Standard Specifications

Objective		UPLSAPO40x (NA 0.95, WD 0.18 mm)
Intermediate magnifications		0.5x / 1x / 2x, Motorized magnification changer
Morphological observation (Transmitted light)	Light source	1W LED (625 nm)
	Contrast method	Differential Interference Contrast (DIC)
	Condenser	NA 0.55, FS fixed (rectangle), DIC prism fixed
Fluorescence observation (Incident light)	Light source	X-Cite eXacte Pre-aligned 2000 hour DC lamp with Closed-Loop Feedback, Adjustable Iris, Liquid Light Guide
	Light control	High Speed Shutter of X-Cite eXacte
	Excitation change	Motorized 6 position, 1 for transmitted light
Motorized stage	Stroke	10mm x 10 mm, each dish
	Sample capacity	Glass bottom dishes with 35mm diameter, up to 8
	Sample tray	Can be easily put on and taken off, autoclave capability, include 8 lids with glass window for the glass bottom dishes with 35mm diameter
Focus		Objective drive, motorized up/down control
	Operation	Jog dial control
Camera		Cooled CCD camera, -35 ºC air cooled
		2/3" (8.67 mm x 6.60 mm), 1344 x 1024 pixels
		12 bit or 16 bit
Liquid handling assist (BTO option)		Motorized open/close control of designated dish.
		Manual pipetting through the small opening on the internal door of the incubator
Imaging software		MetaMorph
CO_2 incubator	Temperature	37 ºC
	Accuracy	+/- 0.3 ºC (ambient temperature 25 ºC, no load)
	Humidity	95% +/- 5% RH
	CO_2 concentration	0 - 20 %
	Accuracy	+/- 0.15 % (ambient temperature 25 ºC, no load)
Operating conditions	Temperature	15-28 ºC
	Humidity	Less than 80% RH
Dimensions of main body		710 x 630 x 1170 mm
Weight		150kg
Electricity power consumption	Main body	500VA
	PC and monitor	About 400VA

Dimensions

Unit: mm

Depth: 630mm, Power consumption: 900VA
** Desk for setting personal computer is not included.*

Reference material related to "HeLa cell constantly expresses Fucci." on page 6
Asako Sakaue-Sawano, Hiroshi Kurokawa, Toshifumi Morimura, Aki Hanyu, Hiroshi Hama, Hatsuki Osawa, Saori Kashiwagi, Kiyoko Fukami, Takaki Miyata, Hiroyuki Miyoshi, Takeshi Imamura, Masaharu Ogawa, Hisao Masai, and Atsushi Miyawaki
Visualizing Spatiotemporal Dynamics of Multicellular Cell-Cycle Progression
Cell 132, 487-498, February 8, 2008

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OLYMPUS CORPORATION has obtained ISO9001/ISO14001

Illumination devices for microscope have suggested lifetimes. Periodic inspections are required. Visit our Website for details.

Specifications are subject to change without any obligation on the part of the manufacturer.

