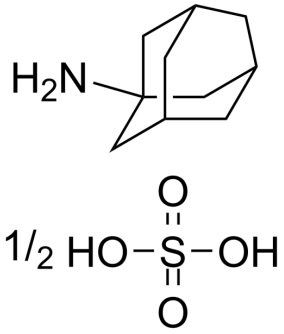
Amantadine sulfate

Cat. No.:	HY-B0402B
CAS No.:	31377-23-8
Molecular Formula:	$C_{10}H_{17}N.{}_1/_2H_2O_4S$
Molecular Weight:	200.18
Target:	Influenza Virus; Orthopoxvirus; SARS-CoV; Apoptosis; CDK; Bcl-2 Family
Pathway:	Anti-infection; Apoptosis; Cell Cycle/DNA Damage
Storage:	Please store the product under the recommended conditions in the Certificate of Analysis.



BIOLOGICAL ACTIVITY

Description	Amantadine (1-Adamantanamine) sulfate is an orally avtive and potent antiviral agent with activity against influenza A viruses. Amantadine sulfate inhibits several ion channels such as NMDA and M2, and also inhibits Coronavirus ion channels. Amantadine sulfate also has anti-orthopoxvirus and anticancer activity. Amantadine sulfate can be used for Parkinson's disease, postoperative cognitive dysfunction (POCD) and COVID-19 research[1][2][3][4][5][6].		
IC_{50} & Target	CDK2	Bcl-2	Bax

In Vitro

Amantadine sulfate (0-500 μM, 26 h) inhibits SARS-CoV-2 replication, with IC_{50} concentrations between 83 and 119 μM[4].
Amantadine sulfate (0-100 μg/mL, 24-72 h) markedly inhibits the proliferation of HepG2 and SMMC□7721 cells[6].
Amantadine sulfate (0-75 μg/mL, 48 h) arrests the cell cycle at the G0/G1 phase and induces apoptosis[6].
Amantadine sulfate (0-75 μg/mL, 48 h) reduces the levels of the cell cycle□related genes and proteins (cyclin D1, cyclin E and CDK2), reduces Bcl-2 and increases the Bax protein and mRNA levels[6].

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

Cell Viability Assay[4]

Cell Line:	Vero E6 cells
Concentration:	500 μM, 100 μM, 20 μM, 4 μM, and 8 nM
Incubation Time:	26 h
Result:	Caused a concentration-dependent reduction (IC_{50}=83 μM) of viral nucleic acids in the supernatant 26 h after infection at 10-500 μM. Caused a concentration-dependent reduction (IC_{50}=119 μM) of viral nucleic acids in the cytosol 26 h after infection.

Cell Proliferation Assay[6]

Cell Line:	Human HCC cell lines (HepG2 and SMMC-7721) and normal hepatocellular cells (L02 cells)
Concentration:	0, 1, 2, 5, 10, 25, 50 and 100 μg/mL
Incubation Time:	24, 48 and 72 h
Result:	Inhibited cellular proliferation in a time- and dose-dependent manner in HepG2 and SMMC-7721 cells.

Cell Cycle Analysis[6]

Cell Line:	HepG2 and SMMC-7721 cells
Concentration:	0, 10, 25, 50 and 75 μg/mL
Incubation Time:	48 h
Result:	Significantly increased the population of HepG2 and SMMC-7721 cells in the G0/G1 phase in a dose-dependent manner, and significantly decreased the number of HepG2 cells in the S phase.

Apoptosis Analysis[6]

Cell Line:	HepG2 and SMMC-7721 cells
Concentration:	0, 10, 25, 50 and 75 μg/mL
Incubation Time:	48 h
Result:	Markedly increased the percentage of apoptotic HepG2 and SMMC-7721 cells (early- and late-stage apoptosis) in a dose-dependent manner.

Western Blot Analysis[6]

Cell Line:	HepG2 and SMMC-7721 cells
Concentration:	0, 10, 25, 50 and 75 μg/mL
Incubation Time:	48 h
Result:	Showed downregulation of cyclin D1, cyclin E and CDK2, and showed a decrease in Bcl-2 levels and an increase of Bax levels in HepG2 and SMMC-7721 cells.

RT-PCR[6]

Cell Line:	HepG2 and SMMC-7721 cells
Concentration:	0, 10, 25, 50 and 75 μg/mL
Incubation Time:	48 h
Result:	Revealed an increase in Bax and decrease in Bcl-2 genes.

In Vivo

Amantadine sulfate (25 mg/kg, IP, once daily for 3 days) inhibits surgery induced neuroinflammation and learning and memory impairment[5].

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Animal Model:	Fischer 344 rats (Four-month old, male, 290-330 g, 15 rats each group)[5]
Dosage:	25 mg/kg
Administration:	IP, once daily for 3 days (the first dose at 15 min before surgery)
Result:	Inhibited surgery induced neuroinflammation and learning and memory impairment, increased GDNF (glial cell line-derived neurotrophic factor) that was co-localized with glial fibrillary acidic protein (an astrocytic marker) in the hippocampus.

CUSTOMER VALIDATION

- Signal Transduct Target Ther. 2021 Mar 27;6(1):134.
- Int J Nanomedicine. 2019 Nov 27;14:9217-9234.

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REFERENCES

[1]. Suzuki H, et al. Emergence of amantadine-resistant influenza A viruses: epidemiological study. J Infect Chemother. 2003;9(3):195-200.

[2]. Hubsher G, et al. Amantadine: the journey from fighting flu to treating Parkinson disease. Neurology. 2012;78(14):1096-1099.

[3]. Donald F Smee, et al. A review of compounds exhibiting anti-orthopoxvirus activity in animal models. Antiviral Res. 2003 Jan;57(1-2):41-52.

[4]. Fink K, et al. Amantadine Inhibits SARS-CoV-2 In Vitro. Viruses. 2021 Mar 24;13(4):539.

[5]. Zhang J, et al. Amantadine alleviates postoperative cognitive dysfunction possibly by increasing glial cell line-derived neurotrophic factor in rats. Anesthesiology. 2014 Oct;121(4):773-85.

[6]. Lan Z, et al. Amantadine inhibits cellular proliferation and induces the apoptosis of hepatocellular cancer cells in vitro. Int J Mol Med. 2015;36(3):904-910.

Tel: 609-228-6898 Fax: 609-228-5909 E-mail: tech@MedChemExpress.com

Address: 1 Deer Park Dr, Suite Q, Monmouth Junction, NJ 08852, USA