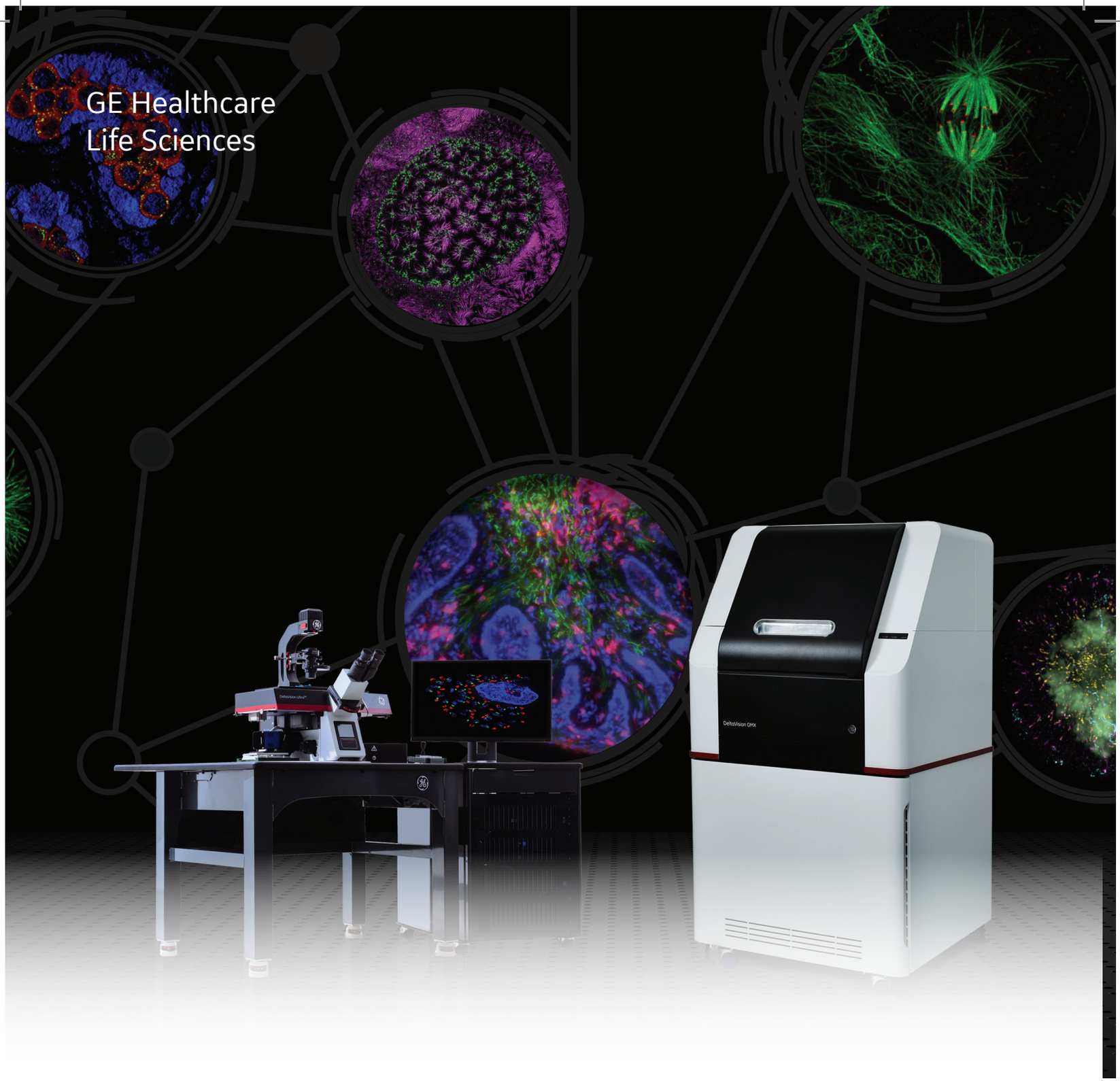
GE Healthcare
Life Sciences



Don't let your microscopy limit your biology

GE Healthcare offers high- and super-resolution microscopes with a range of optimized imaging capabilities that enable you to explore the limits of your biology and advance your research.

