HSCORE

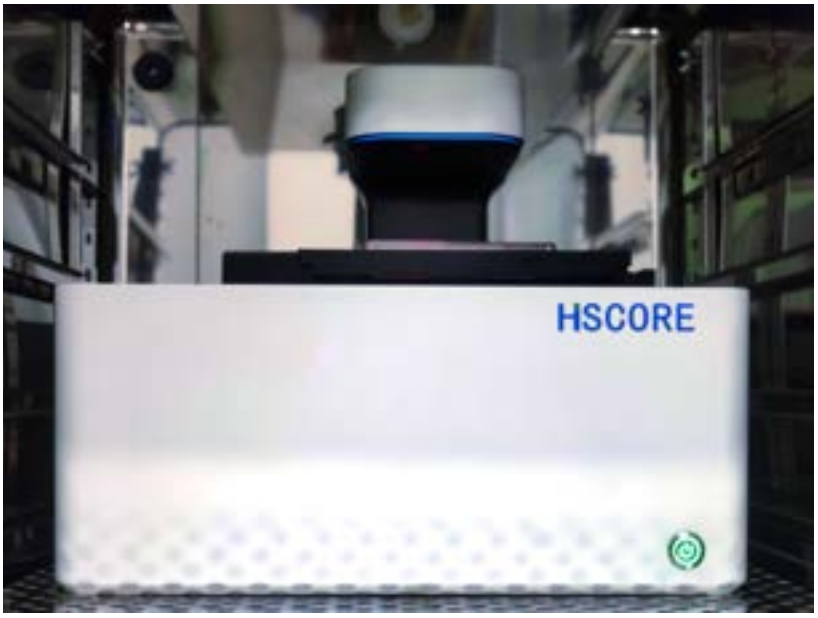
EOS1/6 Long-Term Live Cell Imaging and Analysis System

Decoding the Cellular Code Using Deep Neural Networks

Cells, the fundamental units of life, have always been a focus of scientific exploration due to their complex mechanisms and information transmission systems. Gene expression, protein synthesis, and even signal transduction within a cell contains vast biological information. However, extracting meaningful insights from this overwhelming amount of data has always been a challenge.

With the rapid development of deep learning technologies, particularly the advent of deep neural networks, researchers are now using this powerful tool to decode the "code" of cells at the molecular level. Deep neural networks, which simulate the connections and computations of the human brain, are capable of processing and analyzing massive biological data, revealing hidden patterns and secrets in cellular activities. This not only helps in understanding disease mechanisms and cellular behavior regulation but may also provide new ideas for personalized treatment and drug development.

The EOS1/6 series long-term live cell imaging and analysis systems are fully based on deep learning algorithms, which exhibit near-human intelligence in areas such as autofocus, exposure adaptation, cell segmentation, image processing, and model optimization. Our mission is to bring cutting-edge technologies into device innovation to simplify work and life.



Performance Features

The EOS series devices integrate high-performance, high-precision hardware with perfect control software to ensure that the cell's position remains accurate and stable during long-term monitoring. The system includes an intelligent deep learning autofocus, which effectively prevents image shaking, defocusing, or position shifts during long-term imaging. Whether observing cell behavior dynamically or tracking cell development, the system provides continuous, stable, and high-quality images, meeting the stringent requirements of scientific research.

- Optical System: Olympus premium objective lenses with fully optimized optical paths, offering excellent high-definition cell images.
- Objective Configuration: Fully automated objective turret with 4x, 10x, 20x, and 40x objectives (optional).
- Imaging Modes: Supports various imaging modes including bright field, phase contrast, monochrome fluorescence, multi-color fluorescence (RGB), Z-stack, and full-well imaging.
- Fluorescence Channels: Red, green, blue, and near-infrared fluorescence channels.
- Software Algorithm: Based on deep learning neural network algorithms, offering more accurate cell segmentation and analysis.
- Operating System: User-friendly interface with seamless integration of navigation and system interface.
- Long-Term Observation: The instrument can be placed in CO_2 incubators for long-term time-lapse imaging studies.
- Scan Speed: 2.5 minutes for 96-well plates (single-point acquisition).

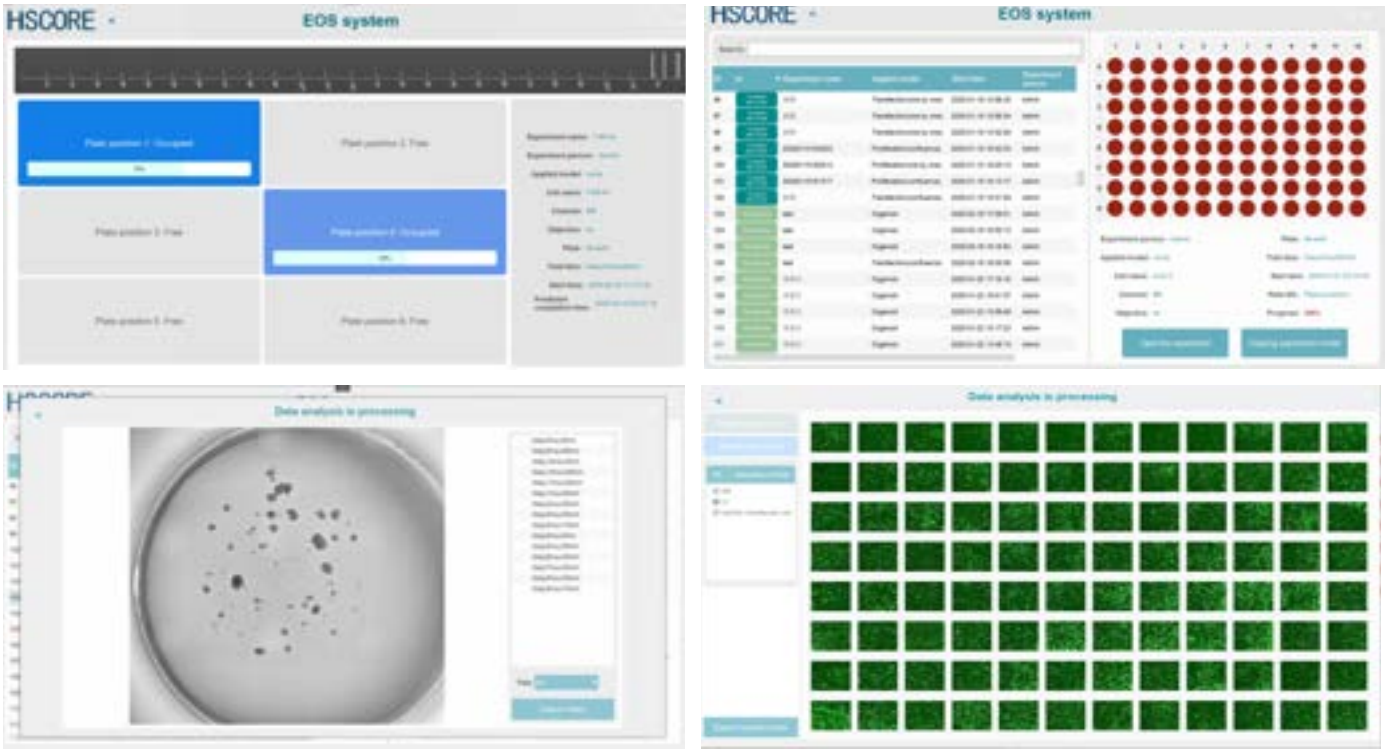
Simplified and Intuitive Operating Interface

