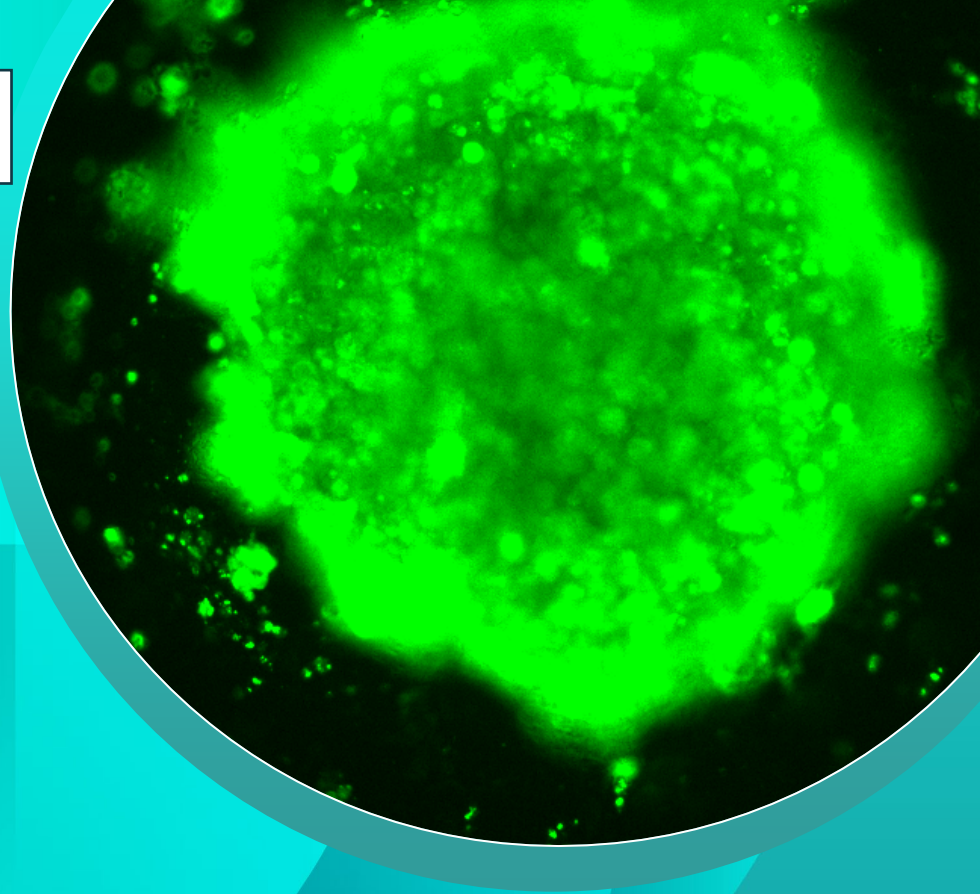
MOLECULAR DEVICES

EASTPORT LIFESCIENCE

Cell Health in the Third Dimension

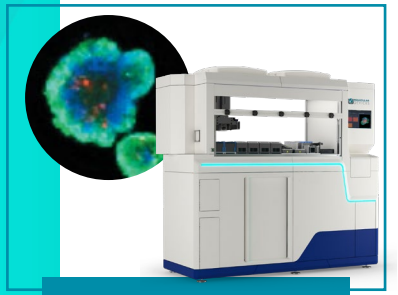


Sylvia de Bruin

April 2026

Integrated Solutions

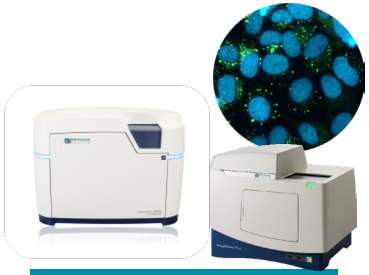
Accelerating development of novel therapeutics



3D Biology

Microplate Readers
with industry-leading
SoftMax Pro Software

GxP Compliance
and Validation Solutions



High-content
Cellular Imaging
and Analysis

Drug Discovery
High-Throughput
Solutions

BioPharma Solutions
for Antibody Discovery, Cell Line
Development and Synthetic Biology

Lab Automation
and Customization
Solutions

Why Molecular Devices?
40+ Years of Imaging Innovation

1983
Molecular Devices founded by Harden McConnell from Stanford

2002
Acquired Universal Imaging Corporation

2005
ImageXpress Micro

2007
Metamorph ICS Confocal Microscope

2009
MetaXpressPowerCore and MetaXpress imaging software

2010
MetaMorph software

2010
Molecular Devices acquired by Danaher Corporation

2011
ImageXpress Micro XL

2013
ImageXpress Micro XLS Widefield

2015
ImageXpress Micro Confocal

2016
ImageXpress Micro 4

2017
ImageXpress Nano System

2018
ImageXpress Pico

2019/2020
New water immersion technology and 5- or 8- channel high-intensity lasers

2021
ImageXpress HT.ai & IN CARTA

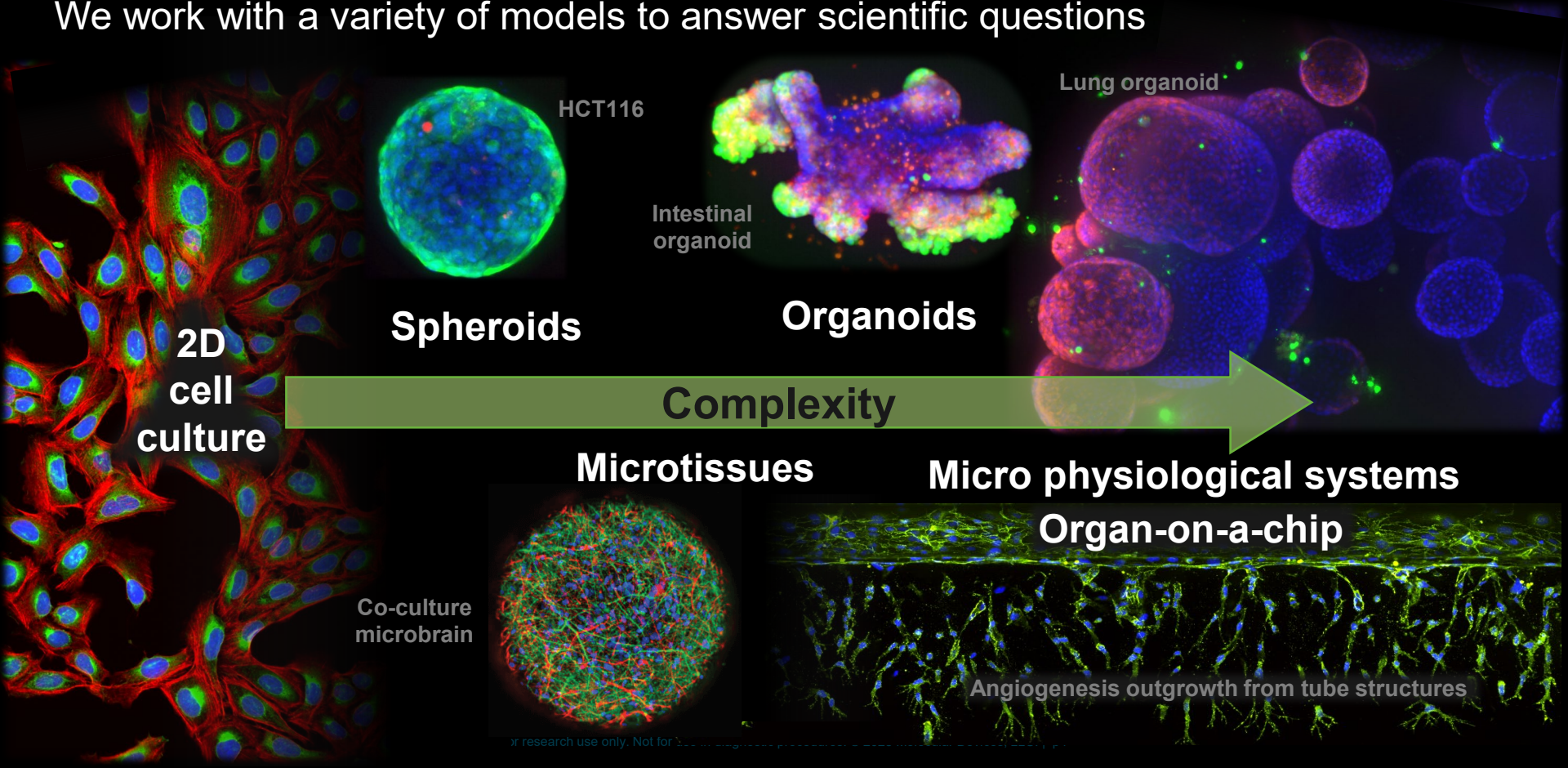
2022
CME in IN CARTA

2023
CellXpress.ai with IN CARTA

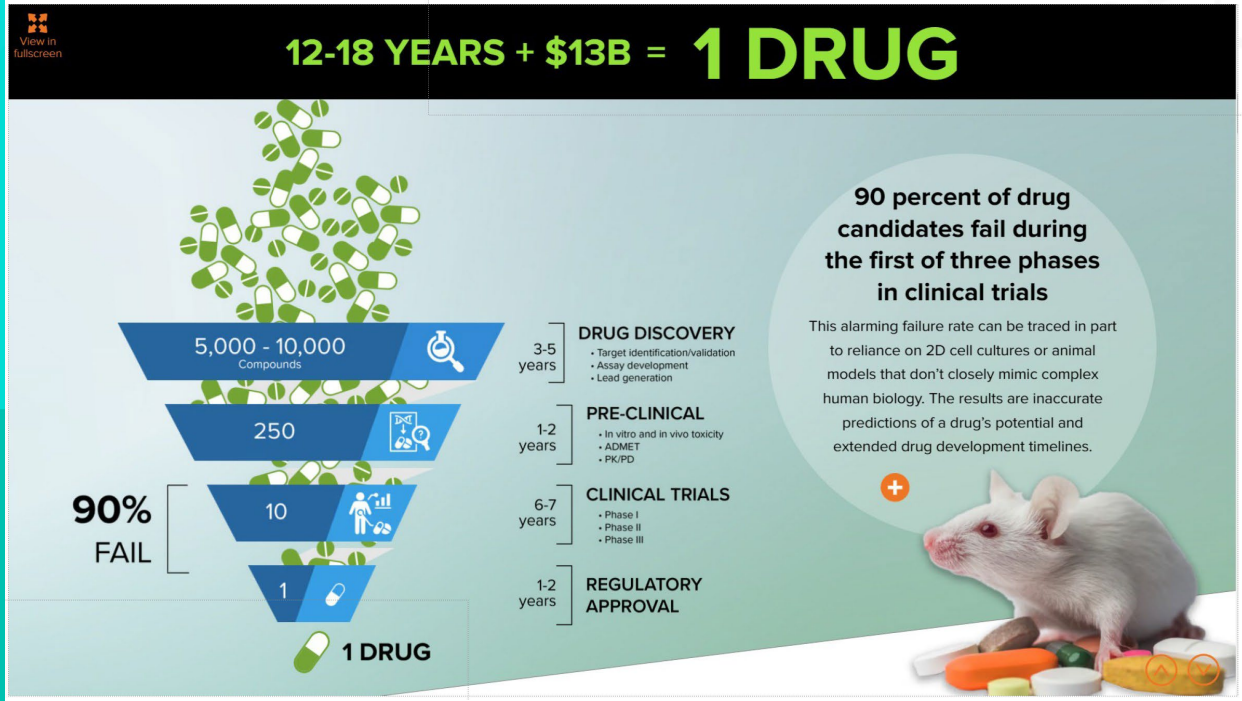
2025
ImageXpress HCS.ai

3D models vary in complexity

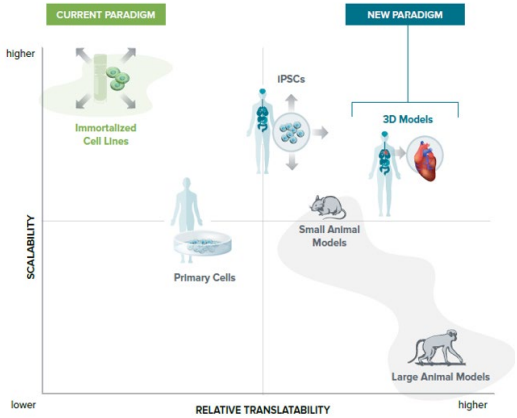
We work with a variety of models to answer scientific questions



High Attrition rate in Drug Development



High demand for **Human Representative Models** that **more accurately** recapitulate human biology



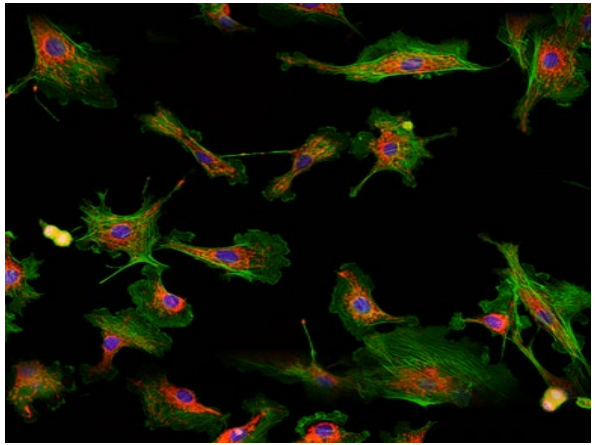
Why Image Analysis?

