Countstar
Smart Cell Analysis

CastorX1

High-throughput Intelligent Cell Analyzer


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CastorX1

High-throughput Intelligent Cell Analyzer

HD IMAGING

Advanced imaging system:

- 4X High NA objective lens
- High resolution CMOS cooling camera
- Equipped with red/green dual fluorescence channel

INTELLIGENT ANALYSIS

- Automatic traceability, Intelligent recognition and identification of monoclonal cell
- Image analysis with traditional algorithm and AI unique image cytometry cell analysis

REPORTING AND COMPLIANCE

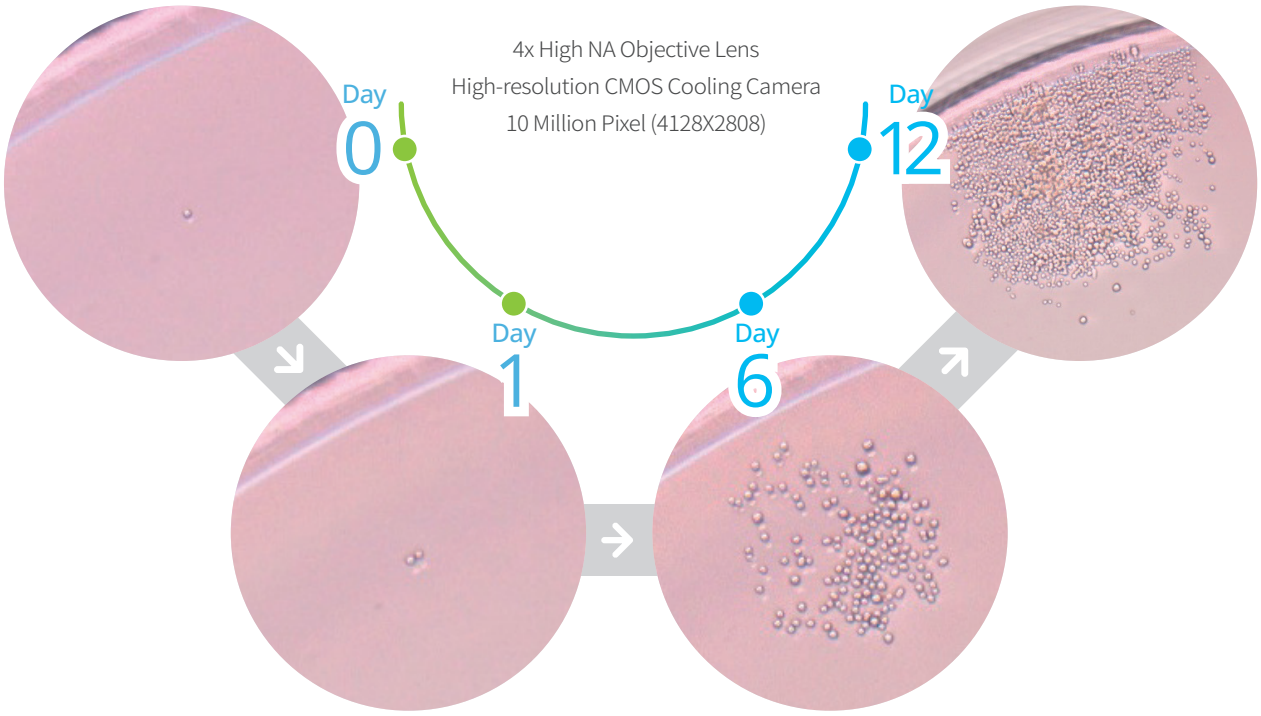
- Powerful data charting function
- Complete compliance report
- Compliant with GMP and FDA 21 CFR Part 11

BROAD APPLICATIONS

- Screening and identification of monoclonal cell
- Cell transfection analysis
- Virus titer detection
- Virus plaque test
- Convergence analysis
- High-throughput Trypan blue staining / AOPI counting
- More ...

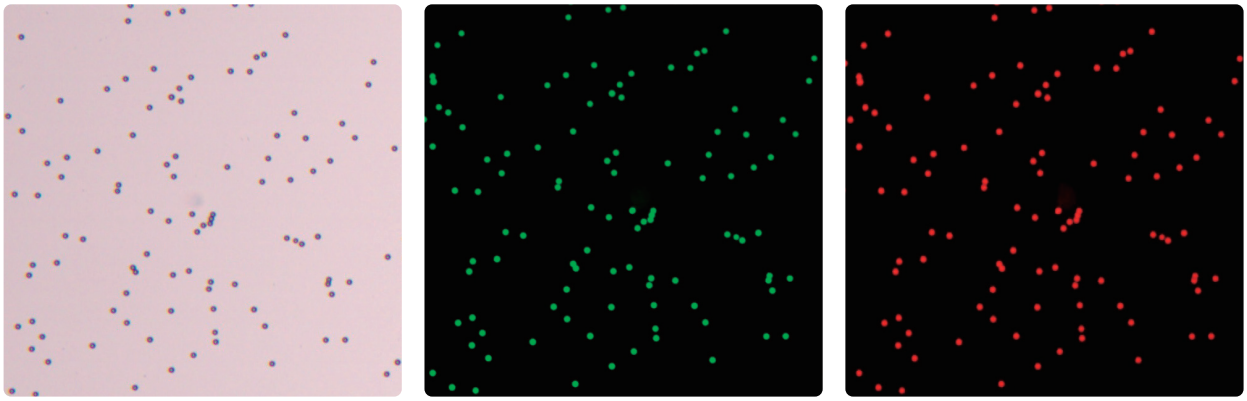
HD IMAGING

With Countstar's advanced imaging system, every cell is clearly visible.



Red/green dual fluorescence channels

Equipped with red/green dual fluorescence channels, Countstar Castor X1 facilitates many kinds of dual fluorescence assays to accomplish your research goals.

