Omni

Analyzes like nobody
else (s)can

cyto smart™

bringing out **the best**

Challenging researchers to bring out their best

CytoSMART™ Technologies is a Dutch company based in the tech-hub of Europe, Eindhoven. We introduce new smart devices into laboratories worldwide. We want to challenge every life science researcher to think differently and become the best in their field of expertise. CytoSMART™ believes that high-end innovative tools should be accessible by all those trying to be at the forefront of scientific discovery.

By working together, CytoSMART™ can help those at the cutting edge of life science research, to achieve greatness.

The smallest automated live-cell imager that fits within any incubator

The all-new CytoSMART™ Omni is the first affordable automated live-cell imager that fits inside a standard cell culture incubator. It can acquire a bright-field scan of any cell culture vessel within minutes and provides almost instant cloud-based image analysis of your cell culture.

The CytoSMART™ Omni is:

+ **Fast** - Faster than any automated live-cell imager ever seen
+ **Flexible** - Any type of transparent culture vessel can be scanned
+ **Compact** - Fits in any cell culture incubator

The world's fastest live-cell imager

The CytoSMART™ Omni can acquire a brightfield scan of your entire cell culture vessel within minutes. Not only the scanning process is fast, setting up your experiment is also done within a few minutes, after which the CytoSMART™ Omni does the work for you.

The scan is made and uploaded to the CytoSMART™ Cloud (powered by Microsoft Azure) where our custom image analysis algorithms evaluate the scan within minutes. This allows you to quickly set up your experiment and walk away, so you can spend your precious time on data analysis instead of obtaining data.

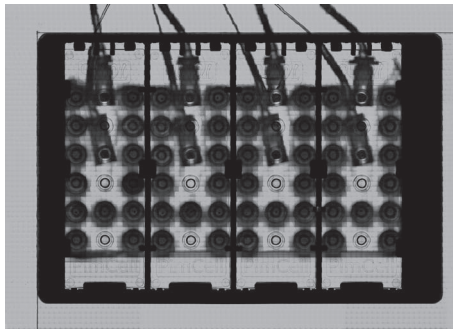
Optimum culture conditions

The CytoSMART™ Omni is so compact, it easily fits inside any cell culture incubator. Next to this, the shape of the CytoSMART™ Omni is especially designed so it does not affect the temperature and airflow inside the incubator. This enables you to perform your experiments at the optimum culture conditions for your cells, without any fluctuations in temperature or CO_2-level.

Because the CytoSMART™ Omni is placed inside the incubator, you can even scan samples cultured under hypoxia without the need to worry about changes in O_2-level. Your colleagues will like this device too, since it is so compact that there is still space left in the incubator for their cell cultures.

Versatile

The large optical window of the CytoSMART™ Omni enables you to easily visualize any well plate, culture flask, petri dish or other labware that fits underneath the light arc. You can simply monitor the health of your cells cultured in flasks or dishes or conduct a wide variety of assays in a 96-well plate. Because of the open design of the CytoSMART™ Omni, you can even perform flow-based experiments in microfluidic devices without any difficulty regarding the tubing (fig. 1).



Higher accuracy

The large area scan acquired by the CytoSMART™ Omni is captured by moving the optics instead of the sample. The CytoSMART™ Omni hardware is designed to make scanning extremely repeatable, increasing the accuracy of your time-lapse data. It also enables you to perform experiments with sensitive or non-adherent cells, since your cells are undisturbed throughout the entire experiment duration. Furthermore, data accuracy is increased by analyzing the total surface area of each well, instead of taking just one image per well using conventional microscopy.

Figure 1. Scan of four PimBio flowchips made with the CytoSMART™ Omni (left). Because of the open design of the CytoSMART™ Omni, the tubing can easily be connected between the flowchips and the pump (right).
Images printed with permission of PimBio B.V.

Set up and walk away

The straightforward Omni app (Fig. 2) allows anyone in your lab to use the CytoSMART™ Omni without extensive training. Just place the device inside your cell culture incubator, connect it to a computer and start the Omni app. Place your culture vessel on the optical window of the Omni, follow the intuitive steps of the Omni app, start your experiment and walk away.

