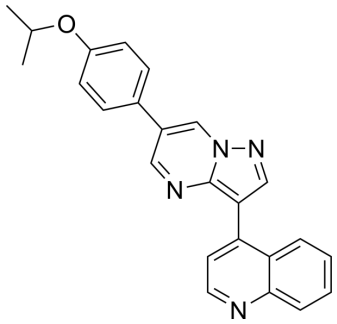
DMH-1



Cat. No.:	HY-12273
CAS No.:	1206711-16-1
Molecular Formula:	$C_{24}H_{20}N_4O$
Molecular Weight:	380.44
Target:	Autophagy; TGF-β Receptor
Pathway:	Autophagy; TGF-beta/Smad
Storage:	Powder -20°C 3 years 4°C 2 years In solvent -80°C 2 years -20°C 1 year

SOLVENT & SOLUBILITY

In Vitro

DMSO : 11.5 mg/mL (30.23 mM; Need ultrasonic and warming)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	2.6285 mL	13.1427 mL	26.2854 mL
	5 mM	0.5257 mL	2.6285 mL	5.2571 mL
	10 mM	0.2629 mL	1.3143 mL	2.6285 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: ≥ 1 mg/mL (2.63 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

DMH-1 is a potent and selective BMP inhibitor with IC_{50}s of 27/107.9/<5/47.6 nM for ALK1/ALK2/ALK3/ALK6, respectively.

IC_{50} & Target

IC50: 27 nM (ALK1), 107.9 nM (ALK2), <5 nM (ALK3), 47.6 nM (ALK6)[1]

In Vitro

DMH-1 (0.5 μM) induces regulation of OCT4, Nanog, and PAX6 protein expression. DMH-1 significantly reduces the percentage of cells expressing the pluripotency marker proteins OCT4 and Nanog in both SM3 and CA6 cells. PAX6 expression is significantly up-regulated by day 5 and day 7 in CA6 and SM3 cells, respectively. DMH-1 induces regulation of pluripotency and neural precursor marker mRNAs. PAX6 can regulate the expression of SOX1 independently by manipulating the DMH-1 concentration during the neural induction of hiPSCs[2]. DMH-1 (5 μM and 10 μM) inhibits CDDP-induced autophagy in HeLa cells and enhances the ability of CDDP to reduce HeLa cell viability, inhibits tamoxifen-induced autophagy in MCF-7 cells and enhances the ability of Tamoxifen (HY-13757A) to reduce MCF-7 cell viability, inhibits 5-FU-induced autophagy in both MCF-7 and HeLa cells but does not affect the inhibitory effects of 5-FU on MCF-7 and HeLa cell

	viability. DMH-1 enhances the apoptotic induction effects of CDDP on HeLa cells after 24 h treatment. DMH-1 inhibits HeLa and MCF-7 cell proliferation[3]. DMH-1 (20 μM) reduces the canonical phosphorylation of Smads 1,5 and 9. DMH-1 in combination with Cisplatin significantly decreases Ki-67 positive staining in the OVCAR8 cells. DMH-1 (20 μM) upregulates JAG1, reduces CYP1B1 and increases HAPLN1 expression in both OVCAR8 and NCI-RES cells[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	DMH1 (5 mg/kg, i.p.) treatment significantly reduces the tumor growth in human lung cancer xenograft model[5]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [3]	Cells are seeded in 96-well plates and treated with different drugs for appropriate time. Then 5 mg/mL MTT is added and incubated for 4 h at 37°C. Medium is then removed and 200 μL of DMSO is added to dissolve the crystal. Absorbance is measured at a wavelength of 490 nm with a plate reader. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [5]	Sub-confluent A549 cells are trypsinized and then suspended in serum free RPMI 1640 medium. The cell suspension (1×10^6 cells in 100 μL medium for each injection) is injected subcutaneously into both the right and left flanks of eight-week old NOD SCID mice (n=5 for each group). Mice are given Intraperitoneal (i.p.) injection of the vehicle (12.5% 2-hydroxypropyl-β-cyclodextrin) or 5 mg/kg DMH1 every other day. The tumor sizes are measured with a vernier caliper from the sixth day to the fourth week after tumor implantation. The tumor volume (V) is calculated according to the formulation: Volume=$(\text{width})^2\times\text{length}/2$. The tumor tissues are dissected at the end of study, and are sectioned and stained with H & E, and for immunohistochemical analysis. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Compos Part B-Eng. 2023 Apr 6, 110711.
- Dev Cell. 2016 Oct 24;39(2):239-253.
- Cell Rep. 2019 Feb 12;26(7):1709-1717.e3.
- Cell Prolif. 2023 Dec 2:e13577.
- Stem Cell Res Ther. 2022 Sep 2;13(1):436.

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REFERENCES

[1]. Engers DW, et al. Synthesis and structure-activity relationships of a novel and selective bone morphogenetic protein receptor (BMP) inhibitor derived from the pyrazolo[1.5-a]pyrimidine scaffold of dorsomorphin: the discovery of mL347 as an ALK2 versus ALK3 selective mLPCN probe. Bioorg Med Chem Lett. 2013 Jun 1;23(11):3248-52.

[2]. Neely MD, et al. DMH1, a highly selective small molecule BMP inhibitor promotes neurogenesis of hiPSCs: comparison of PAX6 and SOX1 expression during neural induction. ACS Chem Neurosci. 2012 Jun 20;3(6):482-91.

[3]. Sheng Y, et al. DMH1 (4-[6-(4-isopropoxyphenyl)pyrazolo[1,5-a]pyrimidin-3-yl]quinoline) inhibits chemotherapeutic drug-induced autophagy. Acta Pharm Sin B. 2015 Jul;5(4):330-6.

[4]. Hover LD, et al. Small molecule inhibitor of the bone morphogenetic protein pathway DMH1 reduces ovarian cancer cell growth. Cancer Lett. 2015 Nov 1;368(1):79-87.

[5]. Hao J, et al. DMH1, a small molecule inhibitor of BMP type i receptors, suppresses growth and invasion of lung cancer. PLoS One. 2014 Mar 6;9(6):e90748.

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