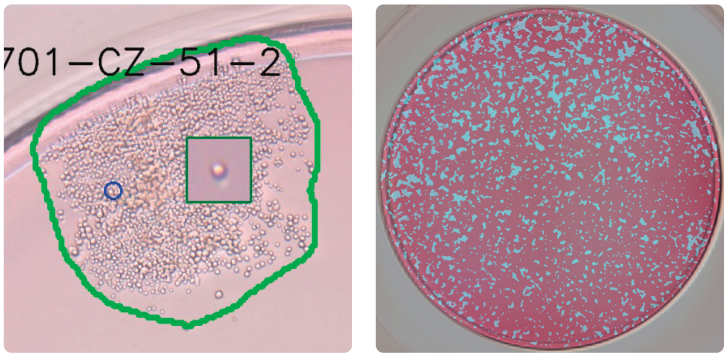


BF FL1(Green) FL2(Red)

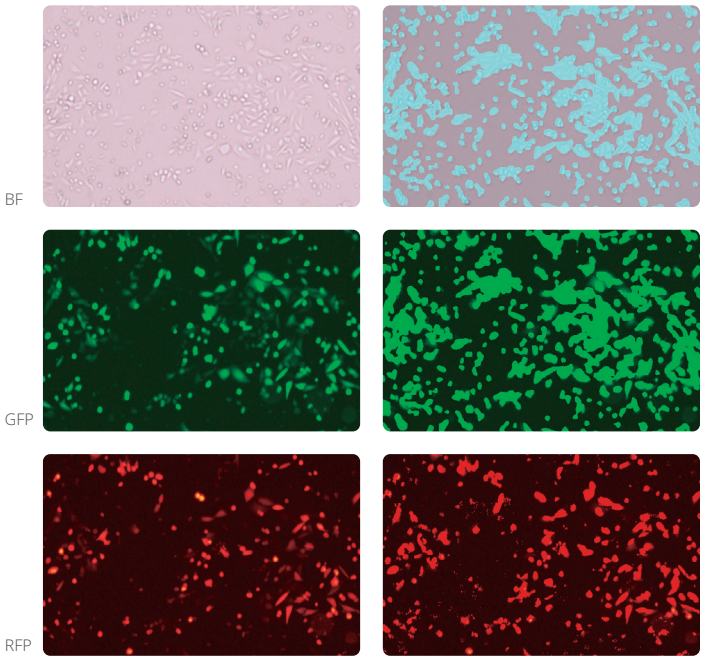
AI-POWERED IMAGE RECOGNITION AND ANALYSIS

Utilizing AI image recognition and analysis algorithms, Castor X1 is able to Intelligently process brightfield and fluorescent images with high accuracy and obtain viability data quickly among numerous samples.

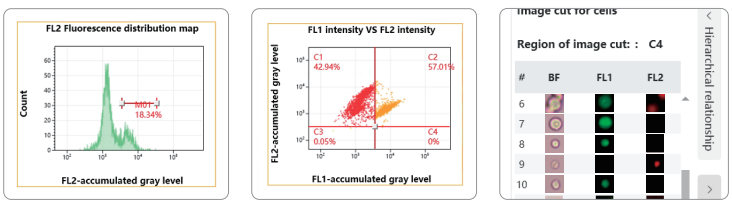
- Intelligent recognition and labeling of cell colonies
- Automatically trace back to day0 and display single cell result
- Cell convergence analysis compatible with diverse and complex clonal cell morphology



- Accurate recognition and detection of fluorescence cells to achieve accurate counting



Detailed results and images can be viewed with cytometry cell analysis function.

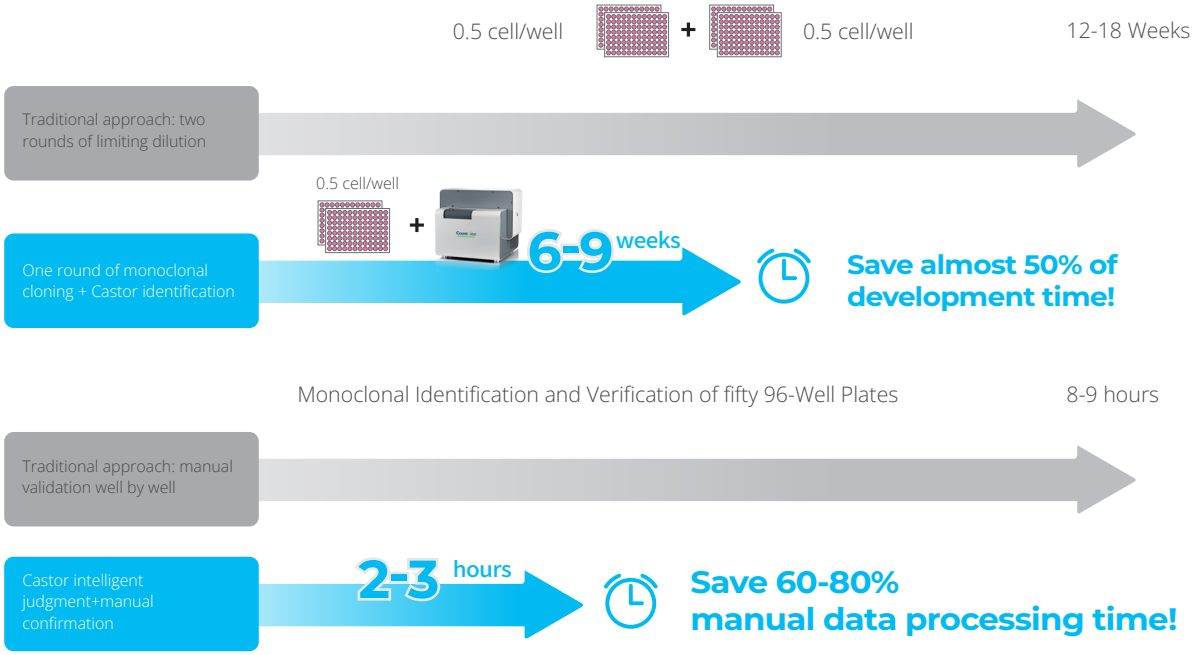


INTELLIGENT ANALYSIS

With AI auto-learning algorithms and smart data analysis, the colony can be accurately recognized and automatically traced to aid in monoclonal cell identification.

