Galanthamine

Cat. No.: HY-76299

CAS No.: 357-70-0

Molecular Formula: $C_{17}H_{21}NO_3$

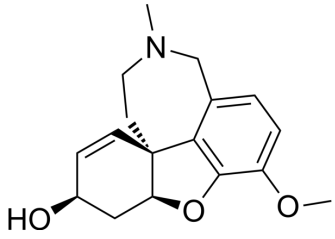
Molecular Weight: 287.35

Target: Cholinesterase (ChE); Apoptosis

Pathway: Neuronal Signaling; Apoptosis

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 : ≥ 59 mg/mL (205.32 mM)

1M HCl : 50 mg/mL (174.00 mM; ultrasonic and adjust pH to 1 with HCl)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	3.4801 mL	17.4004 mL	34.8008 mL
5 mM	0.6960 mL	3.4801 mL	6.9602 mL
10 mM	0.3480 mL	1.7400 mL	3.4801 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 (8.70 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (8.70 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (8.70 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Galanthamine is a potent acetylcholinesterase (AChE) inhibitor with an IC_{50} of 500 nM.

IC_{50} & Target

AChE

In Vitro

Galanthamine inhibits AChE and BChE with IC_{50} of 0.5 and 8.5 μM[1]. Galanthamine acts as a positive allosteric modulator

	(PAM) of human α4β2 AChRs expressed in permanently transfected HEK 293 cells. Galanthamine increases the response of ($α4β2)_2α5$ AChRs to 1 μM ACh by up to 220% with very low concerntration(EC_{50}=0.25 nM). Only small potentiation (20%) of either α4β2 or $(α4β2)_2β3$ AChRs is detected using FLEXstation assays. Galanthamine at concentrations of 1 μM and above inhibits all three AChR subtypes[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	Acute administration of Galantamine (0.3-3 mg/kg, i.p.) increases IGF2 mRNA levels in the hippocampus, but not in the prefrontal cortex, in time- and dose-dependent manner. Galantamine (3 mg/kg, i.p.) causes a transient increase in fibroblast growth factor 2 mRNA levels and a decrease in brain-derived neurotrophic factor mRNA levels in the hippocampus, while it does not affect the mRNA levels of other neurotrophic/growth factors. The Galantamine-induced increase in the hippocampal IGF2 mRNA levels is blocked by Mecamylamine, a nonselective nicotinic acetylcholine (ACh) receptor (nAChR) antagonist, and Methyllycaconitine, a selective α7 nAChR antagonist, but not by Telenzepine, a preferential M1muscarinic ACh receptor antagonist. Moreover, the selective α7 nAChR agonist PHA-543613 increasea the IGF2 mRNA levels, while Donepezil, an acetylcholinesterase inhibitor, does not. Galantamine also increases hippocampal IGF2 protein, which is blocked by Methyllycaconitine[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Animal Administration [2]	Mice[2] Eight-week-old male ddY mice are housed in cages (24 cm×17 cm×12 cm) in each group of five to six animals under controlled environmental conditions (22±1°C; 12:12-h light-dark cycle, lights on at 0800 hours, food and water ad libitum) for 1 week before use in the experiments. 453 mice are used in total and in single use for each purpose. The following drugs are used: mecamylamine, methyllycaconitine, oxotremorine, and telenzepine, and Galantamine, Donepezil, and PHA-543613. All drugs are dissolved in saline (0.9 % solution of NaCl). Drugs are administered in a volume of 10 mL/kg intraperitoneally (i.p.) (Galantamine, Donepezil, Mecamylamine, Methyllycaconitine, Oxotremorine) or subcutaneously (s.c.) (PHA-543613, Telenzepine). MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Nat Commun. 2023 Apr 17;14(1):2182.
- Free Radic Biol Med. 2019 Dec;145:20-32.
- Antioxidants (Basel). 2022, 11(7), 1228.
- Antioxidants (Basel). 2022 Feb 14;11(2):385.
- Biochem Pharmacol. 2020 Oct;180:114139.

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REFERENCES

[1]. Melanie-Jayne R. Howes, et al. Acetylcholinesterase inhibitors of natural origin. International Journal of Research in Pharmaceutical and Biomedical Sciences 3(SI 1):67-86.

[2]. Kuryatov A, et al. Roles of accessory subunits in alpha4beta2(*) nicotinic receptors. Mol Pharmacol. 2008 Jul;74(1):132-43.

[3]. Kita Y, et al. Galantamine increases hippocampal insulin-like growth factor 2 expression via α7 nicotinic acetylcholine receptors in mice. Psychopharmacology (Berl).

2013 Feb;225(3):543-51.

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