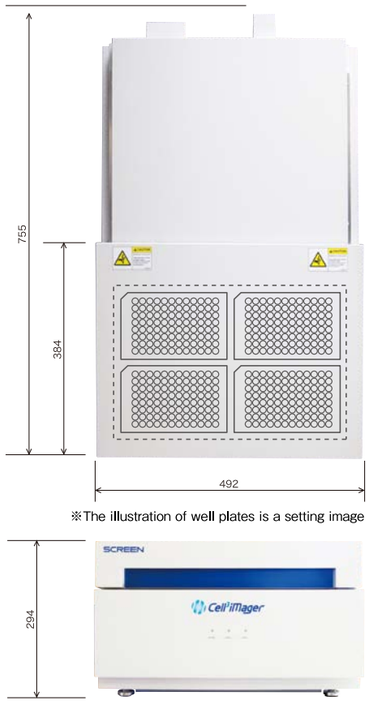
Space requirements

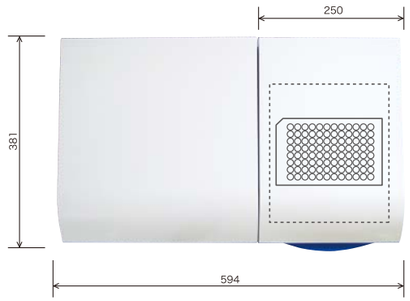
Cell³iMager



※The illustration of well plates is a setting image

Cell³iMager neo

Top view



※The illustration of well plates is a setting image

Front view

(unit : mm)

Product specifications

	Cell³iMager	Cell³iMager neo
Well plates	6 to 384 wells, flat and U-shape bottom types and 35 mm dish Microscope slide, 25cm² flask (only for Cell³iMager neo)	
Plate number	4	1
Scan speed	54 seconds per plate (2400 dpi high speed mode)	50 seconds per plate (2400 dpi high speed mode)
Automated measuring time	20 seconds per plate (2400 dpi high speed mode)	
Scan resolutions	200dpi, 300dpi, 600dpi, 1200dpi, 2400dpi, 4800dpi, 9600dpi	
Light source/optical system	White LEDs/transmission illumination	
Measuring	Number, area, estimated volume, contour, optical density, circularity and edge sharpness	
Output format	- Captured image display and numerical data confirmation using base software - Granular distribution and proliferation trend chart confirmation - Output of measured data in CSV file	
Environment	Recommended: Temperature 18 to 28 ℃(64 to 82°F)	
Power requirements	Single phase 100 - 240V 0.12 kw 0.9A	Single phase 100 - 240V 0.115 kw 0.85A
Dimensions (W x D x H)	492 x 755 x 294 mm	594 x 381 x 294 mm
Weight	Approx. 40 kg	Approx. 25 kg

Specifications and equipment designs are subject to change without notice.

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SCREEN

Cell³iMager

High-Speed 3D Cell Scanner

A Bright Field Spheroid Counter, Ideal for Label-Free Assays of 3D Cell Culture

Compatible with various 3D culture plates, the Cell³iMager allows the use of 6-well to 384-well plates and a 35 mm dish.
It comes with an extensive and convenient software which enables the reading and image composition of soft agar medium, displaying both a full view of a well plate and magnified view of a well center, and the editing of measuring recipes.

Compatible with various 3D culture plates


SUMILON PrimeSurface (Sumitomo Bakelite Co., Ltd.)


GravityPLUS™ Hanging-drop plate (InSphero AG)


SCIVAX NanoCulture plate (Life Science Co., Ltd.)

