

Product Data Sheet

Product Name: trans-AzoTAB

Cat. No.: GC79078

Chemical Properties

Cas. No. 1109241-72-6

Formula $C_{19}H_{26}BrN_3O_2$ M.Wt 408.33

Solubility DMSO: 50 mg/mL (122.45 mM; Need Storage ultrasonic) Store at -20°C, away from moisture

General tips For obtaining a higher solubility, please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution : ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure



Background

trans-AzoTAB is a photoresponsive potassium/sodium/calcium channel modulator and DNA-binding agent. trans-AzoTAB undergoes trans-cis isomerization driven by light, with variable polarity and DNA affinity. trans-AzoTAB also enhances voltage-gated potassium currents and inhibits sodium and

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calcium currents in cardiomyocytes, thereby reducing spontaneous electrical activity and excitation conduction velocity. In addition, trans-AzoTAB induces compaction and frozen conformation of λ -phage DNA, and non-sequence-dependently inhibits transcription and translation processes in the dark; its activity can be reversed and restored by visible light after activation with ultraviolet irradiation. trans-AzoTAB can serve as a probe for two-photon optical regulation of myocardial excitability, and is used to construct photoresponsive interfacial polymer structures [1] [2] [3] [4].

In Vitro, Trans-AzoTAB (1-100 μ M; ≥ 3 min) inhibits voltage-gated peak sodium currents in isolated neonatal rat ventricular myocytes in a concentration-dependent manner, with an EC₅₀ of 60 μ M, and reduces the current density by approximately 60% at 100 μ M^[1]. Trans-AzoTAB (100 μ M; ≥ 3 min) inhibits L-type voltage-gated calcium currents in isolated neonatal rat ventricular myocytes by approximately 60%, and this inhibitory effect is reversible via near-ultraviolet light-induced isomerization of Trans-AzoTAB to cis-AzoTAB^[1]. Trans-AzoTAB (100 μ M; ≥ 3 min) increases the voltage-gated steady-state potassium current in isolated neonatal rat ventricular myocytes to approximately 145% of the control level, and this enhancing effect is reversible via near-ultraviolet light-induced isomerization of Trans-AzoTAB to cis-AzoTAB^[1]. trans-AzoTAB (0.0-2.0 mM) induces end-grafted λ -phage DNA to form a frozen surface-adsorbed conformation at concentrations ≥ 0.3 mM; its lateral extension continuously increases before reaching the freezing threshold, remains stable in the intermediate concentration range, and decreases at concentrations ≥ 0.8 mM^[2]. trans-AzoTAB (0.0-3.0 mM; 20 min) reversibly regulates the transcriptional activity of T4 genomic DNA with *E. coli* RNA polymerase and DNA conformation in a light-dependent manner; under dark conditions, it completely inhibits transcription at concentrations ≥ 2.0 mM, and up to 80% of the activity can be restored after 10 min of irradiation with 365 nm ultraviolet light^[3]. trans-AzoTAB (0.0-3.0 mM; 20 min) enables reversible regulation of the transcriptional activity of a 5 kb linearized plasmid carrying T7 RNA polymerase via light; transcriptional activity is completely inhibited at concentrations ≥ 2.0 mM under dark conditions, and after 10 min of irradiation with 365 nm ultraviolet light, transcriptional activity recovers to exceed the control level without altering the nature of the transcript^[3].

References:

[1]. Frolova SR, et al. Photocontrol of Voltage-Gated Ion Channel Activity by Azobenzene Trimethylammonium Bromide in Neonatal Rat Cardiomyocytes. PLoS One. 2016;11(3):e0152018.

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[2]. Sun Y L, et al. Photocontrol of end-grafted lambda-phage DNA[J]. Soft Matter, 2011, 7(12): 5578-5584.

[3]. Estévez-Torres A, et al. Sequence-independent and reversible photocontrol of transcription/expression systems using a photosensitive nucleic acid binder. Proc Natl Acad Sci U S A. 2009;106(30):12219-12223.

[4]. Shcherbakov D, et al. Optical control of cardiac cell excitability based on two-photon infrared absorption of AzoTAB[J]. arXiv preprint arXiv:1401.0346, 2014.

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