

Product Data Sheet

Product Name: BAPTA
Cat. No.: GC17574

Chemical Properties

Cas. No. 85233-19-8

Chemical Name 2,2',2'',2'''-(((ethane-1,2-diylbis(oxy)))bis(2,1-phenylene))bis(azanetriyl))tetraacetic acid

SMILES OC(CN(CC(O)=O)C1=CC=CC=C1OCCOC2=CC=CC=C2N(CC(O)=O)CC(O)=O)=O

Formula $C_{22}H_{24}N_2O_{10}$ M.Wt 476.23

Solubility DMF: 20 mg/ml, DMSO: 20 mg/ml, DMSO:PBS (pH 7.2) (1:1): 0.5 mg/ml
Storage Store at -20°C

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.

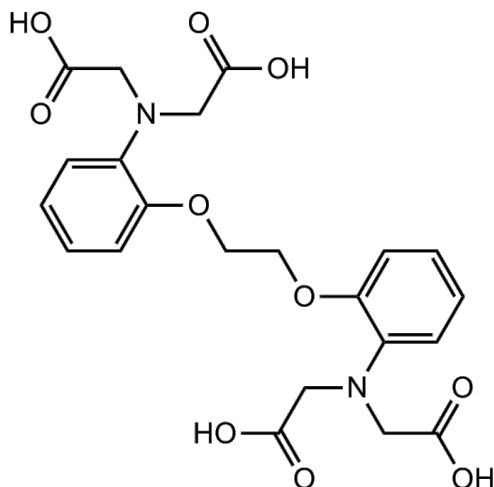
Shipping Condition Evaluation sample solution: ship with blue ice. All other available size: ship with RT, or blue ice upon request.

Caution: Product has not been fully validated for medical applications. For research use only.

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Structure



Kinase experiment [1]:

Measured the kinase activity of the recombinant, purified human 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 3 (PFKFB3) enzyme using a cell-free biochemical assay based on measuring the production of ADP in the presence of different concentrations of BAPTA (ranging from 1 μ M to 1 mM).

Reaction Conditions 1 μ M-1 mM

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Applications BAPTA directly inhibited PFKFB3 activity.

Cell experiment [2]:

Cell lines Neurons

For physically damaging neurons, 100mg of glass beads were mixed with differentiated neurons sunk with DPBS. The plates were gently rocked three times to let the beads roll over the cells. DPBS and the glass beads were removed by suction. Before the experiment, BAPTA was prepared by diluting in DMEM/F12 at final concentrations of 10 μ M, 20 μ M, and 40 μ M. Each of the Preparation Method prepared BAPTA (BAPTA group) or DPBS (vehicle control group) was gently treated on the cell. Then, the plate was incubated at 37°C for 30 minutes so that BAPTA could protect the damaged cells. During this process, the sham group was not damaged, and no specific substances were treated. Cells were detached by treatment with TrypLE and incubating the plate at 37°C for 5 minutes. Finally, the cells were collected in DMEM/F12.

Reaction
Conditions 10, 20, and 40 μ M; 30min

Applications In the BAPTA-treated group, 5.3% of the cells had detached from the plate, versus 14.5% in the vehicle control group. Under SEM, neurons in the vehicle control group displayed apoptotic traits. The number of Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL)-positive cells was significantly decreased in a dose-dependent manner, and at 40 μ M, BAPTA was maximally effective.

Animal experiment [2]:

Animal models BALB/c female mice

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Six-week-old BALB/c female mice were anesthetized using Zoletil (1:1 composite of tiletamine and zolazepam) and xylazine (3:1 ratio, 1mL/kg). Spinal laminectomy was performed at the T9 level. For treatment, 20μL of 10mM BAPTA diluted in DPBS and DPBS were prepared. The BAPTA or DPBS was treated in drops on the full-transection spot with a pipette and was arranged into Preparation Method the BAPTA group and vehicle control group, respectively. The muscle and fascia were sutured, and the skin was closed. Following the surgery, additional water and crushed food were provided for the first 14 days after Spinal cord injury (SCI). Mice had their bladders expressed manually three times a day. Animals in a sham group were subjected to the same surgical procedures except that spinal cords were not injured.

