L-Phenylalanine

Cat. No.: HY-N0215

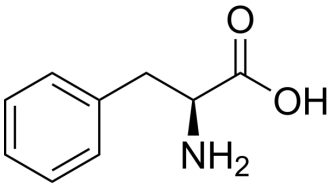
CAS No.: 63-91-2

Molecular Formula: $C_9H_{11}NO_2$

Molecular Weight: 165.19

Target: Calcium Channel; Endogenous Metabolite; iGluR

Pathway: Membrane Transporter/Ion Channel; Neuronal Signaling; Metabolic Enzyme/Protease



Storage:

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

SOLVENT & SOLUBILITY

In Vitro

H_2O : 6.67 mg/mL (40.38 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	6.0536 mL	30.2682 mL	60.5364 mL
5 mM	1.2107 mL	6.0536 mL	12.1073 mL
10 mM	0.6054 mL	3.0268 mL	6.0536 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 9.09 mg/mL (55.03 mM); Clear solution; Need ultrasonic and warming and heat to 60°C

BIOLOGICAL ACTIVITY

Description

L-Phenylalanine ((S)-2-Amino-3-phenylpropionic acid) is an essential amino acid isolated from Escherichia coli. L-Phenylalanine is a α2δ subunit of voltage-dependent Ca^+ channels antagonist with a K_i of 980 nM. L-phenylalanine is a competitive antagonist for the glycine- and glutamate-binding sites of N-methyl-D-aspartate receptors (NMDARs) (K_B of 573 μM) and non-NMDARs, respectively. L-Phenylalanine is widely used in the production of food flavors and pharmaceuticals[1][2][3][4].

IC_{50} & Target			
	Microbial Metabolite	NMDA Receptor	Human Endogenous Metabolite

In Vitro

DAHP synthetase (DS) and chorismate mutase/prephenate dehydratase (CM/PD) are key enzymes in the L-Phenylalanine biosynthesis pathway. DS is sensitive to feedback inhibition by tyrosine, and CM/PD is subject to feedback inhibition by L-Phenylalanine[1].L-Phenylalanine attenuates non-NMDA receptor function in cultured neurons with an IC_{50} of 980 μM[5].

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

In Vivo	The effects of L-Phenylalanine on NMDA-activated currents (I_{NMDA}) are studied in cultured hippocampal neurons from newborn rats using the patch-clamp technique. L-Phenylalanine specifically and reversibly attenuates I_{NMDA} in a concentration-dependent manner (IC_{50} of 1.71 mM). L-Phenylalanine inhibits specifically NMDAR current in hippocampal neurons by competing for the glycine-binding site[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Acta Pharm Sin B. 2024 Apr 23.

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REFERENCES

[1]. Glushakov AV, et al. Long-term changes in glutamatergic synaptic transmission in phenylketonuria. Brain. 2005 Feb;128(Pt 2):300-7.

[2]. Glushakov AV, et al. L-phenylalanine selectively depresses currents at glutamatergic excitatory synapses. J Neurosci Res. 2003 Apr 1;72(1):116-24.

[3]. Glushakov AV, et al. Specific inhibition of N-methyl-D-aspartate receptor function in rat hippocampal neurons by L-phenylalanine at concentrations observed during phenylketonuria. Mol Psychiatry. 2002;7(4):359-67.

[4]. Mortell KH, et al. Structure-activity relationships of alpha-amino acid ligands for the alpha2delta subunit of voltage-gated calcium channels. Bioorg Med Chem Lett. 2006 Mar 1;16(5):1138-41.

[5]. Wu WB, et al. Enhancement of l-phenylalanine production in Escherichia coli by heterologous expression of Vitreoscilla hemoglobin. Biotechnol Appl Biochem. 2018 May;65(3):476-483.

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