Plate Reader

150.5

- One data point
  (i.e. Fluorescence Intensity)

High-Content Image



- Intensity values
- Object counts
- Area/Morphology measurements
- Cell-by-cell data
- Multiple measurements per cell

Benefits of ImageXpress Solutions

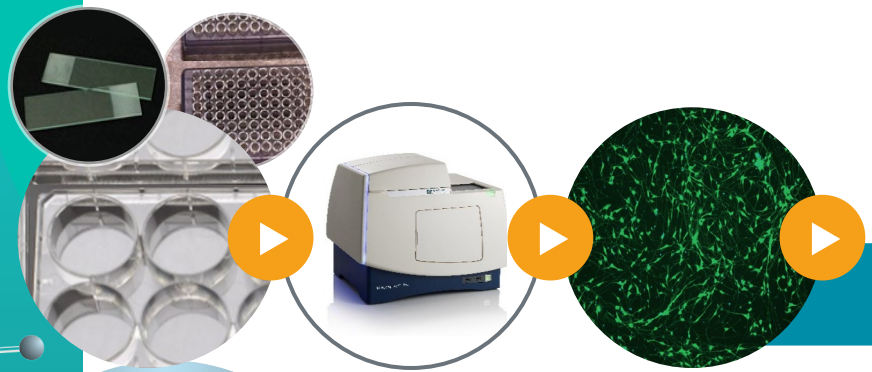
Process with conventional microscope (acquisition only)

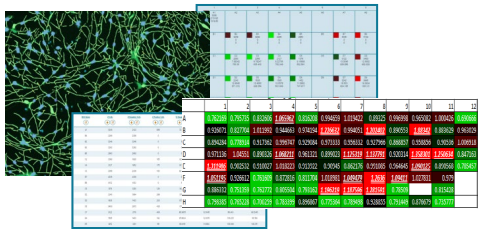
?

Elapsed hands-on time

Typically hours

Process with ImageXpress Automated Imaging Systems (acquisition and analysis)





Minutes

- No dark room
- Optimized system, no separate pieces
- Streamlined workflow
- Time saving
- Analysis tools
- Data mining tools

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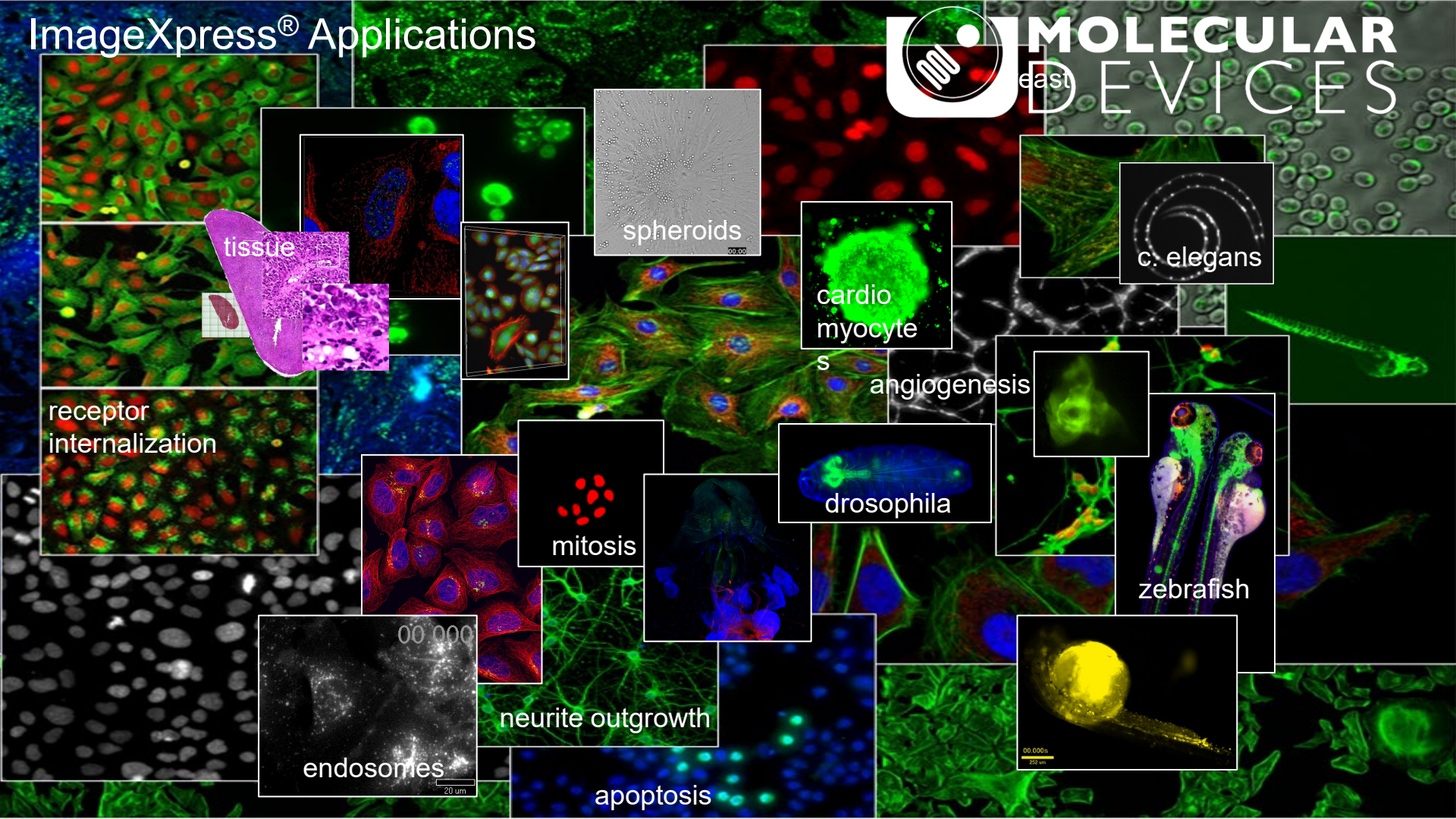
ImageXpress® Applications

MOLECULAR DEVICES east



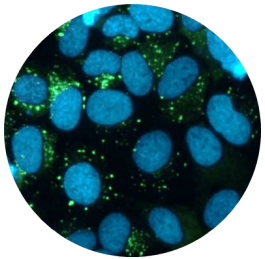
Widefield and Confocal Imaging Solutions

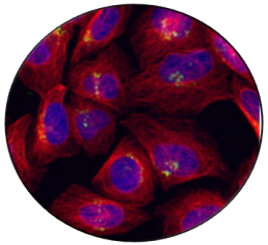
ImageXpress Widefield HCS System

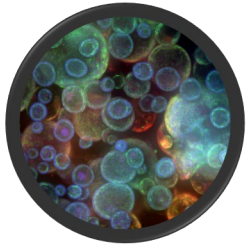
- *LED light engine type illumination (Dapi → Cy5)*
- *Digital Confocal and deconvolution options*

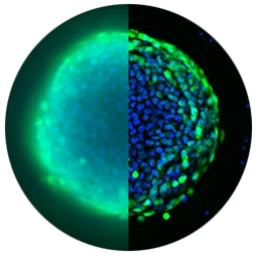
ImageXpress Confocal Systems

- *Spinning disk confocal with multiple pinhole size and geometry (3-5 options)*
- *Digital Confocal and deconvolution options*









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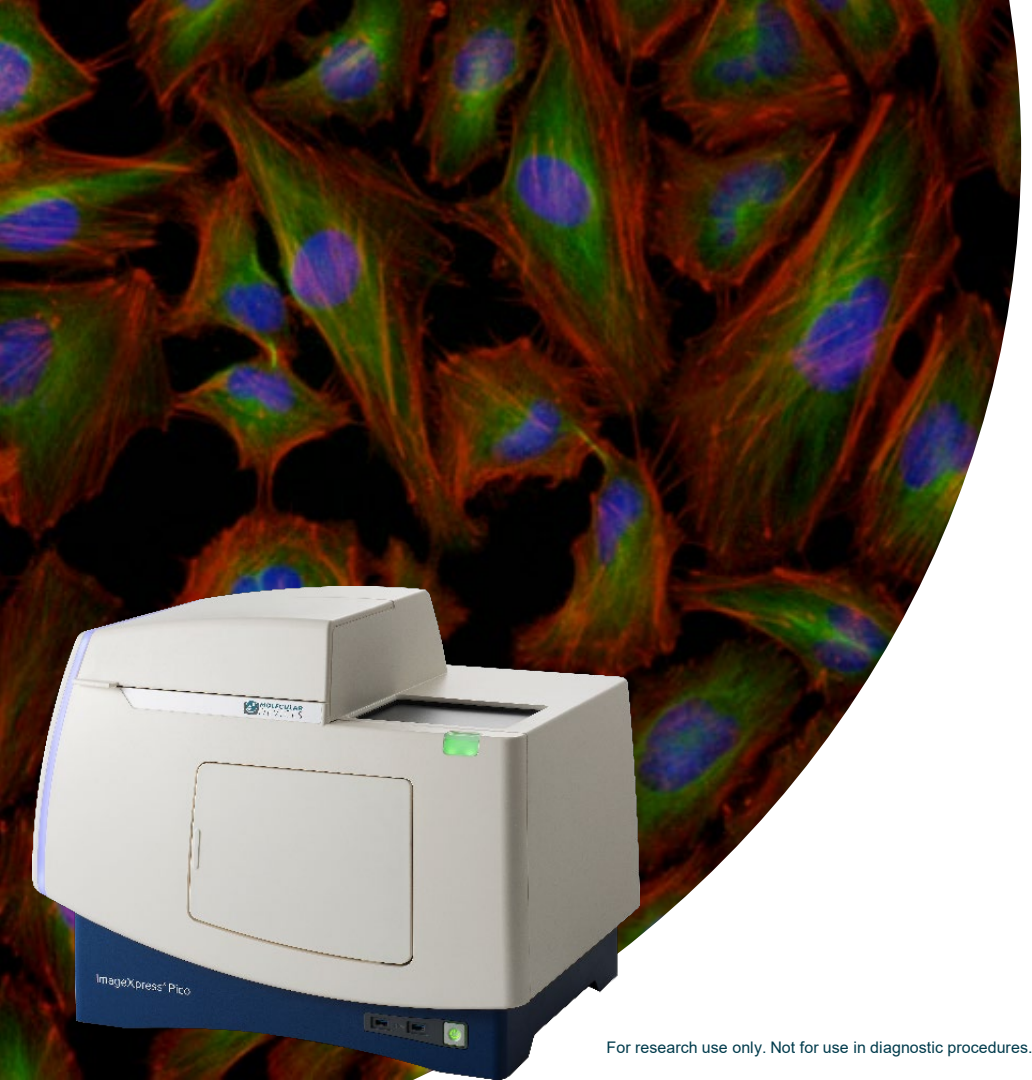


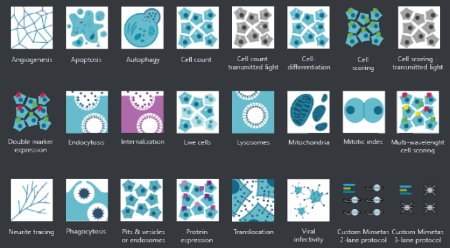
ImageXpress® Pico

- 5 channel imaging including transmitted light
- Small footprint
- Intuitive software
- Environmental Control (temperature, gas, humidity)

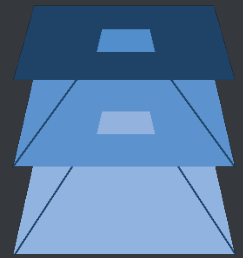
CellReporterXpress (CRX)

Image Acquisition / Analysis Software

Remote Control
Browser-based software enables remote access to your data.



