BioTracker™ Si-DMA Singlet oxygen Live Cell Dye

Live Cell Dye

Cat. # SCT063

pack size: 1 mg

Store at -20ºC

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

Data Sheet

Background

Singlet oxygen ($^1O_2$) is one of the reactive oxygen species (ROS). Singlet oxygen is known to be a cause of spots and wrinkles of the skin due to its very strong oxidizing potential. However, the reactivity of singlet oxygen, if controlled, can be used for therapy. In the field of cancer research and therapy, singlet oxygen is being used for photodynamic therapy (PDT), an emerging anticancer treatment using photoirradiation and photosensitizers.

BioTracker Si-DMA Singlet Oxygen Live Cell Dye is a novel far-red fluorescence probe that is composed of silicon-containing rhodamine and anthracene moieties as a chromophore and a singlet oxygen reactive site, respectively. In the presence of singlet oxygen, fluorescence of BioTracker Si-DMA live cell dye increases 17 times due to endoperoxide formation at the anthracene moiety. The dye is highly selective to singlet oxygen, among seven different reactive oxygen species ($^1O_2$, O_2^-, H_2O_2, $HOCL^-$, RCO^-, OH^-, NO). Among three different intracellular photosensitizers, BioTracker Si-DMA selectively detects the $^1O_2$ that is generated by 5-aminolevulinic acid-derived protoporphyrin IX, localized in mitochondria.

Storage

Store BioTracker™ Si-DMA Singlet oxygen Live Cell Dye at -20°C, desiccate and protect from light

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

Spectral Properties

Absorbance: 640 nm
Emission: 670 nm

Quality Control

Purity: ≥ 98% confirmed by HNMR, LC-MS and HPLC and elemental analysis. Molar Mass: 561.48 g/mol.

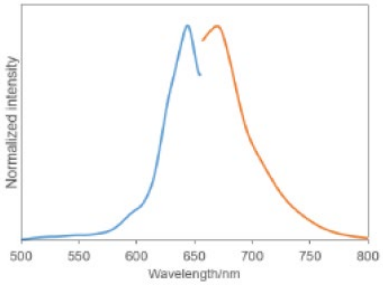

Figure 1: Excitation and emission spectra of Si-DMA after reaction with singlet oxygen.

Protocol

Reagent Preparation

1. Before opening the vial, spin down the solid to the bottom by a microcentrifuge or by a desktop centrifuge.
2. Warm the vial to the room temperature and add 1.8 ml of DMSO to 1 mg of S-DMA to make a 1000 µmol/l stock solution (freeze aliquots at -20°C).
3. Dilute the Si-DMA DMSO stock solution with Hanks' HEPES buffer to prepare 25-100 nmol/l Si-DMA working solution.

Note: The recommended concentration of Si-DMA working solution for use is 25-100 nmol/l. Once the final concentration of Si-DMA becomes more than 1 µmol/l, Si-DMA may be accumulated to organelle. In addition, the final concentration of Si-DMA becomes more than 5 µmol/l, cytotoxicity may be seen.

4. Prepare cells for the assay. Discard the culture medium and wash the cells with Hanks' HEPES buffer twice.
6. Add an appropriate volume of Si-DMA working solution.
7. Incubate for 45 minutes at 37° C.
8. Discard the supernatant and wash the cells with Hanks' HEPES buffer twice.
9. Add Hanks' HEPES buffer and observe the cells under a fluorescence microscope.

Note: Optimal concertation must be determined by end user.

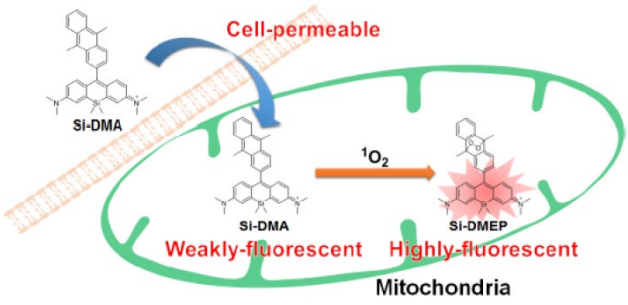

Figure 2. Cell staining mechanism by Si-DMA.

References

Kim S. et al. *Far-Red Fluorescence Probe for Monitoring Singlet Oxygen during Photodyanamic Therapy.* J. Am. Chem. Soc., 2014, 136 (33), 11707-11715.

Rev.1.0/2019-07-11/SCT063MD

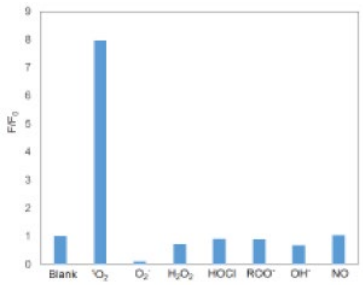

Figure 3. Selectivity of Si-DMA towards various ROS. Si-DMA can selectively detect the singlet oxygen among seven different ROS.