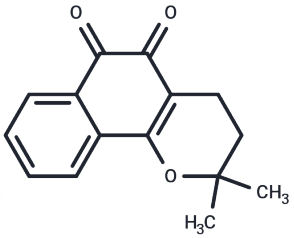
Data Sheet (Cat.No.T6407)

TargetMol

β-Lapachone

Chemical Properties



CAS No. : 4707-32-8

Formula: C15H14O3

Molecular Weight: 242.27

Storage: Keep away from direct sunlight
Powder: -20°C for 3 years | In solvent: -80°C for 1 year
Actual storage temperature shall be subject to the COA.

Biological Description

Description	β-Lapachone (ARQ-501) is a specific DNA topoisomerase I inhibitor, and no inhibitory activities against DNA topoisomerase II or ligase.
Targets(IC50)	Apoptosis,Autophagy,IDO,Indoleamine 2,3-Dioxygenase (IDO),Topoisomerase
In vitro	Beta-Lapachone inhibits DNA relaxation induced by DNA topoisomerase I in a dose-dependent manner. [1] Treatment of beta-lapachone (100 nM or greater) results in >95% inhibition of Topo I DNA unwinding activity compared to the DMSO control. beta-lapachone (1-5 μM) causes a block in G0/G1 of the cell cycle and induces apoptosis by locking Topo I onto DNA and blocking replication fork movement in HL-60 and three human prostate cancer (DU-145, PC-3, and LNCaP) cells. [2] Beta-Lapachone facilitates the migration of mouse 3T3 fibroblasts and human endothelial EAhy926 cells through different MAPK signaling pathways, and thus accelerates scrape-wound healing in vitro. [3] In addition, beta-Lapachone inhibits purified recombinant IDO1 activity through uncompetitive inhibition with IC50 of 0.44 μM, and beta-lapachone also exhibits superior retention of intracellular IDO1 inhibitory activity with an IC50 of 1.0 μM, partially dependent on biotransformation by NQO1. [4] Beta-lapachone induces programmed necrosis of NQO1+ cancer cells by NQO1-dependent reactive oxygen species (ROS) formation and PARP1 hyperactivation. [5]
In vivo	Beta-lapachone treatment (50 mg/kg) leads to potent inhibition of in vivo tumor growth in a xenograft mouse model of human ovarian cancer, and the combination of beta-lapachone and taxol produces a synergistic induction of apoptosis. [6] In normal and diabetic (db/db) mice, treatment of beta-lapachone results in a faster healing process than vehicle only. [3]
Kinase Assay	Topoisomerase I Catalytic Actioity Assay [1]: Topoisomerase I Catalytic Actioity Assay: The enzymatic activity is analyzed by the DNA unwinding assay. DNA topoisomerase I, from TopoGEN (1 unit, which is defined as the amount of enzyme that converts 0.5 μg of superhelical DNA to the relaxed state in 30 minutes at 37 °C), is incubated with 0.5 μg of 6x174 RF DNA, in the presence or absence of Beta-Lapachone, in 20 μL of relaxation buffer (50 mM Tris (pH 7.5). 50 mM KCl, 10 mM MgCl2, 0.5 mM dithiothreitol, 0.5 mM EDTA, 30 μg/mL bovine serum albumin) for 30 minutes at 37 °C. Reactions are stopped by adding 1% SDS and proteinase K (50 μg/mL). After an additional 1-hour incubation at 37 °C, the products are separated by electrophoresis in 1% agarose gel in TAE buffer

Kinase Assay	(0.04 M tris acetate, 0.001 M EDTA). The gel is stained with ethidium bromide after electrophoresis. The photographic negative is scanned with an NIH image analysis system.
Cell Research	IC50 calculations for each cell line are determined by DNA amount (IS) and anchorage-dependent colony formation (CF) assays. For the CF assay, cells are seeded at 500 viable cells/well in 6-well plates and incubated overnight, then treated with equal volumes of media containing beta-lapachone at final concentrations ranging from 0.005 to 50 μM in half-log increments (controls were treated with 0.25% DMSO, equivalent to the highest dose of beta-lapachonc used) for 4 hour or for continuous 12-hour exposures. Plates (3 wells/condition) are stained with crystal violet, and colonies of >50 normal-appearing cells are enumerated. IC50 values for various cells are calculated using drug doses with numbers of colonies surrounding 50% of control. For DNA assays, plates are harvested for IC50 determinations 8 days after treatment using a CytoFluor 2350 fluorescence measurement system. Six-well samplings are included in the calculation of DNA fluor units for each dose. A graph of beta-lapachone dose versus percentage control DNA in fluor units is used to calculate each IC50. All experiments are repeated at least twice, each in duplicate. (Only for Reference)

Solubility Information

Solubility	Ethanol: 12.1 mg/mL (49.94 mM),Sonication is recommended. DMSO: 41.67 mg/mL (172 mM),Sonication is recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)
In vivo Formulation	10% DMSO+40% PEG300+5% Tween 80+45% Saline: 2 mg/mL (8.26 mM),Sonication is recommended. *Please add the solvents sequentially, clarifying the solution as much as possible before adding the next one. Dissolve by heating and/or sonication if necessary. Working solution is recommended to be prepared and used immediately. The formulation provided above is for reference purposes only. In vivo formulations may vary and should be modified based on specific experimental conditions.*

Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	4.1276 mL	20.6381 mL	41.2763 mL
5 mM	0.8255 mL	4.1276 mL	8.2553 mL
10 mM	0.4128 mL	2.0638 mL	4.1276 mL
50 mM	0.0826 mL	0.4128 mL	0.8255 mL

Please select the appropriate solvent to prepare the stock solution, according to the solubility of the product in different solvents. Please use it as soon as possible.

Note: The dilution table applies only to solid products. For liquid products, please calculate the stock solution based on the stated concentration and/or density.

Reference

Li CJ, et al. J Biol Chem. 1993, 268(30), 22463-22468.
Wu L, Ma X, Yang X, et al. Synthesis and biological evaluation of β-lapachone-monastrol hybrids as potential anticancer agents. European Journal of Medicinal Chemistry. 2020: 112594.
Planchon SM, et al. Cancer Res. 1995, 55(17), 3706-3711.
Kung HN, et al. Am J Physiol Cell Physiol. 2008, 295(4), C931-943.
Flick HE, et al. Int J Tryptophan Res. 2013, 6, 35-45.
Huang X, et al. Cancer Res. 2012, 72(12), 3038-3047.
Kim TW, et al. β-Lapachone enhances Mre11-Rad50-Nbs1 complex expression in cisplatin-induced nephrotoxicity. Pharmacol Rep. 2016 Feb;68(1):27-31.
Wu L, Ma X, Yang X, et al. Synthesis and biological evaluation of β-lapachone-monastrol hybrids as potential anticancer agents[J]. European Journal of Medicinal Chemistry. 2020: 112594.