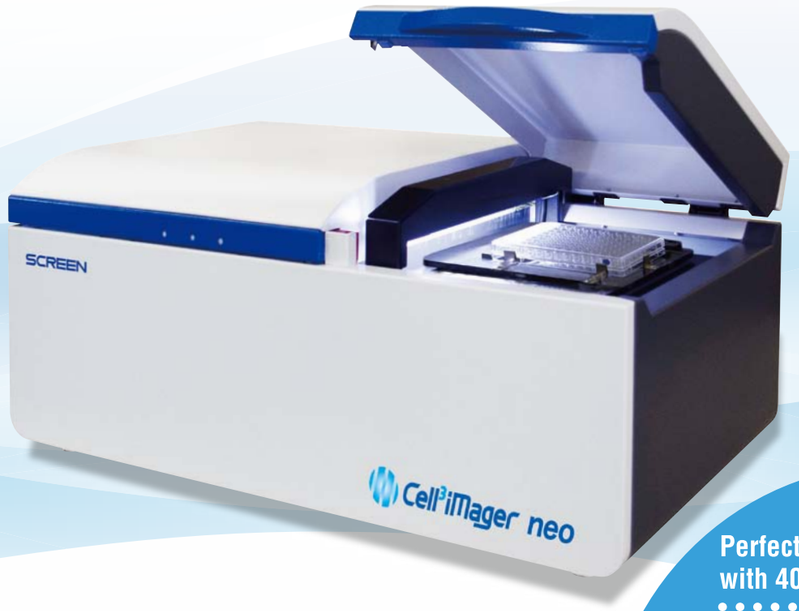

Clear-wall flat bottom plate (Corning Incorporated)

Cell³iMager

4 Plate type

A Compact Spheroid Counter with Greater Scanning Operability Without Compromising the Functions of Cell³iMager

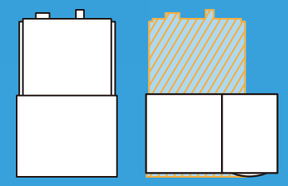
Cell³iMager's sister unit, Cell³iMager neo has a compact design enabling the reduction of footprint by 40%.
In addition to the existing functions of Cell³iMager, this highly versatile 3D spheroid counter provides excellent performance and scalability with even faster scanning speed for a single well plate and its numerous new software.



Cell³iMager neo

Single plate type

Perfect for a lab desk with 40% less footprint



Fearuves of high-speed 3D cell scanner

Point 1

High-speed well plate scanning and automatic measuring

Scanning 3D culture plates in just 54 seconds per plate, it enables high-speed measuring of the area, estimated volume, diameter and number of spheroids.

Point 2

Reagent-free and label-free easy imaging system

The label-free system, eliminating a series of processes including reagent dropping, stirring and fluorescence measuring, enables faster operation with fewer processes.

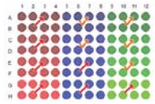
Point 3

High correlativity with drug susceptibility evaluation of ATP reagents and excellent spheroid image capturing performance

Installed software precisely captures spheroids by minimizing the effect of shadows created by meniscus on the peripheral area of wells. This excellent image capturing performance achieves high correlativity with drug susceptibility evaluation of ATP reagents.

Point 4

Follow-up and morphological observation of the same well allows time course observation and effortless image saving



Point 5

Simple and user-friendly operability

Plates by all manufacturers and a wide selection of sample recipes of each well plate type are available.
Adopted graphical user interface (GUI) enables each operation step, based on well plate and scanning images.

Point 6

Designed to accommodate the automation of continuous scanning, it facilitates high-throughput observation

With the automated configuration of a platform, arm, dispensing heads, grip-hand and carrier, a sequence of processes; transferring well plates, dispensing fluid, scanning and storing is automated (under development). It is ideal for both time course observation and high-throughput scanning.

Point 1 High-speed well plate scanning and automatic measuring

Scanning 3D culture plates in approximately 1 minute per plate, it then prepares a recipe for measuring based on the scanned images. In addition to our standard recipe samples, researchers can easily prepare a recipe that they want by fine adjustments of such sample recipe. Once the recipe is ready, measurement can begin, which takes approximately 20 seconds. As the follow-up stage involves scanning and auto-measuring only, an entire operation can be completed in approximately one and half a minute.

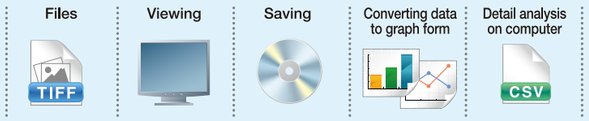
Starting from initial setting

First run: Scanning 1 min. → Preparation of measuring recipe 10 ~ 20 mins. → Auto-measuring 0.5 min.

For specimens with preset recipe

Follow-up run: Scanning 1 min. → Auto-measuring 0.5 min.

Following completion of auto-measuring, it proceeds to scanned image observation and measured numerical data analysis by converting to graph form.



Spheroids can be observed in a raw image high quality TIFF format. Fast and easy image viewing is possible by selecting a whole well plate or individual well in a single image. The results obtained by auto-measuring are converted to graphs showing the proliferation trend and spheroid distribution, thereby aiding trend analysis of drug susceptibility.
All imaging photographs and test results can be backed up and restored by interconnecting. Various computed numerical data is output in the CSV format, enabling import into a spreadsheet or other user familiar software format.

