W-7 hydrochloride

Cat. No.: HY-100912

CAS No.: 61714-27-0

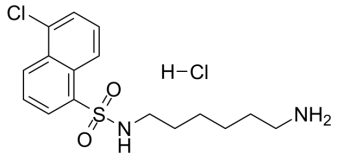
Molecular Formula: $C_{16}H_{22}Cl_2N_2O_2S$

Molecular Weight: 377.33

Target: Phosphodiesterase (PDE); Myosin; Apoptosis; Calmodulin

Pathway: Metabolic Enzyme/Protease; Cytoskeleton; Apoptosis; Membrane Transporter/Ion Channel

Storage: 4°C, sealed storage, away from moisture
* In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 250 mg/mL (662.55 mM; Need ultrasonic)
H_2O : 1.43 mg/mL (3.79 mM; ultrasonic and warming and heat to 60°C)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	2.6502 mL	13.2510 mL	26.5020 mL
5 mM	0.5300 mL	2.6502 mL	5.3004 mL
10 mM	0.2650 mL	1.3251 mL	2.6502 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: ≥ 2.08 mg/mL (5.51 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.08 mg/mL (5.51 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.08 mg/mL (5.51 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

W-7 hydrochloride is a selective calmodulin antagonist. W-7 hydrochloride inhibits the Ca^{2+}-calmodulin-dependent phosphodiesterase and myosin light chain kinase with IC_{50} values of 28 μM and 51 μM, respectively[1][2]. W-7 hydrochloride induces apoptosis and has antitumor activity[3].

IC_{50} & Target

IC50: 28 μM (Phosphodiesterase) and 51 μM (Myosin light chain kinase)[1]

In Vitro

W-7 is distributed mainly in the cytoplasm, and inhibits proliferation of Chinese hamster ovary K1 (CHO-K1) cells. W-7

selectively blocks the phase of the cell cycle (G1/S boundary phase) in a manner. 25 μM W-7 arrests the growth of the cells at the G1/S boundary phase of the cell cycle[1].
W-7 (100 μM) exhibits a similar extent of antagonism between the contractile responses to carbachol and KCl. The increase in myosin light chain (P-LC) phosphate content in response to 1-min stimulation with 10 μM carbachol is inhibited by W-7. W-7 antagonizes the smooth muscle contraction through the inhibition of the initial increase in the P-LC phosphorylation[2].
Treatment with W-7 results in the dose-dependent inhibition of cell proliferation in various human multiple myeloma cell lines. W-7 induces G1 phase cell cycle arrest by downregulating cyclins and upregulating p21cip1. W-7 induces apoptosis via caspase activation; this occurred partly through the elevation of intracellular calcium levels and mitochondrial membrane potential depolarization and through inhibition of the STAT3 phosphorylation and subsequent downregulation of Mcl-1 protein[3].
W-7 competitively inhibits Ca^{2+}/calmodulin-dependent phosphodiesterase with a K_i value of 300 μM[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

W-7 (3 mg/kg; intraperitoneal injection; on 5 consecutive days per week; female BALB/c nu mice) treatment significantly reduces tumor growth in a murine MM model[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Female BALB/c nu mice (6-week-old) injected with RPMI 8226 cells[3]
Dosage:	3 mg/kg
Administration:	Intraperitoneal injection; on 5 consecutive days per week
Result:	Significantly reduced tumor growth in a murine MM model.

CUSTOMER VALIDATION

- Adv Healthc Mater. 2023 Sep 6;e2301137.

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REFERENCES

[1]. H Hidaka, et al. N-(6-aminohexyl)-5-chloro-1-naphthalenesulfonamide, a Calmodulin Antagonist, Inhibits Cell Proliferation. Proc Natl Acad Sci U S A. 1981 Jul;78(7):4354-7.

[2]. M Asano. Divergent Pharmacological Effects of Three Calmodulin Antagonists, N-(6-aminohexyl)-5-chloro-1-naphthalenesulfonamide (W-7), Chlorpromazine and Calmidazolium, on Isometric Tension Development and Myosin Light Chain Phosphorylation in Intact Bovin

[3]. H Itoh, et al. Direct Interaction of Calmodulin Antagonists With Ca2+/calmodulin-dependent Cyclic Nucleotide Phosphodiesterase. J Biochem. 1984 Dec;96(6):1721-6.

[4]. Shigeyuki Yokokura, et al. Calmodulin Antagonists Induce Cell Cycle Arrest and Apoptosis in Vitro and Inhibit Tumor Growth in Vivo in Human Multiple Myeloma. BMC Cancer. 2014 Nov 26;14:882.

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