Mdivi-1

Cat. No.: HY-15886

CAS No.: 338967-87-6

Molecular Formula: $C_{15}H_{10}Cl_2N_2O_2S$

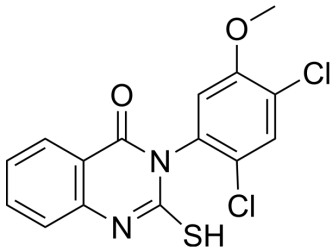
Molecular Weight: 353.22

Target: Dynamin; Mitophagy; Autophagy; Apoptosis

Pathway: Cytoskeleton; Autophagy; Apoptosis

Storage:

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



SOLVENT & SOLUBILITY

In Vitro

DMSO : 160 mg/mL (452.98 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	2.8311 mL	14.1555 mL	28.3110 mL
5 mM	0.5662 mL	2.8311 mL	5.6622 mL
10 mM	0.2831 mL	1.4155 mL	2.8311 mL

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

In Vivo

1. Add each solvent one by one: 17% Polyethylene glycol 12-hydroxystearate in saline
   Solubility: 10 mg/mL (28.31 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 4 mg/mL (11.32 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 4 mg/mL (11.32 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 4 mg/mL (11.32 mM); Clear solution
5. Add each solvent one by one: 0.5% CMC-Na/saline water
   Solubility: 2.5 mg/mL (7.08 mM); Suspended solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Mdivi-1 is a selective dynamin-related protein 1 (Drp1) inhibitor. Mdivi-1 is a mitochondrial division/mitophagy inhibitor.

In Vitro

Mdivi-1 inhibits Dnm1 GTPase activity in a dose-dependent manner, with an estimated EC_{50} of 1-10 μM. Mdivi-1 increases

	the apparent $K_{0.5}$ for GTP, lowers the apparent V_{max} for GTP hydrolysis, and causes an increase in the Hill coefficient observed for GTP in the Dnm1 GTP hydrolysis reaction[1]. Cells treated with mdivi-1 display decreased cytochrome c release and a reduced rate of phosphatidylserine exposure on their surface following apoptosis induction, consistent with an inhibition of apoptosis and with previous studies using other strategies to compromise DRP1 activity[2]. Mdivi-1 results in apoptotic cell death in ischemic retina[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	The mitochondrial division DRP, Dnm1, is the target of mdivi-1 in vivo. Mdivi-1 quantitatively blocks GMPPCP- dependent Dnm1 self-assembly in a concentration range similar to its effects on mitochondrial division in vivo[1]. Mdivi-1 (50 mg/kg, i.p.) significantly decreases GFAP protein expression in the normal mouse retina[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Kinase Assay [1]	All GTPase assay reactions are started in a 200 µL volume, of which 150 µL is placed into the well of a 96-well plate. Depletion of NADH, as monitored by reading the A340 of the reaction, is measured every 20 s for a total of 40 min using a SpectraMAX 250 96-well plate reader. Spectrophotometric data are transferred to Excel and the measured steady state depletion of NADH over time is converted to protein activity. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Cell Assay [1]	YPGlycerol plates are topped with 10 mL YPGlycerol containing 1% low melt agar and 75 µM mdivi-1, and cells are spotted 12 hours later using a 48 well pinning device. After pinning cells, plates are incubated at 24°C or 37°C and imaged using an Eagle Eye II imaging system. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Cell Mol Immunol. 2022 Jan;19(1):67-78.
- Nat Commun. 2022 Jul 6;13(1):3882.
- J Hazard Mater. 15 February 2022, 127268.
- Small. 2023 Apr 22;e2301497.
- Autophagy. 2021 Nov;17(11):3592-3606.

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REFERENCES

[1]. Cassidy-Stone A, et al. Chemical inhibition of the mitochondrial division dynamin reveals its role in Bax/Bak-dependent mitochondrial outer membrane permeabilization. Dev Cell. 2008 Feb;14(2):193-204.

[2]. Tanaka A, et al. A chemical inhibitor of DRP1 uncouples mitochondrial fission and apoptosis. Mol Cell. 2008 Feb 29;29(4):409-10.

[3]. Park SW, et al. A selective inhibitor of drp1, mdivi-1, increases retinal ganglion cell survival in acute ischemic mouse retina. Invest Ophthalmol Vis Sci. 2011 Apr 27;52(5):2837-43.

Caution: Product has not been fully validated for medical applications. For research use only.

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