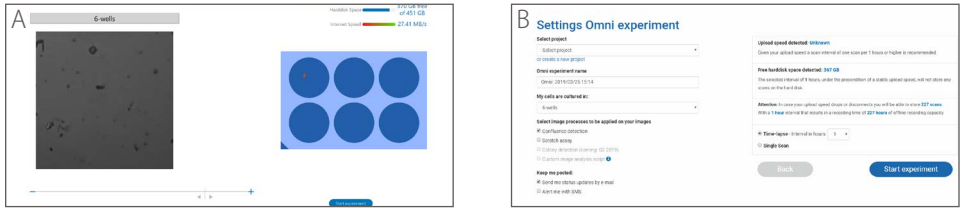


Figure 2. Overview of the CytoSMART™ Omni app. A) Select your culture vessel and focus. B) Select the type of image analysis and set the time interval.

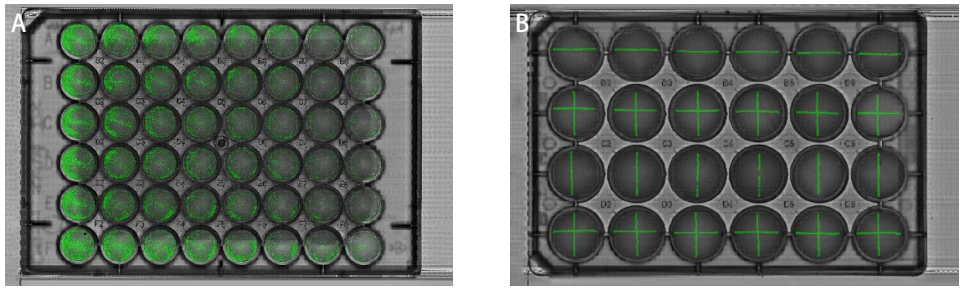


Figure 3. A) Example of confluence analysis in a 48-well plate. B) Example of scratch analysis in a 24-well plate.

Cloud-based image analysis

Once you have started your experiment the images taken by the CytoSMART™ Omni are directly uploaded to the CytoSMART™ Cloud. Once the entire scan is uploaded, it is evaluated by our CytoSMART™ cloud-based image analysis software. Currently you can either select confluence or scratch assay analysis (Fig. 3). However, more analysis tools, such as colony detection, will become available soon. In the future, you will even be able to upload your own image analysis algorithm to our cloud environment. Visualization of the results is done in the map view mode in the CytoSMART™ Cloud. Next to this, you are also able to follow the change in confluence or scratch area over time, create groups to compare different culture conditions with each other and download raw data, graphs, images and videos of your experiment (Fig. 4 and 5).

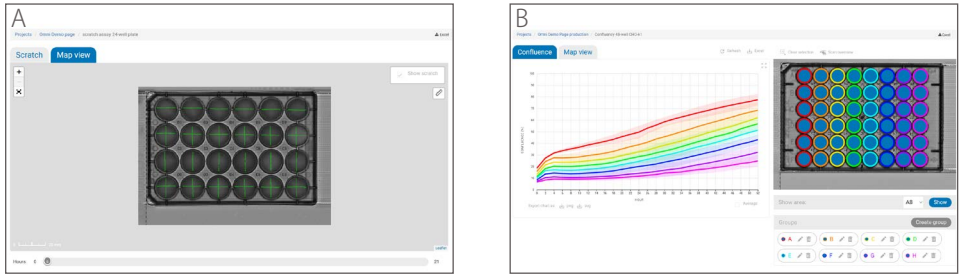


Figure 4. A) Examples of the map view mode in the CytoSMART™ cloud. In the map view mode, you can zoom in to a maximum of 10x magnification and pan through the scans of each timepoint to easily evaluate the results of your experiment. B) A quantitative overview of the results can be generated for each well individually or for multiple wells as a group (average ± standard deviation).

Easy access.
Anywhere. Anytime.

