PHCbi

Cell3iMager NX

IMAGER FOR CELLS CULTURED IN 2D/3D

High-throughput Imager for analysis cells cultured in 2D and 3D environment. Cell3iMager NX offers high-speed, high-quality image acquiring and quantitative data analysis with all-in-one software package.

Model :
Cell3iMager NX (CC-100)

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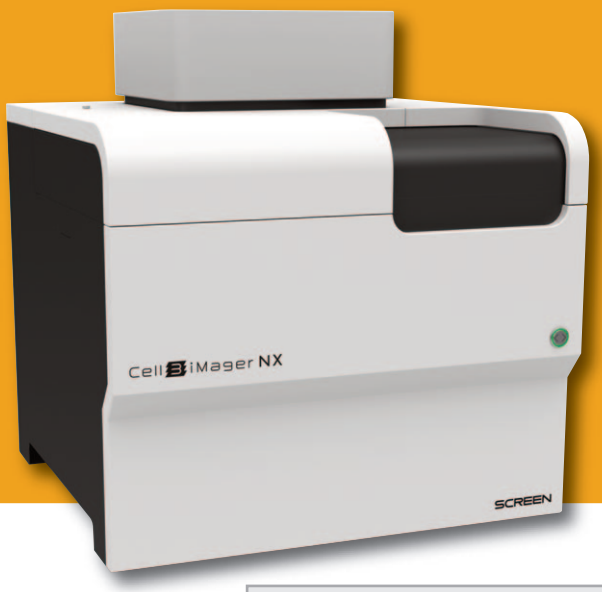
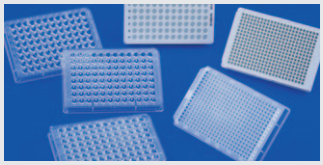
www.phchd.com/eu/biomedical



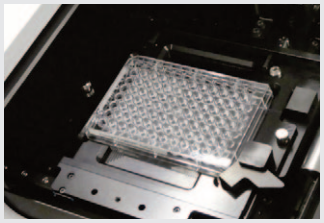
High-throughput Imager for quantative analysis cells cultured in 2D and 3D environment

CellBiMager NX

Installation

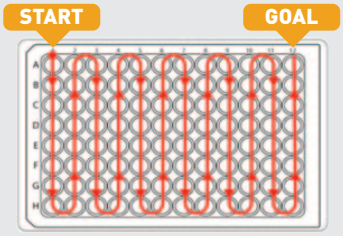


6 to 384 multi-well culture plates 35, 60, 100 mm dish

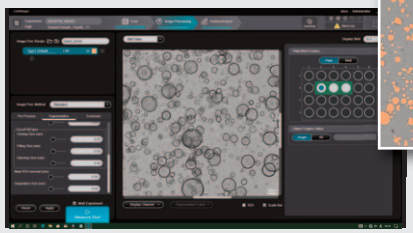


Scan

Brightfield 96well scanned in 44 seconds (4X objective, whole well)
Cell3iMager NX is capable of strobo- scopic imaging, the SCREEN patented imaging lens and dedicated image processing for high-magnification and wide-area large-size images enable high-speed image acquisition. The laser autofocus function enables focus-following imaging of thin-bottomed well plates, which is difficult to achieve with conventional systems. (AF performance may vary with plate type, depending particularly on plate bottom thickness and uniformity).



Create Recipe



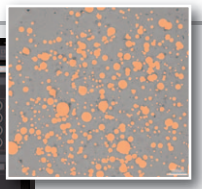


Image with Recipe applied

Classify the object to be measured (e.g. size, optical density, roundness, contour sharpness, etc.)
AI assisted Deep Learning plug-in processing high accuracy Data analysis (option).

* Recipe Creation step requiring only for the first time, can be omitted for the second and subsequent times.

Analysis

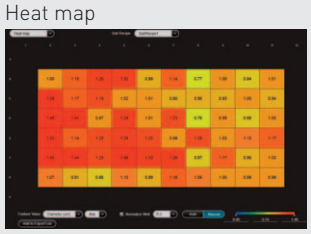
The quantitative cell values are calculated according to the measurement recipe.

Main measurement features

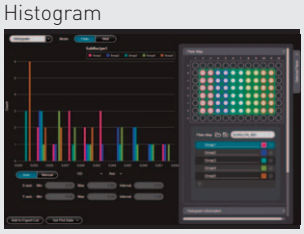
- Area
- Object count
- Cell density per well
- Pseudo-volume
- Diameter
- Circularity
- Optical density
- Aspect ratio
- Contour sharpness, etc.

