

# BioTracker™ NucView® 405 Blue Caspase-3 Dye (DMSO)

Live Cell Dye

Cat. # SCT102

pack size: 100µL

FOR RESEARCH USE ONLY.  
NOT FOR USE IN DIAGNOSTIC PROCEDURES.  
NOT FOR HUMAN OR ANIMAL CONSUMPTION.

Store at 2-8°C



Data Sheet

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## Background

Caspases are a family of protease enzymes that play essential roles in programmed cell death, termed apoptosis. Caspase-3 is a caspase protein that interacts with caspase-8 and caspase-9 and sequential activation of plays a central role in the execution-phase of cellular apoptosis.

The BioTracker™ NucView® 405 Blue Caspase-3 Dye provides a convenient live cell tool for profiling apoptotic cell populations based on caspase-3/7 activity using either fluorescence microscopy or flow cytometry. In contrast to other fluorogenic caspase substrates or fluorescent caspase inhibitor based (FLICA) assays, the BioTracker™ NucView® 405 Caspase-3 Dye can be used to detect caspase-3/7 activity within individual intact cells without inhibiting apoptosis progression. The substrate consists of a fluorogenic DNA dye coupled to the caspase-3/7 DEVD recognition sequence. The substrate, which is initially non-fluorescent, penetrates the plasma membrane and enters the cytoplasm. In apoptotic cells, caspase-3/7 cleaves the substrate, releasing the high-affinity DNA dye, which migrates to the cell nucleus and stains DNA with bright blue fluorescence. Thus, NucView® 405 Caspase-3 Substrate is bifunctional, allowing detection of caspase-3/7 activity and visualization of morphological changes in the nucleus during apoptosis. The dye is formaldehyde-fixable and compatible with subsequent immunostaining. The dye is offered in DMSO and PBS (phosphate-buffered saline) formulations. The substrate in PBS is formulated for use in cells that are sensitive to DMSO toxicity.

NucView® 405 dye is excited by the 405nm laser line for detection by confocal microscopy in the DAPI channel, or by flow cytometry in the Pacific Blue® channel. NucView® 405 is ideal for caspase-3 detection in multi-color applications for researchers who wish to reserve the green fluorescence channel for other detection reagents.

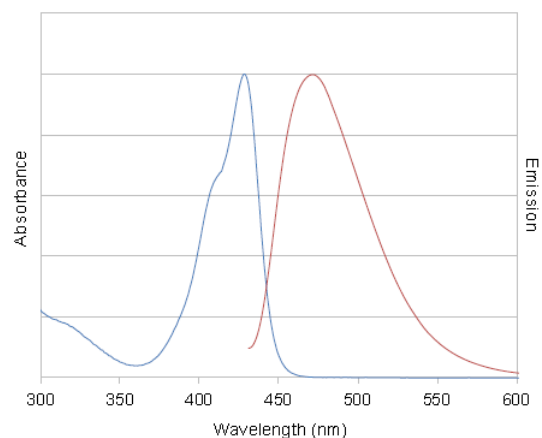
## Storage

Store BioTracker™ NucView® 405 Blue Caspase-3 Dye, 1mM in DMSO at 2-8°C. Protect From Light.

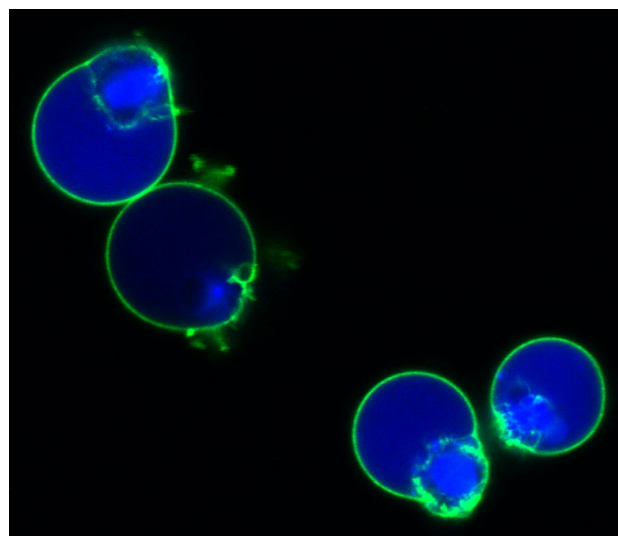
*Note: Centrifuge vial briefly to collect contents at bottom of vial before opening.*

## Spectral Properties

Absorbance: 429nm  
Emission: 469nm



**Figure 1.** Excitation and emission spectra of enzymatically-cleaved BioTracker™ NucView® 405 Blue Caspase-3 Dye in the presence of dsDNA.



