

**cyto**  
smart

# Lux2 Duo Kit



**Live cell imaging for quality control**

## Two mini live-cell imaging microscopes

Live-cell imaging is a useful tool for monitoring the quality of cell cultures. A simple set-up utilizing a high quality camera allows researchers to evaluate cellular health at regular points in time. The CytoSMART Lux2 Duo Kit is a compact and cost-effective method for carrying out this type of analysis, following the complete growth progression of mammalian cells.

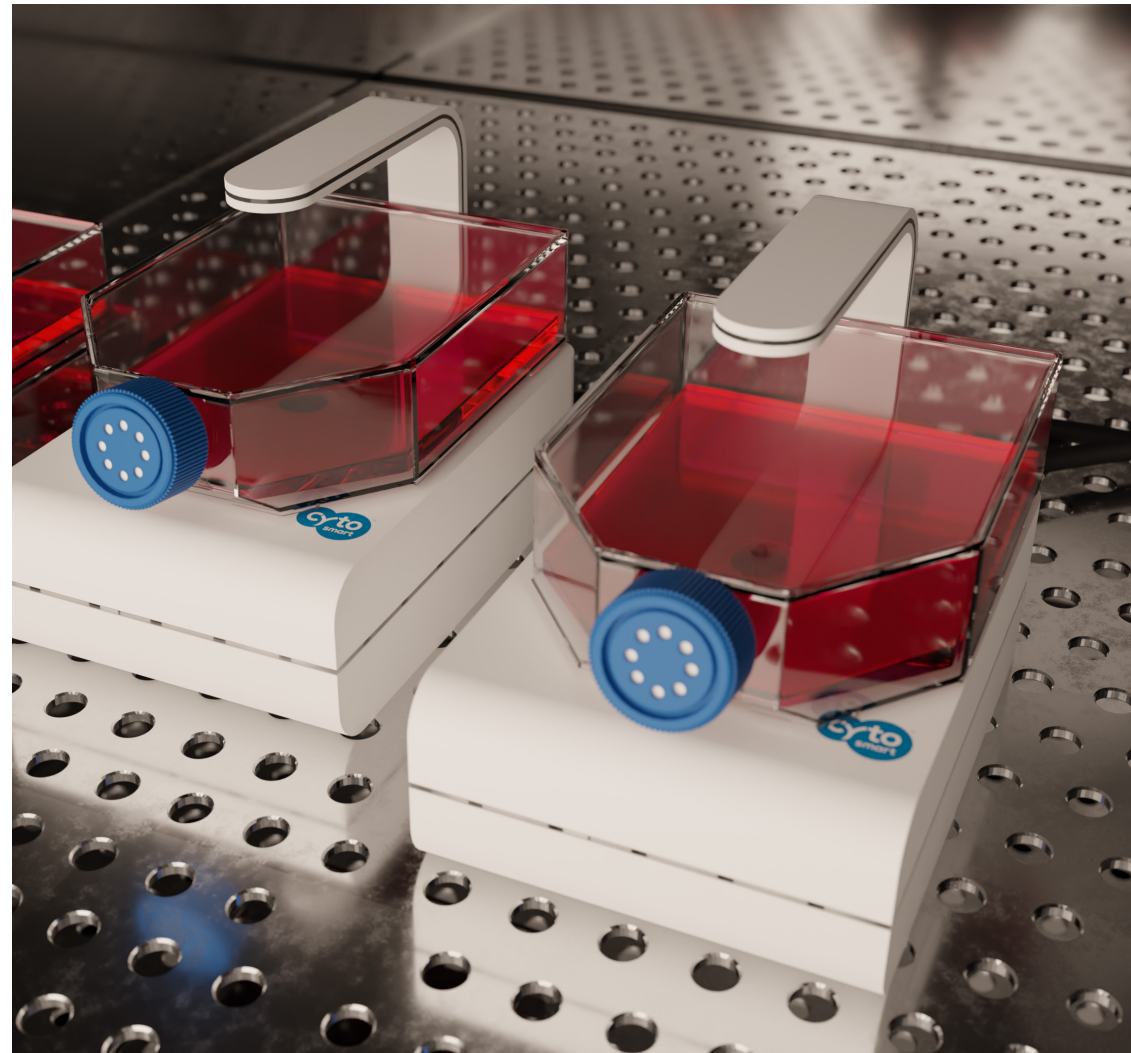
The CytoSMART™ Lux2 Duo Kit:

