

Product Data Sheet

Product Name: Oligomycin A

Cat. No.: GC16859

Chemical Properties

Cas. No. 579-13-5

Chemical Name 4-ethyl-11,12,15,19-tetrahydroxy-6'-(2-hydroxypropyl)-5',10,12,14,16,18,20,26,29-nona methylspiro[24,28-dioxabicyclo[23.3.1]nonacosa-5,7,21-triene-27,2'-oxane]-13,17,23-tri one

SMILES CCC1CCC2C(C(C(C3(O2)CCC(C(O3)CC(C)O)C)C)OC(=O)C=CC(C(C(C(=O)C(C(C(C(=O)C(C(C(CC=CC=C1)C)O)(C)O)C)O)C)O)C)C

Formula C₄₅H₇₄O₁₁

M.Wt 791.06

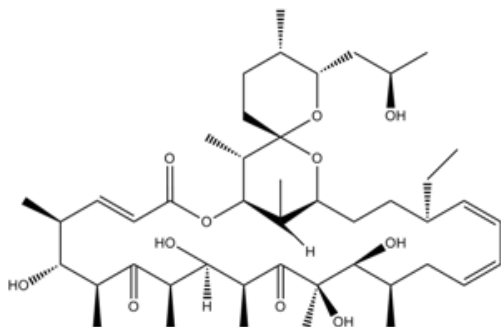
Solubility ≥ 9.9mg/mL in DMSO, ≥ 17.43 mg/mL in EtOH

Storage Store at -20°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



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

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Protocol

Cell experiment [1]:

Cell lines P3 cells

Preparation Method Oxygen consumption was measured at 37 °C in cell culture medium. The oxygen consumption rate was measured under 3 different conditions: phosphorylating state (endogenous respiratory condition), non-phosphorylating state with addition of oligomycin A (50 ng/mL), and uncoupled state by the successive addition of carbonyl cyanide m-chlorophenyl hydrazone (CCCP 0.5 μM) to reach the maximal respiration.

Reaction Conditions 50 ng/mL for 3days

Applications Additional oxygen consumption analysis was performed using the Oroboros oxygraph methodology and showed no difference in endogenous oxygen consumption rate at oligomycin A or CCCP, even with a long-term DCA treatment (3 days)

Animal experiment [2]:

Animal models Wt and Tg mice

Preparation Method Oligomycin A (1mg/kg) was given by i.v. for 2h before lipopolysaccharide (LPS) and galactosamine (GalN) treatment

Dosage form intravenous injection (i.v.), 1 mg/kg,

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Applications Wt mice treated with oligomycin A have decreased ATP levels in the liver. Concomitantly, these mice showed an enhanced apoptosis in hepatocytes as Tg mice after LPS/GalN administration.

References:

- [1]: Larrieu, CM; Storevik, S, et al. Refining the Role of Pyruvate Dehydrogenase Kinases in Glioblastoma Development. 2022. Cancers,14(15). DOI: 10.3390/cancers14153769
- [2]: Shang Y, Liu Y, Du L, Wang Y, et al. Targeted expression of uncoupling protein 2 to mouse liver increases the susceptibility to lipopolysaccharide/galactosamine-induced acute liver injury. Hepatology 2009, 50: 1204-1216

Background

Oligomycin A is an inhibitor of ATP synthase, which inhibits the process taking place on mitochondria coupling membrane that depended on ATP and oxidative phosphorylation [1].

Oligomycin A produced a concentration-dependent block of I_{crac} with similar characteristics, but with lower potency than oligomycin B. Fits of averaged concentration-response data to a logistic function yielded IC₅₀ values and slope factor coefficients (respectively) of 13.5 μ M and 0.85 for oligomycin A, and 2.3 μ M and 0.82 for oligomycin B. A two-way analysis of variance confirmed a significantly greater inhibition by oligomycin B over the concentration range tested [2].

Oligomycin A treated Wt(widetype) mice have decreased ATP levels in the liver. Concomitantly, these mice showed an enhanced apoptosis in hepatocytes as Tg mice after LPS/GalN administration [3]. Further activation of AMPK was detected in Wt mice after treatment with oligomycin A. Collectively, these data demonstrated that UCP2 expression in hepatocytes could alter mitochondrial parameters leading to activation of AMPK [3].

References:

- [1]. Jastroch M, Divakaruni AS, Mookerjee S, et al. Mitochondrial proton and electron leaks. Essays Biochemistry, 2010, 47:53-67.

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[2]. Cho, J.H., M. Balasubramanyam, G. Chernaya, J.P. Gardner, A. Aviv, J.P. Reeves, P.G. Dargis, and E.P. Christian. Oligomycin inhibits storeoperated channels by a mechanism independent of its effects on mitochondrial ATP. *Biochem. J.* 1997.324:971-980.

[3]. Shang Y, Liu Y, Du L, Wang Y, et al. Targeted expression of uncoupling protein 2 to mouse liver increases the susceptibility to lipopolysaccharide/galactosamine-induced acute liver injury. *Hepatology* 2009, 50: 1204-1216

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