Lux2

Your best friend in the lab

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.

World's smallest live-cell imager

Live-cell imaging has become a desired analytical tool in many cell biology laboratories focusing on e.g. pharmacological research, regenerative medicine and tissue engineering. Live-cell imaging is generally a difficult task, because it requires large, costly, high-end devices that are difficult to operate. The CytoSMART™ Lux2 is a compact inverted microscope for brightfield live-cell imaging that makes live-cell imaging easy and affordable so it can be used by every biological laboratory. Even in routine cell culture processes.

The CytoSMART™ Lux2 is:

+ **Compact** - It fits in any cell culture incubator
+ **Easy** - No training is needed to set up your experiment
+ **Cost effective** - Affordable for every biological laboratory

No issues with environmental controls

Tight control of the environment (e.g. temperature, CO_2) is one of the most critical factors determining the success or failure of a live-cell imaging experiment. When using a conventional microscope equipped with an incubator box, it can be quite a challenge to maintain the cells in a healthy state and functioning normally while being imaged for a longer period of time.

The CytoSMART™ Lux2 operates at low-voltage and is designed for safe use in a regular CO_2-incubator. This enables you to minimize environmental changes, giving you more reliable and repeatable experiments for less work.

Easy data storage and image analysis

The CytoSMART™ Lux2 can be set to record images at specific intervals (between 5-60 minutes) for minutes, hours and days. In fact, it is one of the few systems that can run for weeks. The recorded images are sent to the CytoSMART™ Cloud where they are analyzed using our custom, cloud-based, image analysis software. You can select the appropriate image analysis algorithm, such as confluence detection, according to the experiment you are performing. The image analysis data is represented in the images as well as graphically in a dashboard.

Furthermore, alerts can be set for confluency, meaning you will receive an automatic notification once your cell culture has reached a certain confluency and is ready for splitting or for use in an experiment, such as transfection.

Easy access. Anywhere. Anytime.

Thanks to cloud data storage and cloud-based image analysis, you can access your recording and view the cell culture in almost real-time from anywhere on any pc, laptop, tablet or mobile phone with internet access. All the recorded data such as images (.jpg files), time-lapse video (.avi files) or confluency data (.csv files) can be downloaded for further processing. In case you have set a notification, our email alerts will keep you up-to-date on confluence levels or long-term temperature drops.

Plates, dishes, flasks or microfluidic chips

The CytoSMART™ Lux2 can image cells cultured in a wide range of culture vessels including T-flasks, petri dishes, well plates, culture slides and microfluidic chips. You can simply monitor cell growth in a T-flask or conduct an experiment in an other culture vessel or microfluidic chip.

How it works. Simple as 1-2-3

1. Place the CytoSMART™ Lux2 in the incubator. The cable can be run either through a port in the back of the incubator or along the rubber sealing of the door.
2. Connect the CytoSMART™ Lux2 to the tablet.
3. Start the tablet. You're set to go. You can now start recording a time-lapse of your cell culture.

cyto smart™ Lux2

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Applications

With the CytoSMART™ Lux2 you have a big advantage over your colleagues and competitors. With our cloud-based solution, you have access to the following application anywhere and anytime you need it:

+ Monitor cell division
+ Monitor cell growth and confluence (Fig. 1)
+ Analyze cell migration and wound healing (scratch assays)* (Fig. 2)
+ Monitoring colony formation* (Fig. 3)
+ Time lapse imaging
+ Study chemotaxis (Fig. 4)
+ Study cells cultured inside microfluidic devices (Fig. 5)
+ Study stem cell differentiation
+ Cell culture QC

However, you are not limited to these applications or the CytoSMART™ image analysis software. All images and movies can be downloaded from the CytoSMART™ Cloud environment so you can use other (custom) image analysis algorithms if necessary.

* Cloud-based image analysis of these applications are expected to be implemented in 2019.

