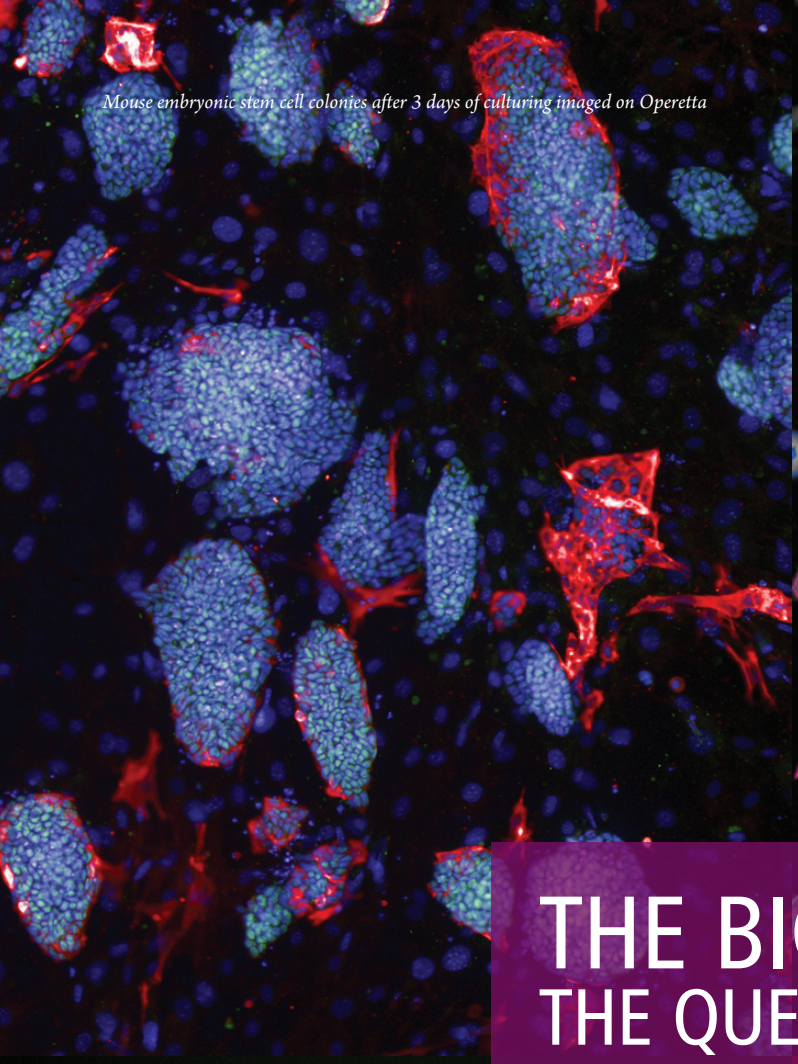
HUMAN HEALTH

ENVIRONMENTAL HEALTH

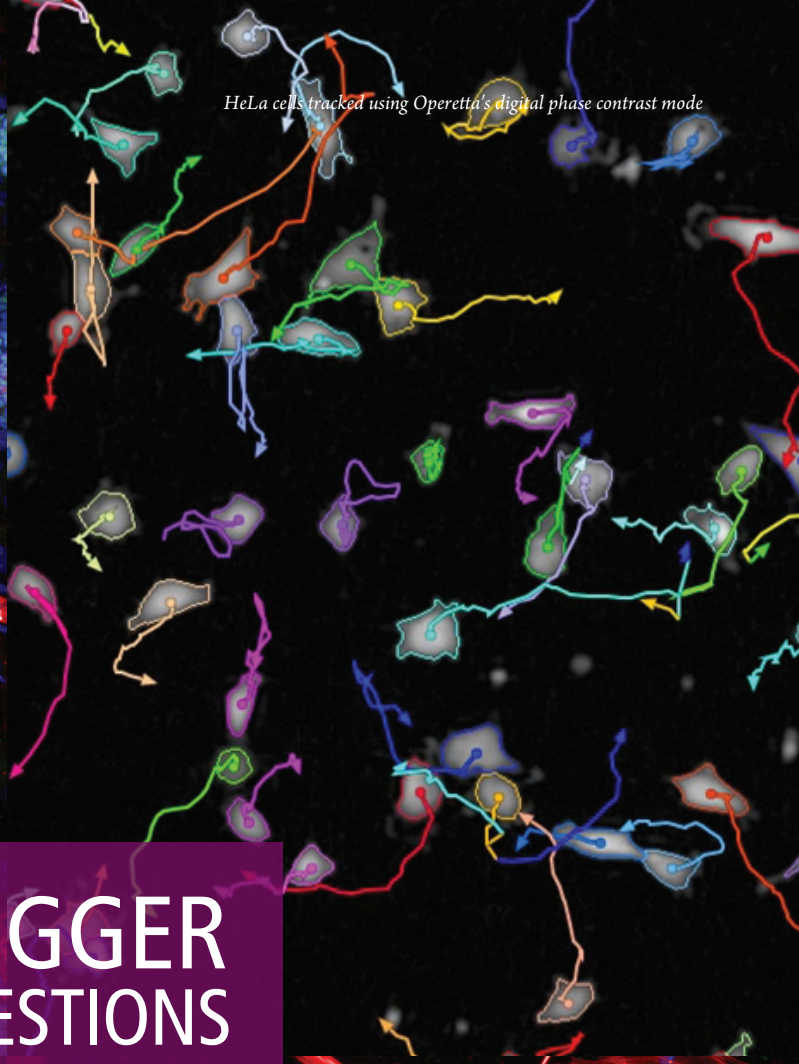
WHEN BIOLOGY GIVES YOU COMPLEXITY CHOOSE SIMPLICITY

