Rotenone

Cat. No.: HY-B1756

CAS No.: 83-79-4

Molecular Formula: $C_{23}H_{22}O_6$

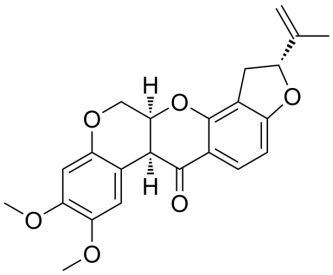
Molecular Weight: 394.42

Target: Mitochondrial Metabolism; Autophagy; Apoptosis

Pathway: Metabolic Enzyme/Protease; Autophagy; Apoptosis

Storage: 4°C, stored under nitrogen

* In solvent : -80°C, 1 year; -20°C, 6 months (stored under nitrogen)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 50 mg/mL (126.77 mM; Need ultrasonic)

H_2O : < 0.1 mg/mL (ultrasonic) (insoluble)

Preparing Stock Solutions

Concentration \ Solvent \ Mass	1 mg	5 mg	10 mg
1 mM	2.5354 mL	12.6768 mL	25.3537 mL
5 mM	0.5071 mL	2.5354 mL	5.0707 mL
10 mM	0.2535 mL	1.2677 mL	2.5354 mL

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

In Vivo

1. Add each solvent one by one: 0.5% CMC-Na/saline water
   Solubility: 25 mg/mL (63.38 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (6.34 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: 2.5 mg/mL (6.34 mM); Suspended solution; Need ultrasonic
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (6.34 mM); Clear solution
5. Add each solvent one by one: 5% DMSO >> 95% (20% SBE-β-CD in saline)
   Solubility: 2.5 mg/mL (6.34 mM); Suspended solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Rotenone is a mitochondrial electron transport chain complex I inhibitor. Rotenone induces apoptosis through enhancing mitochondrial reactive oxygen species production.

In Vitro

Mitogen Activated Protein Kinase (MAPK), Toll-like receptor, Wnt, and Ras signaling pathways are intensively involved in the effect of rotenone on the ENS[2].

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

In Vivo

Rotenone can be used in animal modeling to construct Parkinson's syndrome models. Rotenone causes a significant increase in the excitatory amino acid neurotransmitters; glutamate and aspartate together with a significant decrease in the inhibitory amino acids, GABA, glycine and taurine are observed in the cerebellum of rat model of PD [1]. Rotenone (1.5, 2, or 2.5 mg/kg) causes a dose-dependent increase in α-synuclein in the substantia nigra. Furthermore, at 2 and 2.5 mg/kg, rotenone causes a significant decrease in the number of tyrosine hydroxylase-immunoreactive neurons in the substantia nigra, and dopamine in the striatum in rats[4].

Induction of Parkinson's model[6]

- Background

  Cell loss of dopaminergic (DA) neurons in the substantia nigra is a common feature of Parkinson's disease. Rotenone induces DA neuronal cytotoxicity, leading to motor deficits in the substantia nigra and loss of DA neuronal cells in mice.

- Specific Mmodeling Methods

  Mice: male • C57BL/6J mice • 8 weeks old • 20-25 g

  Administration: 30 mg/kg in 12 mL/kg • po • once daily for 28 days • while control group treated with 0.5% Carboxylmethylcellulose (CMC)

- Modeling Indicators

  Mouse dyskinesia: slow movement/inadequate movement ability.

- Opposite Product(s):

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

CUSTOMER VALIDATION

- Nature. 2023 Sep;621(7977):188-195.
- Cell Stem Cell. 2023 Apr 6;30(4):450-459.e9.
- Nat Cancer. 2022 Aug;3(8):945-960.
- Nat Metab. 2022 Sep;4(9):1119-1137.
- Natl Sci Rev. 2021 Feb 10;8(7):nwab024.

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REFERENCES

[1]. Khadrawy YA, et al. Cerebellar neurochemical and histopathological changes in rat model of Parkinson's disease induced by intrastriatal injection of rotenone. Gen Physiol Biophys. 2016 Nov 30.

[2]. Guan Q, et al. RNA-Seq Expression Analysis of Enteric Neuron Cells with Rotenone Treatment and Prediction of Regulated Pathways. Neurochem Res. 2016 Nov 30.

[3]. Kishore Kumar SN, et al. Morinda citrifolia mitigates rotenone-induced striatal neuronal loss in male Sprague-Dawley rats by preventing mitochondrial pathway of intrinsic apoptosis. Redox Rep. 2016 Nov 24:1-12.

[4]. Zhang ZN, et al. Subcutaneous rotenone rat model of Parkinson's disease: dose exploration study. Brain Res. 2016 Nov 19. pii: S0006-8993(16)30776-4.

[5]. Li N, et al. Mitochondrial complex I inhibitor rotenone induces apoptosis through enhancing mitochondrial reactive oxygen species production. J Biol Chem. 2003 Mar 7;278(10):8516-25.

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