

Cell Observer

Seeing Life Through New Eyes



The complete solution for multi-dimensional imaging of living cells



New Perspectives in Research

Carl Zeiss Cell Observer



The Challenge of Live Cell Imaging

Bordering on *In Vivo* reality – experiments with living cells and tissue have enabled enormous progress to be made in biology, medicine and pharmacology. They have also confronted researchers with real challenges.

How can minimal nanometer movements at cellular level be documented by video? With experiments which can stretch over several days? Experiments involving multiple cells, multiple wavelengths, multiple focal planes and multiple positions? How can conditions be created on a culture plate which allow the cells to survive such stress? And finally: Where can you find the components that make these experiments possible in the first place? And it is not unusual that you are forced to reach your limits here – in terms of technique, time and costs.

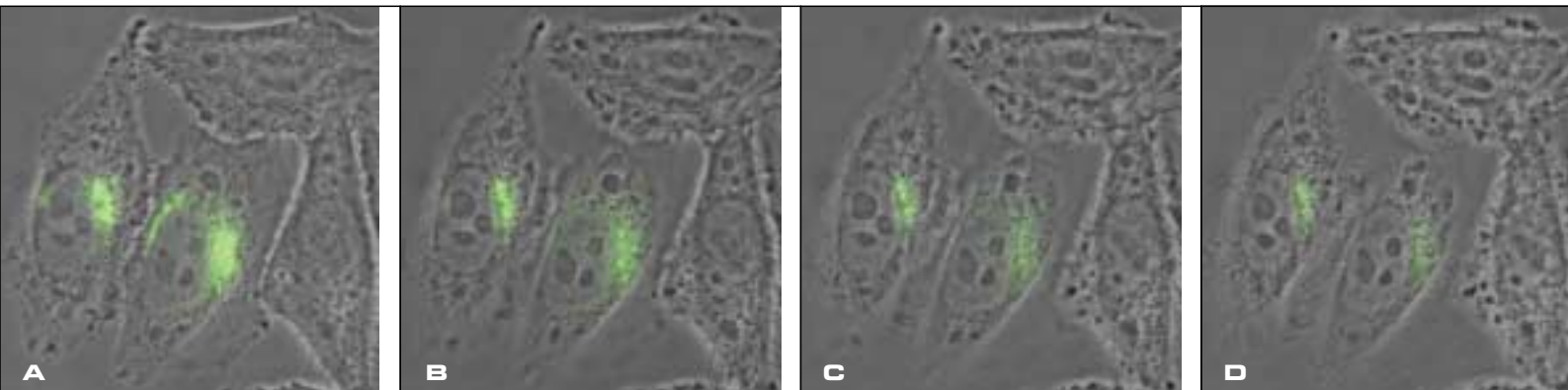
Hela cells in phase contrast combined with GFP-fluorescence (specific Golgi labeling). Dissociation of the Golgi apparatus by Brefeldin A application. Dr. Pepperkok, EMBL Heidelberg.

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0:05

0:10

0:15





The Complete System Solution

The demands placed on equipment used in live cell imaging are well-known: away from individual and time-consuming "patchwork" systems comprising different components from diverse manufacturers – towards a powerful homogeneous system. Now Carl Zeiss offers you the solution: Cell Observer, the complete solution for the observation and digital documentation of living processes. Ready for use. And rigorously tailored to the exacting requirements made by the diverse applications in live cell imaging.

A combination of perfectly matched high-performance components, designed to meet all demands. It doesn't matter whether you're working with 6 images or 600, in 2-D or in high-end 6-D imaging. Or whether you would like to produce video films, process images or measure structures. And there's another big plus: Since Cell Observer is easy to operate and user-friendly, even beginners can benefit from its many top-of-the-line features. The best basis for outstanding success in cell and molecular biology. Saving more time and gaining more precision than ever before.



Cell Observer - the complete system.