Operetta®
High Content Imaging System

PerkinElmer®
For the Better

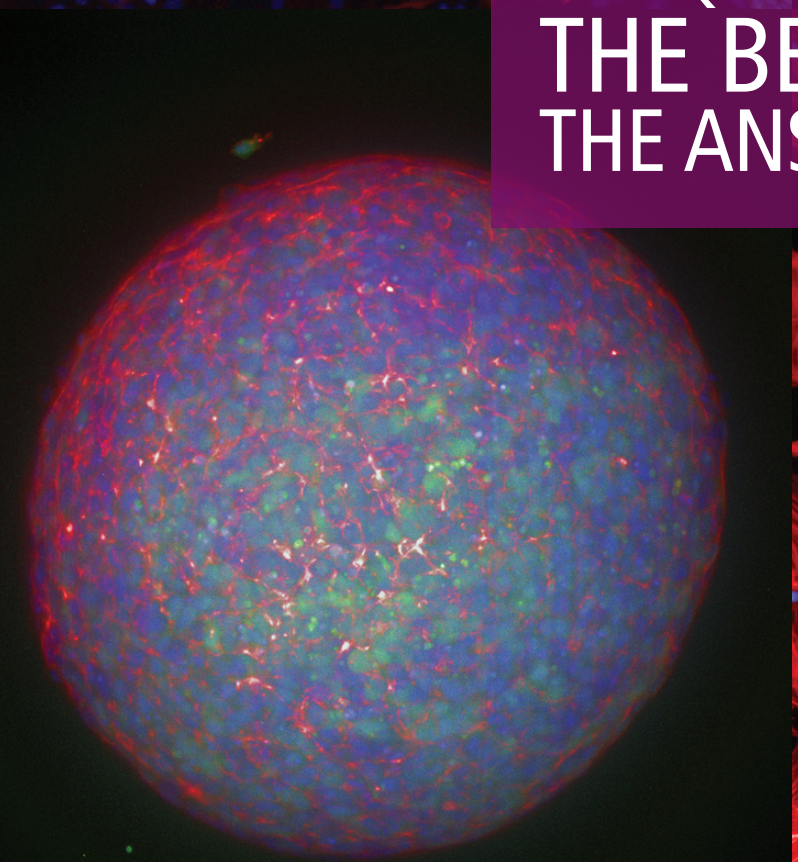


Mouse embryonic stem cell colonies after 3 days of culturing imaged on Operetta

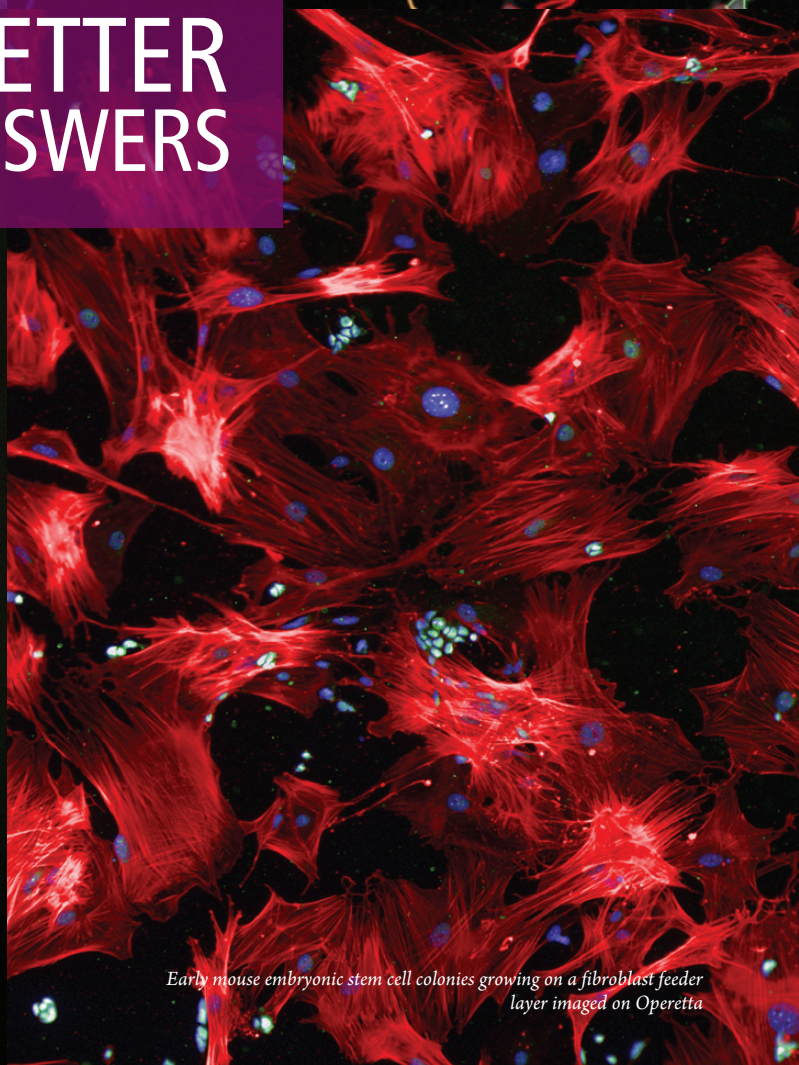


HeLa cells tracked using Operetta's digital phase contrast mode

THE BIGGER THE QUESTIONS THE BETTER THE ANSWERS



Four-day-old mouse embryoid body imaged on Operetta



Early mouse embryonic stem cell colonies growing on a fibroblast feeder layer imaged on Operetta

The platform of choice for high content imaging and analysis

The biological questions facing today's scientists are increasingly daunting and complex – and the answers they're seeking are coming from larger, more complex experiments. For example, researchers in systems biology and drug discovery are looking for models with greater physiological relevance, such as primary cells, live cells, or cells cultured in three dimensions, and they require the throughput to assess varied conditions. So they're turning to the Operetta® High Content Imaging System – the ideal solution for analyzing the inner workings of both healthy and diseased cells.

The Operetta platform delivers fully automated image acquisition, analysis, and data management for robust phenotypic fingerprinting – everything you need to generate statistically significant and relevant data. What's more, it's so simple to use, so intuitive, that even newcomers to high content analysis can be productive right away.

The Operetta system also plays a critical role in a complete portfolio of imaging and analysis instruments, applications, and services – all from one source.

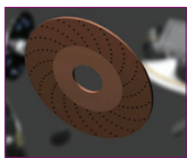
The Operetta High Content Imaging System. Relevant data. Better answers.

THE HIGH CONTENT IMAGING SYSTEM THAT SIMPLY WORKS

The world of cellular biology is increasingly complex and competitive. So to stay ahead, you have to get maximum productivity from your instruments, your methods, and your people. That's what the Operetta High Content Imaging System is all about.

