Data Sheet

BioTracker™ QUMA-1 RNA G-Quadruplex Live Cell Dye

Live Cell Probe

SCT056

Pack Size: 1 mg

Store at −20 °C

FOR RESEARCH USE ONLY

Not for use in diagnostic procedures. Not for human or animal consumption.

Background

RNA G-quadruplexes are formed by self-assembly of guanine-rich RNA into stacked G-quartets. This can occur in protein-coding (mRNA) as well as non-coding (ncRNA) transcripts. There is growing evidence that RNA G-quadruplexes are involved in diverse biological functions: telomere elongation, DNA recombination, transcription, RNA post-transcriptional mechanisms. Moreover, aberrations of RNA G-quadruplexes have been linked to several diseases in humans.

BioTracker™ QUMA-1 RNA G-quadruplex Live Cell Dye (QUMA-1) is a red-emitting fluorescent probe that can be used to study dynamics (folding and unfolding) and movements of RNA G-quadruplexes. QUMA-1 is a reversible dye that emits red-fluorescence upon binding to G-quadruplexes and turns off upon unfolding. QUMA-1 is highly specific for RNA G-quadruplexes and does not bind to DNA, double-stranded RNA, single-stranded RNA or other RNA structures. QUMA-1 expands the potential for the study of RNA-protein interactions.

Source

The BioTracker™ QUMA-1 RNA G-Quadruplex Live Cell Dye (SCT056) does not contain genetically modified organisms.

Spectral Properties

Excitation max: 615 nm

Emission max: 720 nm

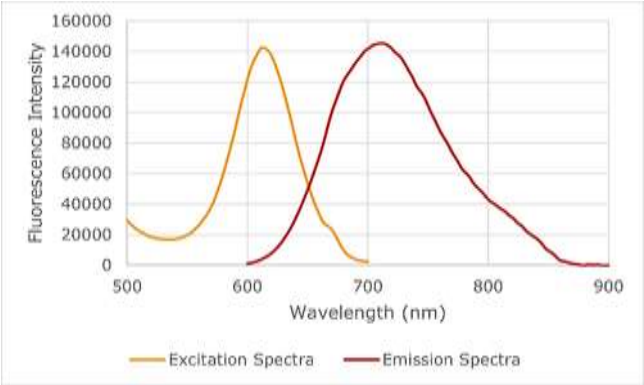

Figure 1. Probe excitation and emission data. 7 µL of probe at stock concentration (10 mM) was diluted in 1 mL of DMSO before undergoing excitation and emission scans. Spectral scans were conducted using a PerkinElmer FL8500 Fluorescence Spectrophotometer.

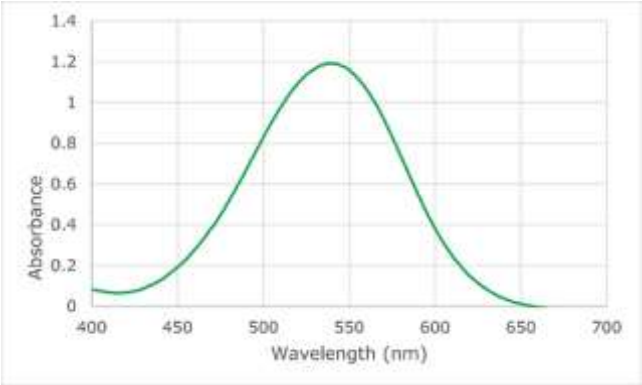

Figure 2. Probe absorbance data. 7 µL of probe at stock concentration (10 mM) was diluted in 1 mL of DMSO before undergoing an absorbance scan. Spectral scans were conducted using a PerkinElmer FL8500 Fluorescence Spectrophotometer

Quality Control Testing

Purity: ≥ 98% confirmed by HNMR, LC-MS and HPLC and elemental analysis.

Molar Mass: 628.17 g/mL

Storage and Handling

Store BioTracker™ QUMA-1 RNA G-quadruplex Live Cell Dye at −20 °C, desiccated and protected from light.