- + **Two sample stages:** for simultaneous side-by-side comparison
- + **Non-invasive:** label-free image analysis
- + **Full remote access:** no need to enter the lab to inspect cell cultures

## Complete cell culture incubator compatibility

During the observation of cell cultures, the right environmental conditions are vital in order to maintain cell health and keep cells active. Using a remote system avoids exposing the cells to potential mechanical and environmental shock from removing them from the incubator.

Once the samples are placed inside the incubator, they no longer need to be handled. The researcher can check videos of the cell cultures in real-time, providing immediate insight into the culture quality. No need to step into the lab for routine inspection rounds, making the process efficient, cost effective and safe.



## Applications

With the CytoSMART™ Lux2 Duo Kit 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 (automated image analysis) (Fig. 1)
- + Analyze cell migration and wound healing (scratch assays; automated image analysis) (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 Quality Control

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.

A

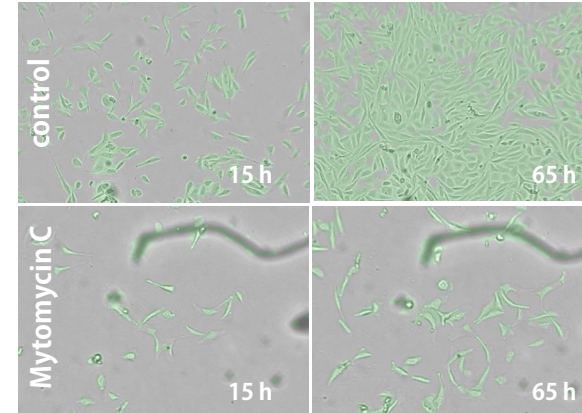


Figure 1:

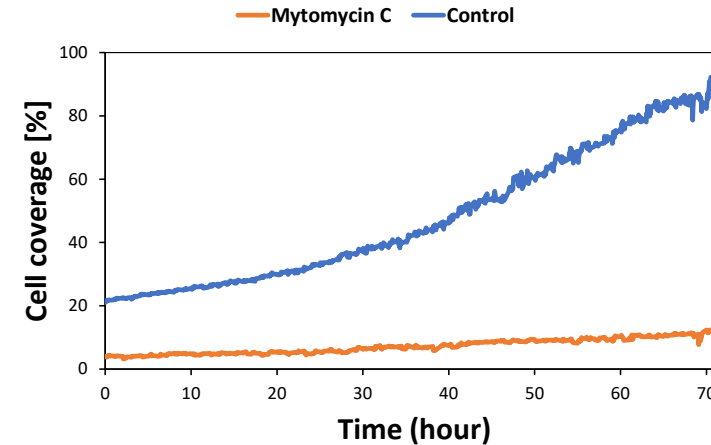
A) Automated confluency detection.

Cells are highlighted in green by overlay of software. Images were captured every 15 mins for a period of 72 hours. Snapshots are shown of the growth of CHO-k1 cells after 15 and 65h after treatment.

B) Cell coverage over time.

Confluency level (%) of the mytomycin C treated cells and the control group over a period of 72 hours.