Point 2 Supporting the Reading and Image Composition of Soft Agar Medium

1. Bracketing:

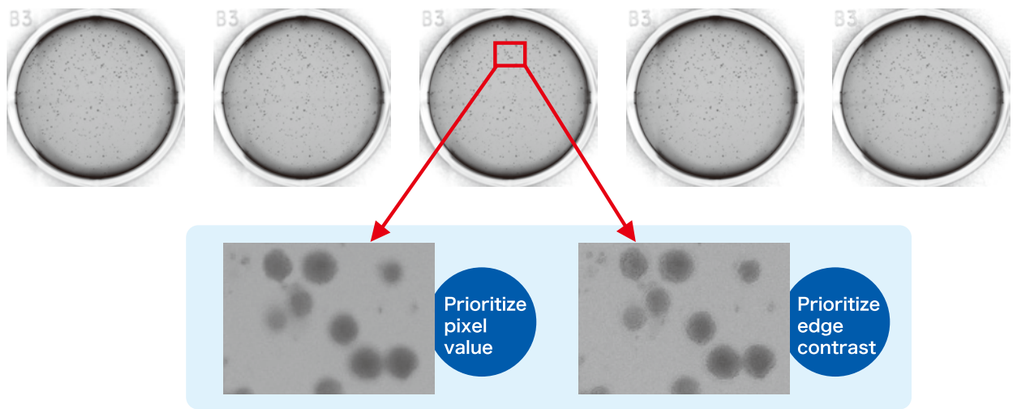
Multiple images can be obtained by changing the Z-direction.

2. A single composite image from obtained multiple images

Two composite methods:

●Prioritize pixel value ●Prioritize edge contrast

Cells cultured in the soft agar medium are found in its overlapping layers. A new function allows the compositing of one image by imaging multiple layers in the Z-direction. Two modes; prioritize pixel value and prioritize edge contrast can be selected for computing the area and number of cell masses in the soft agar medium more precisely.



Reagent-free and label-free easy imaging system

Faster processing / Fewer processes

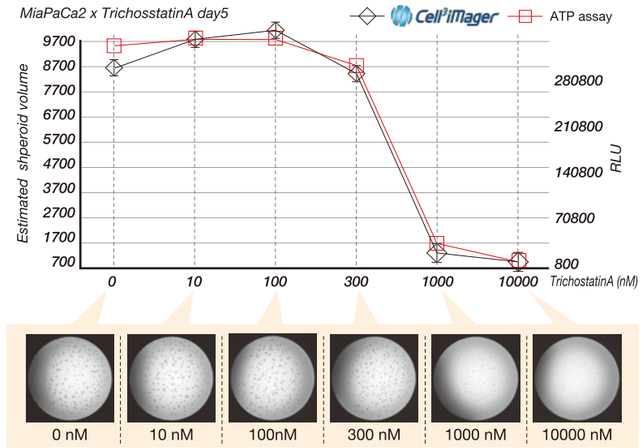
The optical label-free system enables easy operation by simply placing culture plates on the scanning table for scanning and measuring. Reagent dropping, stirring and subsequent fluorescence measuring are no longer necessary, allowing drastic time reduction and simplified operation.

ATP assay: ATP reagent dropping → Stirring → Fluorescence measuring

Cell³iMager: Scanning Measuring → Faster processing/ simplified operation

Point 3 High correlativity with drug susceptibility evaluation of ATP reagents and excellent spheroid image capturing performance

High correlativity has been confirmed between estimated volume measured by Cell³iMager and the relative light unit under the ATP assay, for drug susceptibility tests carried out on 50 cell types. This assures that it can be also used as a plate reader to test cell proliferation and activity.



