

Data Sheet

BioTracker™ fVF2 Voltage Sensitive Dye

Live Cell Dye

Cat. # SCT074**pack size: 1 mg**FOR RESEARCH USE ONLY
NOT FOR USE IN DIAGNOSTIC PROCEDURES
NOT FOR HUMAN OR ANIMAL CONSUMPTION

Store at: -20°C

Background

The gold standard for measuring membrane voltage (V_m) and action potentials (APs) in live cells is electrophysiology: which is highly invasive, low-throughput, and difficult to interpret. Optical recording of the membrane potential using voltage-sensitive fluorescent indicators provides an attractive alternative to probing V_m and AP dynamics in multiple cells, in monolayers, or three-dimensional tissue.

BioTracker™ fVF2 Voltage Sensitive Dye readily detects fast changes in membrane potential in mammalian neurons and cardiomyocytes. The BioTracker dye combines a xanthene-based dye as a fluorescent reporter and a conjugated molecular wire that localizes the indicator to the cell membrane and facilitates photo-induced electron transfer (PeT) from an electron-rich aniline donor to the fluorophore within the low-dielectric environment of the lipid bilayer. The BioTracker dye displays a substantially reduced phototoxicity in cardiomyocytes relative to that of VF2.1.Cl, allowing for prolonged, continuous measurement of cardiomyocyte activity. The dye also exhibits adequate sensitivity and excellent brightness in cells for reporting AP waveforms in neurons and cardiomyocytes with high SNRs.

Source

SCT074 does not contain genetically modified organisms.

Spectral Properties

Absorption wavelength (max): 520 nm; Emission wavelength (max): 535 nm.

Quality Control Testing

Purity: $\geq 95\%$ confirmed by HPLC, HNMR, LC-MS and elemental analysis. Molar Mass: 777.69 g/mol

Storage and Handling

Store BioTracker™ fVF-2 voltage Sensitive Dye at -20°C, desiccate and protect from light.

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

Presentation

Lyophilized. Red color solid.

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Protocols

Preparing BioTracker™ fVF-2 Voltage Sensitive Dye stock solution

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. Add 500 µl of DMSO to 1 mg of the BioTracker™ probe to make a 2.57 mM stock solution (freeze aliquots at -20°C).
3. Aliquote and store stock solution stored at -20°C or below for longer storage.
4. To prepare the working concentration of fVF-2 probe, dilute the BioTracker™ probe with HBSS solution containing 0.10% (w/w) SDS.

Cell Culture, Staining and Imaging

5. HEK293T cells were passaged and plated onto 12 mm glass coverslips coated with Poly-D-Lysine (PDL; 1 mg/ml; Sigma-Aldrich) to a confluency of ~15% and 50% for electrophysiology and imaging experiments, respectively.
6. HEK293T cells were incubated with a HBSS solution containing SCT074 probe (500 nM) at 37°C for 20 min prior to transfer to fresh HBSS (no probe) for imaging.
7. For fluorescence images, the excitation light was delivered from a LED at 475/34 (bandpass) nm and emission was collected with an emission filter at 540/50 nm after passing through a dichroic mirror.

Note: Optimal concentration must be determined by end user.

References

Bogges S.C., et al. *New Molecular Scaffolds for Fluorescent Voltage Indicators*. ACS Chem. Biol. 2019, 14, 390-396.

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