Dosage form 20μL, 10mM; topical application

Applications The Modified Basso Beattie Bresnahan (mBBB) scores in the BAPTA group were significantly higher than the scores of the vehicle control from the 3rd day following SCI. The bodyweight of the BAPTA group was significantly higher than that of the vehicle control from the 23th day following SCI.

References:

- [1] Sneyers F, Kerkhofs M, Speelman-Rooms F, et al. Intracellular BAPTA directly inhibits PFKFB3, thereby impeding mTORC1-driven Mcl-1 translation and killing MCL-1-addicted cancer cells. *Cell Death Dis.* 2023;14(9):600.
- [2] Kang KR, Kim J, Ryu B, et al. BAPTA, a calcium chelator, neuroprotects injured neurons in vitro and promotes motor recovery after spinal cord transection in vivo. *CNS Neurosci Ther.* 2021;27(8):919-929.

Background

BAPTA is a highly Ca^{2+} -selective chelator used to dissect the roles of calcium in diverse cellular functions^[1-2]. The affinity of BAPTA for Ca^{2+} can be strengthened or weakened by electron-donating or -withdrawing substituents on the aromatic rings, respectively. The Ca^{2+} binding to

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BAPTA is independent of pH within cells^[3]. In addition, BAPTA can directly inhibited purified human 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 3 (PFKFB3) activity^[4].

In vitro, treatment of mechanically injured neurons with BAPTA at 10, 20, or 40μM resulted in a dose-dependent reduction in terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL)-positive cells, with maximal protection observed at 40μM^[5]. Treatment of HEK293T cells with increasing concentrations of BAPTA (0.1, 1, and 10mM) progressively elevated the open-channel probability of the endogenous calcium-activated chloride channel ANO6 (TMEM16F)^[6]. BAPTA (0-10mM) inhibits phospholipase C (PLC) activity in a dose-dependent manner independently of Ca²⁺^[7].

In vivo, following complete transection spinal cord injury, topical application of 10mM BAPTA to the lesion site in female BALB/c mice resulted in significantly higher body weight and Modified Basso Beattie Bresnahan (mBBB) scores than in vehicle-treated controls^[4]. Iontophoresis of 150mM BAPTA into the endolymph of the bobtail skink in vivo caused a downward shift in the frequency of individual spontaneous otoacoustic emission (SOAE) peaks, with recovery requiring more than one hour^[8].

References:

- [1] Saoudi Y, Rousseau B, Doussière J, et al. Calcium-independent cytoskeleton disassembly induced by BAPTA. *Eur J Biochem*. 2004;271(15):3255-3264.
- [2] Tsien RY. New calcium indicators and buffers with high selectivity against magnesium and protons: design, synthesis, and properties of prototype structures. *Biochemistry*. 1980;19(11):2396-2404.
- [3] Sneyers F, Speelman-Rooms F, Verhelst SHL, Bootman MD, Bultynck G. Cellular effects of BAPTA: Are they only about Ca²⁺ chelation?. *Biochim Biophys Acta Mol Cell Res*. 2024;1871(2):119589.
- [4] Sneyers F, Kerkhofs M, Speelman-Rooms F, et al. Intracellular BAPTA directly inhibits PFKFB3, thereby impeding mTORC1-driven Mcl-1 translation and killing MCL-1-addicted cancer cells. *Cell Death Dis*. 2023;14(9):600.
- [5] Kang KR, Kim J, Ryu B, et al. BAPTA, a calcium chelator, neuroprotects injured neurons in vitro and promotes motor recovery after spinal cord transection in vivo. *CNS Neurosci Ther*. 2021;27(8):919-929.

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- [6] Kolesnikov DO, Nomerovskaya MA, Grigorieva ER, et al. Calcium chelation independent effects of BAPTA on endogenous ANO6 channels in HEK293T cells. *Biochem Biophys Res Commun.* 2024;693:149378.
- [7] Hardie RC. Inhibition of phospholipase C activity in Drosophila photoreceptors by 1,2-bis(2-aminophenoxy)ethane N,N,N',N'-tetraacetic acid (BAPTA) and di-bromo BAPTA. *Cell Calcium.* 2005;38(6):547-556.
- [8] Manley GA, Kirk DL. BAPTA induces frequency shifts in vivo of spontaneous otoacoustic emissions of the bobtail lizard. *Audiol Neurotol.* 2005;10(5):248-257.

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