

Product Data Sheet

Product Name: Oligomycin Complex

Cat. No.: GC16533

Chemical Properties

Cas. No. 1404-19-9

SMILES O=C([C@H]([C@@H]([C@H](C([C@](C)([C@@H]([C@H](C/C=C/C=C/[C@]([H])(CC[C@@]1([C@@H]([C@]([H])(O2)[C@H]([C@@]3(O1)C(C[C@H]([C@]([H])(O3)C[C@H](C)O)C)=O)C)C)[H])CC)C)O)O)=O)C)O)C[C@@H]([C@H]([C@@H](/C=C/C2=O)C)O)C.O=C([C@H]([C@@H]([C@H](C([C@](C)([C@@H]([C@H

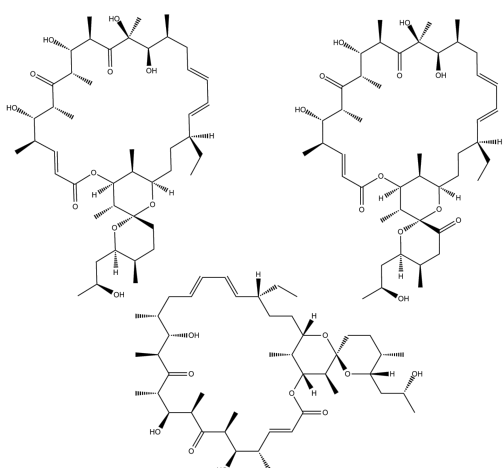
Formula $C_{45}H_{74}O_{11}$ for Oligomycin A; $C_{45}H_{72}O_{12}$ for Oligomycin B; $C_{45}H_{74}O_{10}$ for Oligomycin C. M.Wt 791.06 for Oligomycin A; 805.1 for Oligomycin B; 775.1 for Oligomycin C.

Solubility $\leq 30\text{mg/ml}$ in ethanol; 20mg/ml in DMSO; 30mg/ml in dimethyl formamide Storage Store at -20°C , protect from light

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

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

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Cell experiment 1 [1]:

Cell lines	R-HepG2 and HepG2 cells
Preparation method	Cells were treated with oligomycin at the concentration indicated or medium alone at 37°C, 5% CO ₂ for 24 h.
Reaction Conditions	0-50µg/ml; 24h
Applications	Oligomycin induced mitochondrial depolarization in R-HepG2 and HepG2 cells.

Cell experiment 2 [2]:

Cell lines	HT29 cell
Preparation method	Cells were cultured with different concentrations of oligomycin A for 12,24,36 and 48 h.
Reaction Conditions	0-16 µM;12-48 h
Applications	Oligomycin promotes HT29 cell survival and proliferation.

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References:

- [1]. Li YC, Fung KP, et.al. Mitochondria-targeting drug oligomycin blocked P-glycoprotein activity and triggered apoptosis in doxorubicin-resistant HepG2 cells. *Chemotherapy*. 2004 Jun;50(2):55-62. doi: 10.1159/000077803. PMID: 15211078.
- [2]. Li X, Tian R, et.al. Oligomycin A promotes radioresistance in HT29 colorectal cancer cells and its mechanisms. *Zhong Nan Da Xue Xue Bao Yi Xue Ban*. 2021 Feb 28;46(2):113-120. English, Chinese. doi: 10.11817/j.issn.1672-7347.2021.200063. PMID: 33678646.

Background

Oligomycin complex consists of a blend of oligomycins A, B, and C. Oligomycin is a class of similar 26-membered macrolide antibiotics isolated from *Streptomyces amylase chromogenes*. Oligomycin has antifungal activity, oxidative phosphorylation inhibition and insecticidal activity[1]. Oligomycin A primarily exerts its inhibitory effect on mitochondrial oxidative phosphorylation by blocking the proton channel (F₀ subunit) of ATP synthase, thus inhibiting ATP synthesis. Additionally, it reduces the compensatory increase in oxidative phosphorylation in tumor cells, leading to a decrease in cellular glycolysis levels[2-4]. Oligomycin B acts as a non-selective inhibitor of ATP synthases, effectively slowing down ATP depletion in cases of myocardial ischemia. Oligomycin C is an inhibitor of mitochondrial F₁F₀-ATP synthase, which induces more sensitive cell death and shifts the cell death pattern from apoptosis to necrosis.

