Product Data Sheet

Product Name:	Bacampicillin
Cat. No.:	GC33966

Chemical Properties

Cas. No.	50972-17-3		
SMILES	O=C([C@@H](C(C)(C)S[C@]1([H])[C@@H]2NC([C@H](N)C3=CC=CC=C3)=O)N1C2=O)OC(OC(OCC)=O)C		
Formula	$C_{21}H_{27}N_3O_7S$	M.Wt	465.52
Solubility	Soluble in DMSO	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	Bacampicillin		

Protocol

Cell experiment [1]:

Cell lines	Caco-2 cells (human intestinal epithelial cell line)
Preparation Method	Caco-2 cells were maintained in Dulbecco's minimal essential medium (DMEM) supplemented with 10% heat-inactivated fetal bovine serum (FBS) at 37°C, 5% CO_2. Caco-2 cells were incubated in Bacampicillin (0.2mM) at 37°C for 5-10min.
Reaction Conditions	0.2mM; 5-10min.

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Applications	Bacampicillin was rapidly and extensively converted to its active metabolite ampicillin upon entry into Caco-2 cells. Bacampicillin uptake was significantly higher than ampicillin and pivampicillin. This uptake was mediated by a specialized, carrier-mediated transport system shared with thiamine, as evidenced by significant inhibition by thiamine, oxythiamine, amiloride, and procainamide, and trans-stimulation by preloading cells with thiamine. The uptake increased markedly with the elevation of extracellular pH from 5 to 7. Bacampicillin permeation across Caco-2 cell monolayers from the apical to the basolateral side was significantly inhibited by thiamine.

Animal experiment [2]:

Animal models	Mice (NMRI strain)
Preparation Method	Mice were infected intraperitoneally with various bacterial strains (e.g., *Haemophilus influenzae*, *Klebsiella pneumoniae*) in a challenge dose that resulted in death of control animals within 24-96 hours. In most cases, 0.5ml of 5% hog gastric mucin was co-administered with the bacteria. Bacampicillin (135mg/kg) and sodium ampicillin, dissolved in distilled water, were administered orally immediately after infection or, in one *H. influenzae* series, 4 hours after infection.
Dosage form	135mg/kg; Oral; simultaneously with or after the infection.

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Applications	Orally administered Bacampicillin showed good activity against a range of gram-positive and gram-negative bacterial infections. When administered immediately after infection, Bacampicillin was as active as or more active than an equimolar dose of ampicillin against nine out of eleven tested organisms. In a delayed treatment model (4 hours post *H. influenzae* infection), Bacampicillin was relatively more effective than ampicillin, requiring significantly lower median curative doses to clear the established infection.

References:

[1] Oda M, Fujimoto K, Kobayashi M, et al. Bacampicillin uptake is shared with thiamine in Caco-2 cells. Biol Pharm Bull. 2007 Jul;30(7):1344-9.

[2] Bodin NO, Ekström B, Forsgren U, et al. Bacampicillin: a new orally well-absorbed derivative of ampicillin. Antimicrob Agents Chemother. 1975 Nov;8(5):518-25.

Background

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Background

Bacampicillin is an oral prodrug belonging to the semisynthetic penicillin class of antibiotics. Bacampicillin is hydrolyzed in the body to Bacampicillin active metabolite, ampicillin. Bacampicillin exerts bactericidal action by inhibiting bacterial cell wall synthesis[1-2]. Bacampicillin is used in research related to infections caused by susceptible bacteria, such as respiratory tract infections, urinary tract infections, and skin and soft tissue infections[3-4].

In vitro, Caco-2 cells were incubated with Bacampicillin (0.2mM) for 5-10 minutes. The cellular uptake rate of Bacampicillin was significantly higher than that of Ampicillin. The transmembrane transport of Bacampicillin significantly increased as the pH of the culture medium was elevated[5].

In vivo, conventional female Swiss mice were orally treated with Bacampicillin (0-3mg/mouse/day) for 4 weeks starting from the 3rd week. The fecal microflora of the mice receiving Bacampicillin was almost unaffected. The interference of Bacampicillin with the normal protective intestinal flora was significantly less than that caused by ampicillin alone or its combination with clavulanic acid[6]. Fasted SPF rats were orally administered Bacampicillin (135mg/kg; single injection). Bacampicillin resulted in higher peak ampicillin concentration levels in the blood, kidneys, liver, and tissue fluid from subcutaneously implanted cages compared to treatment with an equimolar dose of ampicillin. In an experimental mouse infection model, when administered orally Bacampicillin (135mg/kg) 4 hours after infection with *Haemophilus influenzae*, Bacampicillin demonstrated higher anti-infective activity compared to ampicillin[7].

References:
[1] Drugs and Lactation Database (LactMed®) [Internet]. Bethesda (MD): National Institute of Child Health and Human Development; 2006–. Bacampicillin. 2024 Sep 15.
[2] Scheife RT, Neu HC. Bacampicillin hydrochloride: chemistry, pharmacology, and clinical use. Pharmacotherapy. 1982 Nov-Dec;2(6):313-21.
[3] Neu HC. The pharmacokinetics of bacampicillin. Rev Infect Dis. 1981 Jan-Feb;3(1):110-6.
[4] Sum ZM, Sefton AM, Jepson AP, et al. Comparative pharmacokinetic study between lenampicillin, bacampicillin and amoxycillin. J Antimicrob Chemother. 1989 Jun;23(6):861-8.

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[5] Oda M, Fujimoto K, Kobayashi M, et al. Bacampicillin uptake is shared with thiamine in Caco-2 cells. Biol Pharm Bull. 2007 Jul;30(7):1344-9.
[6] Hofstra W, Welling GW, Van der Waaij D. A comparative study of the effect of oral treatment with augmentin, amoxycillin and bacampicillin on the faecal flora in mice. Zentralbl Bakteriol Mikrobiol Hyg A. 1988 Jul;269(1):78-85.
[7] Bodin NO, Ekström B, Forsgren U, et al. Bacampicillin: a new orally well-absorbed derivative of ampicillin. Antimicrob Agents Chemother. 1975 Nov;8(5):518-25.

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