates
- Quickly plot cell population data as a: histogram, scatter, dot or contour plot
- Antibody-based immunofluorescence ICC



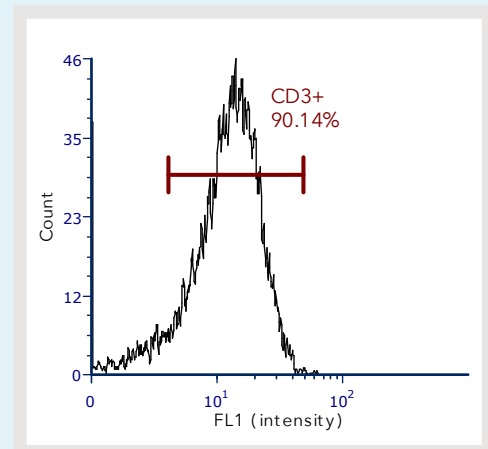
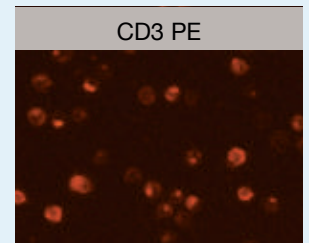
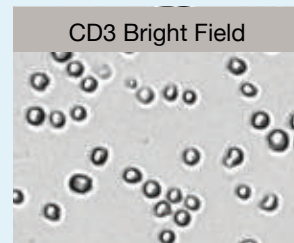
* FCS Express™ Flow Cytometry software is a product of De Novo Software™ and is included with the Cellometer Spectrum™

Surface Marker Analysis



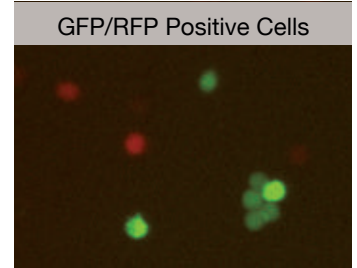
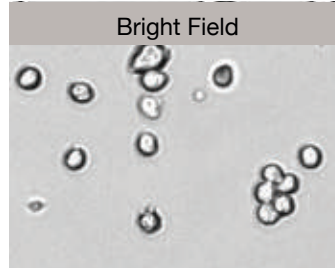
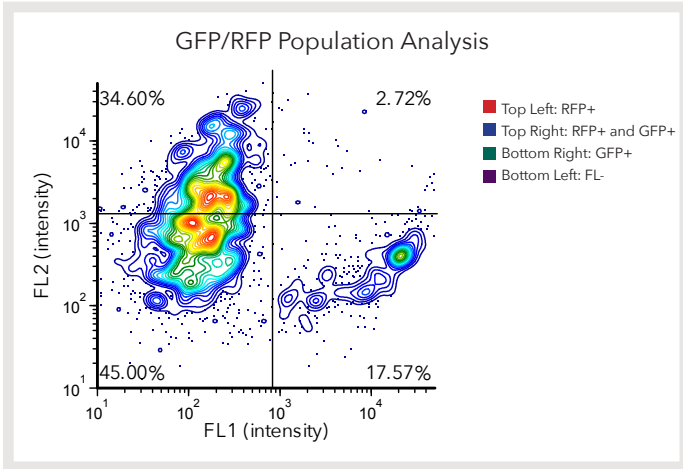
	% Total
Q1: CD8 + (PE)	34.04
Q3: CD4/CD8 -	20.51
Q4: CD4 + (Green)	37.42

A bright field image (A) of human PBMCs as well as those stained with human anti-CD4-BB515 (B) and anti-CD8-PE antibodies (C) were imaged on the Spectrum. Population analysis was performed using FCS Express™ to determine the percentage of CD4 and CD8 positive cells as well as the percentage of cells that were double-negative (D).



Histogram of PE CD3+ Jurkat cells

GFP/RFP Population Analysis



Contour map of Jurkat cells, showing GFP+ and RFP+ intensity profiles.