Application Modules
Over 25 pre-made image analysis modules are available for most biological assays

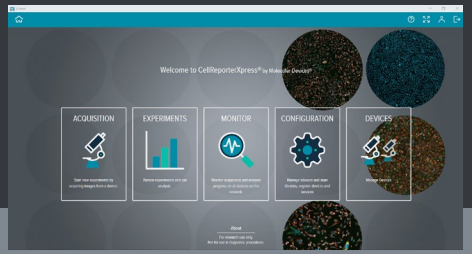


Low Resolution- Large FOV

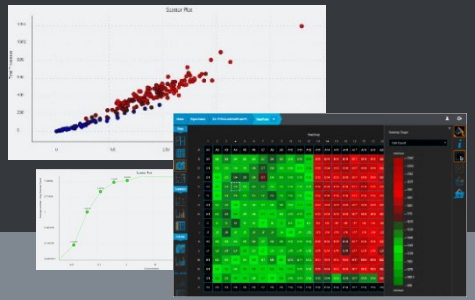
Medium resolution- Medium FOV

High Resolution- Small FOV

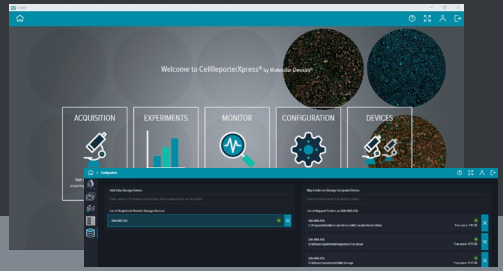
Pyramidal Imaging
Pyramid file format to seamlessly acquire, view, and analyze large image areas.



On the fly analysis
Image acquisition and analysis can be done simultaneously



Visualized Data
Visualize multiplexed datasets will show easy to understand result.



No Database required:
Easy to assign and maintain storage location.

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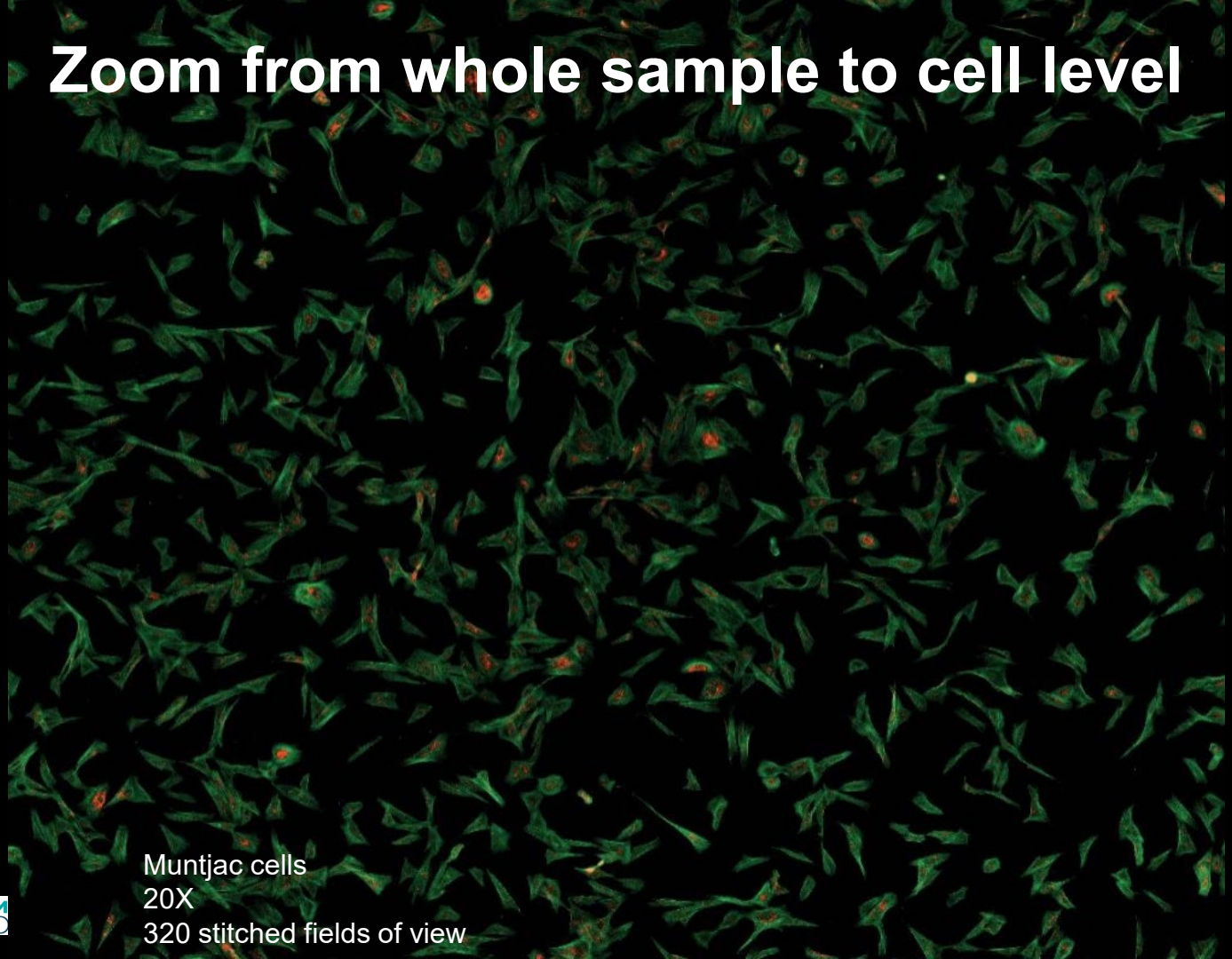
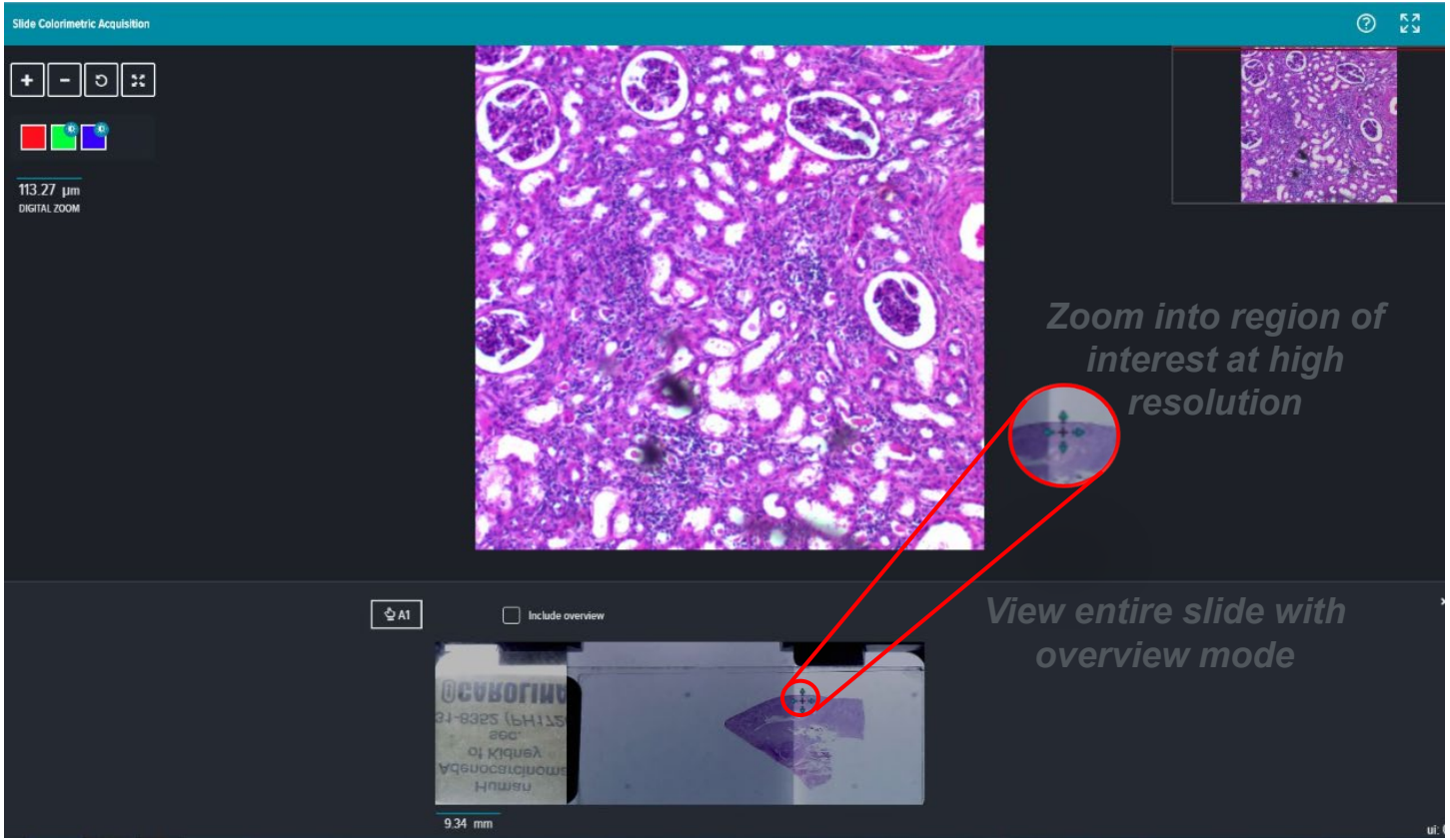
Zoom from whole sample to cell level



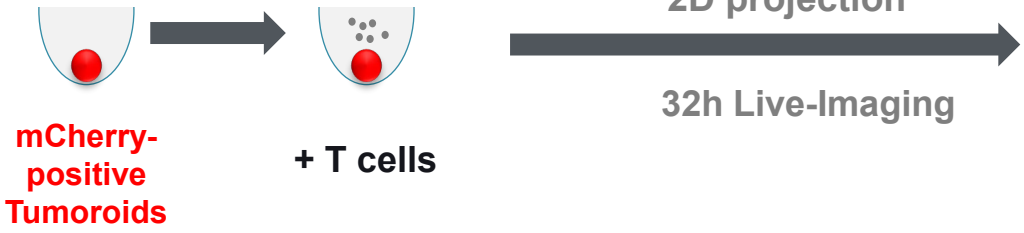
Muntjac cells
20X
320 stitched fields of view

