Product Data Sheet

Product Name: Colistin Sulfate
Cat. No.: GC16332

Chemical Properties

Cas. No.	1264-72-8		
Formula	$C_{52}H_{103}N_{16}O_{23}S_{2.5}$	M.Wt	1400.64
Solubility	≥ 42.475mg/mL in Water with gentle warming	Storage	Store at -20°C
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ 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	Colistin Sulfate		

Protocol

Animal experiment [1]:

Animal models	Female BALB/c mice (Acute pneumonia)
Preparation Method	Mice were inoculated intratracheally with 50L of 0.85% saline containing 2.5x10^7 cfu of Ab396 and 10% porcine mucin (for acute pneumonia). Two hours later, mice were treated with saline i.t. (control group), a combination of imipenem/cilastatin and sulbactam(i.p.; 80/80mg/kg and 40mg/kg), Colistin Sulfate (i.p.; 150000U/kg), and diluted in 50L of 0.85% saline, Colistin Sulfate (i.t.; 75000U/kg) every 8hrs for a total of 48hrs. Survival rates were recorded every 12hrs for 72hrs after bacterial inoculation.
Dosage form	150000U/kg, i.p.; 75000U/kg, i.t.; every 8hrs for a total of 48hrs

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Applications	Compared with the mice in all groups, those in intratracheal Colistin Sulfate group had a significantly favorable outcome at 72hrs after infection (survival rate=0%, 10%, 0% and 100%, respectively). Furthermore, intratracheal therapy decreased significantly the bacterial loads in the lungs and normalized the wet lung/body weight ratios in mice with acute pneumonia.

References:
[1] Chiang, Shyh-Ren et al. “Intratracheal colistin sulfate for BALB/c mice with early pneumonia caused by carbapenem-resistant Acinetobacter baumannii.” Critical care medicine vol. 37,9 (2009): 2590-5.

Background

Colistin Sulfate is a structurally distinct class of nonribosomal, cyclic oligopeptides antimicrobials. Colistin Sulfate is mainly active against multidrug-resistant Gram-negative bacteria (GNB), exerting its antibacterial effect by directly interacting with the lipid A component of lipopolysaccharide (LPS) in the outer membrane (OM). The mainstream mechanism is: The cationic diaminobutyric acid (Dab) residues of Colistin Sulfate electrostatically bind to the anionic phosphate groups of lipid A, competitively displacing divalent cations (such as Mg^{2+} and Ca^{2+}) from the membrane. This interaction disrupts the outer membrane, increases its permeability, leads to leakage of intracellular contents, and ultimately results in bacterial cell death[1].

In vitro, different *Klebsiella pneumoniae* isolates show variable susceptibility to Colistin Sulfate, with susceptible strains having Minimum Inhibitory Concentration (MIC) of 0.125-1mg/L and resistant strains exhibiting MIC of 32–128mg/L. Colistin Sulfate exerts rapid bactericidal activity against *Klebsiella pneumoniae* within 1 hour, but substantial

regrowth may subsequently occur[2]. Colistin Sulfate has an MIC of 2μg/mL against the Ab396 strain of carbapenem-resistant *Acinetobacter baumannii* (CRAB)[3].

In vivo, Colistin Sulfate (75000U/kg; i.t.), administered every 8 hours for a total of 48 hours, significantly reduced lung bacterial loads and normalized the lung wet weight/body weight ratio in acute pneumonia mice inoculated with 2.5×10^7 CFU (Colony Forming Unit) of Ab396 and 10% porcine mucin. Colistin Sulfate (75000U/kg; i.t.) showed superior efficacy compared to colistin Sulfate (150000U/kg; i.p.)[3].

References:
[1] El-Sayed Ahmed, Mohamed Abd El-Gawad et al. “Colistin and its role in the Era of antibiotic resistance: an extended review (2000-2019).” Emerging microbes & infections vol. 9,1 (2020): 868-885.
[2] Poudyal, Anima et al. “In vitro pharmacodynamics of colistin against multidrug-resistant Klebsiella pneumoniae.” The Journal of antimicrobial chemotherapy vol. 62,6 (2008): 1311-8.
[3] Chiang, Shyh-Ren et al. “Intratracheal colistin sulfate for BALB/c mice with early pneumonia caused by carbapenem-resistant Acinetobacter baumannii.” Critical care medicine vol. 37,9 (2009): 2590-5.