Oligomycin D
PRODUCT DATA SHEET

issue date 01/06/2020

Product Name:	Oligomycin D
Product Number:	O020
CAS Number:	1404-59-7
Molecular Formula:	$C_{44}H_{72}O_{11}$
Molecular Weight:	777.0
Appearance:	White Lyophilisate
Solubility:	Soluble in ethanol, methanol, DMSO and DMF. Practically insoluble in water
Source:	Streptomyces diastatochromogenes
Storage Conditions:	-20°C
Description:	Oligomycin D (Rutamycin) is a minor analog of a class of macrocyclic lactones isolated from selected strains of *Streptomyces* spp. It is a non-selective inhibitor of mitochondrial F_1F_0 ATP synthase in eukaryotes. Oligomycins exhibit apoptotic cytotoxicity and mitochondrial toxicity. It can induce apoptosis in a variety of cell types. It is an important bioprobe to study the organization of ATPase on the mitochondrial membrane. Oligomycin D exhibits a broad biological profile including antifungal, antitumor and nematocidal activities. 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 can be used to study the mechanistic aspects of ATP formation in tumor cell biology and apoptosis. Oligomycin C is Soluble in ethanol, methanol, DMSO and DMF. Practically insoluble in water. Additional Oligomycin products can be found here.
Mechanism of Action:	Oligomycin inhibits phosphoryl group transfer in mitochondrial membrane-bound ATP synthase (F1F0 ATPase), blocking proton translocation and leading to hyperpolarization of inner mitochondrial membrane. The result is that mitochondrial ATP is not synthesized, as this enzyme is responsible for ATP production in mammals via a rotary catalytic mechanism. 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 F0 portion of the ATP synthase. The residues involved in the binding site are conserved from yeast to humans (Symersky et al, 2012).

Spectrum: Oligomycin is active against Rhodotorula gultinis, Aspergillus niger and other molds.

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 can be used to measure oxygen consumption rate and extracellular acidification rates in breast cancer cell lines, contributing to our understanding of molecular pathways that contribute to breast cancer progression (Furth et al, 2018).

References:

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