Data Export

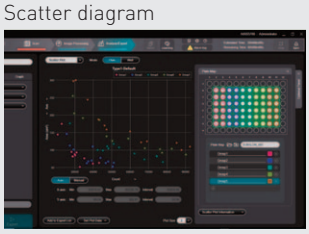
Heat map



Histogram



Scatter diagram



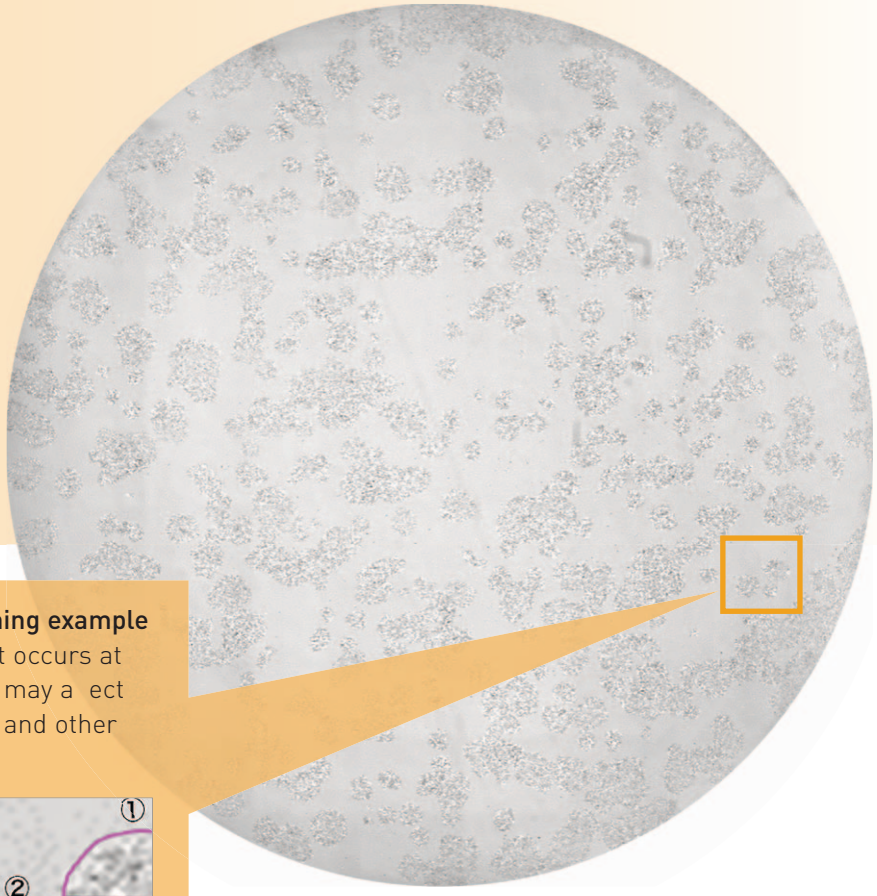
PDF

CSV

Proprietary image processing technology

High-definition Stitching Technology

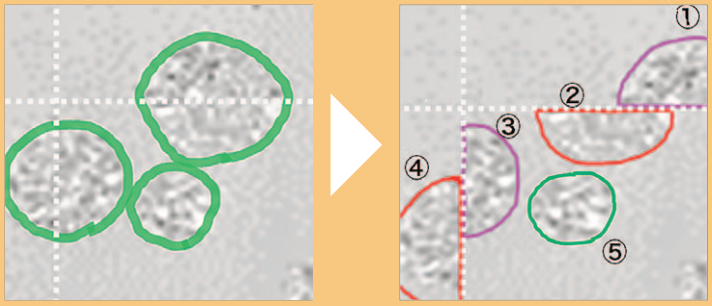
The well is divided into multiple s ots during the scan. The split images are t en stitched together using SCREEN's **proprietary high-definition stitching technology** to minimize the number of image gaps (see image below) and to clearly image the entire well for accurate analysis.



▲
Whole well Bright-field image
96well plate HeLa, 10x

High-definition Stitching
High quality image process for enhance analysis accuracy.

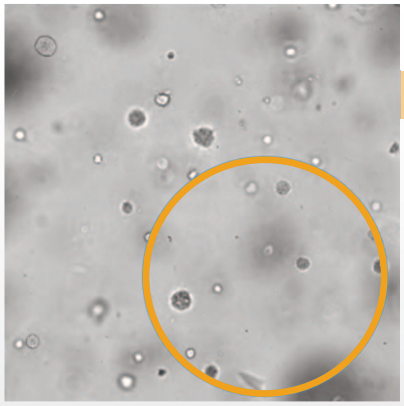
Coarse stitching example
Misalignment occurs at image joints, may a ect cell counting and other analysis.



