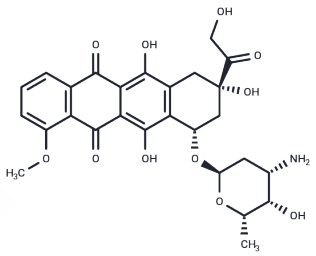
Data Sheet (Cat.No.T1456)

TargetMol

Doxorubicin

Chemical Properties



CAS No. : 23214-92-8

Formula: C27H29NO11

Molecular Weight: 543.52

Storage: Keep away from direct sunlight,Keep away from moisture
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	Doxorubicin (Adriamycin) is a fluorescent anthracycline antitumor antibiotic that inhibits Topoisomerase I/II, induces apoptosis and autophagy, downregulates the AMPK signaling pathway, and is commonly used in cancer chemotherapy as well as in models of nephritis and heart failure.
Targets(IC50)	AMPK,ADC Cytotoxin,Topoisomerase
In vitro	The combination of Doxorubicin and Simvastatin at the highest tested concentrations (2 μM and 10 μM, respec-tively) kills 97% of the Hela cells[2].
In vivo	In an experiment, mice with PC3 xenografts received injections of Doxorubicin at dosages of 2, 4, or 8 mg/kg, and tumor volume was monitored. The 2 mg/kg dose did not inhibit tumor growth, but doses of 4 mg/kg and 8 mg/kg initially delayed growth, significantly reducing c-FLIP levels in the tumors ($p<0.05$ on days 18 and 22)[3]. In a separate study with rats, treatments involved a single intraperitoneal injection of 10 mg/kg Doxorubicin, ten daily injections of 1 mg/kg, or five weekly injections of 2 mg/kg, resulting in an 80% mortality rate by day 28 for the first group, and on days 107 and 98 for the latter groups, respectively. Furthermore, fractional shortening—a measure of heart function—decreased by 30% in the first group at week 2, 55% in the second group at week 13, and 42% in the third group at week 13[4].
Cell Research	Doxorubicin is dissolved in stock solutions (1 mM) and serially diluted with RPMI 1640 media (0.1, 1, and 2 μM)[2]. 160 μL of Hela cells suspension (3×104 cell/mL) is dispensed into three 96-well U-bottom microplates and incubated for 24 h at 37°C in a fully humidified atmosphere of 5% CO2. In plate 1, serial dilutions of Doxorubicin (20 μL; final concentration, 0.1-2 μM) and Simvastatin (20 μL; final concentration, 0.25-2 μM) are added to a final volume of 200 μL and incubated for another 72 h. In plates 2 and 3 serial dilutions of each drug (Simvastatin or Doxorubicin, 40 μL) are added. After an incubation period of 24 h, the medium is aspirated and the cells are washed in PBS. Then, serial dilutions of other drug (40 μL) are added and supplemented with culture medium to a final volume of 200 μL, and incubated for 48 h. Doxorubicin and Simvastatin are used individually as positive controls (40 μL in each well), and the cells treated only with solvent are considered as negative controls. To evaluate cell survival, 20 μL of MTT solution (5 mg/mL in PBS) is added to each well and incubated for 3 h.

Cell Research	Then the media is replaced with 150 μL of DMSO, and complete solubilization of formazan crystals is achieved by repeated pipetting of the solution. Absorbance is then determined at 540 nm by an ELISA plate reader. Each drug concentration is assayed in 4 or 8 wells and repeated 3 times. The cytotoxic/cytostatic effect of Doxorubicin is expressed as the relative viability (% control) and calculated. Percentage of cell survival in the negative control is assumed as 100. Relative viability=(experimental absorbance-background absorbance)/ (absorbance of untreated controls-background absorbance) ×100 %[2].

Solubility Information

Solubility	H2O: 50 mg/mL (91.99 mM),Sonication is recommended. DMSO: 49 mg/mL (90.15 mM),Sonication is recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)

Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	1.8399 mL	9.1993 mL	18.3986 mL
5 mM	0.368 mL	1.8399 mL	3.6797 mL
10 mM	0.184 mL	0.9199 mL	1.8399 mL
50 mM	0.0368 mL	0.184 mL	0.368 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

Nitiss JL, et al. Targeting DNA topoisomerase II in cancer chemotherapy.Nat Rev Cancer. 2009 May;9(5):338-50.
Wu T Y, Chen X C, Tang G X, et al.Development and Characterization of Benzoselenazole Derivatives as Potent and Selective c-MYC Transcription Inhibitors.Journal of Medicinal Chemistry.2023
The TRPV1-PKM2-SREBP1 axis maintains microglial lipid homeostasis in Alzheimer's disease[J]. Cell Death & Disease, 2025, 16(1): 14.
Sadeghi-Aliabadi H, et al. Cytotoxic evaluation of doxorubicin in combination with simvastatin against human cancer cells. Res Pharm Sci. 2010 Jul;5(2):127-33.
Qian S, Han Y, Zhang Y, et al.Discovery of AHCY as an Off-Target of Doxorubicin by Integrative Analysis of Photoaffinity Labeling Chemoproteomics and Untargeted Metabolomics.Analytical Chemistry.2022
El-Zawahry A, et al. Doxorubicin increases the effectiveness of Apo2L/TRAIL for tumor growth inhibition of prostate cancerxenografts. BMC Cancer. 2005 Jan 7;5:2.
Zhao J, Xu J, Wu M, et al.LncRNA H19 Regulates Breast Cancer DNA Damage Response and Sensitivity to PARP Inhibitors via Binding to ILF2.International Journal of Molecular Sciences.2023, 24(11): 9157.
Hayward R, et al. Doxorubicin cardiotoxicity in the rat: an in vivo characterization. J Am Assoc Lab Anim Sci. 2007 Jul;46(4):20-32.
Len J M, Hussein N, Malla S, et al. A Novel Dialkylamino-Functionalized Chalcone, DML6, Inhibits Cervical Cancer Cell Proliferation, In Vitro, via Induction of Oxidative Stress, Intrinsic Apoptosis and Mitotic Catastrophe. Molecules. 2021, 26(14): 4214.
Liang L, Tu Y, Lu J, et al. Dkk1 exacerbates doxorubicin-induced cardiotoxicity by inhibiting Wnt/β-catenin signaling pathway[J]. J Cell Sci. 2019 May 16;132(10).
Liang L, Tu Y, Lu J, et al. Dkk1 exacerbates doxorubicin-induced cardiotoxicity by inhibiting Wnt/β-catenin signaling pathway. J Cell Sci. 2019 May 16;132(10)
Abramczyk O, Stawieraj S, Mlicka A, et al.Effect of combined action of doxorubicin and calcifediol on MCF-7 breast cancer cells.Medical Research Journal.2023
YILDIZHAN K, HUYUT Z, ALTINDAĞ F, et al.EFFECT OF SELENIUM AND N-(P-AMYLCINNAMOYL) ANTHRANILIC ACID ON DOXORUBICIN-INDUCED KIDNEY INJURY IN RATS.İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksek Okulu Dergisi. 11(1): 1181-1191.
Li G J, Wang C, Wang W D, et al.Chromomycins from soil-derived Streptomyces sp. inhibit the growth of human non-small cell lung cancer cells by targeting c-FLIP.Journal of Asian Natural Products Research.2024: 1-16.
Li T, Wan Z, Wang Q, et al.Utilizing Tissues Self-Assembled in Fiber Optic-Based "Chinese Guzheng Strings" for Contractility Sensing and Drug Efficacy Evaluation: A Practical Approach.Small.2406144