The images taken with the CytoSMART™ Omni are analyzed and visualized in the CytoSMART™ Cloud. After each scan, the results of your experiment are updated so the experiment can be monitored in almost real-time via the CytoSMART™ Cloud on your smartphone, tablet, or computer from anywhere you like.

Another benefit of cloud-based data storage and analysis is that you can easily share your experiments with your colleagues. Because only one master copy of your experiment data is stored in the CytoSMART™ Cloud, you always retain tight control over who can access your experiments. Besides, the terabytes of storage space available on the CytoSMART™ Cloud allow you to store tons of data without any inconvenience of the use of hard drives or USB-drives.

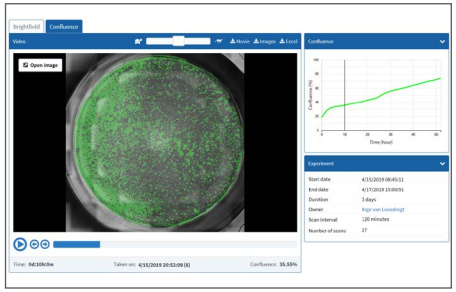
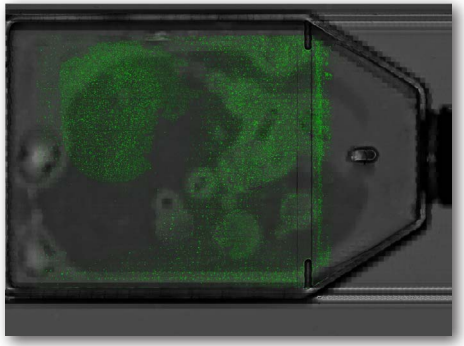


Figure 5. Individual well mode in the CytoSMART™ Cloud. Here you can view the results of this particular well over time.

Applications

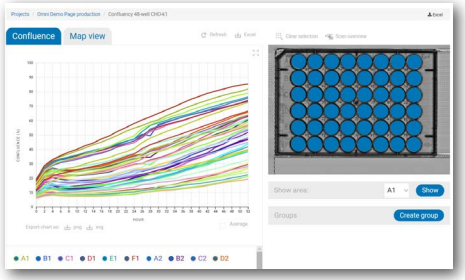
Using the integrated cloud-based image analysis algorithms, you can perform cell culture quality control, proliferation, cytotoxicity and cell migration (wound healing) experiments in just a few clicks.

Using commercially available image analysis programs (e.g. ImageJ, Matlab, Python) you can use the images obtained with the CytoSMART™ Omni for applications such as: 3D spheroid formation, neurite formation, angiogenesis, etc



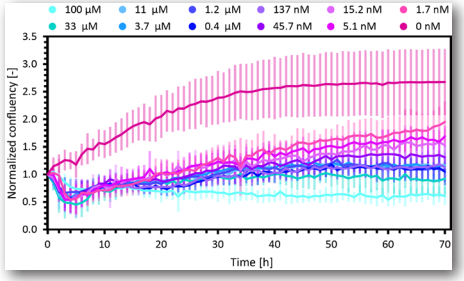
Cell culture quality control

Track cell proliferation over time to monitor any irregularities in cell growth and distribution.



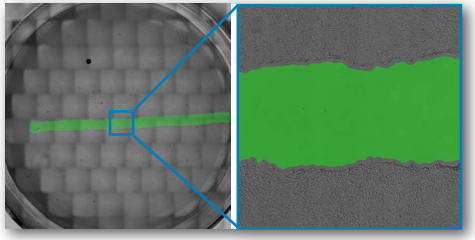
Cell proliferation

Automatically measure cell proliferation over time using our label-free live-cell imaging tools.



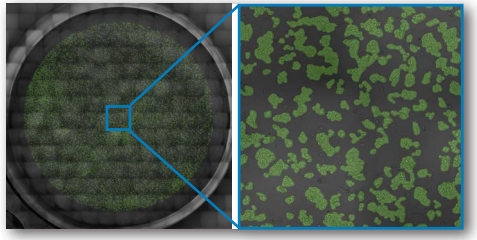
Cytotoxicity

Measure the effect of (toxic) compounds on cell viability in real-time using our cloud-based confluence analysis.



