TO1-3PEG-Biotin Fluorophore

Cat. No. G7955

Store at -20°C. Protect from light.

Product Description

RNA Mango technology is based on the specific binding of the RNA Mango Aptamer and a Thizole Orange (TO) bi-functional dye. Features of this technology are the tight binding between the dye and aptamer (KD ≈ 3nM), and the strong ~1000X enhancement of the dye's fluorescence when bound to the Mango apatmer (Fluorescent enhancement FE=1,100). The TO dye has a number of other desirable properties including:

- small size
- lack of toxicity
- plasma and nuclear membrane permeability
- short intracellular half-life
- the accessibility of a broad wavelength range simply via substitutions and alterations to the TO structure

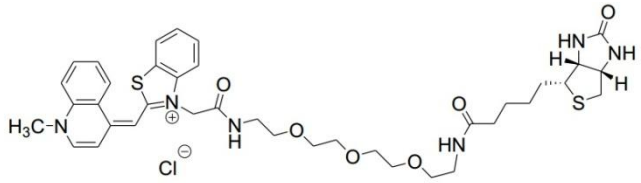
TO1-biotin is the standard variety of TO dye for *in vitro* and *in vivo* RNA Mango and RNA Peach experiments.

Cat. No.	Product	Quantity
G7955	TO1-3PEG-Biotin Fluorophore	250 µM (100 µl)

Applications

Application	Recommended Final Concentration of RNA Mango Dye
In Vitro Fluorescence Assays	100 nM – 200 nM
In Vivo Cellular Imaging	100 nM – 200 nM
In Vitro Transcription (IVT) and RNA Purification	50 nM – 200 nM
FRET Assay	50 nM – 500 nM

Product Specifications

Structure	
Molecular Mass	749.3150
Formula	$C_{38}H_{49}N_6O_6S_2+$
Purity	>95% (by HPLC)
Form	Liquid, in DMF
Solubility	DMF, DMSO, 10% Acetonitrile or MeOH-CH_2-Cl_2
Shelf Life	Three (3) months from receipt.
General Notes	Do not store in water. May break down in water.

Properties of the Fluorophore-Aptamer Complex

Quantum Yield for the Mango I Complex	Φbound = 0.14
Binding Affinity to Mango I Aptamer	3 nM (KCL required)
Fluorescent Enhancement when Bound to Mango I Aptamer	~1000
Extinction Coefficient when Bound to Mango I Aptamer	ε_{510} = 77,500 $M^{-1}cm^{-1}$
Brightness when Bound to Mango I Aptamer	B_{535} = 11,000 $M^{-1}cm^{-1}$

Patent

US11434490B2

References

1. Dolgosheina, E.V., and Unrau, P.J. (2016). Fluorophore-binding RNA aptamers and their applications: Fluorophore-binding RNA aptamers. Wiley Interdiscip. Rev. RNA. **2.** Jeng, S.C.Y., et al. (2016). Fluorophore ligand binding and complex stabilization of the RNA Mango and RNA Spinach aptamers. RNA 22, 1884–1892. **3.** Trachman III, R.J., et al. (2017). Structural basis for high-affinity fluorophore binding and activation by RNA Mango. Nat. Chem. Biol.13(7): 807-813. **4.** Autour, A., et al. (2018). Fluorogenic RNA Mango aptamers for imaging small non-coding RNAs in mammalian cells. Nat Commun 9, 656. **5.** Cawte, A.D., et al. (2020). Live cell imaging of single RNA molecules with fluorogenic Mango II arrays. Nat Commun 11, 1283. **6.** Kong, Kristen Y.S., et al. (2021). RNA Peach and Mango: Orthogonal two-color fluorogenic aptamers distinguish nearly identical ligands. RNA (New York, N.Y.), vol. 27,5 604–615.

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