helicon

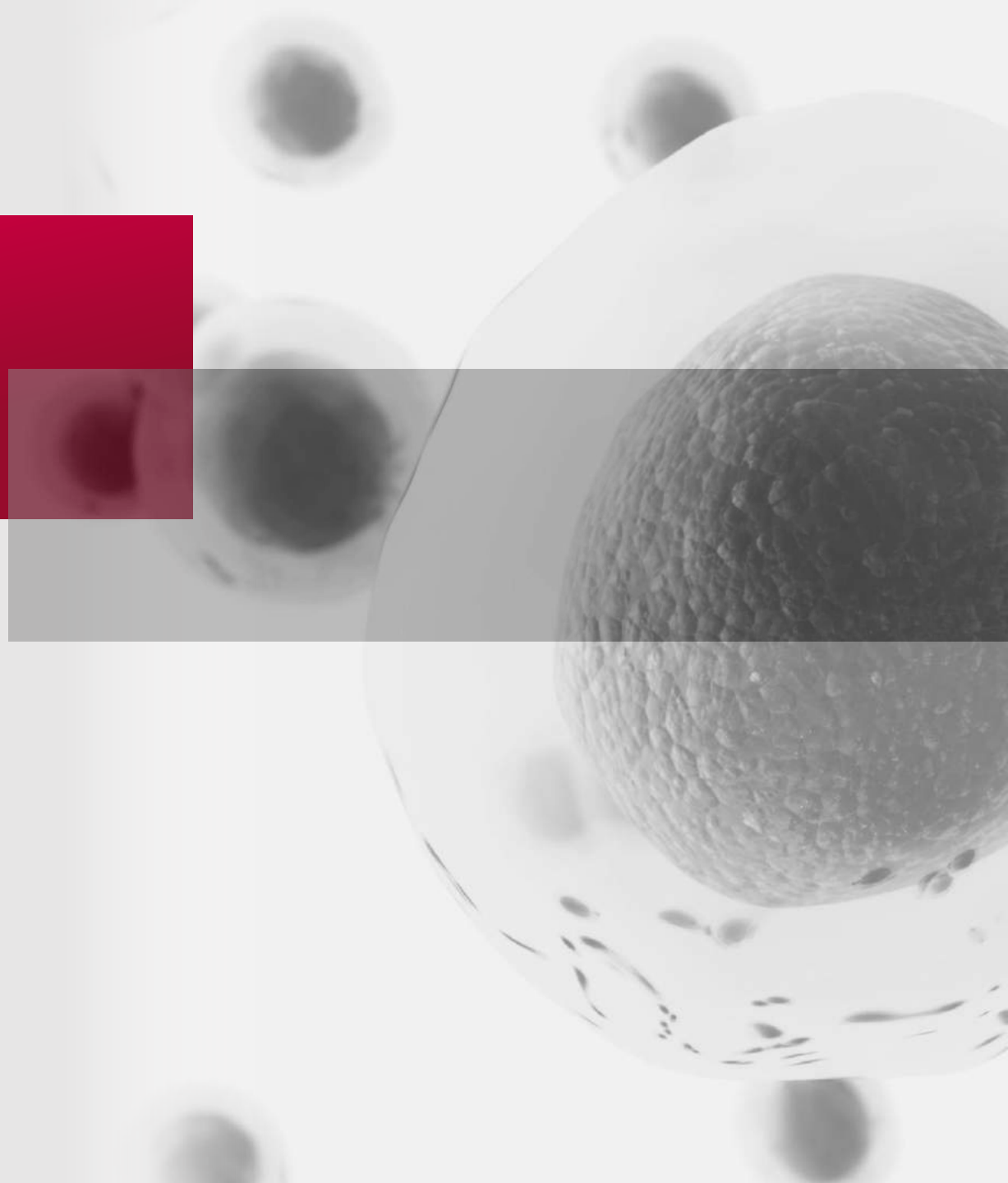
Automated Live Cell Imaging System

CELLOGER SERIES

CURIOSIS

Table of contents

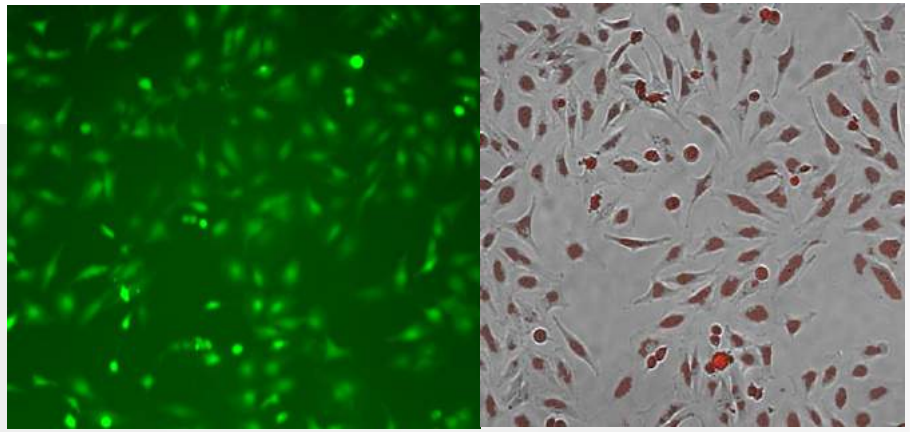
I. Introduction

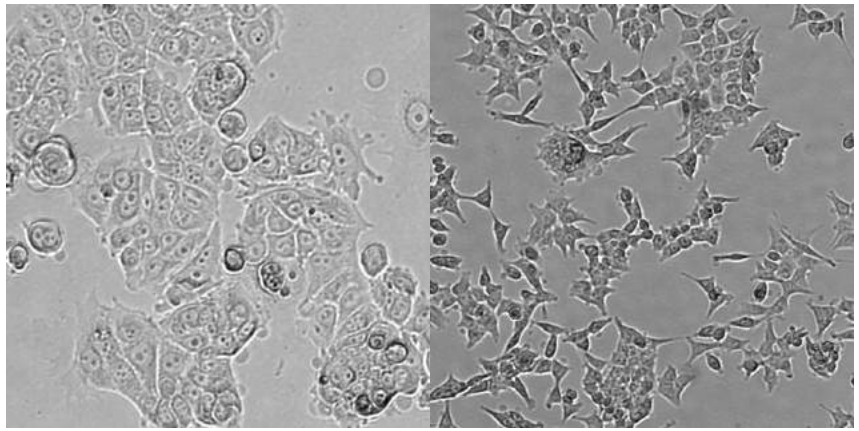


I. Live cell imaging

What is live cell imaging?

Live cell imaging is a method of examining living cells over a period of time using the images acquired by time-lapse microscopy. Dynamic cellular processes and events are being observed in real time to study and understand the biological changes of living cells. Live cell imaging has become an essential method in many fields of life science, especially in research areas such as cell biology, stem cells, developmental biology, pharmaceuticals, drug discovery, and more.





Importance of live cell imaging

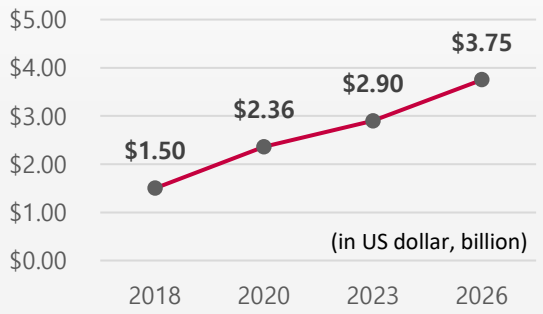
Starting with the discoveries of microscopes in the 16th centuries, there have been endless desires to peer into objects that cannot or hard to be seen by the naked eyes. With the development of technology and the introduction of live cell imaging, it has transformed the way researchers study cells, tissues, proteins, or other cellular interactions; and became a basic analytical tool in the study of life science.

I. Market analysis

Global Live Cell Imaging Market

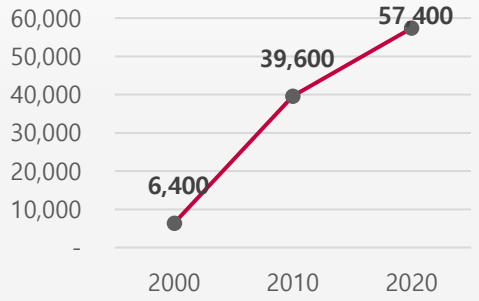
Global market trend

Global live cell imaging market



Research trend

Research on live cell imaging
(*google scholar)



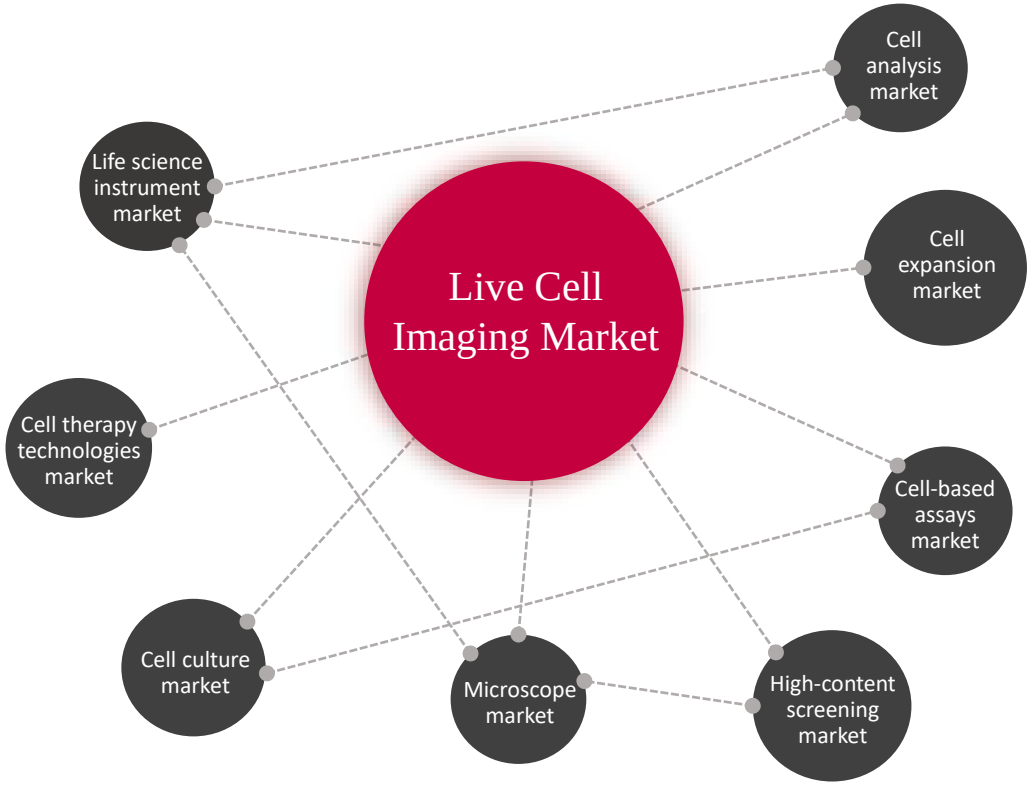
Key players

The leading players in live cell imaging market include BD Biosciences, Bio-Rad, BioTek, Carl Zeiss, CytoSmart, Logos biosystems, Merck KGaA, Nikon, Olympus, PerkinElmer, Sartorius, ThermoFisher.

