Omni FL

High-throughput fluorescence live-cell imaging

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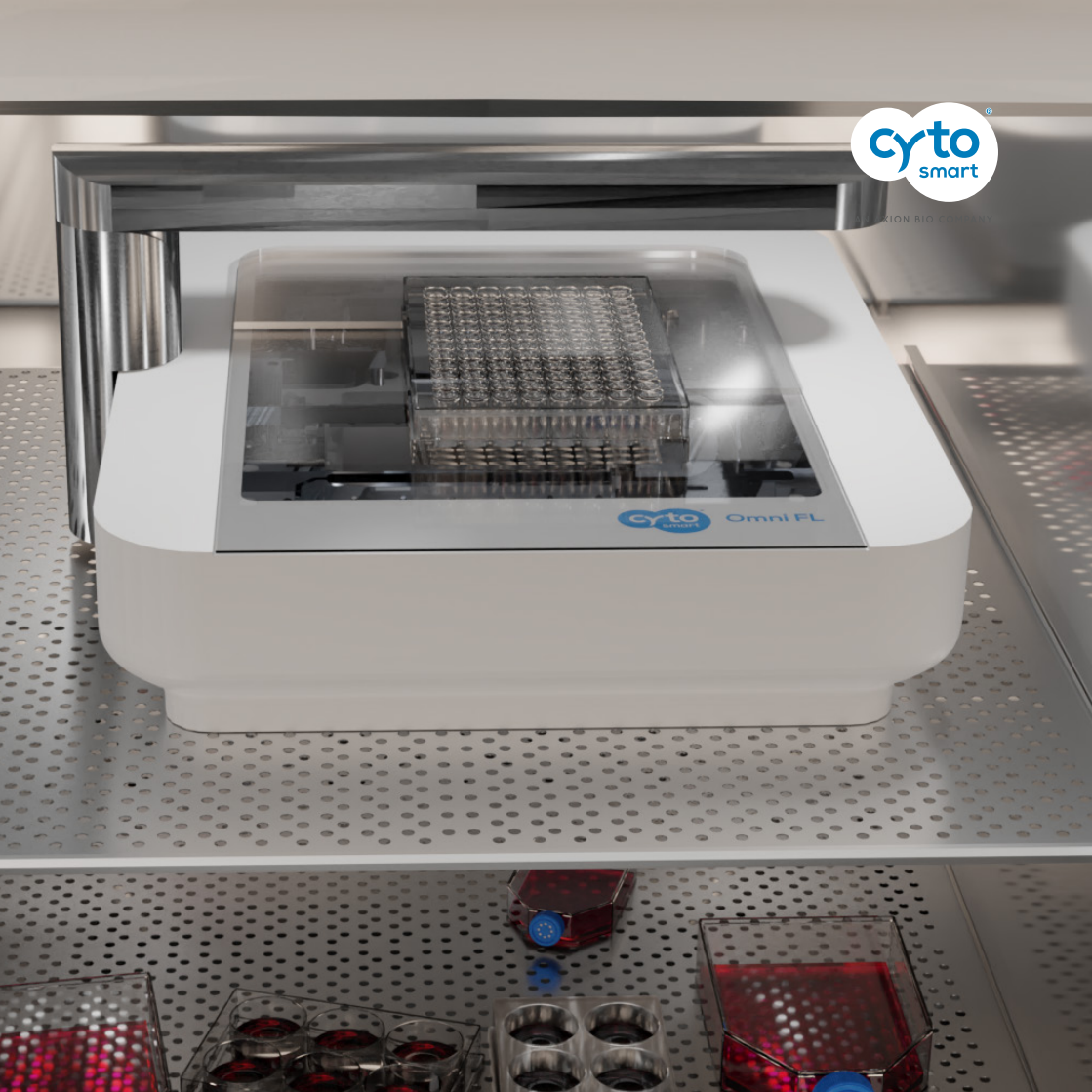
The high-throughput fluorescence live-cell imager that fits inside any incubator