EOS is designed for various scientific applications, providing a streamlined workflow and powerful AI analysis capabilities, significantly simplifying experimental procedures and improving data processing efficiency. Whether it's observing 2D cell cultures or analyzing organoid construction, the system offers precise imaging support. Moreover, deep learning algorithms can automatically recognize and analyze neuron cell bodies, dendritic structures, and organoid morphology changes, covering multi-dimensional metrics such as cell body count, organoid diameter, and area changes. This ensures comprehensive support for a wide range of applications, from basic cell research to complex organoid model analysis.

- User-Friendly Interface: Smart interface design with preset algorithms enabling simultaneous "imaging + computation" automated experimental workflows, greatly reducing manual workload and enhancing experimental efficiency.
- Guided Experiment Setup: Step-by-step design to simplify operations and enhance user experience, supporting field preview for optimal experimental parameter configuration.
- Real-Time Analysis: Simultaneous imaging and algorithm processing, with instant results that can be dynamically adjusted, simplifying analysis.
- Long-Term Live Cell Monitoring: Using deep learning algorithms and non-invasive imaging techniques, the system can monitor live cells over extended periods, automatically generating single-well and multi-group comparative curves to highlight physiological and morphological changes under various treatments.

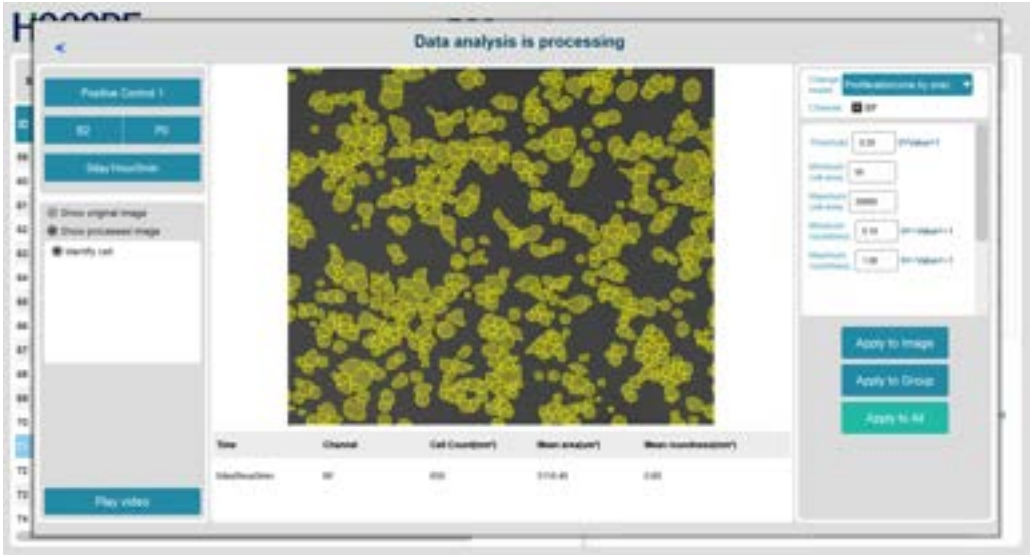
Pre-set Application Algorithms and Models

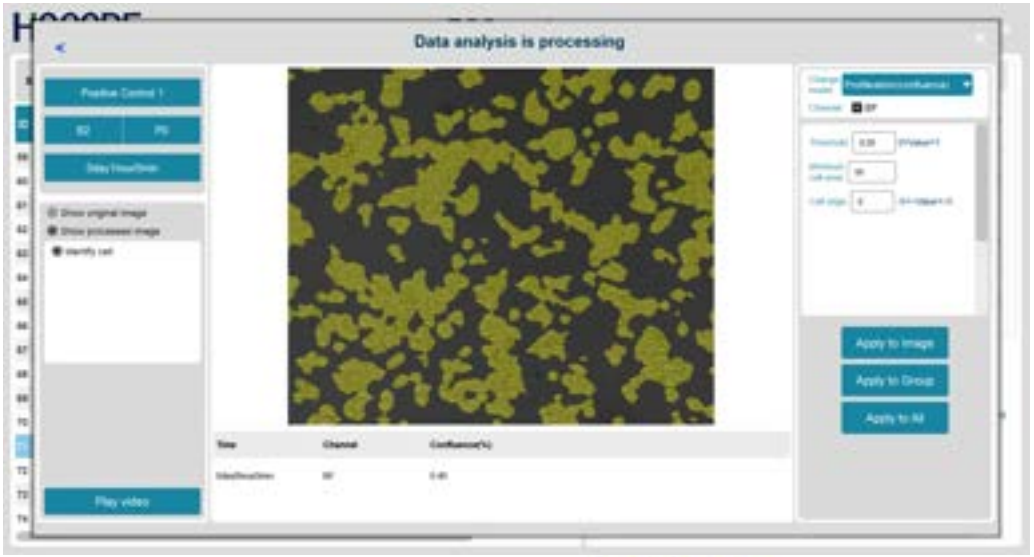
The system comes with pre-set algorithms tailored for different research scenarios, supporting real-time image capture and computation. EOS supports cell proliferation, non-invasive cell segmentation, and cell transfection tracking, while also offering cell-level migration analysis to reveal cell movement patterns in various environments. For neuron and organoid analysis, the system can precisely track the formation and development of neuron networks and the growth dynamics of organoids. Additionally, the Seahorse nuclear normalization function monitors cellular metabolic changes, offering robust support for metabolic research. Co-culture analysis and tumor sphere observation provide insights into intercellular interactions and tumor microenvironment evolution, helping to uncover disease mechanisms.

