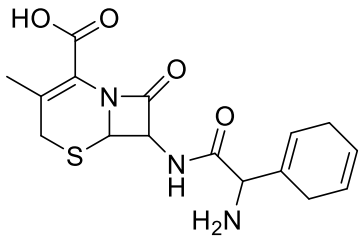
Product data sheet

MedKoo Cat#: 317450 Name: Cephradine (free base) CAS#: 38821-53-3 (free base) Chemical Formula: $C_{16}H_{19}N_3O_4S$ Molecular Weight: 349.4	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:

Cephradine (free base) is a semi-synthetic cephalosporin antibiotic. Cefradin inhibits the last stage of bacterial cell wall synthesis by binding to certain penicillin-binding proteins which results in cell lysis. Cell lysis is mediated by bacterial cell wall autolytic enzymes. Cefradin may interfere with autolysin inhibitors.

2. CoA, QC data, SDS, and handling instruction

SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
Water	4	10.88

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	2.86 mL	14.31 mL	28.62 mL
5 mM	0.57 mL	2.86 mL	5.72 mL
10 mM	0.29 mL	1.43 mL	2.86 mL
50 mM	0.06 mL	0.29 mL	0.57 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator

Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study

In vitro study

1. Kang S, Park GH, Kim S, Kim J, Choi Y, Huang Y, Lee Y, Choi TH. In Vitro and In Vivo Antimicrobial Activity of Antibiotic-Conjugated Carriers with Rapid pH-Responsive Release Kinetics. Adv Healthc Mater. 2019 Jul;8(14):e1900247. doi: 10.1002/adhm.201900247. Epub 2019 May 13. PMID: 31081217.

2. Silver MS, Counts GW, Zeleznik D, Turck M. Comparison of in vitro antibacterial activity of three oral cephalosporins: cefaclor, cephalexin, and cephradine. Antimicrob Agents Chemother. 1977 Nov;12(5):591-6. doi: 10.1128/AAC.12.5.591. PMID: 921255; PMCID: PMC429981.

In vivo study

1. Kang S, Park GH, Kim S, Kim J, Choi Y, Huang Y, Lee Y, Choi TH. In Vitro and In Vivo Antimicrobial Activity of Antibiotic-Conjugated Carriers with Rapid pH-Responsive Release Kinetics. Adv Healthc Mater. 2019 Jul;8(14):e1900247. doi: 10.1002/adhm.201900247. Epub 2019 May 13. PMID: 31081217.

7. Bioactivity

Biological target:

Cefradine is a beta-lactam, first-generation cephalosporin antibiotic with bactericidal activity.

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In vitro activity

The relative viability (OD600) of S. aureus was measured after 12 h of treatment with free cephradine (CP) and β-CD–MCM–CP at pH 7.4 (Figure 4A) and pH 5.5 (Figure 4B). S. aureus was generally more viable at pH 7.4 than at pH 5.5. After free CP incubation, bacterial viability rapidly increased at antibiotic concentrations below the MIC of 0.70 μg mL−1 at both pH 7.4 and pH 5.5. In contrast, the inhibitory effect of β-CD–MCM–CP on bacterial viability differed significantly under different pH conditions. At pH 7.4, the MIC of β-CD–MCM–CP was 2.0 μg mL−1, approximately three times higher than that of free CP. However, at pH 5.5, β-CD–MCM–CP had almost the same antibacterial effect as free CP with an MIC of 0.70 μg mL−1 (Table 1). The CP-conjugated carrier thus exhibited a clear pH-responsive toxicity against S. aureus.

Reference: Mater. 2019 Jul;8(14):e1900247. https://doi.org/10.1002/adhm.201900247

In vivo activity

The in vivo activity of β-CD–MCM–CP was evaluated in subcutaneous abscess models using nondiabetic mice (Balb/c; Figure S9, Supporting Information) and diabetic mice (C57BLKs-Jdb/db; Figure S10, Supporting Information). Figure 7A presents a simplified diagram of the animal experiment. CP and β-CD–MCM–CP were subcutaneously injected into the mice 5 days after infection. CP was injected at a dose of 25 mg kg−1 day−1 for 5 days, and β-CD–MCM–CP containing the same amount of CP was injected in the same manner. The β-CD–MCM carrier and the simple mixture of β-CD–MCM and CP (C + C) at the same molar amount and ratio as β-CD–MCM–CP were also injected as positive controls. Figure 7F,G presents the abscess grade scores and bacterial counts in the abscesses collected from non-insulin-dependent diabetes mellitus model mice. Unlike the nondiabetic mice, there was a significant difference in abscess scores, with those of the CP and β-CD–MCM–CP groups significantly lower than those of the saline-treated and carrier-only groups. A similarly significant reduction in the bacterial counts in the abscesses was observed in the groups treated with CP, β-CD–MCM–CP, and C + C. However, there was no significant difference in abscess scores and bacterial counts between CP, β-CD–MCM–CP, and C + C groups. In this case, the carrier-only exhibited no antimicrobial effect.

Reference: Mater. 2019 Jul;8(14):e1900247. https://doi.org/10.1002/adhm.201900247