

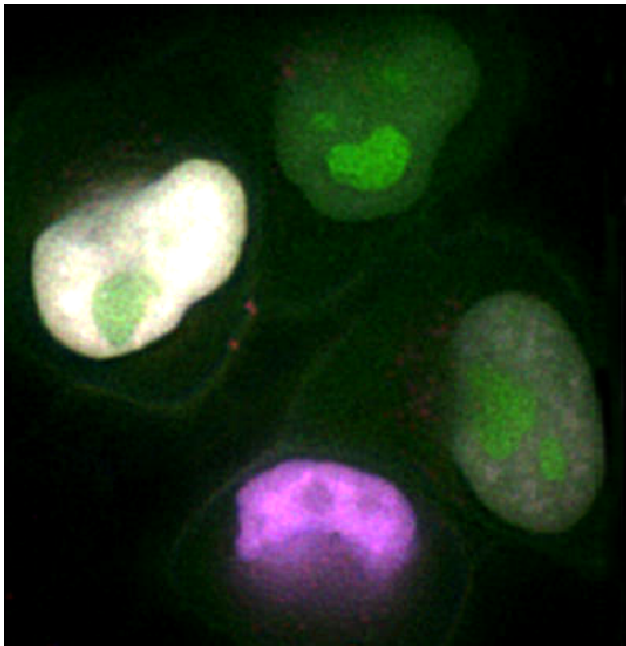
DeltaVision®

Faster Color Switching and Live-Cell Filter Sets

INTRODUCTION

The DeltaVision filtering system has been significantly enhanced to better support advanced live cell imaging:

- Color switching is three times faster than previous versions
- A simple user exchangeable filter-wheel system combined with a full selection of optimized filter sets enables users fast flexibility for a variety of experiments
- A new filter design further reduces phototoxicity



A multicolor image in a FRET experiment

FAST COLOR SWITCHING

Acquiring data from multiple colors (channels) in live samples poses special problems, especially for rapidly moving objects that require minimal time intervals between images. Images must be acquired at very short, frequent time intervals to ensure that the images have accurate image registration and color registration.

Image registration

Image registration is the position of an object in 3D space at any given time. To accurately represent object positions, time-lapse experiments must acquire multiple images with short time intervals between time points. Multiple-color images require longer time intervals between time points than single color images because they require more exposures and additional time to switch colors (e.g., imaging three colors increases the minimum time interval between time points by a factor of three).

Color registration

Color registration is the relative position of colors in X, Y, and Z space. If the time interval between images is too long, the relative positions of the channels at each time point may be incorrect.

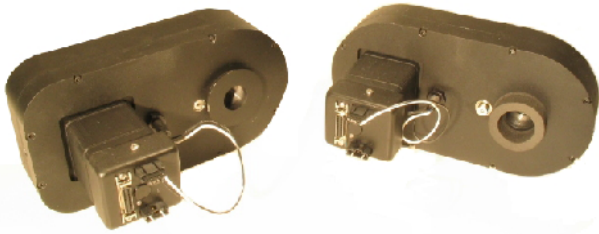
The DeltaVision filter system is specifically designed to enable fast color switching. The user-exchangeable filter wheels and the software that controls them are optimized to rapidly switch filters to minimize the time interval between each acquisition. Fast color switching significantly improves both image registration and color registration for images of live specimens.

CUSTOM LIVE-CELL FILTER SETS

Collecting data in a lab with multiple users often requires a system that is capable of dealing with a wide range of filters, probes, and other experimental conditions. The DeltaVision system includes a variety of filters and allows users to easily add their own custom filters to the system.

Filter Modules

DeltaVision RT includes two sets of filter modules. Each set includes a 10-position excitation module, a 6-position emission module, and a 5-position eyepiece module. These filter modules can be easily changed to meet filtering requirements.



These Excitation and Emission modules are part of a filter module set (the eyepiece filter wheel is not shown)

One set of modules contains the standard DeltaVision RT filter set, as shown below.

DeltaVision Standard Filter Sets

FilterName	Excitation CWL/BP	Emission/Eyepiece CWL/BP
DAPI	360/40	457/40
FITC	490/20	526/38
RD-TR-Cy3®	555/28	617/63
Cy5®	640/20	*685/40

*Emission filter only

The other set of modules includes four of the most common sets of filters used for live cell imaging, as follows.

DeltaVision Live Cell Filter Sets

FilterName	Excitation CWL/BP	Emission/Eyepiece CWL/BP
CFP	436/10	465/30
YFP	492/18	535/30
dsRED	580/20	630/60
EGFP	470/40	525/50

User-Exchangeable Filter Sets

Users can add custom filter sets to the system. Filter modules can be purchased and easily configured with user supplied filter sets to create any filter combination.



Filter modules can be customized for any filter configuration

Low Phototoxicity Filters

Phototoxicity is a major limiting factor in live cell imaging. The free radicals resulting from the excitation of fluorescent molecules and the heat generated by the interaction of cells with light kills cells.

Live cell filters provided by DeltaVision are specially designed to reduce cell phototoxicity. Preliminary studies indicate that using DeltaVision filters can extend cell viability by up to 40%.