Overview mode for easy slide imaging

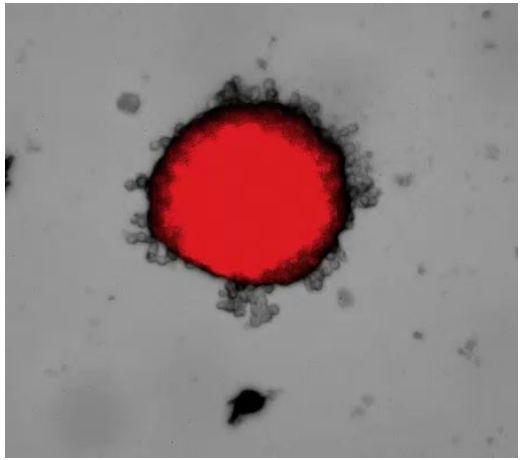


Example of Spheroid Imaging

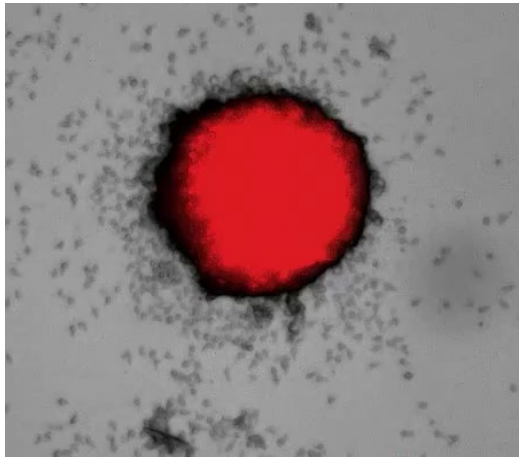
T-cell 3DTumor infiltration Assay



No T cells

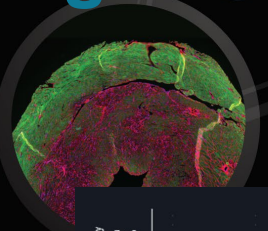


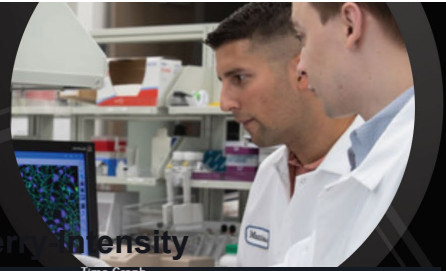
High T cells

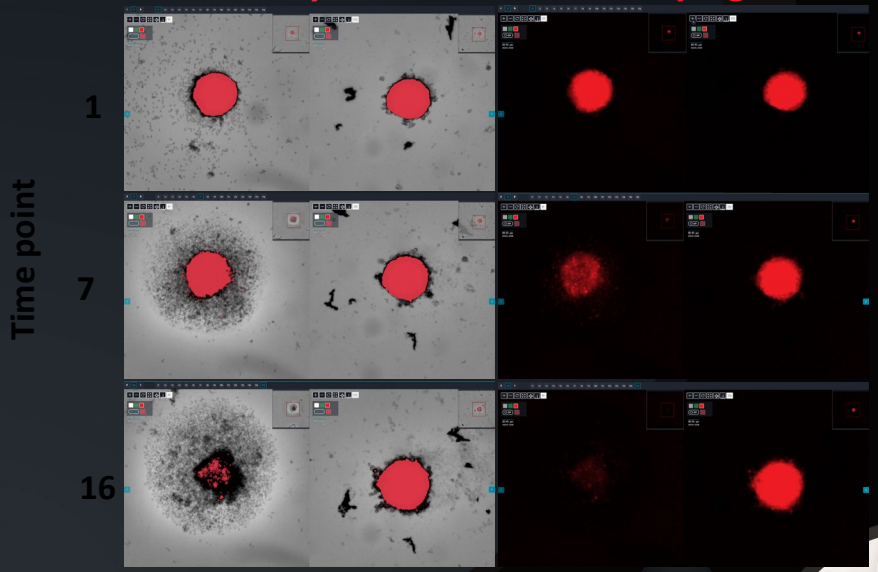


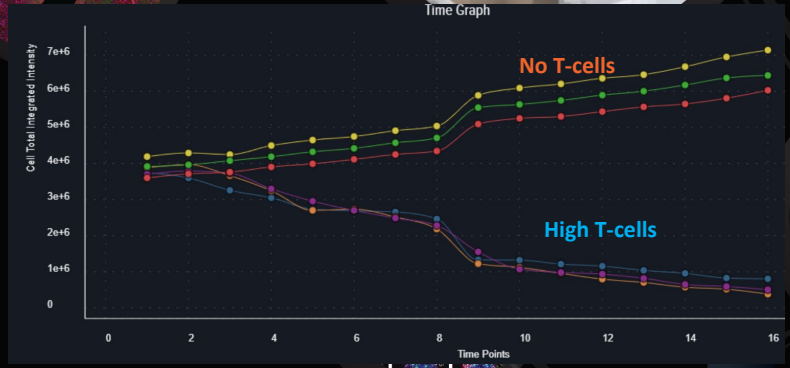
Example of Spheroid Imaging

T-cell 3DTumor infiltration Assay









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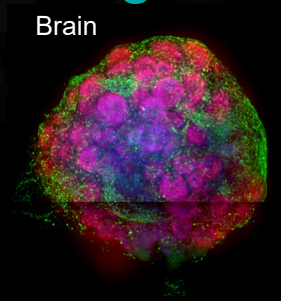
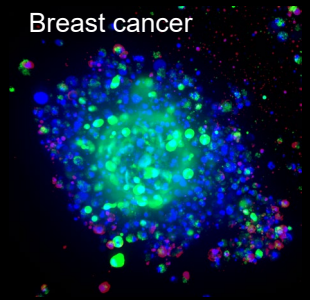
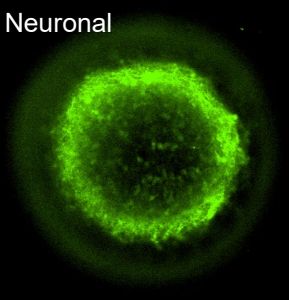
Addressing challenges in 2D/3D Imaging and Image analysis

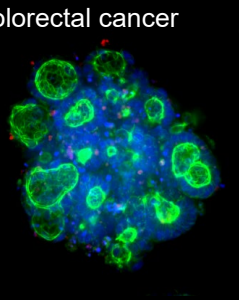
Challenges of 3D Organoid Imaging
Organoids pose imaging challenges due to 3D structure, optical heterogeneity, and variation in size and shape.

Analysis often doesn't scale: Large, variable 3D datasets overwhelm traditional 2D analysis workflows and slow time-to-insight









Addressing challenges in 2D/3D Imaging and Image analysis

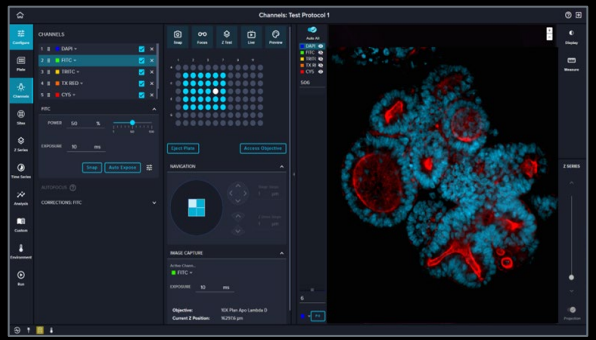
High Content Imaging System – HCS.ai

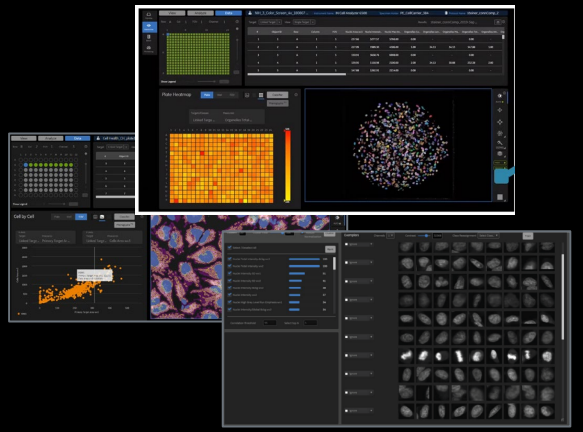
&

New MetaXpress Acquire Intelligent Acquisition

&

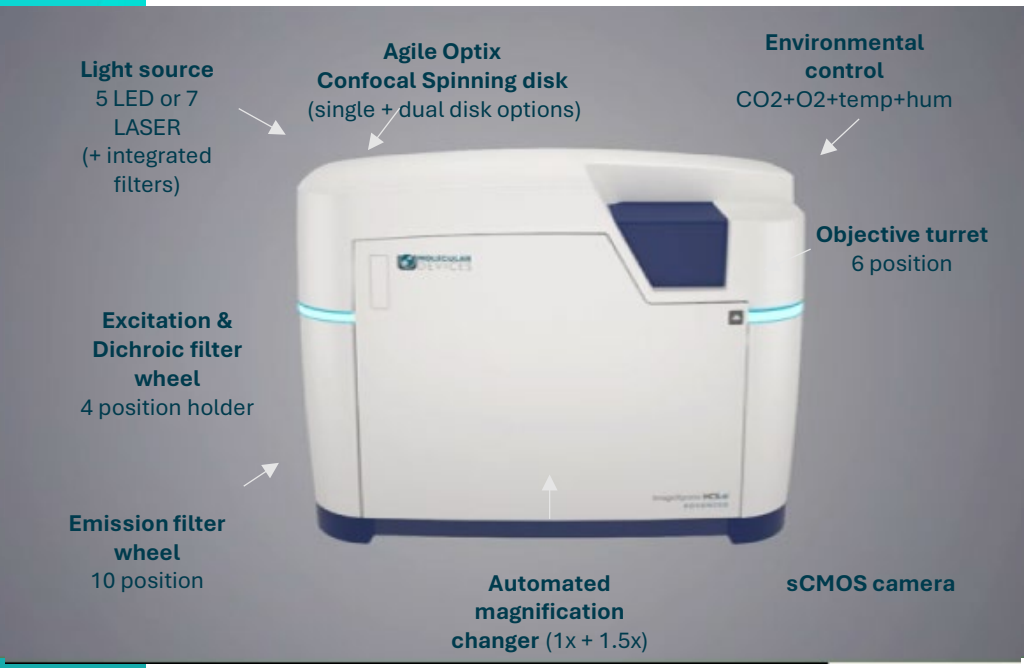
IN Carta Ai-powered Image Analysis





NEW! ImageXpress HCS.ai High-Content Screening System

A fast, intuitive and versatile system delivering deeper insights for every lab



movie

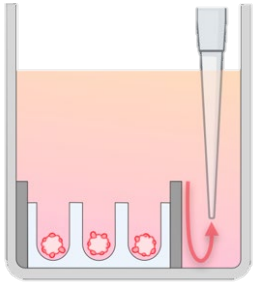
Modular and intuitive for optimal versatility
Features a modular design and a wide array of customizable configuration options to meet your current needs and on-site upgrades to match your future requirements.

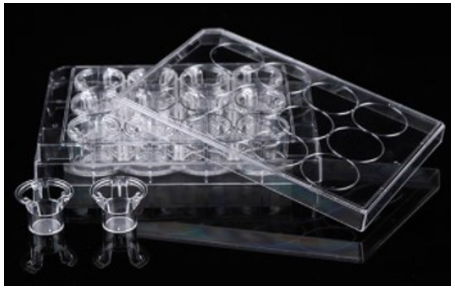
High-intensity laser light source option
Laser illumination captures images faster with shorter exposure times and can multiplex experiments with 7 lasers and 8 imaging channels.

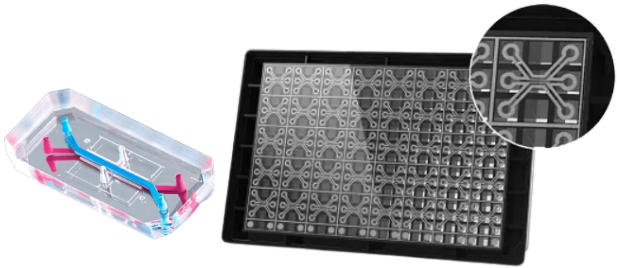
Exclusive AgileOptix™ spinning disk technology
Provides increased sensitivity with specially designed optics, high-powered laser illumination, and sCMOS sensor. Swappable disk geometries provide flexibility between speed and resolution.

Magnification changer option
Get access to 12 magnifications within a single configuration, including high NA (Numerical Aperture) and ELWD (Extra-Long Working Distance) options.

Large compatibility with plates







Calibrate **any** plate or sample vessel using laser and/or software autofocus for consistent and reliable focus on 2D or 3D samples

MetaXpress Acquire Acquisition Software

- Streamlined, simplified intuitive interface
- Seamless integration with IN Carta
- IN Carta enabled Targeted Acquisition
- Software Control of Environmental Conditions (Heat/CO2)

IN Carta Image Analysis

Image Segmentation

Deep Learning segmentation

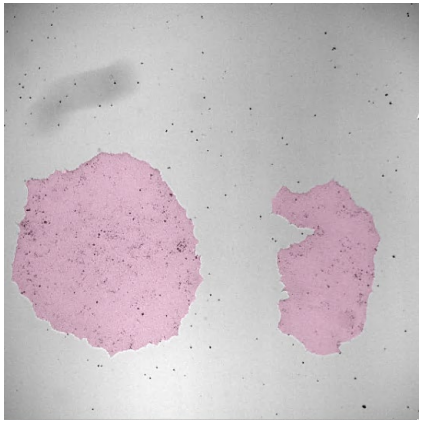
Object classification

Machine Learning classification

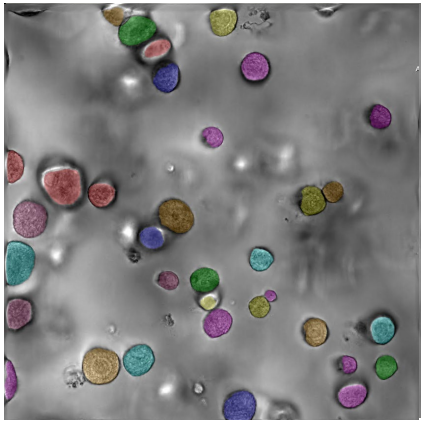
3D analysis and viewer

- Image analysis software for High Content Screening
- Intuitive user interface and workflows for 2D/3D/4D analysis of basic High Content assays
- Advanced modules to address challenges at specific steps in the analysis pipeline

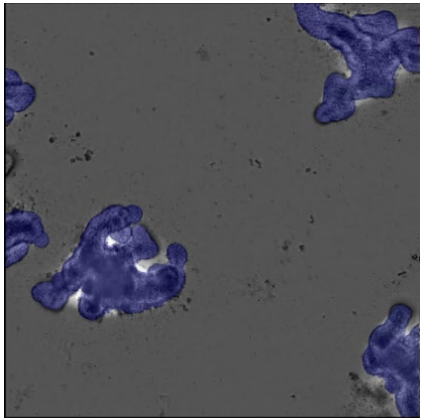
IN CARTA -SINAP Deep Learning-based Segmentation