Key drivers

Key driving factors of live cell imaging market are rising concerns of cancer, the need for drug discovery, increasing research fundings, and development of advanced instruments.

Live Cell Imaging Market Interconnections



I. Light microscopy

Bright-field

- Standard optical microscopy used in the laboratory
- Can view stained and unstained cells
- Only light is used for illumination
- Used to see morphology of a cell (not the details of a cell)

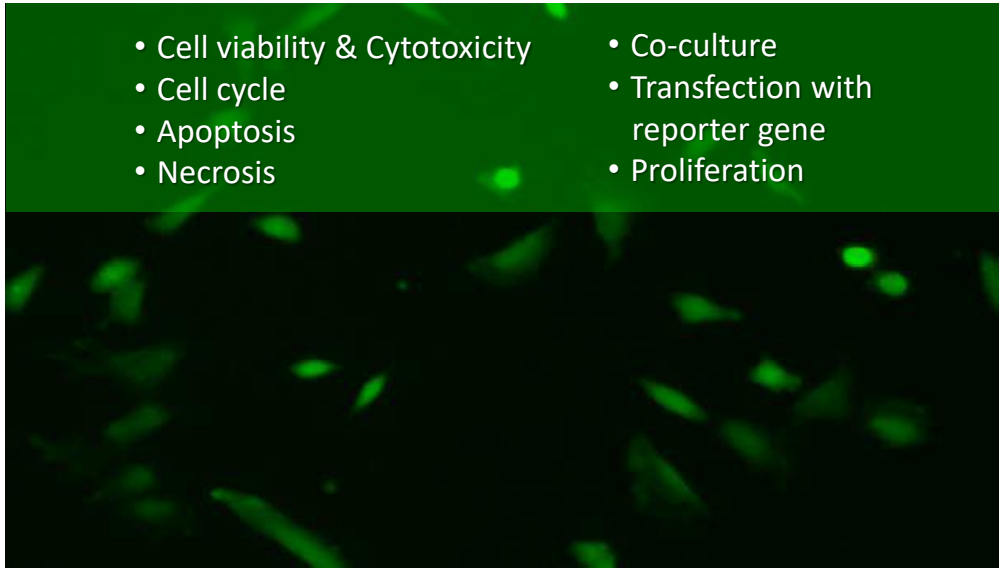
VS

Fluorescence

- Can monitor biological processes & dynamics of cell
- Uses fluorophores that emit light with specific wavelength when exposed to light
- Sample itself provides light source used to form an image
- Possible to observe specific cells or structure in a cell

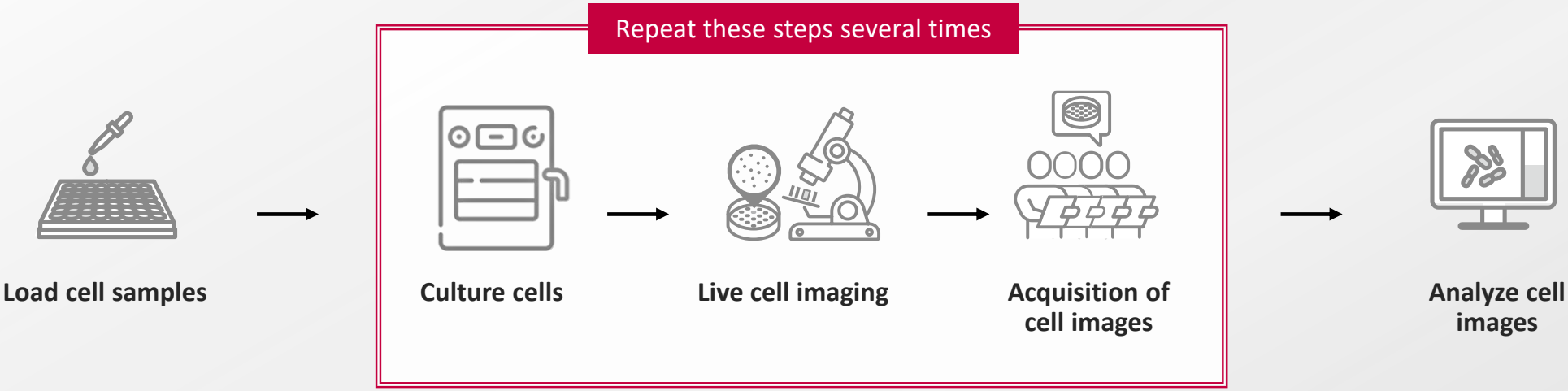
Application

Application



I. Conventional method

Live cell imaging is such a tedious job!

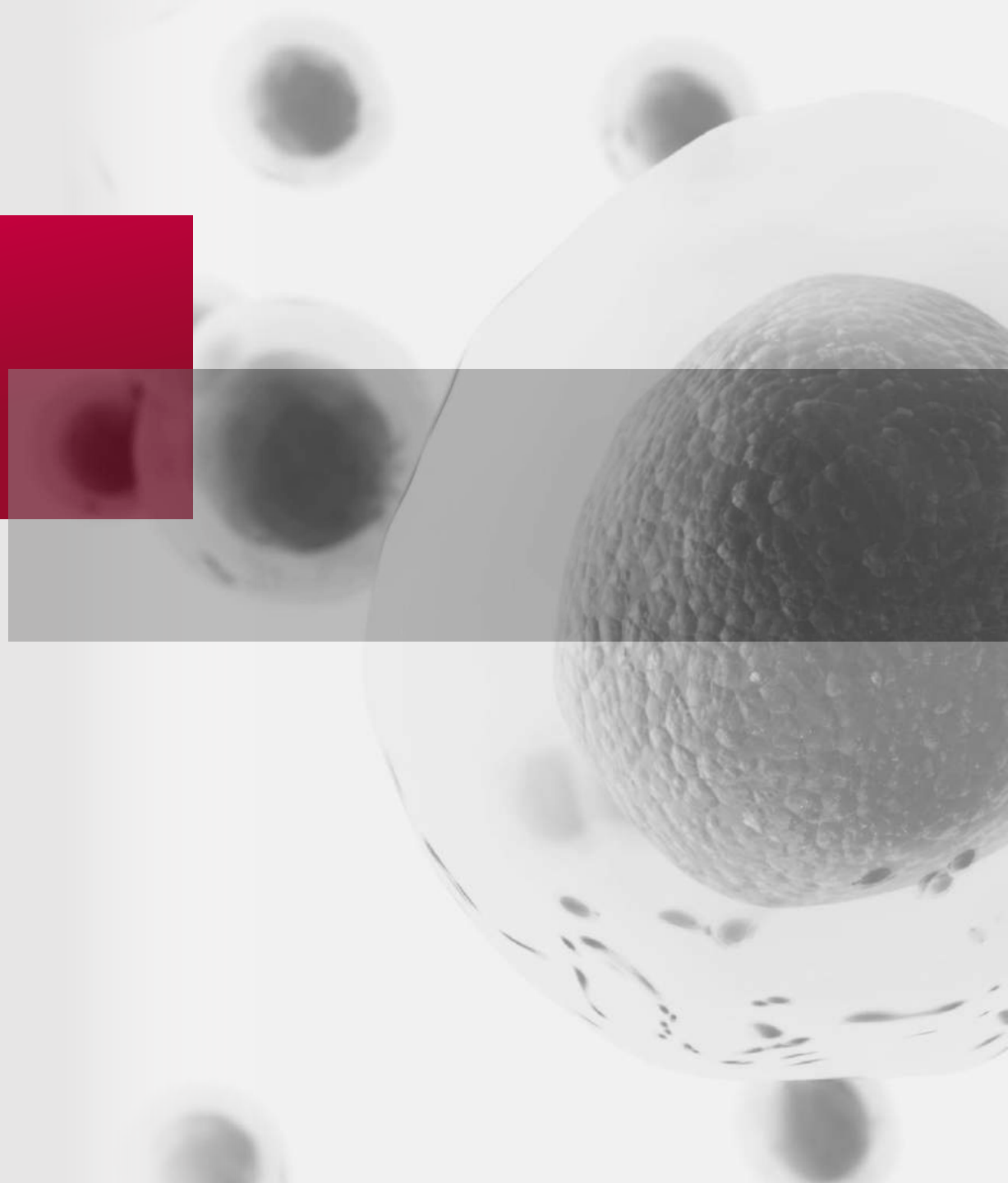


Labor intensive | Prone to human error | Difficult to find same position | Unstable environment for cell growth

Disadvantages of conventional method

This is the reason why you need **Celloger !**

II. Celloger Lineup



Celloger Mini

II-A. Celloger Mini

Diversify your research paradigm with our integrated live cell imaging system, **Celloger Mini**

Celloger Mini is a live cell imaging system based on bright-field microscopy with fully motorized stages. The multi-positioning supported by its motorized stages allows imaging of any position set by the user, thereby providing more meaningful and reliable results than a single point imaging. Moreover, intuitive software provides utmost convenience to monitor and analyze live cells in real-time.

This all-around and compact system provides autofocusing, time-lapse imaging, and analytical software that lets you perform various types of sophisticated research. Celloger Mini is designed to withstand the temperature and humidity suitable for the growth of cells that makes it compatible with CO_2 incubators.

II-A. Celloger Mini

Temperature and humidity sensor

Bright field lamp

Objective Lens

Vessel holder

X-Y Stage

Status light

- Green Ready
- Blue Scanning
- Red PC disconnected

LAN & Power cable
connector (Ethernet)

II-A. Celloger Mini

1. Cell monitoring inside incubator

Remotely monitor live cells inside the incubator without disturbing the environment suitable for cell culture. You can monitor cells in real-time or with the time-lapse function, cell images are captured automatically for days or even weeks without having to move the cells in and out of the incubator.

2. Compact size

Compact size makes it straightforward to install and handle, so there is no need for calibration and complicated maintenance procedures. Small-in-size also provides a room for space utilization inside incubators making it possible for multiple unit installation.

CONVENTIONAL
Vertical : 805mm
Height : 707mm
Horizontal : 226mm

CELLOGER MINI
Vertical : 305mm
Height : 220mm
Horizontal : 195mm

II-A. Celloger Mini

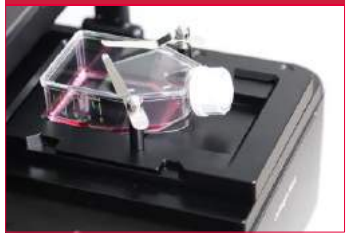
3. Multi-point imaging

Capturing up to 999 positions

The moving XY stage allows imaging of multiple positions within the travel range of 117 x 77mm and it is even possible to capture multiple points within a well. Also, cells cultured in different vessel types such as well plates, flasks, and dishes can be imaged.