Focus Composition Technology

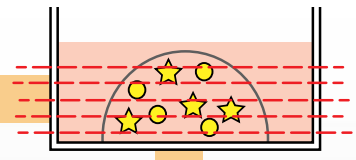
Automatic stacked imaging of objects scattered in the Z-axis direction while changing the focus position. SCREEN's proprietary image processing technology is used to construct all-in-focus images.

Intestinal organoids cultured three-dimensionally in Matrigel®.

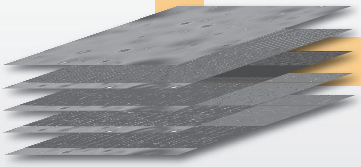


1 Layer scan can not cover samples that extend over multiple focal planes.

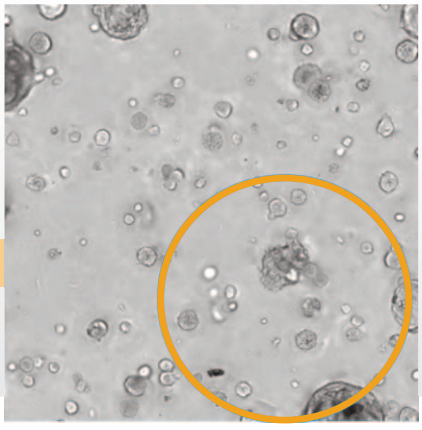
Multi-scan in Z-axis direction.



Proprietary algorithm for image merging.



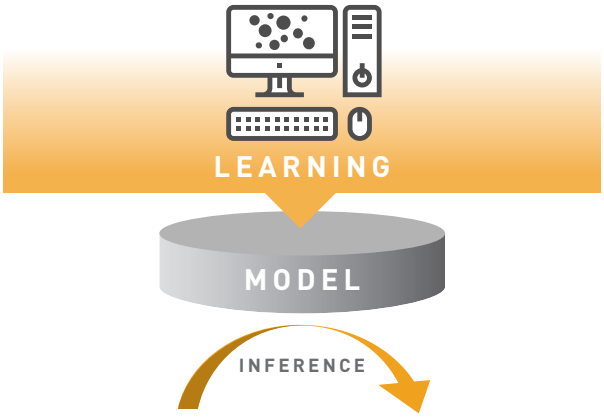
Construction and analysis of omni-focal images.



Most of the cell edges are clearly visible.

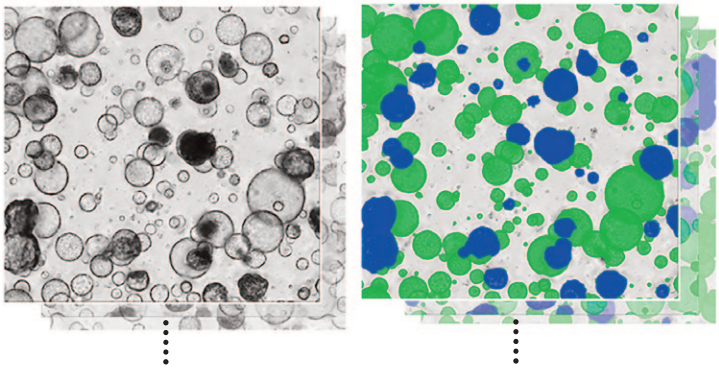
Deep learning

In the case of high-confluency and non-uniform images, it is difficult to segment by luminance shading and edge thresholding. For example, even in the case of overlapping images such as the one shown below, segmentation may be possible using Deep Learning.