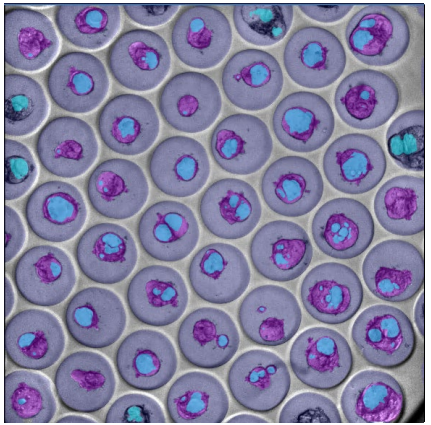
iPSC colonies



Lung organoids



Intestinal organoids



Pancreatic organoids

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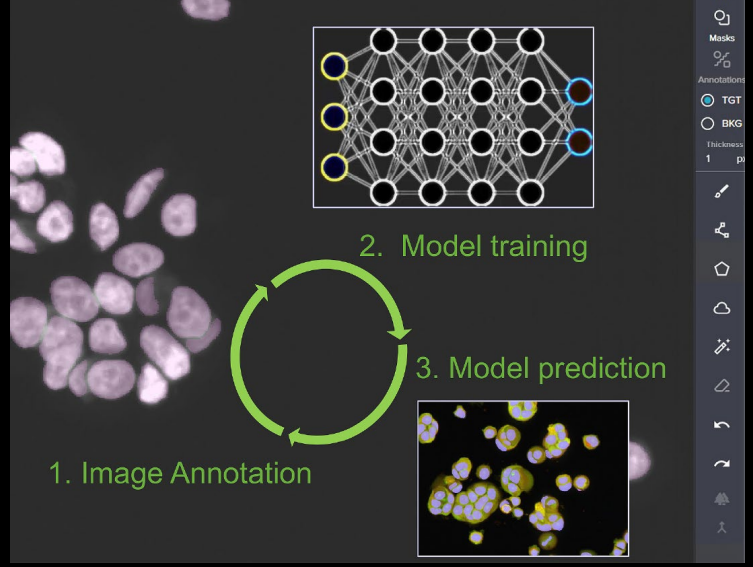
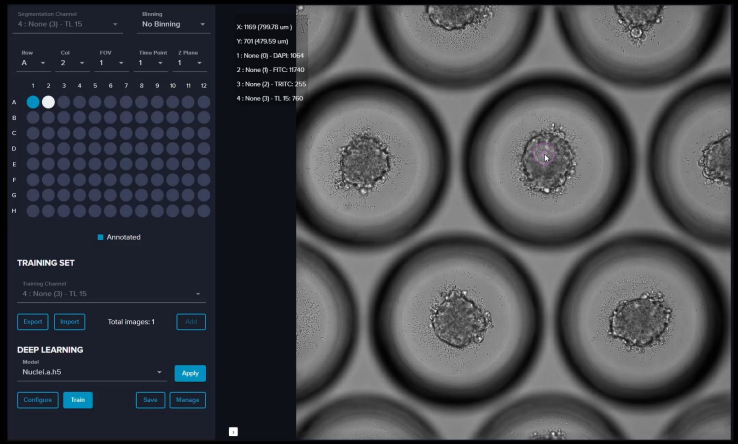
IN Carta SINAP –

...easy model customization with powerful tools

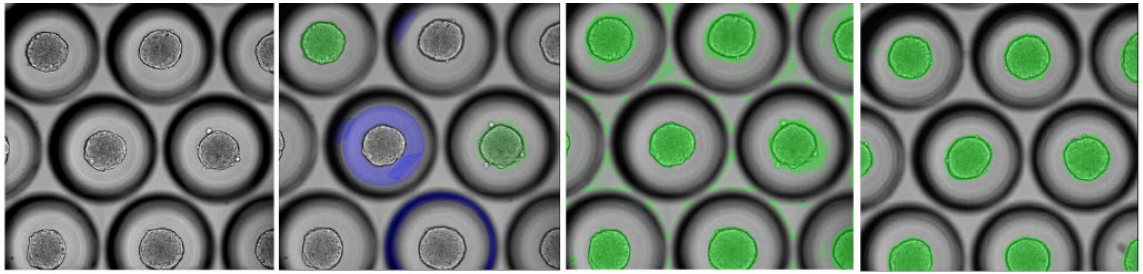
Deep Learning segmentation



SAM annotation



Annotate with drawing tools

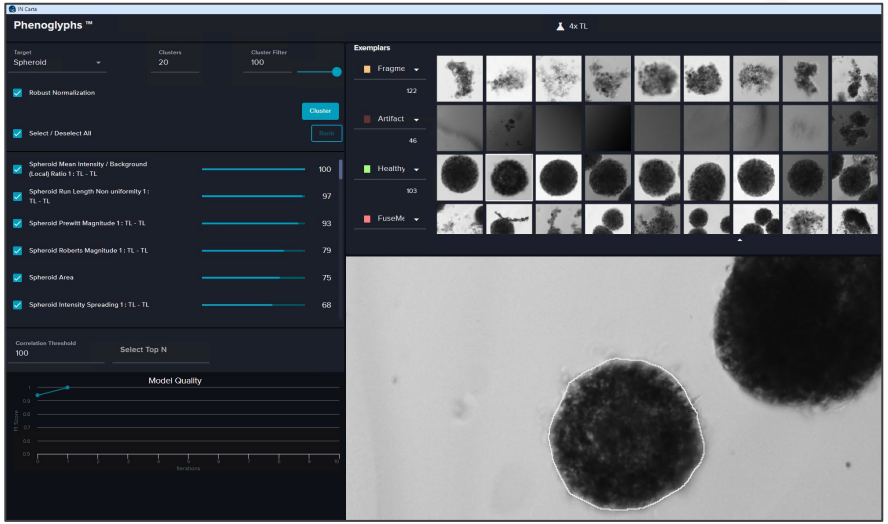


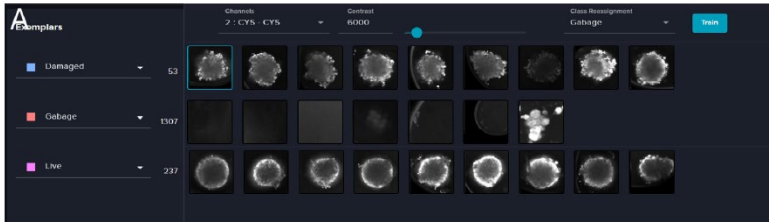
1. Load image
2. Annotate image: outline examples of objects of interest (green) and background (blue)
3. Train model and test. Repeat from step 1 if necessary.
4. Save model

MOLECULAR DEVICES

Phenoglyphs: AI-based Phenotypic Classifier

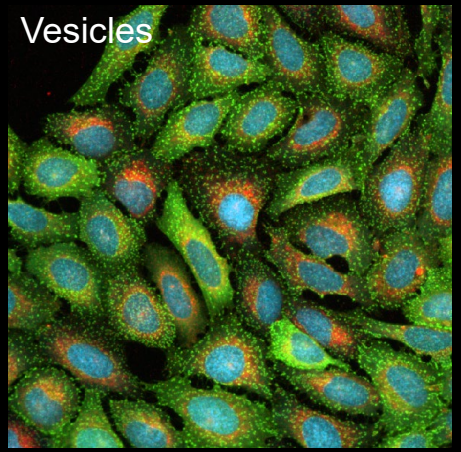
- Simplifies the process to classify cell populations
- Clusters objects with similar visual appearance based on output measurements
- Generates AI machine learning cluster classification model
- Compatible with all protocols (2D/3D Flexi, SINAP, CME)



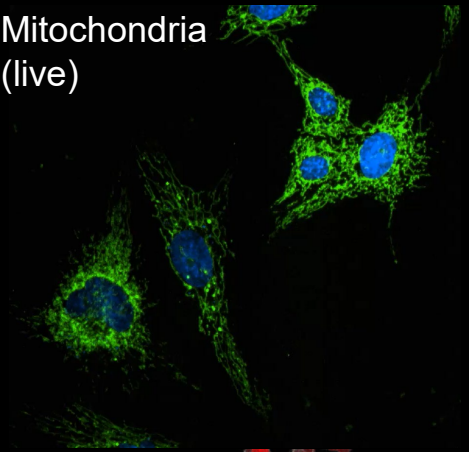


Example 2D Applications

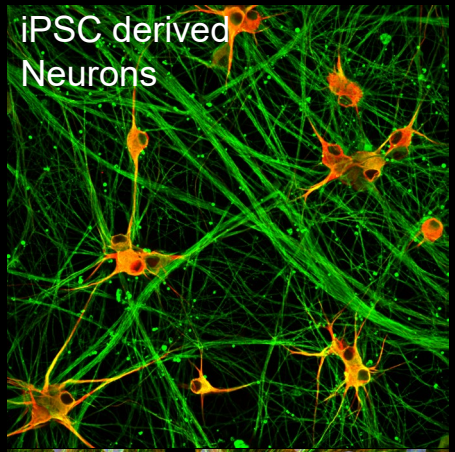
Vesicles



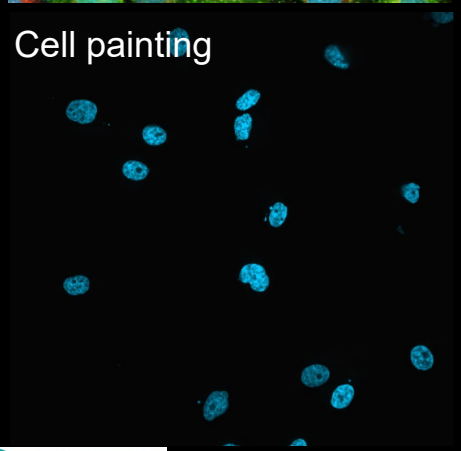
Mitochondria (live)