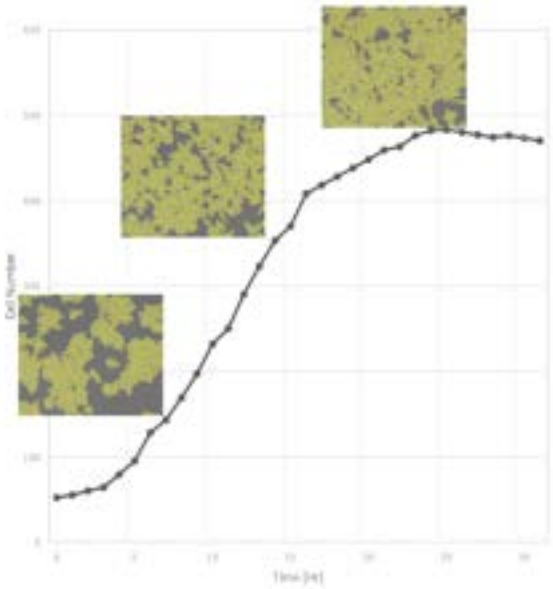


Cell Proliferation Analysis

By combining deep learning neural network algorithms, EOS is able to provide accurate and efficient automation in two key areas: confluence analysis and non-invasive cell segmentation and counting. In confluence analysis, the deep learning algorithm automatically identifies cell boundaries and aggregation patterns, tracking changes in the cell population during growth. For non-invasive cell segmentation and counting, the deep learning network efficiently segments and counts each cell during dynamic imaging, avoiding errors caused by cell overlap, complex morphology, or background interference that can occur with traditional methods. The application of these algorithms not only improves the accuracy of analysis but also significantly increases processing speed and automation, greatly enhancing the depth and reliability of EOS in complex biological research.



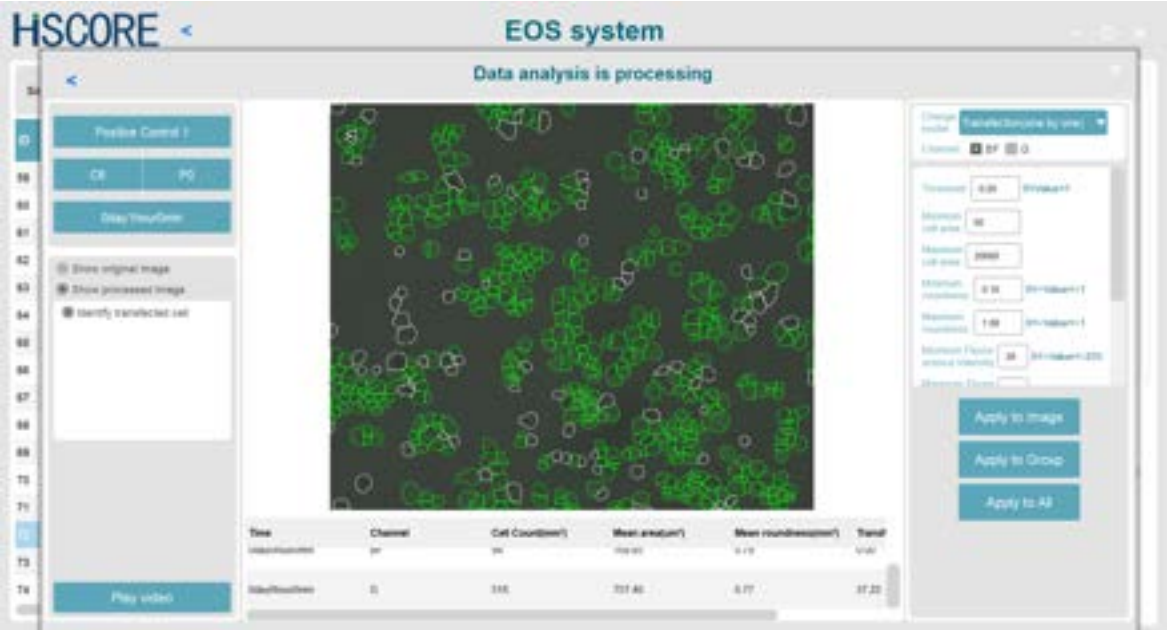




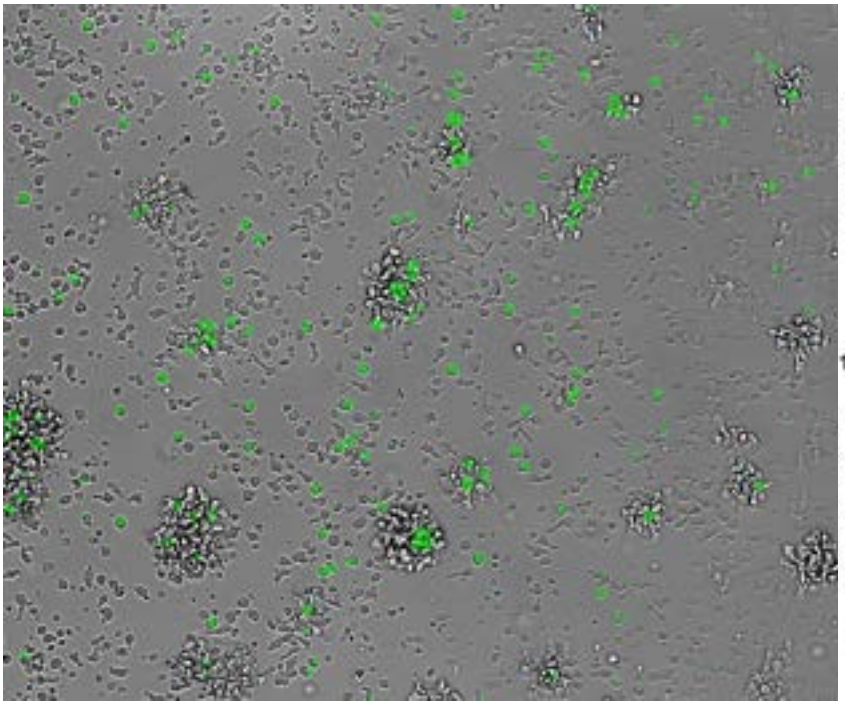
Gene Transfection and Fluorescent Expression Analysis

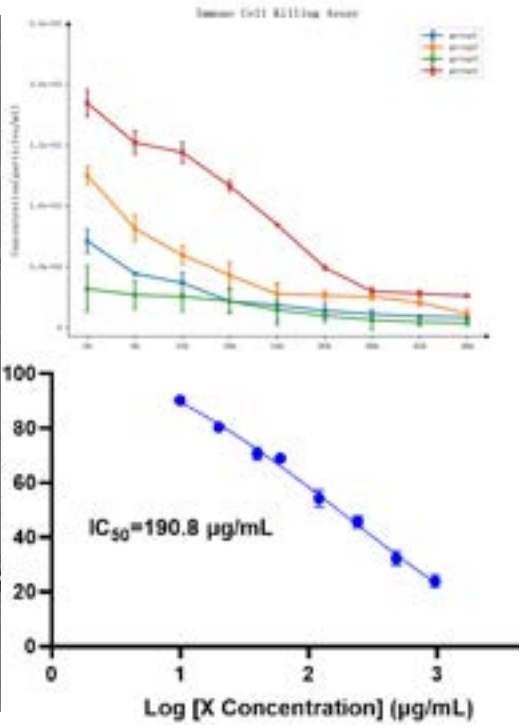
EOS demonstrates significant advantages in cell transfection and fluorescent expression analysis by utilizing deep learning algorithms. The system can efficiently and automatically identify and segment transfected cells, and accurately quantify the intensity and distribution of fluorescent markers. EOS is capable of processing complex image data, recognizing different types of fluorescent labels, and distinguishing fluorescent signals in different regions inside and outside the cell.