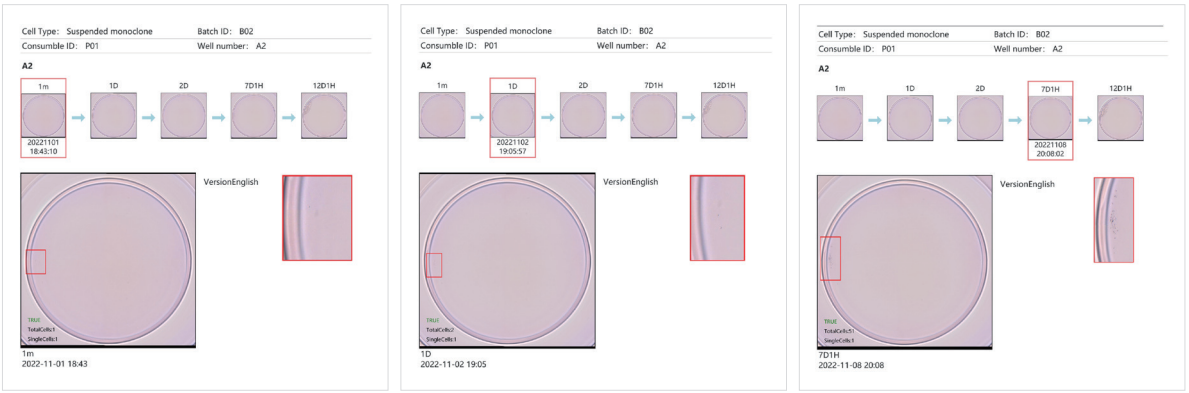
Save **65%** validation time

Castor X1 dramatically accelerates the identification and development process of monoclonal cells



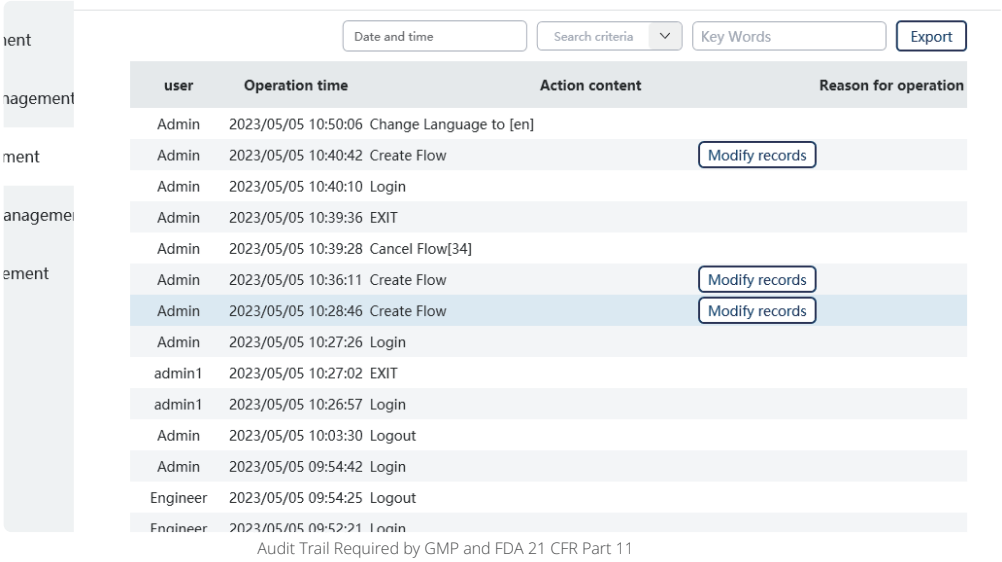
COMPLETE DATA, ACCURATE TRACEABILITY, REAL-TIME RECORD

Castor X1 high-throughput intelligent cell analyzer database provides the ability to generate Monoclonal Cell Report and Chain of Evidence with complete data including data and images of the cell's life cycle from day 0 to day X.



GMP and FDA 21 CFR Part 11 audit trail requirements

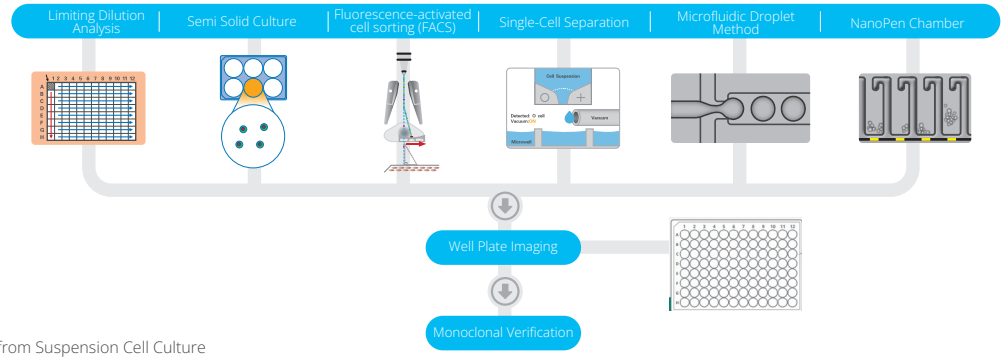
Countstar Castor X1's operating software system contains a GMP management module that conforms with FDA 21 CFR Part 11. In order to adapt needs of modern biopharmaceutics industry, Countstar has accumulated years of experience in instrument validation since its founding in 2009. Countstar manufactures several kinds of products which can be used in the GMP production environment. Alongside a series of consumables and tools, we are able to provide customizable plans to satisfy all requirements from instrument design to performance validation during the instrument validation process.