Insights into New Dimensions of Performance

From the 1st to the 6th Dimension

All in One: The Functions

Documenting dynamic processes with time-lapse, multichannel and z-stack images as well as *Mark&Find* in freely selectable combinations – Cell Observer offers you everything in one system. Including such practical features as the possibility to alter all parameters even while recording through “Pause” and “Continue” functions. Or measuring the distance from A to B, calculating the angle between A, B and C, statistics and much, much more. In a nutshell: all the features that you expect and need in modern live cell imaging. And when you go beyond the second and third dimension, you see with striking clarity the new dimensions in performance you get with the new unique complete system from Carl Zeiss.

2-D - The xy Dimension

Two-dimensional like photography with digital or conventional cameras – the xy dimension corresponds to standard photography.

3-D - The xyz Dimension

All the spatial information about the specimen at a glance – three-dimensional imaging is the result of combining two-dimensional images previously recorded on different focal planes.

4-D - The Wavelength Dimension

Selectively marking cell or tissue components with different fluorescent dyes – the information found in the fourth dimension can be stored in 8 independent channels of the image and freely combined at any time.

5-D - The Time Dimension

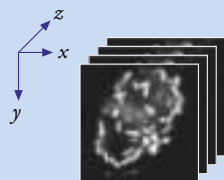
Documenting the dynamic processes of living specimens on “film” – the fifth dimension describes the recording of cells and tissues during a predefined period of time. Freely selectable in the intervals.