This allows for real-time monitoring and quantitative analysis of transfection efficiency. Additionally, the system can automatically track cell behavior during the transfection process, assessing the transfection efficiency and its impact on cell growth, proliferation, or function. Compared to traditional methods, deep learning improves both the accuracy and speed of handling high-throughput data, effectively reducing human error and enhancing the reliability and reproducibility of transfection experiments. This technology is widely applied in gene editing, protein expression research, drug screening, and other fields.



Co-culture of Tumor Cells and Immune Cells

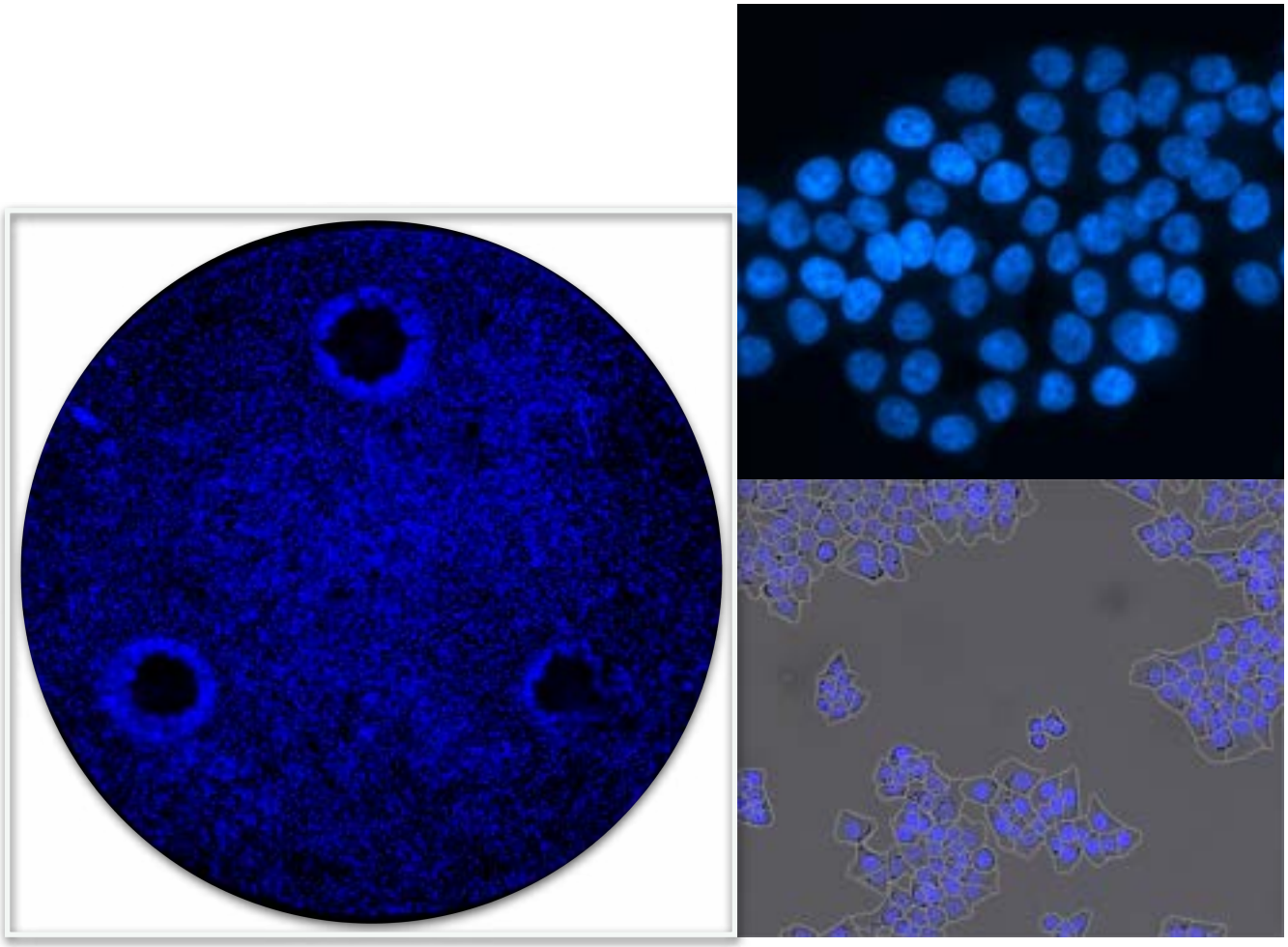




Using different fluorescent labels, the algorithm can accurately identify and segment different types of cell populations. During interactions, it tracks the number and population changes of different cell types, automatically generating dynamic curves. For research on tumor immune evasion mechanisms, immune therapy responses, and more, EOS helps researchers gain deeper insights into how tumor cells regulate immune cell functions, and how immune cells influence tumor cell growth. Compared to traditional methods, EOS can process large amounts of cell image data, significantly improving experimental efficiency, accuracy, and automation, providing strong data support for tumor immunology research and related drug development.

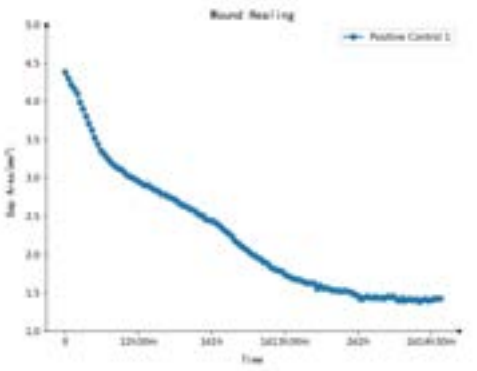
Cell Nucleus Counting

EOS is applied in cell nucleus counting, particularly when using DAPI or Hoechst 33342 staining for cells, enabling precise identification and counting of cell nuclei, and providing reliable data support for Seahorse normalization analysis. Using deep learning-based image stitching and cell segmentation algorithms, the system can automatically recognize the shape of cell nuclei, accurately segment the nuclear region of each cell, and eliminate background noise and overlapping cell interference, thereby providing high-precision nucleus counting. This technology allows researchers to normalize data based on the precise count of cell nuclei during Seahorse metabolic analysis, ensuring the accuracy and reliability of metabolic analysis results.



