Methylene blue trihydrate

Cat. No.: HY-B1359

CAS No.: 7220-79-3

Molecular Formula: $C_{16}H_{24}ClN_3O_3S$

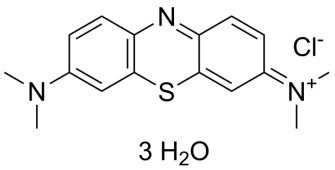
Molecular Weight: 373.9

Target: Guanylate Cyclase; Monoamine Oxidase; NO Synthase; Parasite

Pathway: GPCR/G Protein; Neuronal Signaling; Immunology/Inflammation; Anti-infection

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	6 months
	-20°C	1 month



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (267.45 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	2.6745 mL	13.3726 mL	26.7451 mL
	5 mM	0.5349 mL	2.6745 mL	5.3490 mL
	10 mM	0.2675 mL	1.3373 mL	2.6745 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (6.69 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (6.69 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Methylene blue trihydrate (C.I. Basic Blue 9 trihydrate) is a guanylyl cyclase (sGC), monoamine oxidase A (MAO-A) and NO synthase (NOS) inhibitor. Methylene blue trihydrate is a vasopressor and is often used as a dye in several medical procedures. Methylene blue trihydrate has antinociception, antimalarial, antidepressant and anxiolytic activity effects. Methylene Blue trihydrate has the potential for methemoglobinemias, neurodegenerative disorders and ifosfamide-induced encephalopathytreatment[1][2][3].

IC_{50} & Target

Plasmodium

In Vitro

By acting as an alternative electron acceptor/donor Methylene blue restores mitochondrial function, improves neuronal energy production and inhibits the formation of superoxide[1].

	Methylene blue inhibits cytochrome P450 (CYP) isozymes. Methylene blue is an odorless, water soluble, dark blue-green crystalline powder, which turns blue whenever mixed in solution. Methylene blue is a vasopressor that impacts the NO synthetic pathway by inhibiting inducible NOS and inhibiting the subsequent activation of sGC. In addition, by binding to the iron heme moiety of sGC and causing enzyme inhibition, Methylene blue blocks accumulation of cyclic GMP (cGMP), competing directly with NO in its ability to activate soluble guanylyl cyclase[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	Methylene Blue (1, 5, and 25 μg/rat) significantly decreases sevoflurane minimum alveolar anesthetic concentration (MAC) and brain cyclic guanosine monophosphate (cGMP) content in a dose-dependent manner in male Sprague-Dawley rats (7-week-old, 200-250 g)[2]. Methylene blue is used as a dye in chromoendoscopy, and is sprayed onto the mucosa of the gastrointestinal tract in order to identify dysplasia, or pre-cancerous lesions[2]. Methylene blue is able to restore vascular tone, normalize mean arterial pressures (MAP), and reduce vasopressor usage[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Biomaterials. 2022: 121988.
- Theranostics. 2021 Oct 17;11(20):9884-9903.
- Redox Biol. 2020 Sep;36:101601.
- Cell Rep. 2024 Feb 13;43(2):113779.
- Phytother Res. 2023 Feb 14.

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REFERENCES

[1]. Delport A, et al. Methylene blue and its analogues as antidepressant compounds. Metab Brain Dis. 2017 Oct;32(5):1357-1382.

[2]. Masaki E, et al. Methylene blue, a soluble guanylyl cyclase inhibitor, reduces the sevoflurane minimum alveolar anesthetic concentration and decreases the brain cyclic guanosine monophosphate content in rats. Anesth Analg. 1999 Aug;89(2):484-9.

[3]. McCartney SL, et al. Intraoperative vasoplegia: methylene blue to the rescue! Curr Opin Anaesthesiol. 2018 Feb;31(1):43-49.

Tel: 609-228-6898 Fax: 609-228-5909 E-mail: tech@MedChemExpress.com

Address: 1 Deer Park Dr, Suite Q, Monmouth Junction, NJ 08852, USA