

Product Data Sheet

Product Name: 2,5-Dihydroxybenzoic acid

Cat. No.: GC33519

Chemical Properties

Cas. No. 490-79-9

SMILES Oc1ccc(c(c1)C(=O)O)O

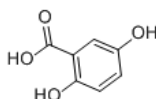
Formula $C_7H_6O_4$ M.Wt 154.12

Solubility DMSO : ≥ 100 mg/mL (648.85 mM); Storage Store at -20°C
H₂O : 7mg/mL (46.42 mM); ultrasonic
and warming and heat to 60°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]:

Cell lines	HepG2 cells (human hepatoblastoma cell line)
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Caution: Product has not been fully validated for medical applications. For research use only.

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Preparation Method	HepG2 cells were maintained in DMEM supplemented with 10% fetal bovine serum and 1% penicillin-streptomycin at 37°C, 5% CO ₂ . HepG2 cells were treated with 0.5mM oleic acid for 24h to induce lipid accumulation, then treated with 10-50μM 2,5-Dihydroxybenzoic acid in the presence of 0.5mM oleic acid for an additional 24h, followed by Oil Red O staining and CCK-8 assay.
Reaction Conditions	10-50μM; 24h
Applications	2,5-Dihydroxybenzoic acid reduced oleic acid-induced Oil Red O staining absorbance in HepG2 cells. 2,5-Dihydroxybenzoic acid maintained cell viability in oleic acid-treated HepG2 cells.
Animal experiment [2]:	
Animal models	male ApoE ^{-/-} mice on C57BL/6 background
Preparation Method	ApoE ^{-/-} mice were fed a high-fat high-cholesterol diet for 18 weeks. From week 8 to week 18, mice were gavaged with 12.5-25mg/kg 2,5-Dihydroxybenzoic acid suspended in 0.05% CMC-Na five times per week; a separate group received 5mg/kg atorvastatin in 0.05% CMC-Na by daily gavage as positive control. Mice were euthanized at week 18 for aortic arch en face Oil Red O staining, aortic sinus H&E/Oil Red O/Masson staining, TUNEL assay, Western blot, MMP2/9 activity assay, RT-qPCR and ELISA.
Dosage form	12.5-25mg/kg; p.o. (gavage); 5 times/week for 10 weeks

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Applications	2,5-Dihydroxybenzoic acid reduced atherosclerotic plaque area in aortic arch and aortic sinus. 2,5-Dihydroxybenzoic acid reduced necrotic core area, cholesterol crystal area and neutral lipid accumulation in plaques. 2,5-Dihydroxybenzoic acid increased collagen content and fibrous cap thickness. 2,5-Dihydroxybenzoic acid downregulated cleaved Caspase-8, cleaved Caspase-3 and BAX, and upregulated BCL-2 in plaque tissue. 2,5-Dihydroxybenzoic acid reduced MMP2 and MMP9 activity and CTSB, CTSK, CTSL, CTSS mRNA levels in plaques. 2,5-Dihydroxybenzoic acid reduced TNF- α , IL-6 and IL-1 β levels in plaques. 2,5-Dihydroxybenzoic acid downregulated LRP6, p-GSK3 β and β -catenin protein levels in plaques.
References: [1] Hsiang CY, Hsu KT, Lo HY, et al. 2,5-Dihydroxybenzoic Acid Ameliorates Metabolic Dysfunction-Associated Steatotic Liver Disease by Targeting the CCL2-CCR2 Axis to Reduce Lipid Accumulation. <i>Nutrients</i>. 2025 Jun;17(11):1835. [2] Chen T, Wang Y, Yang J, et al. Gentisic acid prevents the development of atherosclerotic lesions by inhibiting SNX10-mediated stabilization of LRP6. <i>Pharmacol Res</i>. 2024;210:107516.	

Background

2,5-Dihydroxybenzoic acid is a salicylic acid metabolite with antioxidant and anti-inflammatory effects. 2,5-Dihydroxybenzoic acid can be used in research related to inflammation, oxidative stress, metabolic dysfunction-associated steatotic liver disease, cancer, and angiogenesis-dependent diseases^[1-4].