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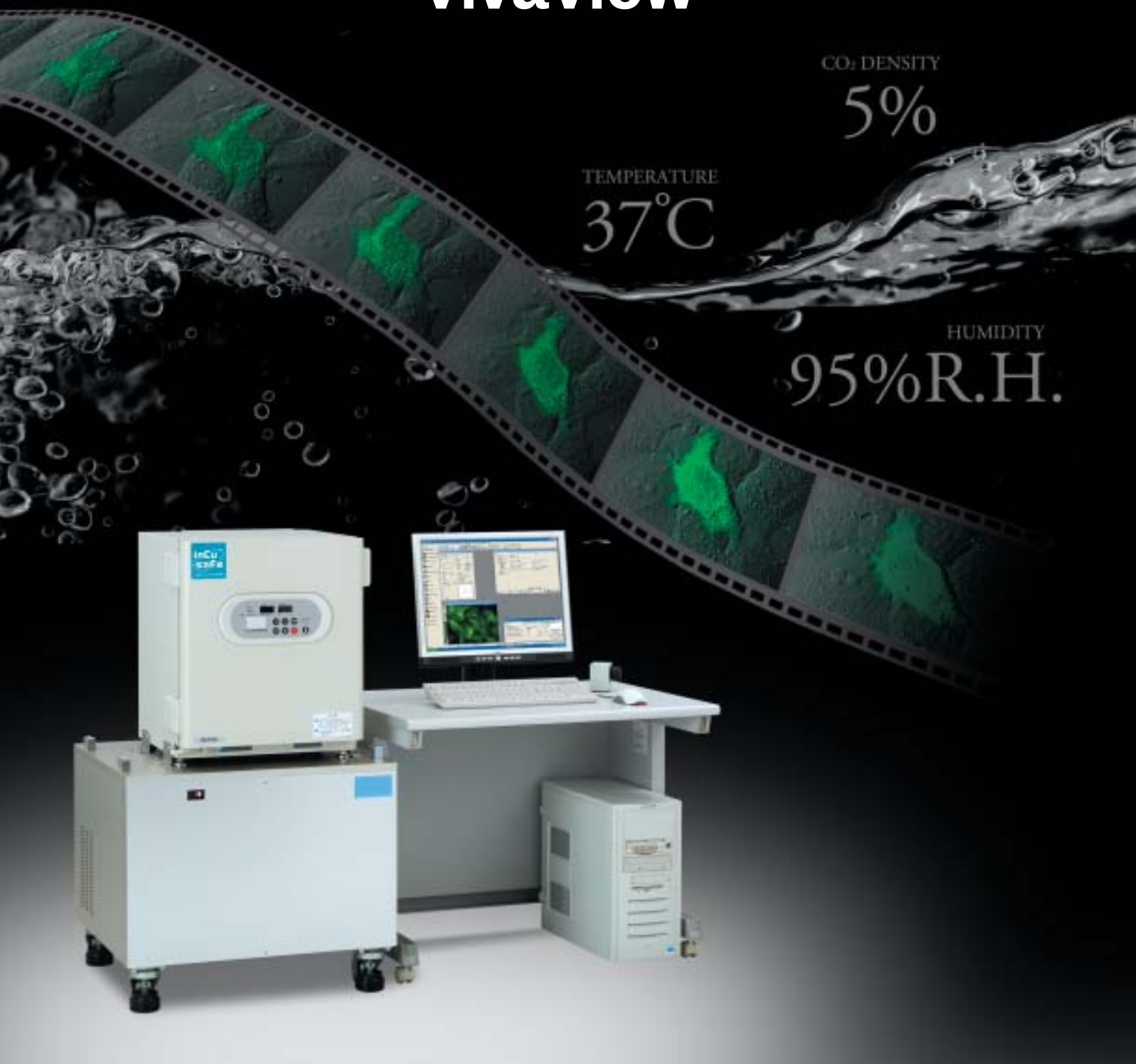
LCV110U

VivaView™ FL

NEW

Ideal Time-lapse Imaging

VivaView™



Captures Live Cell Images, As It Really Is, With Long-Term Mul tidi

"We would love to be able to execute long-term time-lapse observation while culturing cells."

"We need to take multidimensional time-lapse (XY, Z, wavelength, time, position) images of multiple cells in multiple conditions in parallel. This will help us to improve experiment accuracy and efficiency."

"We desire a fluorescence imaging tool which is easy to operate and stable against room temperature fluctuation."

VivaView™ LCV110U realizes ideal time-lapse imaging that enables observation of live cells' intrinsic dynamics.

❶ Eight-dish tray
❷ Objective (motorized Z drive)
❸ Motorized XY stage
❹ LED for transmitted illumination
❺ Fluorescent mirror unit, transmitted DIC mirror unit
❻ Variable magnification lens (0.5x, 1x and 2x)
❼ High sensitive cooled CCD camera

mensional Time-Lapse Imaging.

Cell imaging inside an incubator

- Time-lapse imaging over days or weeks is made possible while maintaining cell activity, by integrating an optical microscope with a CO_2 incubator.

Parallel time-lapse observation of eight dishes

- Eight ø35mm glass bottom dishes can be set in position simultaneously. Multiple experiments with different cell types/ chemical reagents/ genetic manipulation can be executed in the same environment. This significantly improves the accuracy and efficiency of the experiments.
- Time-lapse, multicolor fluorescence, Z-stack, and transmitted light images are obtained at multiple locations on the sample dish.

Eliminates thermal drift during long-term time-lapse imaging

- LCV110U eliminates focus errors in long-term time-lapse imaging by keeping the objective at 37°C; the same temperature as inside the incubator. This minimizes the temperature change that causes thermal focus drift.

