Dobutamine hydrochloride

Cat. No.: HY-15746

CAS No.: 49745-95-1

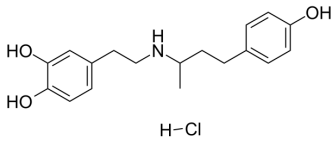
Molecular Formula: $C_{18}H_{24}ClNO_3$

Molecular Weight: 337.84

Target: Adrenergic Receptor

Pathway: GPCR/G Protein; Neuronal Signaling

Storage: 4°C, sealed storage, away from moisture
* In solvent : -80°C, 2 years; -20°C, 1 year (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 33 mg/mL (97.68 mM)
H_2O : 20 mg/mL (59.20 mM; Need ultrasonic)
* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions	Mass / Solvent / Concentration	1 mg	5 mg	10 mg
	1 mM	2.9600 mL	14.7999 mL	29.5998 mL
	5 mM	0.5920 mL	2.9600 mL	5.9200 mL
	10 mM	0.2960 mL	1.4800 mL	2.9600 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 16.67 mg/mL (49.34 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 (7.40 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (7.40 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (7.40 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Dobutamine hydrochloride is a synthetic catecholamine that acts on α1-AR, β1-AR, β2-AR (α-1, β-1 andβ-2 adrenoceptors). Dobutamine hydrochloride is a selective β1-AR agonist, relatively weak activity at α1-AR and β2-AR. Dobutamine hydrochloride can increase cardiac output and correct hypoperfusion[1][2][3][4].

IC_{50} & Target	α adrenergic receptor	β adrenergic receptor

In Vivo

Dobutamine hydrochloride has a rapid onset of action and a short half-life [2].

Dobutamine hydrochloride (0.15-20 mg/kg; i.p.) results in subsequent increase in the left ventricular function and heart rate acceleration with an increasing dose in wildtype mice[3].

Dobutamine hydrochloride results in significant inotropic, lusitropic, and chronotropic cardiac response with a high dose in wildtype mice[3].

Low doses of Dobutamine hydrochloride significantly increases inotropic and lusitropic cardiac performance without chronotropic changes in the Tgαq*44 mice[3].

Dobutamine hydrochloride increases heart rate only after high doses, but then inotropic and lusitropic cardiac functional reserve is lost[3].

Dobutamine hydrochloride increases alveolar liquid clearance in ventilated rats by beta-2 receptor stimulation[4].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Tgαq*44 mice (heart failure models)[3]
Dosage:	0.15 mg/kg, 0.5 mg/kg as a low dose, 1.5 mg/kg, 5 mg/kg, 20 mg/kg as a high dose
Administration:	Intraperitoneal injection
Result:	Induced different response in cardiac function on a low and high dose in mice with with heart failure.

CUSTOMER VALIDATION

- Comput Struct Biotechnol J. 2023 Jul 7, 21, 3490-3502.
- Front Cell Dev Biol. 2022 Apr 20;10:889656.
- Environ Toxicol. 2023 Dec 2.

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REFERENCES

[1]. Tuttle RR, et al. Dobutamine: development of a new catecholamine to selectively increase cardiac contractility. Circ Res. 1975 Jan;36(1):185-96.

[2]. Vallet B, et al. Dobutamine: mechanisms of action and use in acute cardiovascular pathology. Ann Cardiol Angeiol (Paris). 1991 Jun;40(6):397-402.

[3]. Tyrankiewicz U , et al. Characterization of the cardiac response to a low and high dose of dobutamine in the mouse model of dilated cardiomyopathy by MRI in vivo. J Magn Reson Imaging. 2013 Mar;37(3):669-77.

[4]. Tibayan FA, et al. Dobutamine increases alveolar liquid clearance in ventilated rats by beta-2 receptor stimulation. Am J Respir Crit Care Med. 1997 Aug;156(2 Pt 1):438-44.

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