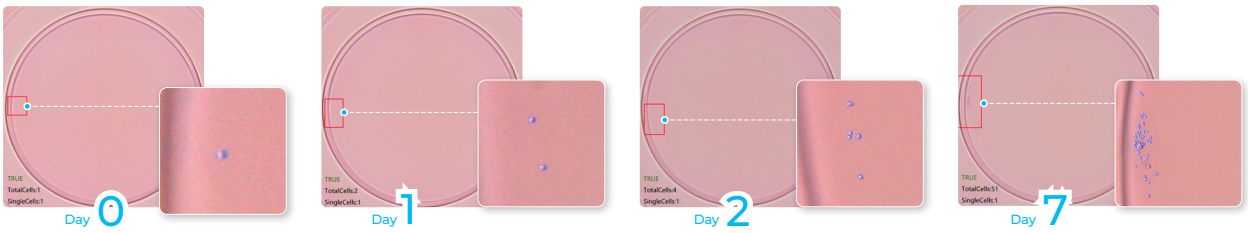
Audit Trail Required by GMP and FDA 21 CFR Part 11

IDENTIFICATION OF SINGLE MONOCLONAL CELL

Castor X1 can automatically trace and identify a monoclonal colony based on the sample's image time.



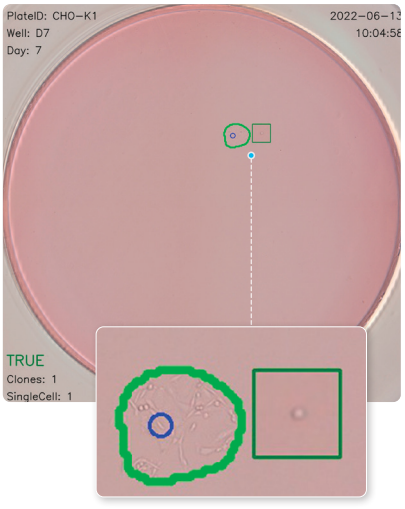
CHO Monoclone from Suspension Cell Culture



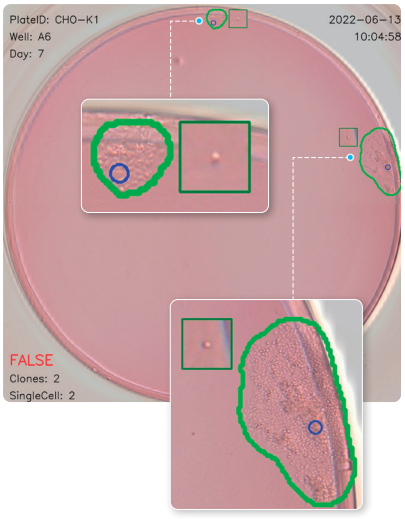
AI-POWERED HIGH EFFICIENCY TRACEABILITY IDENTIFICATION OF MONOCLONAL CELL

Castor X1 High-throughput Intelligent Cell Analyzer can automatically trace and detect monoclonal colonies. When the colony grows and forms visible colony units over a period of 5 days, AI-powered algorithms are able to count the number of colonies automatically. It traces back to day0 and identifies the number of single cells in the area. Based on colony size and cell data from day 0, the Castor X1 is able to label the monoclonal cells as "true" or "false" for subsequent days.

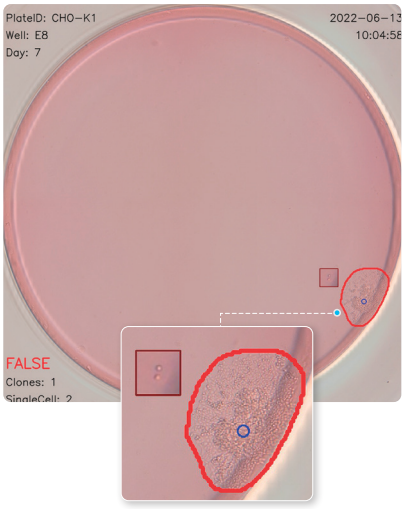
Identify monoclonal cell automatically and trace back to day0. The data is secured and the evidence is reliable as there is watermark of shooting time.



One monoclonal cell formed from a single cell is determined as "TRUE"



Two monoclonal cells formed from two cells are determined as "FALSE"



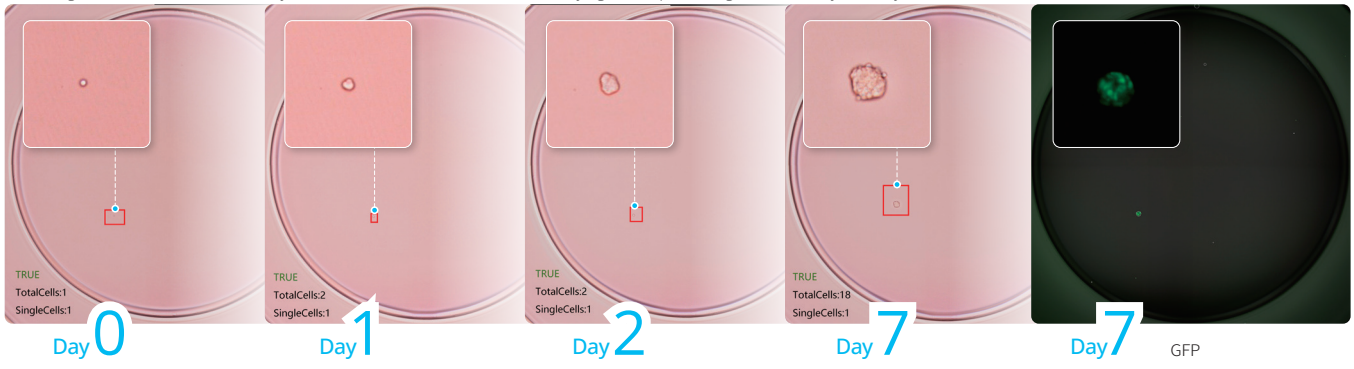
One monoclonal cell formed from two cells is determined as "FALSE"

AI recognition algorithm for suspended cells

The AI algorithm can identify and track the number of cells per well. It assists in screening based on the number of cells expanded on the set standard day and the number of cells on Day 0, while also providing support for manual review and confirmation by users. Confirmed cells are marked in green and can be quickly screened for accuracy and confluency.

