

Product Data Sheet

Product Name: Mupirocin

Cat. No.: GC15238

Chemical Properties

Cas. No. 12650-69-0

Chemical Name 9-[(E)-4-[(2S,3R,4R,5S)-3,4-dihydroxy-5-[[[(2S,3S)-3-[(2S,3S)-3-hydroxybutan-2-yl]oxiran-2-yl]methyl]oxan-2-yl]-3-methylbut-2-enoyl]oxynonanoic acid

SMILES CC(C1C(O1)CC2COC(C(C2O)O)CC(=CC(=O)OCCCCCCCCC(=O)O)C)C(C)O

Formula $C_{26}H_{44}O_9$

M.Wt 500.62

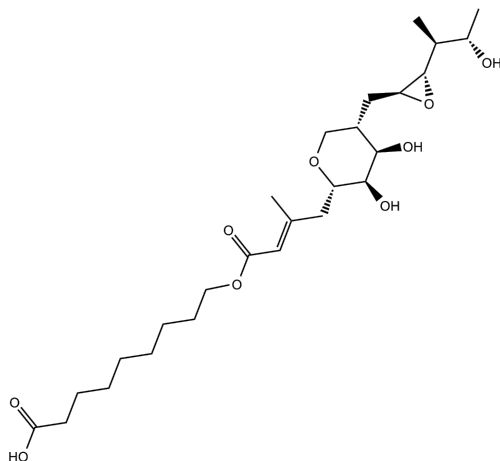
Solubility $\geq 100\text{mg/mL}$ in DMSO

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

Cell experiment [1]:

Cell lines HaCat cells

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

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Preparation Method HaCat cells were seeded at a concentration of 1.5×10^5 cells/mL in a 24-well plate and incubated overnight at 37°C and 5% CO₂ to form confluent monolayers. Subsequently, a cross was drawn in the center of each well to simulate a wound using a 1000-pipette tip. Cell debris was removed by aspirating the culture medium and adding fresh complete medium. Then, the cells were treated with Mupirocin at a final concentration of 0.2mM for 18 hours. The control group included cells grown in the culture medium (untreated) and cells treated with 0.25% DMSO (vehicle control). Images were captured using an optical microscope with a 4× magnification at the time of the initial scratch (0 hours) and 18 hours after treatment.

Reaction Conditions 0.2mM; 18h

Applications Mupirocin treatment significantly increased wound healing in HaCat cells.

Animal experiment [2]:

Animal models SKH-1 hairless mice

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Preparation Method	Female SKH-1 hairless mice (6-8 weeks old) were individually housed in cages for a few days before the experiment to adapt to the environment. The cages were placed close to the ground to allow the mice to adapt to low light levels, and commercial feed and water were freely provided. Under general anesthesia, 20 mice were disinfected with 70% alcohol on their skin, and abrasions were made with a surgical knife until redness appeared and the epidermis was significantly lost. The wound diameter was approximately 0.6cm, located in the back area, 1cm away. Approximately 0.1ml of Mupirocin ointment (20mg/g) was applied to the wound daily (using a separate ointment each time), and gentle massage was performed until the ointment was fully absorbed. The entire process lasted for 12 days, and the pathological characteristics of the wounds were evaluated daily.
Dosage form	20mg/g/day for 12 days; apply to the wound
Applications	Mupirocin treatment significantly promoted wound healing and led to thickening of the epidermis in mice.

References:

- [1] Twilley D, Reva O, Meyer D, et al. Mupirocin promotes wound healing by stimulating growth factor production and proliferation of human keratinocytes[J]. *Frontiers in Pharmacology*, 2022, 13: 862112.
- [2] Pérez M, Robres P, Moreno B, et al. Comparison of antibacterial activity and wound healing in a superficial abrasion mouse model of *Staphylococcus aureus* skin infection using photodynamic therapy based on methylene blue or mupirocin or both[J]. *Frontiers in Medicine*, 2021, 8: 673408.

Background

Mupirocin, a secondary metabolite, naturally produced by *Pseudomonas fluorescens*, with an excellent in vitro activity against some streptococci^[1]. Mupirocin acts on isoleucyl-tRNA synthetase and inhibits bacterial protein synthesis^[2]. Mupirocin is widely used as antibacterial agent against methicillin-resistant *Staphylococcus aureus* (MRSA)^[3].

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In vitro, Mupirocin treatment for 72h showed the potent cytotoxic activity against the UCT-Mel 1 melanoma cell line with an IC₅₀ value of 5.4µg/ml^[4]. 0.2mM of Mupirocin treatment for 18 hours significantly enhanced the viability of HaCat cells and significantly accelerated wound healing^[5]. 0.05mM of Mupirocin treatment for 48 hours inhibited the proliferation of psoriasis lesion epidermal keratinocytes (PLEKs), promoting cell apoptosis^[6].

In vivo, applying 0.1ml of Mupirocin ointment (20mg/g) to the wound daily for 12 days significantly promoted wound healing, resulting in a significant increase in epidermal thickness and a reduction in the growth of *Staphylococcus aureus* in a mouse model of superficial skin infection caused by *Staphylococcus aureus* ^[7].

References:

- [1] Bencardino D, Amagliani G, Brandi G. Carriage of *Staphylococcus aureus* among food handlers: An ongoing challenge in public health[J]. Food control, 2021, 130: 108362.
- [2] Gisby J, Bryant J. Efficacy of a new cream formulation of mupirocin: comparison with oral and topical agents in experimental skin infections[J]. Antimicrobial agents and chemotherapy, 2000, 44(2): 255-260.
- [3] Tucaliuc A, Blaga A C, Galaction A I, et al. Mupirocin: applications and production[J]. Biotechnology letters, 2019, 41(4): 495-502.
- [4] Reva O N, Rademan S, Visagie M H, et al. Comparison of structures and cytotoxicity of mupirocin and batumin against melanoma and several other cancer cell lines[J]. Future medicinal chemistry, 2019, 11(7): 677-691.
- [5] Twilley D, Reva O, Meyer D, et al. Mupirocin promotes wound healing by stimulating growth factor production and proliferation of human keratinocytes[J]. Frontiers in Pharmacology, 2022, 13: 862112.
- [6] Yan B X, Chen X Y, Wang Z Y, et al. Mupirocin blocks imiquimod-induced psoriasis-like skin lesion by inhibiting epidermal isoleucyl-tRNA synthetase[J]. Cell Communication and Signaling, 2022, 20(1): 185.
- [7] Pérez M, Robres P, Moreno B, et al. Comparison of antibacterial activity and wound healing in a superficial abrasion mouse model of *Staphylococcus aureus* skin infection using photodynamic therapy based on methylene blue or mupirocin or both[J]. Frontiers in Medicine, 2021, 8: 673408.

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