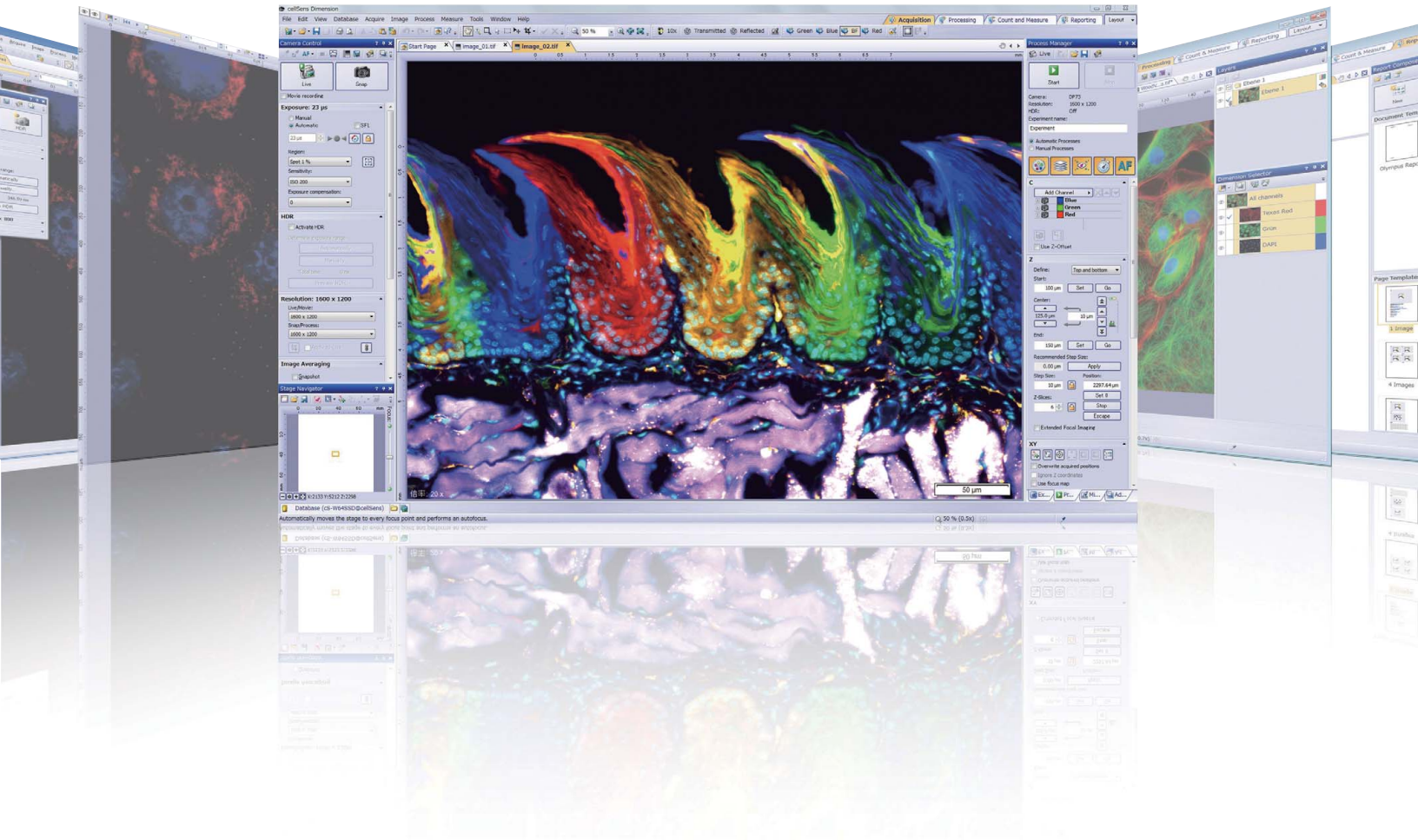
OLYMPUS®

Your Vision, Our Future

Imaging Software

cellSens

Intuitive Operation. Seamless Workflow.



Not for clinical diagnostic use.

Simplify Experiment Design—Leave More Time for Research

Olympus cellSens simplifies your workflow:

-Intuitive user interface.

-User specified configurations to suit imaging needs.

-Seamless functionality from image capture through report creation.

Spend less time wrestling with your software; have more time for research.

Imaging

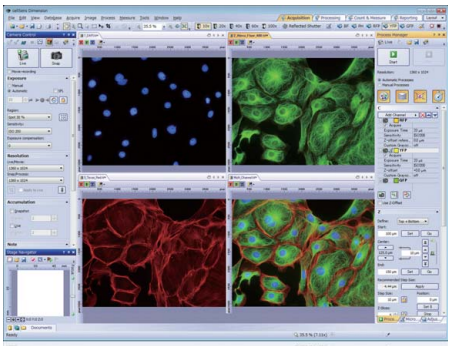
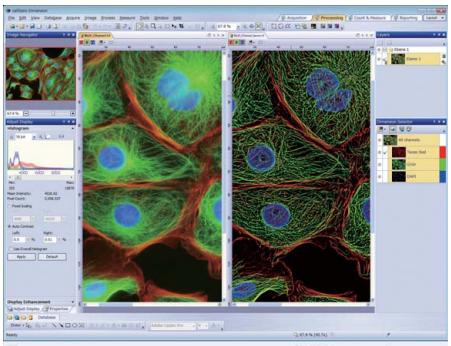


Image Capture

Capture Multi-color, time-lapse, and z-stack images with ease. Just select the appropriate capture button, add relevant parameters, and click "Start." The Process Manager or Experiment Manager make it easy to capture Multi-dimensional images.

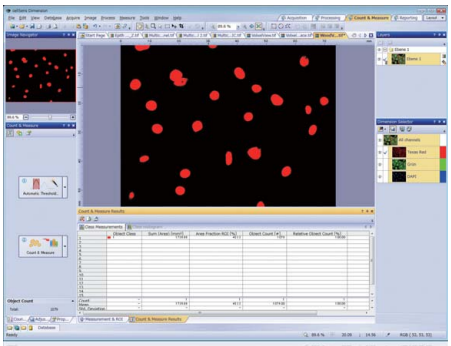
Processing



Viewing and Processing

Automatically view your data in the colors and layout you choose. Take advantage of an array of advanced image processing functions, such as stitching, extended focus, deconvolution, and unmixing.