Castor X1 can perform monoclonal origin identification of HEK 293 cells carrying GFP expression genes transduced by AAV virus. It can identify the wells with cells successfully transduced with GFP fluorescent proteins and originating from a single cell. This allows R&D scientists to quickly screen for qualified monoclonal cell lines to asisst in the R&D cell line construction process.

Screening of the cell 293 transduced by AAV virus and monoclonal cell lines carrying GFP expression genes from Day 0 to Day 7.

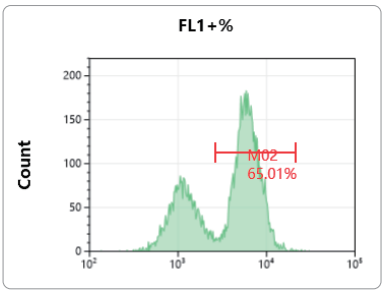


CELL TRANSFECTION

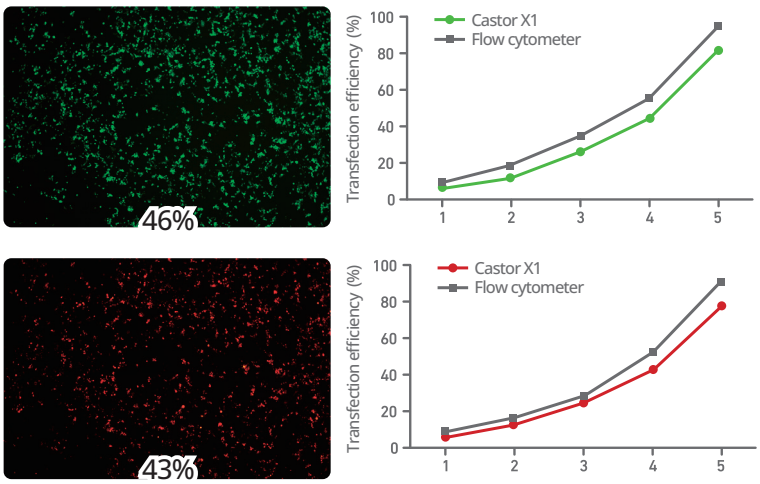
Fluorescence analysis is not only a common approach in cell biology research, but also widely used in fields of pharmaceuticals, cell and gene therapies and synthetic biology. High-throughput screening based on fluorescent images allows profiling of cell morphology with accurate and quantitative data and is essential for screening cells for antibody drug development.

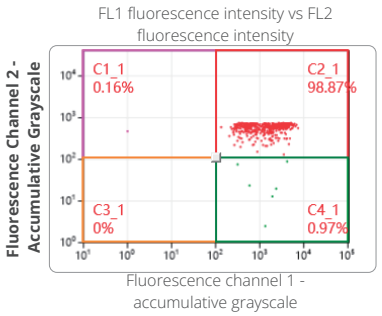
The Castor X1 provides dual advantages of cell imaging and quantitative analysis.

- DoE optimization for transfection process by transfection efficiency analysis;
- Identification and enrichment of high yield pool via fluorescence intensity;
- High throughput screening for genetic modified cells;



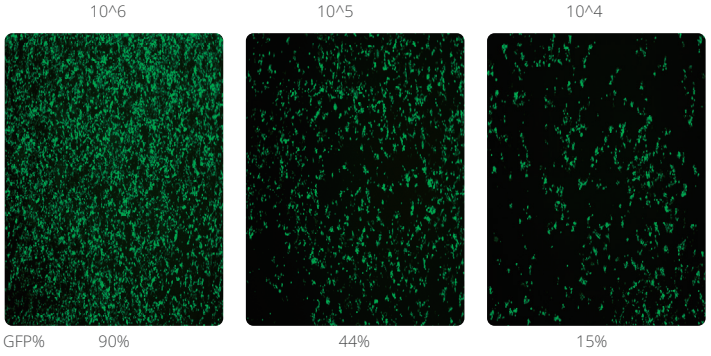
HEK293 adherent cell transient transfection test - titer

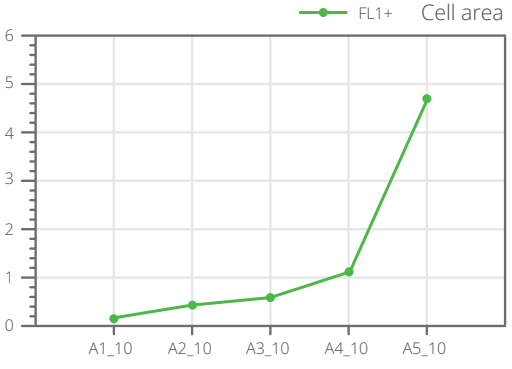




VIRUS TITER DETECTION

Serial dilution is performed to detect the expression of the target gene (or transgene). Based on the number of positive cells or positive wells, the transduction titer, measured in transduction titer(TU), will be calculated with the virus dilution.



