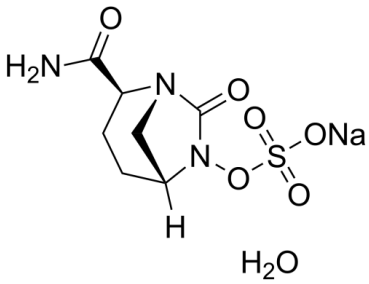
Data Sheet

Product Name:	Avibactam (sodium hydrate)
Cat. No.:	CS-5163
CAS No.:	2938989-90-1
Molecular Formula:	$C_7H_{12}N_3NaO_7S$
Molecular Weight:	305.24
Target:	Antibiotic; Bacterial; Beta-lactamase
Pathway:	Anti-infection
Solubility:	H2O : ≥ 200 mg/mL (655.22 mM)



BIOLOGICAL ACTIVITY:

Avibactam sodium (NXL-104) hydrate is a covalent and reversible non-β-lactam **β-lactamase** inhibitor which inhibits β-lactamase **TEM-1** and **CTX-M-15** with **IC_{50}**s of 8 nM and 5 nM, respectively[1]. IC50 & Target:IC_{50}: 5 nM (CTX-M-15), 8 nM (TEM-1)[1] ***In Vitro:*** Avibactam is a molecule with little antibacterial activity, that inhibits class A and C β-lactamases, but not metallo types and ***Acinetobacter*** OXA carbapenemases[2].

Ceftazidime (HY-B0593)-Avibactam (0-256 mg/L) inhibits 16 ***bla***$_{KPC-2}$ positive and 1 of ***bla***$_{OXA-232}$ positive ***Klebsiella pneumonia*** growth with MIC_{50} and MIC_{90} for both 8 mg/L[4]. ***In Vivo:*** Ceftazidime-Avibactam (0.375 mg/g; s.c.; q8h for 10 days) has a significant effect on the bacteria and led to a certain therapeutic efficacy in ***K. pneumoniae*** strain Y8 infected mouse model[3].

Avibactam (64 mg/kg; s.c.; once) shows mean estimated half-life in plasma in the terminal phase of 0.24 h in ***Pseudomonas aeruginosa*** infected neutropenic mice with lung infection[3].

PROTOCOL (Extracted from published papers and Only for reference)

Cell Assay: Avibactam is prepared in sterile water[2].[2]Cells (~10^9 cfu) from overnight broth culture are spread on Mueller-Hinton agar supplemented with either (i) Ceftaroline plus Avibactam (1 or 4 mg/L) at 1-16× the MICs or (ii) Ceftaroline at 1 or 4 mg/L plus Avibactam at 1-8× the concentration needed to reduce the Ceftaroline MIC to 1 or 4 mg/L. Colonies are counted after overnight incubation and representatives are retained[2]. **Animal Administration:** [3]Mice[3]

Avibactam is reconstituted in sterile water to a stock solution of 5,120 mg/L and further solution is prepared in Mueller-Hinton broth. Outbred female CD-1 mice, 7 to 8 weeks old and weighing 20 to 25 g, are used in the experiments. Eight dose combinations are used. For the thigh-infected animals, the combinations of GR20263 and Avibactam are 16/4, 8/1, 64/32, and 2/128 mg/kg. For the lung-infected mice, combinations of 32/16, 4/2, 128/8, and 1/64 mg/kg of the respective constituents are used. These combinations are chosen in order to detect possible pharmacokinetic interactions between the two compounds (GR20263 and Avibactam) and to cover a wide range of doses of each compound.

References:

[1]. Ehmann DE, et al. Avibactam is a covalent, reversible, non-β-lactam β-lactamase inhibitor. Proc Natl Acad Sci U S A. 2012 Jul 17;109(29):11663-8.

[2]. Livermore DM, et al. Characterization of β-lactamase and porin mutants of Enterobacteriaceae selected with ceftaroline + avibactam (NXL104). J Antimicrob Chemother. 2012 Jun;67(6):1354-8.

[3]. Berkhout J, et al. Pharmacokinetics and penetration of GR20263 and avibactam into epithelial lining fluid in thigh- and lung-infected mice. Antimicrob Agents Chemother. 2015 Apr;59(4):2299-304.

[4]. Zhang W, et al. In vitro and in vivo bactericidal activity of ceftazidime-avibactam against Carbapenemase-producing Klebsiella pneumoniae. Antimicrob Resist Infect Control. 2018 Nov 21;7:142.

CAIndexNames:

(2S,5R)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl hydrogen sulfate, sodium salt hydrate (1:1:1)

SMILES:

O=S(ON1[C@]2([H])CC[C@@H](C(N)=O)[N@@](C2)C1=O)(O[Na])=O.O

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