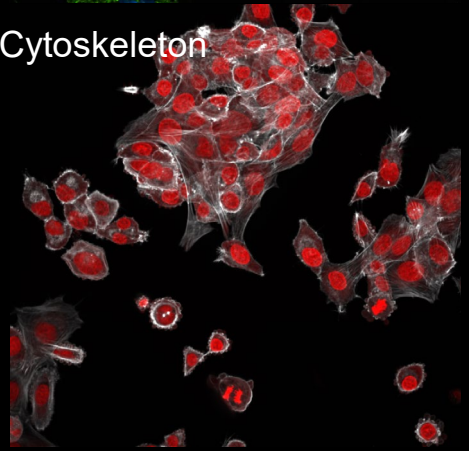
iPSC derived Neurons



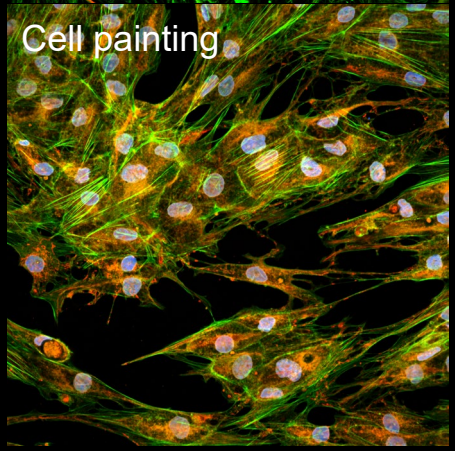
Cell painting



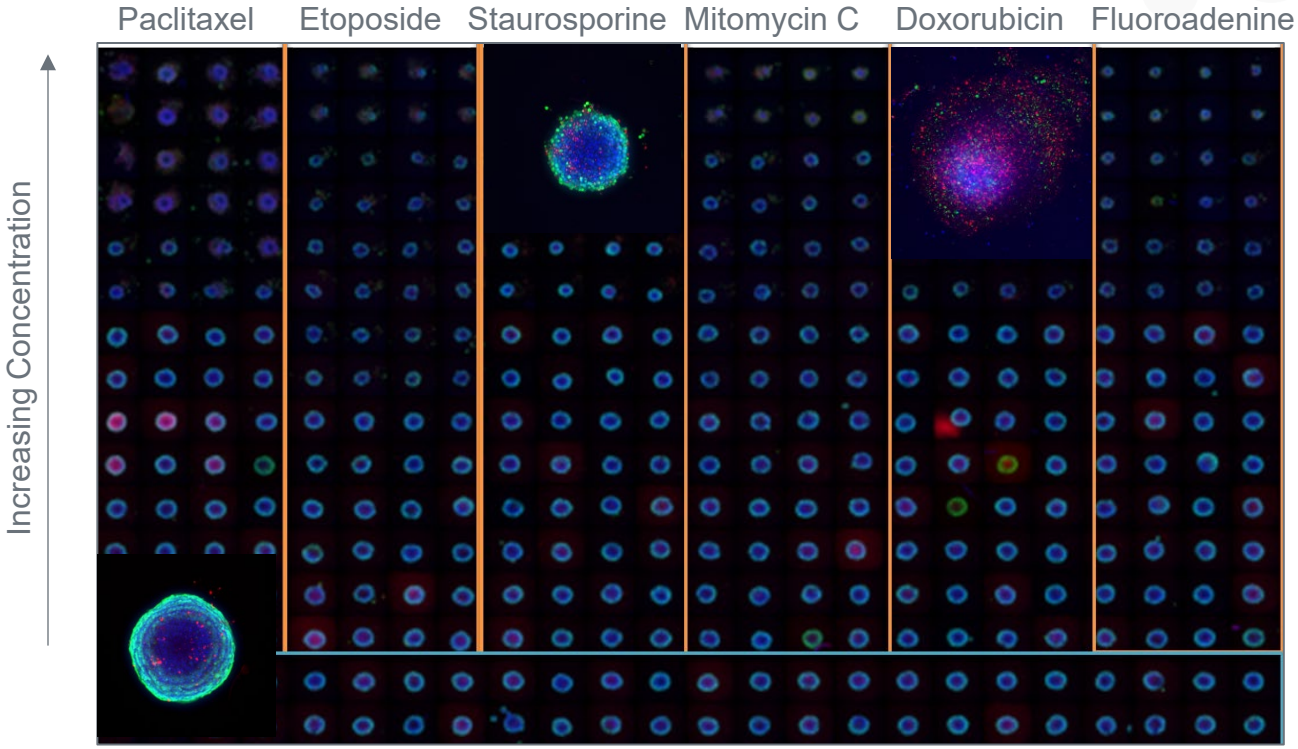
Cytoskeleton



Cell painting



2D-Compound screening of tumor spheroids



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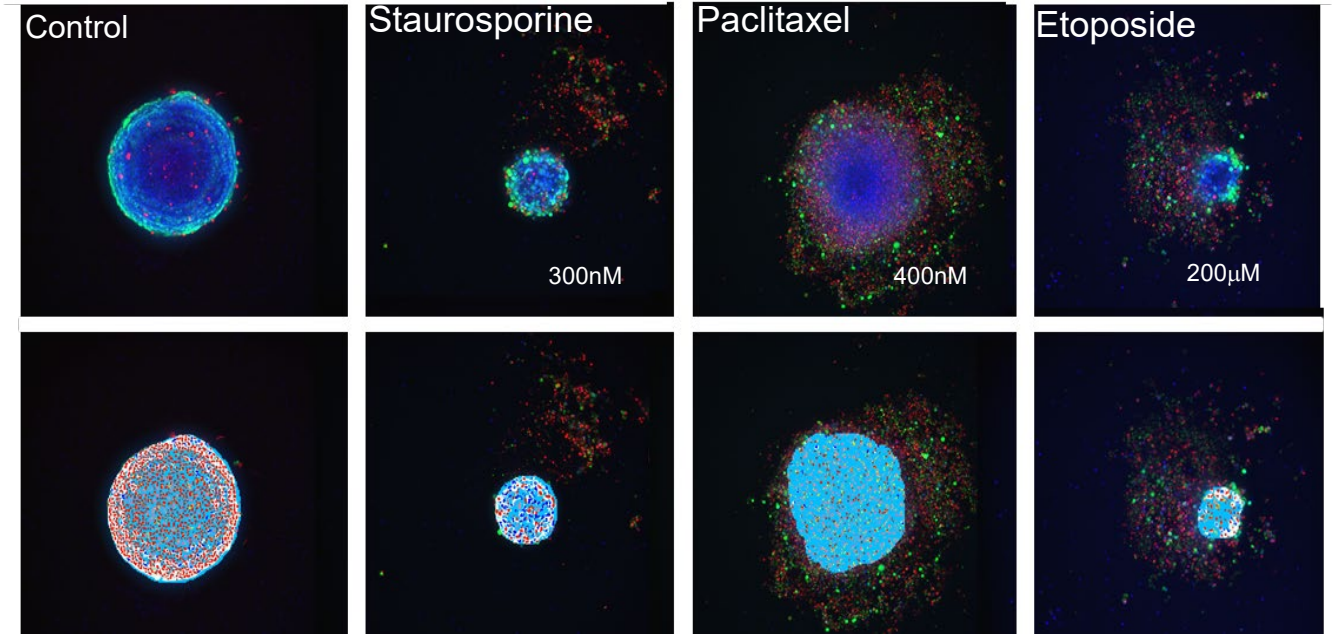
2D Analysis of Spheroid Phenotypes

- Cell count for each stained subpopulation
- Morphological and intensity readouts available



Light blue = spheroid area

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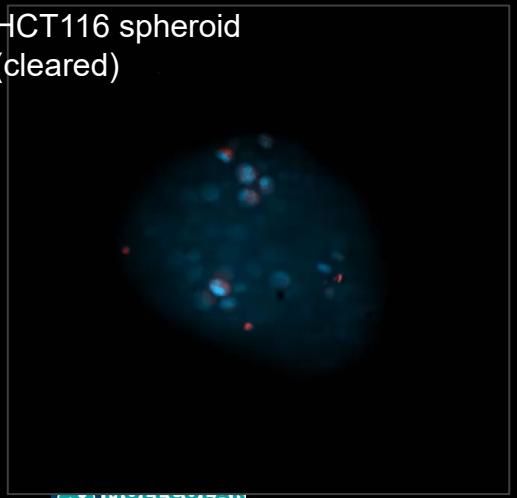
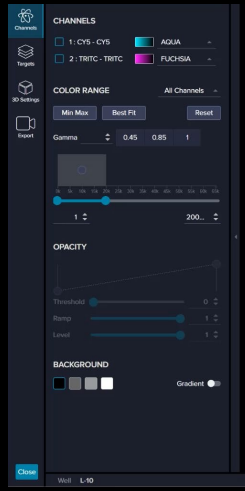
Example 3D Applications

Colorectal Cancer Patient Derived Organoids (PDO)

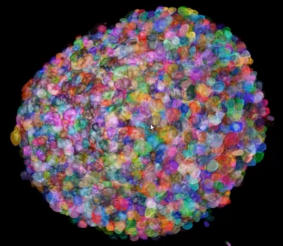
Zebrafish

HCT116 spheroid
(cleared)





spheroid + IN Carta 3D
viewer

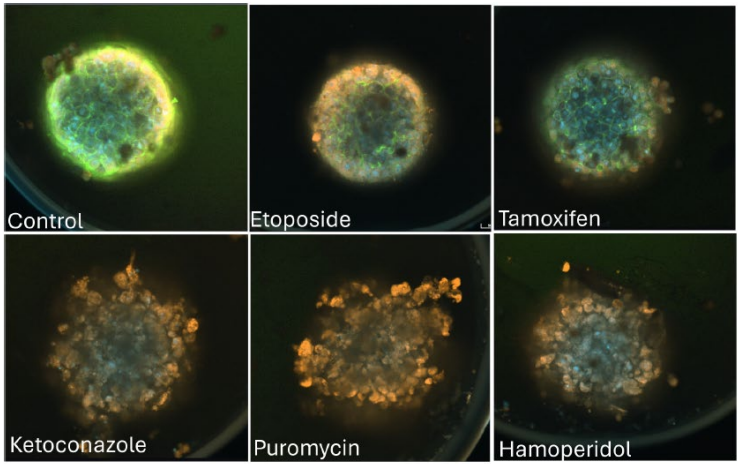


APPLICATION NOTE

AI-Driven 3D Segmentation and Drug Toxicity Screening Using Human Liver Microtissues

Zhisong Tong, PhD, Prathyushakrishna Macha, PhD,
Oksana Sirenko, PhD | Molecular Devices, LLC

Judi Wardwell | InSphero



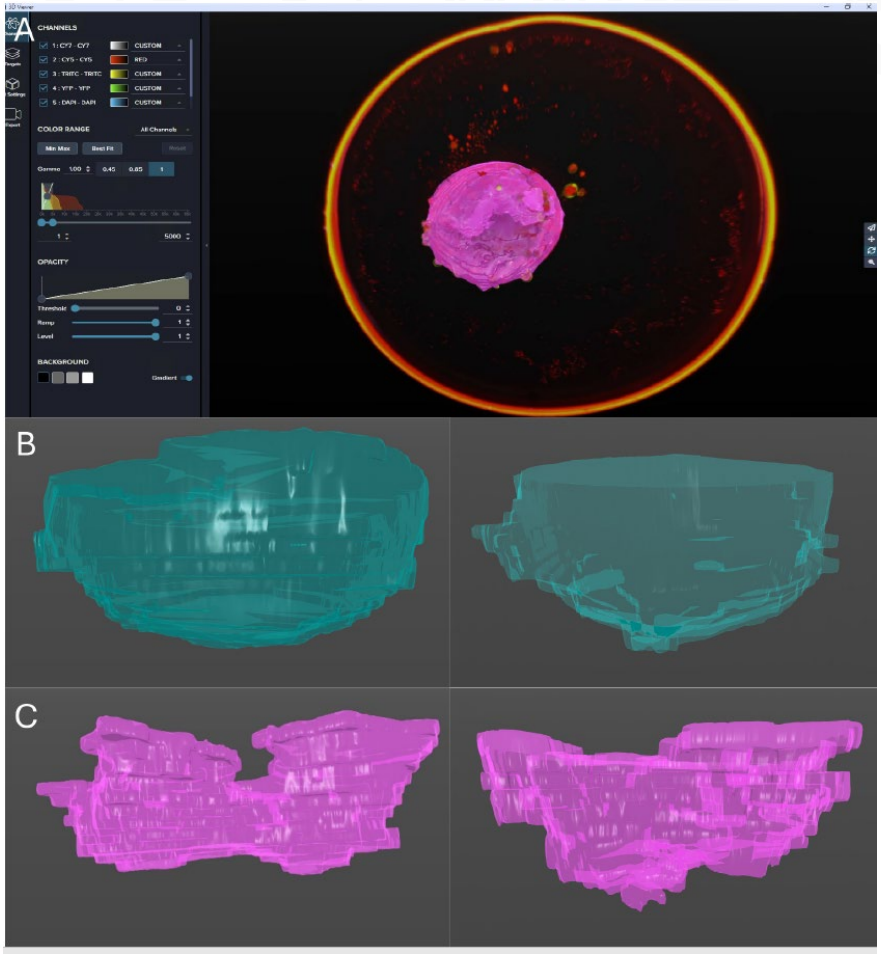


Figure 5. Representative image of microtissues exposed to various compounds (Actin (Green), Mitochondria (Red), Golgi (Yellow) and DAPI (Blue). Noted: the above images are one z-plane at the bottom part of the microtissue, not 2D projection.