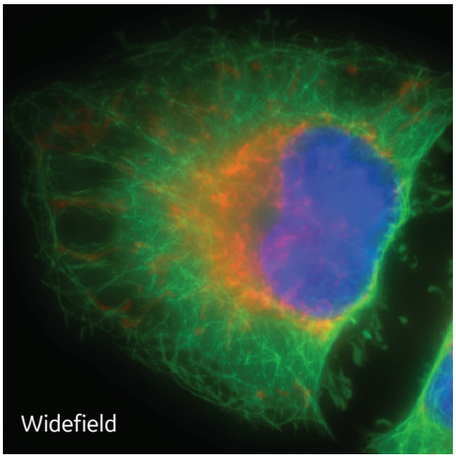
Choose the right microscope for your research

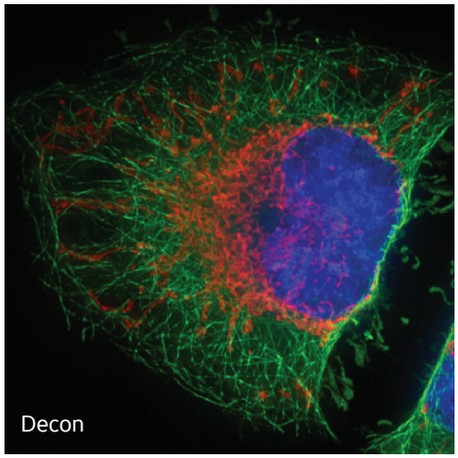
Advances in optical imaging over the past decade have offered new capabilities—and new choices—to researchers. With more imaging options available and increasing competition for funding, researchers must carefully evaluate their needs to make a sound investment. Let your research needs be your guide. Whether your imaging system will be used by a single lab or as part of a larger facility, there are four main factors you should consider.

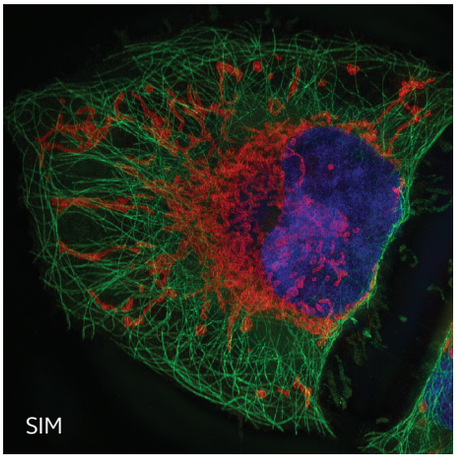
How small

Not all biological structures are the same size, and microscopes have limits to what they can resolve. What level of detail do you need to answer your biological question and achieve your research goals?

In widefield microscopy, the level of detail can be changed by simply changing your imaging objective–increasing magnification and numerical aperture will allow you to resolve smaller structures, down to about 250 nm. Deconvolution enhances image contrast, revealing previously unseen details. For structures smaller than 250 nm, super-resolution techniques such as Structured Illumination Microscopy (SIM) are required to distinguish the fine details, while localization techniques are excellent for visualizing structures smaller than 100 nm.





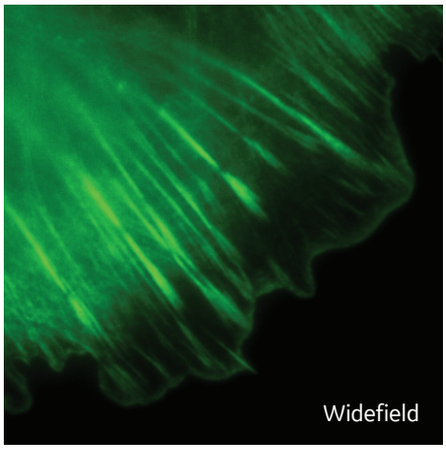


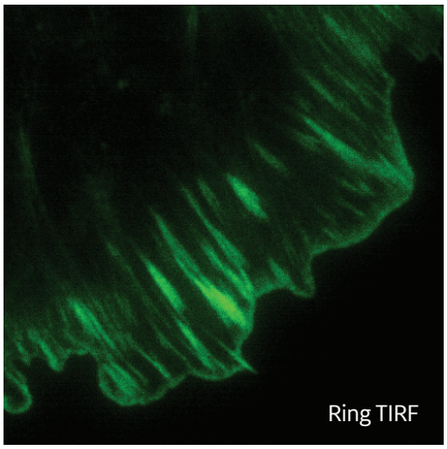
HeLa cells with DAPI (blue), Tubulin (green) and mitochondrial membrane (red).