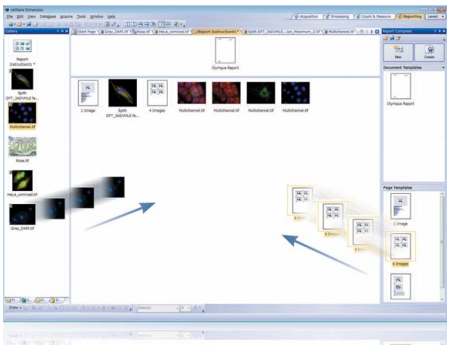
Analyzing



Measurement and Analysis

Make measurements using an intuitive interface. cellSens features region of interest, phase analysis, and cell count capabilities. Export raw measurement data to MS Excel or a cellSens workbook with a single click.

Reporting



Collaboration and Communication

Actively collaborate with colleagues and coworkers with special tools including Database and Reporting functions. These functions make it simple to manage, share, and distribute your image and data reports.

Microscopy Research With a Personal Touch

Olympus microscopes enable new imaging techniques and push the boundaries of resolution at all magnifications. Olympus cellSens software improves productivity with efficient acquisition workflow, image processing capabilities, and analytical strength. Centered around the needs of demanding customers, cellSens is flexible, customizable, and designed to adapt as application requirements evolve.

Reduce Clutter and Confusion by Displaying Only the Tools and Windows You Need

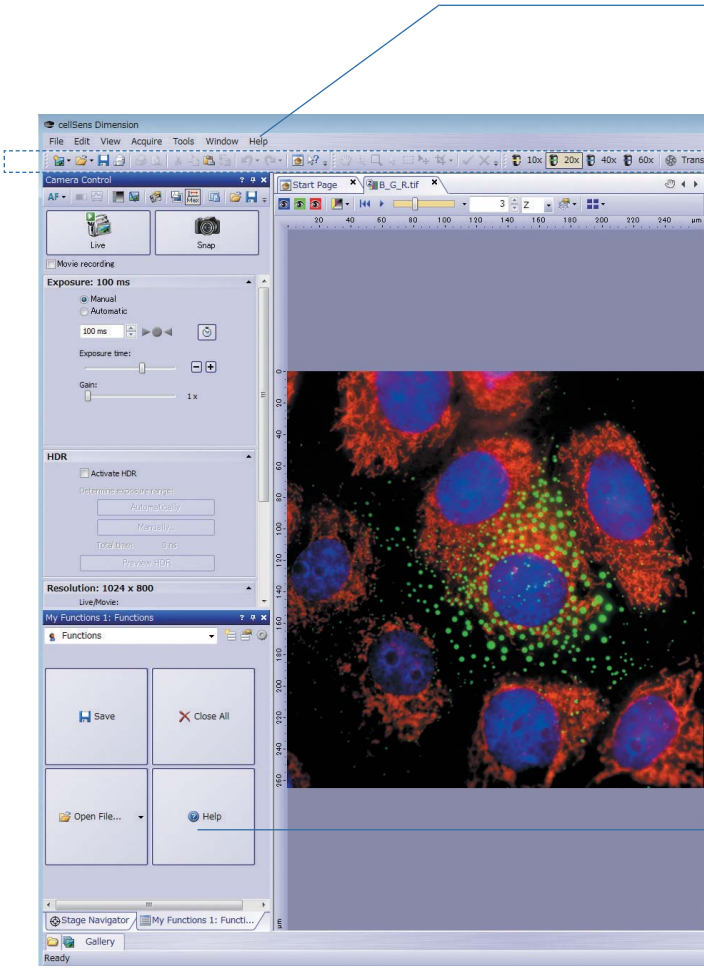
It's Time to Get Personal

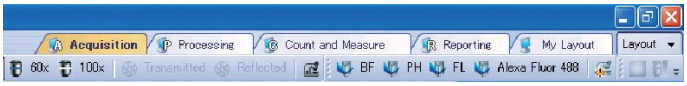
For over 90 years, Olympus has been at the forefront of microscopy and has developed microscopes and systems for a broad range of applications. As a result, we know that each researcher has individual requirements that can't all be met by fixed solutions. The cellSens software family consists of three packages, all featuring an easy-to-use, customizable interface. As a result, each user can define what they want cellSens to show them within defined work areas.

Dynamic Interface

Creating an efficient workflow requires careful definition of the tasks and tools at each stage. With the cellSens platform's dynamic interface, the tools you need for each stage are clearly available, without clutter or the need to search. Olympus has created a number of interface layouts, each developed with capabilities appropriate to the user's needs.

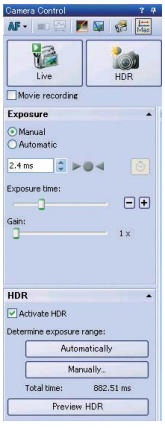
- **Acquisition Layout**—for selecting between different acquisition processes and adjusting the camera settings.
- **Processing Layout**—for post-acquisition functions such as image processing, measuring, collecting data, and presenting the resulting statistics.
- **Count & Measure Layout**—for manual and automated measurement and object counting.
- **Reporting Layout**—for generating reports to document and share results.
- **Create Layout**—a user can define his or her own layout in various arrangements.





Camera Control Panel

The most important microscope component that requires software control when imaging is the digital camera. Modern cameras have functions that can be changed to enhance or perfect an image; for example, exposure time and pixel binning. The cellSens Entry and Standard packages control these features on all Olympus digital microscopes and cameras. In addition, the Dimension package controls such features on high-end research cameras as well. As a result, scientists can maximize the quality of their images.