**Figure 2.** Apoptotic Jurkat cells stained with BioTracker™ NucView® 405 Blue Caspase-3 Dye and CF™488 Annexin V (Green).

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## Assay Protocol

Cell density and dye concentration may require optimization. Optimal dye concentration may vary between 1-10  $\mu\text{M}$ . Cells can be incubated with substrate in culture medium, PBS, or other buffer of your choice. For adherent cells, we recommend removing medium and replacing with fresh medium containing substrate because high background can result in the area where concentrated substrate is added to the well. Media change or washing after incubation with dye is optional.

### Flow Cytometry

1. Induce apoptosis by desired methods. Remember to include an untreated cell sample as a control.
2. For adherent cells, detach cells from culture substrate using trypsin or another cell dissociation method prior to performing the NucView® 405 caspase-3 assay.
3. Resuspend cells at a density of  $10^6$  cells/mL in medium or buffer.
4. Pipette 0.2mL cell suspension into a flow cytometry test tube.
5. Add 1 $\mu\text{L}$  of 1mM substrate solution to 200 $\mu\text{L}$  cells and immediately mix for a final substrate concentration of 5 $\mu\text{M}$ . Optimal substrate concentration may vary.
6. Incubate cells at room temperature for 15-30 minutes, protected from light.
7. Add 300 $\mu\text{L}$  medium or PBS to each tube and analyze by flow cytometry. Measure fluorescence in the blue detection channel (excitation/emission: 429/469nm).

### Fluorescence Microscopy

1. Induce apoptosis by desired methods. Remember to include an untreated cell sample as a control.
2. Replace medium with fresh medium or PBS containing 5 $\mu\text{M}$  NucView® 405 substrate stock solution.
3. Incubate cells with substrate at room temperature for 30 minutes or longer.
4. Cells can be observed directly in medium containing substrate. For endpoint analysis, wash cells with PBS and observe cells by fluorescence microscopy in PBS using filter sets for blue fluorescence (excitation/emission: 429/469nm).

### Fluorescent Plate Reader

1. Grow adherent cells in a black 96-well plate; for suspension cells, adjust density to  $10^6$  cells/mL and pipette 0.2mL cell suspension into each well.
2. Induce apoptosis in cells by desired methods. Remember to include an untreated cell sample as a control. Note: cells may be treated in tubes or flasks and then aliquoted into plate wells for assay.
3. For suspension cells, add substrate directly to wells and mix well. For adherent cells, replace medium with fresh medium or PBS containing 5 $\mu\text{M}$  NucView® 405 substrate.
4. Incubate cells at room temperature for 15-30 minutes, protected from light.
5. For suspension cells, gently shake plate to resuspend cells. Read fluorescence on a plate reader at settings close to 429nm excitation and 469nm emission cut-off. Bottom read is recommended for adherent cells. Inaccurate readings may result from variability in density of adherent cells.

### Notes

a. NucView® 405 staining is formaldehyde-fixable. NucView® 405 staining is not compatible with methanol fixation. Fixed cells can be permeabilized with 0.1% Triton™ X-100, however, staining brightness may be diminished after permeabilization and washing.

## Frequently Asked Questions

1. **Q. When do I add the dye to my cells? How stable is the dye? How long can I monitor the dye under the microscope?**  
A. The dye can be added anytime during the experiment. It does not affect apoptosis progression. The dye is very stable and can be view for up to 4-5 days in real-time experiments.
2. **Q. Can the dye be used on tissues or fixed cells? What cell types have been validated with the dye?**  
A. Yes. We recommend fixation with 2-4% paraformaldehyde for 10-15 minutes at room temperature. Over-fixing can cause the signal to decrease. The dye can withstand permeabilization with 0.1% Triton X-100, although signal intensity may be diminished after permeabilization and washing. Methanol fixation is not recommended. The dye works in a wide variety of primary cells and immortalized cell lines in the published scientific literature.