Training dataset

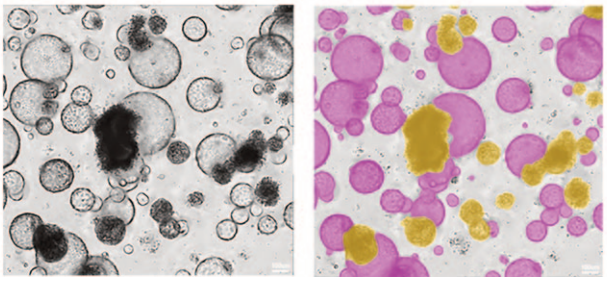
Cell image | Annotation



Mouse Hepatic Organoids, 4x

Another image

Cell image | Segment by AI

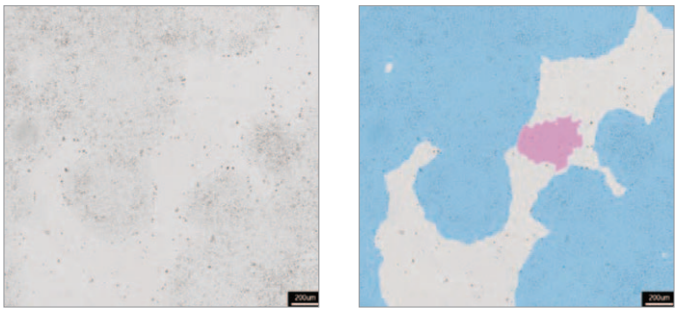


Deep Learning Applications

Deep learning can be used for highly accurate segmentation of the following challenging image examples.

Low contrast

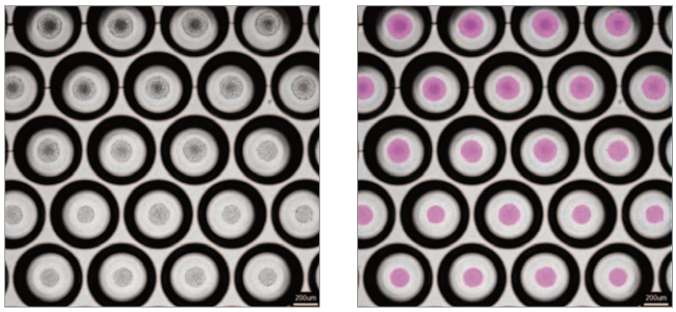
Brightfield | Segmented



Undifferentiated / Differentiated iPSCs, 10x

Micropattern

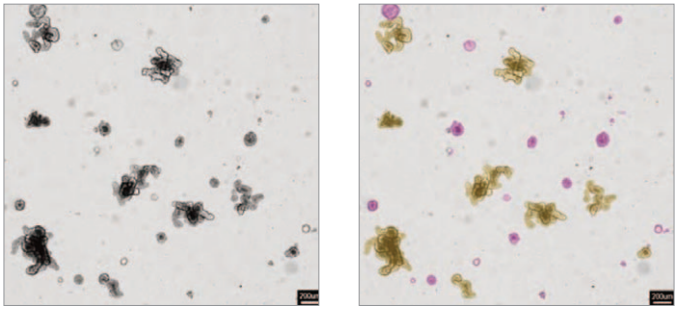
Brightfield | Segmented



MCF7 Spheroid, 10x

Uneven

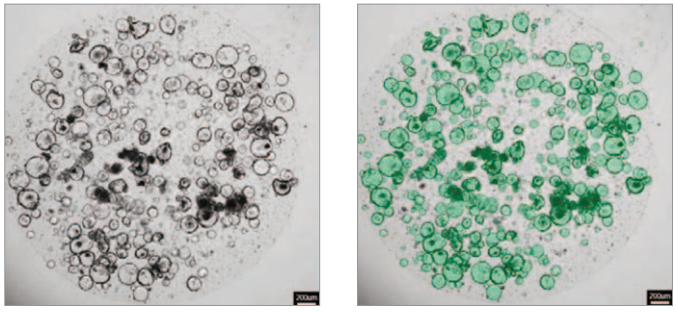
Brightfield | Segmented



Cyst / Crypt
Mouse intestinal organoids, 4x

Overlap, high density

Brightfield | Segmented

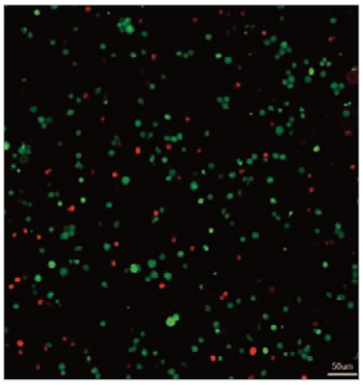


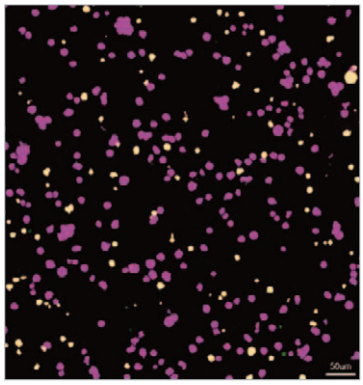
Mouse intestinal organoids, 4x

Multi-color Fluorescence

Supports multi-color fluorescence imaging. Up to five fluorescent filters can be mounted simultaneously, enabling automatic bright-field/fluorescent four-color imaging.

