

Product Data Sheet

Product Name: Artemisinin

Cat. No.: GN10647

Chemical Properties

Cas. No. 63968-64-9

Chemical Name (5aS,6R,8aS,9R,12S,12aR)-3,6,9-trimethyloctahydro-3H-3,12-epoxy[1,2]dioxepino[4,3-i]isochromen-10(12H)-one

SMILES O=C1O[C@]2([H])OC3(C([H])([H])[H])OO[C@]42[C@](C([H])([H])C3([H])([H])([H])[C@@](C([H])([H])[H])([H])C([H])([H])C([H])([H])[C@@]4([H])[C@@]1([H])C([H])([H])[H])

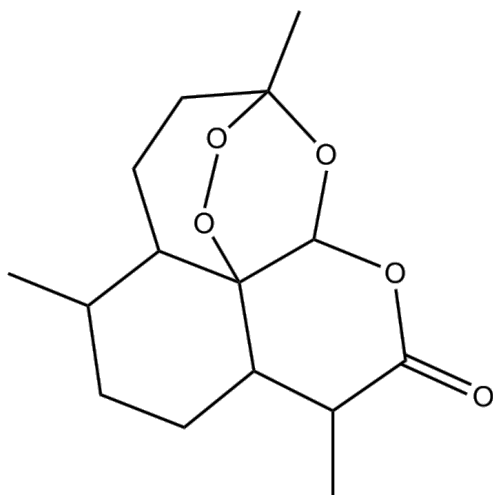
Formula $C_{15}H_{22}O_5$ M.Wt 282.33

Solubility $\geq 13.7\text{mg/mL}$ in DMSO Storage Store at 2-8°C

General tips For obtaining a higher solubility, please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution : ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure



Protocol

Cell experiment [1]:

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Cell lines PC12 cells

PC12 cells were cultured in 75cm² flasks in DMEM supplemented with 5% fetal bovine serum (FBS), 5% horse serum, 100µg/ml streptomycin, 100U/ml penicillin and incubated at 37°C with 5% CO₂ humidified atmosphere. The medium was replaced every 2–3 days, and cells were sub-cultured by trypsin treatment twice a week, at a split of 1:4. PC12 cells were seeded in 96-well plates (coated with 10µg/ml poly-D-lysine) at a density of 4–8×10⁵ cells/well in 1% serum medium for 24h. After serum starvation, the cultures were incubated with Artemisinin(3.125–100µM) for 1h, and then treated with Aβ 25-35; 24h later MTT assay was performed. Then the cells were incubated with MTT (0.5mg/ml) for additional 3h. The medium was aspirated from each well and DMSO (200µl) was added. The absorbance of each well solution was obtained with a Multiskan Ascent Revelation Plate Reader and the data are presented as Optical Density (OD) at wavelength of 570nm. Assays were repeated at least three to six times in quadruplicate.

Reaction
Conditions 3.125–100µM; 1h

Applications Artemisinin significantly inhibit cell death induced by Aβ 25-35.

Animal experiment [2]:

Animal models C57BL/6J mice

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Eighty four C57BL/6J mice (male, 5 weeks) were kept in an environment with a 12h light/dark cycle and a relative humidity of 60–65% at 25±1°C and had free access to food and water. T2DM mouse models were induced by a high fat diet (HFD) and STZ. These T2DM mice were further randomly divided into T2DM group and T2DM+Artemisinin group (n=12 per group). The mice were given Preparation Method Artemisinin (40mg/kg, i.p.) or an equal volume of vehicle (5% DMSO solution) once daily for 4 consecutive weeks. After the Y-maze test (YMT) Morris water maze test (MWM), hippocampal tissues were harvested for hematoxylin and eosin (H&E) staining, transmission electron microscopy (TEM) analysis, and measurement of the iron, ROS, MDA and GSH concentrations by kits. The protein levels of p-Nrf2 and GPX4 were detected by western blotting.

Dosage form 40mg/kg/day; i.p.; 4 weeks

Applications Artemisinin(40mg/kg/day; i.p.; 4 weeks) significantly reversed diabetic cognitive impairments, decreased the levels of ROS, MDA, and Fe²⁺ in the hippocampus, increased the levels of Nrf2, HO-1, GPX4, and GSH, and alleviated neuronal ferroptosis and neuronal loss in the hippocampal CA1 region.

