

Product Data Sheet

Product Name: Monensin

Cat. No.: GC61079

Chemical Properties

Cas. No. 17090-79-8

SMILES C[C@]1([C@]2([H])O[C@@](CC2)([C@]3([H])O[C@]([C@@]4([H])O[C@](O)([C@@H](C[C@@H]4C)C)CO)([H])C[C@@H]3C)CC)O[C@@]5(CC1)O[C@]([C@@H]([C@H](C5)O)C)([H])[C@@H](C)[C@@H](OC)[C@H](C)C(O)=O

Formula $C_{36}H_{62}O_{11}$

M.Wt 670.87

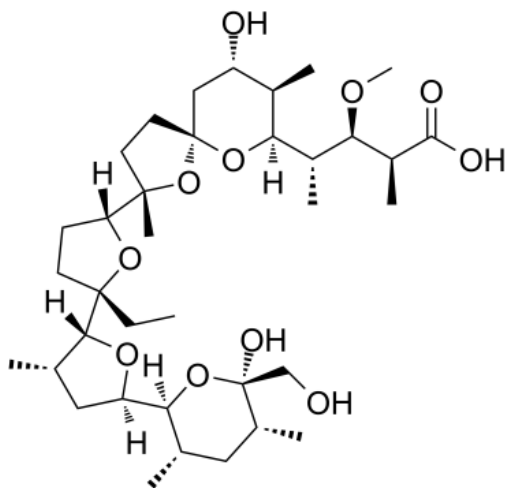
Solubility

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 (human pancreatic ductal adenocarcinoma cell line), MiaPaCa-2 cells (human pancreatic ductal adenocarcinoma cell line)
Preparation Method	Panc-1 and MiaPaCa-2 cells were maintained in DMEM with 10% FBS at 37°C, 5% CO ₂ . Cells were treated with 0.5-4μM Monensin for 48-72h. After treatment, WST-1 assay, crystal violet staining, wound-healing assay, Transwell migration assay (4μM, 12h), cell cycle analysis (2μM, 48h, Hoechst 33258/flow), Annexin V-FITC/PI apoptosis assay (48h), Gaussia luciferase reporter assay for E2F/DP1/STAT1/2/NFκB/AP-1/Elk-1/SRF (24-48h), TqPCR for EGFR/RAF1/KRAS/NRAS/MEK1 (48h), and immunofluorescence for EGFR (36h) were performed.
Reaction Conditions	0.5-4μM; 48-72h
Applications	Monensin suppressed cell proliferation and colony formation, reduced wound closure and Transwell migration cell numbers, increased sub-G1 population and decreased S-phase population, increased early and late apoptotic cell percentages, inhibited E2F/DP1, STAT1/2, NFκB, AP-1 and Elk-1/SRF reporter activities, downregulated EGFR and RAF1 mRNA, reduced membrane EGFR immunofluorescence, and upregulated KRAS, NRAS and MEK1 mRNA in Panc-1 and MiaPaCa-2 cells.
Animal experiment [2]:	
Animal models	6-8-week-old female BALB/c 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	Mice were orthotopically injected with 100000 4T1-Luc2 triple-negative breast cancer cells into the fourth mammary fat pad. When tumor volume reached $\sim 80\text{mm}^3$, mice received daily intraperitoneal injection of 8mg/kg Monensin (dissolved in DMSO/2-hydroxypropyl- β -cyclodextrin 10% in 0.9% NaCl, 1:9 v/v) for 10 days. In vivo IVIS Spectrum imaging (CoroNa Green-AM for intratumoral Na^+ , D-luciferin for tumor mass), caliper tumor measurement, H&E histology, Ki-67 IHC of tumor/intestine/bone marrow/lung/liver/spleen/kidney/brain/heart, and QuPath morphometry (cell density, equivalent circular diameter) were performed 2h after last dose.
Dosage form	8mg/kg; i.p.; daily for 10 days
Applications	Monensin reduced tumor volume ($0.146 \pm 0.06\text{cm}^3$ vs $0.468 \pm 0.2\text{cm}^3$), reduced luciferin signal, increased CoroNa Green-AM fluorescence in tumor (not in healthy tissues), induced extensive tumor necrosis, increased tumor cell equivalent circular diameter, reduced tumor cell density, and did not alter Ki-67 positivity in tumor or intestine/bone marrow, nor cause morphological damage in lung/liver/spleen/kidney/brain/heart or change body weight/survival.
References: [1] Wang X, Wu X, Zhang Z, et al. Monensin inhibits cell proliferation and tumor growth of chemo-resistant pancreatic cancer cells by targeting the EGFR signaling pathway. Scientific Reports. 2018 Dec 17;8:17914. [2] Fiorilla S, Tasso F, Clemente N, et al. Monensin inhibits triple-negative breast cancer in mice by a Na^+-dependent cytotoxic action unrelated to cytostatic effects. Cells. 2025 Jan 25;14(3):185.	