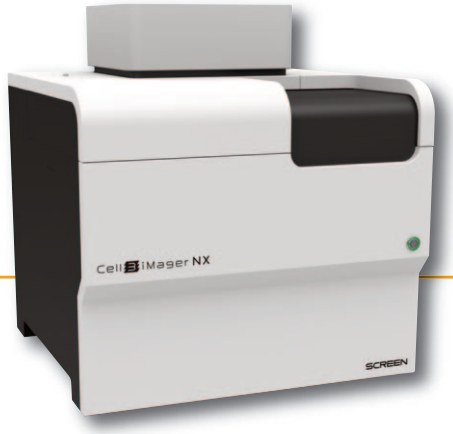
Fluorescence wavelength	Fluorescent dye
460/60	DAPI, Hoechst
525/39	GFP, FITC
605/64	PI, Cy3
620/52	TexasRed, AlexaFluor®594
694/44	Cy5, AlexaFluor®660





APPLICATIONS

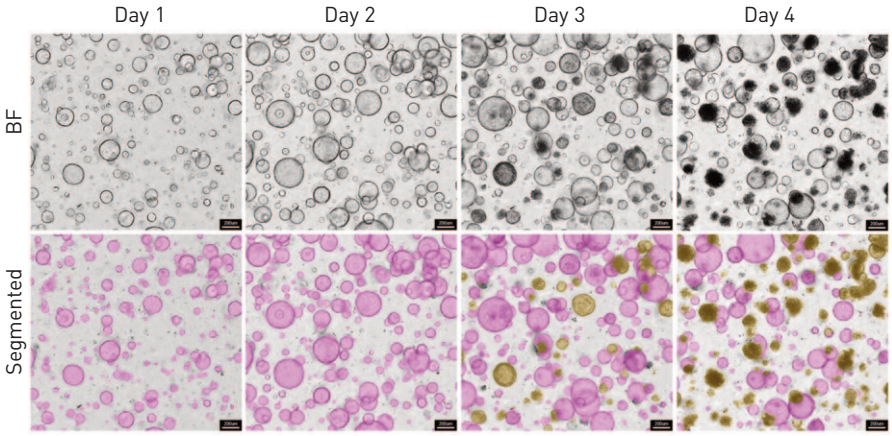
- Cell Morphology
- Cell Proliferation
- Cell Viability Growth Inhibition
- Cell/Colony Count
- Multiplex assays: LIVE/DEAD Cytotoxicity
- Single Cell Detection
- Routine Quality Monitoring
- Cell Adhesion/Extension
- Single Cell Cloning
- Cell Migration (Scratch Assay)
- 3D Organoid/Spheroid Morphology
- Drug Screening 2D & 3D Cell Based
- Drug Efficacy
- Drug Activity and Profiling (2D & 3D Spheroid)
- Growth Rate Monitoring (2D & 3D Spheroid Assays)
- Colony Formation Assay
- iPS Cell Line Generation
- iPS Cell Characterization
- iPS Cell Differentiation
- Hybridoma Cell culture
- Stem Cell Marker Analysis
- Cell Body/Neurite Analysis
- Evaluation of Anti-Angiogenics
- Apoptosis Assays
- Hepatotoxicity Assay
- Embryoid Body Morphology
- Foci & Plaque Counting
- Fluorescence Titer Quantification
- Transfection/Transduction Efficiency
- CRISPR Fluorescent Reporter Monitoring
- Nuclear Translocation
- Reporter Gene Assay
- Immuno-Cyto Chemistry
- DNA Synthesis
- Biomarker Quantification
- Cell Cycle & Mitosis



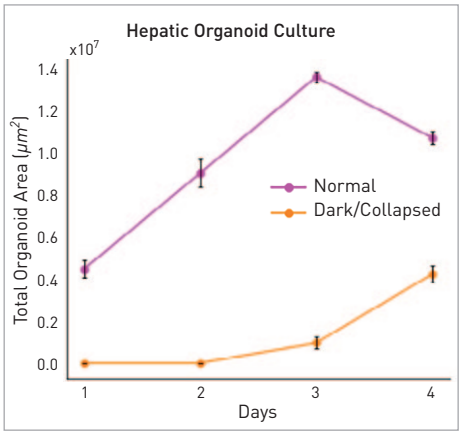
Applications

Proliferation monitoring of liver organoids

Matrigel-dome cultured liver organoids were segmented using deep learning and their area was measured over time. The results showed an increase in the number of black collapsed organoids.