Well-plate

Culture flask

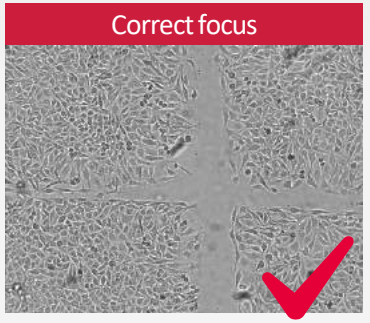


Culture dish

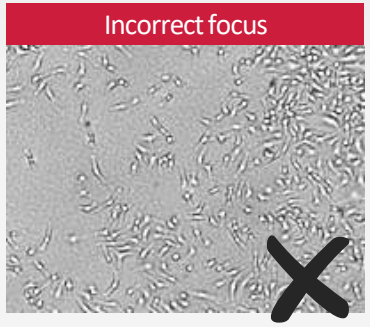
4. User-friendly functions

Autofocus

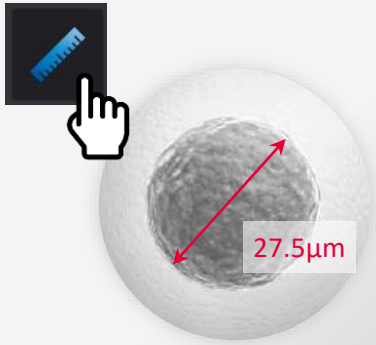
Correct focus



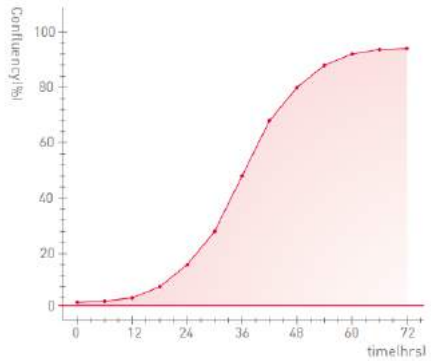
Incorrect focus



Ruler



Cell confluency & growth curve



[Cell growth curve]

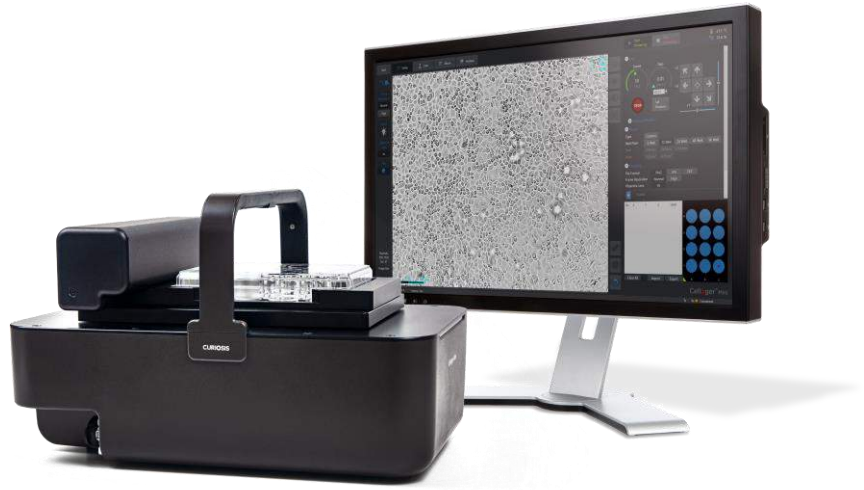
II-A. Celloger Mini

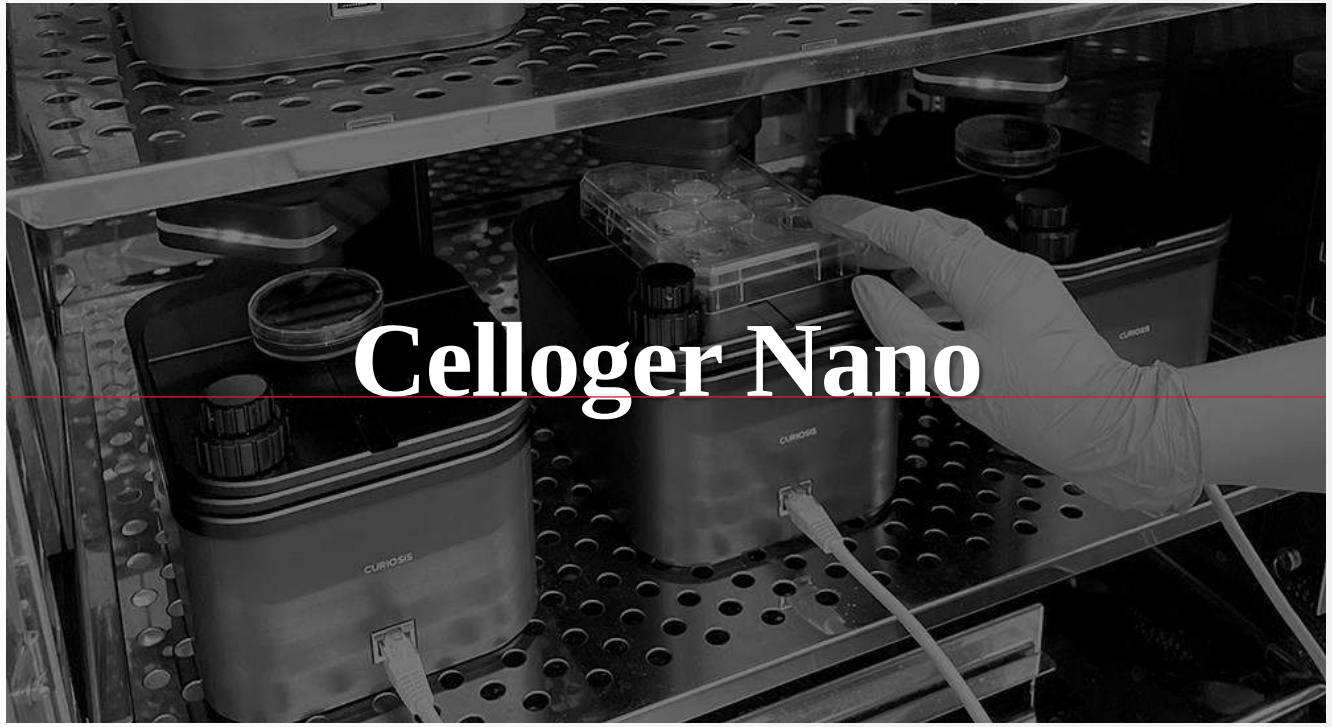
Specification

Dimension	195 x 305 x 220 mm
Weight	4.5kg / 9.9lb
Objective Lens	4X
Imaging modes	Brightfield
Light source	LED
Camera	1.25MP / 5MP CMOS
Stage	Motorized XYZ
Imaging positions	Multiple
File export format	TIFF, JPEG, PNG, AVI
Culture vessels	Flask, dish, well plate, slide
Operating environment	5~40℃, 20~95% humidity
Power requirements	100-240V, ~50/60Hz
Output ports	Ethernet
Computer	External PC
O/S required	Window 10
Processor (recommended)	CPU 3G
Storage (recommended)	1TB
Monitor (Recommended)	1920*1080mm
Accessories	PoE adapter, ethernet cable, vessel holders, USB memory
Warranty	1 year

Ordering Information

Cat. No.	Description
CRCLG-MB01	CLG Mini, Live cell imaging system (Bright Field, 4X)
CRCLG-MBTF25	Vessel holder, T-Flask A25cm2
CRCLG-MBPD35	Vessel holder, Petri dish 35mm
CRCLG-MBPD60	Vessel holder, Petri dish 60mm



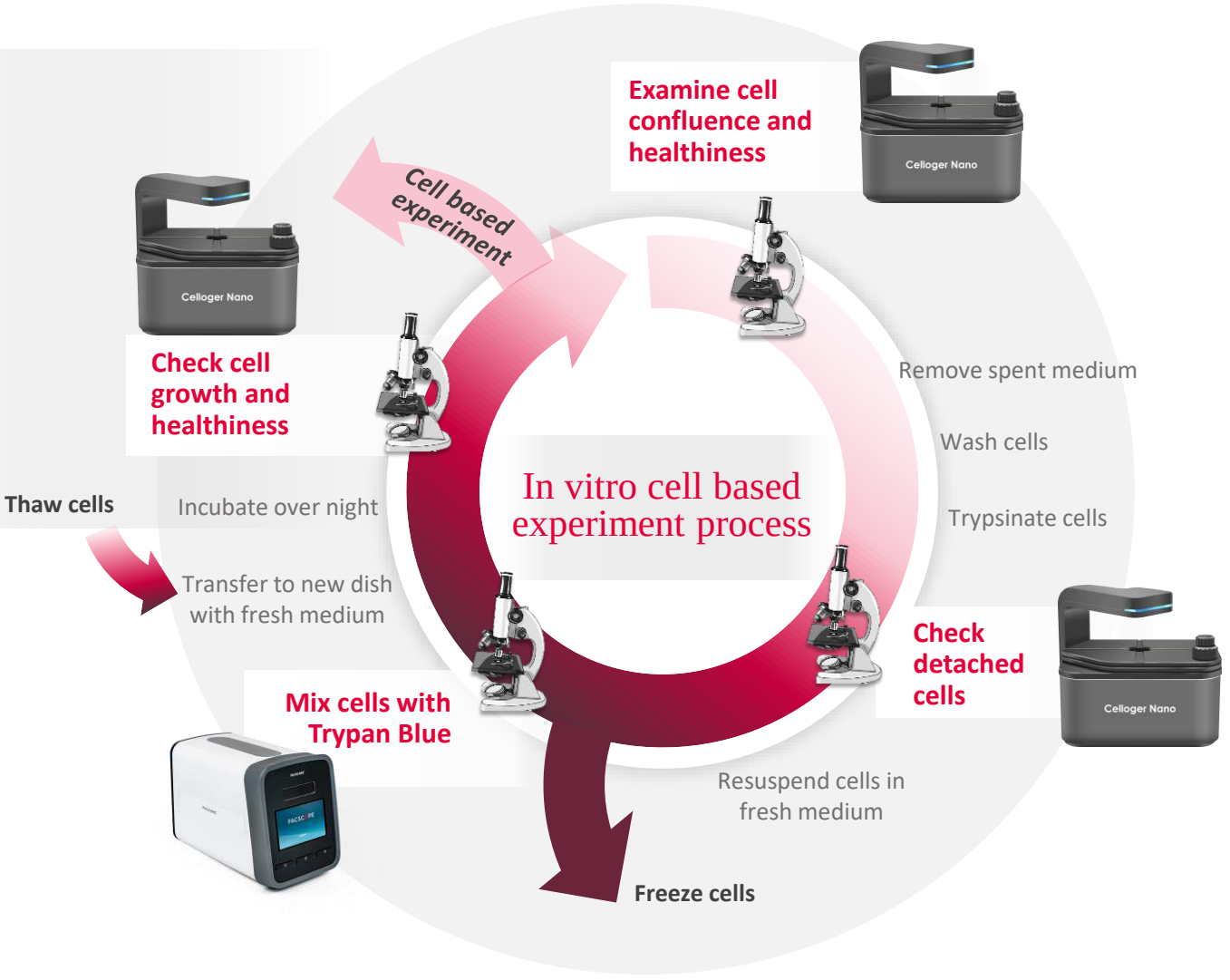


Celloger Nano

II-B. Celloger Nano

Expand your cell-based research through our multifunction live cell imaging system, Celloger Nano.

The NEW super compact and intuitive live cell imaging system, **Celloger Nano** - got everything you need to perform your sophisticate laboratory works. Equipped with exceptional fluorescence and bright field microscopy, time-lapse imaging, auto-focusing technology, precise stage controller, and user-friendly software, accelerates your cell-based research works.



II-B. Celloger Nano

II-B. Celloger Nano

I. Compact system inside incubator

Celloger Nano is a very compact system with a size almost equivalent to half of A4 paper thus making it suitable for placement inside an incubator. Several Celloger Nano systems can fit into a standard CO_2 incubator and are connected to one software enabling various experiments at the same time.

Celloger Mini

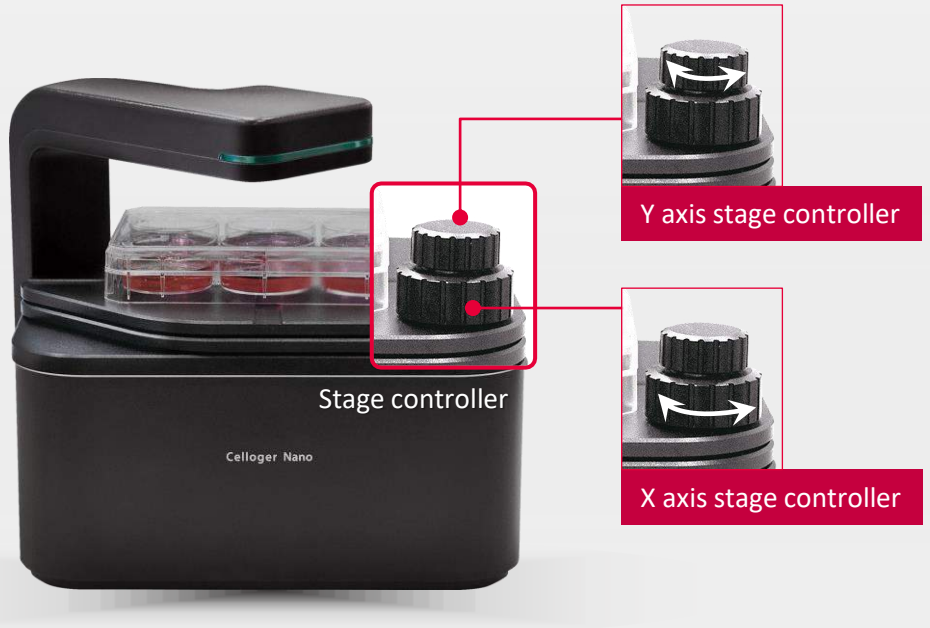
305 x 195 x 220 mm

Celloger Nano

211 x 146 x 188 mm

II. Precise stage controller

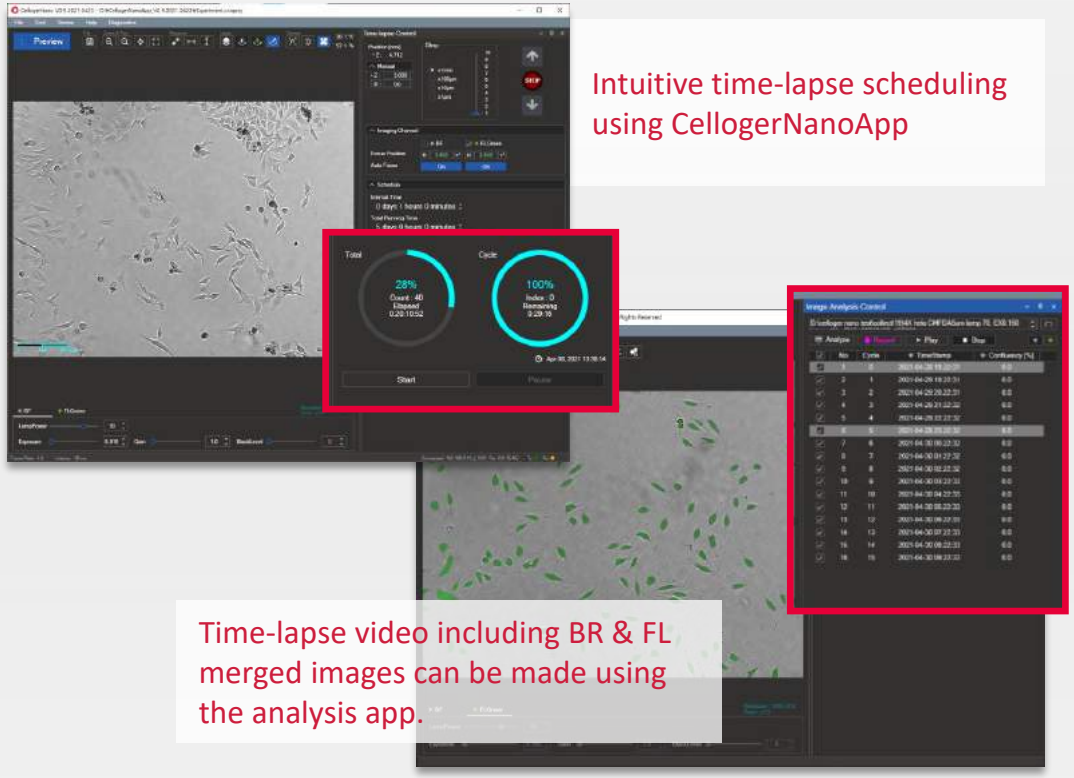
Once the sample is placed at the center of the stage, there is no need to move the sample with bare hands. The sample positioning is done with a simple touch by using the precise stage controller. This controller facilitates X and Y axis positioning with a distance of -/+ 6mm each axis.



II-B. Celloger Nano

III. One-point time-lapse imaging

After placing a sample on the stage and selecting a point to image, time-lapse setting can be easily done using intuitive Celloger Nano App software. Time-lapse video (BR, BR+FL merged) can be made with CLG Nano Analysis software.

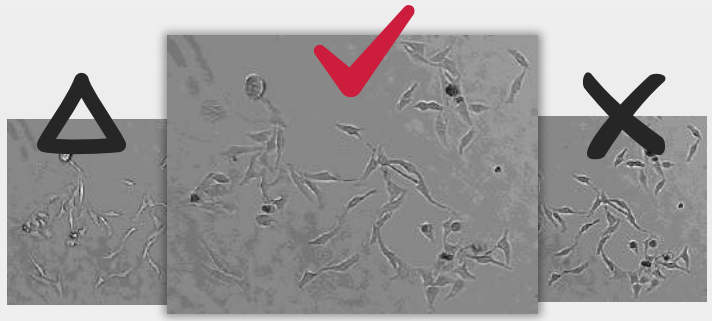


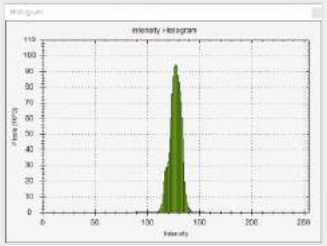
Intuitive time-lapse scheduling using CellogerNanoApp

Time-lapse video including BR & FL merged images can be made using the analysis app.

IV. User-friendly function

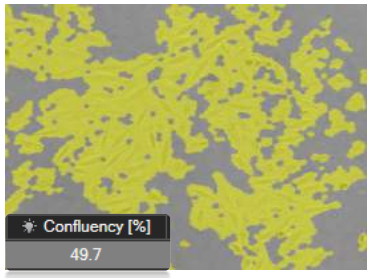
Autofocusing



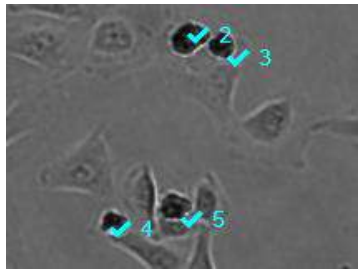


Intensity

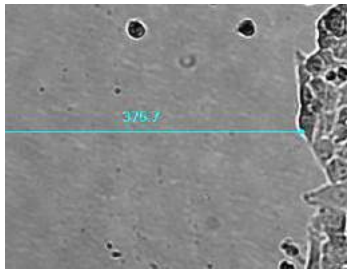
Analysis tools



Confluency



Counting (Manual)



Ruler

II-B. Celloger Nano

Specification

Dimension	211 x 146 x188 mm
Weight	3.2kg / 7.0lb
Objective Lens	4X / 10X
Imaging modes	Brightfield, Fluorescence (Green / Red)
Fluorescence	Green : Excitation (480/30x) / Emission (535/40m) Red: Excitation (540/25x) / Emission (575lp)
Light source	LED
Camera	1.25MP CMOS
Stage	Manual XY, motorized Z
Imaging positions	1
File export format	TIFF, AVI (JPEG, PNG)
Culture vessels	Flask, dish, well plate, slide
Operating environment	10~40℃, 20~95% humidity
Power requirements	100-240V, ~50/60Hz
Output ports	Ethernet
Computer	External PC
O/S required	Window 10
Processor (recommended)	CPU 3G
Storage (recommended)	1TB
Monitor (Recommended)	1920*1080mm
Accessories	PoE adapter, ethernet cable, USB memory
Warranty	1 year

Ordering Information

Cat. No.	Description
CRCLG-NB04	Live cell imaging system (Bright field, 4X)
CRCLG-NB10	Live cell imaging system (Bright field, 10X)
CRCLG-NBG04	Live cell imaging system (Bright field + Green Fluorescence, 4X)
CRCLG-NBG10	Live cell imaging system (Bright field + Green Fluorescence 10X)
CRCLG-NBR04	Live cell imaging system (Bright field + Red Fluorescence 4X)
CRCLG-NBR10	Live cell imaging system (Bright field + Red Fluorescence 10X)

Celloger Mini Plus

II-C. Celloger Mini Plus

Expand your cell discoveries with **Celloger Mini Plus**, automated live cell imaging system

Celloger Mini Plus is an automated live cell imaging system that is equipped with an advanced fluorescence and bright field microscopy, autofocusing and real time multi-position imaging technology. It provides you all the tools you need to acquire the best quality images and accurate research results. Various cell-based research work and applications can be done with this all-around system.

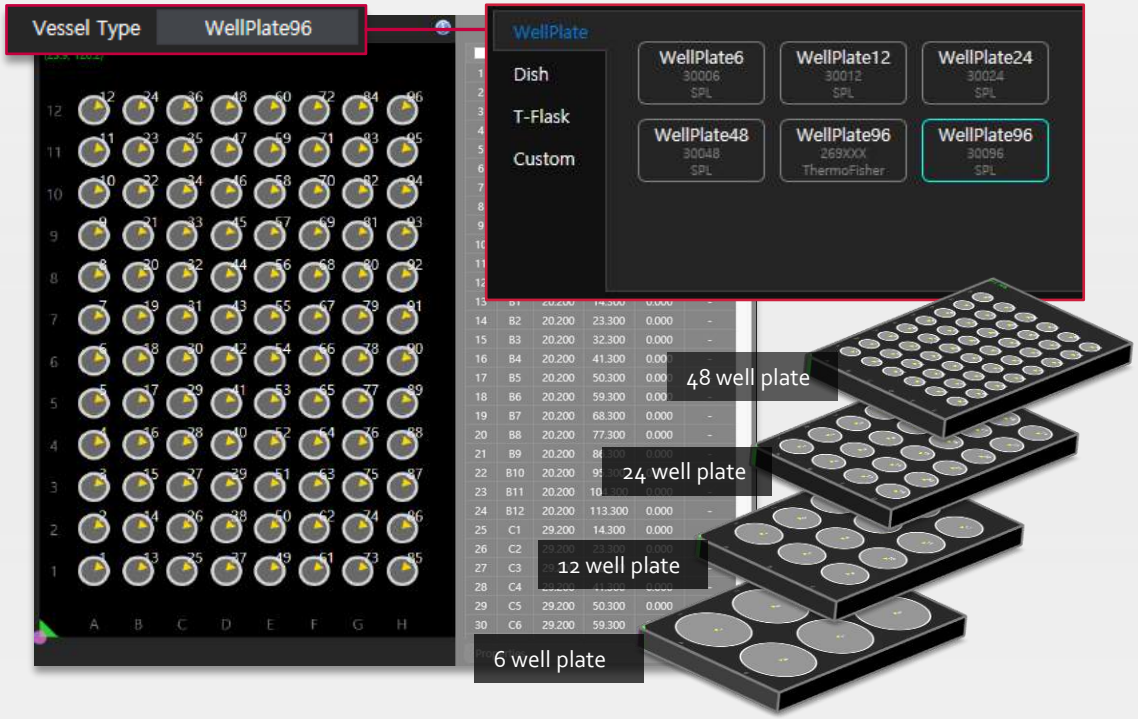
Improve your research outcome by performing real-time cell monitoring and analysis using Celloger Mini Plus. Perform complex research and analysis without taking the cells out of the CO_2 incubator, suitable for a long-term cell monitoring with a perfect environment for your cells to grow.

II-C. Celloger Mini Plus

II-C. Celloger Mini Plus

I. Multipoint imaging

- Using the motorized stages that travel 117mm x 77mm, x and y axis respectively, multiple points within the travel range can be captured following the schedule (intervals, cycles, total time) set by the researcher.
- Different kinds of vessels can be used (Well plates, dishes, flasks, slides)

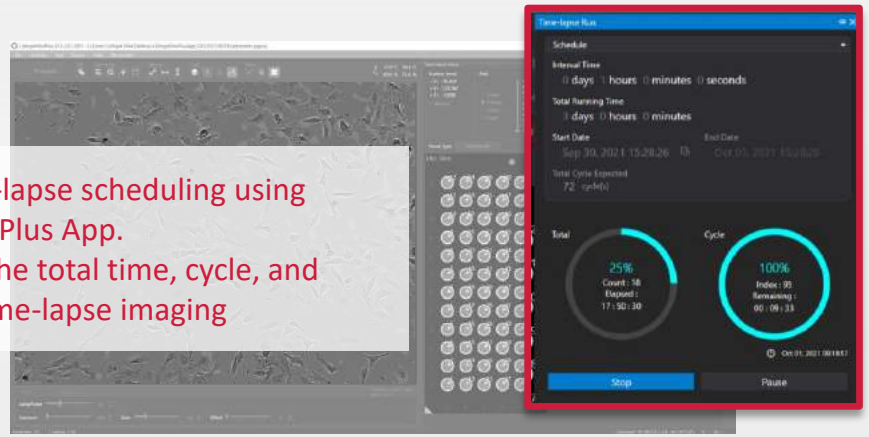


II. Stable imaging performance

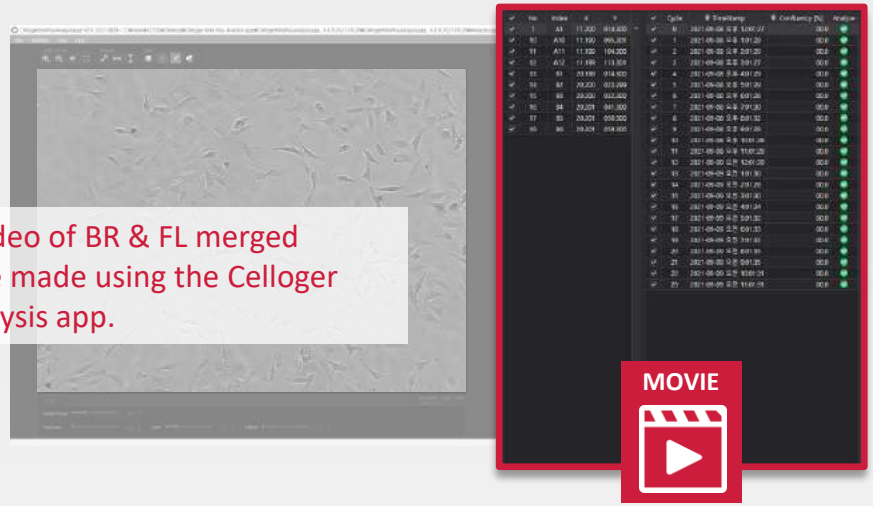
- Celloger Mini Plus doesn't have a moveable stage but instead, the camera located inside the system moves to capture the images of cell in multiple positions
- Precise and sensitive fluorescence detection is possible with the integrated hard-coated optical set and LED filter with more than 50,000-hour lifetime.

II-C. Celloger Mini Plus

III. Time-lapse imaging



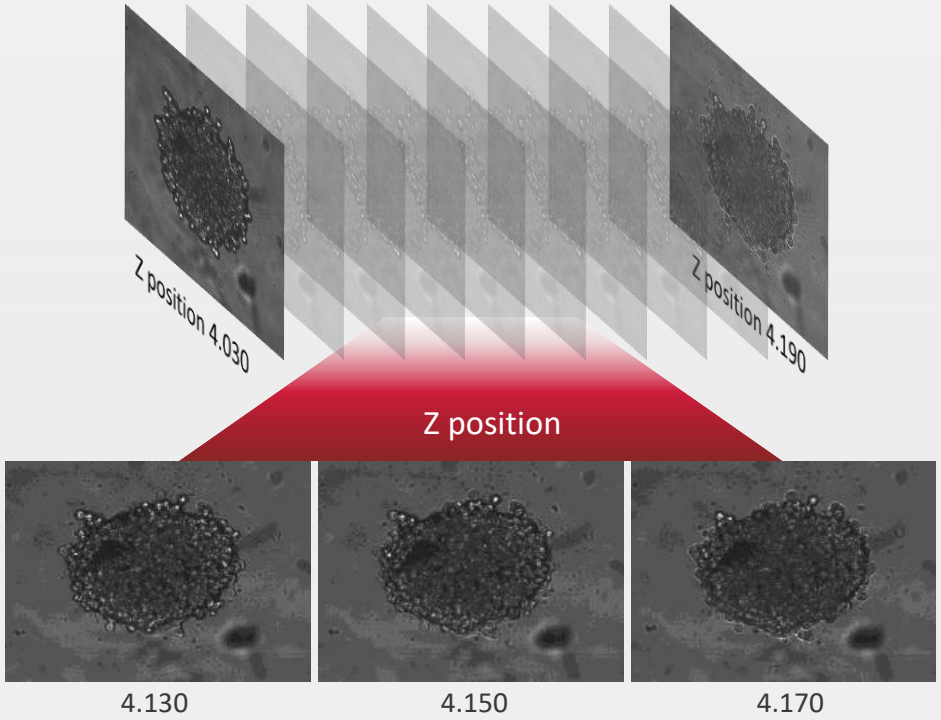
Intuitive time-lapse scheduling using Celloger Mini Plus App.
User can set the total time, cycle, and intervals of time-lapse imaging



Time-lapse video of BR & FL merged images can be made using the Celloger Mini Plus analysis app.

IV. Z-stacking

With the Z-stacking function of Celloger Mini Plus, spheroid cells can be observed using the time-lapse imaging.



II-C. Celloger Mini Plus

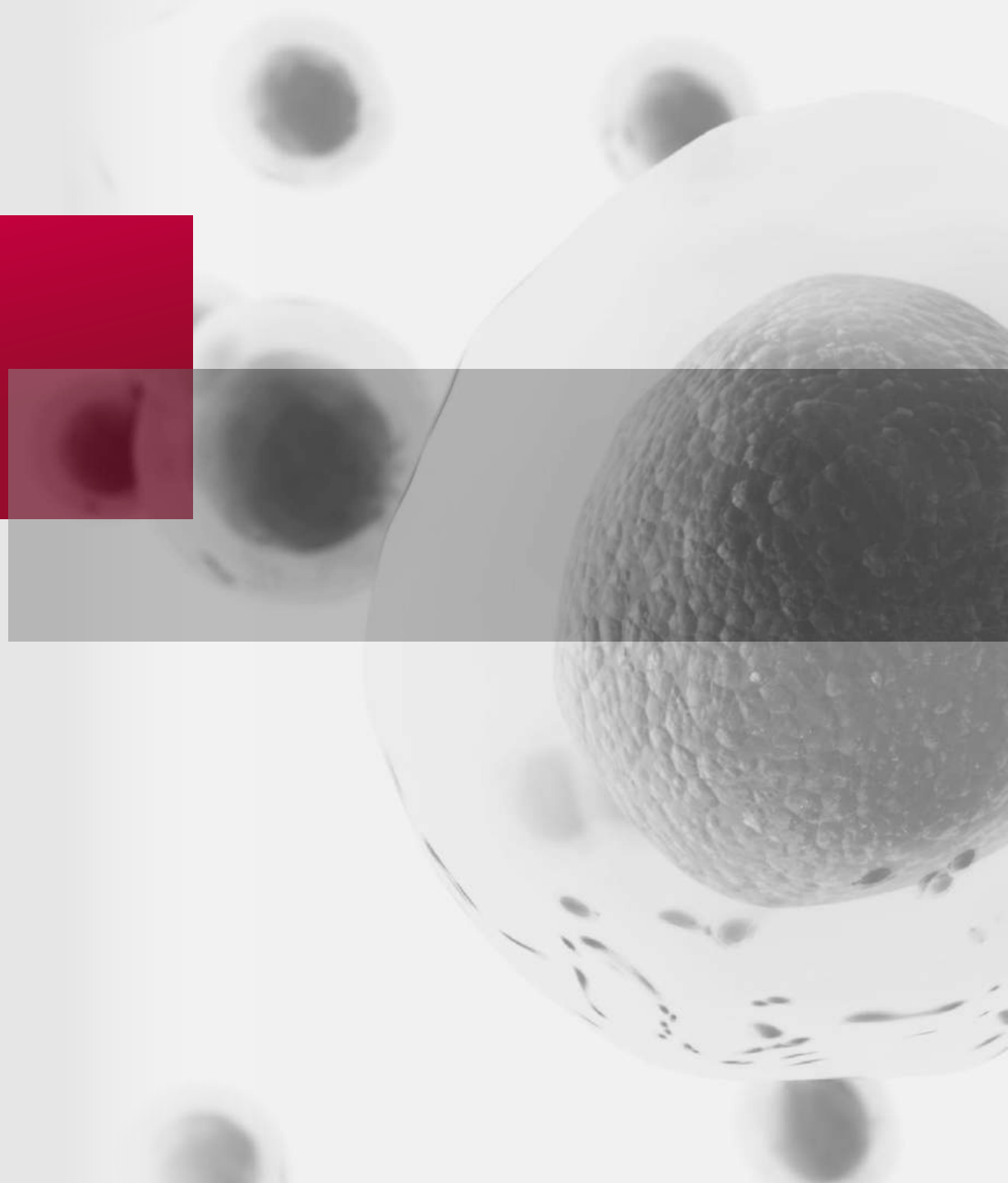
Specification

Dimension	226 x 358 x 215 mm
Weight	5.6kg / 12.3lb
Objective Lens	4X / 10X
Imaging modes	Brightfield, Fluorescence (Green / Red)
Fluorescence	Green : Excitation (470/40x) / Emission (510lp) Red: Excitation (540/25x) / Emission (575lp)
Light source	LED
Camera	5MP CMOS
Stage	Motorized XYZ
Imaging positions	Multiple
File export format	TIFF, AVI (JPEG, PNG)
Culture vessels	Flask, dish, well plate, slide
Operating environment	5~40℃, 20~95% humidity
Power requirements	100-240V, ~50/60Hz
Output ports	Ethernet
Computer	External PC
O/S required	Window 10
Processor (recommended)	CPU 3G
Storage (recommended)	1TB
Monitor (Recommended)	1920*1080mm
Accessories	PoE adapter, ethernet cable, USB memory
Warranty	1 year

Ordering Information

Cat. No.	Description
CRCLG-MPB04	CLG Mini Plus, Live cell imaging system (Bright Field, 4X)
CRCLG-MPB10	CLG Mini Plus, Live cell imaging system (Bright Field, 10X)
CRCLG-MPBG04	CLG Mini Plus, Live cell imaging system (Bright Field+Green Fluorescence, 4X)
CRCLG-MPBG10	CLG Mini Plus, Live cell imaging system (Bright Field+Green Fluorescence, 10X)
CRCLG-MPBR04	CLG Mini Plus, Live cell imaging system (Bright Field+Red Fluorescence, 4X)
CRCLG-MPBR10	CLG Mini Plus, Live cell imaging system (Bright Field+Red Fluorescence, 10X)
CRCLG-MPWPS	Vessel holder, Well plate 6~96 (Single)
CRCLG-MPTFS25	Vessel holder, T-Flask A25cm2 (Single)
CRCLG-MPTFD25	Vessel holder, T-Flask A25cm2 (Dual)
CRCLG-MPTFS75	Vessel holder, T-Flask A75cm2 (Single)
CRCLG-MPPDD35	Vessel holder, Petri dish 35mm (Dual)
CRCLG-MPPDD60	Vessel holder, Petri dish 60mm (Dual)
CRCLG-MPPDS90	Vessel holder, Petri dish 90/100mm (Single)

III. Applications

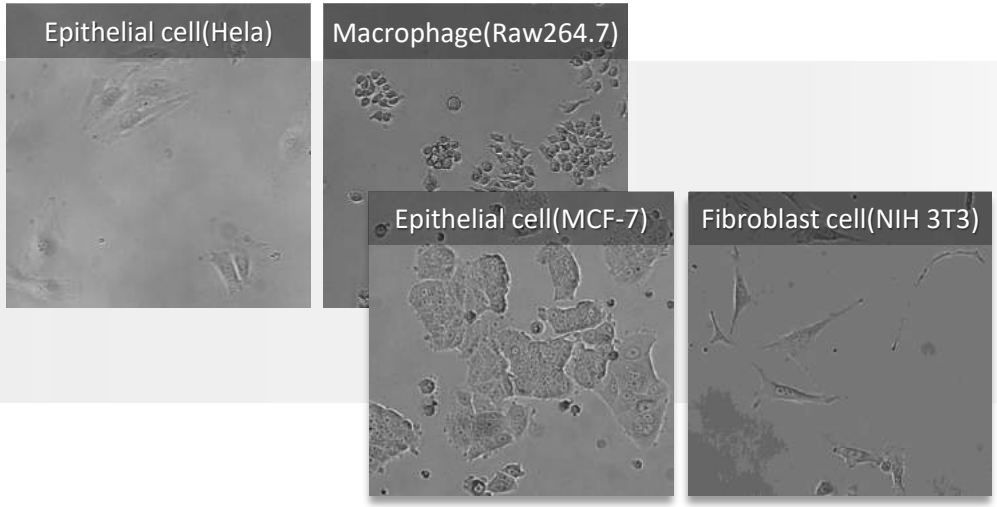


III. Applications

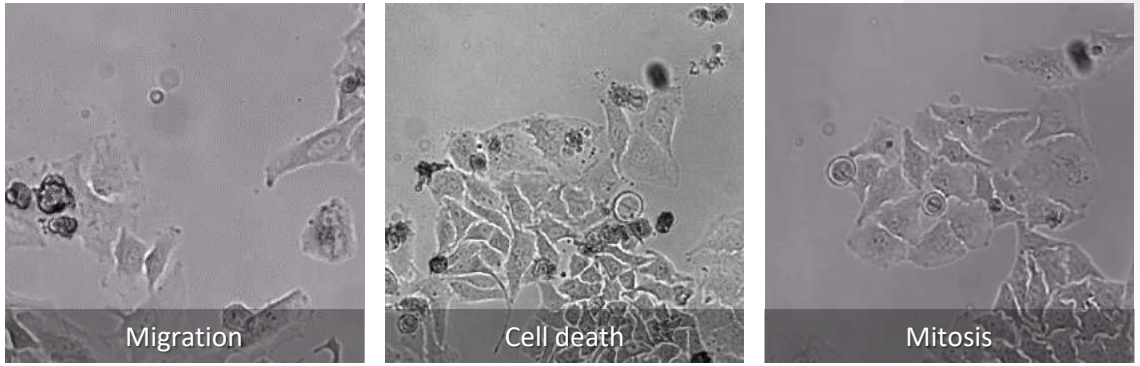
1. Cell monitoring

- Studying morphological changes of the cells is an essential method in the cell-based experiments. The changes in cell morphology occur at every major point in cell cycle and monitoring these changes in appearance of cells in real time is very important.
- Researchers can detect the signs of contamination in earlier stage, can determine senescence stage of the cells, and define the best time for subculture or harvest.

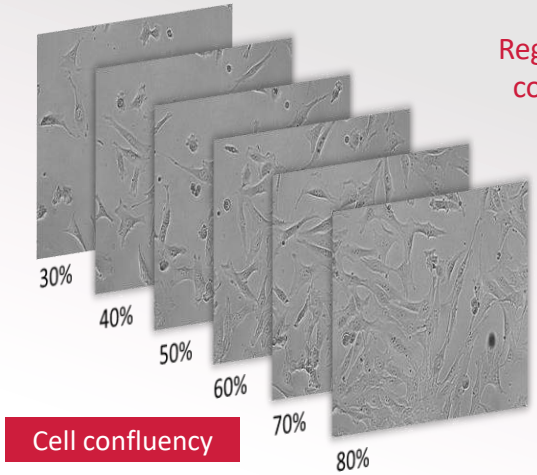
Cell morphology varies according to cell types



Monitor cell morphology changes over time



*Taken from Celloger Nano (10X, Green FL)



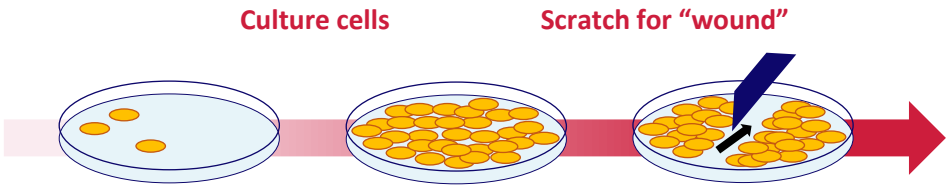
Regular assessment of cell confluency during the cell culture is essential since it is the best way to determine the right time for subculture or harvest.

Ready to Sub-culture

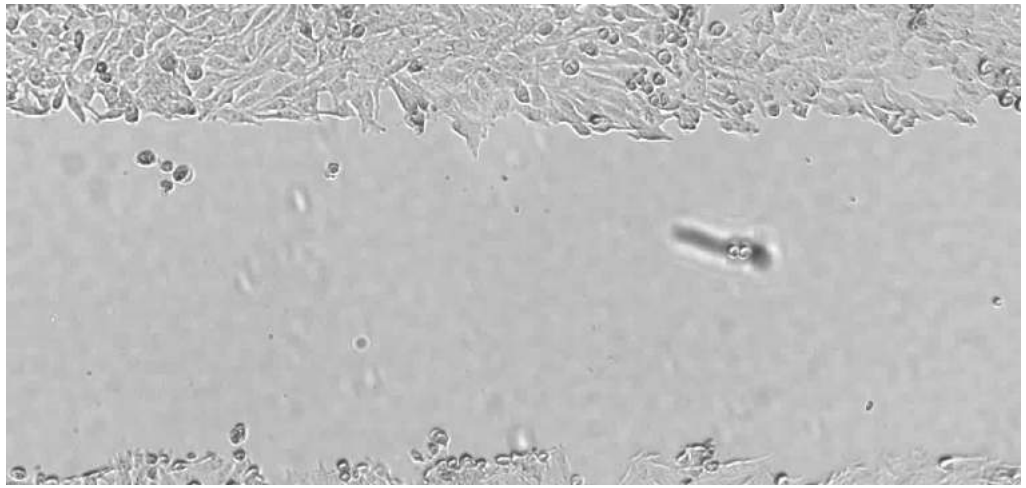
III. Applications

2. Wound healing assay (Cell migration)

Wound healing assay is the easiest and fastest way to check cell migration. When a scratch or space is created in the monolayer of cells, they show the process of movement to fill in the wound until the wound is entirely healed with the new healthy cells.

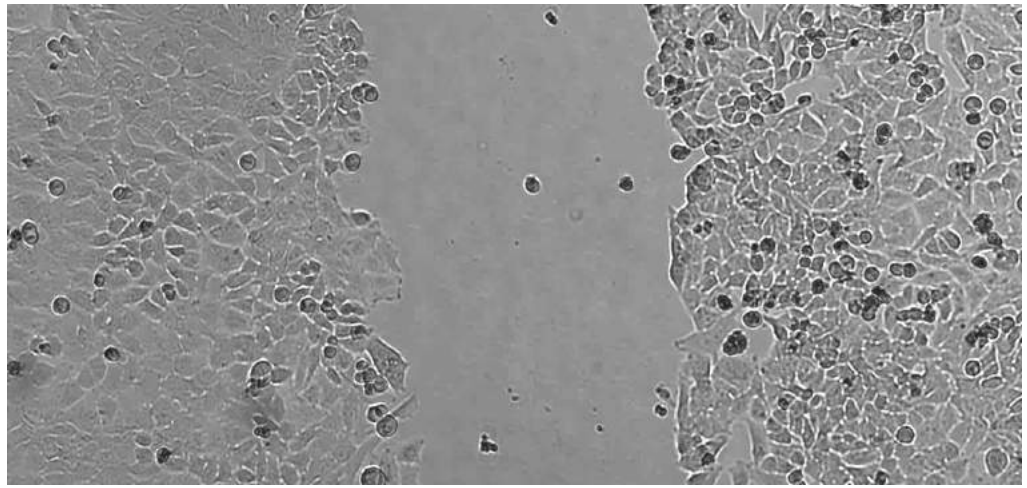


Process of wound healing assay



HeLa cells imaged every 2 hours for 5 days

*Taken from Celloger Mini



HeLa cell imaged every 10 minutes for 22 hours

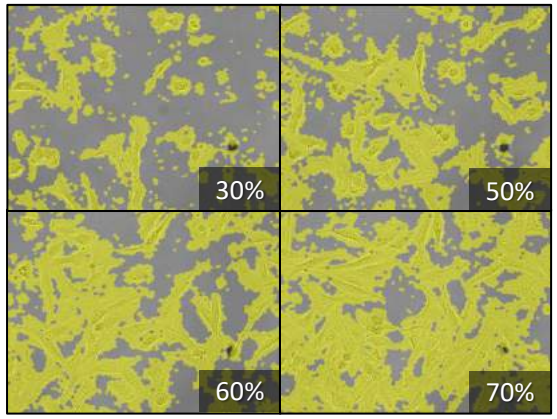
*Taken from Celloger Nano (10X, Green FL)

III. Applications

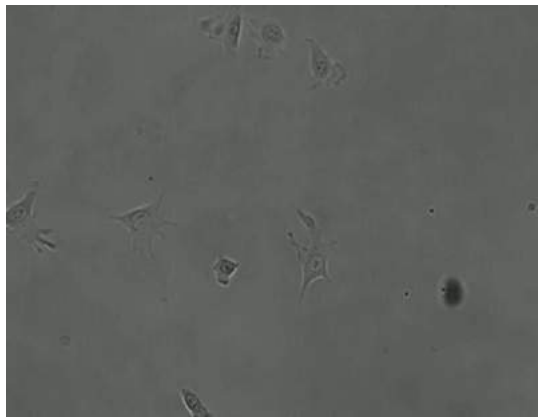
3. Cell proliferation

- Cell proliferation is to quantify the increasing number of cells over a period of time to verify that the cells are growing in normal growth process.
- As a method of quantification, number of fluorescent dyed cells or cell confluency is measured. In other words, a graph of cell number or confluency changes over time is mainly used as the result of proliferation.

Confluency

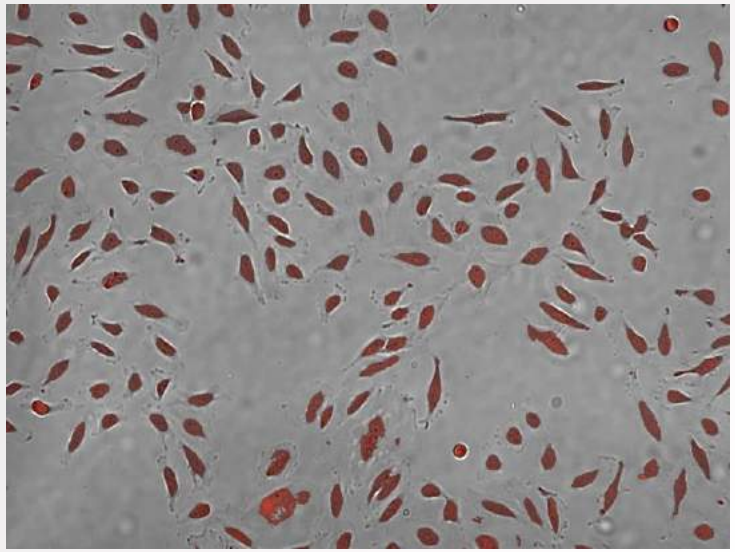


Time-lapse video



NIH 3T3 cell imaged every 15 minutes for 56 hours

*Taken from Celloger Nano (10X, Green FL)



HeLa cell imaged every 1 hour for 23 hours

*Taken from Celloger Mini Plus (4X, Red FL)

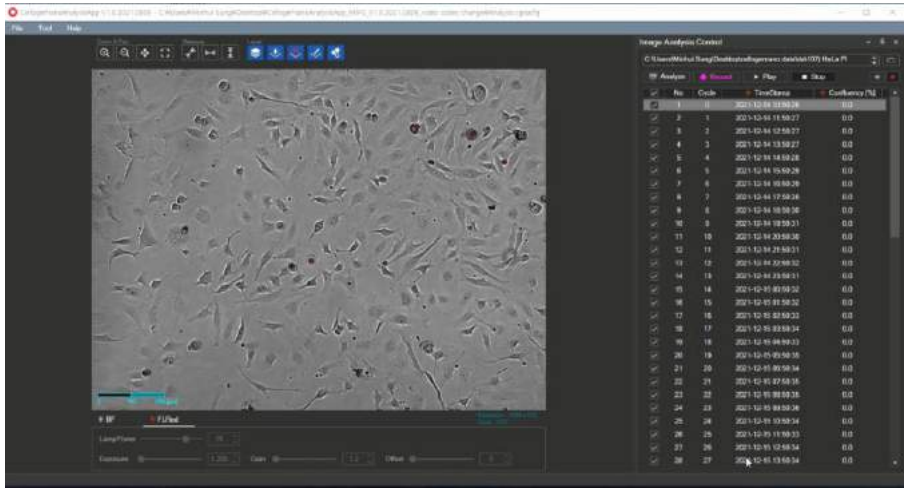
III. Applications

4. Cytotoxicity assay

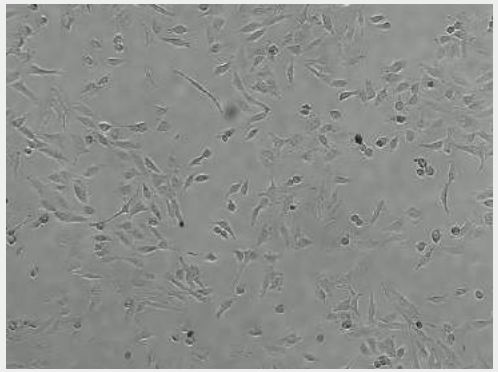
- Cytotoxicity refers to the state of being toxic to cells. Suppression of cell growth and division, cell lysis and apoptosis occur when stimulating activities such as toxic substances or environmental changes affect the cell health. Cytotoxicity assay is a way that compares these occurrences with the control group.

- Depending on the purpose of the experiment, the result of Cytotoxicity could be cell death rate by time, by drug concentration, and by drug type.

Analysis software video



Bright-field

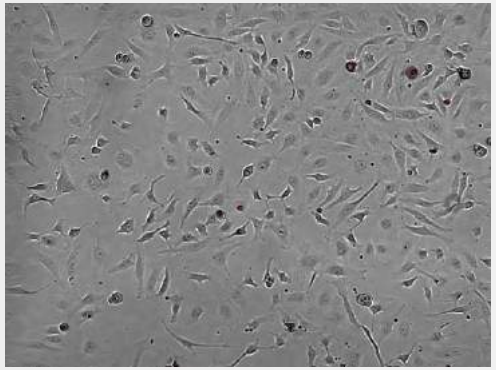


Fluorescence

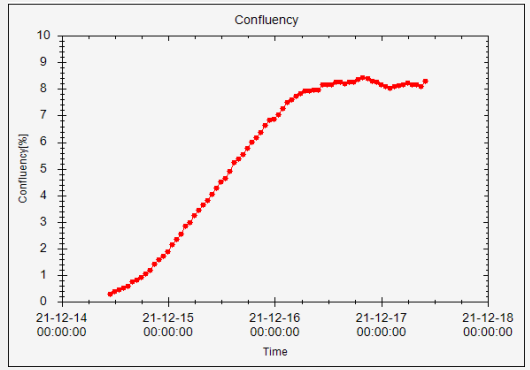
HeLa cell imaged every 1 hour for 48 hours

*Taken from Celloger Nano (4X, Green FL)

Time-lapse video



Confluency graph



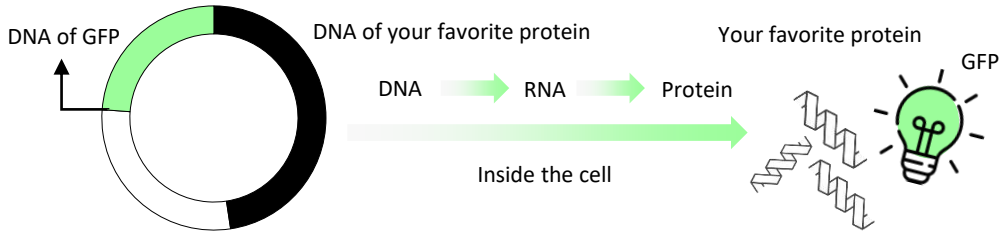
HeLa cell imaged every 1 hour for 71 hours

*Taken from Celloger Nano (4X, Red FL)

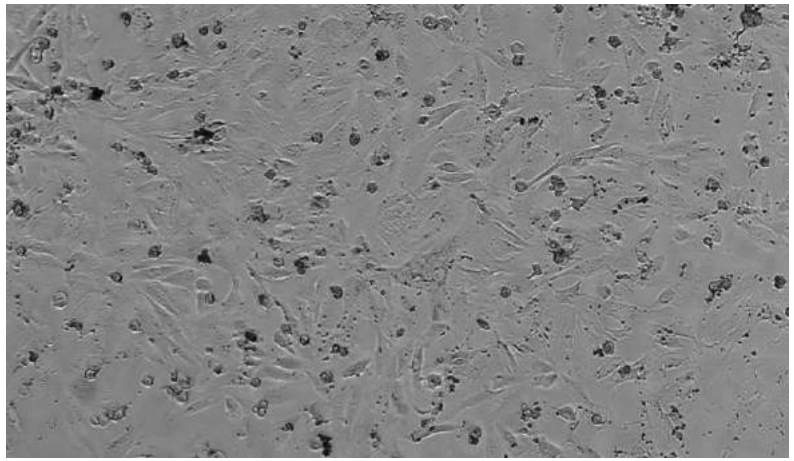
III. Applications

5. Transfection efficiency assessment

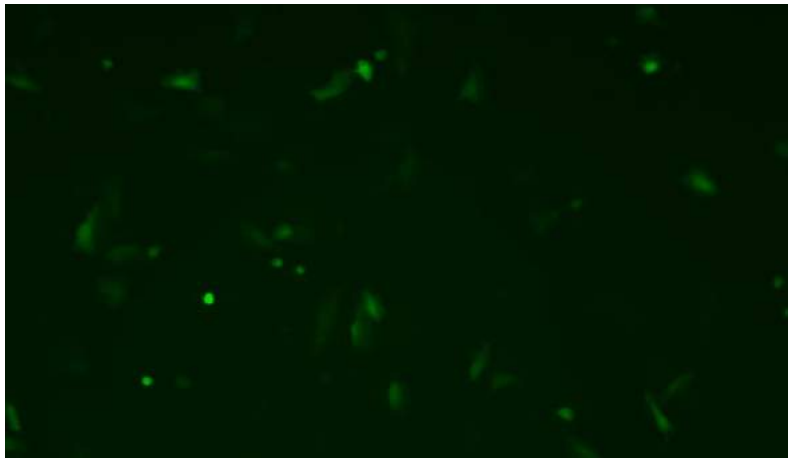
- Transfection is a method of inserting genes into eukaryotic cells and genes called ‘reporter gene’ such as GFP allow easy analysis of gene expressed after the transfection.
- Transfection efficiency is measured to enhance the delivery of gene into cultured cells without affecting the cell viability.