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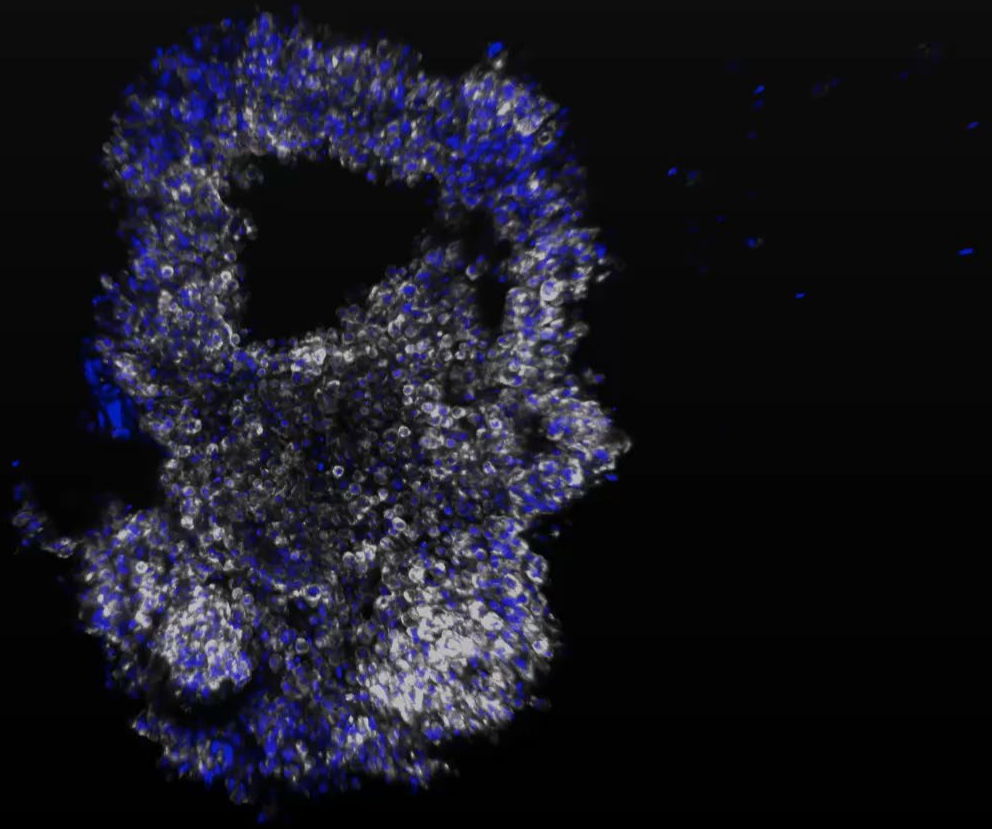
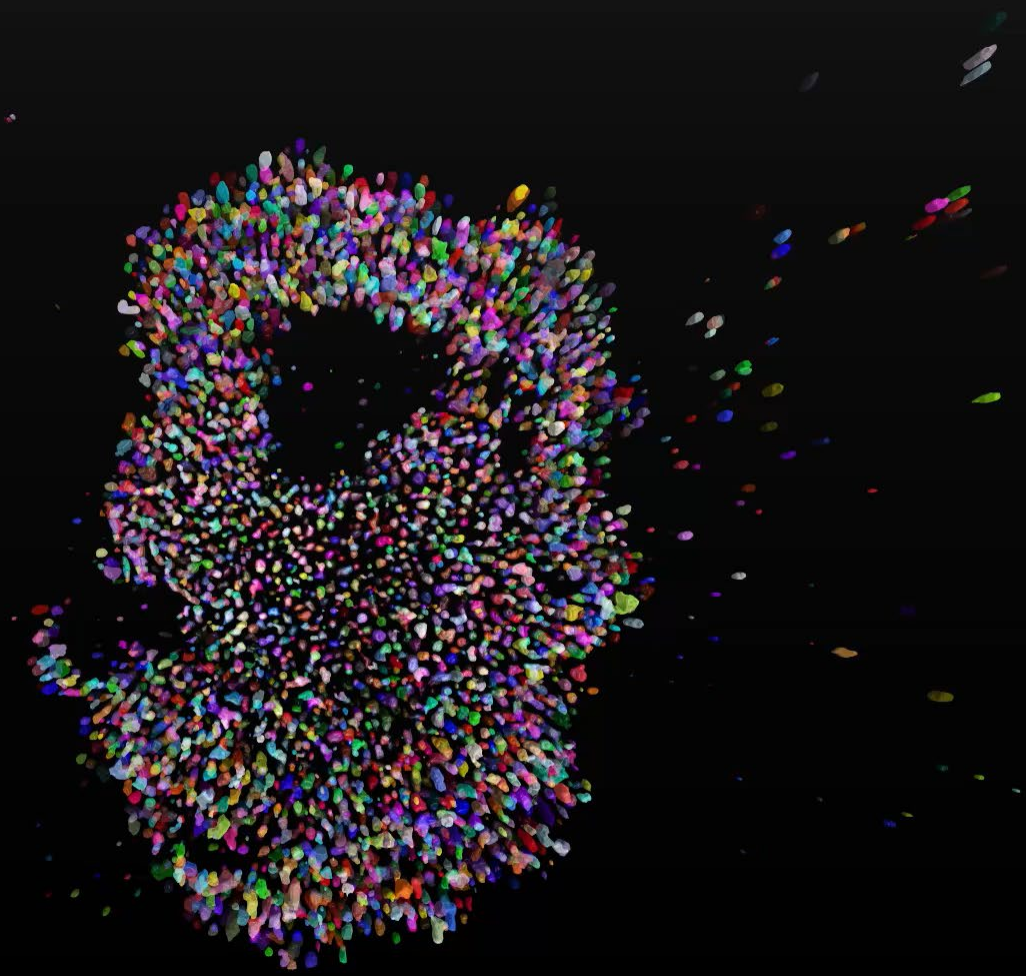
Example
CRC organoid DAPI + Phalloidin



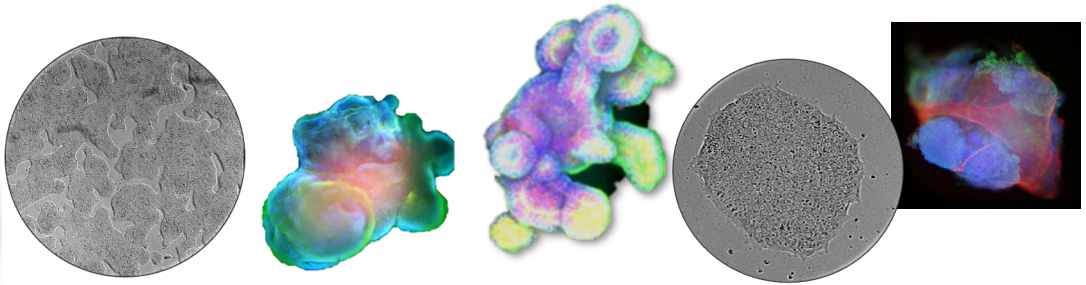
Example
CRC organoid DAPI + Phalloidin
Nuclear analysis mask



CellXpress.ai Automated Cell Culture System

Revolutionize automated cell culture with image-guided AI decision making

- ✓ Maintain a 24/7 schedule for growing and scaling multiple 2D, PDO & iPSC cell lines, spheroids or organoids
- ✓ Take control over demanding feeding & passaging schedules to reduce hands-on time and weekend lab visits
- ✓ Automate cell culture *decision making with AI tools* to monitor growth, size, phenotype, etc.



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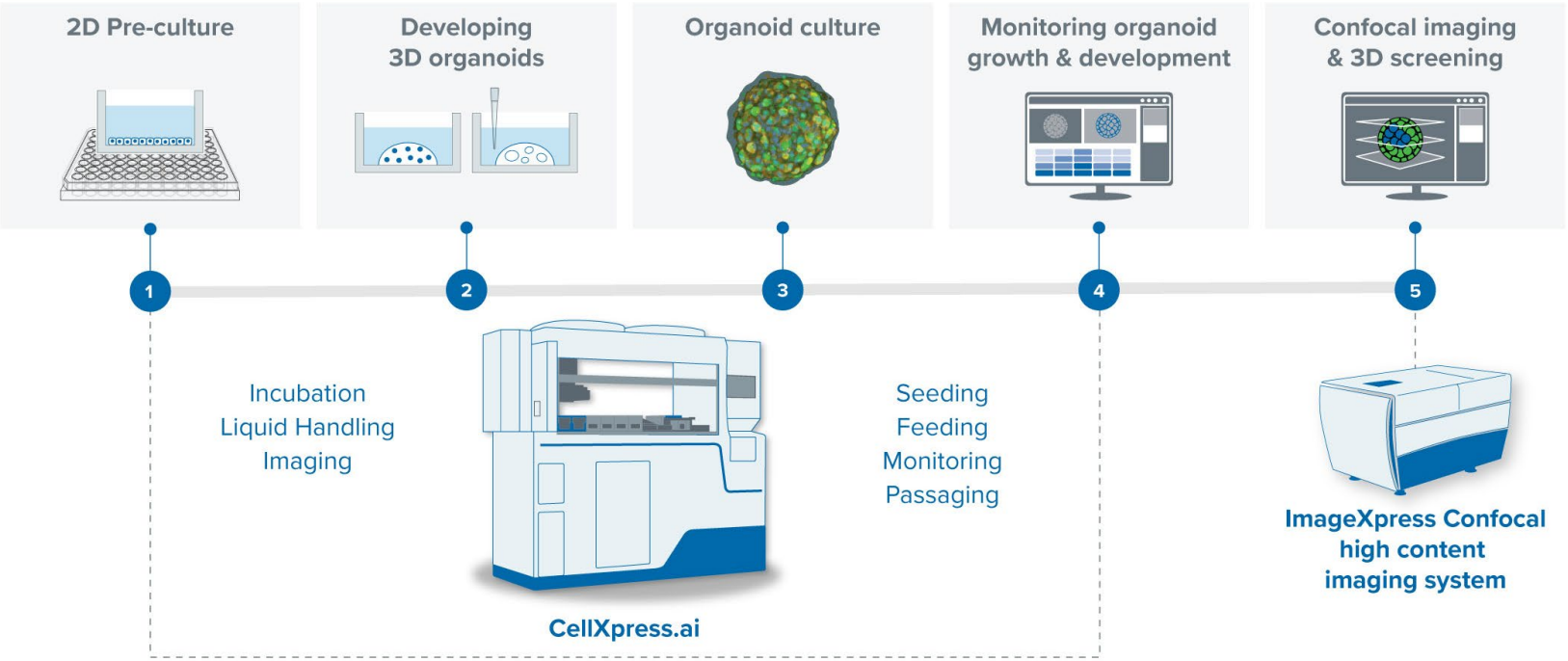
CellXpress.ai Automated Cell Culture System

Example workflow outline…



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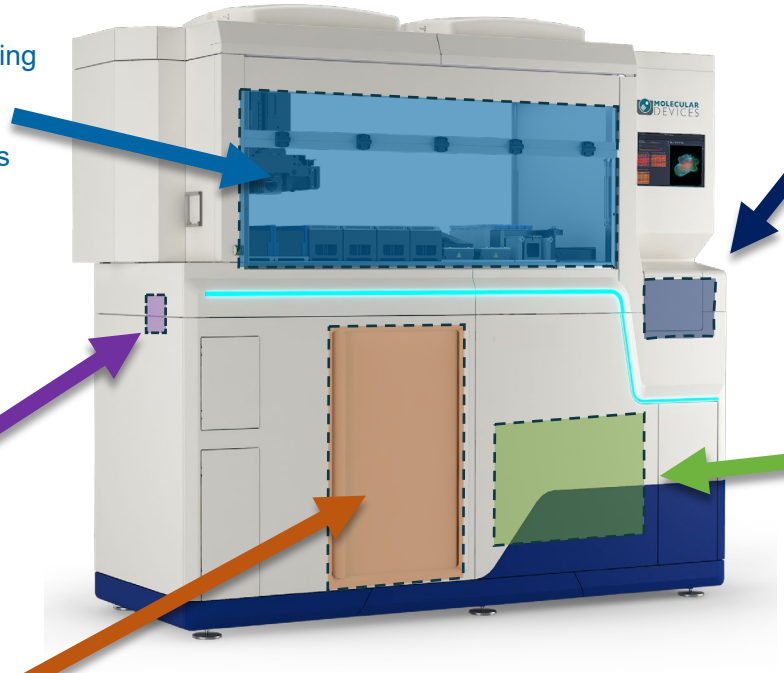
Precision Automation: CellXpress.ai®

Liquid Handler
- Feeding, Seeding, Passaging
- HEPA filtration / UV lamp
- Media Storage:
  - 8 x 370mL media troughs

Large Volume Media Storage
- 2 x 2L vessels
- 4° storage with in-line heating



Access Ports
- Manual or automated plate hand-off

Imager - Monitor
- 2x - 40x objectives
- Brightfield
- 6 Fluorescent channels

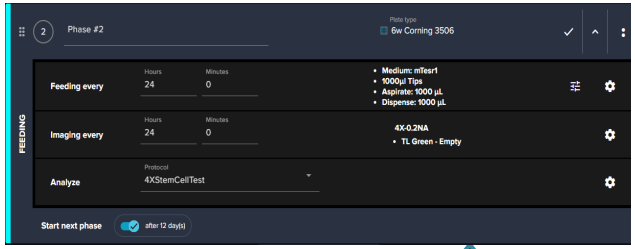
Incubator
- Variable capacity
- Sterilizable
- Rocking option

One software controls everything.
Optimized for 2D and 3D cell handling

No programming background needed!