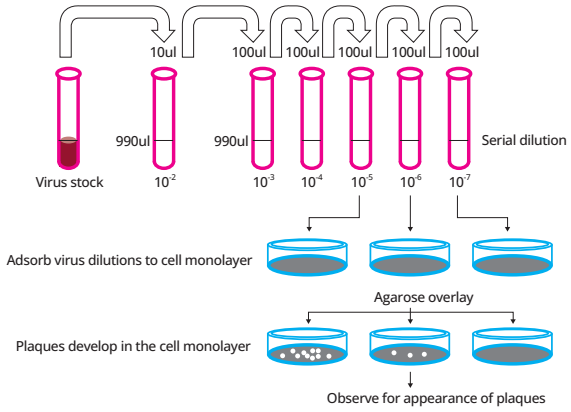


Measurement of virus plaque/blue staining titer by droplet assay

Viral plaque/phage technology is a common technique for virus titer measurement. In this method, adherent cells are cultured into a monolayer then inoculated with an appropriately diluted virus. Virus infection causes cytopathic changes of the cells, forming a lesion area in which cells shed to form plaques. A plaque can represent a living virus particle. For most animal viruses, the number of infected virus particles is proportional to the number of plaques.

Viral plaque-forming unit (PFU) can be used to calculate viral titer. The 2020 edition of the Chinese Pharmacopoeia (Volume I-III) describes in detail the determination of viral titer for yellow fever live attenuated vaccine, Japanese encephalitis live attenuated vaccine, and varicella live attenuated vaccine by the plaque method.

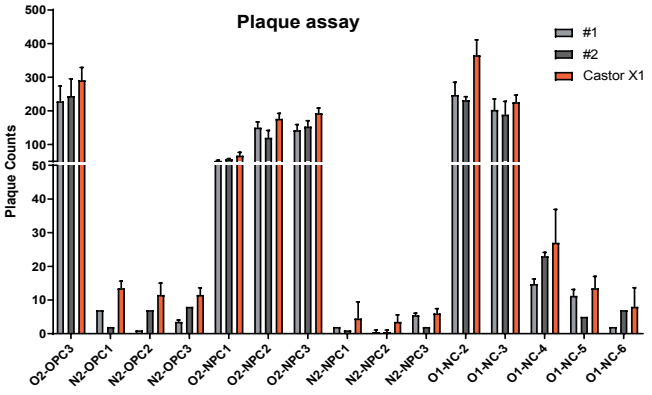
- Inoculation of Vero monolayer cells (eg. 1E6 cells in 6-well, >80% confluence)
- Prepare a 2% agarose solution
- Prepare virus gradient diluent (6 doses, 1:10 dilution, top 10-2) Infected
- Cell monolayer (1h)
- Cover the agarose (6-10 days)
- Plaque observation count (unit number of plaque PFU/ml)

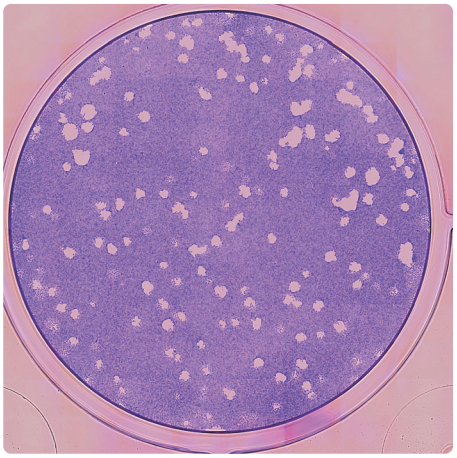


Viral plaque detection

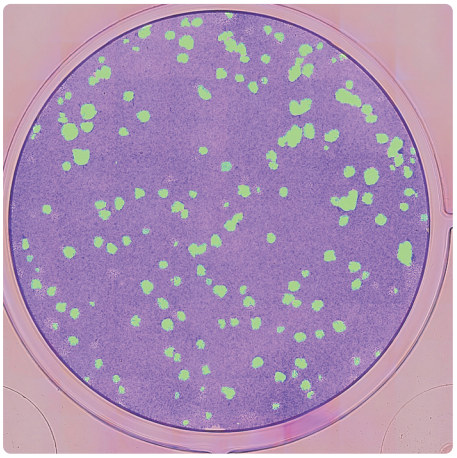
The size and shape of the cell growth surface is a crucial factor in plaque experiments. Each well in the 6-well plate has a diameter of roughly 35mm, enabling the identification of over 200 distinct plaques. However, manual counting can be time-consuming and error-prone.

Castor X1 can perform whole-well imaging, macro-pore splicing, and AI virus plaque algorithms simultaneously on 6 well plates to efficiently identify and analyze palque samples in minimal time.





6-well plates



Virus plaque detection

Compared to manual counting (#1 and #2 in figure above), the Castor X1 generates similar results, and exhibits better precision and accuracy for smaller areas of plaque.

Output Parameter Table

ID	Total number of plaques	Average diameter of the plaques (UM)	Average plaque area (MM2)
A2_01	171	297.10	0.06
A3_01	161	309.63	0.06
B1_01	63	306.98	0.06
B2_01	135	297.84	0.06
B3_01	184	302.81	0.06

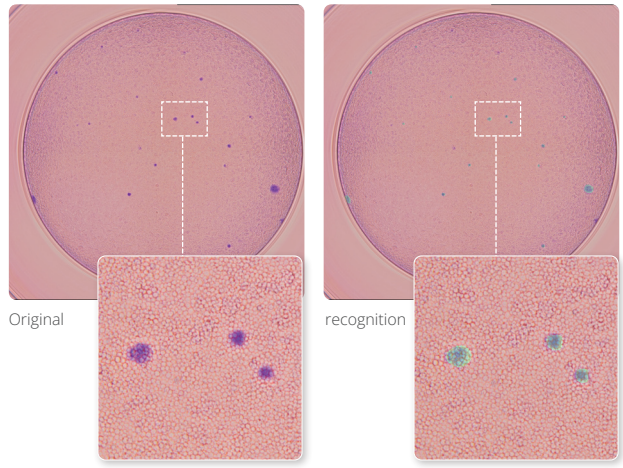
Viral immune blue staining detection

The viral titer is calculated by counting the number of lesions formed on monolayer cells after virus infection. The cells are fixed and bound to viral antigens using fluorescent or enzyme-labeled specific antibodies.

