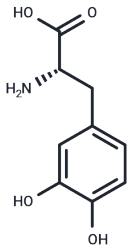
Data Sheet (Cat.No.T0848)

TargetMol

L-DOPA

Chemical Properties



CAS No. : 59-92-7

Formula: C9H11NO4

Molecular Weight: 197.19

Storage: Powder: -20°C for 3 years
Actual storage temperature shall be subject to the COA.

Biological Description

Description	L-DOPA belongs to the category of dopamine precursors, serving as an orally active neurotransmitter metabolic precursor capable of crossing the blood-brain barrier and undergoing conversion to dopamine within the brain. The compound exhibits anti-hyperalgesic properties and finds application in Parkinson's disease research as well as in the induction of disease models.
Targets(IC50)	Endogenous Metabolite,Dopamine Receptor
In vitro	**Methods**: C6 gliosarcoma cells were used to evaluate the antitumor activity of carborane-based L-DOPA compounds through in vitro survival assays (incubation with 20 ppm ^{10}B for 6 h), cytotoxicity assays (continuous exposure for 3 d to determine IC50), and boron uptake assays (1.5 mM boron reagent culture for 24 h). **Results**: The carborane-based L-DOPA compound showed a minimum survival fraction of 0.03 after 75 min of thermal neutron irradiation, an IC50 of 8.93×10^{-4} M, and a cellular boron uptake of 1.53 μg/10^7 cells, demonstrating superior in vitro killing effect compared to BSH.[1]
In vivo	**Methods**: A rat model with unilateral 6-OHDA lesion of the nigrostriatal pathway was established. Rats were administered L-DOPA (50 mg/kg, intraperitoneal injection, combined with benserazide 12.5 mg/kg, twice daily for 5-15 days). D3 receptor expression was detected by in situ hybridization and autoradiography, and rotational behavior was observed. Additionally, an MPTP-induced Parkinsonian monkey model was used to observe abnormal movements following L-DOPA administration. **Results**: Repeated L-DOPA administration induced ectopic expression of D3 receptors in the denervated caudate-putamen. This expression paralleled the time course of enhanced rotational behavior (behavioral sensitization), accompanied by upregulation of prodynorphin mRNA and downregulation of preprotachykinin mRNA. Various abnormal movements were also induced in the monkey model. [2] **Methods**: Intact rats were injected with L-DOPA (50 mg/kg) to measure endocannabinoid concentrations in the basal ganglia. In lesioned rats, L-DOPA-induced oro-lingual spontaneous movements were induced and treated with the cannabinoid agonist R(+)-WIN55,212-2 (1 mg/kg). **Results**: L-DOPA increased endocannabinoid concentrations in the basal ganglia and induced progressively severe oro-lingual spontaneous movements, which were attenuated by the cannabinoid agonist. [3] **Methods**: A rat model with unilateral severe 6-OHDA-induced lesion was used. L-DOPA

In vivo	was administered orally (25 mg/kg, combined with carbidopa, twice daily) for 6 months. Striatal D2 receptor binding levels were detected using 125I-sulpride autoradiography. **Results**: Chronic L-DOPA administration reversed the upregulation of D2 receptors in the caudate-putamen (particularly in the dorsolateral and ventrolateral regions) of severely lesioned rats, confirming that it reaches biologically active concentrations in the basal ganglia. [4]
Kinase Assay	Briefly, transfected HEK-293 cells, incubated in charcoal-treated Dulbecco's modified Eagle's medium for 24 h, are washed once with Hanks' solution and resuspended in a buffer containing 100 mM NaCl, 1 mM MgCl2, 1 mM EDTA, 1 mM EGTA, 250 mMsucrose, 20 mM Tris-HCl, pH 7.4. Cells are lysed by freezing in liquid nitrogen. Dehydrogenase activity is measured in a final volume of 20 µL containing the appropriate concentration of bile acid, 30 nCi of [3H]cortisol, and unlabeled cortisol to a final concentrations of 50 nM. The reaction is started by mixing cell lysate with the reaction mixture. Alternatively, endoplasmic reticulum microsomes are prepared from transfected HEK-293 cells and incubated with reaction mixture containing various concentrations of cortisol and CDCA. Incubation proceeded for 20 min, and the conversion of cortisol to cortisone is determined by thin layer chromatography (TLC). Because of the inaccuracy of the TLC method at low conversion rates and the end-product inhibition of 11βHSD2 at conversion rates higher than 60-70%, only conversion rates between 10 and 60% are considered for calculation. The inhibitory constant IC50 is evaluated using the curve-fitting program. Results are expressed as means±S.E. and consist of at least four independent measurements.

Solubility Information

Solubility	DMSO: Insoluble, H2O: 2.5 mM,Sonication is recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)

Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	5.0713 mL	25.3563 mL	50.7125 mL
5 mM	1.0143 mL	5.0713 mL	10.1425 mL
10 mM	0.5071 mL	2.5356 mL	5.0713 mL
50 mM	0.1014 mL	0.5071 mL	1.0143 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.

Note: The dilution table applies only to solid products. For liquid products, please calculate the stock solution based on the stated concentration and/or density.

Reference

Zhu, Yinghuai et al. Synthesis and in vitro anti-tumor activity of carboranyl levodopa. Bioorganic chemistry vol. 90 (2019): 103090.
Qin Z, Fang W, Jiang Q, et al.The urchin-like gold nanoparticles/poly (ε-caprolactone)/chitosan electrospun nanofibers for antibacterial active packaging.International Journal of Biological Macromolecules.2024: 133287.
Dou S, Pan W, Pan X, et al.The organic acid metabolites of Bifidobacterium longum subsp. iuvenis alleviate ultraviolet irradiation-induced photoaging.Microbiological Research.2025: 128100.
Bordet, R et al. Induction of dopamine D3 receptor expression as a mechanism of behavioral sensitization to levodopa. Proceedings of the National Academy of Sciences of the United States of America vol. 94,7 (1997): 3363-7.
Ferrer, Belen et al. Effects of levodopa on endocannabinoid levels in rat basal ganglia: implications for the treatment of levodopa-induced dyskinesias. The European journal of neuroscience vol. 18,6 (2003): 1607-14.
Murer, M G et al. Chronic levodopa is not toxic for remaining dopamine neurons, but instead promotes their recovery, in rats with moderate nigrostriatal lesions. Annals of neurology vol. 43,5 (1998): 561-75.
Murer MG, et al. Ann Neurol, 1998, 43(5), 561-575.
Perez-Pardo P, et al. Additive Effects of Levodopa and a Neurorestorative Diet in a Mouse Model of Parkinson's Disease. Front Aging Neurosci. 2018 Aug 3;10:237.