

Product Data Sheet

Product Name: Dextromethorphan (hydrobromide hydrate)

Cat. No.: GC43428

Chemical Properties

Cas. No. 6700-34-1

SMILES CN1[C@@H]2[C@@]3([H])CCCC[C@]3(CC1)C4=CC(OC)=CC=C4C2

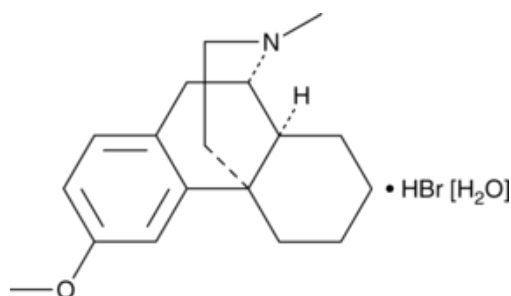
Formula $C_{18}H_{25}NO \cdot HBr [H_2O]$ M.Wt 370.3

Solubility DMF: 20 mg/ml, DMSO: 10 mg/ml, Ethanol: 20 mg/ml, PBS (pH 7.2): 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.

Structure



Protocol

Cell experiment [1]:

Cell lines BMDC cells

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The expression of cell surface molecules was quantified by flow cytometry as follows. The Dextromethorphan was prepared in PBS as a 12.5 millimolar stock solution. Aliquots of 2×10^5 immature BMDCs or MDDCs were cultured in the presence or absence of Dextromethorphan for 1h and then stimulated with 100ng/mL Escherichia coli serotype O26:B6 LPS or 100ng/mL LPS plus 10ng/mL IFN- γ for 18h. The control group was treated with PBS alone. After incubation, DCs were harvested and stained with the following antibodies for 45min on ice (1 μ g/mL diluted in PBS/1.0% FCS (v/v)): FITC-conjugated anti-human CD1a⁺ or anti-murine CD11c⁺; phycoerythrin (PE)-conjugated anti-human CD80⁺, anti-human CD83⁺, anti-murine CD40, anti-murine CD80, anti-murine CD86, anti-murine MHC class I, anti-murine MHC class II or isotype-matched control mAbs; or PE-conjugated anti-human HLA-DR. After washing with PBS, the cells were analyzed in a FACSCalibur flow cytometer, and the data were analyzed using WINMDI software.

Reaction Conditions 12.5, 25, 50 and 100 μ M; 18h

Applications The dextromethorphan treatment dose-dependently inhibited the expression of co-stimulatory molecules (CD80, CD86 and CD40) in mouse bone marrow-derived dendritic cells (BMDCs) induced by LPS.

Animal experiment [2]:

Animal models C57BL/6 mice

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Dextromethorphan, Imipramine hydrochloride and Quinidine sulfate (QND) were dissolved in 0.9% saline and administered via intraperitoneal (i.p.) injection at a volume of 10ml/kg. Drug doses and pretreatment times were selected based on published literature and are as follows: Dextromethorphan (32mg/kg; 30min or 24h), imipramine (0 or 20mg/kg; 30min), and QND (0 or 32mg/kg; 30min). To assess the sustained antidepressant-like effects of Dextromethorphan, a 24h pretreatment time was used prior to the tail suspension test (TST).

Preparation Method Dosage form 32mg/kg/day; single-dose; i.p.

Applications Dextromethorphan pretreatment for 30 minutes produced an acute antidepressant-like effect in the tail suspension test (TST) in C57BL/6 mice, but no such effect was observed 24 hours after administration.

References:

- [1] Chen D Y, Song P S, Hong J S, et al. Dextromethorphan inhibits activations and functions in dendritic cells[J]. Journal of Immunology Research, 2013, 2013(1): 125643.
- [2] Saavedra JS, Garrett PI, Honeycutt SC, Peterson AM, White JW, Hillhouse TM. Assessment of the rapid and sustained antidepressant-like effects of dextromethorphan in mice. Pharmacol Biochem Behav. 2020;197:173003.

Background

Dextromethorphan (hydrobromide hydrate) is a D-isomer of levorphanol, similar to codeine. Unlike several other morphine derivatives, Dextromethorphan does not cause opioid activity [1]. Dextromethorphan is a conformational antagonist and voltage-dependent antagonist of N-methyl D-aspartate (NMDA) control ion channels [2]. Due to its strong antitussive effect, Dextromethorphan is widely used as a cough suppressant. Dextromethorphan has been used in multimodal analgesic treatment for acute and neuropathic pain [3-4].

In vitro, Dextromethorphan (12.5, 25, 50 and 100μM; 18h) dose-dependently inhibited the expression of co-stimulatory molecules (CD80, CD86 and CD40) in LPS-induced mouse bone marrow-derived dendritic cells (BMDCs), and reduced the production of reactive oxygen species, pro-inflammatory

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cytokines and chemokines in the cells [5]. Under an intracellular/extracellular pH gradient of 5.5/7.3, Dextromethorphan (0-100 μ M; 10min) reversibly inhibited the voltage-gated proton current in BV2 microglial cells, with an IC₅₀ of 51.7 μ M [6].

In vivo, Dextromethorphan (1 and 3mg/ml; 8 weeks; orally in drinking water) long-term treatment significantly improved the plasma insulin concentration, glucose tolerance and islet cell quality of 2-type diabetic (T2DM) mice [7]. Dextromethorphan (32mg/kg/day; single-dose; i.p.) pretreatment for 30min produced a similar antidepressant effect in C57BL/6 mice in the tail suspension test (TST), but failed to produce a similar antidepressant effect 24 hours after administration [8].

References:

- [1] Mayet S. Atypical opioids[J]. Southern African Journal of Anaesthesia and Analgesia, 2023: 147-152.
- [2] Werling L L, Lauterbach E C, Calef U. Dextromethorphan as a potential neuroprotective agent with unique mechanisms of action[J]. The neurologist, 2007, 13(5): 272-293.
- [3] Bolser, D.C., Aziz, S.M., DeGennaro, F.C., et al. Antitussive effects of GABAB agonists in the cat and guinea-pig. Br. J. Pharmacol. 110(1), 491-495 (1993).
- [4] Chen, Y.W., Chu, K.S., Lin, C.N., et al. Dextromethorphan or dextrorphan have a local anesthetic effect on infiltrative cutaneous analgesia in rats. Anesth. Analg. 104(5), 1251-1255 (2007).
- [5] Chen D Y, Song P S, Hong J S, et al. Dextromethorphan inhibits activations and functions in dendritic cells[J]. Journal of Immunology Research, 2013, 2013(1): 125643.
- [6] Song JH, Yeh JZ. Dextromethorphan inhibition of voltage-gated proton currents in BV2 microglial cells. *Neurosci Lett*. 2012;516(1):94-98.
- [7] Marquard J, Otter S, Welters A, et al. Characterization of pancreatic NMDA receptors as possible drug targets for diabetes treatment[J]. Nature medicine, 2015, 21(4): 363-372.
- [8] Saavedra JS, Garrett PI, Honeycutt SC, Peterson AM, White JW, Hillhouse TM. Assessment of the rapid and sustained antidepressant-like effects of dextromethorphan in mice. *Pharmacol Biochem Behav*. 2020;197:173003.

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