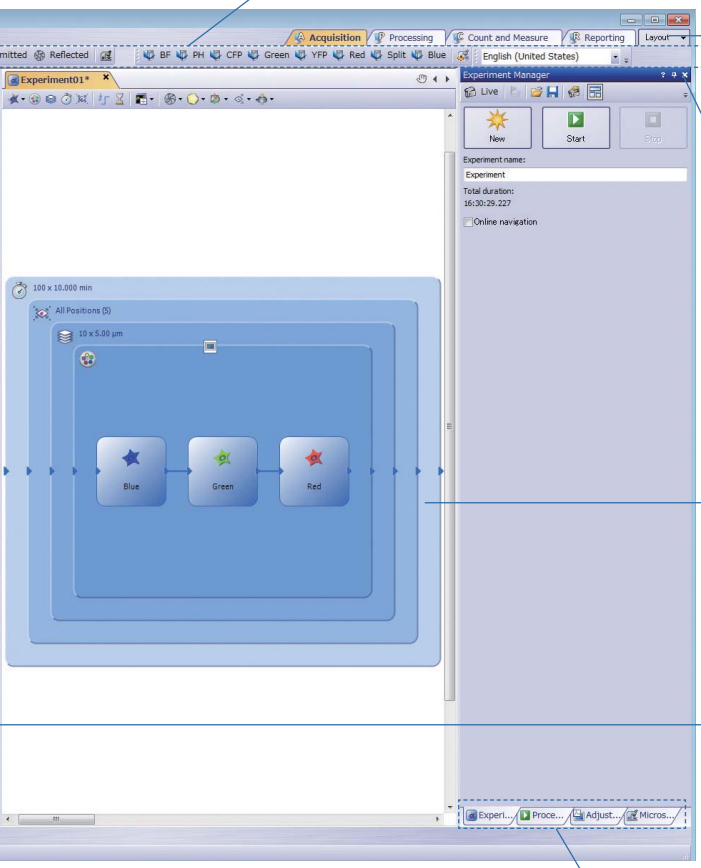
Dark Application Skin

The Dark Application Skin reduces computer monitor-generated ambient light, enabling cellSens users to adapt to darkened environments; icon contrast remains high for easy recognition and quick selection.

Dark skin

Need Help? Online Assistance or Support is Just a Click Away

Display Only the Functions You Need on the Toolbar



Common Functions Grouped in a Single Tab

All necessary functions are placed where you want. Layout tabs make it easy to select functions according to your workflow. For instance, display camera control features in your Acquisition layout and then remove them from view when you switch to the Processing layout.

Display or Hide Windows as You Require, or Use Auto-hide for Clean Operation

Graphical Experiment Manager (GEM)

The GEM enables users to design complex experiments by simply dragging and dropping icons onto the canvas.

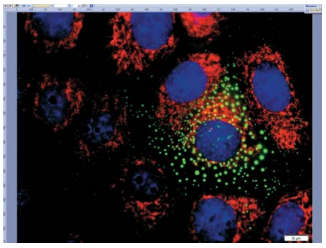
Create Flexible Workflow Toolbars for Repetitive Operations

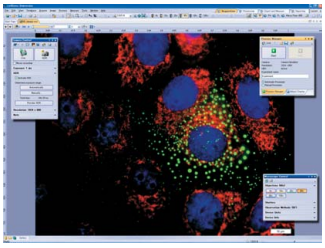
Create custom toolbars for your most frequently used functions and then save them to the My Functions window. Custom buttons are also easy to use, with convenient tab access that further enhances workflow efficiency. The appearance of each toolbar in the My Functions window can be customized by choosing an icon and/or text from the Button Appearance window.

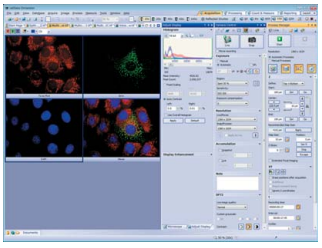
Functional Panels are Grouped in Tabs for Easier Access

Arrange Your Own Windows

Organize the tools and windows for the job at hand to create a functional layout that works best for you.


Full screen


Floating panels


Docked panels

Solutions to Empower Your Research

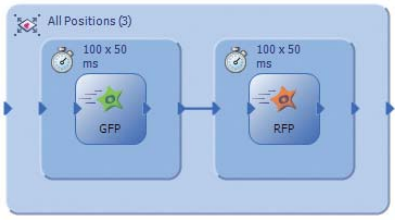
What Scientific Researchers Wanted

Our Solutions

Quickly define complex experiments without programming

Graphical Experiment Manager (GEM)

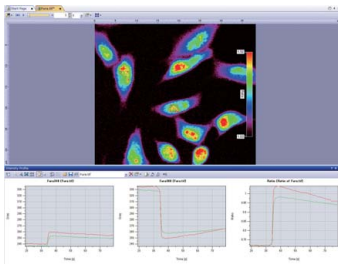
Experiments can be freely designed simply by connecting the various commands. Furthermore, image acquisition is available for up to 6 dimensions (XYZTλ multipoint).



Study cell dynamics with fluorescent markers

Intensity Analysis

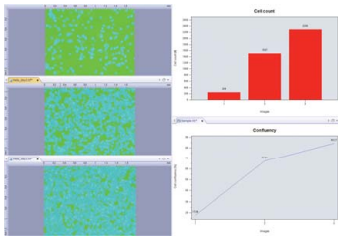
Visualize changes in intensity over time, and save this information for later analysis. Ratio Analysis function enables calibration, display, and analysis of live/stored data reflecting changes in the intensity ratio between two acquisition channels.



Measurement of cell count and confluency without stain

Cell Confluency Measurement

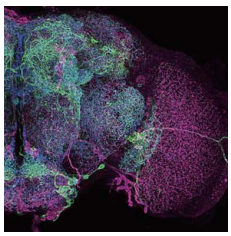
Measure cell count and confluency using phase contrast images. Multiple images can be measured at once, so users can easily average the data and create cell growth curves.



Improved image detail

Deconvolution

Choose between 2D (included) and 3D (optional) blind deconvolution. This proprietary and highly efficient post-processing tool for both CCD and confocal imaging enhances the ability to differentiate between imaged objects.