B



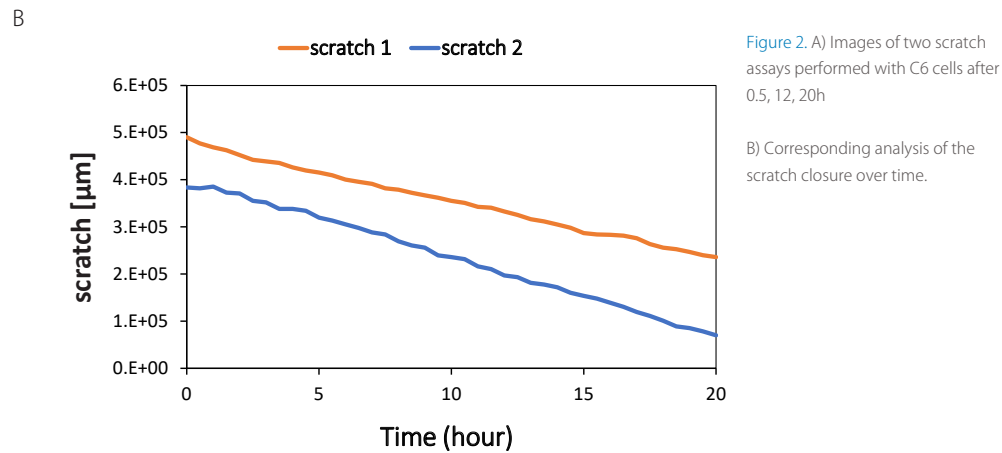
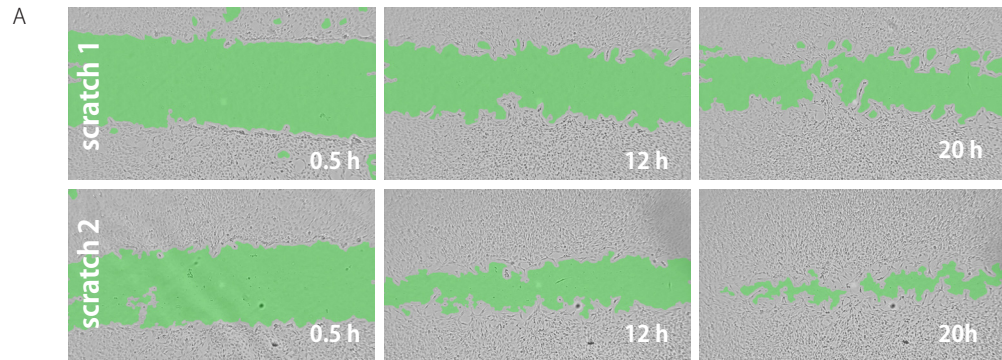


Figure 2. A) Images of two scratch assays performed with C6 cells after 0.5, 12, 20h

B) Corresponding analysis of the scratch closure over time.

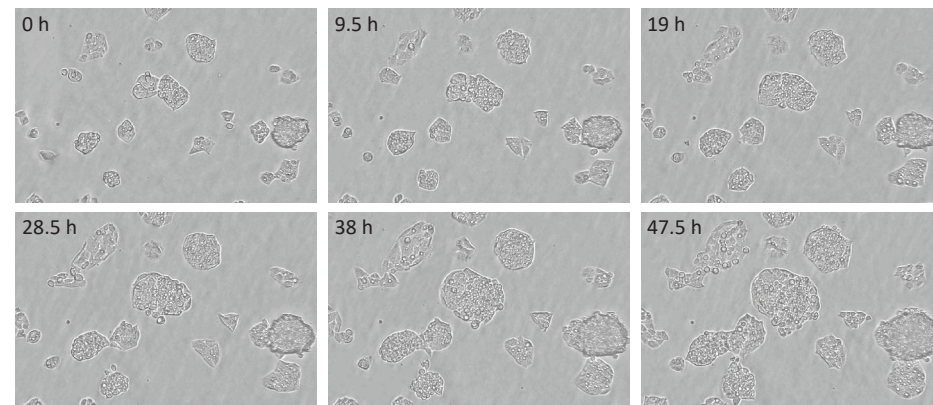


Figure 3. Images of HEP-G2 cells at 0, 9.5, 19, 28.5, 38 and 47.5 h after seeding. The size and number of colonies formed by these cells can be monitored over time.





