Varenicline Tartrate

Cat. No.: HY-10021

CAS No.: 375815-87-5

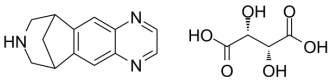
Molecular Formula: $C_{17}H_{19}N_3O_6$

Molecular Weight: 361.35

Target: nAChR; ERK; p38 MAPK

Pathway: Membrane Transporter/Ion Channel; Neuronal Signaling; MAPK/ERK Pathway; Stem Cell/Wnt

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 : 20 mg/mL (55.35 mM; ultrasonic and warming and heat to 60°C)
DMSO : 14.29 mg/mL (39.55 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	2.7674 mL	13.8370 mL	27.6740 mL
	5 mM	0.5535 mL	2.7674 mL	5.5348 mL
	10 mM	0.2767 mL	1.3837 mL	2.7674 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 10 mg/mL (27.67 mM); Clear solution; Need ultrasonic and warming and heat to 60°C
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 1.43 mg/mL (3.96 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 1.43 mg/mL (3.96 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Varenicline (CP 526555) is an orally active partial agonist of α4β2 nicotinic acetylcholine receptor (α4β2 nAChR, IC_{50} = 250 nM), which is the principal mediator of nicotine dependence. Varenicline is also a partial agonist of α6β2 nAChR and a full agonist of α6β2 nAChR. Varenicline blocks the direct agonist effects of nicotine on nAChR while stimulates nAChR in a more moderate way, being widely used as an aid of smoking cessation[1][2][3][4][5].

IC_{50} & Target

IC50: 250 nM (α4β2 nAChR) [2]

In Vitro

Varenicline (200 μM, 24 h) shows no affection to cell viability of HUVEC cells[3].
Varenicline (100 μM, 24 h) lowers expression of VE-cadherin in HUVEC cells as Varenicline (100 μM, 30 min) significantly activates ERK1/2 and p38 signaling[3].
Varenicline (100 μM, 4 h) promotes migration of HUVEC cells by 2.4-fold[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[3]

Cell Line:	HUVEC
Concentration:	100, 200, 300, 500 μM
Incubation Time:	24 h
Result:	Did not affect cell viability at 100 and 200 μM (96.8 ± 0.1% and 93.9 ± 1.8%, respectively). Decreased cell viability to 85.7 ± 7.5% and 57.8 ± 7.7% for 300 and 500 μM, respectively.

Western Blot Analysis[3]

Cell Line:	HUVEC
Concentration:	100 μM
Incubation Time:	1, 5, 10, 15 ,30 ,60 min, 24 h
Result:	Significantly activated ERK1/2 and p38 signaling with peak activity at 10–15 min and 10–30 min after treatment, respectively, lowered expression of VE-cadherin at 24 h. MLA (100 nM) significantly reversed the Varenicline-induced effects.

Cell Migration Assay [3]

Cell Line:	HUVEC
Concentration:	100 μM
Incubation Time:	4 h
Result:	Significantly increased the number of migrating cells by 2.4-fold compared with vehicle treatment. MLA (100 nM) completely blocked Varenicline-stimulated migration.

In Vivo

Varenicline (0.5, 1mg/kg, s.c., acute administration) dose-dependently reverses Fentanyl-induced respiratory depression in rats while slightly alleviates Fentanyl-induced sedation[4].
Varenicline (0.004–0.04 mg/kg/h, i.v.drip, 23h a day for 7-10 d) dose-dependently reduces self-administration of nicotine alone (0.0032 mg/kg/inj), and in combination with cocaine (0.0032 mg/kg/inj) with no significant effects on food-maintained responding in cocaine- and nicotine-experienced adult rhesus monkeys[5].
Varenicline (0.178-5.6 mg/kg, i.p., acute administration) shows antidepressant-like activity in the forced swim test in C57BL/6J and CD-1 mice[6].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

REFERENCES

[1]. Koegelenberg CF, et al. Efficacy of varenicline combined with nicotine replacement therapy vs varenicline alone for smoking cessation: a randomized clinical trial. JAMA. 2014 Jul;312(2):155-61.

[2]. Magnus CJ, et al. Ultrapotent chemogenetics for research and potential clinical applications. Science. 2019;364(6436):eaav5282.

[3]. Koga M, et al. Varenicline promotes endothelial cell migration by lowering vascular endothelial-cadherin levels via the activated α7 nicotinic acetylcholine receptor-

mitogen activated protein kinase axis. Toxicology. 2017;390:1-9.

[4]. Ren J, et al. Countering Opioid-induced Respiratory Depression in Male Rats with Nicotinic Acetylcholine Receptor Partial Agonists Varenicline and ABT 594. Anesthesiology. 2020 May;132(5):1197-1211.

[5]. Mello NK, et al. Effects of chronic varenicline treatment on nicotine, cocaine, and concurrent nicotine+cocaine self-administration. Neuropsychopharmacology. 2014 Apr;39(5):1222-31.

[6]. Rollema H, et al. Varenicline has antidepressant-like activity in the forced swim test and augments sertraline's effect. Eur J Pharmacol. 2009 Mar 1;605(1-3):114-6.

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