Oligomycins
PRODUCT DATA SHEET

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Product Name:	Oligomycins
Product Number:	O037
CAS Number:	1404-19-9
Molecular Formula:	$C_{45}H_{74}O_{11}$
Molecular Weight:	791.06
Solubility:	Freely soluble in ethanol. Soluble in DMSO. Practically insoluble in water.
Source:	Active against fungi including Aspergillus, Penicillium.
Storage Conditions:	-20°C
Description:	Oligomycin is a macrolide antibiotic complex from *Streptomyces.* It is an inhibitor of mitochondrial ATP synthase as first reported in 1958 by Henry Lardy et al. Oligomycins exhibit apoptotic cytotoxicity and mitochondrial toxicity. The Oligomycin complex was first reported in 1954, from a strain of *Streptomyces diastatochromogenes* from soil that was 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. The Oligomycins have antifungal, antibacterial and antitumor properties. Oligomycin is freely soluble in ethanol. It is soluble in DMSO. It is practically insoluble in water. Additional Oligomycin products can be found here.
Mechanism of Action:	Oligomycin inhibits phosphoryl group transfer in membrane-bound ATP synthase. The result is that mitochondrial ATP is not synthesized. It inhibits F_0F_1-ATPase, blocks proton translocation leading to hyperpolarization of inner mitochondrial membrane. 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 (Symersky et al, 2012). The residues involved in the binding site are conserved from yeast to humans.
Spectrum:	Active against fungi including *Aspergillus*, *Penicillium*.
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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