Single unified software

- Simplify user experience and training
- Intuitive interface designed for biologists
- Traceable experiments and data



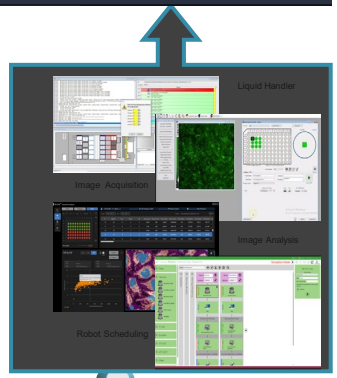
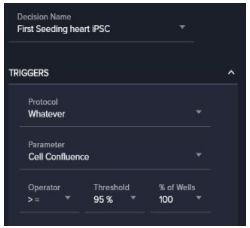
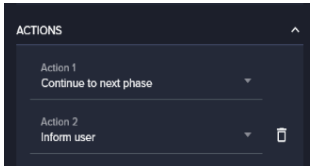
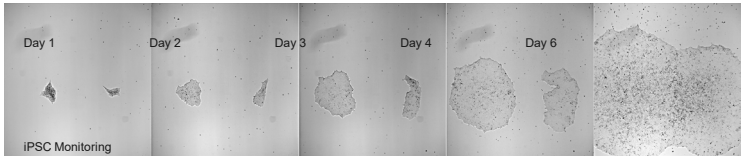


Image-guided AI decision-making

- Protocol decisions based on data
- Standardised protocols
- Standardised cell culturing







Reproducible biology

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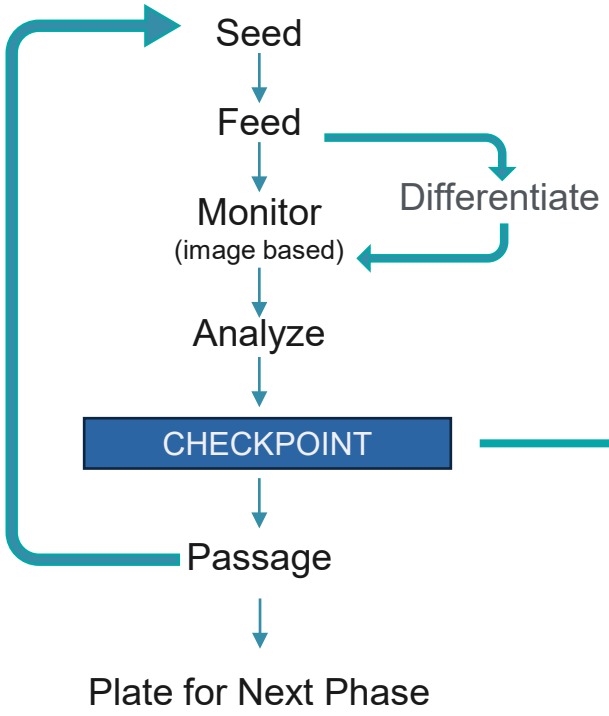
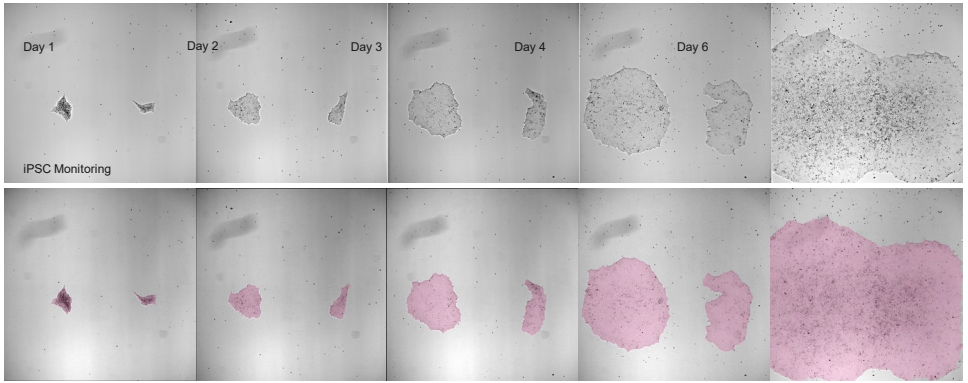
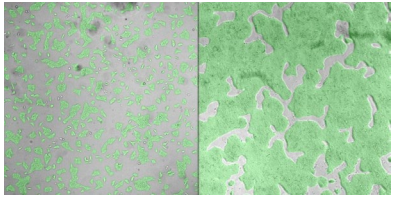
Your decisions. Trained once. Applied every time.





Use **InCarta SINAP** to train image analysis to evaluate culture state: Track colony number, size and confluency



These rules can then trigger additional steps without user involvement

Why choose **CellXpress.ai?**

Easily access 3D models at scale
Validated turnkey protocols lower the barriers to entry for automating assays

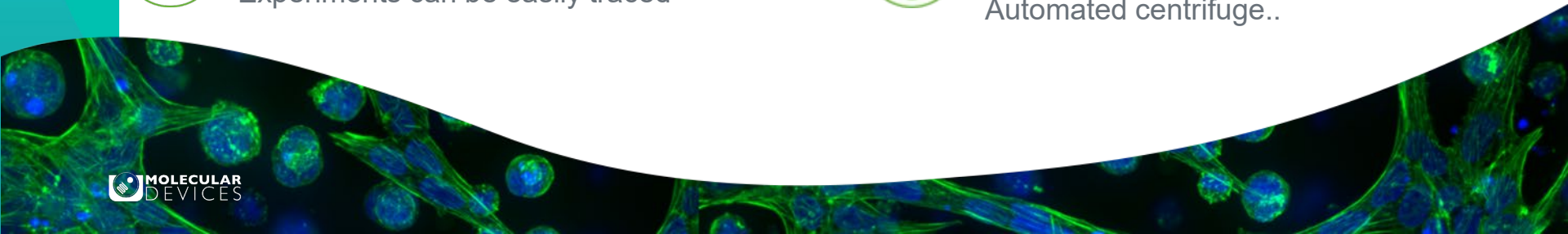
AI-analysis & decision making
Allow autonomous, data-driven decisions to guide your experiments

Track the cell journey with ease
Flexible data visualisation tools get the data you need

Unified software environment
Access data & control the system from one platform

Traceable experiments & data
Data is secure and all in one place
Experiments can be easily traced

Add more functionality…
Combine with additional analysis systems:
ImageXpress Confocal HT.ai, FLIPR Tetra
Automated centrifuge..



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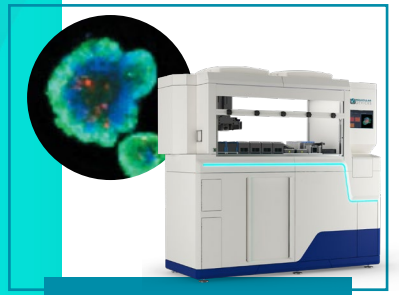
Integrated Solutions

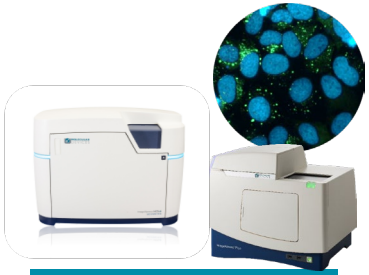
Accelerating development of novel therapeutics



3D Biology

Microplate Readers
with industry-leading
SoftMax Pro Software

GxP Compliance
and Validation Solutions



High-content
Cellular Imaging
and Analysis

Drug Discovery
High-Throughput
Solutions

BioPharma Solutions
for Antibody Discovery, Cell Line
Development and Synthetic Biology

Lab Automation
and Customization
Solutions

Scientific Forum 2026

19 May | Vienna, Austria

Consistent results from complex biology

https://info.moleculardevices.com/ts/gen/2026_scientific_forum_registration

Confirmed speakers

Dr Jennifer Just
Helmholtz Centre for Infection Research

Dr Hitesh Mangukiya
University of Uppsala

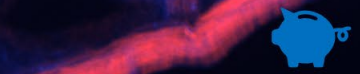
Dr Federico Zambon
University of Oxford

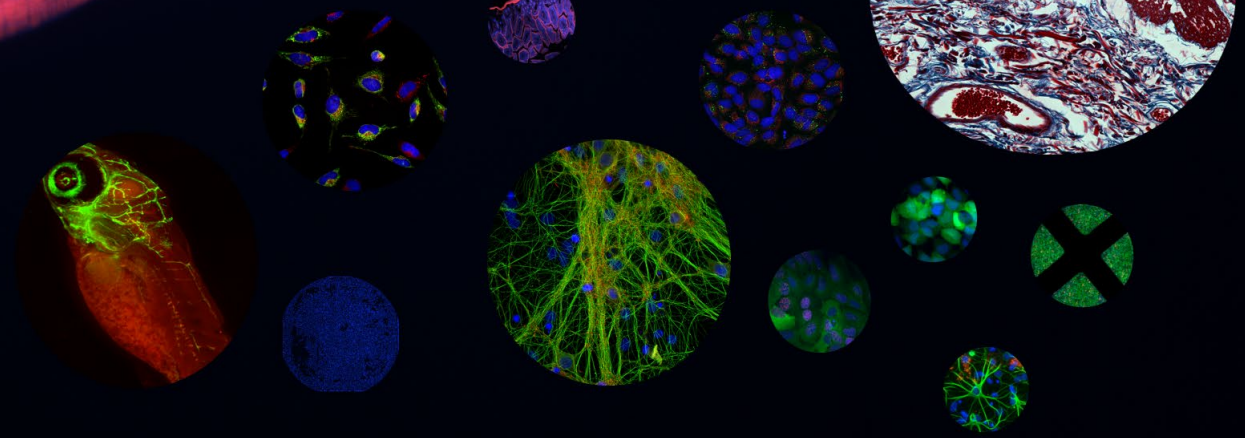
Dr Jared Pache
Molecular Devices

Dr Joan Goetz
Poly-DTech

Sylvia de Bruin
Sylvia.debruin@moldev.com

Questions?





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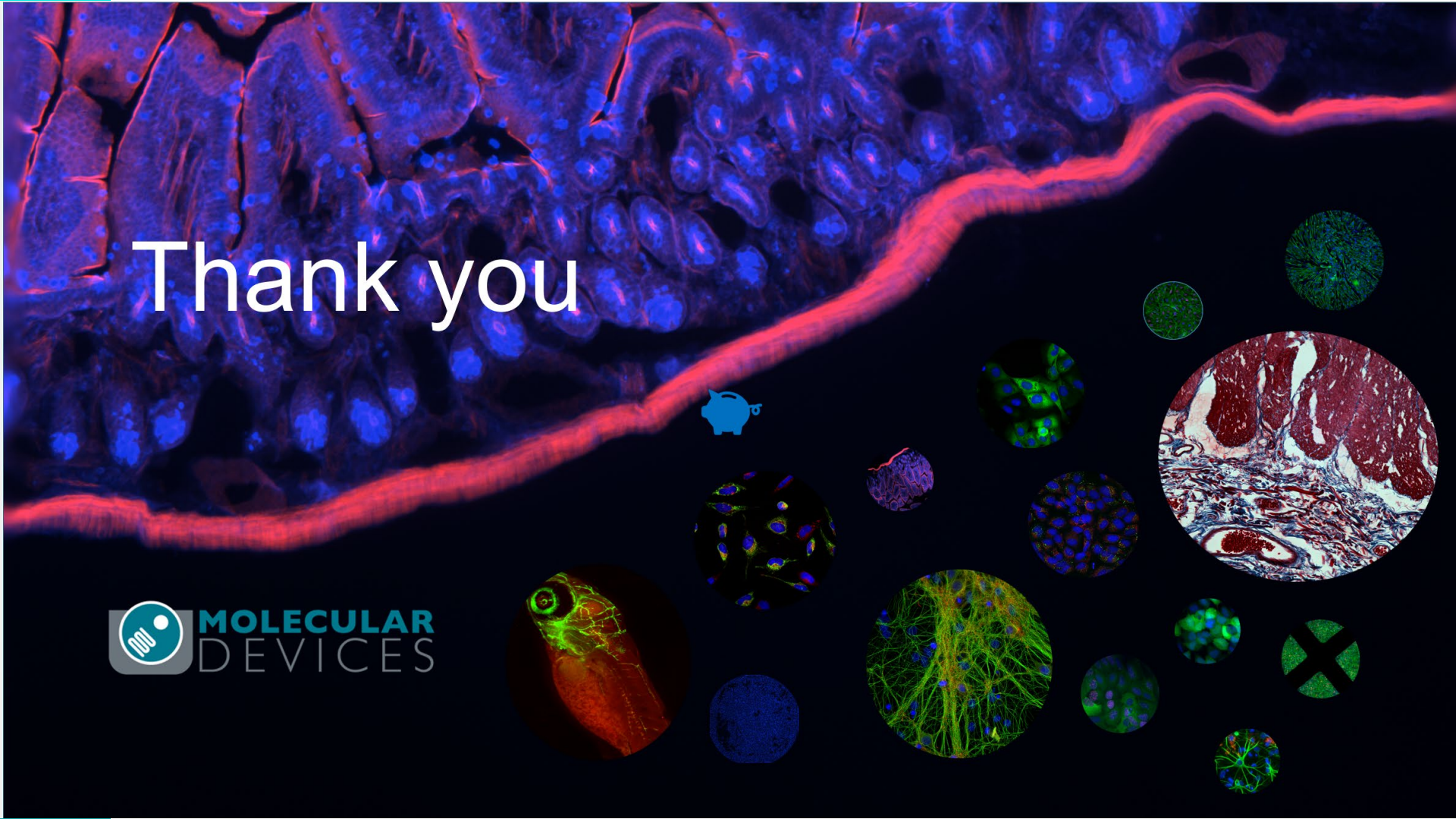
EASTPORT LIFESCIENCE

Thank you



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