# L-DOPA

**Cat. No.:** HY-N0304

**CAS No.:** 59-92-7

**Molecular Formula:** $C_9H_{11}NO_4$

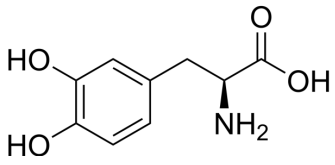
**Molecular Weight:** 197.19

**Target:** Endogenous Metabolite; Dopamine Receptor

**Pathway:** Metabolic Enzyme/Protease; GPCR/G Protein; Neuronal Signaling

**Storage:** 4°C, stored under nitrogen

* The compound is unstable in solutions, freshly prepared is recommended.




## SOLVENT & SOLUBILITY

**In Vitro**

0.1 M HCL : 20 mg/mL (101.43 mM; ultrasonic and warming and adjust pH to 2 with HCl and heat to 60°C)

$H_2O$ : 1 mg/mL (5.07 mM; Need ultrasonic)

**Preparing Stock Solutions**

| Concentration \ Solvent \ Mass | 1 mg | 5 mg | 10 mg |
|---|---|---|---|
| 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 |

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

**In Vivo**

1. Add each solvent one by one: PBS

Solubility: 3.33 mg/mL (16.89 mM); Clear solution; Need ultrasonic and warming and heat to 60°C

## BIOLOGICAL ACTIVITY

**Description**

L-DOPA (Levodopa) is an orally active metabolic precursor of neurotransmitters dopamine. L-DOPA can cross the blood-brain barrier and is converted into dopamine in the brain. L-DOPA has anti-allodynic effects and the potential for Parkinson's disease[1][2][3].

**$IC_{50}$ & Target**

Human Endogenous Metabolite

**In Vivo**

L-DOPA can be used in animal modeling to construct a rat model of dyskinesia. L-DOPA (20 mg/kg; oral) reduces Rotenone-induced motor dysfunction[3].

L-DOPA (10, 30, 50, 70, and 100 mg/kg; oral) reverses tactile, cold and heat allodynia in neuropathic rat without any side effect in sprague-Dawley rats[4].In adult common marmosets (Callithrix jacchus, 2-3 years old, 270-350 g), L-DOPA (20/5 mg/kg, p.o.) shows the $T_{max}$ was 30 min in plasma and 60-90 min in extracellular fluid (ECF) of striatum. Mean $C_{max}$ was 20.3 μM in plasma and 442.9 nM in ECF of striatum, which is about 2.2% of that in plasma[6].

Induction of dyskinesia model[5]

Background

L-DOPA-induced dyskinesia results from a pulsatile stimulation of brain dopamine (DA) receptors, triggering a complex cascade of molecular and synaptic alterations within the basal ganglia[5].

Specific Mmodeling Methods

Mice: C57Bl/6 mice?•?male?• 8 weeks (period: 21 days)

Administration: 20 mg/kg?•?ip?•?once daily for 21 days

Note

(1) sustained unilateral 6-OHDA injections in the striatum before starting treatment.

(2) Injection volume is 10mL/kg body weight.

Modeling Record

Behavioral changes: Shows developed abnormal involuntary movements (AIMs) affecting the head, trunk and forelimb on the side contralateral to the lesion.

Correlated Product(s): Oxidopamine hydrochloride (HY-B1081)
Oxidopamine hydrobromide (HY-B1081A)

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

| | |
|---|---|
| Animal Model: | 7-week-old C57BL/6J mice[3] |
| Dosage: | 20 mg/kg |
| Administration: | Orally |
| Result: | Reduced Rotenone-induced motor dysfunction. |

| | |
|---|---|
| Animal Model: | Sprague-Dawley rats (male 100-150 g)[4] |
| Dosage: | 10, 30, 50, 70, and 100 mg/kg |
| Administration: | Orally |
| Result: | Reverses tactile, cold and heat allodynia in neuropathic rat without any side effect. |

## CUSTOMER VALIDATION

- Int J Biol Macromol. 2020 Jun 15;153:88-99.
- Biomed Pharmacother. 2024 Apr 27:175:116664.

- Free Radic Biol Med. 2024 May 6:S0891-5849(24)00437-4.
- Antioxidants (Basel). 2022, 11(7), 1317.
- Nutrients. 2022, 14(21), 4678

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## REFERENCES


[1]. M Lundblad, et al. Pharmacological validation of a mouse model of l-DOPA-induced dyskinesia. Exp Neurol. 2005 Jul;194(1):66-75.

[2]. Jie Zhang, et al. Pharmacokinetics of L-dopa in plasma and extracellular fluid of striatum in common marmosets. Brain Res. 2003 Dec 12;993(1-2):54-8.

[3]. Hyland K, et al. Aromatic L-amino acid decarboxylase deficiency: diagnostic methodology. Clin Chem. 1992 Dec;38(12):2405-10.

[4]. Merims D, et al. Dopamine dysregulation syndrome, addiction and behavioral changes in Parkinson's disease. Parkinsonism Relat Disord. 2008;14(4):273-80. Epub 2007 Nov 7.

[5]. 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.

[6]. Park HJ, et al. Anti-allodynic effects of levodopa in neuropathic rats. Yonsei Med J. 2013 Mar 1;54(2):330-5.





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