Mupirocin

Cat. No.: HY-B0958

CAS No.: 12650-69-0

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

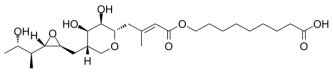
Molecular Weight: 500.62

Target: Bacterial; Antibiotic

Pathway: Anti-infection

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	6 months
	-20°C	1 month



SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 100 mg/mL (199.75 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	1.9975 mL	9.9876 mL	19.9752 mL
5 mM	0.3995 mL	1.9975 mL	3.9950 mL
10 mM	0.1998 mL	0.9988 mL	1.9975 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (4.99 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (4.99 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (4.99 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Mupirocin (BRL-4910A, Pseudomonic acid) is an orally active antibiotic isolated from Pseudomonas fluorescens. Mupirocin apparently exerts its antimicrobial activity by reversibly inhibiting isoleucyl-transfer RNA, thereby inhibiting bacterial protein and RNA synthesis[1][2].

In Vitro

Mupirocin (BRL-4910A, Pseudomonic acid) (0-100 μM; 48 h) shows antibacterial effect against staphylococci, streptococci and certain gram-negative bacteria, with MIC values range from 0.06-0.25 μg/mL (MIC_{50} =0.12 μg/mL, MIC_{90} =0.25 μg/mL)[1].

Mupirocin is highly bound (95% bound) to human serum protein, thus results in activity inhibition in the presence of human serum[1].
Mupirocin apparently exerts its antimicrobial activity by reversibly inhibiting isoleucyl-transfer RNA, thereby inhibiting bacterial protein and RNA synthesis[2].
Mupirocin (2% ointment) reduces pro-inflammatory cytokines IL-1β and IL-17 level, decreases tumor necrosis factor-alpha (TNF-α) expression, and increases the leavel of vascular endothelial growth factor (VEGF)[4].
Mupirocin inhibits MS (S. epidermidis ATCC 12228), MR (S. epidermidis (Se56-99)), and VIR (S. epidermidis (Se43-98)) with MICs of 0.25, 1.26, 1.59 mg/L[5].
Note: MIC, the minimum inhibition concentration.
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[1]

Cell Line:	Staphylococcus aureus
Concentration:	0-100 μM/mL
Incubation Time:	24, 48 hours
Result:	Resulted in a 90 to 99% reduction at 24 h, with MIC values ranged from 0.12-1.0 μM/mL and MBC values ranged from 4.0-32 μM/mL at 48 h.

In Vivo

MRSA: Meticillin-resistant Staphylococcus aureus
Mupirocin (BRL-4910A, Pseudomonic acid) is well absorbed after oral and parenteral administration but serum antibiotic concentrations were short-lived as a result of extensive degradation to the antibacterially inactive metabolite, monic acid A [1].
Mupirocin (2% ointment; external administration; twice daily; 3-6 d) decreases the total bacterial loads in the skin lesions with either topical treatment[3].
Mupirocin (2% ointment; external administration; 4 d) alleviates MRSA-infected pressure ulcers in mice[4].
Mupirocin (100 mg/mL; s.c.; 7 d) exerts prevention efficacy against vascular prosthetic graft infection due to Staphylococcus epidermidis[5].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	MRSA skin infection model in mice (10-12 weeks old)[3]
Dosage:	2% ointment
Administration:	External administration; twice daily; 3-6 days
Result:	Reduced the total bacterial loads in the skin lesions, and decreased by 2.0, 5.1 $\log_{10}$ CFU on day 3 and 6, respectively.

Animal Model:	Diabetic pressure ulcer mouse model (33.2-39.2 g)[4]
Dosage:	2% ointment
Administration:	External administration; 4 days
Result:	Resulted less superficial mats of bacterial colonies, and improved histopathology evaluation.

Animal Model:	Adult male Wistar rats (weight 275-325 g)[5]
Dosage:	Impregnated with 100 μg of mupirocin/mL; segments:1.5 cm *1 cm^2

Administration:	Subcutaneous implantation; 7 days
Result:	Resulted in preventing S. epidermidis infection of the graft in a rat model with spontaneously bound to collagen-sealed Dacron grafts.

REFERENCES

[1]. Vingsbo Lundberg C, et al. Efficacy of topical and systemic antibiotic treatment of meticillin-resistant Staphylococcus aureus in a murine superficial skin wound infection model. Int J Antimicrob Agents. 2013 Sep. 42(3):272-5.

[2]. Mohammad H, Abutaleb NS, Dieterly AM, Lyle LT, Seleem MN. Investigating auranofin for the treatment of infected diabetic pressure ulcers in mice and dermal toxicity in pigs. Sci Rep. 2021 May 25;11(1):10935.

[3]. Giacometti A, et al. Mupirocin prophylaxis against methicillin-susceptible, methicillin-resistant, or vancomycin-intermediate Staphylococcus epidermidis vascular-graft infection. Antimicrob Agents Chemother. 2000 Oct. 44(10):2842-4.

[4]. Sutherland R, et al. Antibacterial activity of mupirocin (pseudomonic acid), a new antibiotic for topical use. Antimicrob Agents Chemother. 1985 Apr;27(4):495-8.

[5]. Parenti MA, et al. Mupirocin: a topical antibiotic with a unique structure and mechanism of action. Clin Pharm. 1987 Oct;6(10):761-70.

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