

Product Data Sheet

Product Name: MCU-i4
Cat. No.: GC61790

Chemical Properties

Cas. No. 371924-24-2

SMILES O=C(C1=C(NC2=CC=C(N(CC)CC)C=C2)C3=CC(C)=CC=C3N=C1)OCC

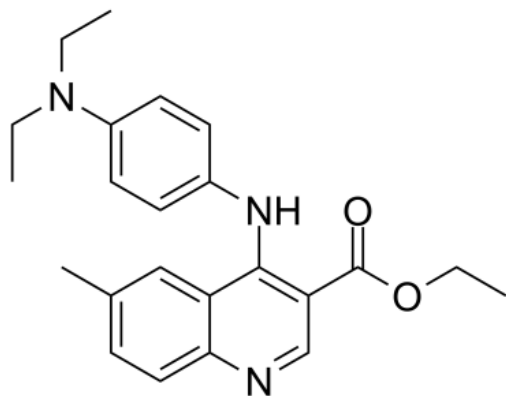
Formula $C_{23}H_{27}N_3O_2$ M.Wt 377.48

Solubility DMSO : 12.5 mg/mL (33.11 mM; Need ultrasonic) Storage 4°C, protect from light

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]:

Cell lines	Marc-145 cells
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Preparation Method	Marc-145 cells were cultivated in DMEM medium supplemented with 10% fetal bovine serum, 100U/ml penicillin, and 100µg/ml streptomycin at 37°C in an incubator with 5% CO ₂ . Marc-145 cells were mock-infected or PRRSV-infected (MOI=0.1) for 24h without or with the addition of VBIT-12 (10µM) or MCU-i4 (10µM). The mitochondrial membrane potential was detected and cell lysates were harvested for western blot.
Reaction Conditions	10µM; 24h
Applications	MCU-i4 preserved the impaired mitochondrial membrane potential and impeded the PRRSV-induced expression of PINK1/Parkin and conversion of LC3II in Marc-145 cells.
References: [1] Sun Z, Ma Z, Cao W, et al. Calcium-mediated mitochondrial fission and mitophagy drive glycolysis to facilitate arterivirus proliferation[J]. PLoS pathogens, 2025, 21(1): e1012872.	

Background

MCU-i4 is a negative modulator of the mitochondrial calcium uniporter (MCU) complex that decreases mitochondrial Ca²⁺ uptake^[1]. By regulating the uptake of calcium ions by mitochondria, MCU-i4 improves mitochondrial function, regulates pyruvate oxidation in vitrified oocytes, and increases ATP levels to compensate for energy expenditure during vitrification^[2]. MCU-i4 has been widely used to reduce the secretion of IL-1β by bone marrow-derived macrophages and to prevent the activation of the NLRP3 inflammasome^[3].

In vitro, MCU-i4 (10µM) treatment for 18 hours alleviated the depolarization of mitochondrial membrane potential in PK-15 cells infected with pseudorabies virus (PRV), reduced the production of ROS, and inhibited PRV-induced phosphorylation of AMPK and ULK1^[4]. 5µM of MCU-i4 treatment for 48 hours alleviated the endoplasmic reticulum stress in rat hippocampal neuronal cells induced by

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high glucose, and normalized the levels of GAP43 and SYP^[5]. Treatment with 10 μ M MCU-i4 for 24 hours inhibited the mitochondrial dysfunction and mitochondrial autophagy induced by porcine reproductive and respiratory syndrome virus (PRRSV) in Marc-145 cells, and prevented the replication of PRRSV in Marc-145 cells^[6]. Incubation with 10 μ M MCU-i4 for 18 hours at 4°C alleviated hepatocellular injury in the liver from NRF2 knockout mice and inhibited the levels of malondialdehyde and lactate dehydrogenase^[7]. Treatment with 30 μ M MCU-i4 for 48 hours reduced the viability of BT474 cells and induced cell apoptosis, while enhancing glycolysis and ATP production^[8].

References:

- [1] Di Marco G, Vallese F, Jourde B, et al. A high-throughput screening identifies MICU1 targeting compounds[J]. Cell reports, 2020, 30(7): 2321-2331. e6.
- [2] Lan T, Zhang K, Lin F, et al. Effects of MICU1-mediated mitochondrial calcium uptake on energy metabolism and quality of vitrified-thawed mouse metaphase II oocytes[J]. International Journal of Molecular Sciences, 2022, 23(15): 8629.
- [3] Gherardi G, Spinelli F, Sbrissa M, et al. Mitochondrial calcium uptake drives organelle remodeling to promote inflammasome-dependent cytokine release[J]. Cell Death & Differentiation, 2026: 1-18.
- [4] Zhao Y, Qi X, Zhu Z, et al. Increased ROS levels activate AMPK-ULK1-mediated mitophagy to promote pseudorabies virus replication[J]. Veterinary Research, 2025, 56(1): 156.
- [5] Zhang J, Jiang J, Li H, et al. MAM-Mediated Mitochondrial Ca²⁺ Overload and Endoplasmic Reticulum Stress Aggravates Synaptic Plasticity Impairment in Diabetic Mice[J]. Brain Sciences, 2025, 15(11): 1157.
- [6] Sun Z, Ma Z, Cao W, et al. Calcium-mediated mitochondrial fission and mitophagy drive glycolysis to facilitate arterivirus proliferation[J]. PLoS pathogens, 2025, 21(1): e1012872.
- [7] Kojima H, Hirao H, Kadono K, et al. Cold stress-induced ferroptosis in liver sinusoidal endothelial cells determines liver transplant injury and outcomes[J]. JCI insight, 2024, 9(3): e174354.
- [8] So E C, Chow L W C, Chuang C M, et al. MCU-i4, a mitochondrial Ca²⁺ uniporter modulator, induces breast cancer BT474 cell death by enhancing glycolysis, ATP production and reactive

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oxygen species (ROS) burst[J]. Oncology research, 2025, 33(2): 397.

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