

Product Data Sheet

Product Name: ML-210
Cat. No.: GC18705

Chemical Properties

Cas. No. 1360705-96-9

Chemical Name [4-[bis(4-chlorophenyl)methyl]-1-piperazinyl](5-methyl-4-nitro-3-isoxazolyl)-methanone

SMILES C1C=CC=C(C(C2=CC=C(Cl)C=C2)N3CCN(C(C4=NOC(C)=C4[N+](O-)=O)=O)CC3)C=C1

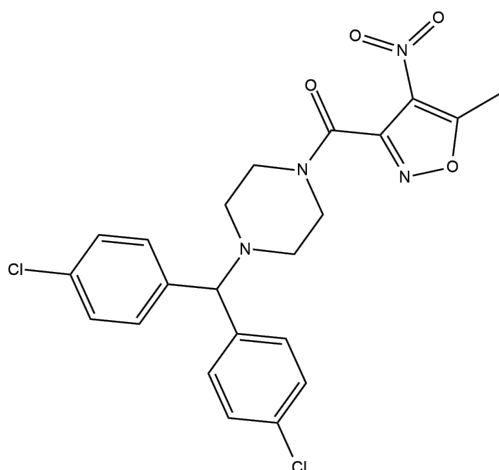
Formula $C_{22}H_{20}Cl_2N_4O_4$ M.Wt 475.3

Solubility 25mg/mL in DMSO (Need ultrasonic), 10mg/mL in DMF, slightly soluble in ethanol 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]:

Caution: Product has not been fully validated for medical applications. For research use only.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

Cell lines PANC-1 cells

Preparation Method 2×10^5 PANC-1 cells were seeded in a 6-well dish plates and incubated for 24h. The cells were treated with 0, 0.025, 0.05, 0.1, 0.3 μ M ML-210 for 24h. The cells were then trypsinized and suspended in FBS (–) medium and seeded into the culture inserts with a filter membrane (8.0 μ m). The culture inserts were then put on the bottom of the chambers with 750 μ L of FBS (+) medium. The filter membranes were fixed with cold methanol and stained with crystal violet after 24h of incubation. The cells on the upper surface of filter membranes were wiped away by using a cotton swab and the cells on the lower surface of the membranes were evaluated under a microscope with the imaging system. Each experiment was done in triplicate.

Reaction Conditions 0, 0.025, 0.05, 0.1, 0.3 μ M; 24h

Applications ML-210 treatment inhibited the migration of PANC-1 cells in a dose-dependent manner.

Animal experiment [2]:

Animal models C57BL/6 mice

Caution: Product has not been fully validated for medical applications. For research use only.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

Preparation Method	5-week-old female C57BL/6 mice were bred and raised in SPF laboratory at a temperature of 26°C with free access to water and food. Mice were inoculated with 5×10^6 ID8-Luc-puro cells by intraperitoneal injection in 200μL PBS. On the seventh day after cell inoculation, mice were treated with 1mg/kg trigonelline, 30mg/kg ML385, 0.5mg/kg clobetasol propionate, 3mg/kg RSL3, 5mg/kg ML-210, and 10% DMSO + 40% PEG300 + 5% Tween-80 + 45% saline were given as a control. ML-210 was intraperitoneally administered every other day for a total of 10 administrations. Body weight was measured every 5 days. After treatment, mice were injected with pentobarbitone (1mg/mice) and D-luciferin (3mg/mice) in succession, and luminescence signals were observed within 15min using the In-vivo Xtreme live imaging system. Illuminance intensity was normalized and analyzed by the related software.
Dosage form	5mg/kg, every other day for 20 days; i.p.
Applications	ML-210 treatment inhibited the spread of ID8-Luc-puro cells in mice and modestly reduced body weight in mice.

References:

- [1] Takemura K, Ikeda K, Miyake H, et al. Epithelial–Mesenchymal Transition Suppression by ML210 Enhances Gemcitabine Anti-Tumor Effects on PDAC Cells[J]. Biomolecules, 2025, 15(1): 70.
- [2] Li N, Jiang X, Zhang Q, et al. Synergistic suppression of ovarian cancer by combining NRF2 and GPX4 inhibitors: in vitro and in vivo evidence[J]. Journal of Ovarian Research, 2024, 17(1): 49.

Background

ML-210 is a prodrug that selectively inhibits GPX4 covalently with an EC_{50} of 30nM^[1]. ML-210 has been widely used as a target or model compound to develop a range of GPX4 degraders^[2].

In vitro, ML-210 treatment at 10μM for 2 hours induced rapid accumulation of lipid radicals in clear-cell renal cell carcinoma cells and caused ferroptosis^[3]. Treatment of PANC-1 cells with 3μM ML-210 for 48 hours significantly inhibited cell viability, strongly decreased N-cadherin expression,

Caution: Product has not been fully validated for medical applications. For research use only.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

increased lipid peroxides on the cell membrane, and inhibited cell migration^[4]. ML-210 treatment (10 μ M) for 24h significantly induced cell cycle arrest in ABCB1 overexpressing colorectal cancer cells without altering ABCB1 protein expression^[5]. In OCI-AML3 cells, treatment with 0.5 μ M of ML-210 for 48h simultaneously increased the proportion of annexin V-positive and DAPI-positive cells, resulting in an increased number of apoptotic cells^[6].

In vivo, ML-210 treatment (5mg/kg; administered intraperitoneally every other day for 20 days) inhibited ovarian cancer progression and modestly reduced body weight in mice^[7].

References:

- [1] Eaton J K, Furst L, Ruberto R A, et al. Selective covalent targeting of GPX4 using masked nitrile-oxide electrophiles[J]. Nature chemical biology, 2020, 16(5): 497-506.
- [2] Wang H, Wang C, Li B, et al. Discovery of ML210-Based glutathione peroxidase 4 (GPX4) degrader inducing ferroptosis of human cancer cells[J]. European Journal of Medicinal Chemistry, 2023, 254: 115343.
- [3] Zou Y, Palte M J, Deik A A, et al. A GPX4-dependent cancer cell state underlies the clear-cell morphology and confers sensitivity to ferroptosis[J]. Nature communications, 2019, 10(1): 1617.
- [4] Takemura K, Ikeda K, Miyake H, et al. Epithelial–Mesenchymal Transition Suppression by ML210 Enhances Gemcitabine Anti-Tumor Effects on PDAC Cells[J]. Biomolecules, 2025, 15(1): 70.
- [5] Li Y C, Xiong Y M, Long Z P, et al. ML210 Antagonizes ABCB1-Not ABCG2-Mediated Multidrug Resistance in Colorectal Cancer[J]. Biomedicines, 2025, 13(5): 1245.
- [6] Akiyama H, Zhao R, Ostermann L B, et al. Mitochondrial regulation of GPX4 inhibition–mediated ferroptosis in acute myeloid leukemia[J]. Leukemia, 2024, 38(4): 729-740.
- [7] Li N, Jiang X, Zhang Q, et al. Synergistic suppression of ovarian cancer by combining NRF2 and GPX4 inhibitors: in vitro and in vivo evidence[J]. Journal of Ovarian Research, 2024, 17(1): 49.

Caution: Product has not been fully validated for medical applications. For research use only.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA