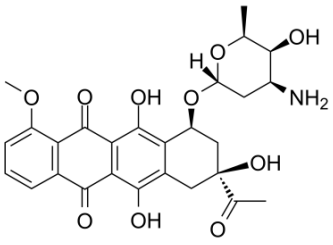
Daunorubicin

Cat. No.:	HY-13062A
CAS No.:	20830-81-3
Molecular Formula:	$C_{27}H_{29}NO_{10}$
Molecular Weight:	527.52
Target:	Topoisomerase; DNA/RNA Synthesis; ADC Cytotoxin; Autophagy; Bacterial; Antibiotic
Pathway:	Cell Cycle/DNA Damage; Antibody-drug Conjugate/ADC Related; Autophagy; Anti-infection
Storage:	Please store the product under the recommended conditions in the Certificate of Analysis.



BIOLOGICAL ACTIVITY

Description	Daunorubicin (Daunomycin; RP 13057; Rubidomycin) is a topoisomerase II inhibitor with potent antineoplastic activities. Daunorubicin (Daunomycin; RP 13057; Rubidomycin) inhibites DNA and RNA synthesis in sensitive and resistant Ehrlich ascites tumor cells.	
IC_{50} & Target	Topoisomerase II	Daunorubicins/Doxorubicins
In Vitro	The mean IC_{50} value is 0.04 μM for Daunorubicin (Dnr) in Molt-4 cells. Daunorubicin belongs to the anthracyclines, a group of cytotoxic chemotherapeutics. The cytotoxic effects of anthracyclines are caused by DNA intercalation and the ability to interfere with DNA transcription and replication by inhibiting Topoisomerase II as well as by producing reactive oxygen species[2] Daunorubicin inhibits of both DNA and RNA synthesis in HeLa cells over a concentration range of 0.2 through 2 μM. The IC_{50} value is 0.4 μM for Daunorubicin (Dnr) in human pancreatic cell line L3.6[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	
In Vivo	Urinary protein excretion, serum creatinine, and blood urea nitrogen (BUN) level are significantly increased in group Daunorubicin (3 mg/kg, i.v.) compared with those in group Control. Administration of Daunorubicin (DNR) causes a significant increase in malondialdehyde (MDA) level in renal tissue compared with that in the control group[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	

PROTOCOL

Cell Assay [2]	The chemosensitivity to Daunorubicin is assessed using the MTT assay. In brief, the 96 well plates are set up with cells at the initial density of 2×10^5 cells/mL and are incubated at 37°C for 72 h in an atmosphere of 5% CO_2 in the absence and presence of nine different concentrations of Daunorubicin (Dnr) or Dox ranging from 1.90 to 0.007 μM in triplicate. After incubation, 10 μL of MTT solution (5 mg/mL tetrazolium salt) is added to each well and the plates are incubated for a further 4 h at 37°C. The formazan salt crystals are dissolved by adding 100 μL 10% SDS in 10 mM HCl solution and incubating over night at 37°C. The absorbance is measured at 540 nm with a reference at 650 nm by a 96-well enzyme-linked immunosorbent assay (ELISA) plate reader. Chemosensitivity is expressed as the IC_{50}, which is the concentration of drug causing 50% cell survival compare to control cells grown without drug. Calculations are carried out using Microsoft Excel[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Administration [4]	Rat[4] Eight-week-old male Sprague-Dawley rats are used. The animals are quarantined and acclimatized for the additional 2 weeks prior to the initiation of the experiments. On day 0, each animal receives a single intravenous injection of Daunorubicin at a dose of 3 mg/kg (i.v.). Daunorubicin is administered in three equal injections at 48 h intervals for a period of one week to achieve an accumulative dose of 9 mg/kg, which is well documented to produce cardiotoxicity and nephrotoxicity. Age-matched rats are injected with corresponding volumes of 0.9% NaCl and used as a control (group Control;n=5). Twenty-two DNR-treated rats are randomly divided into two groups and received oral administration of Telmisartan (10 mg/kg/day; group Daunorubicin+Telmisartan; n=10) or vehicle (group Daunorubicin; n=12). The dose of Telmisartan is chosen on the basis of a previous report. Administration of Telmisartan is started on the same day as Daunorubicin administration and continued for 5 additional weeks after cessation of Daunorubicin administration (6 weeks total period). This duration of study is chosen on the basis of previous reports. On day 41, rats are placed individually in metabolic cages for 24-h urine collections for the measurement of protein concentrations and body weight (BW) is measured. After the end of the study period (6 weeks), rats are sacrificed and kidney tissue is harvested for semi-quantitative immunoblotting and immunohistochemical studies. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Clin Cancer Res. 2020 Apr 15;26(8):2011-2021.
- J Mol Med (Berl). 2019 Aug;97(8):1183-1193.
- Cancer Biol Ther. 2020 Jan 13:1-12.
- Mol Cell Biochem. 2020 Nov 28.
- Oncol Lett. 2019 Nov.

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REFERENCES

[1]. Lehmann M, et al. Activity of topoisomerase inhibitors daunorubicin, idarubicin, and aclarubicin in the Drosophila Somatic Mutation and Recombination Test. Environ Mol Mutagen. 2004;43(4):250-7.

[2]. Svensson SP, et al. Melanin inhibits cytotoxic effects of Doxorubicin and Daunorubicin in MOLT 4 cells. Pigment Cell Res. 2003 Aug;16(4):351-4

[3]. Gervasoni JE Jr, et al. An effective in vitro antitumor response against human pancreatic carcinoma with paclitaxel and Daunorubicin by induction of both necrosis and apoptosis. Anticancer Res. 2004 Sep-Oct;24(5A):2617-26

[4]. Arozal W, et al. Telmisartan prevents the progression of renal injury in daunorubicin rats with the alteration of angiotensin II and endothelin-1 receptor expression associated with its PPAR-γ agonist actions. Toxicology. 2011 Jan 11;279(1-3):91-9.

[5]. Dano K, et al. Inhibition of DNA and RNA synthesis by daunorubicin in sensitive and resistant Ehrlich ascites tumor cells in vitro. Cancer Res. 1972 Jun;32(6):1307-14.

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