2D



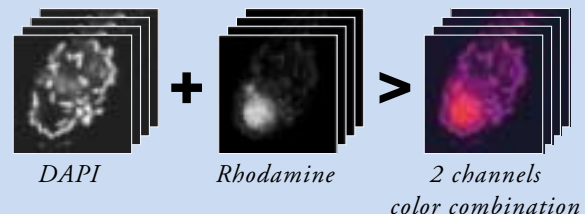
$x + y$

3D

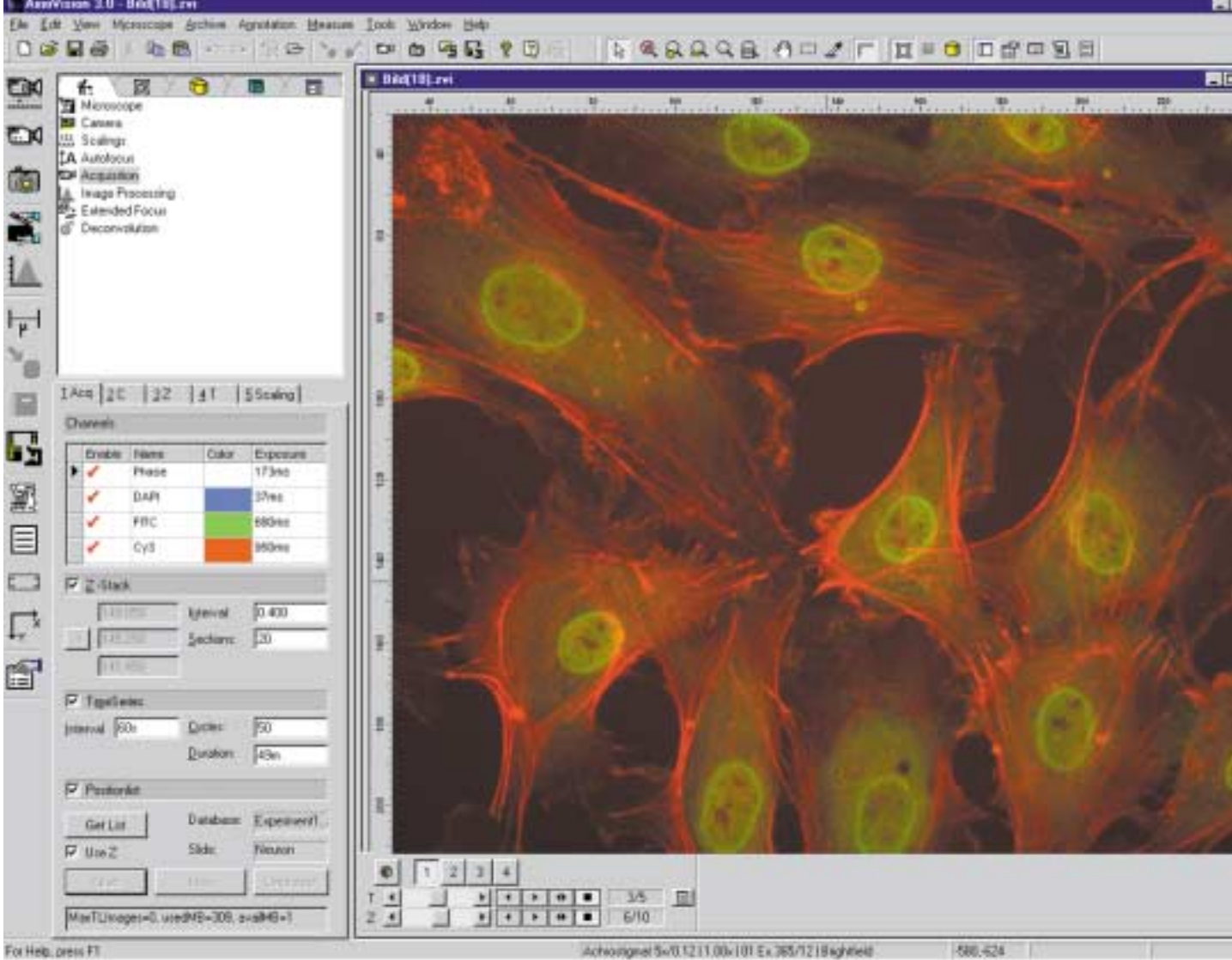


$x, y + z$

4D



$x, y, z + \lambda$



Intelligence enters the picture – AxioVision software to control 6-D imaging.

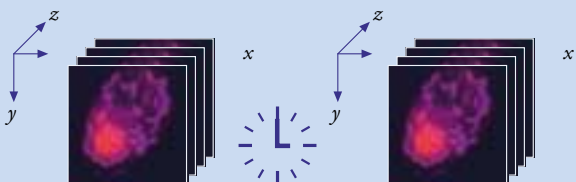
6-D - The Local Dimension

Observing more cells in parallel means fewer experiments. In the sixth dimension various positions are brought into focus on the culture plate – automatically controlled.

Free to Combine

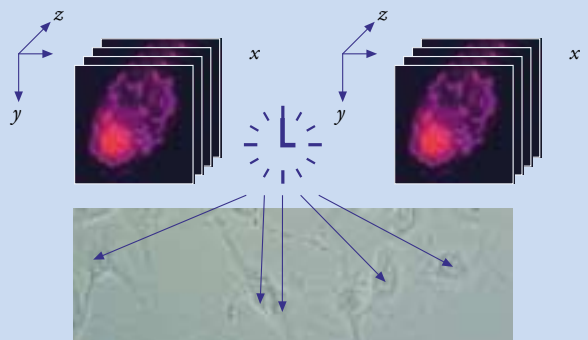
3-D over time, multichannel in different positions – all imaging dimensions can be freely combined with each other. Enabling you to select the combination that best fits your experimental conditions.

5D



x, y, z, λ + t

6D



x, y, z, λ, t + various positions

Focus on Perfect Teamwork

The Components

Superb Optics: The Microscopes

Manual or motorized: The high-end research microscopes from Carl Zeiss are setting worldwide standards in microscopy. With outstanding optics and fluorescence, enviable flexibility, countless ergonomic benefits and unique innovations such as Light Trap.

AxioCam: The Digital Camera

Perfect for all of your applications – the sensitive digital camera from Carl Zeiss gives you the full resolution capacity of our high-end microscopes scaleable up to 3900 by 3090 pixels in color. With high 14 bit dynamics per fluorescence channel. With amazing brilliance and the finest details. In color or black & white.

