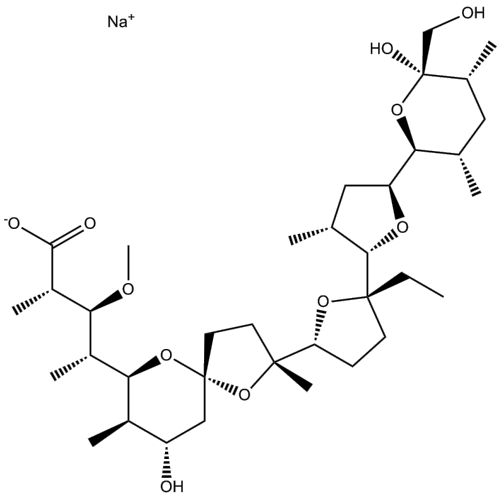
Product Data Sheet

Product Name: Monensin sodium salt
Cat. No.: GC16995

Chemical Properties

Cas. No.	22373-78-0		
SMILES	O[C@H]1C[C@]2(O[C@H]([C@H](C)[C@@H]([C@@H](C([O-])=O)C)OC)[C@@H]1C)O[C@@](CC2)(C)[C@@H]3O[C@](CC3)(CC)[C@H]4O[C@H]([C@H]([C@@H](C)C[C@H]5C)O[C@]5(CO)O)C[C@H]4C.[Na+]		
Formula	$C_{36}H_{61}NaO_{11}$	M.Wt	692.85
Solubility	≥ 69.3mg/mL in EtOH with ultrasonic, <6.93mg/mL in DMSO	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

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Cell experiment [1]:

Cell lines	Human colorectal cancer cell lines RKO and HCT-116
Preparation Method	RKO and HCT-116 cells were maintained in complete Dulbecco's Modified Eagle's Medium (DMEM) containing 10% fetal bovine serum (FBS), 100 units of penicillin, and 100μg of streptomycin at 37°C in a humidified atmosphere with 5% CO_2. Cells were treated with varied concentrations of Monensin sodium salt (0–8μM) for 24–48 hours.
Reaction Conditions	0–8μM; 24–48h.
Applications	Monensin sodium salt effectively inhibited cell proliferation and migration in a dose-dependent and time-dependent manner. Monensin sodium salt also induced apoptosis and G1 arrest in both cell lines. Monensin sodium salt targeted multiple cancer-related signaling pathways, including Elk1, AP1, and Myc/max, and suppressed IGF1R expression via increasing IGF1 in colorectal cancer cells.

Animal experiment [2]:

Animal models	Nude mice
Preparation Method	Firefly luciferase-tagged Panc-1 cells were subcutaneously injected into the flanks of athymic nude mice. After 3 days, the mice were randomly divided into two groups and treated with Monensin sodium salt (10mg/kg) or vehicle control. Tumor progression was monitored through whole body Xenogen bioluminescence imaging at 7, 11, 16, and 26 days post-treatment. Mice were sacrificed after 4 weeks.

Caution: Product has not been fully validated for medical applications. For research use only.
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Dosage form	10mg/kg; i.p.
Applications	Monensin effectively suppressed tumor growth, reduced tumor volume, and decreased the expression of the cell proliferation marker PCNA and EGFR in the tumor samples.

References:
[1] Zhou Y, Deng Y, Wang J, et al. Effect of antibiotic monensin on cell proliferation and IGF1R signaling pathway in human colorectal cancer cells. Ann Med. 2023 Dec;55(1):954-964.
[2] 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. Sci Rep. 2018 Dec 17;8(1):17914.

Background

Monensin sodium salt is a polyether ionophore antibiotic that exhibits antibacterial activity against a variety of Gram-positive bacteria. Monensin sodium salt is used for the treatment and prevention of coccidiosis in poultry and other livestock [1]. Monensin sodium salt is an ionophore that mediates Na^+/H^+ exchange and is used as a tool to study ionophore mechanisms [2]. Additionally, Monensin sodium salt is an effective inhibitor of Wnt signaling[3]. Monensin sodium salt also has the potential to inhibit cancer development[4].

In vitro, treatment of human colorectal cancer cells RKO and HCT-116 with Monensin sodium salt (4μM) significantly inhibits cell proliferation, migration, and cell cycle progression, while inducing apoptosis and G1 arrest. Moreover, Monensin sodium salt can suppress the expression of IGF1R by increasing the expression of IGF1[5]. Monensin sodium salt (0.1–10μM) treatment of human peripheral blood eosinophils for 2 hours induces apoptosis-like cell death, with minimal effects on neutrophils[6].

In vivo, Monensin sodium salt (1mg/kg) was administered intraperitoneally to BALB/c mice sensitized with house dust mite (HDM) for 6 weeks. Monensin sodium salt significantly reduced the infiltration of eosinophils and lymphocytes into the airway lumen and decreased the lung tissue inflammation

score[7]. Monensin sodium salt (10mg/kg) was administered intraperitoneally in a xenograft tumor model established with the pancreatic cancer cell line Panc-1. Monensin sodium salt significantly inhibited tumor growth, reduced tumor volume, and decreased the expression of proliferating cell nuclear antigen (PCNA) and epidermal growth factor receptor (EGFR) in the tumor tissues[8].

References:

[1] Rajendran V, Ilamathi HS, Dutt S, et al. Chemotherapeutic Potential of Monensin as an Anti-microbial Agent. Curr Top Med Chem. 2018;18(22):1976-1986.
[2] Dias SADN, Divyasorubini S, Gamage KTJ, et al. Na+/K+ carrier ionophore antibiotics valinomycin and monensin enhance the antibacterial activity of fluoride. J Antibiot (Tokyo). 2023 Jul;76(7):425-429.
[3] Fu B, Fang L, Wang R, et al. Inhibition of Wnt/β-catenin signaling by monensin in cervical cancer. Korean J Physiol Pharmacol. 2024 Jan 1;28(1):21-30.
[4] Markowska A, Kaysiewicz J, Markowska J, et al. Doxycycline, salinomycin, monensin and ivermectin repositioned as cancer drugs. Bioorg Med Chem Lett. 2019 Jul 1;29(13):1549-1554.
[5] Zhou Y, Deng Y, Wang J, et al. Effect of antibiotic monensin on cell proliferation and IGF1R signaling pathway in human colorectal cancer cells. Ann Med. 2023 Dec;55(1):954-964.
[6] Vraila M, Asp E, Melo FR, et al. Monensin induces secretory granule-mediated cell death in eosinophils. J Allergy Clin Immunol. 2023 Nov;152(5):1312-1320.e3.
[7] Allam VSRR, Akula S, Waern I, et al. Monensin Suppresses Multiple Features of House Dust Mite-Induced Experimental Asthma in Mice. Inflammation. 2025 Apr;48(2):806-819.
[8] 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. Sci Rep. 2018 Dec 17;8(1):17914.