Cell types of which the correlativity with ATP assay has been confirmed*

[Conditions] Drugs used: 2 kinds (Trichostatin A and MG132) / 3D culture plate (NCP by SCIVAX)

[Cell types]

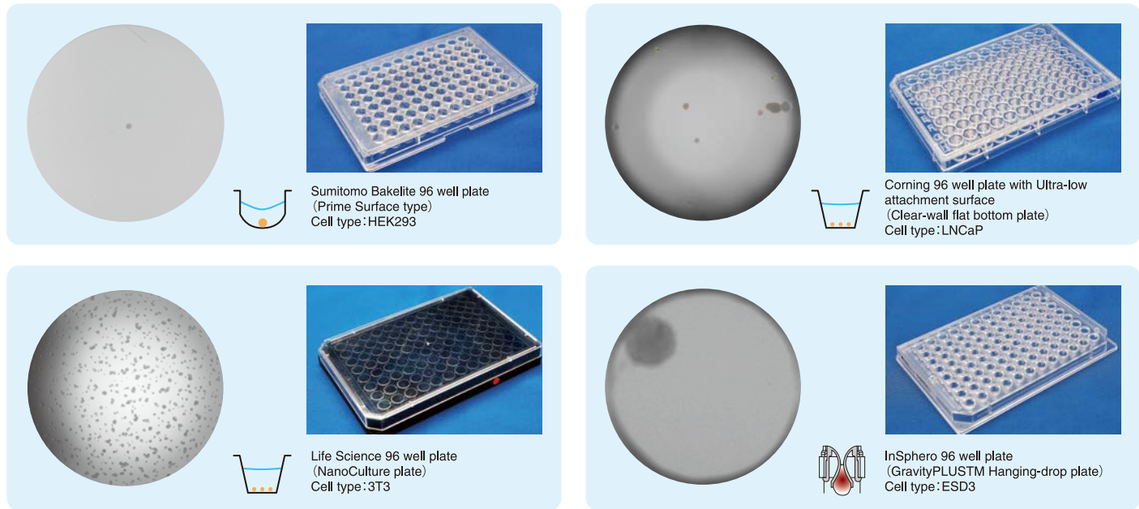
HT29	Colo201	Li-7	PP5	Capan-2
MiaPaCa-2	HCT116	SUIT-2	A549	WiDr
BxPC-3	RKO	JHH-5	SW620	DU145
T47-D	MCF-7	Panc-1	SKOV-3	NCI-H1650
HLF	MM231	BT474	SW480	DLD-1
JHH-7	Capan-1	OVCAR-3	SK-BR-3	huH-1

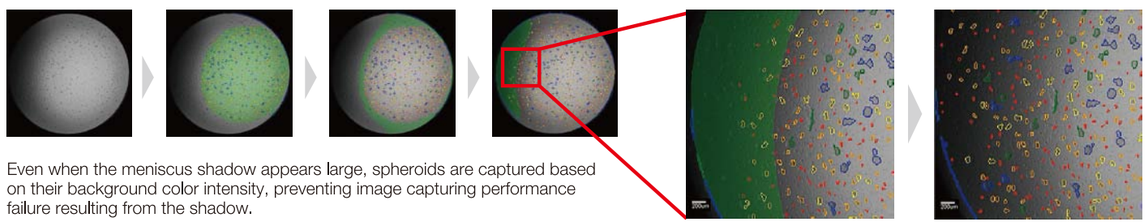
HCC1954	HCC1806	BT20	HepG2
HeLa	MKN-74	HLE	MKN-45
AsPC-1	Colo205	ACHN	
JHH-2	NCI-H1993	3T3L1	
NCI-H441	NCI-H23	Hep3B	
Hs578T	NCI-H1975	PC-3	

*By inhouse tests

In order to obtain high correlativity with ATP reagents, software is installed which captures spheroids precisely. Cell³iMager uses the transmission illumination system for estimation of 3D cultured spheroid volume, which may produce the meniscus effect on the image depending on the culture medium. The software installed minimizes such shadow effect created by menisci and helps capture spheroids at the peripheral area of wells.

Compatible with various 3D culture plates

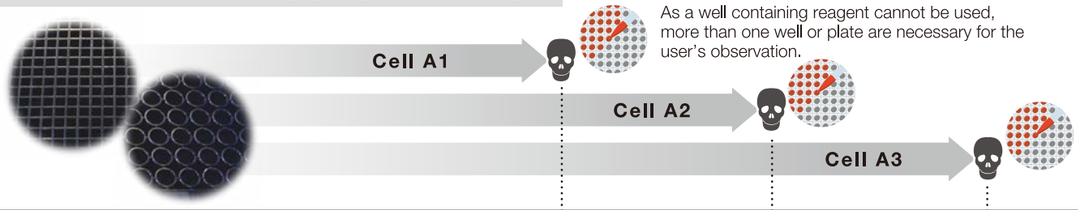




Even when the meniscus shadow appears large, spheroids are captured based on their background color intensity, preventing image capturing performance failure resulting from the shadow.

