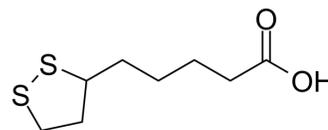


α-Lipoic Acid

Cat. No.:	HY-N0492												
CAS No.:	1077-28-7												
Molecular Formula:	C ₈ H ₁₄ O ₂ S ₂												
Molecular Weight:	206.33												
Target:	NF-κB; HIV; Mitochondrial Metabolism; Endogenous Metabolite; Apoptosis												
Pathway:	NF-κB; Anti-infection; Metabolic Enzyme/Protease; Apoptosis												
Storage:	<table border="0"> <tr> <td>Powder</td> <td>-20°C</td> <td>3 years</td> </tr> <tr> <td></td> <td>4°C</td> <td>2 years</td> </tr> <tr> <td>In solvent</td> <td>-80°C</td> <td>2 years</td> </tr> <tr> <td></td> <td>-20°C</td> <td>1 year</td> </tr> </table>	Powder	-20°C	3 years		4°C	2 years	In solvent	-80°C	2 years		-20°C	1 year
Powder	-20°C	3 years											
	4°C	2 years											
In solvent	-80°C	2 years											
	-20°C	1 year											



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (484.66 mM; Need ultrasonic)
 H₂O : < 0.1 mg/mL (ultrasonic) (insoluble)

Preparing Stock Solutions	Solvent Concentration	Mass		
		1 mg	5 mg	10 mg
	1 mM	4.8466 mL	24.2330 mL	48.4660 mL
	5 mM	0.9693 mL	4.8466 mL	9.6932 mL
	10 mM	0.4847 mL	2.4233 mL	4.8466 mL

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

In Vivo

- Add each solvent one by one: 50% PEG300 >> 50% saline
Solubility: 10 mg/mL (48.47 mM); Clear solution; Need ultrasonic
- Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
Solubility: ≥ 2.5 mg/mL (12.12 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
Solubility: ≥ 2.5 mg/mL (12.12 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% corn oil
Solubility: ≥ 2.5 mg/mL (12.12 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

α-Lipoic Acid (Thioctic acid) is an antioxidant, which is an essential cofactor of mitochondrial enzyme complexes. α-Lipoic Acid inhibits NF-κB-dependent HIV-1 LTR activation^{[1][2][3]}. α-Lipoic Acid induces endoplasmic reticulum (ER) stress-mediated apoptosis in hepatoma cells^[4]. α-Lipoic Acid can be used with [CPUL1](#) (HY-151802) to construct the self-assembled nanoaggregate CPUL1-LA NA, which has improved antitumor efficacy than CPUL1^[5].

IC ₅₀ & Target	Human Endogenous Metabolite	NF-κB	Mitochondrial bioenergetics	HIV-1
In Vitro	<p>The long terminal repeat (LTR) of HIV-1 is the target of cellular transcription factors such as NF-κB, and serves as the promoter-enhancer for the viral genome when integrated in host DNA^[1]. α-Lipoic Acid (Alpha-Lipoic acid, ALA), a naturally occurring dithiol compound, plays an essential role in mitochondrial bioenergetics. α-Lipoic Acid reduces lipid accumulation in the liver by regulating the transcriptional factors SREBP-1, FoxO1, and Nrf2, and their downstream lipogenic targets via the activation of the SIRT1/LKB1/AMPK pathway. Treatment of cells with α-Lipoic Acid (250, 500 and 1000 μM) significantly increases the NAD⁺/NADH ratio in HepG2 cells (P<0.05 or P<0.01). Treatment with α-Lipoic Acid (50, 125, 250 and 500 μM) increases SIRT1 activity in HepG2 cells. α-Lipoic Acid (50, 125, 250, 500 and 1000 μM) increases phosphorylation of AMPK and acetyl-CoA carboxylase (ACC) in HepG2 cells in a dose-dependent fashion^[1].</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p>			
In Vivo	<p>C57BL/6J mice, divided into four groups, are fed an high-fat diet (HFD) for 24 weeks to induce nonalcoholic fatty liver disease (NAFLD) followed by daily administration of α-Lipoic Acid. Then, the effects of α-Lipoic Acid on hepatic lipid accumulation in long-term HFD-fed mice are assessed. Administration of α-Lipoic Acid (100 mg/kg or 200 mg/kg) markedly reduces visceral fat mass in mice. In addition, α-Lipoic Acid (100 mg/kg or 200 mg/kg) treatment inhibits the appetite and causes a dramatic weight loss (all P<0.05)^[1].</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p>			

PROTOCOL

Cell Assay ^[1]	<p>The human hepatocellular carcinoma (HepG2) cell line is cultured in Dulbecco's modified Eagle's medium containing 10% fetal bovine serum at 37°C and 5% CO₂. HepG2 cells are treated with AMPK inhibitor (CC, 20 μM, 0.5 h), SIRT1 inhibitor (NA, 10 mM, 12 or 24 h), and AMPK activator (AICAR, 2 mM, 1 h), Palmitate (PA, 125 μM, 12 h) and α-Lipoic Acid (250 μM, 6 or 12 h) ^[1].</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p>			
Animal Administration ^[1]	<p>Mice^[1]</p> <p>Male C57BL/6J mice (6-week-old; body weight: 22-24 g) are allowed ad libitum access to normal diet and water for 2 weeks before dividing into four groups (n=8): normal diet (ND) (10% energy from fat), high-fat diet (HFD) (60% energy from fat) and HFD plus α-Lipoic Acid (100 mg/kg or 200 mg/kg). After 24 weeks of treatment, blood samples are collected after the eyeballs of the mice are extracted for serum preparation by centrifugation at 2000×g for 10 min at 4°C. The liver tissues are harvested in liquid nitrogen and stored at -80°C.</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p>			

CUSTOMER VALIDATION

- J Nanostructure Chem. 13 May 2022.
- Virol Sin. 2021 Sep 12;1-12.
- J Biochem Mol Toxicol. 2023 Sep 15;e23542.
- Oxid Med Cell Longev. 2021 Jun 4.
- Oncotarget. 2018 Jan 30;9(15):12137-12153.

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- [1]. Liu J, et al. Nanoaggregates of Disulfide-Decorated TrxR Inhibitor Promote Cellular Uptake, Selective Targeting, and Antitumor Efficacy. *Langmuir*, 2022.
- [2]. Xiao L, et al. Activity of the dietary antioxidant ergothioneine in a virus gene-based assay for inhibitors of HIV transcription. *Biofactors*. 2006;27(1-4):157-65.
- [3]. Yang Y, et al. Alpha-lipoic acid improves high-fat diet-induced hepatic steatosis by modulating the transcription factors SREBP-1, FoxO1 and Nrf2 via the SIRT1/LKB1/AMPK pathway. *J Nutr Biochem*. 2014 Nov;25(11):1207-1217.
- [4]. Lei D, et al. Synergistic neuroprotective effect of rasagiline and idebenone against retinal ischemia-reperfusion injury via the Lin28-let-7-Dicer pathway. *Oncotarget*. 2018 Jan 30;9(15):12137-12153.
- [5]. Pibiri M, et al. α -Lipoic acid induces Endoplasmic Reticulum stress-mediated apoptosis in hepatoma cells. *Sci Rep*. 2020 Apr 28;10(1):7139.
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Caution: Product has not been fully validated for medical applications. For research use only.

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