Oligomycin A
PRODUCT DATA SHEET

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Product Name:	Oligomycin A
Product Number:	O013
CAS Number:	579-13-5
Molecular Formula:	$C_{45}H_{74}O_{11}$
Molecular Weight:	791.1
Appearance:	White Lyophilisate
Solubility:	soluble in ethanol, methanol, DMSO and DMF. It has poor water solubility.
Source:	Streptomyces diastatochromogenes
Storage Conditions:	-20°C
Description:	Oligomycin A is the dominant analog of a class of macrocyclic lactones isolated from selected strains of *Streptomyces* sp. Oligomycin A exhibits a broad biological profile including antifungal, antitumor and nematocidal activities. Oligomycin A, a dominant analog of the isomers, is an inhibitor of mitochondrial F_1F_0 ATP synthase as first reported in 1958 by Henry Lardy et al. Oligomycins exhibit apoptotic cytotoxicity and mitochondrial toxicity. It can induce apoptosis in a variety of cell types. Oligomycin is a macrolide antibiotic complex from *Streptomyces.* It is an inhibitor of mitochondrial F_1F_0 ATP synthase. The Oligomycin complex was first reported in 1954, from a strain of *Streptomyces diastatochromogenes* from soil and highly active against fungi. The Oligomycin class includes the analogs/isomers A through G. Different isomers are highly specific for the disruption of mitochondrial metabolism. Oligomycin A is soluble in ethanol, methanol, DMSO and DMF. It has poor water solubility. Additional Oligomycin products can be found here.
Mechanism of Action:	Oligomycin inhibits phosphoryl group transfer in mitochondrial membrane-bound ATP synthase (F_1F_0 ATPase), blocking proton translocation and leading to hyperpolarization of inner mitochondrial membrane. The result is that mitochondrial ATP is not synthesized. After more than 50 years of studies on the binding site of Oligomycin, a team at the Rosalind Franklin University (North Chicago, IL) discovered that it binds to the subunit-c of the F_0 portion of the ATP synthase. The residues involved in the binding site are conserved from yeast to humans (Symersky et al, 2012).

Microbiology Applications A number of mutations in yeast have been shown to confer resistance to Oligomycin.

Cancer Applications Mitochondria are regulators in apotosis, thus are a target for cancer research. Oligomycin was found to bypass doxorubicin resistance and block P-glycoprotein activity. P-glycoprotein causes multidrug resistance, and extrudes anticancer drugs to the extracellular environment using ATP. The result was that it triggered apoptosis in drug-resistant HepG2 cells (Li et al, 2002).

Oligomycin has been used to study the mechanistic aspects of ATP formation in tumor cell biology and apoptosis.

References:

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