**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 Duo Kit.

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



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

## Easy data storage and image analysis

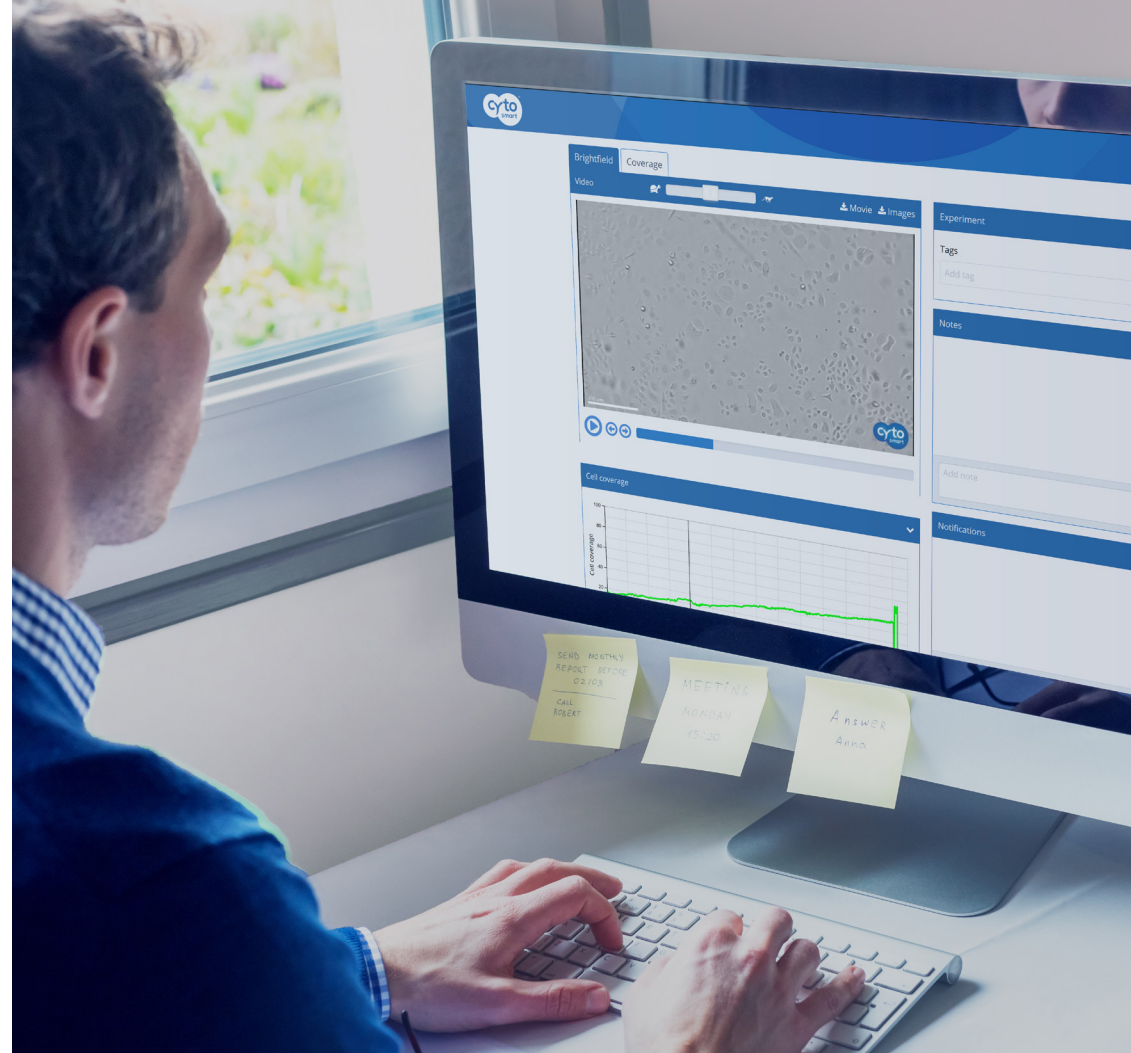
The CytoSMART™ Lux2 Duo Kit can be set to record images at specific intervals (between 5 min - 12 h.) for minutes, hours and days. In fact, it is one of the few systems that can run for weeks. The recorded images are sent to the CytoSMART™ Cloud where they are analyzed using our custom, cloud-based, image analysis software. You can select the appropriate image analysis algorithm, such as confluence detection or wound healing assays, according to the experiment you are performing.