Cell migration

Investigate the effect of specific treatments on collective cell migration in 2D using scratch assays.



Colony detection (coming soon)

Follow the change in number and size of 2D cell colonies over time using our online colony detection algorithm.

Frequently Asked Questions

Q: How does the CytoSMART™ Omni work?
A: The device takes about 6,000 images in an area of 94 x 132 mm, that are uploaded to the CytoSMART™ Cloud. There, they are combined into one scan and subsequently analyzed using our custom image analysis algorithms.

Q: Can I specify the recording interval?
A: You can specify the interval rate between 1 - 24 h or choose to perform a single scan.

Q: What is the magnification of the CytoSMART™ Omni?
A: The magnification is equal to the magnification of a microscope with a 10X objective.

Q: What type of image analysis algorithms can I use?
A: Currently you can choose between confluence and scratch assay analysis. However, new image analysis algorithms, such as colony detection, will be added to our cloud-based image analysis library soon. In the future, it will also be possible to add your own image analysis algorithm to our cloud-based image analysis library.

Q: Can the CytoSMART™ Omni be used inside a cell culture incubator?
A: Yes, the CytoSMART™ Omni 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: Do I need to label my cells in order to perform image analysis?
A: No, our image analysis algorithms are designed to evaluate unlabeled cells, so you don't have to add (toxic) dyes to your cells, leading to non-invasive analysis of your cells.

Q: Is a computer required to operate the CytoSMART™ Omni?
A: Yes, the device can only be used with a Windows-based computer with a USB3.0 port (which can also be purchased at CytoSMART™). A WiFi or wired ethernet connection is necessary to be able to connect to the CytoSMART™ Cloud for data storage and analysis.

Q: Which culture vessels are compatible with the CytoSMART™ Omni?
A: Any culture vessel that is lower than 55 mm (height of the light arc) can be scanned. However, the size of the scan is limited to 94 x 132 mm, which exactly fits a T175 flask. In case you would like to image larger vessels, you cannot image the entire surface.

Q: Why is the CytoSMART™ Omni a cloud-based device?
A: The scans are uploaded to the CytoSMART™ Cloud because of the vast amount of data that is created with the CytoSMART™ Omni. In order to store and analyze the gigabytes of data, you would need a high-end local computer which costs a lot more compared to cloud-based storage and analysis. Furthermore, the CytoSMART™ Cloud is powered by the Microsoft Azure, which is one of the most secure cloud-platforms. This ensures safe storage of your data and allows you to retain tight control over data sharing.

Q: How do I clean the CytoSMART™ Omni?
A: Clean the device using lint-free wipes and ethanol (70%) or isopropyl alcohol (IPA). Do not use acetone to clean the device. The device cannot be autoclaved.

Q: Can the CytoSMART™ Omni be used in a cleanroom?
A: Yes, after sterilizing with ethanol (70%) or IPA, the device can be used in a cleanroom.

Specifications

Unit dimensions	396 x 345 x 171 mm (LxWxH)
Weight	9 kg
Optics	Brightfield with digital phase contrast
Magnification	10x fixed objective
Light source	LED
Camera	5 MP CMOS
Scan area	94 x 132 mm
Exported formats	png, csv
Well plate types	6 – 96-well plates
Culture flask types	T25 – T225 and triple flasks
Other labware	Anything transparent and lower than 55 mm
Operating environment	5-40 °C, 20-95% humidity
Support	Via mail and live chat

Interested? Contact us!

Ordering information

at #	Product	Quantity
XAB-1002	CytoSMART™ Omni	1
QNT-1007	CytoSMART™ Connect Cloud & starter license key	1

bringing out **the best**

CytoSMART™ Technologies B.V.

Emmasingel 33
5611 AZ Eindhoven
The Netherlands

Phone: +31 (0)88 20 32 200
Website: www.cytosmart.com
Email: info@cytosmart.com