How deep

Some biological processes occur at the surface of the cell, while other interactions are deep beneath the cell membrane layer. The thickness of your sample and depth of your structure of interest can be one of the most critical components of your experiment.

For shallow imaging (0-200 nm), total internal reflection fluorescence (TIRF) imaging is often used to visualize events at the coverslip. For imaging up to 50 µm beyond the coverslip, widefield fluorescence techniques including deconvolution and SIM are preferred.



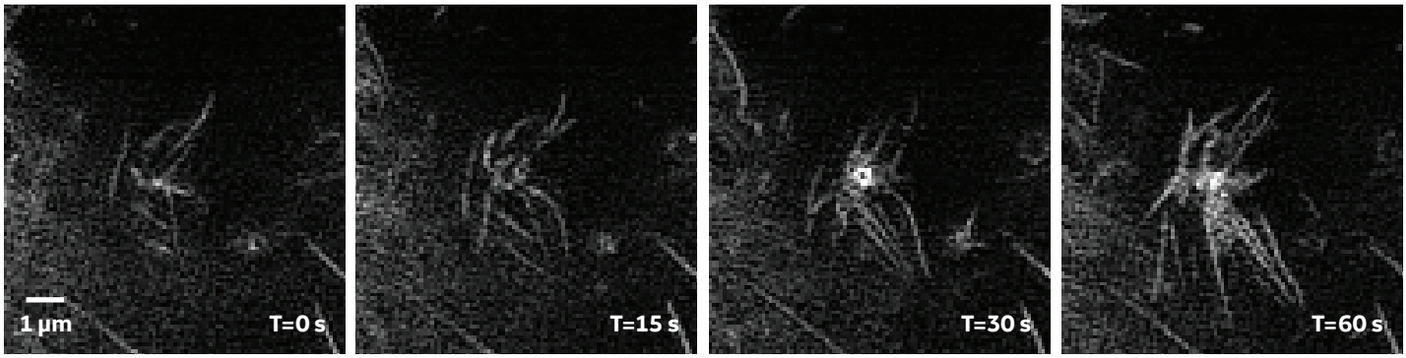


Actin in U2OS cells.

How fast

Fixed cell imaging can provide a lot of information about a biological structure or event. However, it may not provide complete information. Would live cell imaging augment your understanding of your biological system?

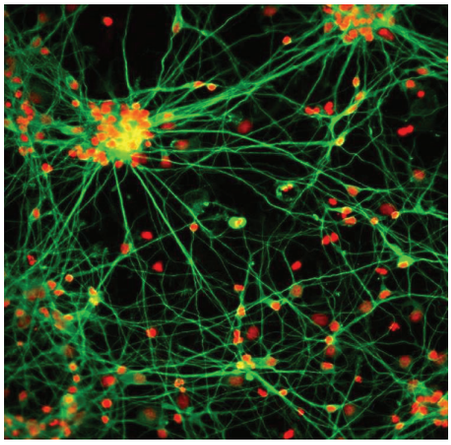
Live cell imaging allows you to visualize dynamic events as they occur. If your event of interest occurs in seconds or just a couple minutes, the speed of the microscope is a critical feature. If your event occurs more slowly, or you need to image over multiple cell cycles, advanced live cell support is required to maintain cell viability. Widefield and SIM techniques are very fast and can capture images rapidly. If 3D-SIM isn't fast enough, 2D-SIM and 2D-TIRF SIM can be an excellent compromise between speed and resolution.



2D TIRF-SIM of mCherry-LifeAct-Actin in HeLa cells.

How many

Are you studying events in a single cell or handful of cells, or are you interested in observing trends across a cell population? Most microscope systems can easily image single cells or tens of cells, but if you are studying cell populations or require a more statistically significant result, you may need to image and analyze hundreds, or even thousands of cells. If that is the case, you'll need a platform that is capable of imaging multi-well plates quickly and reliably, along with robust image analysis software.



Stem cell derived human neurons.

	DV Ultra	DV OMX
	Versatile automated widefield microscope	Compact super-resolution microscope
How small		
>250 nm	X	X
100–250 nm		X
30–100 nm		X
How deep		
0–200 nm from coverslip		X
0–50 µm from coverslip	X	X
How fast		
Fixed cells	X	X
Fast events in live cells	X	X
Long term	X	X
How many		
Single cells	X	X
Cell populations	X	

If you carefully consider these factors up front, you can more effectively answer your research questions by choosing the right tool for the job.

