Imipramine

Cat. No.: HY-B1490A

CAS No.: 50-49-7

Molecular Formula: $C_{19}H_{24}N_2$

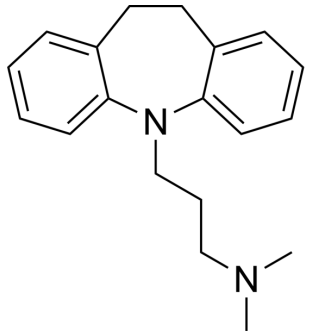
Molecular Weight: 280.41

Target: Autophagy; Apoptosis; Serotonin Transporter

Pathway: Autophagy; Apoptosis; Neuronal Signaling

Storage:

Pure form	-20°C	3 years
	4°C	2 years
In solvent	-80°C	6 months
	-20°C	1 month



SOLVENT & SOLUBILITY

In Vitro

DMSO : 250 mg/mL (891.55 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	3.5662 mL	17.8310 mL	35.6621 mL
	5 mM	0.7132 mL	3.5662 mL	7.1324 mL
	10 mM	0.3566 mL	1.7831 mL	3.5662 mL

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

BIOLOGICAL ACTIVITY

Description

Imipramine is an orally active tertiary amine tricyclic antidepressant. Imipramine is a Fascin1 inhibitor with antitumor activities. Imipramine also inhibits serotonin transporter with an IC_{50} value of 32 nM. Imipramine stimulates U-87MG glioma cells autophagy and induces HL-60 cell apoptosis. Imipramine shows neuroprotective and immunomodulatory effects[1][2][3][4][5].

IC_{50} & Target

Fascin1, Serotonin Transporter, Autophagy, Apoptosis[1][2][3][5]

IC_{50}: 32 nM (human placental serotonin transporter)[5]

In Vitro

Imipramine (0.5-300 μM, 3 days) inhibits HCT-116 cell viability[1].

Imipramine (20 μM) inhibits cell migration (7 h) and invasion (48 h)[1].

Imipramine (50 μM, 0-240 min) inhibites the PI3K/Akt/mTOR signaling pathway in U-87MG glioma cells[2].

Imipramine (60 μM, 24 h) stimulates U-87MG glioma cells autophagy[2].

Imipramine (80 μM, 24 h) induces HL-60 cell apoptosis[3].

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

Cell Viability Assay[1]

Cell Line:	DLD-1, HCT-116, and SW-480
Concentration:	0.5-300 μM
Incubation Time:	3 days
Result:	Inhibited cell viability and HCT-116 was more sensitive than DLD-1 and SW-480.

Cell Migration Assay [1]

Cell Line:	DLD-1, HCT-116, and SW-480
Concentration:	20 μM
Incubation Time:	7 h
Result:	Produced a remarkable inhibition of migration in all assayed cell lines.

Cell Invasion Assay[1]

Cell Line:	HCT-116
Concentration:	20 μM
Incubation Time:	48 h
Result:	Inhibited cell invasion through Matrigel.

Western Blot Analysis[2]

Cell Line:	U-87MG
Concentration:	50 μM
Incubation Time:	0, 15, 30, 60, 120 and 240 min
Result:	Markedly inhibited the phosphorylation of both Akt (Ser473) and mTOR (Ser2481) in a time-dependent manner. Also dephosphorylated p70 S6K, a downstream target of mTOR.

Cell Autophagy Assay[2]

Cell Line:	U-87MG
Concentration:	60 μM
Incubation Time:	24 h
Result:	Stimulated the induction of autophagy through the redistribution of LC3 in U-87MG glioma cells.

Apoptosis Analysis[3]

Cell Line:	HL-60
Concentration:	80 μM
Incubation Time:	24 h
Result:	Induced cell apoptosis.

In Vivo

Imipramine (20 mg/kg, i.p. or 15 mg/kg, p.o.; daily for 24 days) attenuates neuroinflammatory signaling and reverses stress-induced social avoidance in mice[4].

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

Animal Model:	Male C57BL/6 mice (6–8 weeks old) subjected to RSD (repeated social defeat) and HCC (home cage control)[4]
Dosage:	20 mg/kg or 15 mg/kg
Administration:	Intraperitoneal injection or oral administration, daily for 24 days
Result:	Reversed RSD-induced social avoidance behavior, significantly increasing the interaction time, significantly decreased stress-induced mRNA levels for IL-6 in brain microglia.

CUSTOMER VALIDATION

- Nat Chem Biol. 2024 Feb 14.
- Cell Commun Signal. 2023 May 25;21(1):123.
- Inflammation. 2021 Jan 29.
- Pathogens. 2022 May 22;11(5):602.

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REFERENCES

[1]. Alburquerque-González B, et al. New role of the antidepressant imipramine as a Fascin1 inhibitor in colorectal cancer cells. Exp Mol Med. 2020 Feb;52(2):281-292.

[2]. Jeon SH, et al. The tricyclic antidepressant imipramine induces autophagic cell death in U-87MG glioma cells. Biochem Biophys Res Commun. 2011 Sep 23;413(2):311-7.

[3]. Xia Z, et al. The antidepressants imipramine, clomipramine, and citalopram induce apoptosis in human acute myeloid leukemia HL-60 cells via caspase-3 activation. J Biochem Mol Toxicol. 1999;13(6):338-47.

[4]. Ramirez K, et al. Imipramine attenuates neuroinflammatory signaling and reverses stress-induced social avoidance. Brain Behav Immun. 2015 May;46:212-20.

[5]. Balkovetz DF, et al. Evidence for an imipramine-sensitive serotonin transporter in human placental brush-border membranes. J Biol Chem. 1989 Feb 5;264(4):2195-8.

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