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

Presentation

Lyophilized

Representative Data

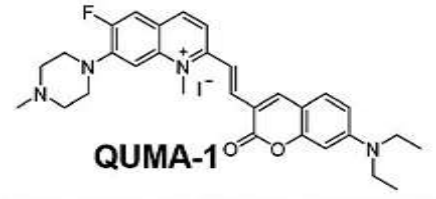

Figure 3. Structure of BioTracker™ QUMA-1.

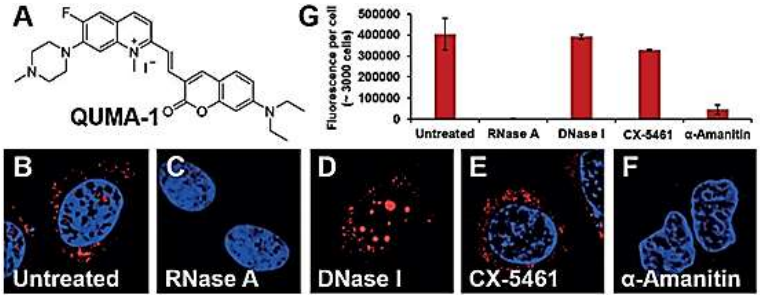

Figure 4. (**A**) Structure of QUMA-1. (**B**) Fixed cells stained with QUMA-1. (**C**) Complete loss of QUMA-1 fluorescence after RNase A treatment. (**D**) QUMA-1 fluorescence remains after DNase I treatment. (**E**) QUMA-1 fluorescence remains in the cytoplasm but not in the nucleus after CX-5461 treatment. (**F**) Loss of cytoplasmic QUMA-1 fluorescence after α-amanitin treatment. (**G**) Quantification of the QUMA-1 fluorescence intensity for (**B–F**). For each sample, approximately 3000 cells were measured, and the standard error was calculated from a set of three replicate experiments.

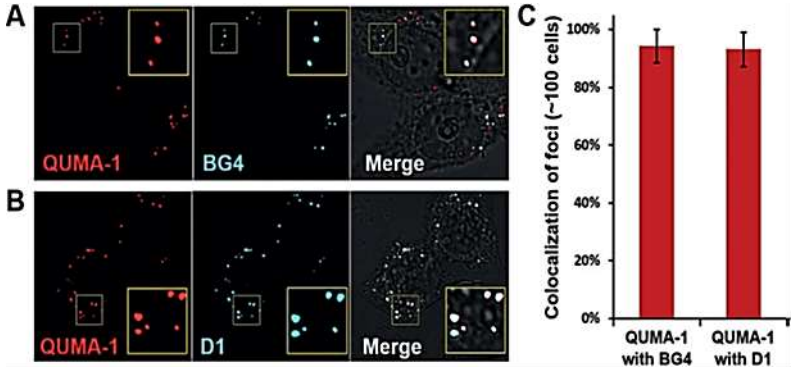

Figure 5. Colocalization of QUMA-1 with G-quadruplex specific antibodies. (**A**) Fixed cells stained with QUMA-1 (red) and specific G-quadruplex antibody BG4 (cyan) after DNase I treatment. (**B**) Fixed cells stained with QUMA-1 (red) and specific G-quadruplex antibody D1 (cyan) after DNase I treatment. (**C**) Quantification of QUMA-1 foci inside specific G-quadruplex antibody foci. Enlarged image in the yellow box shows the colocalized foci. For each sample, approximately 100 cells were measured, and the standard error was calculated from a set of three replicate experiments.

Protocols

Reagent Preparation for Live Cell Imaging

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 DMSO to make a 2000X stock solution of 1 mM (freeze aliquots at −20 °C).
3. Dilute in cell culture media at a final concentration of 0.5-1 μM and add to cells in culture. Incubate at 37 °C for 3 hours.

   Note: Optimal concentration must be determined by end user.

References

1. Chen X, Chen S, Dai J, Yuan J, Ou T, Huang Z, Tan J. 2018. Tracking the Dynamic Folding and Unfolding of RNA G-Quadruplexes in Live Cells. Angewandte Chem ie. 130(17):4792–4796.

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