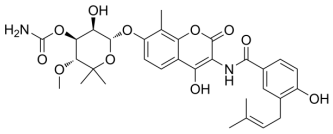
Novobiocin

Cat. No.:	HY-B0425
CAS No.:	303-81-1
Molecular Formula:	$C_{31}H_{36}N_2O_{11}$
Molecular Weight:	612.62
Target:	Antibiotic; DNA/RNA Synthesis; HSP; Apoptosis; Bacterial; Orthopoxvirus
Pathway:	Anti-infection; Cell Cycle/DNA Damage; Metabolic Enzyme/Protease; Apoptosis
Storage:	-20°C, sealed storage, away from moisture * In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



BIOLOGICAL ACTIVITY

Description	Novobiocin (Albamycin) is a potent and orally active antibiotic. Novobiocin also is a DNA gyrase inhibitor and a heat shock protein 90 (Hsp90) antagonist. Novobiocin has the potential for the research of highly beta-lactam-resistant pneumococcal infections. Novobiocin shows anti-orthopoxvirus activity[1][2][3][4][6].	
IC_{50} & Target	β-lactam	HSP90
In Vitro	Novobiocin (1 mM) competitively inhibits ATP binding to gyrase B to interfere with nucleotide binding and interferes with the association of the co-chaperones Hsc70 and p23 with Hsp90[1]. Novobiocin (200 μM; 24 h) inhibits the rate of repair of both cis-DDP and BCNU induced DNA interstrand cross-links and with a corresponding decrease in the clonogenic survival of the human glioblastoma multiforme cells[2]. Novobiocin (0.3 mM; 48 hours) induces a caspase-3/7 enzyme–dependent apoptosis assays with an induction of approximately three- to fivefold of apoptotic cells in K562, HL60, Mutz-2[5]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	
In Vivo	Novobiocin (25, 50, 100, 200 mg/kg; s.c.; 4 times at 1, 5, 24 and 48 h after infection) shows anti-infection activity in mice infected with amoxicillin-resistant Streptococcus pneumoniae[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	

Animal Model:	30 g adult female Swiss mice (sepsis induced by the penicillin-susceptible strain (AR33118))[3]
Dosage:	25, 50, 100, 200 mg/kg
Administration:	S.c.; given at 1, 5, 24 and 48 h after infection
Result:	Showed anti-infection activity in mice infected with amoxicillin-resistant S. pneumoniae.

CUSTOMER VALIDATION

- Nat Methods. 2023 Jul 20.

- Blood. 2018 Jul 19;132(3):307-320.
- Adv Sci (Weinh). 2022 Oct 18;e2203088.
- Int J Mol Sci. 2019 Mar 5;20(5). pii: E1125.
- Mol Pharm. 2022 Oct 21.

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REFERENCES

[1]. Marcu MG, et al. The heat shock protein 90 antagonist novobiocin interacts with a previously unrecognized ATP-binding domain in the carboxyl terminus of the chaperone. J Biol Chem. 2000 Nov 24;275(47):37181-6.

[2]. Ali-Osman F, et al. Topoisomerase II inhibition and altered kinetics of formation and repair of nitrosourea and cisplatin-induced DNA interstrand cross-links and cytotoxicity in human glioblastoma cells. Cancer Res. 1993 Dec 1;53(23):5663-8.

[3]. Rodríguez-Cerrato V, et al. Comparative efficacy of novobiocin and amoxicillin in experimental sepsis caused by beta-lactam-susceptible and highly resistant pneumococci. Int J Antimicrob Agents. 2010 Jun;35(6):544-9.

[4]. Eder JP, et al. A phase I clinical trial of novobiocin, a modulator of alkylating agent cytotoxicity. Cancer Res. 1991 Jan 15;51(2):510-3.

[5]. Bhatia S, et al. Targeting HSP90 dimerization via the C terminus is effective in imatinib-resistant CML and lacks the heat shock response.Blood. 2018 Jul 19;132(3):307-320.

[6]. Smee DF. Progress in the discovery of compounds inhibiting orthopoxviruses in animal models. Antivir Chem Chemother. 2008;19(3):115-24.

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