Variability in growth speed is easily recognized using the CytoSMART cell monitoring software, while image analysis provides an unambiguous read out for cell confluency meaning you can be confident in your data's integrity. As such, the system is the ideal approach for the systematic comparison of cultures, in order to select the ideal culturing conditions.

## Online connection to inspect your cell cultures

CytoSMART's compact cell video monitoring system can film living cells without disturbing their growth. The device is accessible from an online environment, thus enabling researchers to look at their cell cultures and assess what the next steps are, without having to step into the laboratory.

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 (.mp4 files) or confluency data (.xlsx 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 Duo Kit 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 another culture vessel or microfluidic chip.



CytoSMART™ Lux2 Duo Kit

## How to install

1. Place the CytoSMART™ Lux2 Duo Kit devices 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 devices to your PC or laptop via the USB ports.
3. Start the PC. Download the CytoSMART Lux2 Duo Kit application.
4. You're set to go. You can now start recording a time-lapse of your cell culture.



Live cell imaging for quality control



## Frequently Asked Questions

### **Q: What is the CytoSMART Lux2 Duo Kit?**

**A:** The Duo kit is a system, which employs two compact inverted microscopes, that are designed to be placed inside an incubator, to monitor cell cultures. The system can be used as a notification system to alert users when a cell culture confluence target is reached.

### **Q: Do I need to calibrate the CytoSMART Lux2 Duo Kit?**

**A:** No calibration by the user is needed for the device to operate.

### **Q: Is a computer required?**

**A:** The system requires a dedicated PC or laptop running on windows 10 or above and with two USB3 ports and an active internet connection. If your lab doesn't have the sufficient hardware, we can supply these for a fee as part of your order.

### **Q: What are the software requirements?**

**A:** The CytoSMART Lux2 Duo Kit remote functionality runs on cloud-based software. In this cloud-environment the images are stored and can be accessed using user-specific login details. Next to unlimited data storage, image analysis algorithms can be run to quantify confluence and cell migration.

### **Q: Which culture flasks and dishes are compatible?**

**A:** The CytoSMART Lux2 Duo Kit allows monitoring of a wide range of different culture dishes and flasks, such as: T-flasks (T-25 up to T-250), single well, multi-well plates (6, 12, 24, 96 well), microfluidic chips, flat tubes, petri dishes, slides.

This is not an exhaustive list, so if your preferred equipment isn't on this list please get in touch. For larger flasks an adapter plate may be required. This plate can be purchased at CytoSMART.

### **Q: What is the magnification?**

**A:** Magnification is equal to a standard microscope with a 10X and 20X (digital magnification) lens.

### **Q: Can I specify the recording interval?**

**A:** Images can be recorded at pre-defined intervals. At the start of a new project you can specify the interval rate anywhere between 5 min - 12 h.

### **Q: How do I clean the devices?**

**A:** The devices are easy to clean using lint-free swipes and EtOH (70%) or IPA. Do not use Acetone to clean the device. Please be aware that the device cannot be autoclaved.

### **Q: Can the CytoSMART Lux2 Duo Kit be used in a cleanroom?**

**A:** After sterilizing with EtOH or IPA the device can be used in a clean room.

### **Q: What if I already own a CytoSMART Lux2?**

**A:** If you have a single CytoSMART Lux2 in your lab already, upgrading to the Duo Kit can be done by simply ordering an extra CytoSMART Lux2. Any software updates can be performed remotely. No extra laptop is needed, provided there are 2 USB3 ports.