User-Changeable Fluorescence Optics Modules*

The Spectrum is designed to hold two user-changeable fluorescence optics modules. Purchase only the modules you need and easily configure the instrument by quickly changing the colors to fit your experimental design.

Optics Module	Fluorophores	Nucleic Acid Stains	Fluorescent Proteins and other Fluorescent Cell Reagents
S1-452-365 Ex: 370 nm (BW: 36 nm) Em: 452 nm (BW: 45 nm)	BV421 V450 Pacific Blue	Hoechst 33342 DAPI ViaStain™ Dead Cell Nuclear Blue	Calcein AM Violet CTV (CellTrace Violet) Tracer Blue BFP
S1-534-470 Ex: 470 nm (BW: 42 nm) Em: 534 nm (BW: 42 nm)	FITC AlexaFluor® 488	AO (acridine orange) SYTO®9, SYTO®13 SYTOX®Green SYTO®BC	GFP YFP Calcein AM CFSE JC-1
S1-594-470 Ex: 475 nm (BW: 42 nm) Em: 594 nm (LP – Long Pass)			Chlorophyll A Chlorophyll B
S1-605-527 Ex: 525 nm (BW: 45 nm) Em: 605 nm (BW: 64 nm)	AlexaFluor® 546 AlexaFluor® 555 Cy3® PE (R-phycoerythrin)	PI (propidium iodide) EB (ethidium bromide) SYTOX® Orange	RFP mCherry TdTomato TurboRed TMRE/TMRM JC-1
S1-655-527 Ex: 525 nm (BW: 45 nm) Em: 655 nm (BW: 40 nm)		PI (propidium iodide) EB (ethidium bromide) 7-AAD	Nile Red
S1-692-620 Ex: 628 nm (BW: 40 nm) Em: 692 nm (BW: 40 nm)	AlexaFluor® 647 APC (allophycocyanin) Cy5®	SYTOX® Red	iRFP670 CellTrace Far Red Cell Tracker Deep Red LysoTracker Deep Red

*This table is a partial list of compatible fluorophores, nucleic acid stains, and fluorescent proteins. Please contact Nexcelom technical support regarding compatibility of other reagents.