References:

- [1] Zeng Z, Xu J, Zheng W. Artemisinin protects PC12 cells against β -amyloid-induced apoptosis through activation of the ERK1/2 signaling pathway. *Redox Biol.* 2017;12:625-633.
- [2] Wang B, Zhu S, Guo M, et al. Artemisinin ameliorates cognitive decline by inhibiting hippocampal neuronal ferroptosis via Nrf2 activation in T2DM mice. *Mol Med.* 2024;30(1):35.

Background

Artemisinin is a sesquiterpene lactone antimalarial drug extracted from the plant *Artemisia annua*^[1]. Artemisinin interferes with the biological membrane structure of the malaria parasite, particularly the mitochondrial and endoplasmic reticulum membranes, leading to the death of the parasite and thus is widely used in the treatment of malaria^[2]. Artemisinin has also been studied for its potential

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applications in treating various diseases, including antiviral activity, cancer, metabolic syndrome, and fibrosis^{[3][4]}.

In vitro, pretreatment of PC12 cells with Artemisinin (3.125–100 μM; 1h) concentration-dependently inhibited Aβ_{25–35}-induced cytotoxicity, reduced the release of lactate dehydrogenase (LDH), decreased intracellular reactive oxygen species (ROS) generation, restored mitochondrial membrane potential ($\Delta\psi_m$), and inhibited the increase in caspase 3/7 activity associated with apoptosis^[5]. Pretreatment of HT-22 cells with Artemisinin (25 μM; 12h) significantly reduced glutamate-induced cell death and activated Akt/Bcl-2 signaling^[6].

In vivo, treatment of STZ-induced T2DM mice with Artemisinin (40mg/kg/day; i.p.; 4 weeks) significantly reversed diabetic cognitive impairments, decreased the levels of ROS, MDA, and Fe²⁺ in the hippocampus, increased the levels of Nrf2, HO-1, GPX4, and GSH, and alleviated neuronal ferroptosis and neuronal loss in the hippocampal CA1 region^[7]. Artemisinin (10mg/kg/day; i.p.; 7 days) reversed ischemic stroke-induced neuronal pyroptosis in photochemically induced thrombosis (PIT) model mice, decreased the levels of IL-1β and IL-18 in serum, and downregulated the expression of key proteins NLRP3, ASC-1, Caspase-1, and TXNIP in mouse brain tissue^[8].

References:

- [1] Tu Y. Artemisinin-A Gift from Traditional Chinese Medicine to the World (Nobel Lecture). *Angew Chem Int Ed Engl*. 2016;55(35):10210-10226.
- [2] Ribbiso KA, Heller LE, Taye A, Julian E, Willems AV, Roepe PD. Artemisinin-Based Drugs Target the Plasmodium falciparum Heme Detoxification Pathway. *Antimicrob Agents Chemother*. 2021;65(4):e02137-20.
- [3] Augustin Y, Staines HM, Krishna S. Artemisinins as a novel anti-cancer therapy: Targeting a global cancer pandemic through drug repurposing. *Pharmacol Ther*. 2020;216:107706.
- [4] Addissouky T A. Artemisinin and its derivatives throughout the therapeutic mechanisms and clinical potential. *Discover Chemistry*. 2025, 2(1):1-16.
- [5] Zeng Z, Xu J, Zheng W. Artemisinin protects PC12 cells against β-amyloid-induced apoptosis through activation of the ERK1/2 signaling pathway. *Redox Biol*. 2017;12:625-633.
- [6] Lin SP, Li W, Winters A, Liu R, Yang SH. Artemisinin Prevents Glutamate-Induced Neuronal Cell Death Via Akt Pathway Activation. *Front Cell Neurosci*. 2018;12:108.
- [7] Wang B, Zhu S, Guo M, et al. Artemisinin ameliorates cognitive decline by inhibiting hippocampal

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neuronal ferroptosis via Nrf2 activation in T2DM mice. *Mol Med.* 2024;30(1):35.

[8] Wang Y, Yuan H, Shen D, et al. Artemisinin attenuated ischemic stroke induced pyroptosis by inhibiting ROS/TXNIP/NLRP3/Caspase-1 signaling pathway. *Biomed Pharmacother.* 2024;177:116894.

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