Harmine

Cat. No.: HY-N0737A

CAS No.: 442-51-3

Molecular Formula: $C_{13}H_{12}N_2O$

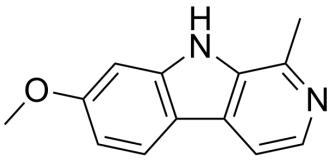
Molecular Weight: 212.25

Target: DYRK; 5-HT Receptor

Pathway: Protein Tyrosine Kinase/RTK; GPCR/G Protein; Neuronal Signaling

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	1 year
	-20°C	6 months



SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 30 mg/mL (141.34 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	4.7114 mL	23.5571 mL	47.1143 mL
5 mM	0.9423 mL	4.7114 mL	9.4229 mL
10 mM	0.4711 mL	2.3557 mL	4.7114 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 (11.78 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (11.78 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Harmine is a natural dual-specificity tyrosine phosphorylation-regulated kinase (DYRK) inhibitor with anticancer and anti-inflammatory activities. Harmine has a high affinity of 5-HT_{2A} serotonin receptor, with an K_i of 397 nM[1].

IC_{50} & Target

5-HT_{2A} Receptor 397 nM (Ki)	DYRK1A

In Vitro

Harmine inhibits tau phosphorylation by DYRK1A by selected DANDYs, with an IC_{50} of 190 nM[2].Harmine negatively regulates homologous recombination (HR) by interfering Rad51 recruitment, resulting in severe cytotoxicity in hepatoma cells. Furthermore, NHEJ inhibitor Nu7441 markedly sensitizes Hep3B cells to the anti-proliferative effects of Harmine[3].

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

In Vivo

It is shown that brain water content is significantly increased in the TBI group. Treatment with Harmine significantly reduces the tissue water content at 1, 3 and 5 days, compared with the TBI group. Harmine treatment significantly reduces the escape latency at 3 and 5 days, compared with the TBI group. Post-TBI administration of Harmine significantly improves the motor function recovery of the rats at 1, 3 and 5 days following TBI, compared with the TBI group without Harmine treatment. The neuronal survival rate in the Harmine-treated group is significantly increased, compared with the TBI group. Administration of Harmine results in marked elevation in the expression of GLT-1, compared with the TBI group. The administration of Harmine significantly reduces the expression of caspase 3, compared with the TBI group[4].

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PROTOCOL

Animal Administration [4]

Rats[4]

A total of 150 male Sprague-Dawley rats (age, 10-12 weeks; weighing, 280-320 g; are used in the present study. The rats are randomly divided into three groups: Sham-operated group (sham; n=15); the TBI group (TBI; n=35) and the TBI + Harmine-treated group (Harmine; n=35). Harmine is administered immediately following TBI (i.p, 30 mg/kg per day) for up to 5 days. The sham and TBI groups receive equal volumes of 0.9% saline solution (i.p.). The rats are grouped as follows for examination of behavioral recovery: Sham, n=3; TBI, n=7; and Harmine, n=7. Following TBI, the NSS is evaluated at 1, 3 and 5 days. Each rat is assessed by an observer who is blinded to the animal treatment[4].

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

CUSTOMER VALIDATION

- Cell Stem Cell. 2022 Apr 7;29(4):545-558.e13.
- J Clin Invest. 2024 Jul 18:e179472.
- Sci Adv. 2023 Dec 22;9(51):eadi5683.
- J Biomed Sci. 2022 Jun 2;29(1):34.
- Int Immunopharmacol. 2023 May 5;119:110208.

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REFERENCES

[1]. Glennon RA, et al. Binding of beta-carbolines and related agents at serotonin (5-HT(2) and 5-HT(1A)), dopamine (D(2)) and benzodiazepine receptors. Drug Alcohol Depend. 2000 Aug 1;60(2):121-32.

[2]. Neumann F, et al. DYRK1A inhibition and cognitive rescue in a Down syndrome mouse model are induced by new fluoro-DANDY derivatives. Sci Rep. 2018 Feb 12;8(1):2859.

[3]. Zhang L, et al. Harmine suppresses homologous recombination repair and inhibits proliferation of hepatoma cells. Cancer Biol Ther. 2015;16(11):1585-92.

[4]. Zhong Z, et al. Treatment with harmine ameliorates functional impairment and neuronal death following traumatic brain injury. Mol Med Rep. 2015 Dec;12(6):7985-91.

Caution: Product has not been fully validated for medical applications. For research use only.

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