Stress-free time-lapse imaging

- Experimental settings can be easily made with personal computer operations, even if you are not well experienced with a time-lapse microscope system. Effortless imaging is achieved via a simple, on-screen control panel.
- Without the need to continuously monitor your cells and correct focus, long-term time-lapse observation can be executed without anxiety.
- Conventional complicated accessory components are NOT necessary; all the equipment required for live cell imaging is fully integrated.

In a conventional time-lapse system, there are....

Bothersome microscope settings

- Heater cord and CO_2 tube settings
- Condenser centering, optical adjustment for DIC observation
- Focus check
- Fluorescent lamp centering

Bothersome management of observation environments

- Preparing a dark room, requiring a large amount of space
- Paying attention to those who come and go during an experiment
- Managing location of peripheral devices
- Managing room temperature

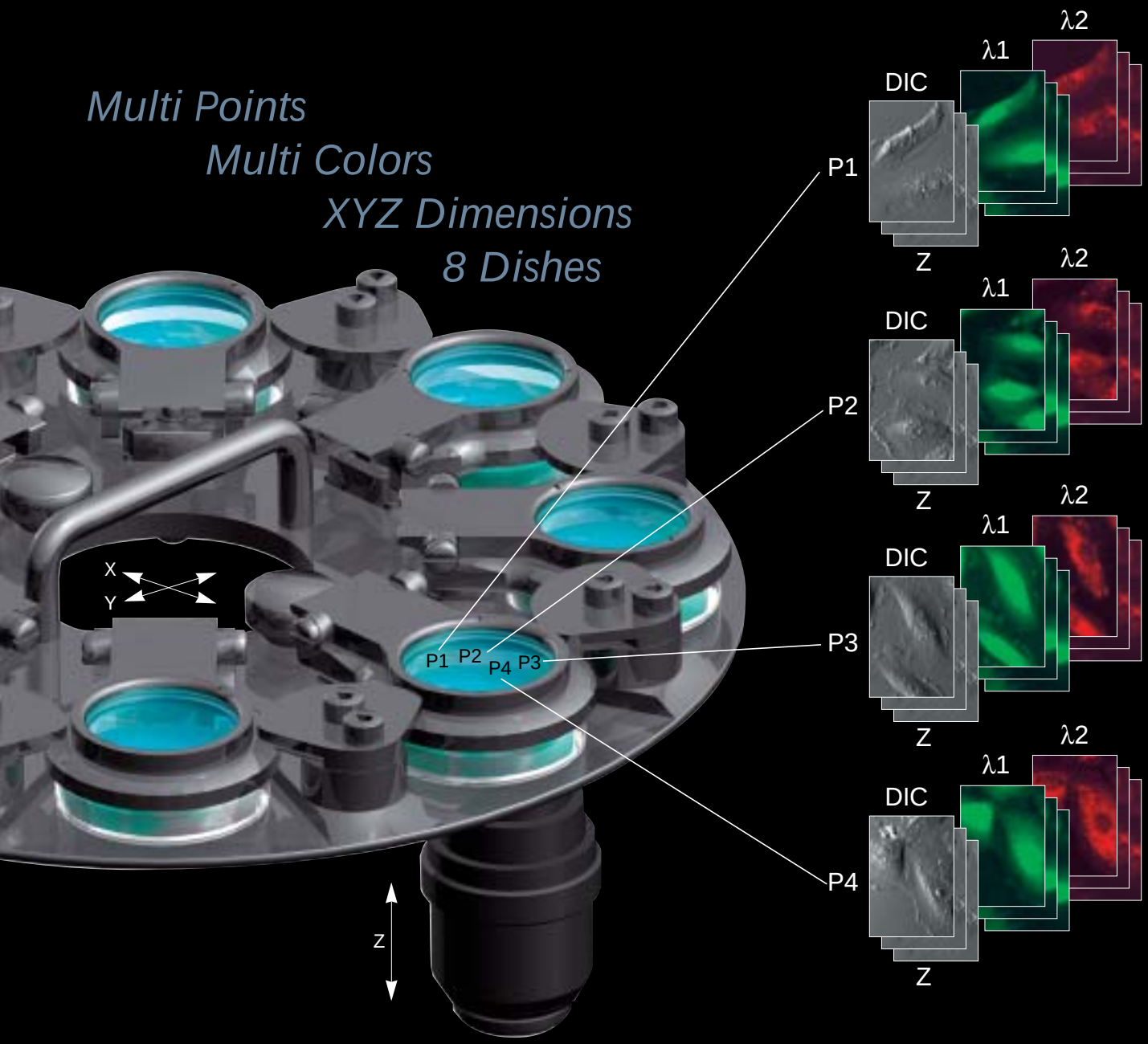
Bothersome cell activity check

- Cell activity check
- Contamination control
- Water makeup for bath heater
- CO_2 density check