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Which Instrument is Right for Me?						
Features/Specifications	Single-sample Fluorescent Cell Counters			High-throughput Cell Counter	High-throughput Image Cytometers	
	Auto 2000	K2	Spectrum	Cellaca MX FL2	Celigo 4 Channel	Celigo 5 Channel
Channels	Brightfield, Green, Red	Brightfield, Green, Red	Brightfield + Fluorescence (modular)	Brightfield, Green, Red	Brightfield, Blue, Green, Red	Brightfield, Blue, Green, Red, Far-Red
Number of Channels	3	3	3	3	4	5
Optics	4x objective	4x objective	5x or 10x objective	1.27 um/pixel resolution	1um/pixel resolution	1um/pixel resolution
Fluorescence upgradeable	No	No	No	Yes	Yes	N/A
Excitation LED	470, 540 nm	470, 540 nm	475, 525, 525, 628, 370, 475 nm*	470, 527 nm	377, 483, 531 nm	377, 483, 531, 628 nm
Emission Filters	535, 605 nm	535, 660 nm	534, 605, 655, 692, 452, 594 nm*	534, 655 nm	470, 536, 629 nm	470, 536, 629, 688 nm
IQ/OQ Option	Yes	Yes	Yes	Yes	Yes	Yes
GLP/GMP Audit Control Option	No	Yes	Yes	No	No	No
Auto-export to Excel	No	Yes	Yes	Yes	Yes	Yes
FCS Express Software for flow-like data reporting for cell-based assays	No	Yes	Yes	No	Yes	Yes
Commonly used Compatible Dyes	Trypan Blue, AO/PI, Calcein AM, CMFDA, AO, PI	Trypan Blue, AO/PI, 7AAD, AO, PI, Calcein AM, CMFDA, Calcein AM/PI	Trypan Blue, AO, AO/PI, CMFDA, CFSE, Calcein AM, AO/EB GFP, FITC, PI, EB, PE (R-phycoerythrin), 7-AAD	Trypan Blue, AO/PI	FITC, Calcein, Calcein AM, Calcein AM Violet, GFP, AlexaFluor 488, R-PE, PI, Texas Red, AlexaFluor 568	Hoechst, DAPI, FITC, Calcein, Calcein AM, Calcein AM Violet, GFP, AlexaFluor 488, R-PE, PI, Texas Red, AlexaFluor 568, DRAQ5, AlexaFluor 647
Counting Speed	30 seconds	< 60 seconds	30 seconds/sample	2.5 minutes for 24 fluorescent samples	< 2 minutes per 384-well plates	< 2 minutes per 384-well plates
Sample Volume (per well)	20 µL sample volume	20 µL sample volume	20 µL sample volume	25 µL - 100 µL	80 µl - 200 µl	80 µl - 200 µl
Total Volume (per well)	N/A	N/A	N/A	50 µL - 200 µL	Depends on plate type	Depends on plate type
Size/Diameter Range	5 - 300* µm	5 - 300* µm	5-300* µm (5x) 0.5-25µm (10x)	5 - 80 µm	6- to 1536-well plates, T-25 and T-75 flasks	6- to 1536-well plates, T-25 and T-75 flasks
Concentration Range	10 ⁵ - 10 ⁷ cells/ml	10 ⁵ - 10 ⁷ cells/ml	5x - 10 ⁵ - 10 ⁷ cells/mL 10x - up to 2x10 ⁷ cells/mL	10 ⁵ - 10 ⁷ cells/mL	Depends on plate type	Depends on plate type
Integrated Touchscreen	Yes	No	No	No	No	No
Focus	Manual	Manual	Manual	Automated or Manual	Automated or Manual	Automated or Manual
Computer included	No	Laptop Optional	Laptop Included	Laptop Included	Desktop Included	Desktop Included
Robotic Compatible	No	No	No	Yes	Yes	Yes
Dimensions	11.1 in x 12.8 in x 13.4 in (28.3cm x 32.4 cm x 34.0 cm)	6 in x 8.5 in x 14 in (15.2 cm x 21.6 cm x 35.6 cm)	6 in x 8.5 in x 14 in (15.2 cm x 21.6 cm x 35.6 cm)	13 in x 13 in x 16 in (33 cm x 33 cm x 41 cm)	20 in x 25 in x 20 in	21 in x 25 in x 20 in
Weight	26 lbs. (11.8 kg)	23 lbs. (10.4 kg)	24 lbs. (10.9 kg)	42 lbs (19 kg)	117 lbs. (53 kg)	117 lbs. (53 kg)
Cell / Sample Type						
Cell Line	X	X	X	X	X	X
Cultured Primary Cells	X	X	X	X	X	X
Low Concentration Cell Lines	X	X	X	X	X	X
Yeast			X			
Primary Cells	X	X	X	X	X	X
PBMCs, Splenocytes, Stem Cells	X	X	X	X	X	X
Hepatocytes		X	X	X	X	X
Adipocytes**	X	X	X		X	X
Apoptosis		X	X	X	X	X
Autophagy (Cytold-green)			X			
Cell Proliferation (CFSE)			X		X	X
Cell Cycle (PI)		X	X		X	X
GFP Transfection	X	X	X	X	X	X
RFP Transfection			X	X	X	X
Mitochondrial Potential (JC-1, JC-10)			X		X	X
Multi-drug Resistance (ABC Transporter)			X		X	X
Surface Marker Analysis			X		X	X
Vitality (Calcein-AM/PI)		X	X	X	X	X

*The Spectrum holds two user-changeable fluorescence optics modules at a time
**Cytometer CHT4-PD300 slides are required for cells greater than 80µm in diameter

Innovation and Expertise in the Science of Cell Counting

Schedule a FREE demonstration or technical seminar with a Nexcelom Applications Specialist today. Learn more nexcelom.com/spectrum



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