A

0 h | 24 h | 48 h
72 h | 96 h | 120 h

B
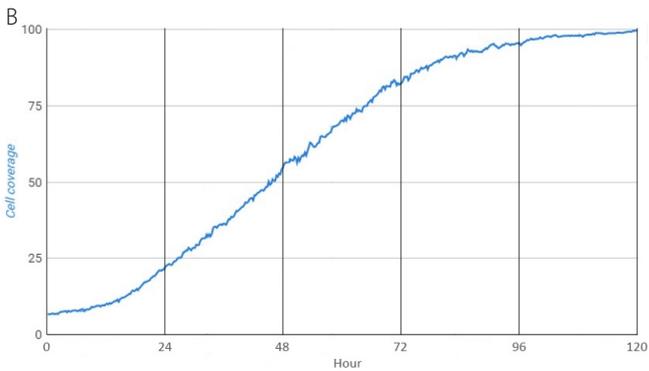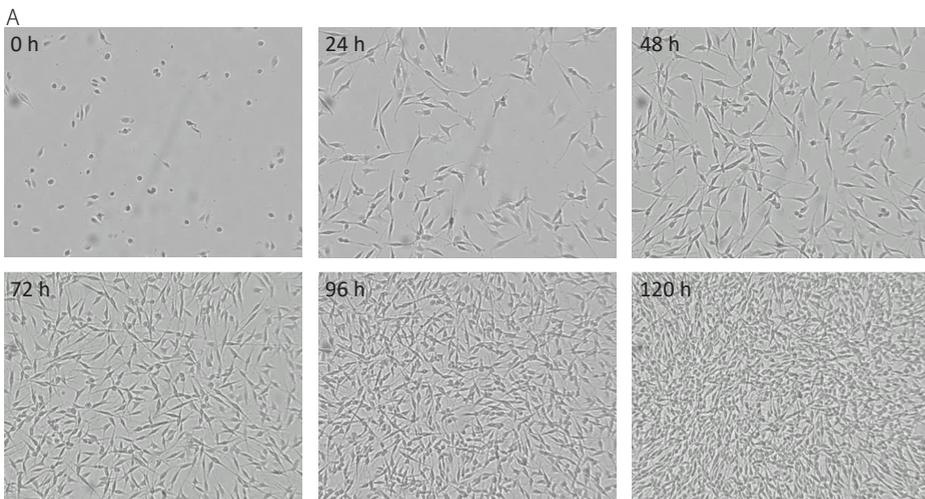
Figure 1. A) Images of the growth of C6 cells after 0, 24, 48, 72, 96 and 120 h after seeding. B) Corresponding confluency analysis of the the cell growth over time.

A

B
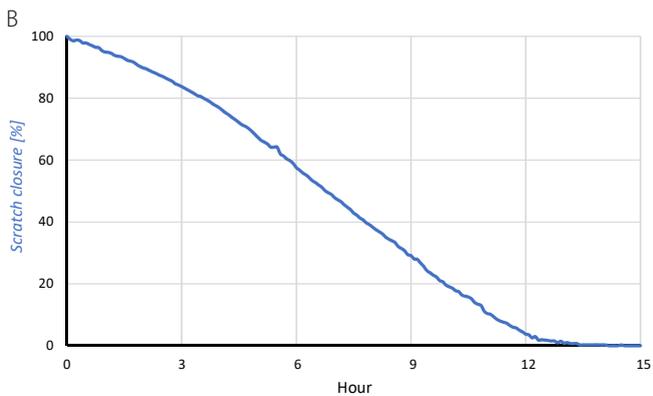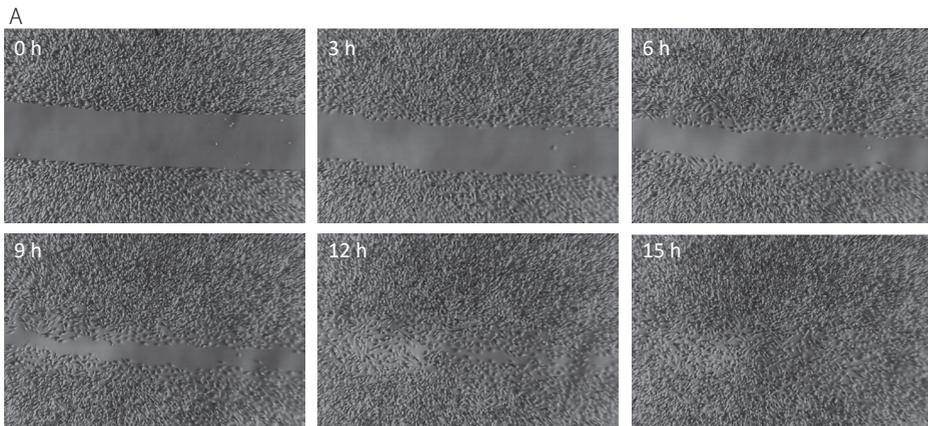
Figure 2. A) Images of a scratch assay performed with C6 cells after 0, 3, 6, 9, 12 and 15 h. B) Corresponding analysis of the scratch closure over time.
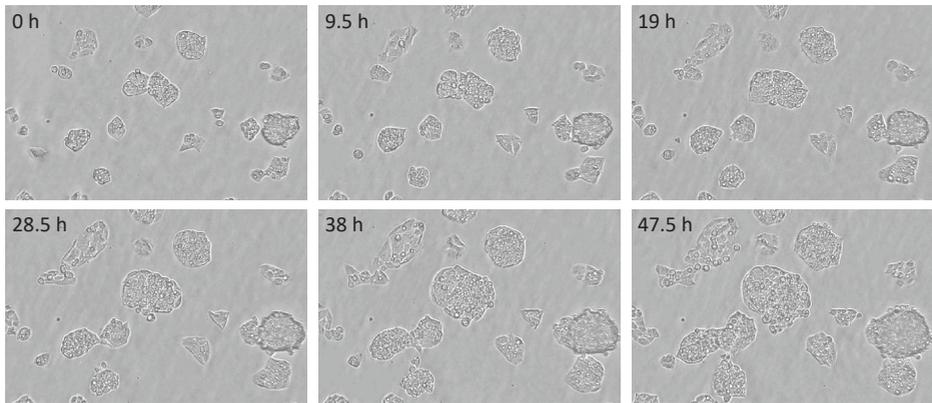
Figure 3. Images of HEP-G2 cells at 0, 9.5, 19, 28.5, 38 and 47.5 h after seeding. The size and number of colonies formed by these cells can be monitored over time.