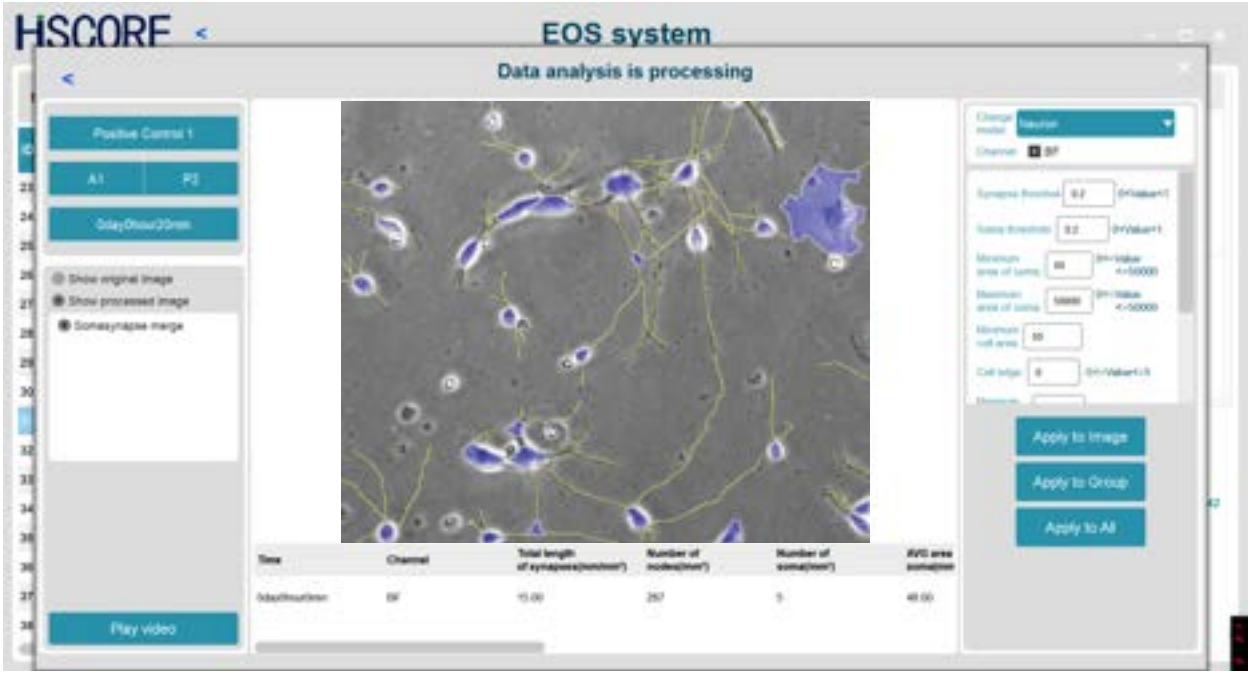
Scratch Assay (Wound Healing)

In the scratch assay, the cell layer's migration ability is a key indicator. EOS algorithm tracks the migration process of cells in the scratched area in real-time, accurately identifying and analyzing changes in the cell boundaries.



Neuron Cell Growth Analysis

In neuron cell growth analysis, the system can achieve precise identification and quantitative analysis of structures such as neuron cell bodies, dendrite length, and branching nodes. The deep learning model, through automated segmentation techniques, accurately identifies the cell body of each neuron and further divides cell structures like dendrites and axons, capturing subtle changes during neuron growth. In dendrite length measurement, the algorithm can precisely calculate the extent of dendrite extension, assess the branching complexity of neuron cells, and identify the branching nodes of dendrites, providing quantitative data for analyzing the development of neural networks, synapse formation, and their function.