GE Healthcare microscopy innovation supports important advances in scientific discovery.

Scientists have been relying on DeltaVision™ systems since 1993 to deliver the quality imaging they need to advance their research. The results speak for themselves.

Key

- **Nobel Prize**
- Seminal Publication
- DeltaVision Product Launch
- DeltaVision OMX Product Launch

For references on seminal publications see page 8.

1993

DeltaVision predecessor, SA3, launched enabling deconvolution and live cell imaging.

1995

Yokota and colleagues publish in Journal of Cell Biology (JCB) on chromatin organization using deconvolution.

1997

Toczyski and Hartwell publish on cell cycle in Cell.

DeltaVision 3.1 launched enabling automated multi-point time-lapse experiments.

2000

Prober and Edgar publish their findings on Ras1 promoting cellular growth in *Drosophilain* Cell.

DeltaVision 3.5 launched enabling fast imaging of dynamic events.

2001

DeltaVision users Dr. Hartwell and Dr. Nurse win the Nobel Prize in Physiology or Medicine along with Dr. Hunt.

2002

DeltaVision Spectris launched with improved environmental control.

2003

Green and Kaplan publish that chromosome instability in colorectal cancer cells correlates to APC genotype using deconvolution microscopy and quantification.

2004

Xu and Blackburn publish on telomeres in JCB using deconvolution microscopy.

DeltaVision RT launched with TIRF and photokinetics enabling studies of membrane and cytoskeletal dynamics in live cells.

2005

Tanaka and Tanaka publish on molecular mechanism of kinetochore capture in Nature using time-lapse deconvolution.

2006

Meyer and Young publish on circadian clock in Science using FRET.

2007

DeltaVision Core launched enabling ultra fast ~~ultra-fast~~ multi-channel imaging.

DeltaVision Personal launched making advanced imaging affordable for individual labs

Super resolution Optical Microscope X (OMX) technology licensed from UCSF.

2008

DeltaVision OMX V2 launched introducing 3D-SIM capabilities to the research community.

2009

DeltaVision user Dr. Blackburn is awarded the Nobel Prize along with Dr. Greider and Dr. Szostak.

DeltaVision OMX V3 launched with the first commercial implementation of 3D-SIM.

2011

DeltaVision users Drs. Rothman, Scheckman and Sudhof win the Nobel Prize in Physiology or Medicine.

DeltaVision Elite launched making optimized imaging easier with a revolutionary automated optical path.

DeltaVision OMX V4 launched making live cell 3D-SIM imaging accessible to biologists.

2014

Das and Storey publish on embryonic development in Science using time-apse imaging of tissue slices on DeltaVision and SIM on DeltaVision OMX.

DeltaVision Localization Microscopy on OMX enabled scientists to address colocalization, structural, and particle tracking questions at higher resolution.

2015

DeltaVision OMX SR launched with multiple imaging modalities (2D-SIM, 3D-SIM, TIRF-SIM) available with a simple software selection.

TIRF-SIM enabled scientists to see structures previously only observed in EM and enabled single molecule tracking of cytoskeletal dynamics.

2016

DeltaVision user Dr. Ohsumi wins the Nobel Prize in Physiology or Medicine.

2017

DeltaVision users Drs. Rosbash and Young win the Nobel Prize in Physiology or Medicine.

DeltaVision Ultra launches with improved user experience that grows with your research needs.

Over 10,000 DeltaVision and DeltaVision OMX papers are published!

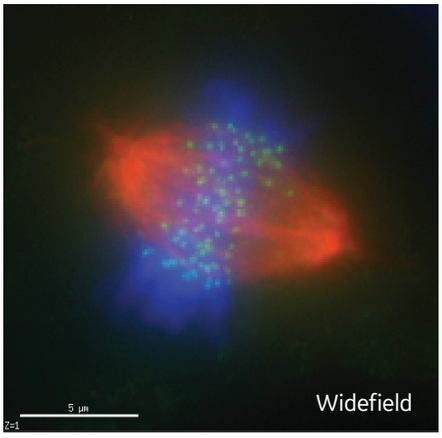
GE Healthcare continues to lead with versatile and easy-to-use microscopy solutions that deliver data that makes the difference.