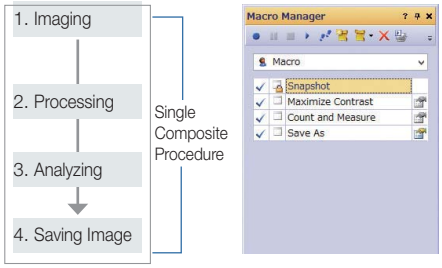


Kei Ito, Ph. D.
Institute of Molecular and Cellular Biosciences, University of Tokyo

Automate repeating tasks

Macro Manager

Perform tasks, from imaging to processing and analysis, as a single composite procedure. Batch processing is also available, enabling multiple images to be subjected to preferred processes as a continuous series for a significant improvement in workflow efficiency.

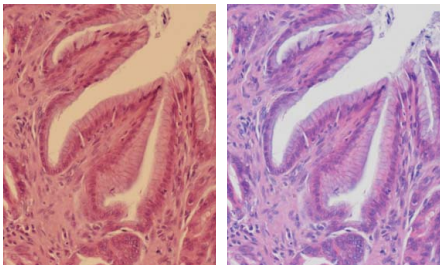


What Medical Researchers Wanted

Our Solutions

Retention of intact observed images

Live/Snapshot Function with White Balance Adjustment
Simply align the focus and select the appropriate white balance to capture images with true-to-life quality.

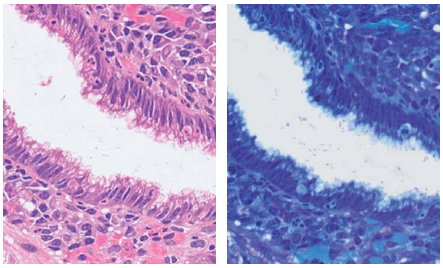


Observe an entire large sample at once

Panoramic Imaging
Create clear and seamless panorama images; mismatching between each image is automatically corrected, even when using the manual stage. A fully functional wide-area focus map enables improved clarity in panoramic imaging.

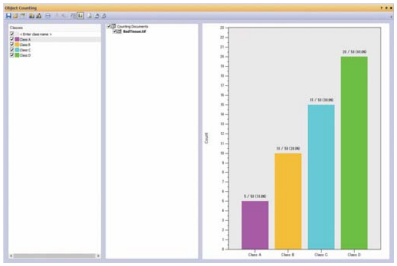
Image comparison

Synchronized image windows
Display images side-by-side for accurate comparison, with simultaneous zooming and movement.



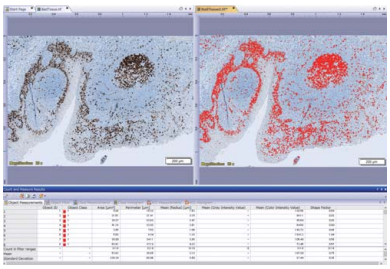
Speed up manual counting procedures

Object Counting
Perform manual counts with self-set classes. Generate counts and proportions for each class using your mouse.



Nuclei counting with variable thresholding

Particle Analysis
Set threshold levels for nuclei counts, or calculate parameters such as tissue slice total area and area ratios.



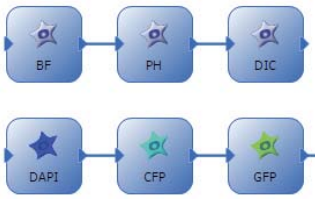
A Range of Easy-to-Use Functions
Turn Your Findings into Compelling Presentations

Image Capture

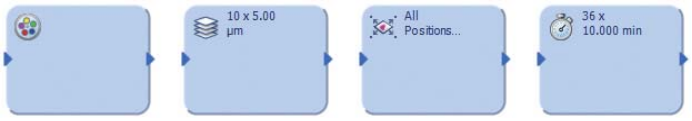
Graphical Experiment Manager (GEM)

Dimension

A departure from the usual complex panel-based interfaces, the GEM uses a flexible drag-and-drop interface to build simple or complex experiments within the cellSens workspace. Actions can be combined within specialized frames to dictate the desired order and priority of automation and imaging. Easily acquire multichannel imaging, Z-stacks, or time-lapse acquisitions across one or more sample positions. Perform two-channel simultaneous imaging using two cameras or an image splitter within GEM using the cellSens High-End Device solution. GEM permits user interaction with the system during automation to address unforeseen changes in the sample, save time, and prevent having to redo work.



Capture command

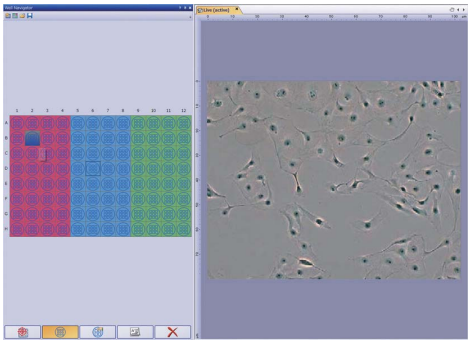


Loop command

Well Plate Navigator

Dimension + Multiposition + Well Plate Navigator

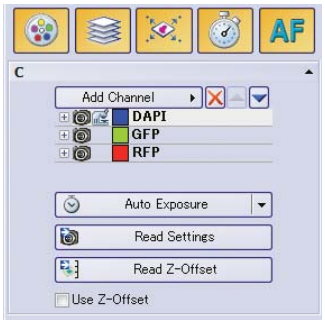
The Well Plate Navigator automatically scans and acquires images from standard and customized well plate formats. All acquired images, sample positions, and user comments can be saved into a structured database for rapid centralized access. Move to the center of any well in a single click. Wells can be selected individually, by row or column, or in discontinuous groups. Apply unique multi-dimensional acquisition settings to single well or multiple selected wells in one step. Additionally, the Well Plate Navigator supports the execution of multiple experiments within a single well plate to support more complex experiments.



