Ipratropium bromide

Cat. No.: HY-B0241

CAS No.: 22254-24-6

Molecular Formula: $C_{20}H_{30}BrNO_3$

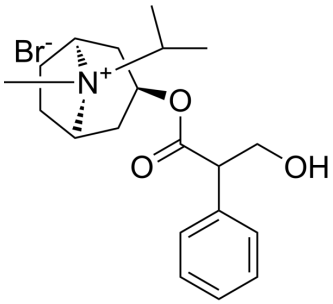
Molecular Weight: 412.36

Target: mAChR

Pathway: GPCR/G Protein; Neuronal Signaling

Storage: 4°C, sealed storage, away from moisture

* In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

H_2O : 100 mg/mL (242.51 mM; Need ultrasonic)

DMSO : ≥ 35 mg/mL (84.88 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	2.4251 mL	12.1253 mL	24.2507 mL
5 mM	0.4850 mL	2.4251 mL	4.8501 mL
10 mM	0.2425 mL	1.2125 mL	2.4251 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 50 mg/mL (121.25 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (6.06 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (6.06 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (6.06 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Ipratropium bromide (Sch 1000) is a muscarinic receptor antagonist, with IC_{50}s of 2.9 nM, 2 nM, and 1.7 nM for M1, M2, and M3 receptors, respectively. Ipratropium bromide relaxes smooth muscle, can be used in the research for COPD (chronic obstructive pulmonary disease) and asthma[1][2][3][4][5].

IC_{50} & Target	mAChR1	mAChR2	mAChR3

In Vitro

Ipratropium bromide (1 nM, 10 nM, 100 nM; 15 min) exerts its toxic effects via disruption of mitochondrial membrane potential[1].
Ipratropium bromide (1 nM-1 μM; 4 h) increases infarct size in isolated perfused heart ischaemia/reperfusion experiments with a dose-responsive manner (EC_{50}=22.7 nM)[1].
Ipratropium bromide (0.001 nM-0.1 mM; 2 h) inhibits adult rat cardiac myocyte growth after 4 h hypoxia treatment[1].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[1]

Cell Line:	Adult Rat Cardiac Myocyte
Concentration:	0.001 nM-0.1 mM
Incubation Time:	2 h in dark; prior to 4 h hypoxia
Result:	Resulted cell viability in a dose-dependent manner, with the inhibition rate of 52.7% at 0.1 mM dose.

In Vivo

Ipratropium bromide (1.0 μg/kg; i.v.; single dose) enhances vagal nerve stimulation induing bronchoconstriction[2].
?Ipratropium bromide (0.04 mg/20 mL and 0.20 mg/20 mL; 30 min, rate=30 mL/30 min) can protect the lungs against the cadmium-induced acute neutrophilic inflammation by reducing the parenchyma inflammatory infiltration of neutrophils[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Guinea-pigs of the Dunkin Hartley strain[2].
Dosage:	0.1-1 μg/kg
Administration:	Intravenous injection; single dose
Result:	Resulted little blocking effect on post-junctional muscarinic receptors at 0.3 μg/kg, and inhibited ACh-induced bronchoconstriction at 0.5 μg/kg.

Animal Model:	Male Sprague-Dawley rats (300-350 g)[4]
Dosage:	0.04 mg/20 mL and 0.20 mg/20 mL
Administration:	Inhalation; atomization rate of 30 mL/30 min; 30 min
Result:	Had no significant effects on any parameters recorded in healthy rats but exerted a protective effect against the inflammatory reaction elicited by cadmium.

REFERENCES

[1]. Fryer AD, et al. Maclagan, Ipratropium bromide potentiates bronchoconstriction induced by vagal nerve stimulation in the guinea-pig. Eur J Pharmacol, 1987. 139(2): p. 187-91.

[2]. Harvey, et al. Maddock, Ipratropium Bromide-Mediated Myocardial Injury in In Vitro Models of Myocardial Ischaemia/Reperfusion. Toxicol Sci, 2014.

[3]. Maria Prat, et al. Discovery of novel quaternary ammonium derivatives of (3R)-quinuclidinyl amides as potent and long acting muscarinic antagonists. Bioorg Med Chem Lett. 2015 Apr 15;25(8):1736-1741.

[4]. Wenhui Zhang, et al. Anti-inflammatory effects of formoterol and ipratropium bromide against acute cadmium-induced pulmonary inflammation in rats. Eur J Pharmacol. 2010 Feb 25;628(1-3):171-8.

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

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