## Technical Specifications

Optics	Brightfield only with digital phase contrast
Magnification	10x fixed objective, digital zoom to 20x
Fluorescence filters	N/A
Camera	5 MP CMOS
Data formats	JPG, XLSX, MP4
Image size	960 * 960 pixels
Field of view	1.9 * 1.9 mm
Culture vessels	well-plates, petri dishes, flasks, microfluidic chips and custom culture vessels
Computer requirements	Windows 10 with 2 USB3 ports
Power Supply	AC 100-240V, 2A, 10W, 50/60HZ
Dimensions (single device)	133 x 90 x 100 mm (L x W x H) 5.2 x 3.5 x 3.9 in (L x W x H)
Weight (single device)	0.5 kg (1.1 lb)
Operating conditions	5-40 °C, 20-95% humidity
Warranty	1 year parts & labor
Data storage	unlimited cloud storage

## Ordering Information

### Ordering information

at #	Product	Quantity
JAC-1008	CytoSMART™ Lux2 Duo Kit	1

[Request demo on www.cytosmart.com](http://www.cytosmart.com)

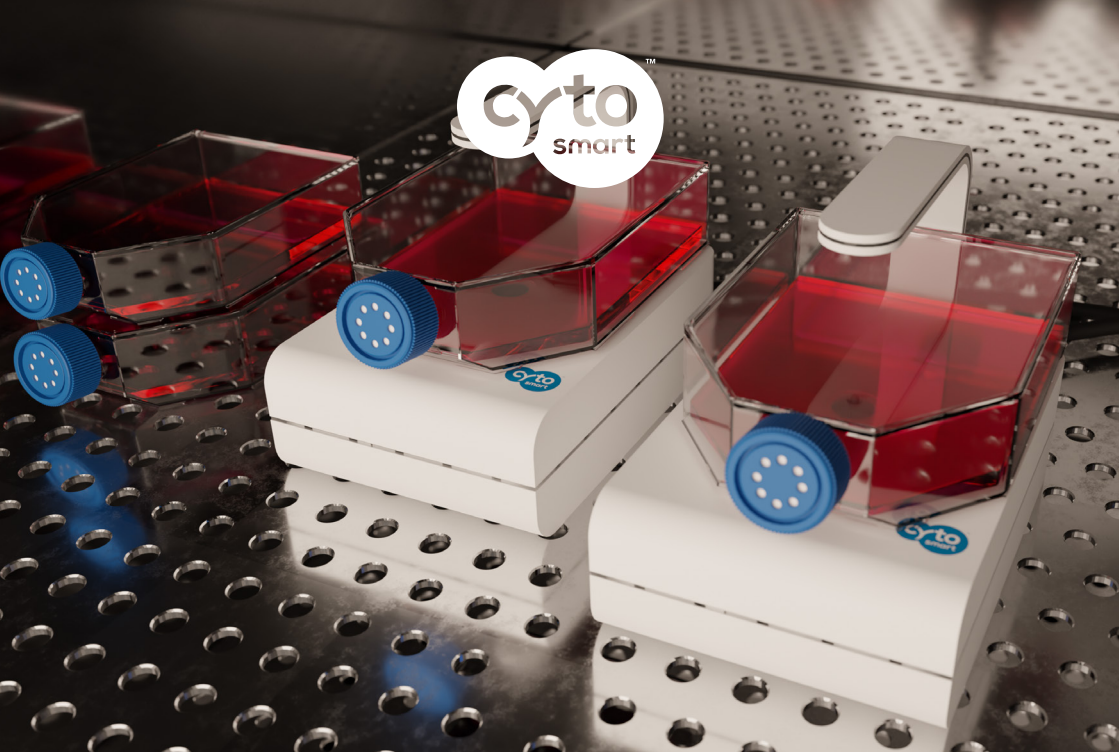


## About CytoSMART

CytoSMART Technologies is a specialist in development and manufacturing of smart microscope systems for life science labs. The company was founded in 2012 by a team of biologists and engineers who were convinced that a new generation of miniaturized microscopes, powered by artificial intelligence for image analysis, would allow biologists to make discoveries more efficiently and at a larger scale.

In 2018 CytoSMART was selected by Microsoft for their prestigious Scale Up program.

CytoSMART's microscopy solutions are used in over a thousand laboratories around the world.



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