AxioVision: The Software

Time-saving, affordable, efficient. The intelligent software system solution from Carl Zeiss controls microscope, camera, light, xy stage, shutter and filter wheels. Easy and fast with the click of the mouse. Tailor-made for live cell imaging with all essential modules: *Multichannel* for the simultaneous recording of several wavelengths, *Z-stack* to generate image piles, *Time-lapse*,

Mark&Find for the automatic control of motorized xy stages, and finally *Autofocus* for 100% sharpness on all focal planes and in every position.

Zeiss Culture: The Peripherals

Defining and adjusting temperature, pH values, CO₂ content, culture fluid and the humidity of the air: harmonizing perfectly with the sensitive handling of living cells and tissues and perfectly integrated into the system – Carl Zeiss offers you a wide-ranging spectrum of xy stages, filter wheels, shutters, incubators, culture chambers and other components. The guarantee for consistently ideal conditions in petri dishes.

*Axiovert 200 plus Zeiss Incubator XL.
Tailored to the most diverse applications,
Cell Observer also offers a wide spectrum of
further cultivation systems.*





**Economically Sound:
The Modular System**

A system that is complete in itself and still expandable. With Cell Observer you can meet every one of the demands placed on your applications precisely and economically. Starting from digital imaging over time in phase contrast right up to real 6-D imaging. True freedom for your individual solutions begins with the inverted microscope Axiovert 200.

Available in either a manual or motorized version, ready for all important contrasting methods and for the entire spectrum of high-performance Carl Zeiss objectives. Freedom also in the selection of cell cultivation – from simple heating stages to Carl Zeiss culture chambers. And freedom with AxioVision software, that keeps you prepared for the future through its modular structure – regardless of what challenges confront you tomorrow.

**Always in Sight:
The Support**

Just as efficiency in research is becoming increasingly crucial, so is proximity becoming one of the most important factors for success. And we mean the proximity to your requirements, interests and wishes. But above all the proximity to you: being there on the spot when you need us in your laboratory. After all, every experiment that is interrupted costs time and money. At Carl Zeiss it has always been our philosophy to invest extensively in on-the-spot support – and we are continually expanding this support. Carl Zeiss has always believed in investing in areas most important to you: our instrumentation ... and our people.

Today support teams of superbly trained system and image analysis specialists are there to assist you worldwide. And after we have familiarized you with Cell Observer, we will continue to support you through a modular service package which has been put together precisely for your individual needs. Support combined with service: your best guarantee for continuing success in research.



The New Complete Solution at a Glance

Carl Zeiss Cell Observer

Perfect teamwork: Cell Observer is a combination of precisely matching high-performance components. They comprise a powerful homogeneous system capable of meeting the toughest demands.

Cell Observer: The Components

Components

→ **Carl Zeiss
Microscopes**

- > worldwide standards in high-end research microscopy
- > outstanding optics and brilliant fluorescence performance
- > superior flexibility, stability and ergonomics

→ **AxioCam**

- > highly sensitive Carl Zeiss digital camera – color or black & white
- > brilliance in every application
- > high-resolution of up to 3900 by 3090 pixels

→ **AxioVision**

- > efficient Carl Zeiss software solution
- > automatic control of microscope, camera and peripherals
- > intelligently constructed with “plug-in” module concept

→ **Cell
Cultivation**

- > precise regulation of temperature, CO₂ and humidity of the air
- > wide range of xy stages, incubators and culture chambers
- > guarantee for consistently ideal conditions for your cells or tissues

Cell Observer: The Applications

Applications

→ **Transmitted
Light**

- > observation over time
- > observation over time with interruptions and manipulation
- > observation over time with motorized xy stage
- > observation over time with z-stack

→ **Fluorescence**

- > observation over time in up to 8 channels (fluorescence or transmitted light)
- > observation over time in up to 8 channels with interruptions and manipulation
- > observation over time in up to 8 channels with motorized xy stage
- > observation over time in up to 8 channels with z-stack

**Carl Zeiss
Light Microscopy**

P.O.B. 4041
37030 Göttingen
GERMANY

Phone: ++49 551 5060660
Telefax: ++49 551 5060464
Internet: www.zeiss.de/micro
E-Mail: micro@zeiss.de

Subject to change.