Shedding New Light On **MICROSCOPY**

APPLICATION NOTE

Smart Imaging System ECLIPSE Ji
Imaging Software NIS-Elements SE
Cell Counting - endpoint

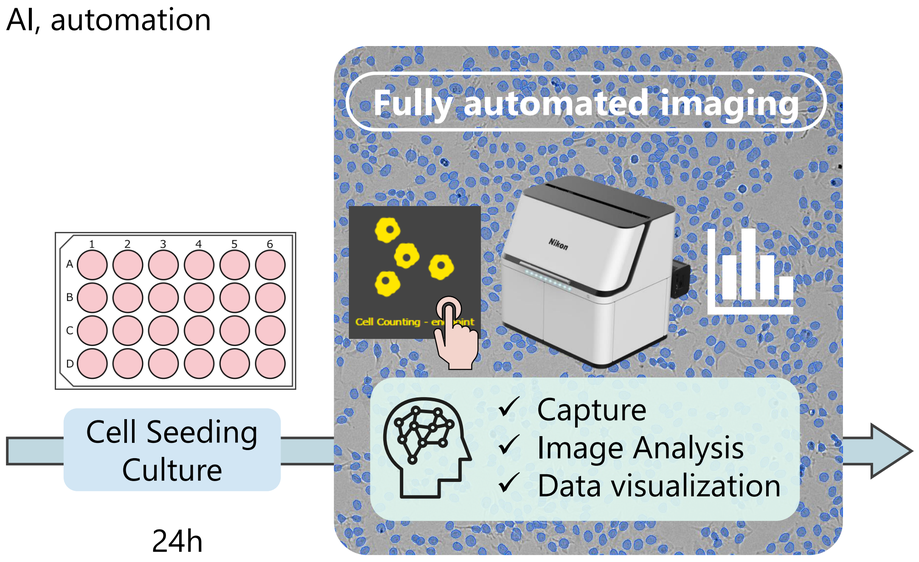
Label-free cell counting using AI-driven fully automated smart imaging system ECLIPSE Ji

ECLIPSE Ji with Smart Experiment software enables seamless experiments from image acquisition to analysis and graph creation. Pre-trained Artificial Intelligence (AI) and pre-defined imaging processes automatically optimize image acquisition and analysis condition settings, providing visualized data and cell count information with simple operation. This application note introduces an example of using Cell Counting – endpoint module of Smart Experiments, to detect cell nucleus regions from brightfield images using AI. This can be accomplished label-free, and measures the total number of cell nuclei in a given sample.

Keywords: cell counting, label-free, AI, pre-trained AI, automation

Experimental overview

(1) HeLa cells were seeded in 24-well plates and cultured for 24 hours.
(2) The well plate was placed on ECLIPSE Ji and image acquisition and analysis was run automatically by selecting the Cell Counting – endpoint icon.



- **Key features**
  - ✓ Fully automated from image acquisition to analysis and graphing
  - ✓ Label-free cell counting
  - ✓ Pre-trained AI is implemented

Detection region	Fluorescence label	Ex/Em (nm)
Cell nuclei	None (Detect from brightfield image using AI)	Brightfield
Magnification	**Field of view**	
4X	4.4mm x 4.44 mm Tiling image (2X2) FOV: 8.73 x 8.73 mm	

Table. 1: Detection regions, fluorescence labels, and image acquisition conditions

Point

Label-free

Pre-trained AI

AI automatically identifies **nuclei** from brightfield image

Results

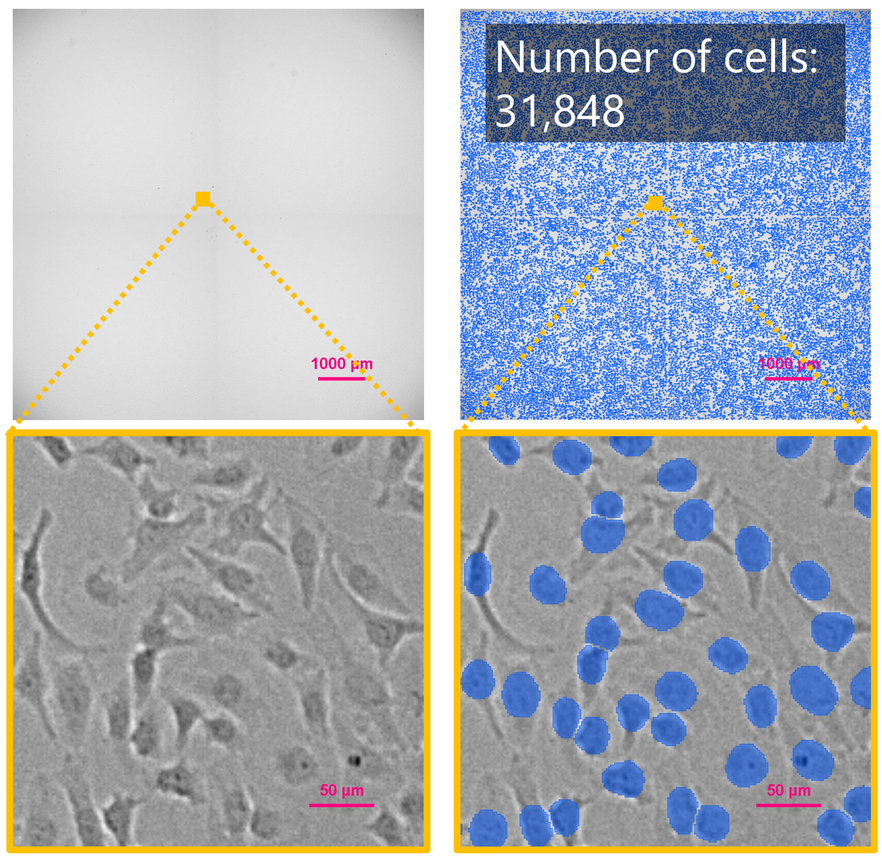


Fig. 1:Brightfield and binarized images of HeLa cells
2x2 tiling image, left: brightfield image, right: nuclear mask overlaid on brightfield image. Upper row: Scale bar: 1000 µm, Lower row: Scale bar: 50 µm

Product information

Smart Imaging System ECLIPSE Ji

ECLIPSE Ji is an AI-Driven, fully automated imaging system. By using it in combination with NIS-Elements SE, image acquisition, analysis, and graph creation can be run seamlessly and automatically. It is equipped with "CellFinder.ai", which uses AI to find the optimal focal plane in autofocus settings that normally require advanced human judgment. Various trained AIs are implemented in the image acquisition and analysis process. This greatly reduces the number of steps for setting and optimization and makes it easier for everyone to get results.

Imaging Software NIS-Elements SE SmartExperiment Basic Set Cell Counting - endpoint

- ✓ Fully automated from image acquisition to analysis and graph display.
- ✓ Label-free cell counting by pre-trained AI