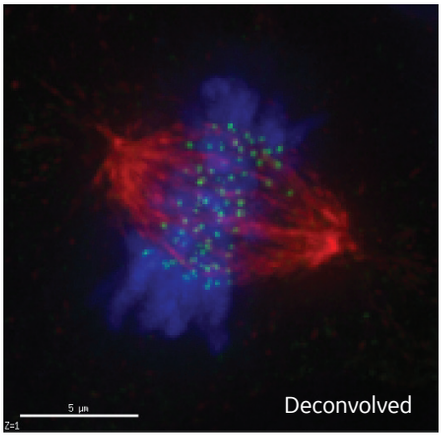
DeltaVision Ultra

Designed to deliver quality data in an easy-to-use and versatile system, DeltaVision Ultra is an automated widefield microscope that builds on a legacy of excellent image quality, incorporating advanced support that allows you to focus on discovery while maintaining simple design and workflow. Even novice users can achieve expert results!

Data that makes a difference

See structures that matter. Enhance data quality with DeltaVision Ultra's exclusive deconvolution method to boost contrast and resolution without sacrificing quantitation. Reveal previously unseen details and advance your research one question at a time.





Be flexible

As your research evolves, so do your research needs. DeltaVision Ultra has the capacity to handle most imaging applications, including time-lapse live cell imaging, multi-point cell tracking, multi-well plate scanning, and more. Go further with a single instrument that supports your changing research needs.

Move quickly

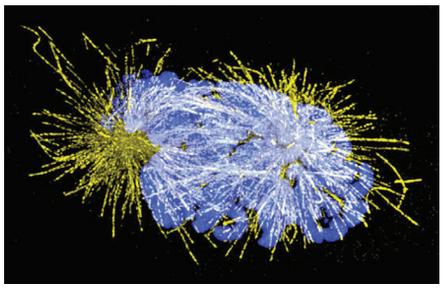
DeltaVision Ultra's user-friendly software requires minimal training and simplifies tasks, so your time is spent on your research. With smart experiment setup, the acquisition protocol is defined as the user explores the sample. Simple workflows mean that even novice users are empowered to collect quality data and execute complex experiments.

DeltaVision OMX SR

Designed for biologists who want to look beyond the resolution limit, DeltaVision OMX SR is a compact super-resolution microscope system optimized to deliver the power of structured illumination microscopy (SIM) combined with a stable live-cell imaging platform. Super-resolution doesn't need to be complicated, simply accessible.

Easy adoption

SIM is a super-resolution technique that doesn't require reinventing your sample preparation like many others do. With the DeltaVision OMX SR and the various SIM imaging options, you can use your existing samples to acquire outstanding super-resolution images and answer questions about your smallest, dimmest, and even live biology. Without the need to make major changes in your sample preparation you can be confident that your results are physiologically relevant from day one.

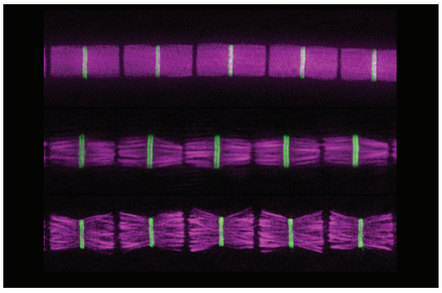


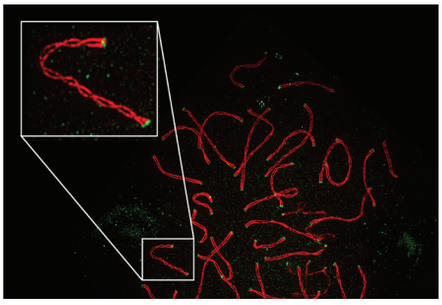
Dependability

A microscope is only as great as it is reliable. Time after time, DeltaVision OMX has delivered reliable results to help answer researchers' most complex questions. With minimal maintenance requirements and full training and post-installation support, you can be confident that the DeltaVision OMX SR will deliver for you, as well.

Versatility

The extensive imaging capabilities offered by the DeltaVision OMX SR make it the ideal choice to support a wide range of research projects. In addition to 3D-, 2D- and TIRF-SIM super-resolution imaging, the DeltaVision OMX SR offers widefield imaging, deconvolution, Ring-TIRF, photokinetic capabilities and a localization microscopy option. Switch between imaging modes with the click of a button–no hardware adjustment or alignment required. See beyond the diffraction limit using the microscopy application of your choice!





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