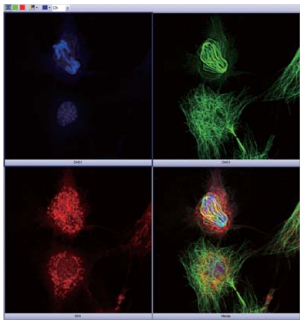
Capture Multi-dimensional Images

Dimension + Multiposition

In combination with a motorized microscope, the Process Manager makes it easy to capture Multi-colored and Multi-dimensional images with just a couple of click. With the optional Multiposition solution, automatically capture multipoint and large area images.



Process Manager Setting



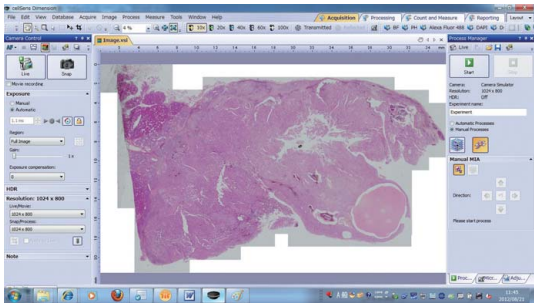
Multi-color images

Panoramic Imaging

Dimension + Multiposition

Standard + Manual Process

The manual multiple image alignment function creates a single panoramic image as the specimen is scanned. Wide area imaging using a motorized stage can be fully automated with cellSens Dimension and the optional Multiposition solution. In combination with a motorized z-focus, this function captures images that are auto-corrected for sample distortion and tilting.



Extended Focus Imaging

Dimension

Standard + Manual Process

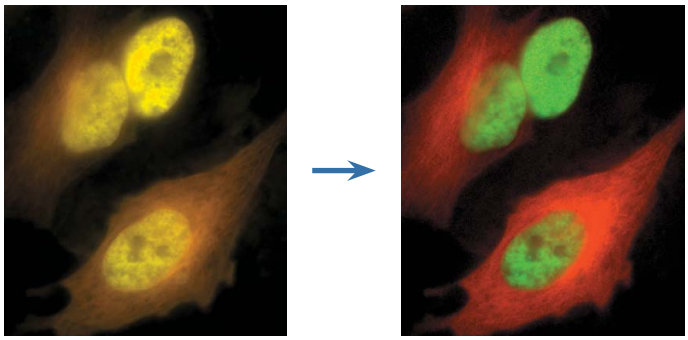
Create a single in-focus image from successive image planes as the focus knob is turned using the Extended Focus Imaging (EFI) function. A motorized focus drive fully automates EFI acquisition. EFI composite images can also be created directly from previously captured Z-stacks.

Viewing and Processing

Unmixing

Dimension

The linear unmixing algorithm in cellSens Dimension results in crosstalk-free fluorescent images useful for addressing the challenge of fluorochromes with overlapping emission spectra — such as GFP and YFP. Linear unmixing also helps separate background autofluorescence from fluorescence signal.



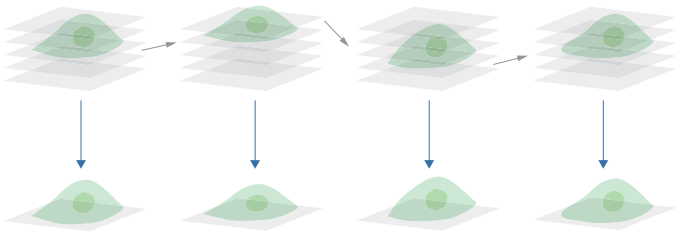
Before unmixing

After unmixing

Best Focus Extraction

Dimension

Extract the best focus from images including z-stack, time-lapse images. This function is effective in creating T-series images with the best focus possible, even when working with defocused time-lapse images.



High Dynamic Range Imaging (HDRI)

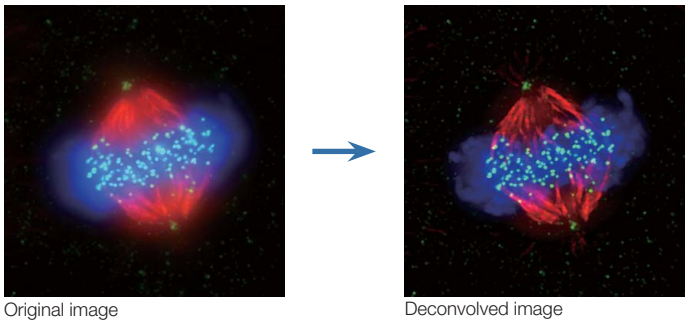
Dimension

By automatically capturing many images at different exposures, the HDRI function creates a final image with a much greater dynamic range; low intensity signals are clearly visible without overexposing the bright areas of the sample.

Deconvolution

Dimension + CI Deconvolution

The optional constrained iterative (CI) Deconvolution Solution employs the latest in CI algorithms to produce improved resolution, contrast, and dynamic range, with industry-leading speed. Each cellSens Dimension license includes live 2D deblurring for preview and acquisition to enable better contrast within thick specimens. cellSens comes complete with the most widely requested deblurring techniques such as 2D deconvolution, nearest neighbor and Wiener filter.



Original image

Deconvolved image

Cell line: Human cervical cancer cell line HeLa cell
Immunostaining: Hec1 staining (green, Alexa Fluor 488), α-tubulin staining (red, Alexa Fluor 568), DAPI staining (blue)
Mitotic HeLa cell derived from human cervical cancer.
Mitotic spindle and kinetochores are stained with anti-α-tubulin (red) and anti-Hec1 (green) antibodies, respectively. Chromosomes interact with microtubules constituting mitotic spindle via kinetochores, protein structure assembled on centromere region of chromosomes.