Point 4 Follow-up and morphological observation of the same well allows time course observation and effortless image saving.

Luminescence/absorbance measuring by using conventional reagents

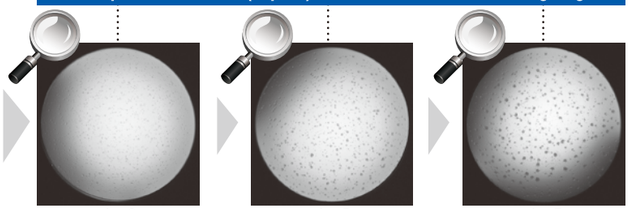


As a well containing reagent cannot be used, more than one well or plate are necessary for the user's observation.

Cell³iMager

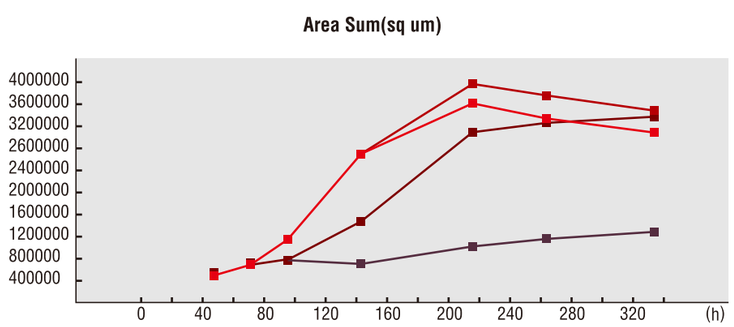
Batch storage of both plate and well images assures easy control of all tested images.

Follow-up of the same well (or plate) can be carried out without using reagents

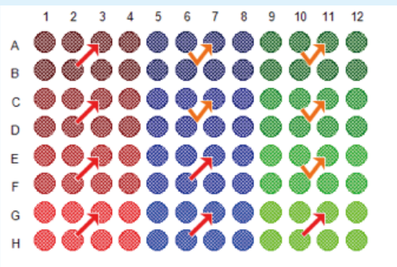


Time course statistics

Different culture environments within a well plate and compound test patterns can be set per group. This allows not only the tracking of changes and development of images based on data imaged over time, but also the numerical control of changes in the number, area and volume of cells. Further, with the function that converts data to graph format by the single touch of a button, the researcher can have a full view of his/her desired data e.g. the timing of drug effects.



▲Time course graph of the spheroid area by group



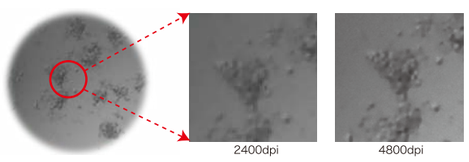
▲The plate map shows changes/development by icons.

	Name	2days(48h	3days(72	4days(96	6days(1	9days(2	11days	13days	Comment1	Comment2
☑	A1:B4	552053...	66427...	77709...	72112...	10271...	1152...	1306...	LNCap / PRMI...	1000nM
☑	C1:D4	513516...	65549...	79966...	14867...	30840...	3267...	3356...	LNCap / PRMI...	100nM
☑	E1:F4	505887...	70498...	11248...	27193...	39782...	3772...	3464...	LNCap / PRMI...	10nM
☑	G1:H4	510535...	65986...	11603...	27222...	36315...	3359...	3104...	LNCap / PRMI...	Control
☐	A5:B8	997666...	91791...	10519...	12167...	11308...	1292...	1491...	MCF7 / RPMI1...	1000nM
☐	C5:D8	107829...	89095...	51278...	13142...	20159...	2093...	1877...	MCF7 / RPMI1...	100nM
☐	E5:F8	109317...	11174...	15537...	23183...	21200...	1975...	2179...	MCF7 / RPMI1...	10nM
☐	G5:H8	104372...	11516...	14855...	21374...	18990...	1854...	2190...	MCF7 / RPMI1...	Control
☐	A9:B12	139953...	10548...	85369...	10735...	36663...	4081...	4273...	3T3 rasLacZ/...	1000nM
☐	C9:D12	160232...	12513...	11508...	20702...	36340...	4532...	5804...	3T3 rasLacZ/...	100nM
☐	E9:F12	162166...	15696...	19553...	35566...	48903...	6029...	7168...	3T3 rasLacZ/...	10nM
☐	G9:H12	155781...	17564...	23032...	35657...	47967...	5731...	6726...	3T3 rasLacZ/...	Control

▲Time course data sheet of the spheroid area by group
(Inclusion of comments re. cell types and culture medium volume is possible.)