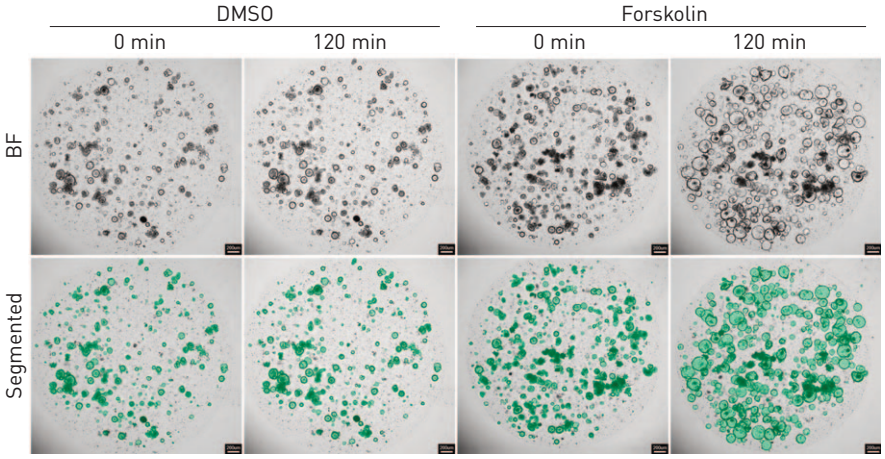
Images of liver organoids



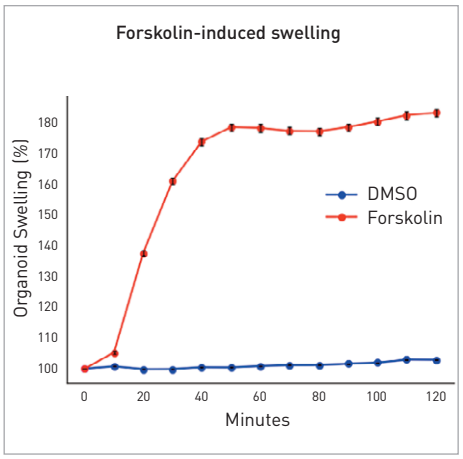
Quantitative Results

FIS assay of intestinal epithelial organoids

Matrigel dome cultures of intestinal organoids showed that Forskolin stimulation caused organoid expansion.



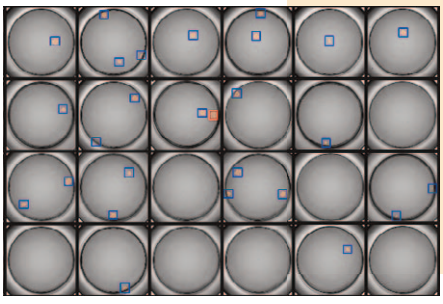
Images of intestinal epithelial organoids



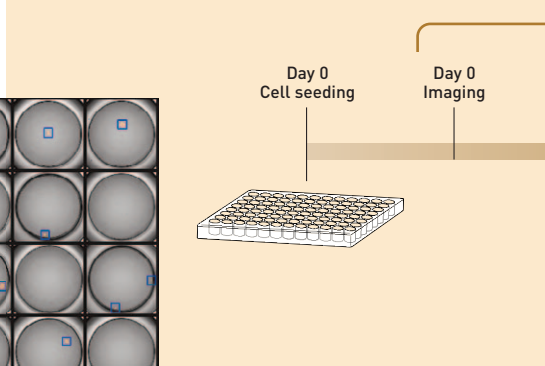
Quantitative results of FIS assay

Single cell cloning of CHO-K1 cells

O-K1 cells were seeded into 96-well plates by limiting dilution method Bright field imaging and measurements were taken immediately after sowing (Day 0) and periodically with a 10X lens.



Colony position in plate



Killing/ADCC Assay of NK cells

Segmentation of cancer spheroid areas in bright-field images and quantification of the area showed that the area decreased in an NK cell number-dependent manner.