Image data courtesy of:
Department of Molecular Oncology, Institute of Development, Aging and Cancer, Tohoku University
Masanori Ikeda and Kozo Tanaka

Solution

Each cellSens package can be expanded towards a specific application by using optional “Solutions”

Dimension available solutions:

CI Deconvolution	Multiposition	Well Plate Navigator
Count & Measure	Ratio/FRET	Database Core
Database Client	NetCam	Photo Manipulation

Standard available solutions:

Multichannel Acquisition	Manual Process	Database Core
Database Client	NetCam	Confluency Checker

Entry available solution:

Database Client

A Range of Easy-to-Use Functions
Turn Your Findings into Compelling Presentations

Measurement and Analysis

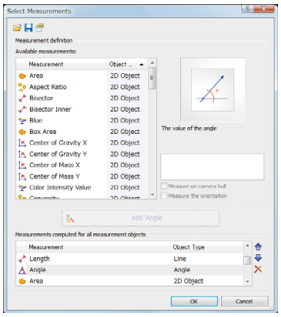
Manual Measurement

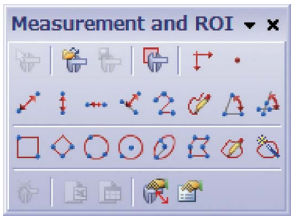
Dimension

Standard

Entry

Distances between points, areas, intensity measurements, and morphological parameters are accessible using the cellSens measurement tools. Measurement data are saved as an image layer that can be exported to MS Excel and cellSens workbook formats, or viewed using OlyVIA, a free image viewer software package.

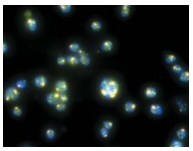




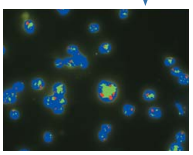
Automatic Object Measurement and Classification

Dimension + Count & Measure

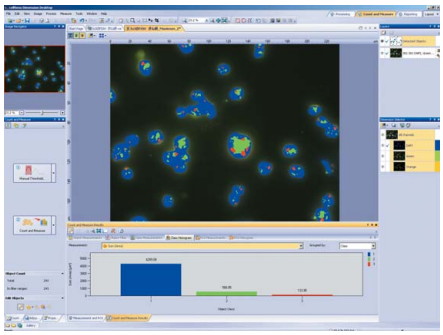
The Count & Measure Solution adds efficient and precise object detection for automated nuclei counting and classification. This solution expands the set of manual measurements in cellSens. Perform automatic object measurement and classification easily, using an interactive interface where recognized objects are always linked with their measurements.



Original image



Object detected on image

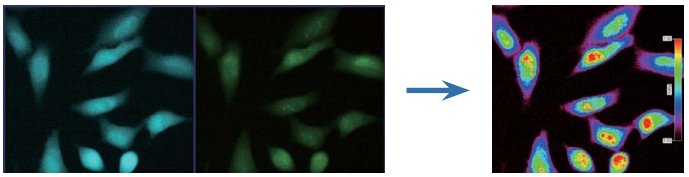


Measurement and classification results

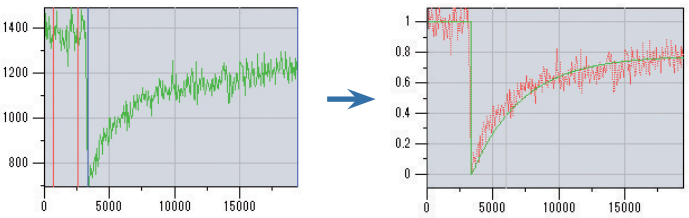
Intensity Analysis

Dimension

Graphically depict intensity and ratio values defined by Regions of Interest (ROIs) and adjust ROI placement to compensate for cell movement. Export data directly to Excel. Convert variations of intensity to hue and brightness using Intensity Modulated Display (IMD) to visually enhance the fine image structures often found within ratio or FRET images. The Ratio/FRET Solution is used to display and analyze real-time ratiometric imaging and data. FRET analysis of both sensitized emission and acceptor photo-bleaching is also supported within this user friendly workflow.
The Photo-Manipulation Solution can be used for the curve-fitting analysis of FRAP images.



Ratio image display/analysis



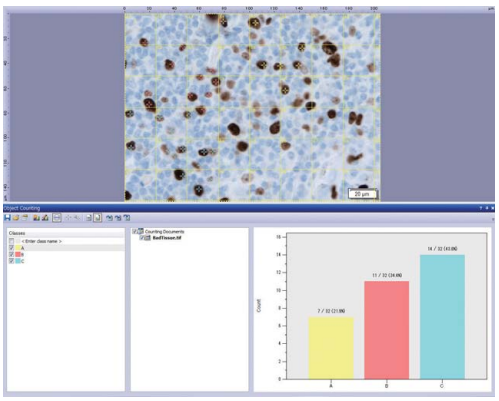
FRAP analysis function

Manual Count

Dimension

Standard

Perform manual counts with self-set classes. Generate counts and proportions for each class using your mouse.



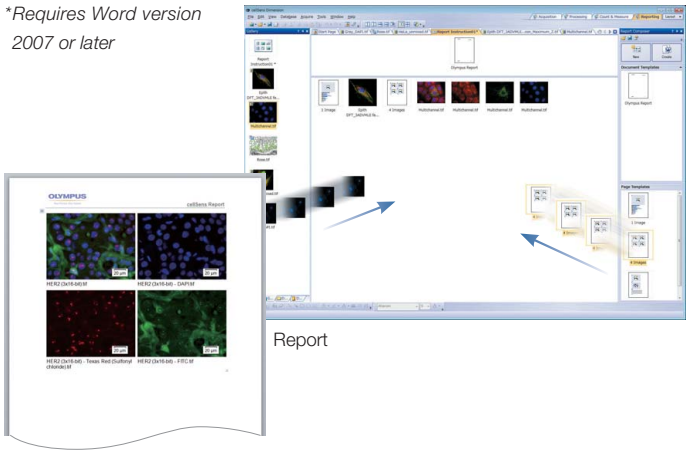
Collaboration and Communication

Reporting

Dimension

Easily drag-and-drop image property data, measurement data, and user-customized fields into a report template using the convenience of a built-in reporting tool to produce reports in MS Word*. Collaborate with colleagues and communicate results quickly and easily.