LCV110U eliminates this entire cumbersome management process.

Dramatic Improvements In Efficiency With Multidimensional Time-Lapse Imaging In Each Of Eight Dishes.

- Multidimensional time-lapse observation can be executed at multiple locations within each ø35mm glass bottom dish. Moreover, eight ø35mm glass bottom dishes can be set on the tray, enabling eight different experiments in parallel.



Superior position reproducibility

High-performance motorized stage is incorporated with the ability to accurately reproduce position.

High-contrast DIC images

High-contrast DIC images can be acquired by the optimized optical system.

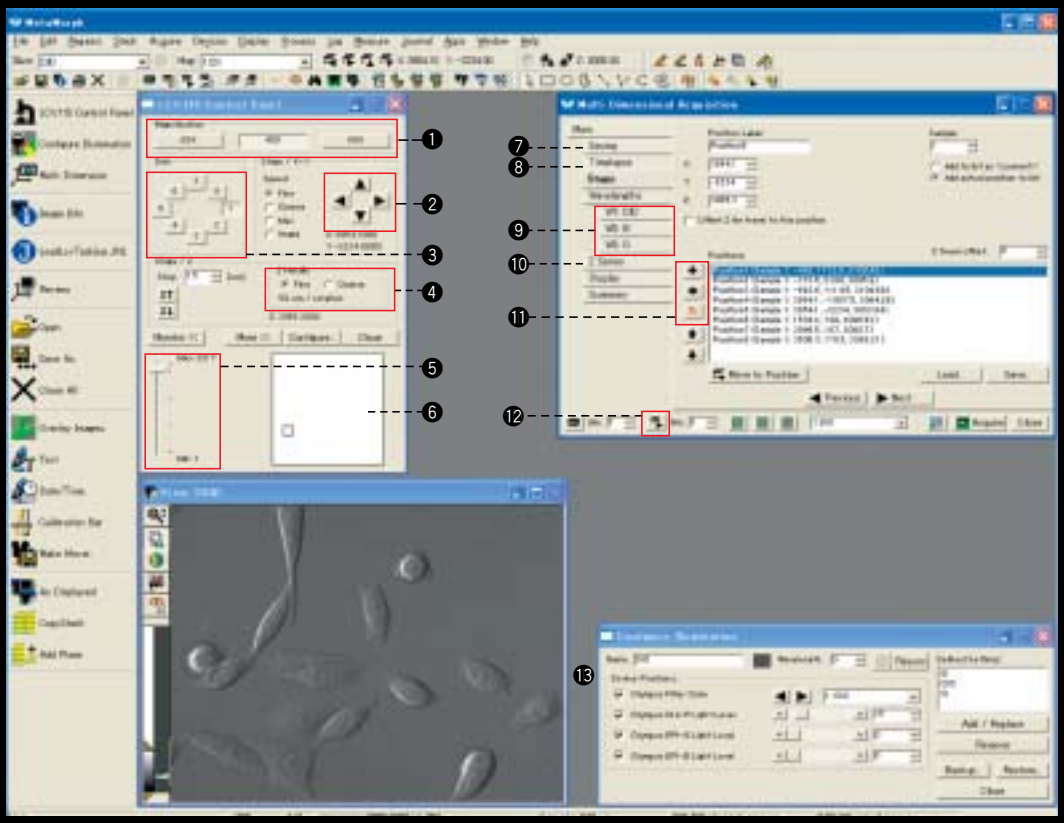
Clear and high-contrast fluorescence image

The high-NA objective (UPLSAPO40x: NA 0.95) efficiently detects dim fluorescent signals.