Figure 4. Human neutrophils navigate their way through a microscopic size maze (total maze size is 0.8 mm) towards a reservoir with chemoattractant on the right. Colored arrowheads indicate the same neutrophils at different timepoints. The speed and directionality of neutrophil movement towards the chemoattractant is followed using the CytoSMART™ Lux2.

Images courtesy of Dr. Daniel Irimia, Massachusetts General Hospital & Harvard Medical School, Boston, USA.

Figure 5. The open design of the CytoSMART™ Lux2 enables easy monitoring of cells cultured inside microfluidic devices. In this case, the flow and attachment of cells within a microfluidic chip is monitored.

Frequently Asked Questions

Q: What is the CytoSMART™ Lux2?
A: The CytoSMART™ Lux2 is a functional mini microscope that is designed to be placed inside an incubator to monitor cell cultures. Images are analyzed almost real-time using image analysis software to provide insights into the cell confluency.

Q: What are the dimensions of the CytoSMART™ Lux2?
A: The dimensions are 13.3 x 9.0 x 10.0 cm (5,2″ x 3,5″ x 3.9″) and it weighs 0.5 kg (1.1 lb).

Q: What type of microscopy technique does the CytoSMART™ Lux2 use?
A: The CytoSMART™ Lux2 uses inverted brightfield microscopy. The sample is illuminated from the top and observed from below.

Q: Which culture flasks and dishes are CytoSMART™ Lux2 compatible?
A: The CytoSMART™ Lux2 allows monitoring of a wide range of different culture dishes and flasks, such as: T-flasks, well plates, flat tubes, petri dishes, (chamber) slides, microfluidic chips. An adapter plate may be required for stable positioning of larger flasks. This plate can be purchased at CytoSMART™.

Q: Do I need to calibrate the CytoSMART™ Lux2?
A: No calibration by the user is needed for the device to operate.

Q: Can I use a fluorescence dye?
A: The CytoSMART™ Lux2 is a brightfield microscope. It cannot detect fluorescent dyes.

Q: How do I clean the CytoSMART™ Lux2?

A: The device is easy to clean 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™ Lux2 be used in a cleanroom?

A: Yes, after sterilizing with ethanol or IPA the device can be used in a cleanroom.

Q: Do I need an internet connection to operate the CytoSMART™ Lux2?

A: No, you can use the CytoSMART™ Lux2 without an internet connection, however, in that case data storage is limited to the storage capacity of the tablet and you are not capable to make movies. When the CytoSMART™ Lux2 is connected to internet the CytoSMART™ Cloud can be accessed for online storage and analysis of your data.

Q: How much project data can I collect?