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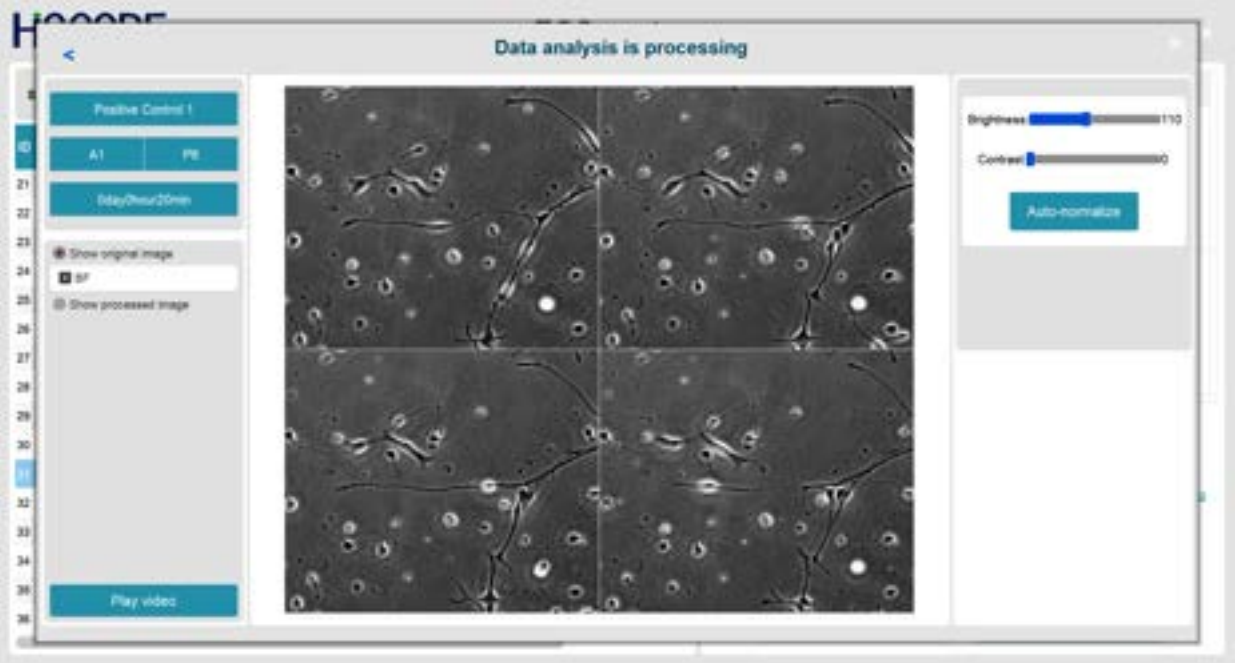
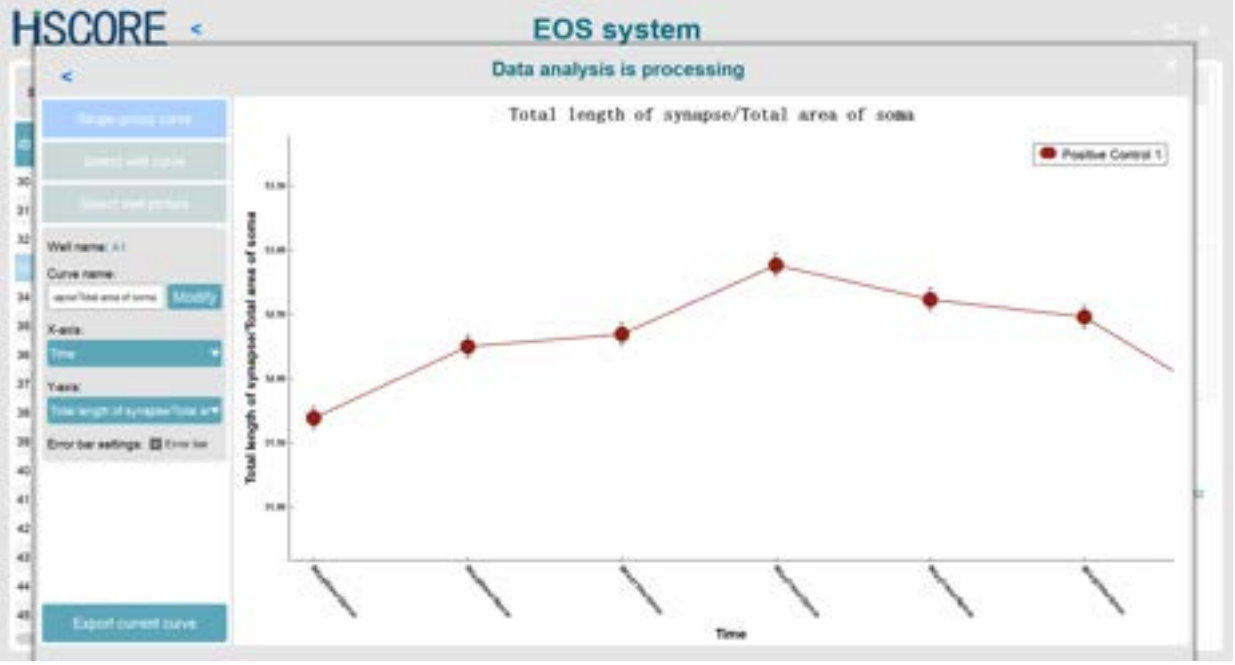
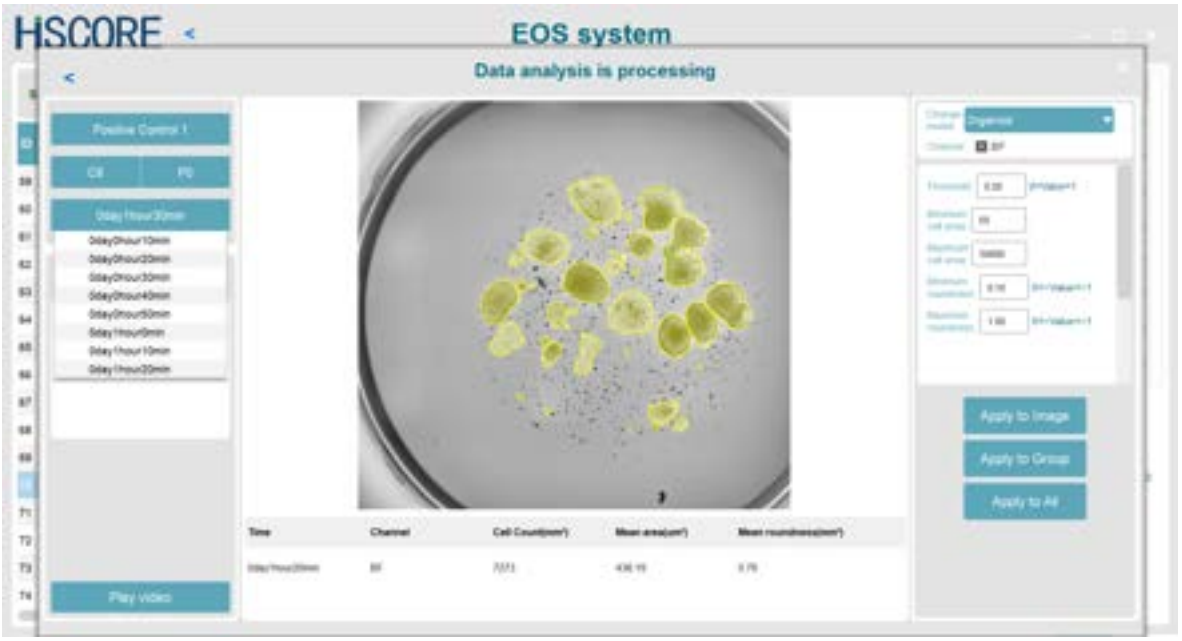




