Mitoquinone mesylate

Cat. No.: HY-100116A

CAS No.: 845959-50-4

Molecular Formula: $C_{38}H_{47}O_7PS$

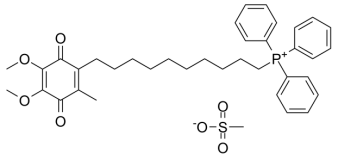
Molecular Weight: 678.81

Target: Reactive Oxygen Species

Pathway: Immunology/Inflammation; Metabolic Enzyme/Protease; NF-κB

Storage: -20°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 : 100 mg/mL (147.32 mM; ultrasonic and warming and heat to 60°C)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	1.4732 mL	7.3658 mL	14.7317 mL
	5 mM	0.2946 mL	1.4732 mL	2.9463 mL
	10 mM	0.1473 mL	0.7366 mL	1.4732 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 7.69 mg/mL (11.33 mM); Clear solution; Need ultrasonic and warming and heat to 60°C
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (3.68 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: 2.5 mg/mL (3.68 mM); Suspended solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Mitoquinone mesylate is a TPP-based, mitochondrially targeted antioxidant in order to protect against oxidative damage[1].

In Vitro

Mitoquinone (MitoQ) is a mitochondria-targeted antioxidant.The optimal doses for Mitoquinone (MitoQ) and DecylTPP treatment are selected from dose-response experiments during 4-h cold storage (CS). The potential protective benefits of Mitoquinone treatment against CS injury are tested initially using MitoSOX Red, a mitochondrial-targeted fluorescent dye that measures mitochondrial superoxide generation. Normal rat kidney (NRK) cells exposed to CS result in a ~2-fold increase in fluorescence due to mitochondrial superoxide compared with untreated cells. Mitoquinone offers significant protection against CS-induced mitochondrial superoxide generation; whereas the control compound DecylTPP does not offer any protection. Mitoquinone treatment markedly decreases mitochondrial superoxide generation, whereas kidneys treated with

	DecylTPP have comparable levels of mitochondrial superoxide to kidneys exposed to CS alone[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	Mitoquinone (MitoQ) treatment significantly reduces pancreatic oedema and neutrophil infiltration. MitoQ dose-dependently increases serum amylase with an approximate doubling at the higher dose. MitoQ treatment nearly doubles lung MPO activity induced by Caerulein with a significant increase of serum IL-6 levels also evident at 10 mg/kg (dose 1)[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [1]	Normal rat kidney proximal tubular cells (NRK-52E) are maintained in six-well 100 or 150-mm, or 150-mm plates in a humidified incubator gassed with 5% CO_2 and 95% air at 37°C in DMEM containing 5% fetal calf serum (FCS). Cells are grown to 60% confluence and divided into four treatment groups: 1) untreated (Untx), 2) CS, 3) CS+Mitoquinone (MitoQ), and 4) CS+DecylTPP. Untreated cells remained at 37°C in DMEM containing 5% FCS (group 1). CS is initiated by washing cells with cold PBS twice and storing them in UW/Viaspan solution alone (4 h at 4°C) (group 2), CS+Mitoquinone (1 μM) (group 3), or CS+DecylTPP (1 μM) (group 4). In separate experiments, cells are exposed to CS plus RW by replacing UW solution alone or UW solution containing Mitoquinone or DecylTPP with DMEM containing 5% FCS overnight (18 h at 37°C)[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [2]	Mice[2] Male CD1 mice (30-35 g) or C57BL/6J mice (20-25 g) are used. Seven intraperitoneal injections of a supramaximal dose (50 μg/kg) of Caerulein, a CCK-8 analogue, are given on an hourly basis to induce hyperstimulation acute pancreatitis (CER-AP). Control mice receive equal volumes of PBS injection. In the Mitoquinone treatment groups, Mitoquinone at 10 mg/kg (dose 1) or 25 mg/kg (dose 2) is given at the first and third injections of Caerulein. Similarly, dTPP at 9.6 mg/kg (dose 1) or 24 mg/kg (dose 2) is given for the dTPP treatment group. Mitoquinone and dTPP are at the same molar concentration at doses 1 and 2. Mice are sacrificed at 12 h after the first Caerulein injection to collect samples. Bile acid-induced AP is achieved by retrograde infusion of TLCS into the pancreatic duct (TLCS-AP). After induction of anesthesia, TLCS applied using a mini infusion pump at a speed of 5 μL/min for 10 minutes. Successful infusion of TLCS into pancreas is demonstrated by a diffuse light blue colour (methylene blue) appearing in the pancreatic head. Control mice receive sham surgery without TLCS infusion. In the treatment groups, Mitoquinone (10 mg/kg) or dTPP (9.6 mg/kg) is given at 1 h and 3 h after TLCS infusion. Mice are sacrificed at 24 h after the TLCS infusion or sham surgery. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Cell Metab. 2023 Jan 3;35(1):200-211.e9.
- Cell Metab. 2020 Dec 17;S1550-4131(20)30656-2.
- Nat Commun. 2023 Jul 24;14(1):4456.
- Nat Commun. 2022 Aug 6;13(1):4583.
- J Exp Med. 2021 Sep 6;218(9):e20202637.

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REFERENCES

[1]. Mitchell T, et al. The mitochondria-targeted antioxidant mitoquinone protects against cold storage injury of renaltubular cells and rat kidneys. J Pharmacol Exp Ther. 2011 Mar;336(3):682-92.

[2]. Huang W, et al. Effects of the mitochondria-targeted antioxidant mitoquinone in murine acute pancreatitis. Mediators Inflamm. 2015;2015:901780.

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