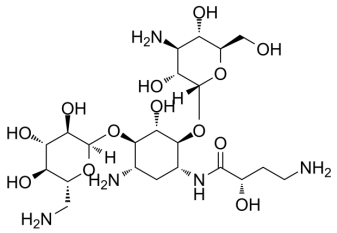
Amikacin

Cat. No.:	HY-B0509A
CAS No.:	37517-28-5
Molecular Formula:	$C_{22}H_{43}N_5O_{13}$
Molecular Weight:	585.6
Target:	Bacterial; Antibiotic
Pathway:	Anti-infection
Storage:	Powder -20°C 3 years 4°C 2 years In solvent -80°C 6 months -20°C 1 month



SOLVENT & SOLUBILITY

In Vitro

H_2O : 100 mg/mL (170.77 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	1.7077 mL	8.5383 mL	17.0765 mL
	5 mM	0.3415 mL	1.7077 mL	3.4153 mL
	10 mM	0.1708 mL	0.8538 mL	1.7077 mL

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

BIOLOGICAL ACTIVITY

Description

Amikacin (BAY 41-6551) is a semisynthetic kanamycin analog that is active against most Gram-negative bacteria, including gentamicin- and tobramycin-resistant strains. Significant inhibitory effect. Amikacin is ototoxic and nephrotoxic. Amikacin can be used in bacteriostatic, anti-cancer and analgesic studies[1][2][3][4][5].

IC_{50} & Target		
	Aminoglycoside	TXNIP

In Vitro

Amikacin (30 μg, 0-24 h) has antibacterial activity, with a MIC_{50} value of 512 μg/mL against clinically isolated E. coli, and has a synergistic effect with imipenem (HY-B1369A), and the antibacterial effect is better when used in combination[1].

Amikacin (250 μg/mL, 0-24 h) inhibits the migration and invasion of human breast cancer cell line MDA-MB-231 cells by up-regulating the expression of TXNIP, indicating its anti-tumor potential[2].

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

Western Blot Analysis[2]

Cell Line:	human breast cancer cell line MDA-MB-231 cells

Concentration:	250 μg/mL
Incubation Time:	0-24 h
Result:	Upregulated the expression of TXNIP to 4.87 times.

In Vivo

Amikacin (single 30 mg/kg, s.c. or i.p.) has an analgesic effect in mice and has a synergistic effect when combined with morphine, but the analgesic effect of Amikacin can be reversed by Naloxone (HY-17417A)[3].
Amikacin (500 mg/kg/day for 8 days, s.c.) damages calpain activity in rat cochlea, promotes the degradation of sensory cells and neurons, and then leads to ototoxicity[4].
Amikacin (100 and 500 mg/kg/day for 10 days, s.c.) is nephrotoxic and its continued accumulation in rats can lead to kidney damage[5].

Pharmacokinetic Analysis in SD rats[5]

Route	Dose (mg/kg)	K_a (h^{-1})	K_{e1} (h^{-1})	$t_{1/2}$ (h)	V (liter/kg)	$AUC_{0-\infty}$ (mg·h/mL)
s.c.	100	1.20	6.77	0.10	0.28	53.0
s.c.	500	1.40	1.39	0.50	0.55	649.7

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

CUSTOMER VALIDATION

- Nat Commun. 2022 Mar 2;13(1):1116.
- Int J Antimicrob Agents. 2018 Aug;52(2):269-271.
- J Antimicrob Chemother. 2020 Sep 1;75(9):2609-2615.
- J Antimicrob Chemother. 2020 Jul 1;75(7):1850-1858.
- Appl Microbiol Biotechnol. 2022 Apr;106(7):2689-2702.

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REFERENCES

[1]. Farhan SM, et al. In Vitro and In Vivo Effect of Amikacin and Imipenem Combinations against Multidrug-Resistant E. coli. Trop Med Infect Dis. 2022 Oct 2;7(10):281.

[2]. Wang YH, et al. Amikacin Suppresses Human Breast Cancer Cell MDA-MB-231 Migration and Invasion. Toxics. 2020 Nov 20;8(4):108.

[3]. Atamer-Simsek S, et al. Antinociceptive effect of amikacin and its interaction with morphine and naloxone. Pharmacol Res. 2000 Mar;41(3):355-60.

[4]. Ladrech S, et al. Calpain activity in the amikacin-damaged rat cochlea. J Comp Neurol. 2004 Sep 13;477(2):149-60.

[5]. Chan K, et al. Characterization of Amikacin Drug Exposure and Nephrotoxicity in an Animal Model. Antimicrob Agents Chemother. 2020 Aug 20;64(9):e00859-20.

Caution: Product has not been fully validated for medical applications. For research use only.

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