Organoid Growth Monitoring

By combining Z-stack scanning with mosaic algorithms, the system can efficiently monitor the growth of organoids in 96-well plates. The intelligent algorithms developed by EOS can precisely analyze growth indicators such as the diameter, area, size, and activity of each organoid, and track the development process of the organoids in real time, providing researchers with high-precision quantitative data. Additionally, the system's algorithms are highly customizable and can be tailored to optimize for different sizes and materials of specialized culture chips based on the client's needs, ensuring the system can deliver stable and accurate analytical results under various experimental conditions.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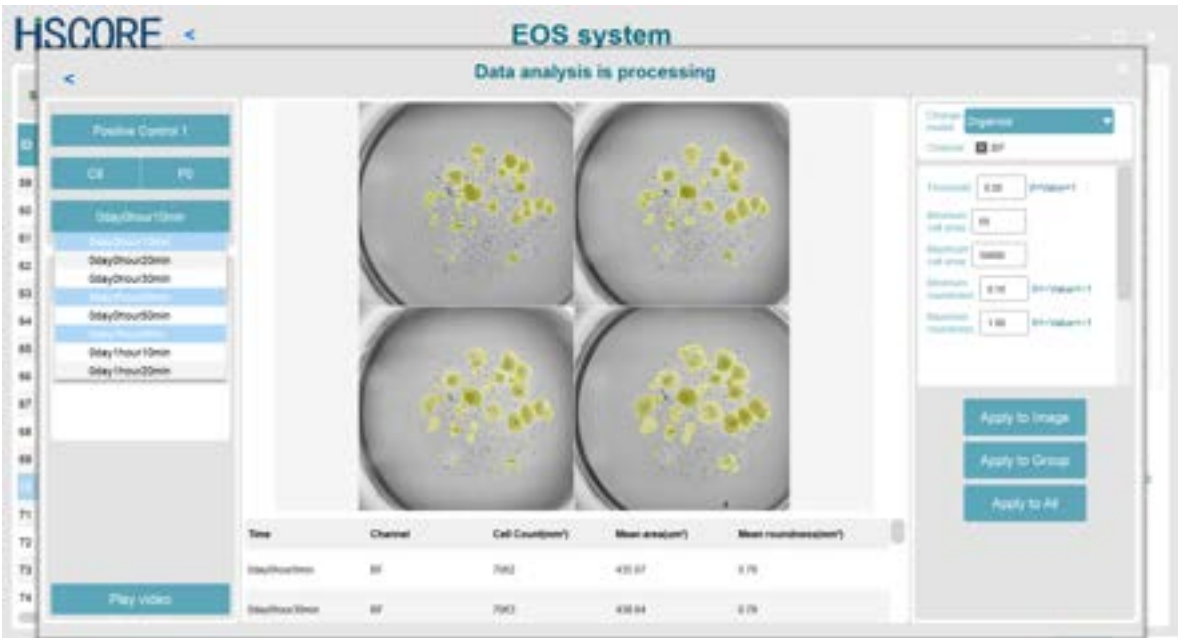
EOS system
Data analysis is processing
Positive Control 1
Play video
Apply to Image
Apply to Group
Apply to All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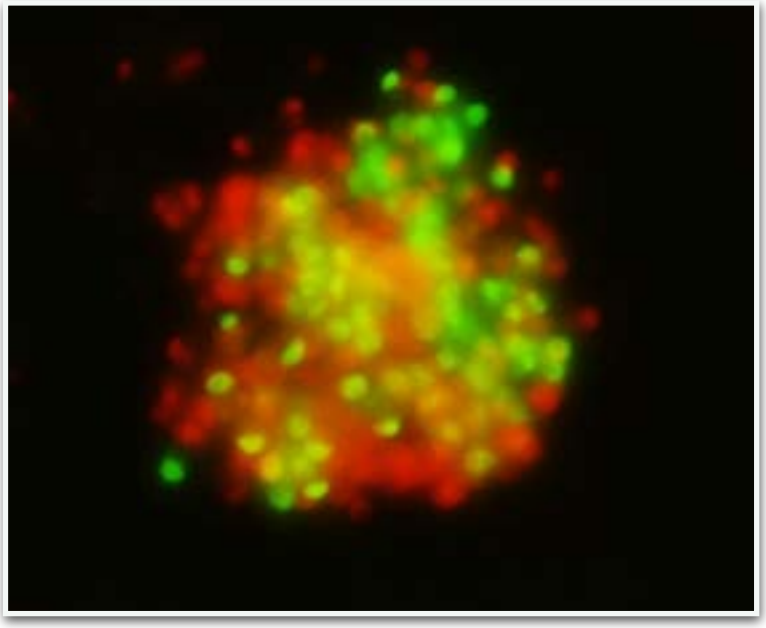
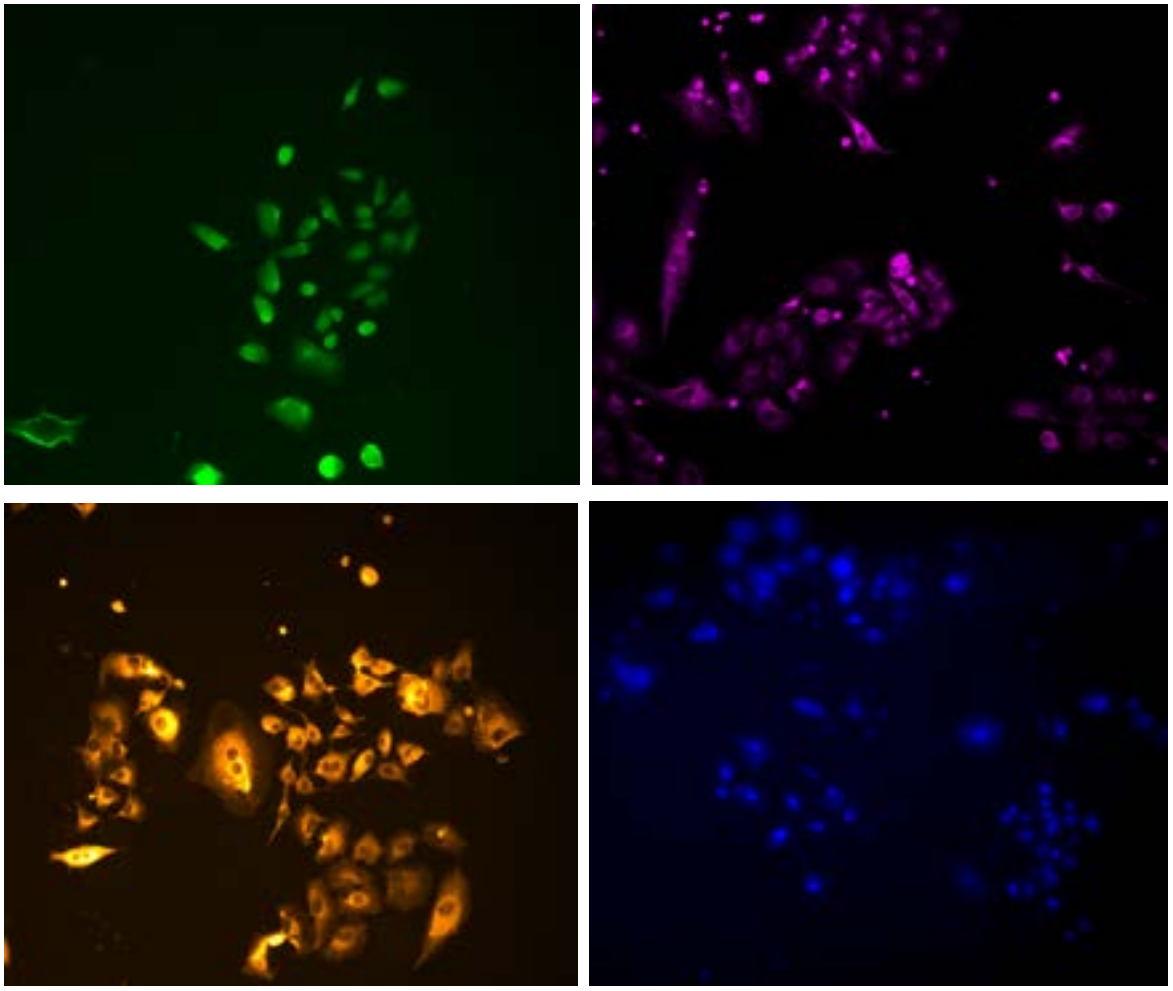