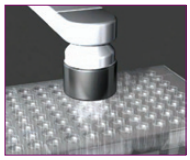
See your research in stunning clarity

Start with the remarkable clarity the Operetta system brings. Every component has been carefully designed to give stunningly clear image quality – and extremely reliable results.

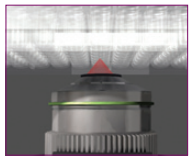


Confocal imaging eliminates background, improves signal-to-noise ratio, and protects live cell samples by reducing photobleaching and phototoxicity, for more reliability in both 2D and 3D imaging.

Custom-designed optics, including barcoded emission filters and objectives, deliver both sensitive imaging and error-free operation.



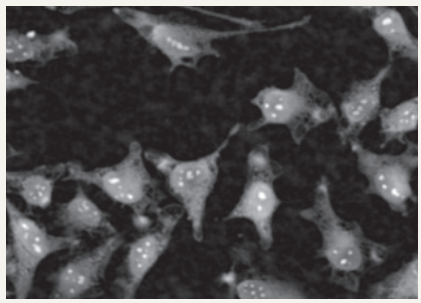
Transmitted light and digital-phase contrast imaging enable live-cell experiments without labeling, minimizing phototoxicity and interference from staining.



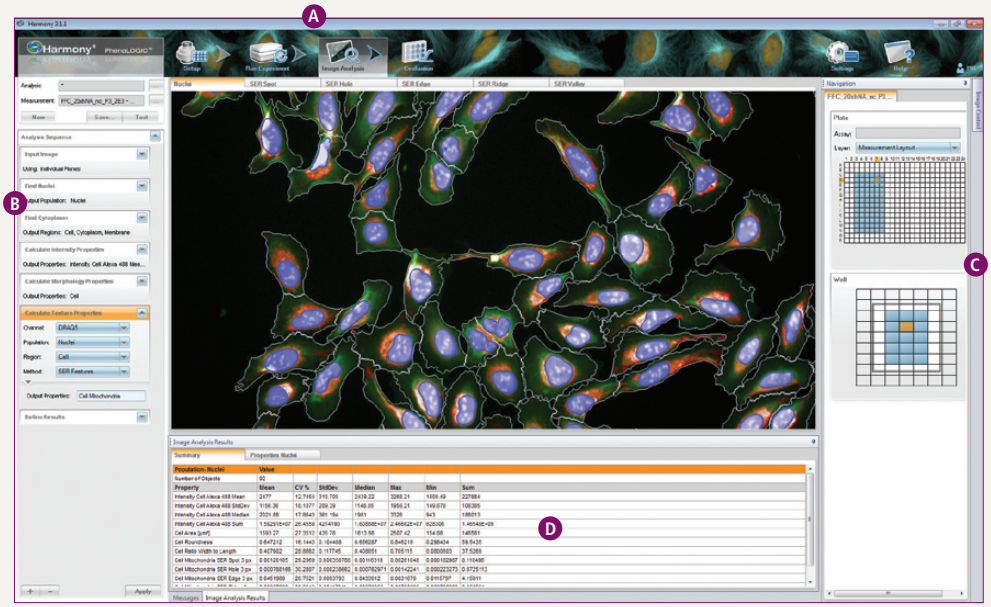
The fast laser autofocus and intuitive plate wizards automatically detect important plate parameters, enabling reliable, unsupervised acquisition of high-quality images – quickly and accurately.

It's All Happening Live

The Operetta system is the ideal platform for longitudinal cell studies: Its live cell chamber can maintain the correct environment for keeping cell samples intact, and its kinetic analysis capabilities let you track those cells over time, quantifying dynamic behavior such as chemokinesis, chemotaxis, and signal oscillations.



HeLa cells acquired on Operetta using digital-phase contrast imaging.



A. Workflow-based interface with easy-to-read icons

B. Analysis building blocks for easy protocol design

C. Clear plate navigation and wizard for easy setup of new plate types

D. Results summary with immediate numerical output for faster insights

Say hello to Harmony – and to better answers

You expect more productivity and better, more scientifically relevant answers from your research. With Harmony® High Content Imaging and Analysis Software, you can deliver on a wide range of requirements, including the ability to look at few samples in great detail, assay development, genome-wide siRNA screens, compound screens, and much more.