Selectable scanning resolution

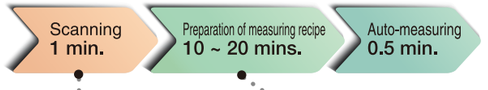
Select 2400 dpi resolution to obtain rough drug susceptibility at high speed, and 4800 dpi or 9600 dpi for more precise observation as needed.

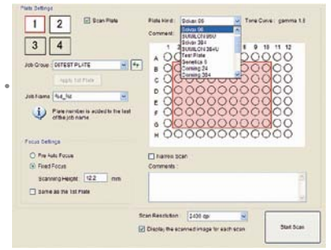


*It is possible to scan the entire well plate or a specific well.

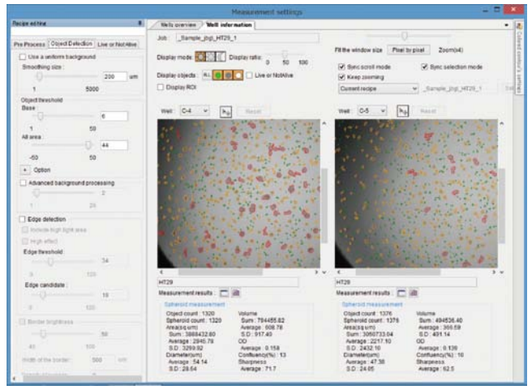
- 2400 dpi: Approximately 10 μm
- 4800 dpi: Approximately 5 μm
- 9600 dpi: Approximately 2.6 μm

Point 5 Simple and user-friendly operability



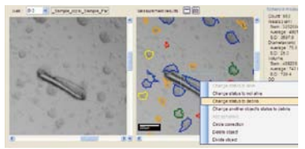


Place the cell culture plate on the stage, and scan by selecting plate type, wells to be scanned and scanning resolution.



Set the size, concentration, circularity, etc. and select the spheroids subject to measuring.

File / View



When foreign matters are found in the measured image, command to identify and eliminate them from aggregating calculation.

Storage

All images will be stored in the same folder with measuring recipes and measured data for easy access as needed.

Converting data to graph form

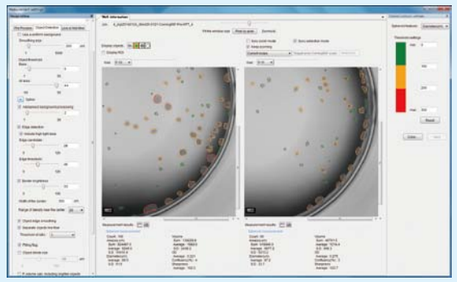
Granular distribution of specified wells, a graph of the follow-up proliferation development and other test data can be created using the standard software.

Detail analysis on computer

Measured data output in the CSV format can be used for detail analysis on a spreadsheet or other software format. The spheroid area, number and estimated volume are computed for use in CSV data and graphs.

Editing of measuring recipes

A new function is added which enables the measurement of cell spheroids even when the background density differs, by defining the volume of the peripheral area of wells. It separates subject spheroids from overlapping fibriform debris and improves the precision of measurement. As both the full view of a well plate and magnified view of a single spheroid's center are available, work can be executed with a comprehensive view of the subject.

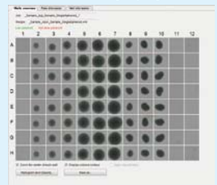


■Well side edge corresponding

■Fibriform debriis separation function

■Well plate full view function

■Well center magnifying function



Point 6 Designed to accommodate the automation of continuous scanning

Through collaboration with a liquid handling robot manufacturer, a sequence of processes; transferring well plates from a carrier, dispensing fluid, scanning with the spheroid counter and storing by a carrier is automated (under development), with the configuration of a platform, arm, dispensing heads, grip-hand and carrier. It enables mass continuous processing, while providing optimal efficiency for both time course observation and high-throughput scanning.