A: 50 Gb of cloud storage is provided with the CytoSMART™ Lux2, allowing for online storage and image analysis. This is enough for approximately 500.000 analyzed images.

Q: What is the magnification of the CytoSMART™ Lux2?

A: The magnification of the CytoSMART™ Lux2 is equal to a microscope with a 10X and 20X lens.

Q: Can I specify the recording interval?

A: At the start of an experiment you can specify the interval rate between 5 - 60 minutes.

Q: What is the field of view of the optics?

A: The device has a field of view of 2.4 mm x 1.5 mm (3.6 mm^2).

Specifications

Unit dimensions	133 x 90 x 100 mm (L x W x H)
Weight	0.5 kg (1.1 lb)
Optics	Brightfield with digital phase contrast
Magnification	10x fixed objective, digital zoom to 20x
Light source	LED
Camera	5MP CMOS
Image size	960 x 960 pixels
Field of view	1.84 x 1.84 mm
Culture vessels	Flasks, well plates, petri dishes, slides
Storage	50 GB cloud storage (Microsoft Azure cloud)
Operating conditions	5-40 °C, 20-95% humidity
Warranty	1 year parts & labor
Support	Via mail and live chat

Interested? Contact us!

Ordering information

at #	Product	Quantity
JAB-1004	CytoSMART™ Lux2	1
RRA-1002	Tablet & starter license key	1
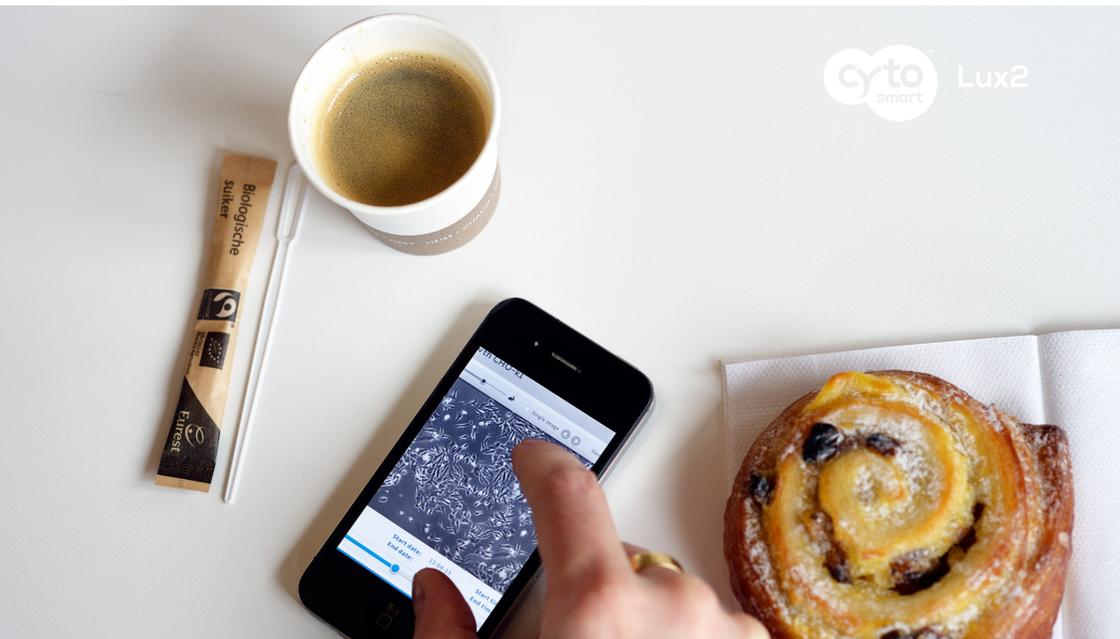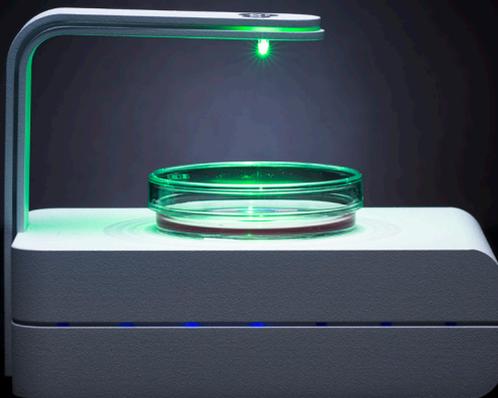
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