With Harmony software, new users with little experience can set up assays, automate experiments, analyze data, and present results. You can also view and analyze data from any computer running Harmony software, which frees you and the Operetta system to move on to your *next* important task.

Answers that everyone can understand and share

Harmony software is the efficient, highly flexible way to gather usable, relevant data from your cell samples. The software's workflow-based interface makes it quick and easy for experts and novices alike to turn that analysis into quantitative data: Big, easy-to-read icons and a logical building-block approach enable even newcomers to set up experiments and operate the system, while precise, straightforward instructions let you know how the experiment is progressing – and what to do next.

Once you've identified your positive samples or calculated EC50 curves, Harmony makes it easy to share and manage your results, while experiment metadata such as dyes, objectives, and plate layout are stored in the Harmony database for future reference.

High content analysis – ready made

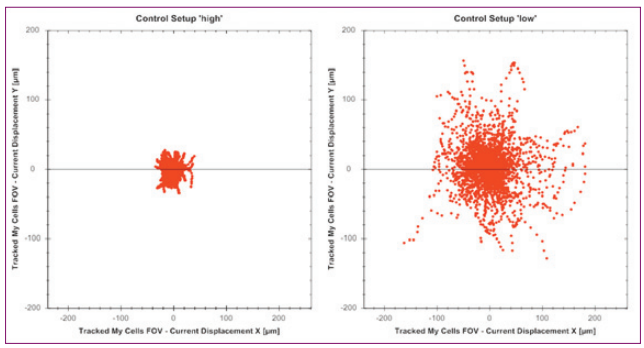
Harmony software includes a full range of ready-made solutions that enable the analysis of the most common assays, including:

- Apoptosis
- Cell cycle
- Cell proliferation
- Cytoskeletal rearrangement
- Cytotoxicity
- Neurite outgrowth
- Protein expression
- Receptor translocation
- Signaling pathways

These and other ready-made solutions can be used as is or adapted easily to your specific assay, so you can get the information you're looking for.

Shape, size, texture, and more

Harmony software allows you to describe cells by measuring hundreds of features – from classical parameters such as signal intensities or morphology to mathematically advanced descriptors such as STAR morphology and SER texture, which provide statistically robust measures of distribution patterns within cells (such as distribution changes of mitochondria). Together, these measurements can provide a phenotypic fingerprint – a detailed, quantitative description of complex and variable cellular phenotypes.



Graphs from Harmony showing normalized movement of cells over time. Cells treated with inhibitor of motility (left); untreated with random movement (right).

ACCELERATING YOUR SCIENCE HAS NEVER BEEN THIS EASY

Algorithm creation made simple

Our **PhenoLOGIC™** machine-learning software recognizes different cell populations and regions using a simple learn-by-example approach. Just click on cells of each type to "teach" the software, and PhenoLOGIC does the rest. The software then sets parameters for optimal image segmentation. It even chooses the most meaningful combination of parameters for discriminating cell populations, regardless of how many are needed for proper classification. Just identify the cell type and PhenoLOGIC can learn to do it, too – without an image analysis expert. Image analysis that might have taken hours can now be completed in a matter of minutes.