Four-Color Fluorescence Channels Offer More Choices

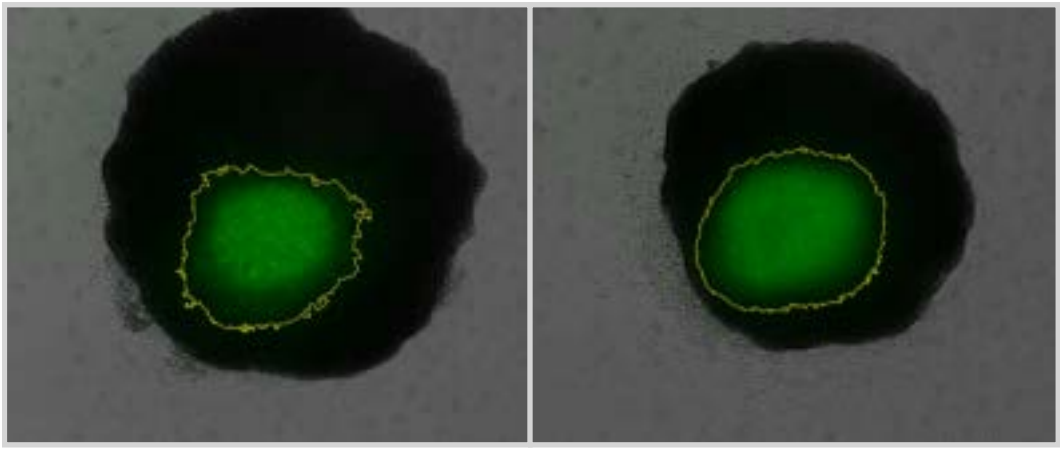
The infrared detection channel causes minimal damage to cells, making it suitable for long-term observation of fragile cells.



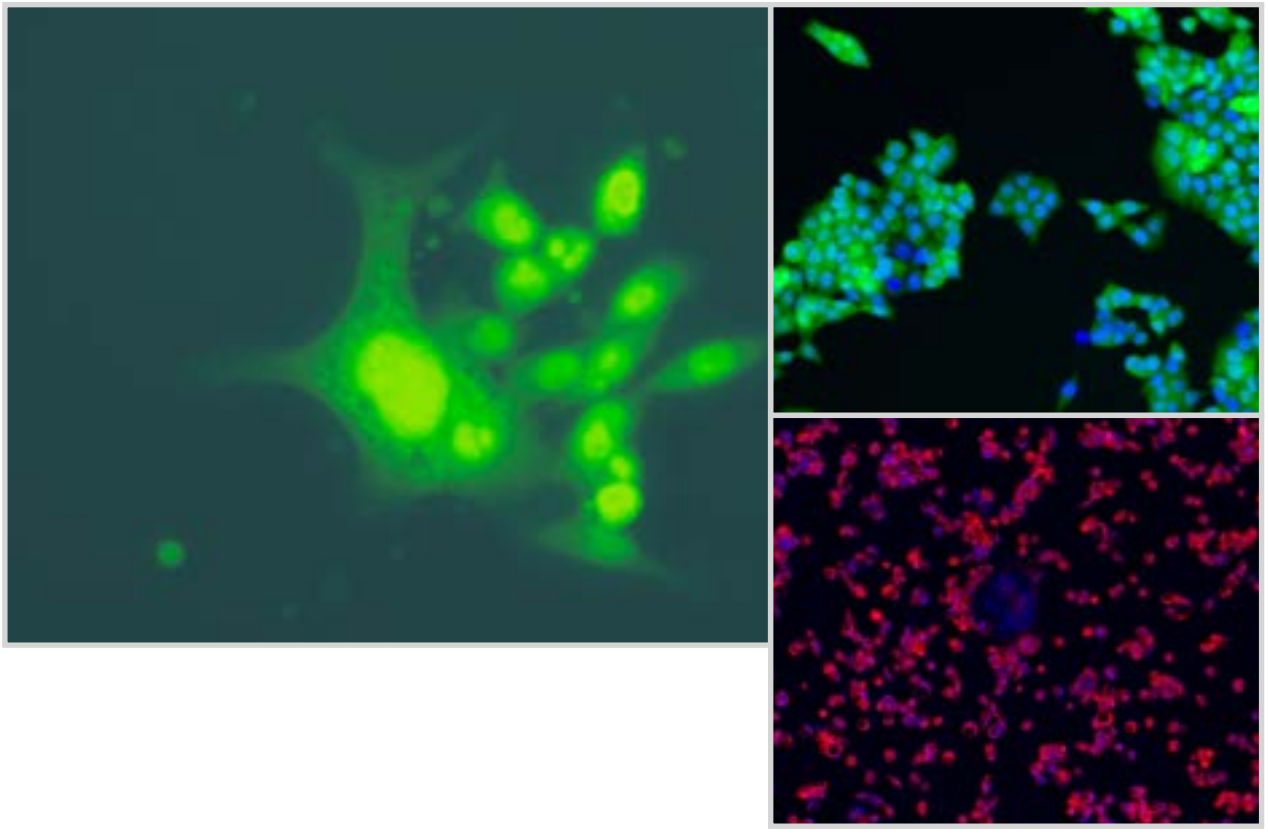
Top left：Green； Top right：Near-infrared； Down left：Orange； Down right：Blue

Tumor spheroid

Through the study of 3D tumor spheroids, we can gain a deeper understanding of the mechanisms of tumor initiation and development, providing an important theoretical basis for early cancer diagnosis and treatment. The application of EOS allows us to more intuitively observe the dynamic changes of tumor spheroids, capturing subtle interactions between cells, thus opening up new perspectives for research in life sciences.



40x observation of internal cellular changes and multi-color overlap



Specification

Model	EOS1	EOS6
Imaging mode	Brightfield, phase contrast, fluorescence, Z-stack, whole imaging.	
Objective lens	Motorized four-position turret with 4x, 10x, 20x, and 40x (optional) phase contrast and fluorescence objective lenses.	
Fluorescence channel	Four-channel fluorescence: red, green, blue, and near-infrared (optional)	
Excitation light source	360-370nm 483-493nm 555-565nm 645-655nm(optional)	
Emission wavelength	430-465nm 510-530nm 580-615nm 670-738nm	
Brightfield light source	620nm	
Phase contrast imaging	Motorized phase contrast control	
Motorized XY stage	X-axis travel: 86 mm, Y-axis travel: 115 mm, minimum increment: 1 μm	
Motorized Z-axis stage	Minimum increment: 100 nm	
Number of sample containers	1	6
Container specifications	6-384 well plates, culture dishes, various dishes, as well as T25, T75, and microfluidic chips.	
Temperature and humidity control	Can be placed in a CO2 incubator	
Camera	5-megapixel research-grade camera	
Output format	Time-lapse imaging videos, high-definition images (.tiff, .jpg), Excel files, curve graphs, and other data.	
Dimensions and weight	416x346x347mm,15KG	
Voltage and power	120W	
External storage	16T	

About us

Hiscore was founded in 2021, our HQ located in Beijing. We committed to develop robust cytobiology analysis instrument, our team owned over fifty years experience in cell imaging analysis system.
Our company got ISO9001 Certification, our products conform to CE, FCC and TELEC Certification.

Hiscore Inc

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