In vitro, co-treatment with 10-50 μ M 2,5-Dihydroxybenzoic acid and 0.5mM oleic acid for 24 hours reduced intracellular lipid accumulation without affecting cell viability in HepG2 human hepatoma cells^[5]. Treatment with 1.6 μ g/mL 2,5-Dihydroxybenzoic acid for 48 hours decreased TRPV1 expression, reduced TLR4 and p-p65/p65 levels, and enhanced cell viability in neurons^[6]. Treatment with 14.67mM 2,5-Dihydroxybenzoic acid for 24 hours reduced cell viability in HepG2 cells^[7].

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In vivo, oral gavage of 12.5-25mg/kg 2,5-Dihydroxybenzoic acid five times per week for 10 weeks reduced atherosclerotic plaque area in the aortic arch and aortic sinus, decreased necrotic core area, cholesterol crystal deposition, and neutral lipid accumulation in ApoE^{-/-} mice fed a high-fat high-cholesterol diet^[8]. Daily oral gavage of 10-100mg/kg 2,5-Dihydroxybenzoic acid for 3 weeks starting from week 3 after transverse aortic constriction preserved left ventricular ejection fraction and fractional shortening, reduced heart weight and cardiomyocyte cross-sectional area, attenuated myocardial collagen deposition, and suppressed type II alveolar cell hyperplasia and pulmonary vascular remodeling in CD-1 mice^[9]. Topical application of 2.0-4.0µg 2,5-Dihydroxybenzoic acid on dorsal skin for 3 consecutive days followed by topical application of 20nmol 12-O-Tetradecanoyl phorbol-13-acetate 1 hour after the last dose. 2,5-Dihydroxybenzoic acid increased GSH, GR and GST levels, promoted CAT, GPX and G6PD activities, and reduced MDA formation in Swiss albino mice^[10].

References:

- [1] Cunha LB, Lepore ED, Medeiros CCB, et al. Can Gentisic Acid Serve as a High-Performance Antioxidant with Lower Toxicity for a Promising New Topical Application? Life. 2024 Aug;14(8):1022.
- [2] Calderon Guzman D, Trujillo Jiménez F, Hernandez Garcia E, et al. Assessment of Antioxidant Effect of 2,5-Dihydroxybenzoic Acid and Vitamin A in Brains of Rats with Induced Hyperoxia. Neurochem Res. 2007 Jun;32(6):1036-40.
- [3] Fernández IS, Cuevas P, Angulo J, et al. Gentisic Acid, a Compound Associated with Plant Defense and a Metabolite of Aspirin, Heads a New Class of in Vivo Fibroblast Growth Factor Inhibitors. J Biol Chem. 2010 Apr 9;285(15):11714-29.
- [4] Sun S, Kee HJ, Jin L, et al. Gentisic acid attenuates pressure overload-induced cardiac hypertrophy and fibrosis in mice through inhibition of the ERK1/2 pathway. J Cell Mol Med. 2018;22(12):5964-5977.
- [5] Hsiang CY, Hsu KT, Lo HY, et al. 2,5-Dihydroxybenzoic Acid Ameliorates Metabolic Dysfunction-Associated Steatotic Liver Disease by Targeting the CCL2-CCR2 Axis to Reduce Lipid Accumulation. Nutrients. 2025 Jun;17(11):1835.
- [6] Li S, Chen T, Shen X, et al. Gentisic acid ameliorates lumbar disc herniation by regulating M1/M2

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Polarization via the MAPK14/S100A9/Rac1/2 pathway. Cell Biol Toxicol. 2025;41:161.

[7] Cunha LB, Lepore ED, Medeiros CCB, et al. Can Gentisic Acid Serve as a High-Performance Antioxidant with Lower Toxicity for a Promising New Topical Application? Life. 2024 Aug;14(8):1022.

[8] Chen T, Wang Y, Yang J, et al. Gentisic acid prevents the development of atherosclerotic lesions by inhibiting SNX10-mediated stabilization of LRP6. Pharmacol Res. 2024;210:107516.

[9] Sun S, Kee HJ, Ryu Y, et al. Gentisic acid prevents the transition from pressure overload-induced cardiac hypertrophy to heart failure. Sci Rep. 2019 Feb 28;9:3018.

[10] Sharma S, Khan N, Sultana S. Study on prevention of two-stage skin carcinogenesis by Hibiscus rosa sinensis extract and the role of its chemical constituent, gentisic acid, in the inhibition of tumour promotion response and oxidative stress in mice. Eur J Cancer Prev. 2004 Feb;13(1):53-63.

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