Data Sheet (Cat.No.T5980)

TargetMol

2-Ketoglutaric acid

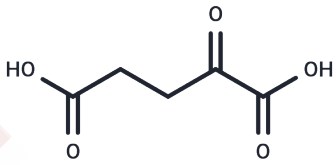
Chemical Properties

CAS No. : 328-50-7

Formula: C5H6O5

Molecular Weight: 146.10

Storage: Powder: -20°C for 3 years | In solvent: -80°C for 1 year
Actual storage temperature shall be subject to the COA.



Biological Description

Description	2-Ketoglutaric acid is a reversible inhibitor of tyrosinase (IC50=15 mM) and exhibits antioxidant activity. As an intermediate in the Krebs cycle, 2-Ketoglutaric acid can generate ATP or GTP. 2-Ketoglutaric acid also serves as the primary carbon skeleton for nitrogen assimilation reactions.
Targets(IC50)	Endogenous Metabolite,Tyrosinase
In vitro	**Methods**: Human primary chondrocytes were treated with IL-1β (10 ng/mL) or 2-Ketoglutaric acid (2 mM) or both agents for 24 hours. Cell proliferation was assessed via EdU staining and counted under fluorescence microscopy. **Results**: IL-1β inhibited cell proliferation, while 2-Ketoglutaric acid significantly reversed this effect. [1] **Methods**: ESC-1 cells (S/L) were treated with DM-2-Ketoglutaric acid (4 mM). After three passages, global DNA methylation was assessed by ELISA. **Results**: DM-2-Ketoglutaric acid treatment reduced overall DNA methylation levels. [2] **Methods**: Neonatal SD rat ventricular myocytes (NRVMs) were co-treated with LPS (0.5 μg/mL) and 2-Ketoglutaric acid (2 mM) for 24 hours. Apoptosis was assessed by TUNEL staining, and Bcl-2 expression was measured by Western Blot. **Results**: The LPS group exhibited a 7-fold increase in TUNEL-positive cells and significantly reduced Bcl-2 protein levels; 2-Ketoglutaric acid significantly reversed these changes. [3]
In vivo	**Methods**: To investigate the therapeutic effects of 2-Ketoglutaric acid on osteoarthritis, an osteoarthritis model was established in 8-week-old female Wistar rats via anterior cruciate ligament transection (ACLT) surgery. One week post-surgery, treatment groups received 2-Ketoglutaric acid in drinking water (2% concentration) while the control group received standard drinking water. Treatment lasted for 8 weeks. **Results**: The surgical group exhibited mitochondrial swelling, vacuolation, and structural disruption, whereas the surgical group treated with 2-Ketoglutaric acid showed normal mitochondrial morphology. PINK1/Parkin expression decreased in the ACLT group; 2-Ketoglutaric acid significantly upregulated its expression. [1] **Methods**: To investigate the ameliorative effects of 2-Ketoglutaric acid on septic cardiomyopathy, 8-week-old male C57BL/6 mice were intraperitoneally injected with LPS (10 mg/kg) to establish a septic cardiomyopathy model. Prior to LPS injection, mice received 9 weeks of free-drinking water treatment (2-Ketoglutaric acid: 2% drinking water). Ultrasound examinations were performed post-LPS injection.

In vivo	**Results**: The LPS group exhibited a 33% decrease in LVEF and a 32% decrease in LVFS, along with a 40% increase in LVEDD and a 60% increase in LVESD. 2-Ketoglutaric acid significantly improved these parameters. [3]

Solubility Information

Solubility	DMSO: 480.00 mg/mL (3285.42 mM),Sonication is recommended. H2O: 100 mg/mL (684.46 mM),Sonication is recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)
In vivo Formulation	PBS: 100.00 mg/mL (684.46 mM) 10% DMSO+40% PEG300+5% Tween 80+45% Saline: 5.00 mg/mL (34.22 mM),Sonication is recommended. *Please add the solvents sequentially, clarifying the solution as much as possible before adding the next one. Dissolve by heating and/or sonication if necessary. Working solution is recommended to be prepared and used immediately. The formulation provided above is for reference purposes only. In vivo formulations may vary and should be modified based on specific experimental conditions.*

Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	6.8446 mL	34.2231 mL	68.4463 mL
5 mM	1.3689 mL	6.8446 mL	13.6893 mL
10 mM	0.6845 mL	3.4223 mL	6.8446 mL
50 mM	0.1369 mL	0.6845 mL	1.3689 mL

Please select the appropriate solvent to prepare the stock solution, according to the solubility of the product in different solvents. Please use it as soon as possible.

Note: The dilution table applies only to solid products. For liquid products, please calculate the stock solution based on the stated concentration and/or density.

Reference

Liu L, et al. The physiological metabolite α-ketoglutarate ameliorates osteoarthritis by regulating mitophagy and oxidative stress. Redox Biol. 2023 Jun;62:102663.

Liu W, Liu X, Liu M, et al.Oxyglutamate Carrier Alleviates Cerebral Ischaemia-Reperfusion Injury by Regulating Mitochondrial Function.European Journal of Neuroscience.2025, 61(1): e16659.

Carey BW, et al. Intracellular α-ketoglutarate maintains the pluripotency of embryonic stem cells. Nature. 2015 Feb 19;518(7539):413-6.

Wu W, et al. α-ketoglutarate protects against septic cardiomyopathy by improving mitochondrial mitophagy and fission. Mol Med Rep. 2025 Jun;31(6):146.