

## Robust morphology-based classification of cells following label-free cell-by-cell segmentation using convolutional neural networks

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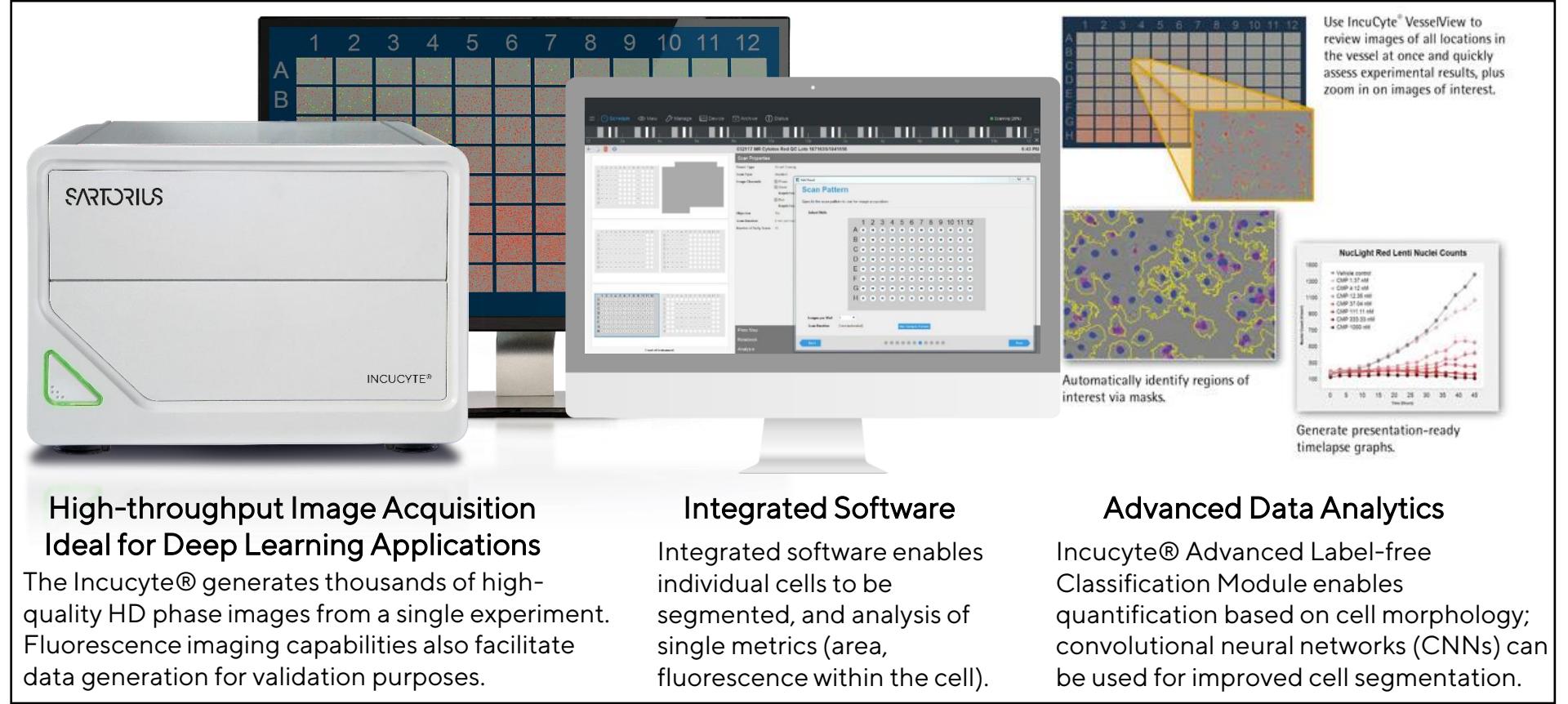
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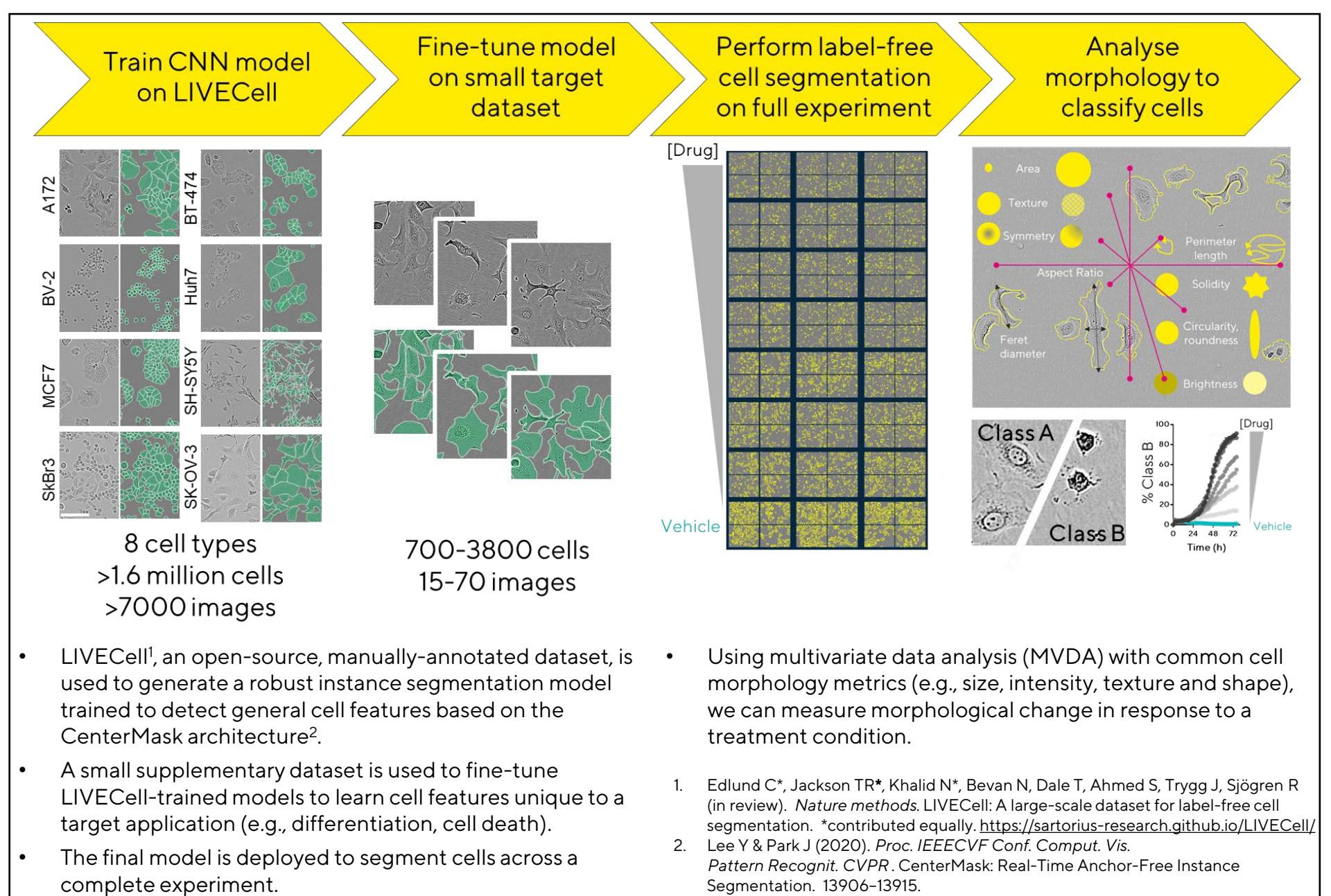
### Introduction

