Asaraldehyde

Cat. No.: HY-100580

CAS No.: 4460-86-0

Molecular Formula: $C_{10}H_{12}O_4$

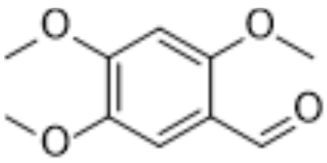
Molecular Weight: 196.2

Target: COX

Pathway: Immunology/Inflammation

Storage: 4°C, stored under nitrogen

* In solvent : -80°C, 6 months; -20°C, 1 month (stored under nitrogen)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (509.68 mM; Need ultrasonic)

Ethanol : 50 mg/mL (254.84 mM; Need ultrasonic)

H_2O : < 0.1 mg/mL (insoluble)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	5.0968 mL	25.4842 mL	50.9684 mL
5 mM	1.0194 mL	5.0968 mL	10.1937 mL
10 mM	0.5097 mL	2.5484 mL	5.0968 mL

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

In Vivo

1. Add each solvent one by one: 10% EtOH >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 3.75 mg/mL (19.11 mM); Clear solution
2. Add each solvent one by one: 10% EtOH >> 90% corn oil
   Solubility: ≥ 3.75 mg/mL (19.11 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (12.74 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (12.74 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Asarylaldehyde (Asaronaldehyde), a COX-2 inhibitor, significantly inhibits cyclooxygenase II (COX-2) activity with an IC_{50} value of 100 μg/mL[1].

IC_{50} & Target

COX-2

In Vitro

Asarylaldehyde (2,4,5-TMBA) is a natural COX-2 inhibitor, which isolated from carrot (Daucus carota L.) seeds significantly inhibits cyclooxygenase II (COX-2) activity at the concentration of 100 μg/mL compared to three commercial nonsteroidal anti-inflammatory drugs Aspinin, Ibuprofen, and Naproxen at their IC_{50} values 180, 2.52, and 2.06 μg/mL, respectively. 2,4,5-TMBA, a natural inhibitor of cyclooxygenase-2, suppresses adipogenesis and oromotes lipolysis in 3T3-L1 adipocytes. 2,4,5-Trimethoxybenzaldehyde (2,4,5-TMBA) present in plant roots, seeds, and leaves is reported to be a significant inhibitor of cyclooxygenase-2 (COX-2) activity at the concentration of 100 μg/mL. Because COX-2 is associated with differentiation of preadipocytes, the murine 3T3-L1 cells are cultured with 100 μg/mL of 2,4,5-TMBA during differentiation and after the cells are fully differentiated to study the effect of 2,4,5-TMBA on adipogenesis and lipolysis. Oil Red O staining and triglyceride assay revealed that 2,4,5-TMBA inhibited the formation of lipid droplets during differentiation; moreover, 2,4,5-TMBA down-regulated the protein levels of adipogenic signaling molecules and transcription factors MAP kinase kinase (MEK), extracellular signal-regulated kinase (ERK), CCAAT/enhancer binding protein (C/EBP)α, β, and δ, peroxisome proliferator-activated receptor (PPAR)γ, adipocyte determination and differentiation-dependent factor 1 (ADD1), and the rate-limiting enzyme for lipid synthesis acetyl-CoA carboxylase (ACC). In fully differentiated adipocytes, treatment with 2,4,5-TMBA for 72 h significantly decreased lipid accumulation by increasing the hydrolysis of triglyceride through suppression of perilipin A (lipid droplet coating protein) and up-regulation of hormone-sensitive lipase (HSL). When treated with 100 μg/mL of 2,4,5-TMBA for 24, 48, or 72 h, the viability of fully differentiated 3T3-L1 adipocytes is decreased by 8.35, 15.54, and 27.26%, respectively. When the preadiocytes are treated with 100 μg/mL of 2,4,5-TMBA for 24 h before differentiation medium is supplemented, the cell viability is decreased by 26.46%[1]. A COX-2 inhibitor 2,4,5-trimethoxybenzaldehyde (TMBA) is found to be the most abundant constituent, but is totally absent in its cultured broth and its natural host, C. kanehirae wood. 2,4,5-trimethoxybenzaldehyde (TMBA) is the major constituent in fruiting bodies[2].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [1]

3T3-L1 preadipocytes are seeded into 6-well plates at a concentration of 10^5/well and cultured in DMEM supplemented with 10% bovine calf serum at 37°C in a humidified atmosphere containing 5% CO_2. Two days after confluence, cells are cultured in FBS-containing DMEM (10%, v/v) with the addition of adipogenic factors (0.5 mM IBMX, 1 μM DEX, 5 μg/mL insulin) to induce differentiation (Day 0). Two days later (Day 2), the medium is changed to DMEM supplemented with 10% FBS and 5 μg/mL insulin for another two days. Afterward (Day 4), the medium is changed to DMEM supplemented with 10% FBS only. For the coculture study, 2,4,5-TMBA (0.1 g dissolved in 2 mL of DMSO) is added to the medium from Day 0 to Day 8 (final concentration 100 μg/mL). Control samples are prepared by adding isovolumetric DMSO to the culture medium. For the postculture study, 2,4,5-TMBA is added to the medium on Day 8 (when the cells are fully differentiated) at a final concentration of 100 μg/mL, followed by another 72 h culture. 3T3-L1 cells are seeded in 96-well plates at a concentration of 10^4/well. Twenty-four hours after seeding, the cells are treated with 100 μg/mL of 2,4,5-TMBA for 24 h or for the whole 8-day differentiation period. Fully differentiated adipocytes are also treated with 100 μg/mL of 2,4,5-TMBA for 24-72 h to test the cytotoxicity. At the end of treatment, cells are cultured with MTT at a final concentration of 0.5 mg/mL for another 4 h. The purple MTT formazan is dissolved by DMSO and the absorbance at 570 nm is taken with a spectrophotometer. The absorbance is proportional to the viability of adipocytes[1].

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REFERENCES

[1]. Wu MR, et al. 2,4,5-TMBA, a natural inhibitor of cyclooxygenase-2, suppresses adipogenesis and promotes lipolysis in 3T3-L1 adipocytes. J Agric Food Chem. 2012 Jul 25;60(29):7262-9.

[2]. Chen CC, et al. Production of a COX-2 inhibitor, 2,4,5-trimethoxybenzaldehyde, with submerged cultured Antrodia camphorata. Lett Appl Microbiol. 2007 Apr;44(4):387-92.

Caution: Product has not been fully validated for medical applications. For research use only.

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