Output Parameter Table

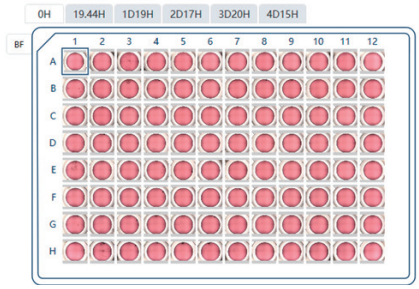
ID	Total number of blue	Average diameter of blue staining(UM)	Average blue staining area (MM2)
C04	14	61.90	0.00
C05	7	116.18	0.01
C06	19	77.24	0.00
C07	16	81.54	0.01
C08	19	67.25	0.00
C09	14	67.52	0.00
D04	3	76.62	0.00

Castor X1 AI algorithm identifies and analyzes virus immune blue staining for precise results.

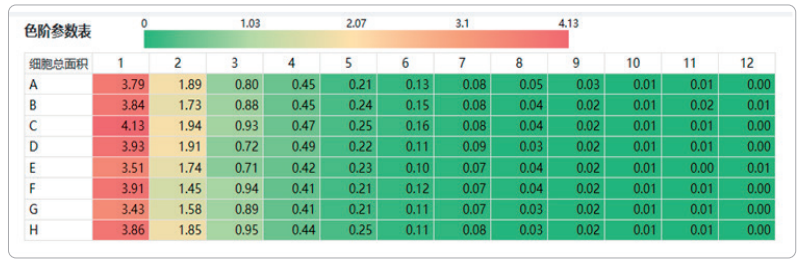


CONVERGENCE ANALYSIS

Convergence analysis can be used in the assessment of cell proliferation, migration, cytotoxicity, and cell culture quality control. It is also the foundation of cell transfection and other downstream analysis. High-throughput Cell convergence analysis using multi-wellplates can optimize cell culture conditions, correct expression levels of antibodies, and evaluate cytotoxicity.

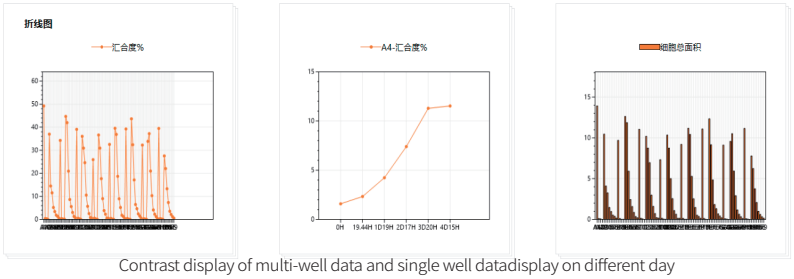


The cell growth in 96 well plate can be consistantly monitored and analyzed.



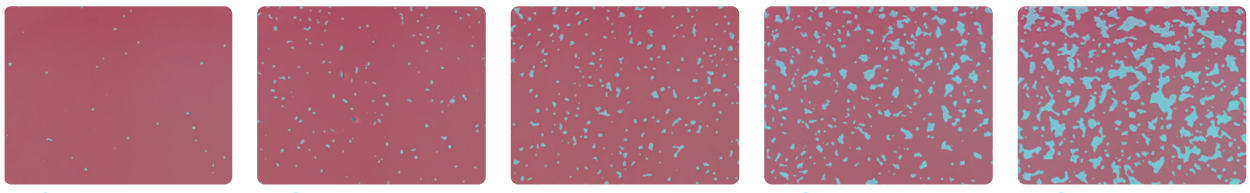
细胞总面积	1	2	3	4	5	6	7	8	9	10	11	12
A	3.79	1.89	0.80	0.45	0.21	0.13	0.08	0.05	0.03	0.01	0.01	0.00
B	3.84	1.73	0.88	0.45	0.24	0.15	0.08	0.04	0.02	0.01	0.02	0.01
C	4.13	1.94	0.93	0.47	0.25	0.16	0.08	0.04	0.02	0.01	0.01	0.00
D	3.93	1.91	0.72	0.49	0.22	0.11	0.09	0.03	0.02	0.01	0.01	0.00
E	3.51	1.74	0.71	0.42	0.23	0.10	0.07	0.04	0.02	0.01	0.00	0.01
F	3.91	1.45	0.94	0.41	0.21	0.12	0.07	0.04	0.02	0.01	0.01	0.00
G	3.43	1.58	0.89	0.41	0.21	0.11	0.07	0.03	0.02	0.01	0.01	0.00
H	3.86	1.85	0.95	0.44	0.25	0.11	0.08	0.03	0.02	0.01	0.01	0.00

The chromaticity diagram represents the distribution of whole plate.



Contrast display of multi-well data and single well datadisplay on different day

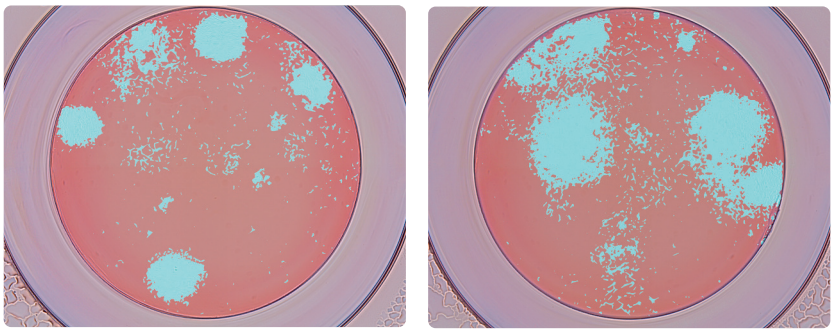
CHO K1 cell growth images of a single well on a 96-well plate



Day 0 Convergence: 1.7%
Day 2 Convergence: 4.8%
Day 4 Convergence: 10.8%
Day 6 Convergence: 26.8%
Day 8 Convergence: 51.2%

Development of cell-based meat to quickly screen seed cells

Cultivating cell-based meat requires stable and rapidly proliferating cell lines. Castor X1 is capable of conducting high-throughput analysis of cell confluence accurately while also identifying multi-cell clusters in-situ to screen for rapidly proliferating cell lines.

