Spectinomycin dihydrochloride pentahydrate

Cat. No.: HY-B1828A

CAS No.: 22189-32-8

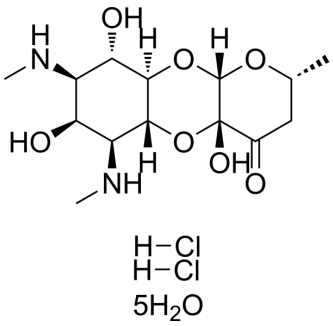
Molecular Formula: $C_{14}H_{36}Cl_2N_2O_{12}$

Molecular Weight: 495

Target: Bacterial; Antibiotic

Pathway: Anti-infection

Storage: 4°C, sealed storage, away from moisture
* In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

H_2O : 62.5 mg/mL (126.26 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	2.0202 mL	10.1010 mL	20.2020 mL
	5 mM	0.4040 mL	2.0202 mL	4.0404 mL
	10 mM	0.2020 mL	1.0101 mL	2.0202 mL

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

In Vivo

1. Add each solvent one by one: PBS
Solubility: 50 mg/mL (101.01 mM); Clear solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Spectinomycin dihydrochloride pentahydrate is a broad-spectrum antibiotic and inhibits the growth of a variety of gram-positive and gram-negative organisms. Spectinomycin dihydrochloride pentahydrate acts by selectively targeting to the bacterial ribosome and interrupting protein synthesis. Spectinomycin dihydrochloride pentahydrate is also a noncompetitive inhibitor of td intron RNA with an K_i value of 7.2 mM[1]-[5].

IC_{50} & Target

bacterial ribosomal subunit[5]

In Vitro

Spectinomycin dihydrochloride pentahydrate selectively inhibits protein synthesis in cells and in extracts of Escherichia coli:
Spectinomycin dihydrochloride pentahydrate (50 μg/mL) inhibits Escherichia coli growth rapidly and reversibly, and suppresses amino acid incorporation immediately[1].
Spectinomycin dihydrochloride pentahydrate (1 μg/mL or 3 μM) inhibits polypeptide synthesis directed either by endogenous messenger RNA or by MS-2 bacteriophage RNA, with maximum inhibition of 70-80% in extracts of Escherichia coli[1].
Spectinomycin dihydrochloride pentahydrate blocks the translocation of peptidyl-tRNAs from A-site to P-site by inhibiting

the binding of elongation factor G to the ribosome[2].
Spectinomycin dihydrochloride pentahydrate interacts specifically with the residues G1064 and 01192 in 16S rRNA and potentially makes it inactive[2].
Spectinomycin dihydrochloride pentahydrate exhibits splicing inhibition and dependent on pH changes and Mg^{2+} concentration, indicating electrostatic interactions with the intron RNA[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

Spectinomycin dihydrochloride pentahydrate (20 mg/kg; i.m.; 20-100 mg/kg; 9 d) shows the safety in healthy chicks[4].
Spectinomycin dihydrochloride pentahydrate (10 mg/kg; i.v.; single dose) has the major elimination pathway by renal excretion, approximately 55% is excreted into the urine in unchanged form[5].
Pharmacokinetics of Spectinomycin dihydrochloride pentahydrate in Rat[5]

Parameter	C_0 (μg/mL)	$AUC_{0-\infty}$ (μg•h/mL)	V_d (L/kg)	CL (L/h/kg)	MRT (h)	$T_{1/2\alpha}$ (h)	$T_{1/2\beta}$ (h)	$T_{1/2\gamma}$ (h)	f_e	CL_{renal} (L/h/kg)	E_{ratio}
Non atrioventricular analysis	44.3	16.8	0.756	0.602	0.757	/	/	/	0.553	0.359	1.00
Three-compartment model	37.8	15.7	0.747	0.649	1.11	/	0.237	0.754	19.5	/	/

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Arbor Acres plus broiler chicks (15-day-old)[4]
Dosage:	20 mg/kg, 60 mg/kg, 100 mg/kg
Administration:	Intramuscular injection (chest muscles); 9 days
Result:	Showed biosecurity of 20 mg/kg by complete blood count, biochemical parameters, histopathological, clinical signs, body weight gain, and feed conversion ratio (FCR). Resulted minor toxicity of 60 mg/kg.

CUSTOMER VALIDATION

- BMC Vet Res. 2022 Jul 12;18(1):270.
- Patent. US20200368199A1.

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REFERENCES

[1]. Khan EA, et al. Safety evaluation study of lincomycin and spectinomycin hydrochloride intramuscular injection in chickens. Toxicol Rep. 2022 Jan 29;9:204-209.

[2]. Davies J, et al. Inhibition of protein synthesis by spectinomycin. Science. 1965 Sep 3;149(3688):1096-8.

[3]. Brink MF, et al. Spectinomycin interacts specifically with the residues G1064 and C1192 in 16S rRNA, thereby potentially freezing this molecule into an inactive

conformation. Nucleic Acids Res. 1994 Feb 11;22(3):325-31.

[4]. Park IK, et al. Spectinomycin inhibits the self-splicing of the group 1 intron RNA. Biochem Biophys Res Commun. 2000 Mar 16;269(2):574-9.

[5]. Madhura DB, et al. Pharmacokinetic profile of spectinomycin in rats. Pharmazie. 2013 Aug;68(8):675-6.

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