

Product Data Sheet

Product Name: Zinc protoporphyrin IX

Cat. No.: GC11208

Chemical Properties

Cas. No. 15442-64-5

Chemical Name zinc;3-[18-(2-carboxyethyl)-8,13-bis(ethenyl)-3,7,12,17-tetramethylporphyrin-21,24-diido-2-yl]propanoic acid

SMILES OC(CCC1=C(C)/C([N-]/C1=C\2)=C/C(C(C)=C/3C=C)=NC3=C/C4=N/C(C(C=C)=C4C)=C\C5=C(C)C(CCC(O)=O)=C2[N-]5)=O.[Zn+2]

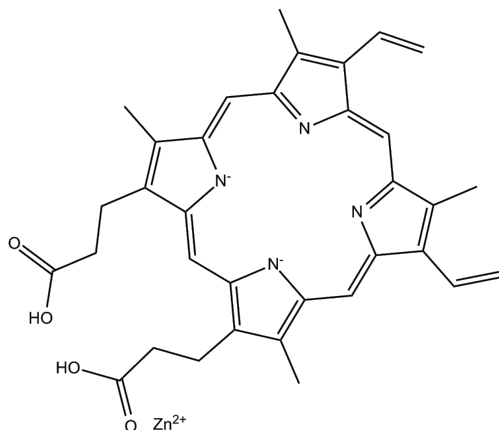
Formula $C_{34}H_{32}N_4O_4Zn$ M.Wt 626.03

Solubility DMSO : slightly soluble Storage Store at -20°C, sealed storage, away from moisture

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]:

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Cell lines Human ovarian carcinoma (MDAH2774), human pancreatic adenocarcinoma (Mia PaCa2), human breast carcinoma (MDA-MB231), murine breast carcinoma (EMT6) cell lines.

Preparation Method Tumor cells were dispensed into 96-well plates at a concentration of 5×10^3 cells per well and allowed to attach overnight. The following day investigated agents were added at indicated concentrations. Cells were kept in dark for 48 or 72 h. After the incubation time the cells were rinsed with PBS and stained with 0.5% crystal violet in 2% ethanol for 10 min at room temperature. Plates were washed four times with tap water and the cells were lysed with 1% SDS solution. Absorbance was measured at 595 nm using an enzyme-linked immunosorbent assay reader, equipped with a 595 nm filter.

Reaction Conditions 0-40 μ M for 48, 72 hours

Applications Incubation of C-26 cells with Zinc protoporphyrin IX for 48 or 72 h resulted in dose- and time-dependent reduction of cells in G1 phase of the cell cycle.

Animal experiment [1]:

Animal models Murine C-26 model

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For assessment of antitumor activity of Zinc protoporphyrin IX in vivo, exponentially growing C-26 were harvested, re-suspended in PBS medium to the appropriate concentration, and injected at the dose of 1×10^5 cells per mouse into the footpad of the right hind limb of experimental mice. Tumor cell viability measured by trypan blue exclusion was always above 95%. For in vivo Preparation Method treatment Zinc protoporphyrin IX was dissolved in DMSO and further diluted in 0.9% NaCl to required concentrations. Final DMSO concentration was always less than 0.1%. Zinc protoporphyrin IX was distributed intraperitoneally at doses from 12.5 to 50 mg per kg of body weight or orally at doses from 11 to 22 mg per kg of body weight. Control animals received 0.1% DMSO solution in 0.9% NaCl i.p. or orally.

Dosage form 12.5 to 50 mg/kg i.p. for 7 days; 11 to 22 mg/kg oral for 7 days

Applications HO-1 inhibitor was administered either intraperitoneally (i.p.) or per os and the tumor volume was monitored every second day, starting from day 7 after inoculation of tumor cells. Zinc protoporphyrin IX exerted dose-dependent antitumor effects manifested by the retardation of tumor growth. A statistical significance was reached on days 17 and 19 for Zinc protoporphyrin IX administered at a dose of 25 mg/kg either i.p. or orally. A stronger effect was observed when Zinc protoporphyrin IX was administered i.p. at a dose of 50 mg/kg, where a statistically significant retardation of tumor growth was observed on days 13-19, as compared with controls .

References:

[1]: Nowis D, Bugajski M, Winiarska M, et al. Zinc protoporphyrin IX, a heme oxygenase-1 inhibitor, demonstrates potent antitumor effects but is unable to potentiate antitumor effects of chemotherapeutics in mice[J]. BMC cancer, 2008, 8(1): 1-12.

Background

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Zinc protoporphyrin IX (ZnPP) is a member of metalloporphyrins in which the heme iron is replaced by zinc, which becomes a competitive inhibitor of heme oxygenase 1 (HO-1) [1].

Zinc protoporphyrin IX tested presented anti-vesicular stomatitis virus (VSV) activity without photoactivation, with the reduction in viral titer being about 10-fold for 1 μ M Zinc protoporphyrin. At 5 μ M, Zinc protoporphyrin IX tested were able to completely abolish VSV infectivity. Photoactivation of the porphyrins significantly enhanced their antiviral activities, with 0.1 μ M ZnPPIX completely abolishing VSV infectivity [2]. Zinc protoporphyrin IX (ZnPP) (5 μ M; 72 hours) causes the fraction of late apoptotic and necrotic cells increasing from 10.9% in controls to 30.4% after 72 h in C-26 cells [3]. Zinc protoporphyrin IX (1.25-40 μ M; 48 or 72 hours) exerts cystostatic/cytotoxic effects against human ovarian carcinoma (MDAH2774), human pancreatic adenocarcinoma (Mia PaCa2), human breast carcinoma (MDA-MB231), murine breast carcinoma (EMT6) cell lines [3].

Zinc Protoporphyrin IX (12.5, 25, 50 mg/kg for i.p.; 12.5, 50 mg/kg for p.o. for 7days) exerts dose-dependent antitumor effects manifested by the retardation of tumor growth in BALB/c mice inoculated with C-26 cells [3]. Zinc Protoporphyrin IX (5 and 20 μ g/mouse) dose-dependently inhibited tumor growth in LL/2-tumor model mice. Vascular endothelial growth factor concentration in tumors was reduced by Zinc Protoporphyrin IX [4].

References:

- [1]. Fang J, Greish K, Qin H, et al. HSP32 (HO-1) inhibitor, copoly (styrene-maleic acid)-zinc protoporphyrin IX, a water-soluble micelle as anticancer agent: In vitro and in vivo anticancer effect[J]. European Journal of Pharmaceutics and Biopharmaceutics, 2012, 81(3): 540-547.
- [2]. Cruz-Oliveira C, Almeida A F, Freire J M, et al. Mechanisms of vesicular stomatitis virus inactivation by protoporphyrin IX, zinc-protoporphyrin IX, and mesoporphyrin IX[J]. Antimicrobial agents and chemotherapy, 2017, 61(6): e00053-17.
- [3]. Nowis D, Bugajski M, Winiarska M, et al. Zinc protoporphyrin IX, a heme oxygenase-1 inhibitor, demonstrates potent antitumor effects but is unable to potentiate antitumor effects of chemotherapeutics in mice[J]. BMC cancer, 2008, 8(1): 1-12.
- [4]. Hirai K, Sasahira T, Ohmori H, et al. Inhibition of heme oxygenase-1 by zinc protoporphyrin IX reduces tumor growth of LL/2 lung cancer in C57BL mice[J]. International Journal of Cancer, 2007, 120(3): 500-505.

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