

Product Data Sheet

Product Name: IR 783
Cat. No.: GC48378

Chemical Properties

Cas. No. 115970-66-6

SMILES C1C1=C(CCC/C1=C\C=C2C(C)(C)C3=CC=CC=C3N2CCCCS([O-])(=O)=O)/C=C/C4=[N+](CCCCS([O-])(=O)=O)C5=CC=CC=C5C4(C)C.[Na+]

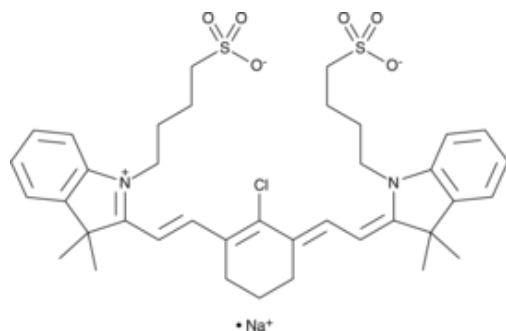
Formula C₃₈H₄₆ClN₂O₆S₂•Na M.Wt 749.4

Solubility DMF: 1 mg/ml, DMSO: 1 mg/ml, Ethanol: 1 mg/ml, PBS (pH 7.2): 1 mg/ml
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 MDA-MB-231 and MCF-7 breast cancer cells

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The human breast cancer cell lines MDA-MB-231 and MCF-7 were cultured in Dulbecco's modified Eagle's medium (DMEM) containing 10% fetal bovine serum (FBS). Cells were cultured at 37°C with 5% CO₂ and digested every 2 days by 0.25% trypsin. Cells (2×10^4 cells/well) were seeded onto 96-well plates and allowed to attach. After treatment with various concentrations of IR 783 (0, 20, 40, 60, 80, 100, 120, 140 and 160μM) for 24h or with 80μM IR 783 for different time intervals (0, 3, 6, 12, 24, 36, 48 and 72h) in a 5% CO₂ incubator at 37°C. The proliferation of cells was determined by MTT assay. Cell cycle analysis was performed by flow cytometry. The migration ability of MDA-MB-231 cells was assessed using a wound healing assay. The morphology of mitochondria was studied using a Tecnai 10 transmission electron microscope.

Reaction Conditions 0-160μM; 0-72h

Applications Treatment of MDA-MB-231 and MCF-7 breast cancer cells with IR 783 inhibited the proliferation and migration, promoted mitochondrial fission, and decreased filopodia formation in a dose- and time-dependent manner.

Animal experiment [2]:

Animal models Female nude mice

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Female nude mice (5 weeks old) were used in this experiment. MDA-MB-231 cells were mixed with Matrigel (1:1) and injected subcutaneously into the right hind legs of nude mice. Mice were randomized into 2 groups (n=5). IR 783 (20mg/kg) or an equal volume of vehicle was administered daily by intravenous injection starting 7 days after tumour inoculation. Tumour growth and mice body weights were measured every week, and tumour volume was calculated as

Preparation Method $(\text{length} \times \text{width}^2)/2$. After 4 weeks of treatment, mice were killed by cervical dislocation, and tumour tissues were harvested and fixed in 4% paraformaldehyde or frozen at -80°C. Histological, immunohistochemical and immunofluorescence analyses were performed. TdT-mediated dUTP nick-end labelling (TUNEL) analysis was used to detect the dead cells in the tissue samples. Tumour tissues from each group were lysed and subjected to western blot analysis.

Dosage form 20mg/kg/day; intravenous injection; 4 weeks

Applications IR 783 significantly inhibited tumor growth, increased mitochondrial translocation of Drp1, and activated the mitochondrial apoptotic pathway in an MDA-MB-231 xenograft mouse model.

References:

- [1] Li P, Liu Y, Liu W, et al. IR-783 inhibits breast cancer cell proliferation and migration by inducing mitochondrial fission. *Int J Oncol*. 2019;55(2):415-424.
- [2] Tang Q, Liu W, Zhang Q, et al. Dynamin-related protein 1-mediated mitochondrial fission contributes to IR-783-induced apoptosis in human breast cancer cells. *J Cell Mol Med*. 2018;22(9):4474-4485.

Background

IR 783 is a near-infrared (NIR) heptamethine cyanine fluorescent probe with excitation/emission maxima of 633/780nm, respectively^[1]. IR 783 can be used in combination with anticancer drugs to enhance their targeting and therapeutic efficacy^[2]. IR 783 is usually used in research related to for

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cell imaging and drug delivery^{[3][4][5]}.

In vitro, treatment of MDA-MB-231 and MCF-7 breast cancer cells with IR 783 (0-160 μ M; 0-72h) inhibited the proliferation and migration, promoted mitochondrial fission, and decreased filopodia formation in a dose- and time-dependent manner^[6].

In vivo, IR 783 (20mg/kg/day; intravenous injection; 4 weeks) significantly inhibited tumor growth, increased mitochondrial translocation of Drp1, and activated the mitochondrial apoptotic pathway in an MDA-MB-231 xenograft mouse model^[7].

References:

- [1] Yuan J, Yi X, Yan F, et al. Nearinfrared fluorescence imaging of prostate cancer using heptamethine carbocyanine dyes. *Mol Med Rep*. 2015;11(2):821-828.
- [2] Huang QJ, Liao GC, Zhuang XR, et al. Ras inhibitor farnesylthiosalicylic acid conjugated with IR783 dye exhibits improved tumor-targeting and altered anti-breast cancer mechanisms in mice. *Acta Pharmacol Sin*. 2022;43(7):1843-1856.
- [3] Yang X, Shao C, Wang R, et al. Optical imaging of kidney cancer with novel near infrared heptamethine carbocyanine fluorescent dyes. *J Urol*. 2013;189(2):702-710.
- [4] De Los Reyes-Berbel E, Salto-Gonzalez R, Ortega-Muñoz M, et al. PEI-NIR Heptamethine Cyanine Nanotheranostics for Tumor Targeted Gene Delivery. *Bioconjug Chem*. 2018;29(8):2561-2575.
- [5] Yang X, Shi C, Tong R, et al. Near IR heptamethine cyanine dye-mediated cancer imaging. *Clin Cancer Res*. 2010;16(10):2833-2844.
- [6] Li P, Liu Y, Liu W, et al. IR-783 inhibits breast cancer cell proliferation and migration by inducing mitochondrial fission. *Int J Oncol*. 2019;55(2):415-424.
- [7] Tang Q, Liu W, Zhang Q, et al. Dynamin-related protein 1-mediated mitochondrial fission contributes to IR-783-induced apoptosis in human breast cancer cells. *J Cell Mol Med*. 2018;22(9):4474-4485.

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