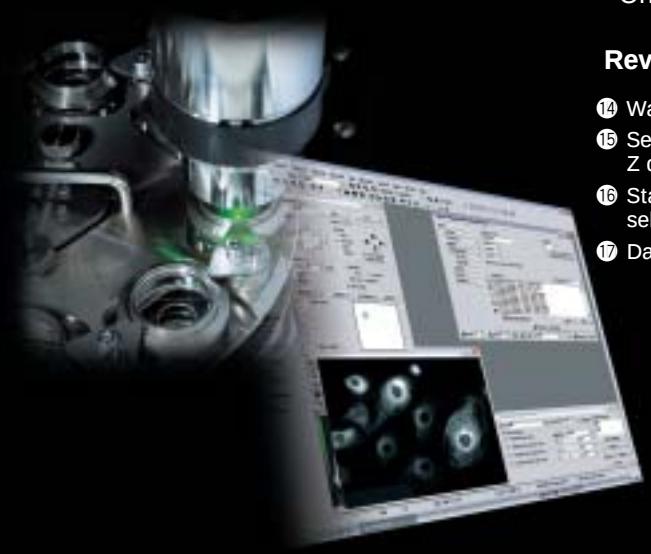
Everything Is Controlled From A Personal Computer.

- Once the dishes are set, various settings can easily be made using only personal computer operations. It is not necessary to watch the equipment all the time, and long-term time-lapse observation can be executed without anxiety.

Operation screen



❶ Magnification selection
❷ Observation position control
❸ Dish number selection
❹ Coarse/Fine Z adjustment
❺ Objective Z position control
❻ Position navigator (within the 10 mm x 10 mm observable area)
❼ Data storage location
❽ Time-lapse interval and total time settings
❾ Exposure time setting for each illumination method
❿ Setting of number of images captured in the Z direction
⓫ Setting of observation position
⓬ Live button
⓭ Observation method settings



- Once acquired, image data can be recalled and displayed.

Review screen

⓮ Wavelength selection
⓯ Selection of time and Z direction
⓰ Stage position selection
⓱ Data loading

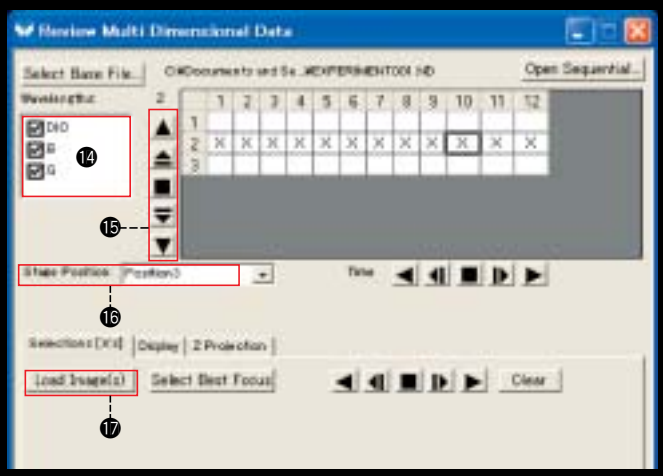
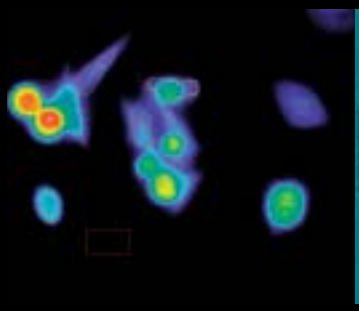


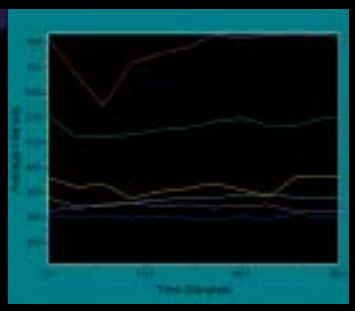
Image Processing/Analysis

- Intensity measuring function: Intensity measurement/indication in graph for acquired images (transmitted light/ fluorescence) are available.
- Morphology analysis function: A full complement of morphological features can easily be measured, viewed and exported.
- Deconvolution: Removes blur of images. No Neighbors or Nearest Neighbors methods are selectable.
- Tracking (optional): Pinpoint tracking of a target object overtime.