**Requires Word version 2007 or later*



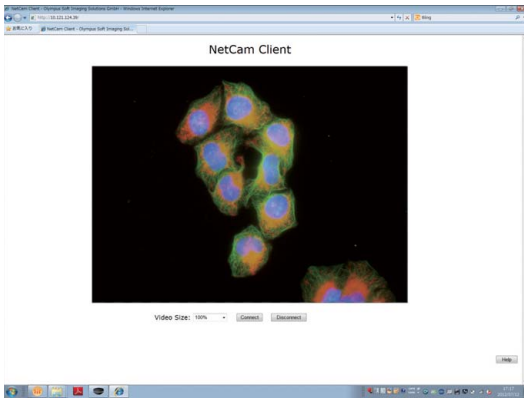
Report

Remote Live Image

Dimension + NetCam

Standard + NetCam

The cellSens NetCam Solution facilitates the transfer of live or static imaging over a network for teaching, mentoring, or supervision.



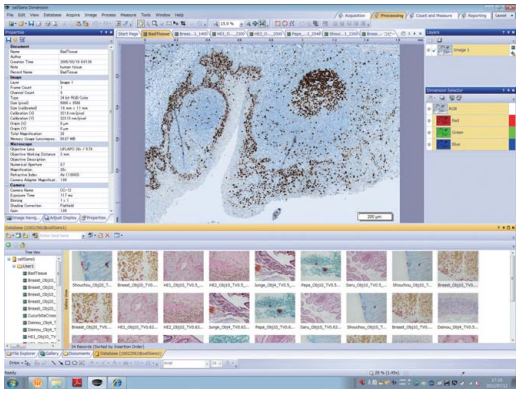
Database

Dimension + Database Core or Database Client

Standard + Database Core or Database Client

Entry + Database Client

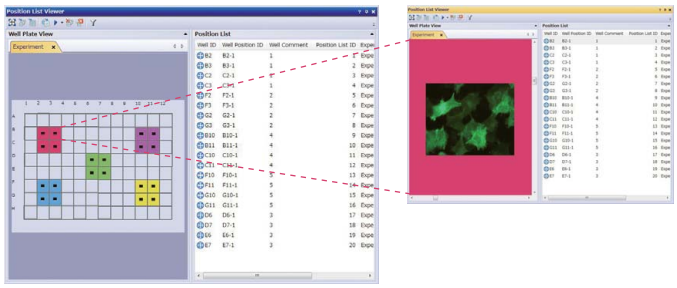
The Database Core Solution enables users to create network shared, user-definable databases with full access controls. The database stores images and all associated image properties, user comments, and any other related files that a user wishes to include. The interactive query tool makes it easy to find the data and provides automatic previews of each queried image. Conveniently read and write to a shared database from different stations with the Database Client Solution.



Database+Well Navigator

Dimension + Multiposition + Well Plate Navigator + Database Core or Database Client

In combination with the Well Navigator solution, the Database solution greatly improves the efficiency of viewing and analyzing well plate images with a large amount of data. By clicking on icons for image information such as the date, file name, or well plate number, any selection of captured images can be viewed for further analysis. This solution also enables users to view captured images and continuously analyze selected images (the Batch Macro function) via the well plate GUI.



cellSens functions

		DIMENSION	STANDARD	ENTRY
Layout	User experience customization	✓	✓	✓
View	Overlay multiple images	✓	✓	
	Document groups for side-by-side image comparison	✓	✓	✓
	Movie playback	✓	✓	✓
	Tile view (multiple images in a single data set shown side-by-side)	✓	✓	✓
	Slice view for orthogonal plane viewing of 3D or time-lapse data sets	✓		
	Voxel viewer for isosurface and volumetric rendering of 3D and 4D data sets	✓		
Image Acquisition	Snap/movie acquisition	✓	✓	✓
	Time-lapse at specified interval	✓	✓	
	Automated multi-wavelength	✓	Multichannel Acquisition	
	Z-stack	✓		
	Multi-dimensional (xyzt and wavelength)	✓		
	Graphical Experiment Manager	✓		
	Manual assisted panoramic imaging (manual MIA)	✓	Manual process	
	Multiposition visitation and stage navigator	Multiposition		
	Automated panoramic imaging (auto MIA, requires motorized stage)	Multiposition		
	Instantly create EFI image (manual or motorized Z)	✓	Manual process	
	Simultaneous Multi-color Imaging (requires two identical cameras or image splitter)	Ratio/FRET High-end device	or	
	Live deblurring	✓		
	High Dynamic Range Imaging (HDRI)	✓		
	Multi-well Plate Acquisition	Well plate navigator Multiposition	and	
Image Processing	Geometry/combine/filter processing	✓	✓	
	Fluorescence unmixing	✓		
	Brightfield unmixing	✓		
	Deblurring (No/Nearest Neighbor, Wiener Filter)	✓		
	Kymograph	✓		
	2D deconvolution	✓		
	3D deconvolution (constrained iterative deconvolution)	CI Deconvolution		
Image Analysis	Region and line measurements	✓	✓	
	Phase analysis	✓		
	Object analysis and classification	Count & Measure		
	Interactive measurement	✓	✓	✓*
	Intensity plot over time/z	✓		
	Colocalization	✓		
	Object counting (Manual)	✓	✓	
	Online ratio and kinetics	Ratio/FRET		
	Ratio analysis (off-line)	✓		
	FRET analysis	Ratio/FRET High-end device	or	
	FRAP analysis	Photo manipulation Life science analysis	or	
	Cell count and confluency measurements	✓	Confluency checker	
Documentation and Collaboration	Automatically compose MS Word reports	✓		
	Database image and data management solution for microscopy	Database Core	Database Core	
	Open database and load records/documents from database	Database Client	Database Client	Database Client
Remoting	Remote live image viewing	Netcam	Netcam	

* 3 points angle, 4 points angle, arbitrary line, closed polygon, polyline and perpendicular line only.

