

Product Data Sheet

Product Name: Ranitidine

Cat. No.: GC20026

Chemical Properties

Cas. No. 66357-35-5

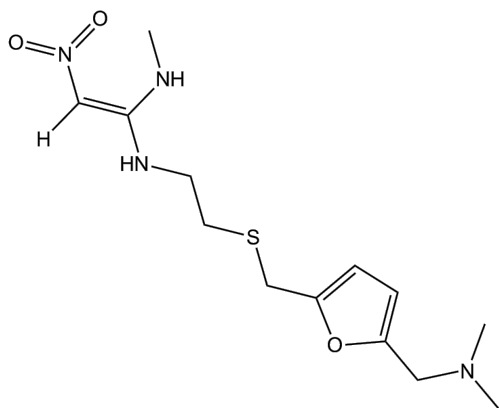
Formula $C_{13}H_{22}N_4O_3S$ M.Wt 314.39

Solubility DMSO : 63mg/mL Storage -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 SH-SY5Y cells

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

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Preparation Method SH-SY5Y cells were cultured in DMEM medium supplemented with 10% fetal bovine serum, 100U/ml penicillin, and 100µg/ml streptomycin at 37°C with 5% CO₂ and 95% saturated atmospheric humidity. Cells were seeded into 96-well microplates at a density of 5×10^3 cells/ml for 24h. In the presence or absence of rotenone (10µM; 24h), cells were treated with different concentrations (0, 1, 5, 10, 50, and 100µM) of Ranitidine for 24 hours, and cell viability was analyzed.

Reaction Conditions 0, 1, 5, 10, 50, and 100µM; 24h

Applications Ranitidine treatment significantly inhibited the cell death of SH-SY5Y cells induced by rotenone in a dose-dependent manner.

Animal experiment [2]:

Animal models Female C57BL/6 mice

Female C57BL/6 mice (6 weeks old; 20-22g) were grouped in individually ventilated cages (IVC) and maintained under specific pathogen-free (SPF) conditions in an environment-controlled room (12h light/12h dark cycle, $21 \pm 2^\circ\text{C}$, 55% relative humidity) and had access to sterilized tap water and standard chow ad libitum. 2×10^5 E0771 cells in 100µl of Matrigel were injected subcutaneously into the mammary fat pad near the fourth nipple. The mice were given drinking water containing an 8mg/kg dose of Ranitidine every day for a period of 21 days. The volume of the tumor was determined by caliper measurements every second day using the equation $\text{volume} = \text{length} \times \text{width}^2/2$.

Dosage form 8mg/kg/day; 21 days; p.o.

Applications Ranitidine treatment significantly decreased tumor growth in mice with E0771 xenografts.

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References:

- [1] Park H J, Kim H J, Park H K, et al. Protective effect of histamine H₂ receptor antagonist ranitidine against rotenone-induced apoptosis[J]. Neurotoxicology, 2009, 30(6): 1114-1119.
- [2] Vila-Leahey A, Oldford S A, Marignani P A, et al. Ranitidine modifies myeloid cell populations and inhibits breast tumor development and spread in mice[J]. Oncoimmunology, 2016, 5(7): e1151591.

Background

Ranitidine, an inhibitor of gastric acid secretion, competitively antagonizes histamine-induced increases in contraction frequency with a pA₂ value of 7.2^[1]. Ranitidine inhibits the activity of yeast sucrose enzyme in a non-competitive manner and causes structural changes, with an IC₅₀ value of 2.2mM^[2]. Ranitidine attenuates rotenone-induced apoptosis by inhibiting the phosphorylation of JNK and p38, as well as the activation of CASP, thereby preventing the cleavage of PARP and CASP3^[3]. Ranitidine has been widely used to inhibit liver regeneration in rats after liver resection and to suppress the cell mitotic activity of liver cells^[4].

In vitro, Ranitidine (100μM) pretreatment for 20 minutes significantly inhibited the death of rat cortical neuron cells induced by oxygen-glucose deprivation (OGD), and suppressed the activation of caspase 3 as well as the changes in the cytoskeleton^[5]. Treatment with 0.1μM Ranitidine for 48 hours significantly inhibited the growth of Caco-2 cells and induced cell apoptosis^[6].

In vivo, Ranitidine treatment via oral administration at a dose of 8mg/kg/day for 8 days significantly reduced the number of CD11b⁺ Ly6C^{hi} cells in the spleen and bone marrow of BALB/c mice ^[7]. Oral administration of Ranitidine at a dose of 30mg/kg/day for 14 days significantly increased locomotor exploratory behavior and reduced anxiety-related behavior in a mouse model of gastrointestinal disease^[8].

References:

- [1] Daly M J, Humphray J M, Stables R. Some in vitro and in vivo actions of the new histamine H₂-receptor antagonist, ranitidine[J]. British journal of pharmacology, 1981, 72(1): 49.
- [2] Minai-Tehrani D, Ghaffari M, Sobhani-Damavandifar Z, et al. Ranitidine induces inhibition and structural changes in sucrase[J]. Journal of Enzyme Inhibition and Medicinal Chemistry, 2012, 27(4):

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553-557.

[3] Park H J, Kim H J, Park H K, et al. Protective effect of histamine H2 receptor antagonist ranitidine against rotenone-induced apoptosis[J]. Neurotoxicology, 2009, 30(6): 1114-1119.

[4] Kanashima R, Nagasue N, Sakato K. Ranitidine as an inhibitor of liver regeneration[J]. The American journal of surgery, 1985, 149(2): 223-227.

[5] Malagelada C, Xifró X, Badiola N, et al. Histamine H2-receptor antagonist ranitidine protects against neural death induced by oxygen-glucose deprivation[J]. Stroke, 2004, 35(10): 2396-2401.

[6] Rajendra S, Mulcahy H, Patchett S, et al. The effect of H2 antagonists on proliferation and apoptosis in human colorectal cancer cell lines[J]. Digestive diseases and sciences, 2004, 49(10): 1634-1640.

[7] Vila-Leahey A, Oldford S A, Marignani P A, et al. Ranitidine modifies myeloid cell populations and inhibits breast tumor development and spread in mice[J]. Oncoimmunology, 2016, 5(7): e1151591.

[8] Selvaraj D B, Vergil Andrews J F, Anusuyadevi M, et al. Ranitidine alleviates anxiety-like behaviors and improves the density of pyramidal neurons upon deactivation of microglia in the CA3 region of the hippocampus in a cysteamine HCl-induced mouse model of gastrointestinal disorder[J]. Brain Sciences, 2023, 13(2): 266.

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