The CytoSMART® Omni FL is a live-cell imager capable of producing high-quality, whole-well brightfield or high-throughput fluorescence images of living cells. Equipped with a brightfield and two fluorescence channels (green and red), the CytoSMART® Omni FL can be used for continuous live-cell imaging, as well as endpoint assays. The applications of the CytoSMART® Omni FL range from high-throughput analysis of cell viability and colony formation to evaluation of transfection efficiency and co-cultures. The versatility and flexibility of the device is further enhanced through its ability to scan multiple types of transparent cell culture vessels, ranging from T75 flasks and 96-well plates to microfluidic chips and custom culture vessels. The intuitive and open design of the CytoSMART® Omni FL ensures that the device is easy to use and maintain, as well as it allows the incorporation of the device into established automated workflows.

The CytoSMART® Omni FL offers:

- Innovative cloud-based storage and image analysis monitor and analyze your experiments in real-time, anywhere, anytime. Automatically keep your analyses up-to-date
- Incubator-friendly perform fluorescence and/or brightfield analyses without disturbing your cells
- Plug-and-play easy to install and requires no maintenance/calibration
- Automation-ready open design of the CytoSMART® Omni FL ensures effortless incorporation into established workflows, such as automated lab setups or custom culture systems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Omni FL

High-throughput fluorescence and brightfield imaging

Fluorescent labelling of cells and cell structures can aid understanding of complex biological processes. The CytoSMART® Omni FL can acquire full-well (and whole-plate) brightfield, as well as fluorescence images and time-lapse videos of cells. Its ability to scan multi-well plates (from 6- to 384-well plates) enables the CytoSMART® Omni FL to be used for high-throughput analyses. In addition, other types of culture vessels (e.g. flasks, microfluidic devices, custom culture vessels) can also be imaged using the CytoSMART® Omni FL.

Monitor and analyze your experiments anywhere, anytime

Images and videos of running or completed experiments can be accessed and analyzed from anywhere and anytime using the CytoSMART® Cloud. The AI-based image analysis enables efficient and accurate quantification of output parameters, including brightfield/fluorescence cell confluence and fluorescent object count.

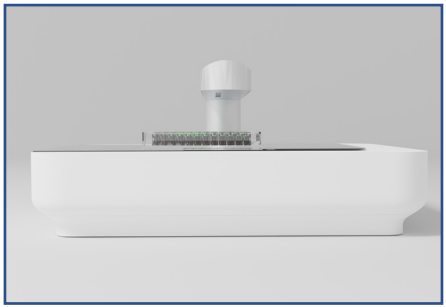

Fig. 1: The CytoSMART® Omni FL is designed to scan multiple types of culture vessels, and can be used in a variety of applications.


5% CO2
37°C
cyto
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Integrate live-cell imaging into your lab automation system

The open design of the CytoSMART® Omni FL facilitates its incorporation into existing (non-)automated workflows and protocols. The incorporation of a live-cell imaging module not only increases the range of output measurements, but also the efficiency and reproducibility of a scientific study.

Applications

- Cell viability
- 3D cultures
- Clonogenic assays
- Transfection efficiency
- Wound healing assays
- Cell culture monitoring
- Co-culture analysis
- and more

Easy installation and maintenance

The intuitive design of the CytoSMART® Omni FL ensures that the device is easy to use and maintain. A short training together with an introductory video will get you up-and-running. In addition, the microscope requires no additional calibration or maintenance by a service engineer.

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Cell culture monitoring and analysis. Anywhere. Anytime.

Images and videos of running or completed experiments can be accessed and analyzed from anywhere and anytime using the CytoSMART® Cloud. The artificial intelligence (AI)-based image analysis algorithms enable efficient and accurate quantification of output parameters, including brightfield/fluorescence cell confluence, fluorescent object count, collective cell migration and more. The AI-mediated quantification of output parameters significantly minimizes intra- and inter-observer variability and bias in the interpretation of results.


Omni FL
Set up experiment
Scan mode
Full well plate
Scan pattern
Navigate in 48 well plate
Change well plate
Channels: Brightfield, Green, Red
Edit pattern
cyto smart

Application example: co-culture

When compared to brightfield-only imaging, fluorescence live-cell imaging multiplies the number of read-outs – and consequently the obtained information from one experiment – with the number of fluorescence channels. In cellular co-cultures, fluorescence imaging facilitates distinction of the cell types, when cell types are assigned specific fluorescent labels. Quantitative and qualitative read-outs per cell type can then be based on the respective fluorescent labels.

The corresponding Cloud-based image analysis algorithm for brightfield and fluorescent channel confluence provides kinetic confluence profiles of fluorescently labeled cells in co-cultures. This provides fundamental insight into interactions between the cell types.

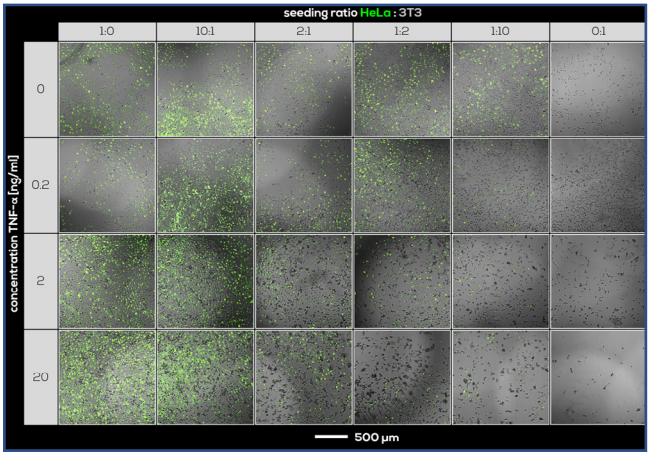


Fig. 2 Images of HeLa : 3T3 co-cultures, corresponding to various seeding ratios and TNF-α concentrations. Green fluorescent HeLa cells and non-fluorescent 3T3 fibroblasts were seeded at 1:0, 10:1, 2:1, 1:2, 1:10 or 0:1 ratios, and exposed to 0-20ng/ml TNF-α for 48 h. 3images per well were made at each time point.

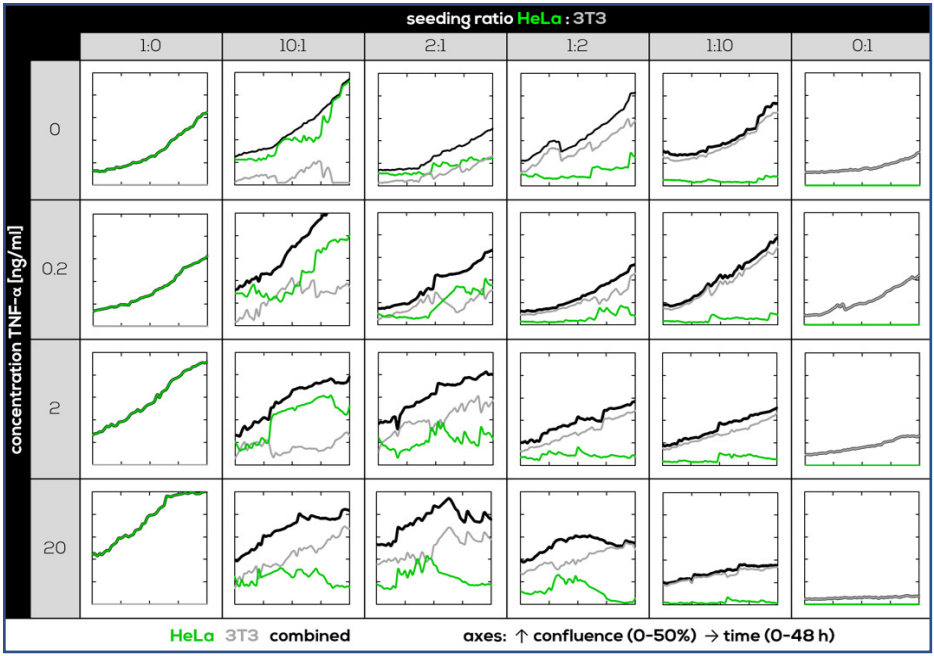


Fig. 3 Confluence quantifications per cell type over time for HeLa : 3T3 co-cultures, corresponding to various seeding ratios and TNF-α concentrations. All conditions were monitored with the CytoSMART® Omni FL over 48 h with a 1 h imaging interval and 3 images per well. The confluence per channel was assessed in the CytoSMART® Cloud, and averaged over the 3 images per well. All graphs have a vertical axis range of 0-50% confluence, and a horizontal axis range of 0-48 h.

Frequently Asked Questions

Q: What is the CytoSMART® Omni FL?

A: The CytoSMART® Omni FL is a fluorescence (green and red) and brightfield microscope designed to image live cells directly inside a cell culture incubator. The device can be used for continuous cell culture monitoring, as well as endpoint assays.

Q: How does the CytoSMART® Omni FL work?

A: Samples are illuminated using an LED and recorded with a moving camera positioned below the sample stage. During brightfield acquisition, the camera scans the sample stage and acquires a series of sequential images. One complete brightfield scan generates around 7850 snapshots. These are stitched to form an image with a surface area of 86 mm × 124 mm (3.4'' × 4.9''). When acquiring fluorescence images, the users can choose how many snapshots of a defined location within the well they want to record. The images are then uploaded to the CytoSMART® Cloud where they can be analyzed using our image analysis algorithms.

Q: Can I specify a recording interval?

A: You can specify the interval rate between 1 – 24 hours or choose to perform a single scan.

Q: Can the CytoSMART® Omni FL be used inside a cell culture incubator?

A: Yes, the CytoSMART® Omni FL is designed to be used inside a cell culture incubator. Its hardware and electronics can operate at 5 – 40°C and between 20 – 95% humidity.

Q: What type of image analysis algorithms can I use?

A: Brightfield/fluorescence cell confluence analysis algorithm, scratch assay (i.e. collective cell migration) analysis algorithm, clonogenic assay algorithm, and fluorescent object count are currently a part of the image analysis software package. Users always have the option to download the raw data and perform their own analysis.

Q: Which fluorescent dyes are recommended to use with the CytoSMART® Omni FL?

A: Many different fluorescent dyes can be used, as long as the fluorescent dye's excitation and emission spectra correspond with the fluorescence filters of the Omni FL (green – excitation: 452/45 nm, emission: 512/23 nm; red – excitation: 561/14 nm, emission: 630/90 nm). Some examples are calcein-AM, and green fluorescent protein (GFP) for the green channel, and propidium iodide (PI) and red fluorescent protein (RFP) for the red channel.

It is essential to match the fluorescent dye to the optical filter specifications of the device. In addition, it is important to ensure that the dye is not toxic to live cells.

Q: What culture vessels are compatible with the CytoSMART® Omni FL?

A: Any transparent culture vessel that is lower than 55 mm (2.2") (height of the light arc) can be scanned. Some examples include 6 – 384-well plates, Petri dishes, T25 – T225, triple flasks, and HYPERFlasks. However, the user needs to keep in mind that the size of the scan area is limited to 86 mm × 124 mm (3.4" × 4.9").

Specifications

Channels	Brightfield, green and red fluorescence channels
Magnification	10× fixed objective
Fluorescence filters	Green: Excitation: 452/45 nm, Emission: 512/23 nm Red: Excitation: 561/14 nm, Emission: 630/90 nm
Camera	6.4 MP CMOS
Image size	2072 x 2072 pixels
Brightfield scan area	86 × 124 mm (3.4″ × 4.9″)
Light source	LED
Data formats	JPG, TIFF, XLSX, MP4
Computer requirements	Windows 10 or higher, USB 3.0, 2.4 GHz i5, 8 GB RAM
Culture vessels	Well-plates, Petri dishes, flasks, microfluidic chips, and custom culture vessels (lower than 55 mm (2.2″))
Algorithms	Brightfield: cell confluence, scratch assay, and colony assay Fluorescence: cell confluence and fluorescent object count
Dimensions	396 × 345 × 171 mm (15.6″ × 13.6″ × 6.7″) (L x W x H)
Weight	9 kg (19.8 lb)
Operating conditions	5 - 40 °C (41-104 °F), 20-95% humidity
Warranty	1-year parts and labor
Data storage	Unlimited Cloud storage
Support	Via mail and live chat

Interested?

April 2022

Ordering information

Article number: TAB-1010
Product: CytoSMART® Omni FL
Request quote: cytosmart.com

CytoSMART® Cloud license options

1 year: WNA-1007
5 years: YNA-1007
10 years: XNA-1007

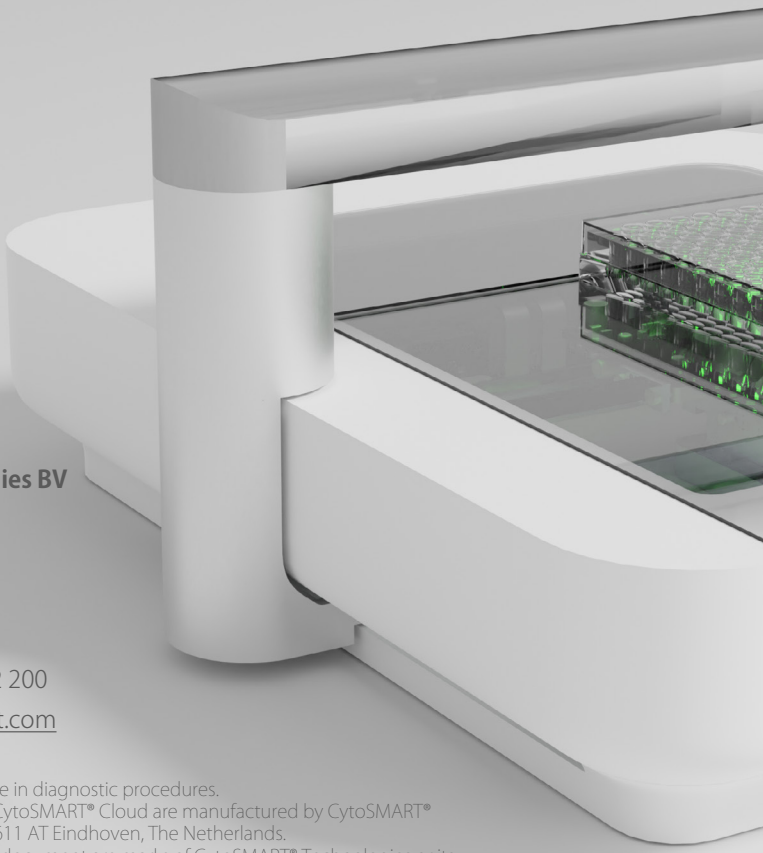
Research use only. Not intended for diagnostic purposes.

About CytoSMART®

CytoSMART® Technologies is an innovator in kinetic live-cell imaging. Combining compact and fast imaging hardware with powerful image analysis algorithms supported by cloud computing. Automation in time-lapse microscopy and image-based cell counting to generate high-quality and robust data.

Our team of engineers continues to develop and optimize the image analysis and data storage capacities linked to our systems, making sure that data-sets are easily processed, stored and kept securely in an online environment. We want to enable research that builds on large data-sets and is conveniently communicated.

In 2022, Axion BioSystems, a US-based leading life sciences tools company focused on advanced live-cell assay systems, has acquired CytoSMART® Technologies. Both companies see large synergies to accelerate further growth together.



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