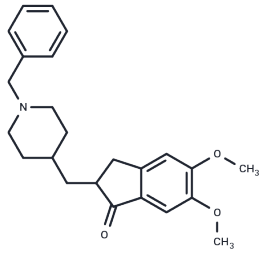
Data Sheet (Cat.No.T7041)

TargetMol

Donepezil

Chemical Properties



CAS No. : 120014-06-4

Formula: C24H29NO3

Molecular Weight: 379.49

Appearance: no data available

Storage: Powder: -20°C for 3 years | In solvent: -80°C for 1 year

Biological Description

Description	Donepezil (Aricept) is a piperidine-based, potent, specific, and reversible inhibitor of acetylcholinesterase (AChE). It can be used for the treatment of mild to moderate dementia of the Alzheimer's type.
Targets(IC50)	Cholinesterase (ChE)
In vitro	Donepezil has 500-1000-fold more selective for AChE over butyrylcholinesterase (BuChE). Short- and long-exposure of SH-SY5Y human neuroblastoma cells to donepezil induces a concentration-dependent inhibition of cell proliferation unrelated to muscarinic or nicotinic receptor blockade or apoptosis. Donepezil reduces the number of cells in the S-G2/M phases of the cell cycle, increases the G0/G1 population, and reduces the expression of two cyclins of the G1/S and G2/M transitions, cyclin E and cyclin B, in parallel with an increase in the expression of the cell cycle inhibitor p21. In addition, donepezil increases action potential-dependent dopamine release and modulates nicotinic receptors of substantia nigra dopaminergic neurons[1].
In vivo	In plasma, urine, and bile, most donepezil metabolites are O-glucuronides. After oral ingestion, peak plasma concentrations are achieved in 3-5 hours and its absorption is not affected by food. Donepezil is slowly absorbed from the gastrointestinal tract and has a terminal elimination half-life of 50-70 hours in young volunteers (>100 hours in elderly subjects). After extensive metabolization in the liver, the parent compound is 93% bound to plasma proteins. Donepezil is metabolized in the liver via the cytochrome P450 system (CYP1A2-, CYP2D6-, CYP3A4-related enzymes). In animals, donepezil is found unchanged in the brain, and no metabolites are detected in the nervous tissue. Donepezil has linear pharmacokinetics over a dose range of 1-10 mg/day. 96% of circulating donepezil is protein bound [1].
Cell Research	Cell lines: retinal ganglion cells (RGCs). Concentrations: 0.1-10 μM. Incubation Time: 3 days. RGC survival after exposure to each reagent (glutamate, donepezil, tacrine, galanthamine, and HA14-1) is measured by calcein-AM staining after 3 days in culture, Briefly, cells are incubated in 1 μM calcein-AM in PBS for 15 minutes at 37°C. After the medium is replaced with fresh PBS, cells are examined under a fluorescence microscope using a fluorescein filter. The total number of surviving RGCs defined as cells with a calcein-AM stained cell body and a process extending at least two cell diameters from the cell body is counted in each well. The number of surviving RGCs without any drug served as a control.

Animal Research	Animal Models: male C57BL/6 wild-type and CGRP(?/?) mice (10-12 weeks old, 21-24 g). Formulation: added to the food powder. Dosages: 1.5 mg/kg (i.g.)

Solubility Information

Solubility	DMSO: 50 mg/mL (131.76 mM),Sonication is recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)

Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	2.6351 mL	13.1756 mL	26.3512 mL
5 mM	0.527 mL	2.6351 mL	5.2702 mL
10 mM	0.2635 mL	1.3176 mL	2.6351 mL
50 mM	0.0527 mL	0.2635 mL	0.527 mL

Please select the appropriate solvent to prepare the stock solution, according to the solubility of the product in different solvents. Please use it as soon as possible.

Reference

Cacabelos R. Donepezil in Alzheimer's disease: From conventional trials to pharmacogenetics[J]. Neuropsychiatric Disease & Treatment, 2007, 3(3):303-333.

Jiang Q, Lu C, Sun T, et al. Alterations of the Brain Proteome and Gut Microbiota in d-Galactose-Induced Brain-Aging Mice with Krill Oil Supplementation. Journal of agricultural and food chemistry. 2019, 67(35): 9820-9830.

Miki A, et al. Protective effect of donepezil on retinal ganglion cells in vitro and in vivo[J]. Current Eye Research, 2006, 31(1):69-77.

Jiang Q, Lu C, Sun T, et al. Alterations of the Brain Proteome and Gut Microbiota in d-Galactose-Induced Brain-Aging Mice with Krill Oil Supplementation[J]. Journal of agricultural and food chemistry. 2019, 67(35): 9820-9830.