Background

Monensin is a polyether ionophore antibiotic with anticancer activity. Monensin selectively binds

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

monovalent cations such as Na⁺ and K⁺ and mediates Na⁺/H⁺ exchange. Monensin inhibits Gram-positive bacteria and coccidia by disrupting intracellular ion gradients, osmotic pressure and pH homeostasis. Monensin interferes with Golgi protein transport and inhibits autophagic flux. Monensin can be used in research related to bacterial infections, coccidiosis, viral infections, and cancer^[1-4].

In vitro, Panc-1 and MiaPaCa-2 cells were treated with 0.5-8μM Monensin for 48-72 hours. Monensin inhibited cell proliferation and migration, arrested the cell cycle at the sub-G1 phase and decreased the S-phase population, and increased the proportion of apoptotic cells^[5]. UOK146 cells were treated with 5-25μM Monensin for 24 hours. Monensin induced cell death, caused vacuolar morphological changes, and decreased mitochondrial membrane potential^[6]. H1299 cells were treated with 500nM Monensin for 0-24 hours. Monensin reduced GOLIM4 protein levels in the Golgi apparatus and inhibited cell migration and invasion^[7].

In vivo, BALB/c mice were intranasally sensitized with 10μg house dust Mite extract (HDM) twice weekly for 6 weeks. Monensin was administered via i.p. (1mg/kg) or i.n. (0.25-1mg/kg) 30min prior to each sensitization. Monensin reduced total cell, eosinophil and lymphocyte counts in bronchoalveolar lavage fluid, decreased lung inflammation scores, and alleviated lung tissue inflammation^[8]. 4T1-Luc2 tumor xenograft BALB/c mice were intraperitoneally injected with 8mg/kg Monensin daily for 10 consecutive days. Monensin increased intracellular Na⁺ levels in tumor cells, reduced tumor volume, and induced extensive tumor necrosis^[9]. Apc^{+/Min} mice were orally gavaged with 10mg/kg Monensin daily for 6 consecutive weeks. Monensin reduced average intestinal tumor area and total tumor area per animal, increased the number of apoptotic cells and p21-positive cells on the tumor surface, and did not change tumor number^[10].

References:

- [1] Potter EL, VanDuyn RL, Cooley CO. Monensin toxicity in cattle. J Anim Sci. 1984 Jun;58(6):1499-511.
- [2] Zeng C, Long M, Lu Y. Monensin synergizes with chemotherapy in uveal melanoma through suppressing RhoA. Immunopharmacol Immunotoxicol. 2023 Feb;45(1):35-42.
- [3] Li Y, Sun Q, Chen S, et al. Monensin Inhibits Anaplastic Thyroid Cancer via Disrupting Mitochondrial Respiration and AMPK/mTOR Signaling. Anticancer Agents Med Chem.

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

2022;22(14):2539-2547.

[4] Donoho AL. Biochemical studies on the fate of monensin in animals and in the environment. J Anim Sci. 1984 Jun;58(6):1528-39.

[5] Wang X, Wu X, Zhang Z, et al. Monensin inhibits cell proliferation and tumor growth of chemo-resistant pancreatic cancer cells by targeting the EGFR signaling pathway. Scientific Reports. 2018 Dec 17;8:17914.

[6] Verma SP, Das P. Monensin induces cell death by autophagy and inhibits matrix metalloproteinase 7 (MMP7) in UOK146 renal cell carcinoma cell line. In Vitro Cellular & Developmental Biology - Animal. 2018 Oct;54(8):736-42.

[7] Tan X, Cardin DL, Wang S, et al. Monensin suppresses EMT-driven cancer cell motility by inducing Golgi pH-dependent exocytosis of GOLIM4. PNAS. 2025 Jul 9;122(28):e2501347122.

[8] Allam VSRR, Akula S, Waern I, et al. Monensin suppresses multiple features of house dust mite-induced experimental asthma in mice. Inflammation. 2025;48:806-19.

[9] Fiorilla S, Tasso F, Clemente N, et al. Monensin inhibits triple-negative breast cancer in mice by a Na⁺-dependent cytotoxic action unrelated to cytostatic effects. Cells. 2025 Jan 25;14(3):185.

[10] Tumova L, Pombinho AR, Vojtechova M, et al. Monensin inhibits canonical Wnt signaling in human colorectal cancer cells and suppresses tumor growth in multiple intestinal neoplasia mice. Molecular Cancer Therapeutics. 2014 Apr;13(4):812-22.

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