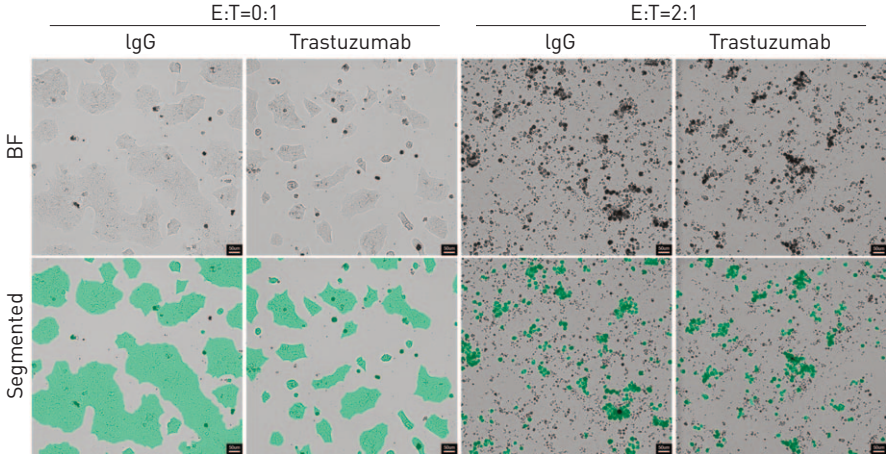
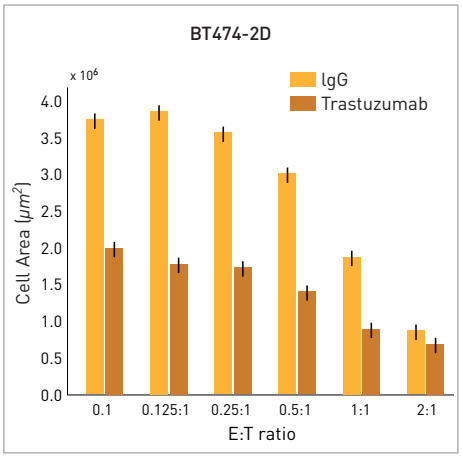
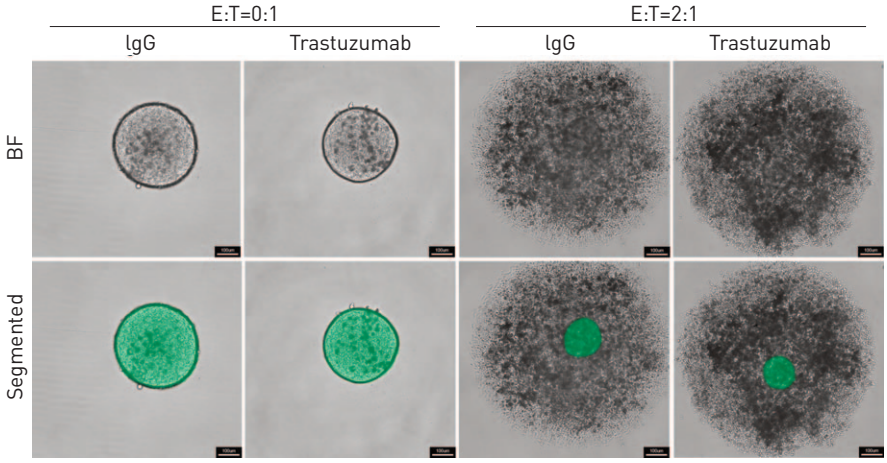


Image of BT474/NK cells (2D)

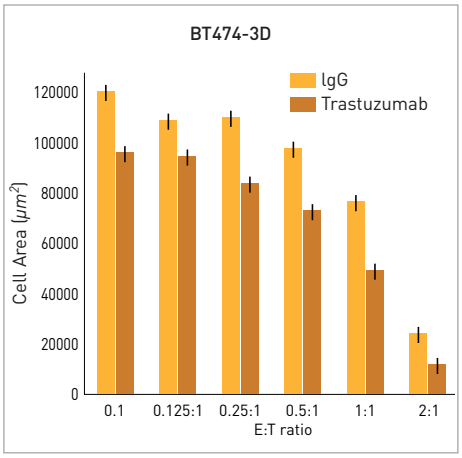


Quantitative results of BT474/NK cells (2D)

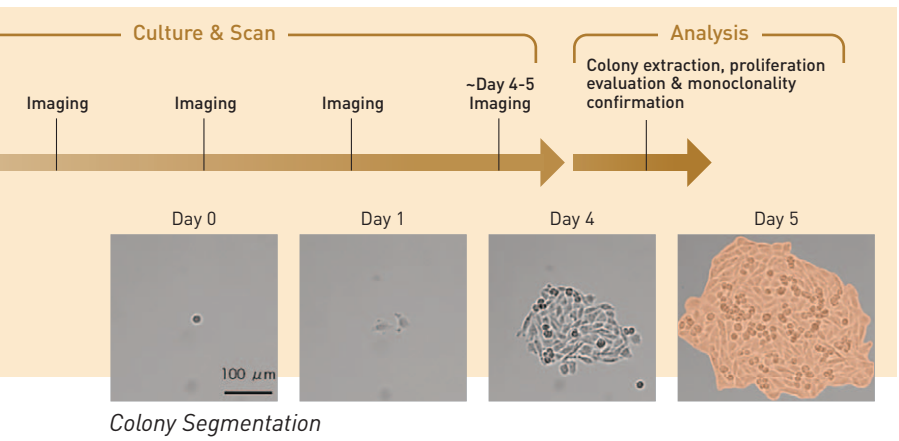
Segmentation and quantification of the area of cancer cells in bright-field images showed that the area decreased in an NK cell number-dependent manner and that the area of HER-2 positive BT474 cells was reduced, enhancing NK cell injurious potential.



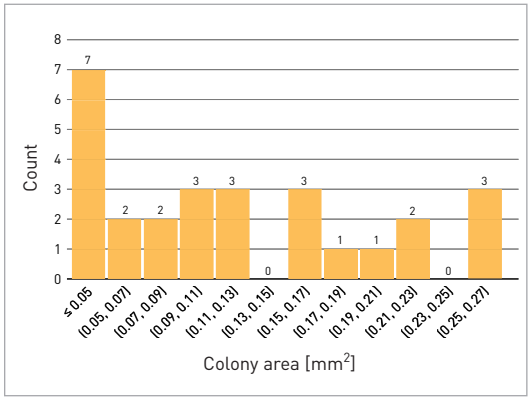
BT474/NK cells (3D)



Quantitative results of BT474/NK cells (3D)



Colony Segmentation



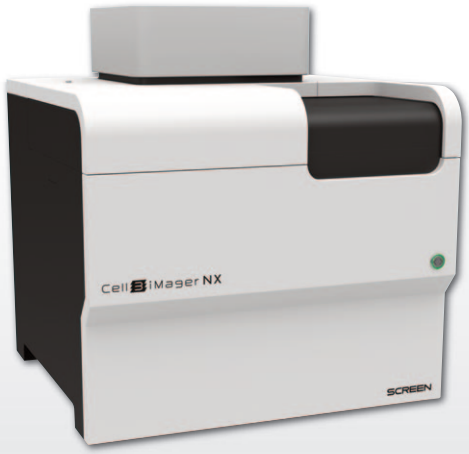
Colony size distribution

PRODUCT SPECIFICATIONS

Product name (model)	Cell3iMager NX (CC-100)
Dimensions [WxDxH]	500 × 500 × 530 mm
Weight [Kg]	44
Lighting Unit	LED transparent lighting (white) / Switching aperture (2types) /Automatic phase difference shutter
Camera	CMOS 12Mpixel monochrome
Auto Focus	Light source Laser diode / Detection range -0.5mm~3.5mm
Magnification	4x, 10x objective lens (standard) 2x, 20x, 40x, 10x phase difference, 20x phase difference (options)
Supported Plates	6,12,24,48,96,384 well plate etc. 35,60,100 mm dish, glass slide
Image Output	8bit mono
Scanning resolution	20320dpi (4x) / 50800dpi (10x)
Fluorescent Filters	5 colors
Channel	Bright Field and 4 Colors of Fluorescence
Power Supply	AC100-240V / 190VA
Internal temperature	Adjustable between 18°C ± 2°C and 40°C ± 2°C in 1°C increments (without cooling mechanism)
Environment	18-28°C, humidity less than 80%, no condensation
Automation Support	Available
Software	Cell3imager NX dedicated software (Standard) • Imaging, Analysis and Export • Neurite projection measurement Data security functions (database management/user management/audit trail) Time-lapse function (Options) Deep Learning Plug-ins Robot interface

Imaging Time*	Conditions
44 seconds	4X objective lens , 96Well x Whole well , BF
4 minutes 37 seconds	4X objective lens , 96Well x Whole well , Brightfield + FL 2ch(DAPI,GFP)
2 minutes 20 seconds	10X objective lens , 96Well x Whole well , BF
19 minutes 58 seconds	10x objective lens , 96Well x Whole well , Brightfield + FL 2ch(DAPI,GFP)

* Imaging time is for reference only. It varies depending on imaging conditions such as luminescence time



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