Products with confirmed functionality

			DIMENSION	STANDARD	ENTRY
Olympus	Camera	DP20*1, DP21, DP22*5, DP25*2, DP26, DP27*5, DP70*1, DP71*2, DP72*2, DP73*3 , DP80*3	✓	✓	✓
	Microscope	BX43, BX53, BX63, BX61, BX61WI, IX83, IX73, IX81, SZX16A	✓	✓	
		IX81-ZDC, IX81-ZDC2, IX3-ZDC、IX3-ZDC2	✓		
	Peripherals	BX-DSU, IX3-DSU, IX2-DSU, U-CBF	✓		
	Motorized XY stage	BX3-SSU, IX3-SSU	Multiposition		
OSIS	Camera	CC12, F-View II, Colorview I, Colorview II, Colorview III, Colorview IIIu, XM10, XC10, XC30, XC50, UC30, UC50, UC90*4, LC20, SC20, SC30, SC50, SC100	✓	✓	✓
	Peripherals	cell^TIRF (multi-line, single line), MT20, USB-ODB converter, Real Time Controller (U-RTC and U-RTCE), U-FCB, U-STC, IX3-FRAP	✓		

*1 DP20/70 does not support Windows 7 64-bit, Windows 8.1/10 32-bit/64-bit. *2 DP25/DP71/DP72 does not support Windows 8.1/10 32-bit/64-bit. *3 DP73/80 support only Windows 7/8.1/10 64-bit. *4 UC90 is not available in some areas. *5 DP22/27 does not support Windows 10 32-bit/64-bit.

			Note
Andor	Camera	iXon series, Zyla series, Neo	Requires high-end camera solution
Hamamatsu		ORCA series, ImagEM series, C11440-36U	Several cameras require high-end camera solution
Photometrics		CoolSNAP HQ2, Evolve 512 Delta, Prime (PCI-Express)	
Qimaging		MicroPublisher 3.3 RTV/5 RTV, Exi series, QI Click, Retiga series, OptiMOS, Rolera Thunder	
Jenoptik		ProgRes C3, ProgRes C5	Available in cellSens Standard and Dimension
Prior	Peripherals	ProScan I, II, III, Optiscan II,III	Requires Multi position Solution for motorized stage use
Ludl		MAC6000	
Objective Imaging		Oasis 4i	
Märzhäuser		Tango	
Applied Scientific Instrumetation		MS-2000	
Vincent Associates		Uniblitz shutter (VCM-D1, VMM-D1, VMM-D3)	Available in cellSens Standard and Dimension
CoolLED		pE-1, pE-2, pE4000	Available in cellSens Dimension
Excelitas		X-Cite 120 PC, X-Cite exacte, X-Cite XLED1, X-Cite110LED, X-Cite120LED	
Sutter		Lambda 10-3/10-B, Lambda DG4	
National Instruments		NI USB-6501	
Yokogawa		CSU-X1	Requires high-end device solution

*See detailed information: http://www.olympus-lifescience.com/en/software/cellsens/

Compatible image formats

Read and write	JPEG, JPEG2000, TIFF, BMP, AVI, PNG, VSI
Read only	GIF, PSD (Adobe PhotoShop), TIFF (DP-BSW, FSX100, MetaMorph), OIF/OIB/OIR (FLUOVIEW format), Cell, STK (MetaMorph), MRC (Medical Research Council)

Recommended system requirements

OS	Microsoft Windows 10 Pro (32-bit/64-bit), Microsoft Windows 8.1 Pro (32-bit/64-bit), Microsoft Windows 7 Ultimate/Professional (32-bit/64-bit) with SP1
OS Language	English, Simplified Chinese, Japanese, German, Russian (only for Entry and Standard), and all others with English like alphabet
CPU	Intel Core i5, Intel Core i7, Intel Xeon; recommended for high-speed image acquisition: QuadCore
RAM	4GB for general applications, 8GB or more is recommended for high-speed image acquisition
Graphic card	1280×1024 (min. 1024×768) monitor resolution with 32-bit video card with separate graphics memory (no integrated graphics processor with shared memory)
Port	USB 2.0 port to connect devices to the system
	Fire Wire A to connect devices to the system (BX63, IX83 etc...)
	Serial (RS232) to connect devices to the system (BX61, IX81, SZX2-MDCU, IX3-DSU etc...)
	Additional PCI/PCIe slots as necessary to connect third party peripherals (principally third party cameras) with proprietary interface cards
HDD	1 GB for installation; performance of hard disk could be a limiting factor for image acquisition speed. Recommended for high-speed image acquisition: Solid State Drive (SSD)
Drive	DVD drive (Read: DVD-R DL)
Web Browser	Recommended: Microsoft Internet Explorer 11

Image data courtesy of:
Hiroo Ueno, Ph.D. Department of Stem Cell Pathology, Kansai Medical University
(cover page)

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- **OLYMPUS CORPORATION is ISO14001 certified.**
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For enquiries - contact
www.olympus-lifescience.com/contact-us

OLYMPUS CORPORATION
Shinjuku Monolith, 2-3-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-0914, Japan

OLYMPUS EUROPA SE & CO. KG
Wendenstrasse 14-18, 20097 Hamburg, Germany

OLYMPUS SCIENTIFIC SOLUTIONS AMERICAS CORP.
48 Woerd Avenue, Waltham, MA 02453, U.S.A.

OLYMPUS SINGAPORE PTE LTD.
491B River Valley Road, #12-01/04 Valley Point Office Tower, Singapore 248373

OLYMPUS MEDICAL SYSTEMS INDIA PRIVATE LIMITED.
102-B, First Floor, Time Tower, M.G. Road, Gurgaon 122001, Haryana, INDIA

OLYMPUS LATIN AMERICA, INC.
5301 Blue Lagoon Drive, Suite 290 Miami, FL 33126, U.S.A.

OLYMPUS (CHINA) CO., LTD.
A8F, Ping An International Financial Center, No. 1-3, Xinyuan South Road, Chaoyang District, Beijing, 100027 P.R.C.

OLYMPUS KOREA CO., LTD.
8F Olympus Tower, 446 Bongeunsa-ro, Gangnam-gu, Seoul, 06153 Korea

OLYMPUS AUSTRALIA PTY. LTD.
3 Acacia Place, Notting Hill VIC 3168, Australia

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