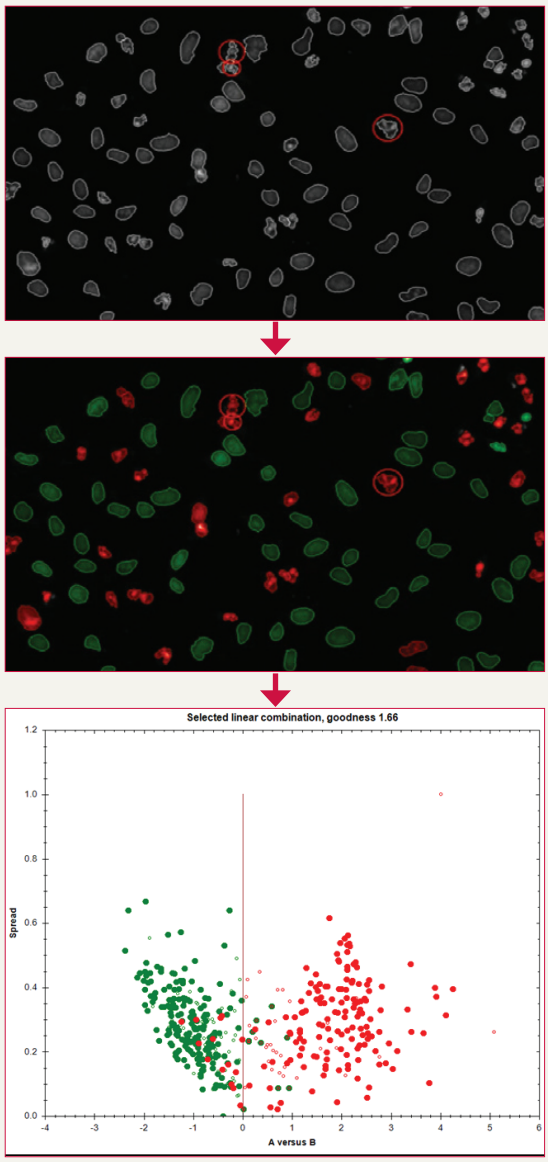
Welcome to the translational world

The Operetta system makes it easier for you to translate your results from the cellular assay format to more complex systems. You can work with human cells from primary sources, iPS-derived cells, or cells cultured in 2D and 3D microtissues. Operetta even allows you to use *in vivo* nIR agents such as ProSense 680 to analyze, for example, human cancer cells. Then you can use the same agent to monitor tumor progression *in vivo* using our **IVIS®** Pre-clinical or **FMT®** Imaging Systems.

Everything just flows

When you need even more insight into your data, Operetta and Harmony make it easy for you to transfer information to specialized software packages. Just drag and drop your image stacks into **Volocity®** 3D Image Analysis Software for stunning 3D visualizations and measurements of your cell samples.

For analyzing large screens from your browser and sharing data across your organization, you can automatically export data from Harmony to the server-based **Columbus™** Image Data Storage and Analysis System. Columbus technology allows you to store and analyze images from high content imaging systems with no need for locally installed software – and it shares the same easy-to-use building-block interface with Harmony software.



The PhenoLOGIC software plug-in makes it easy for every biologist to create optimized algorithms. Click on a few objects to teach PhenoLOGIC to recognize the different types, then PhenoLOGIC calculates a linear classifier and identifies them in all images.

TIBCO Spotfire® Pro client showing a cell toxicity study: the tab pictured is summarizing cell health. The plate map controls what other data is displayed, including dynamically calculated dose response curves and the stored cellular images.

New ways to integrate and visualize your data

To make new discoveries you often need to combine data from different sources and look at them from different angles. **TIBCO Spotfire®** software is the collaborative platform for data aggregation and visualization. It makes it easy for you to integrate results from Harmony software with compound data, such as structures and chemical properties, enabling you to create intuitive visual dashboards to analyze complex data in minutes. With a few clicks, you'll be running visualizations and making new discoveries.

To accelerate your biological discovery processes even further, our **E-Notebook** for Biology solution delivers an intuitive, flexible, collaborative electronic lab notebook that minimizes the time you spend collecting, collating, analyzing, and managing data, giving you more time to concentrate on your science.

Automate for even better productivity

By automating your Operetta system, you can remove bottlenecks from your workflow and maximize the usage of the system. For example, by adding a **plate::handler**™ system, you can automate plate loading to enable overnight runs. Or you can automate whole workflows in one system, such as siRNA library and compound screening, by combining dedicated incubators with PerkinElmer liquid handling systems that automate cell staining, or with plate readers that provide additional readouts. Integrated systems can even be fully enclosed and work with HEPA filtered air to reduce contamination. The **cell::explorer**™ automated workstations can help improve cell viability, reduce well-to-well variance, reduce variability, and save on reagent costs. Let us consult with you to find the solution that maximizes your lab's productivity.

The cell::explorer robotic automation platform enables you to reduce well-to-well variance during assay preparation and plate incubation and improve overall data quality.

Count on Our Support

Your application and automation needs are as individual as you are. So we take a team-based, consultative approach to every engagement with you – one that addresses your unique set of requirements. Our expert, global service and support teams, comprised of dedicated lab- and field-based applications specialists, can work with you in partnership to overcome the unique challenges your application brings.

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