

Product Data Sheet

Product Name: RI-1
Cat. No.: GC18140

Chemical Properties

Cas. No. 415713-60-9

Chemical Name 3-chloro-1-(3,4-dichlorophenyl)-4-morpholin-4-ylpyrrole-2,5-dione

SMILES C1COCCN1C2=C(C(=O)N(C2=O)C3=CC(=C(C=C3)Cl)Cl)Cl

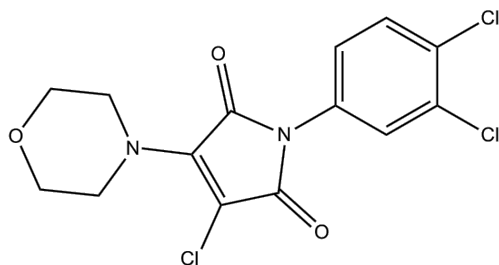
Formula $C_{14}H_{11}Cl_3N_2O_3$ M.Wt 361.61

Solubility ≥ 18.1 mg/mL in DMSO, ≥ 8.89 mg/mL in EtOH with gentle warming
Storage Store at -20°C

General tips For obtaining a higher solubility, please warm the tube at 37°C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution: ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure



Protocol

Cell experiment [1]:

Cell lines	FLO-1 cells
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Preparation Method	FLO-1 cells were cultured in DMEM medium supplemented with 10% fetal bovine serum (FBS), 2mM glutamine, and 1% penicillin-streptomycin at 37°C in 5% CO ₂ /atmosphere. FLO-1 cells were seeded onto 96-well microplates (1×10^4 cells/well) and cultured for 24h. The cells were treated with PBS or RI-1 at different concentrations (0, 1, 10, and 20μM) in the presence of 1μM etoposide. After 48h incubation, cell viability was assessed.
Reaction Conditions	0, 1, 10, and 20μM; 48h
Applications	RI-1 treatment reduced the cell viability of FLO-1 cells in a dose-dependent manner in the presence of etoposide.
Animal experiment [2]:	
Animal models	Female BALB/c-nude mice
Preparation Method	Female BALB/c-nude mice (6-weeks old) were housed under controlled temperature (21-23°C), humidity (30-35%) and light cycle (7:00 AM to 7:00 PM) and maintained on a standard rodent diet. HeLa Cells (1×10^7) in the exponential growth phase were collected and suspended in 200μl phosphate-buffered saline and then injected subcutaneously into the posterior side of mice. RI-1 (5mg/kg in 200μl phosphate-buffered saline) was injected intraperitoneally every other day for 36 days into mice when the tumor volume reached 120mm ³ . Analyze the tumor volume of the mice every 3 days.
Dosage form	5mg/kg; every other day; 36 days; i.p.

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Applications	RI-1 treatment significantly inhibited tumor growth in mice with HeLa xenografts.
References: [1] Liao C, Zhao J, Kumar S, et al. RAD51 inhibitor reverses etoposide-induced genomic toxicity and instability in esophageal adenocarcinoma cells[J]. Archives of clinical toxicology, 2020, 2(1): 3. [2] Chen Q, Cai D, Li M, et al. The homologous recombination protein RAD51 is a promising therapeutic target for cervical carcinoma[J]. Oncology reports, 2017, 38(2): 767-774.	

Background

RI-1 is a RAD51 protein inhibitor, with IC₅₀ values ranging from 5 to 30μM^[1]. RI-1 contains a chloromaleimide group that functions chemically as a Michael acceptor, thereby inhibiting RAD51 by covalently binding to the Cys319 residue, and RI-1 disrupts RAD51-ssDNA binding by preventing oligomerization of RAD51 into filaments on DNA^[2]. RI-1 has been widely used to increase the sensitivity of glioblastoma stem cell-like cells to ionizing radiation and to interfere with the DNA repair process^[3].

In vitro, RI-1 treatment (20μM) in combination with etoposide (1μM) for 48 hours significantly inhibited the viability of FLO-1 cells and induced cell apoptosis^[4]. Treatment with 20μM RI-1 for 48 hours markedly reduced the camptothecin-induced genomic instability of MCF7, HCT116, and OE19 cells^[5]. Treatment with 1.5μM RI-1 for 3 weeks following 2Gy irradiation (2h) significantly reduced the survival of glioblastoma cells and decreased the expression level of SOX2 mRNA^[6].

In vivo, RI-1 treatment via intraperitoneal injection at a dose of 5mg/kg every other day for 36 days significantly inhibited the growth of HeLa xenograft tumors in mice^[7]. Intraperitoneal injection of RI-1 at a dose of 50mg/kg every 3 days for 30 days significantly reduced tumor growth in the MDA-MB-157 xenograft mouse model without affecting body weight^[8].

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- [3] Balbous, Anaïs, et al. "A radiosensitizing effect of RAD51 inhibition in glioblastoma stem-like cells." BMC cancer 16.1 (2016): 604.
- [4] Liao C, Zhao J, Kumar S, et al. RAD51 inhibitor reverses etoposide-induced genomic toxicity and instability in esophageal adenocarcinoma cells[J]. Archives of clinical toxicology, 2020, 2(1): 3.
- [5] Liao C, Talluri S, Zhao J, et al. RAD51 is implicated in DNA damage, chemoresistance and immune dysregulation in solid tumors[J]. Cancers, 2022, 14(22): 5697.
- [6] King H O, Brend T, Payne H L, et al. RAD51 is a selective DNA repair target to radiosensitize glioma stem cells[J]. Stem cell reports, 2017, 8(1): 125-139.
- [7] Chen Q, Cai D, Li M, et al. The homologous recombination protein RAD51 is a promising therapeutic target for cervical carcinoma[J]. Oncology reports, 2017, 38(2): 767-774.
- [8] Shi Y, Jin J, Wang X, et al. DAXX, as a tumor suppressor, impacts DNA damage repair and sensitizes BRCA-proficient TNBC cells to PARP inhibitors[J]. Neoplasia, 2019, 21(6): 533-544.

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