Daunorubicin Hydrochloride

Cat. No.: HY-13062
CAS No.: 23541-50-6
Molecular Formula: C₂₇H₃₀ClNO₁₀
Molecular Weight: 563.98
Target: Topoisomerase; DNA/RNA Synthesis; ADC Cytotoxin; Autophagy
Pathway: Cell Cycle/DNA Damage; Antibody-drug Conjugate/ADC Related; Autophagy
Storage: 4°C, protect from light

**SOLVENT & SOLUBILITY**

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Solvent</th>
<th>Mass 1 mg</th>
<th>Mass 5 mg</th>
<th>Mass 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mM</td>
<td>H₂O</td>
<td>1.7731 mL</td>
<td>8.8656 mL</td>
<td>17.7311 mL</td>
</tr>
<tr>
<td>5 mM</td>
<td>H₂O</td>
<td>0.3546 mL</td>
<td>1.7731 mL</td>
<td>3.5462 mL</td>
</tr>
<tr>
<td>10 mM</td>
<td>H₂O</td>
<td>0.1773 mL</td>
<td>0.8866 mL</td>
<td>1.7731 mL</td>
</tr>
</tbody>
</table>

In Vitro H₂O : ≥ 34 mg/mL (60.29 mM)

* “≥” means soluble, but saturation unknown.

**BIOLOGICAL ACTIVITY**

**Description**
Daunorubicin Hydrochloride (RP 13057 Hydrochloride) is a topoisomerase II inhibitor with potent antineoplastic activities. Daunorubicin Hydrochloride (RP 13057 Hydrochloride) inhibits DNA and RNA synthesis in sensitive and resistant Ehrlich ascites tumor cells.

**IC₅₀ & Target**
Topoisomerase II

**In Vitro**
The mean IC₅₀ value is 0.04 μM for Daunorubicin Hydrochloride (RP 13057 Hydrochloride) in Molt-4 cells. Daunorubicin Hydrochloride (RP 13057 Hydrochloride) 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 Hydrochloride (RP 13057 Hydrochloride) inhibits both DNA and RNA synthesis in HeLa cells over a concentration range of 0.2 through 2 μM. The IC₅₀ value is 0.4 μM for Daunorubicin Hydrochloride (RP 13057 Hydrochloride) in human pancreatic cell line L3.6[3].
**In Vivo**

Urinary protein excretion, serum creatinine, and blood urea nitrogen (BUN) level are significantly increased in group Daunorubicin Hydrochloride (RP 13057 Hydrochloride) (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].

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**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 compared 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.

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