Intensity analysis

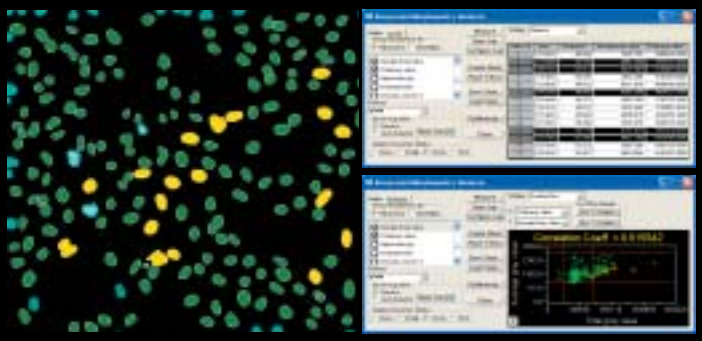


Original image



Intensity graph

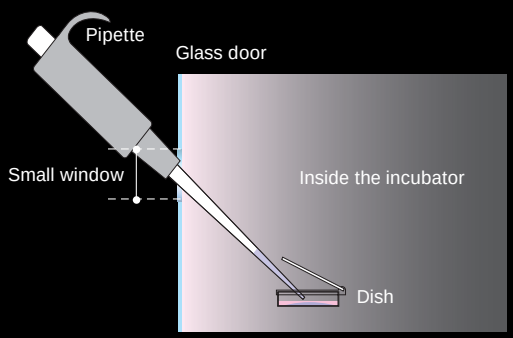
Morphology analysis



Loading Chemical Solutions During Experiment (option)

- During observation, chemical solutions can be directly loaded using a pipette from the small window on the inner door of the incubator, and the difference between before and after loading of chemical solutions can be imaged.
  This process is performed without opening the door and removing the dish, minimizing the environmental changes in the incubator or in the sample.
- A special tray and a special dish lid is prepared for loading chemical solutions, which can be opened and closed using software operations.

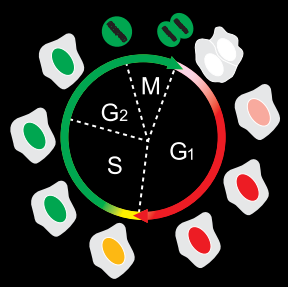
Special tray for loading chemical solutions/ special dish lid (options)

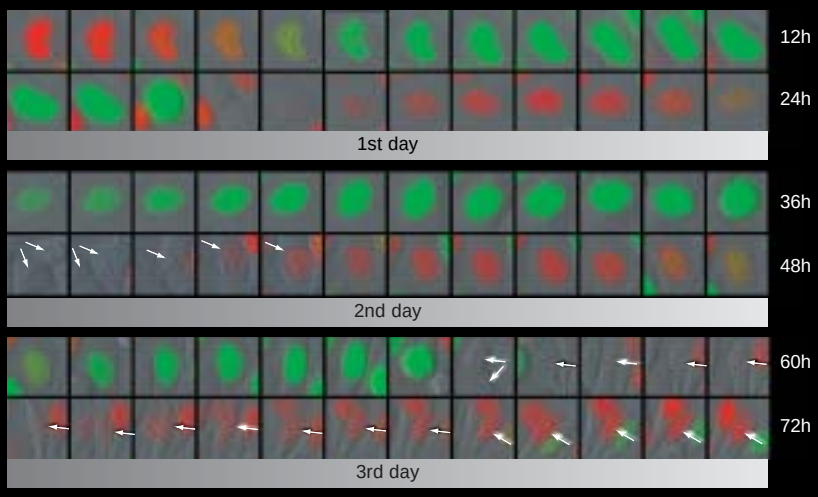


Applications

HeLa cells constitutively express Fucci

While it was dreamed of a technology for observing the G_1/S transition, namely the start of DNA replication, of individual live cells with high contrast, the dream has been realized by Fucci (Fluorescent Ubiquitination-based Cell Cycle Indicator). Fucci labels individual cell nuclei in G_1 phase red and those in S/G_2/M phases green.