Bright-field



Fluorescence



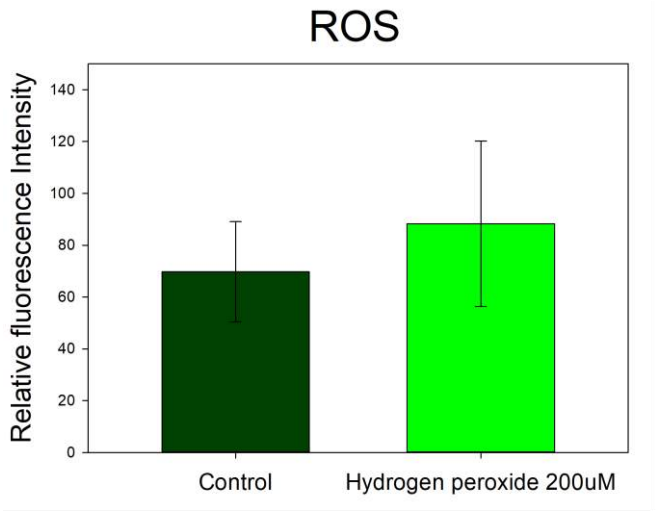
HeLa cell imaged every 2 hour for 44 hours

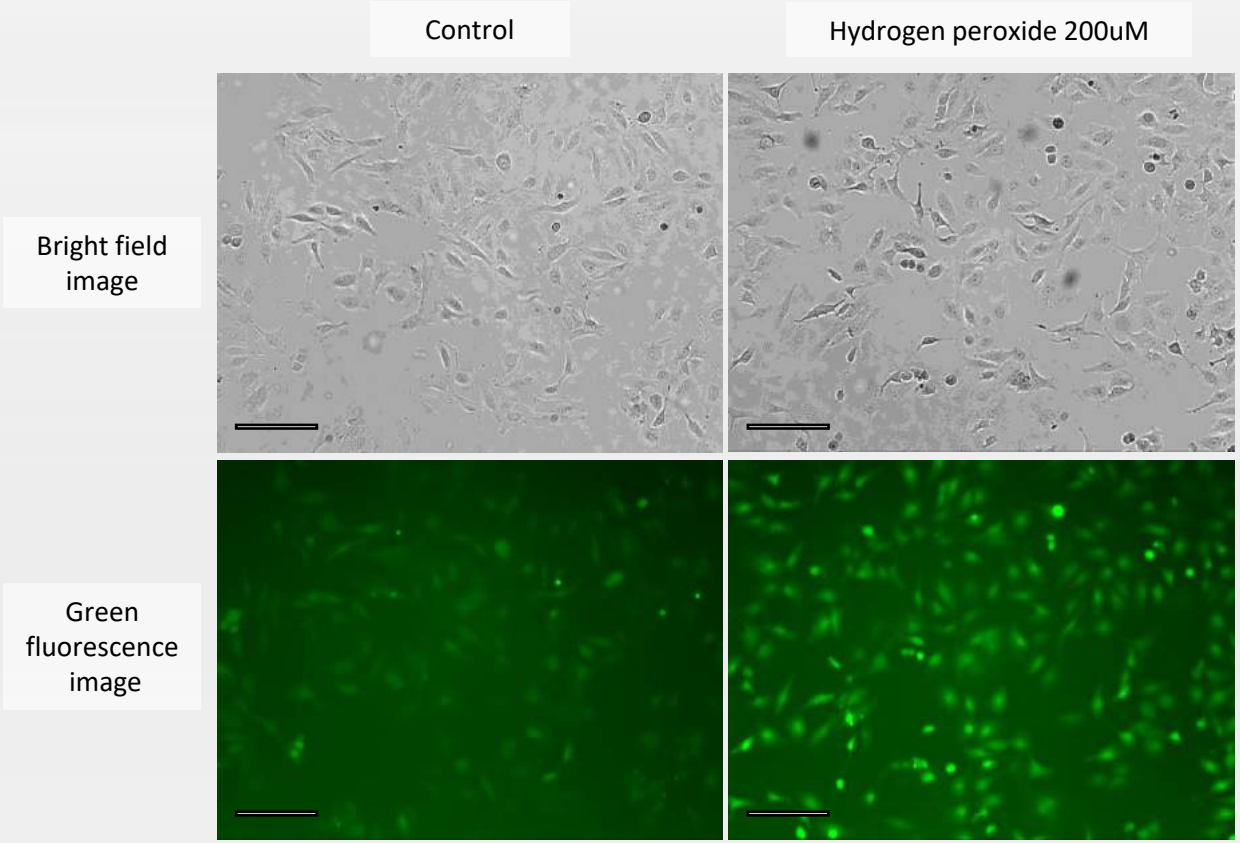
*Taken from Celloger Nano (4X, Green FL)

III. Applications

6. Reactive oxygen species (ROS) detection

Cells generate ROS as a by-product in the aerobic metabolism process. In order to prevent the excessive generation of ROS, antioxidative defense mechanism exists in a cell to maintain cellular redox homeostasis. However, excessive ROS causes oxidative stress, resulting in various diseases including cancer.



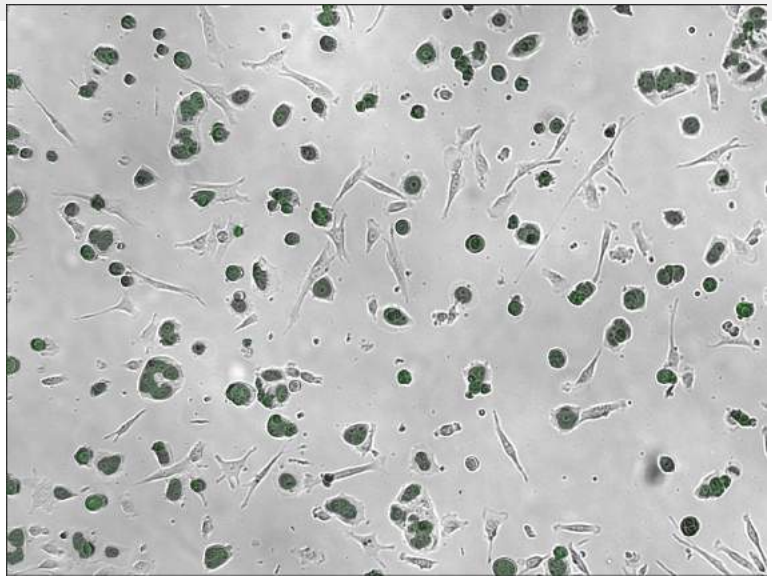


HeLa cells stained with DCF-DA 20uM taken with Celloger Nano 4X, Green FL

III. Applications

7. Coculture monitoring

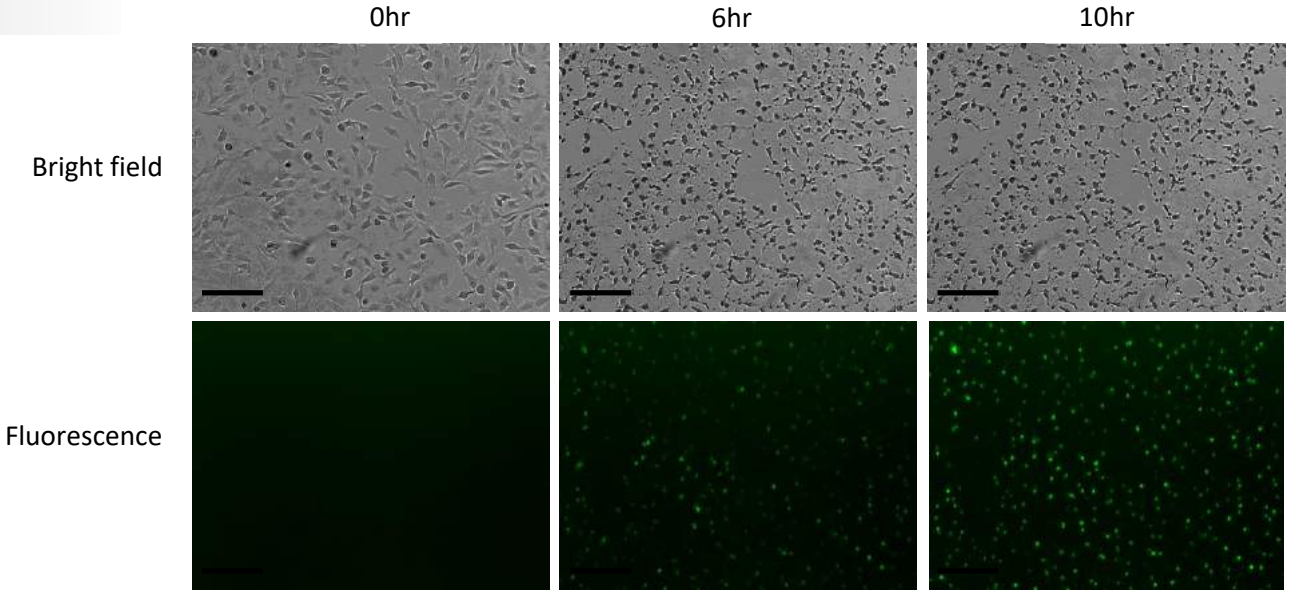
- Coculture monitoring is the analysis of cell-to-cell contact and it is the real time observation of changes in morphology caused by the interactions of two or more cells using live cell imaging.
- In order to distinguish the two cells, one cell is labelled with fluorescence and then cultured with other types of cell.



NIH3T3 & MCF-7 cells taken with Celloger Nano 4X, Green FL

8. Apoptosis

Apoptosis is the process of programmed cell death where processes such as membrane blebbing, cell shrinkage and nuclear fragmentation occur. In this process, the enzyme called caspase is activated to mediate this reaction in the cell.



Hela cells imaged every 30 minutes for 10 hours

*Taken from Celloger Nano (4X, Green FL)

IV. Comparison

IV. Celloger series comparison

	Celloger Mini	Celloger Nano	Celloger Mini Plus
Bright-field imaging	O	O	O
Fluorescence imaging (Green or Red)	X	O	O
Magnification	4X	4X / 10X	4X / 10X
Field of view	1.4 x 1.0 mm	4X: 1.4 x 1.0 mm 10X: 0.5 x 0.4 mm	4X: 1.4 x 1.0 mm 10X: 0.5 x 0.4 mm
Automatic stage	O (Moving stage)	X (Stage controller)	O (Moving optics)
Travel range	75 x 117 mm	12 x 12mm (Manual)	75 x 117 mm
Autofocusing	O	O	O
Manual focusing	O	O	O
Z-stacking	X	O (Manual)	O
Stitching	X	X	O
Multi-point imaging	O	X	O
Time-lapse imaging	O	O	O
Movie maker	O	O	O
Dimension (LxWxH)	305 x 195 x 220 mm	211 x 146 x 188 mm	358 x 226 x 215 mm
Weight	4.5kg	3.2kg	5.6kg
End user price	$19,500	$9,500	$29,000

Thank you

End of Document

Curiosis Inc.

4F 10, Teheran-ro 38-gil, Gangnam-gu, Seoul 06221, South Korea I T 82 2 508 5237 I F 82 2 508 5246 I sales@curiosis.com
www.curiosis.com