- Light microscopy is a cost-effective, non-invasive, accessible modality for high-throughput live-cell imaging.
- Accurate segmentation of individual cells enables exploration of complex biological questions, particularly related to morphological change, but require sophisticated algorithms such as convolutional neural networks (CNNs).
- Many deep learning studies have limited amounts of quality training data.
- We previously reported on LIVECell, an open-source, high-quality, manually annotated and expert-validated dataset, comprising over 1.6 million annotated cells of 8 highly diverse cell types from initial seeding to full confluence, acquired on the Incucyte®.
- With minimal additional data, we fine-tune one of our publicly available LIVECell-trained models to enable quantitative analysis of complex morphological change associated with two applications, cell viability and differentiation.

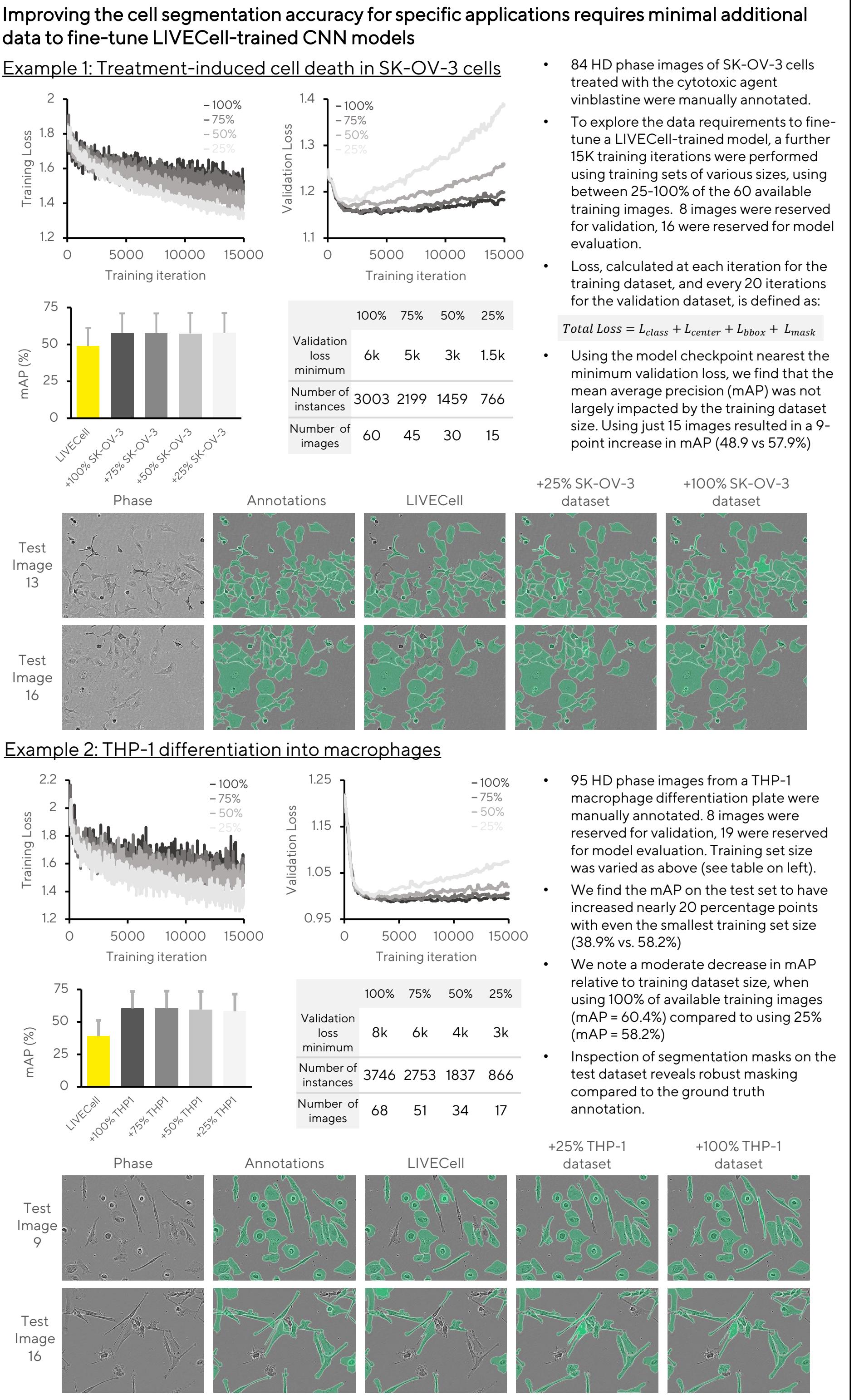
### Incucyte® Live-cell imaging and analysis systems



### LIVECell enables morphological analysis of cells with minimal additional annotated data



### Application-specific CNN model fine-tuning



### Segmentation data provides biological insight