Oligomycin(0-50 µg/ml; 24h) induced mitochondrial membrane depolarization and cytochrome c release in HepG2 and R-HepG2 cells[5]. Oligomycin A(0-16 µM; 12-48 h) promotes HT29 cell survival and proliferation[6]. In A549 cells, 100 ng/ml Oligomycin could completely inhibit OXPHOS phosphorylation activity in 1 hour and stimulate various levels of glycolysis gains[7]. 5 µg/ml Oligomycin could inhibit the F₀ part of H⁺-ATP-synthase, and strongly suppress cytochrome c release and apoptosis in Hela cells induced by TNF[8]. Oligomycin B(1 µM) induced vasodilations that were 39-61% smaller in sulfonylurea receptor 2 null (SUR2(nl)) than in SUR2 wild-type (SUR2(wt)) arteries[9].

References:

- [1]. SMITH RM, PETERSON WH, et.al. Oligomycin, a new antifungal antibiotic. *Antibiot Chemother (Northfield)*. 1954 Sep;4(9):962-70. PMID: 24543225.

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- [2]. Vestergaard M, NØhr-Meldgaard K, et al. Inhibition of the ATP synthase eliminates the intrinsic resistance of *Staphylococcus aureus* towards polymyxins[J]. *mBio*, 2017, 8(5): e01114-17.
- [3]. Untereiner AA, Pavlidou A, et al. Drug resistance induces the upregulation of H₂S-producing enzymes in HCT116 colon cancer cells[J]. *Biochem Pharmacol*, 2018, 149: 174-185.
- [4]. Ruas JS, Siqueira-Santos ES, et al. High glycolytic activity of tumor cells leads to underestimation of electron transport system capacity when mitochondrial ATP synthase is inhibited[J]. *Sci Rep*, 2018, 8(1): 17383.
- [5]. Li YC, Fung KP, et al. Mitochondria-targeting drug oligomycin blocked P-glycoprotein activity and triggered apoptosis in doxorubicin-resistant HepG2 cells. *Chemotherapy*. 2004 Jun;50(2):55-62. doi: 10.1159/000077803. PMID: 15211078.
- [6]. Li X, Tian R, et al. Oligomycin A promotes radioresistance in HT29 colorectal cancer cells and its mechanisms. *Zhong Nan Da Xue Xue Bao Yi Xue Ban*. 2021 Feb 28;46(2):113-120. English, Chinese. doi: 10.11817/j.issn.1672-7347.2021.200063. PMID: 33678646.
- [7]. Hao W, Chang CP, et al. Oligomycin-induced bioenergetic adaptation in cancer cells with heterogeneous bioenergetic organization. *J Biol Chem*. 2010 Apr 23;285(17):12647-54. doi: 10.1074/jbc.M109.084194. Epub 2010 Jan 28. PMID: 20110356; PMCID: PMC2857128.
- [8]. Shchepina LA, Pletjushkina OY, et al. Oligomycin, inhibitor of the F₀ part of H⁺-ATP-synthase, suppresses the TNF-induced apoptosis. *Oncogene*. 2002 Nov 21;21(53):8149-57. doi: 10.1038/sj.onc.1206053. PMID: 12444550.
- [9]. Adebiyi A, McNally EM, et al. Vasodilation induced by oxygen/glucose deprivation is attenuated in cerebral arteries of SUR2 null mice. *Am J Physiol Heart Circ Physiol*. 2011 Oct;301(4):H1360-8. doi: 10.1152/ajpheart.00406.2011. Epub 2011 Jul 22. PMID: 21784985; PMCID: PMC3197357.

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