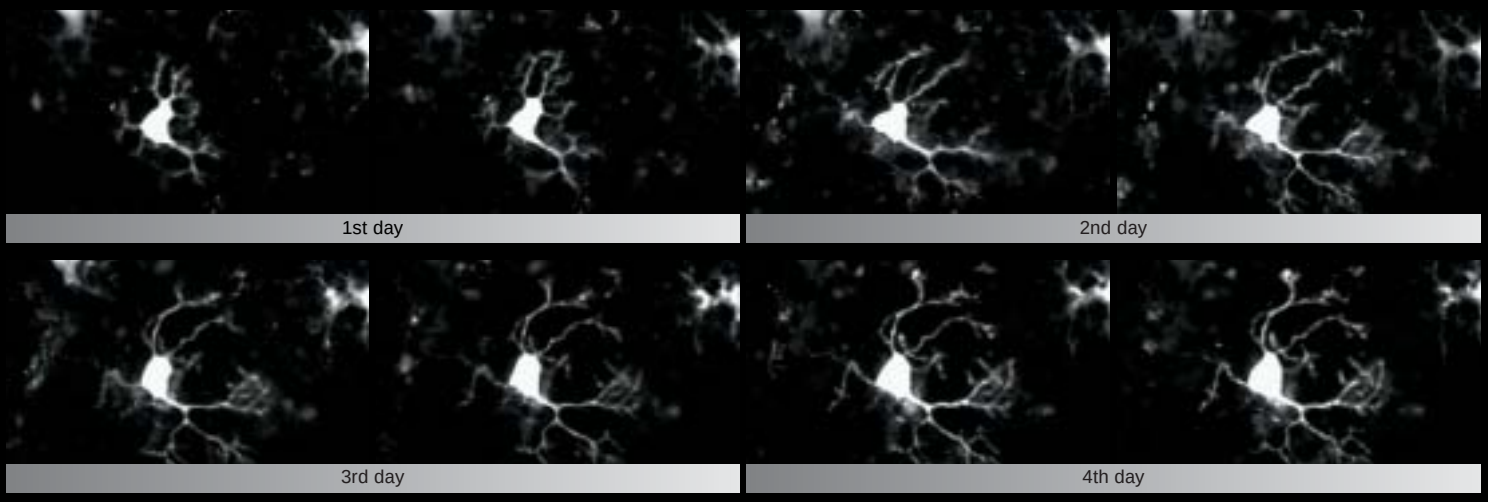




Thus, the transition from G_1 to S phases can be traced with a color change from red to green (via yellow).
LCV has contributed to the development of Fucci. To examine effects of numerous probe constructs on the cell cycle of recipient cells, the microscopy providing a stable culture environment for a considerable period of time was indispensable. Effective uses in medical fields, such as evaluation of antineoplastic agents, etc. are expected.

The image data courtesy of: Asako Sakaue-Sawano Ph,D, Atsushi Miyawaki M.D.,Ph.D,
RIKEN Brain Science Institute Laboratory for Cell Function Dynamics, Life Function Dynamics, ERATO, JST

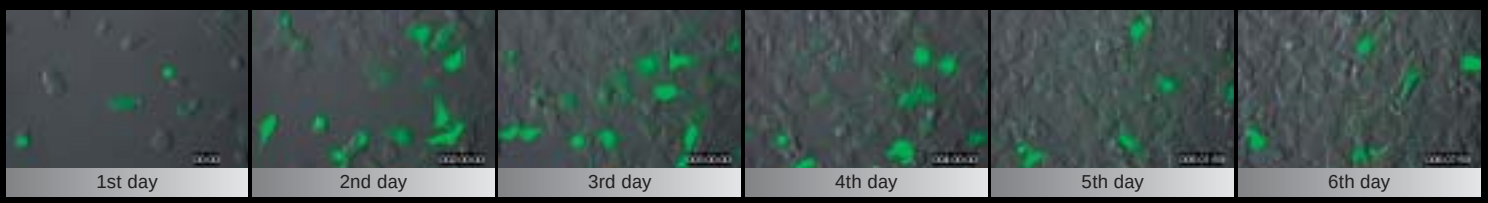
Primary mouse Purkinje cell in culture



Period of data acquisition: Observation for four days at two hour intervals,
Fluorochrome: GFP

The image data courtesy of: Mineko Kengaku Ph.D,
RIKEN Brain Science Institute Laboratory for Neural Cell Polarity

Neuron-like cell PC12



An example of success in six-day time-lapse imaging.
GFP was transfected to PC12 for NGF (nerve growth factor) stimulation.

Period of data acquisition: Shooting at intervals of two hours for six days