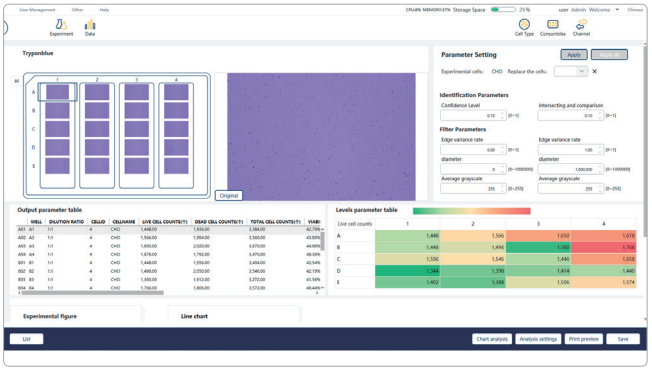


Multi-cell cluster labeling picture in Castor X1 AI recognition plate

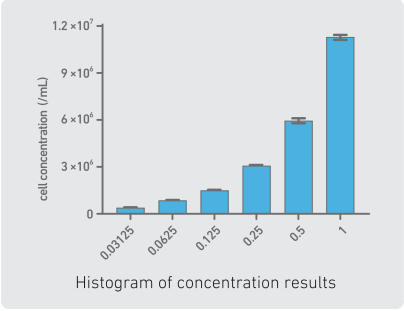
HIGH-THROUGHPUT CELL COUNT

Trypan blue staining AOPI counting

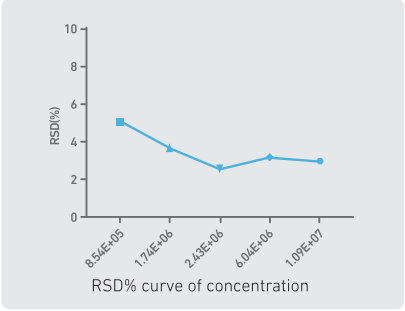
20 samples can be analyzed simultaneously in one single experiment; AI intelligent recognition algorithms ensures accuracy of results.



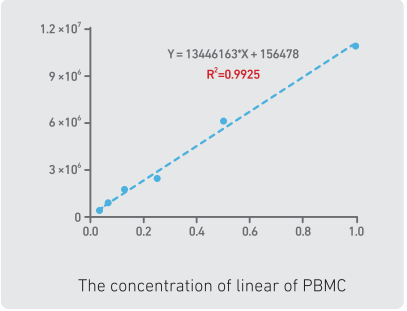
Titer linearity and repeatability test counted by PBMC Castor AOP



Histogram of concentration results

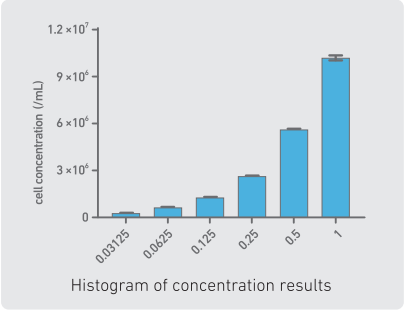


RSD% curve of concentration

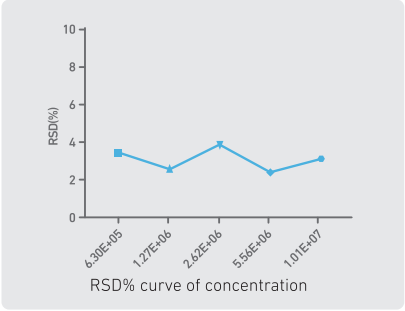


The concentration of linear of PBMC

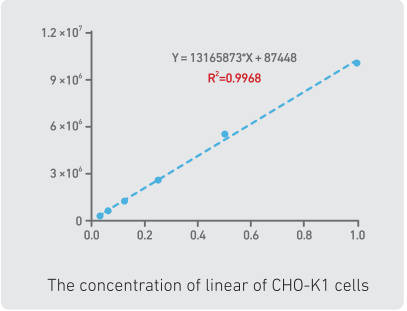
Titer linearity and repeatability test counted by trypan blue staining



Histogram of concentration results



RSD% curve of concentration



The concentration of linear of CHO-K1 cells

PRODUCT PARAMETERS

Light source	LED light source
Optical magnification	4Xobjective lens
Imaging elements	16 digit cooling CMOS camera
Focus mode	Laser auto-focusing / image auto-focusing
Souce plate type	6-384 well plate, slides, culture dish, culture flask
Carrying capacity	1plate
Fluorescence channel	EX:480/30nm EM:535/40nm EX:540/25nm EM:620/60nm
Storage capacity	256GB + 4T
Power input	AC110-240V、50/60 Hz、1.5A
Display size	23.8 inches
Computer size (W*D*H)	169mm × 300mm × 367mm
Product size (W*D*H)	555mm × 540mm × 482mm
Product weight	36.5kg

Product ordering information

Product name: Castor X1 high-throughput intelligent cell analyzer
Type: Countstar castor X1
Product No.: IN060102(USA) / IN060103(EUR)


Countstar

ALIT LifeTech Inc.

Countstar series product is for research purposes only and is not available for diagnostic operation.

Countstar
Smart Cell Analysis

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