Penicillamine

Cat. No.: HY-B0300

CAS No.: 52-67-5

Molecular Formula: $C_5H_{11}NO_2S$

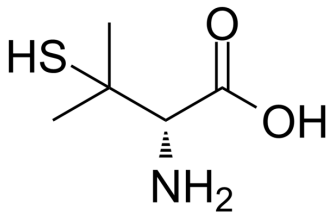
Molecular Weight: 149.21

Target: Drug Metabolite; Cuproptosis

Pathway: Metabolic Enzyme/Protease; Apoptosis

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 : 83.33 mg/mL (558.47 mM; ultrasonic and warming and heat to 60°C)
DMSO : 1.43 mg/mL (9.58 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	6.7020 mL	33.5098 mL	67.0196 mL
5 mM	1.3404 mL	6.7020 mL	13.4039 mL
10 mM	0.6702 mL	3.3510 mL	6.7020 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 100 mg/mL (670.20 mM); Clear solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Penicillamine (D-(-)-Penicillamine) is a penicillin metabolic degradation product, can be used as a heavy metal chelator. Penicillamine reduces free copper and reduces oxidative stress. Penicillamine has effect of seizures through nitric oxide/NMDA pathways. Penicillamine is a potential immune modulator. Penicillamine can be used for the research of Wilson disease, rheumatoid arthritis, and cystinuria[1][2][3][4].

In Vitro

Penicillamine (D-(-)-Penicillamine) (5 mg; 7 d; $CD4^+$ and CD^+ splenocytes) promotes cellular immune responses[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Western Blot Analysis[3]

Cell Line:	$CD4^+$ and CD^+ splenocytes

Concentration:	5 mg
Incubation Time:	7 days
Result:	Increased IL-4 and IFN-γ mRNA expression in response to high dose treatment and remained high in both $CD4^+$ and CD^+ splenocytes.

In Vivo

Penicillamine (D-(-)-Penicillamine) (200 mg/kg; i.g.; daily, for 3, 10 and 14 d; tx mice and DL mice) increases serum free copper concentration[1].
Penicillamine (200 mg/kg; i.g.; daily, for 3, 10 and 14 d; tx mice and DL mice) increases ATP7A and CTR1 mRNA expression in the brain of tx mice[1].
Penicillamine (200 mg/kg; i.g.; daily, for 3, 10 and 14 d; tx mice and DL mice) induces oxidative-stress in the central nervous system[1].
Penicillamine (0.1-250 mg/kg; i.p.; once, for 90 min; male NMRI mice) has binaural phase effect on seizure[2].
Penicillamine (5 mg/kg; i.v.; daily, for 8 weeks; male BN rats) prevents the onset of autoimmunity at a low dose[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Toxic milk mutant mice (tx mice) and DL mice[1]
Dosage:	200 mg/kg
Administration:	Oral gavage; daily, for 3, 10 and 14 days
Result:	Increased the free copper concentrations in the tx mice serum on the 3rd day.

Animal Model:	Toxic milk mutant mice (tx mice) and DL mice[1]
Dosage:	200 mg/kg
Administration:	Oral gavage; daily, for 3, 10 and 14 days
Result:	Increased the mRNA expression of ATP7A by 4-fold. Increased CTR1 mRNA expression by 6.9-fold in the cortex and 9.1-fold in the basal ganglia of tx mice.

Animal Model:	Toxic milk mutant mice (tx mice) and DL mice[1]
Dosage:	200 mg/kg
Administration:	Oral gavage; daily, for 3, 10 and 14 days
Result:	Increased the concentration of MDA and decreased GSH/GSSG ratios through nitric oxide/NMDA pathways.

Animal Model:	Male NMRI mice[2]
Dosage:	0.1, 0.5, 1, 10, 100, 150 and 250 mg/kg
Administration:	Intraperitoneal injection; once, for 90 minutes
Result:	Had anticonvulsant effects at a low dose (0.5 mg/kg) and had anticonvulsant effects at a high dose (250 mg/kg). Reversed the anti- and proconvulsant effects by acute pretreatment of L-NAME (a nonselective nitric oxide synthase inhibitor) and 7-NI (a selective neuronal nitric oxide synthase inhibitor).

Animal Model:	Male BN rats[3]
Dosage:	5 mg/kg
Administration:	Intravenous injection; daily, for 8 weeks
Result:	Inhibited IgE upregulation and prevented the onset of autoimmunity.

CUSTOMER VALIDATION

- Antioxidants. 2021 Jun 29;10(7):1049.
- Nitric Oxide. 8 October 2022.

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REFERENCES

[1]. Chen DB, et, al. Penicillamine increases free copper and enhances oxidative stress in the brain of toxic milk mice. PLoS One. 2012;7(5):e37709.

[2]. Rahimi N, et, al. Effects of D-penicillamine on pentylenetetrazole-induced seizures in mice: involvement of nitric oxide/NMDA pathways. Epilepsy Behav. 2014 Oct;39:42-7.

[3]. Masson MJ, et, al. Tolerance induced by low dose D-penicillamine in the brown Norway rat model of drug-induced autoimmunity is immune-mediated. Chem Res Toxicol. 2004 Jan;17(1):82-94.

[4]. Ishak R, et, al. Penicillamine revisited: historic overview and review of the clinical uses and cutaneous adverse effects. Am J Clin Dermatol. 2013 Jun;14(3):223-33.

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