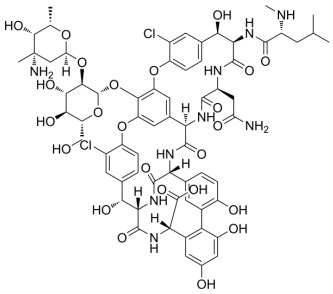
Vancomycin

Cat. No.:	HY-B0671
CAS No.:	1404-90-6
Molecular Formula:	$C_{66}H_{75}Cl_2N_9O_{24}$
Molecular Weight:	1449.25
Target:	Bacterial; Autophagy; Antibiotic
Pathway:	Anti-infection; Autophagy
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

DMSO : 125 mg/mL (86.25 mM; ultrasonic and warming and heat to 60°C)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	0.6900 mL	3.4501 mL	6.9001 mL
	5 mM	0.1380 mL	0.6900 mL	1.3800 mL
	10 mM	0.0690 mL	0.3450 mL	0.6900 mL

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

In Vivo

1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 4.17 mg/mL (2.88 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 4.17 mg/mL (2.88 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Vancomycin is an antibiotic for the treatment of bacterial infections.

IC_{50} & Target

Glycopeptide

In Vitro

Vancomycin is a large glycopeptide compound with a molecular weight of 1450 Da[1]. Vancomycin is a unique glycopeptide structurally unrelated to any currently available antibiotic. It also has a unique mode of action inhibiting the second stage of cell wall synthesis of susceptible bacteria. Vancomycin is active against a large number of species of Gram-positive bacteria, such as Staphylococcus aureus, Staph. epidermidis, Str. agalactiae, Str. bovis, Str. mutans, viridans streptococci, enterococci[2].

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

In Vivo

Vancomycin can be used in animal modeling to construct animal kidney injury models. Vancomycin is administered intravenously, with a standard infusion time of at least 1 h, to minimize infusion-related adverse effects. Subjects with normal creatinine clearance, vancomycin has an α-distribution phase of 30 min to 1 h and a β-elimination half-life of 6-12 h. The volume of distribution is 0.4–1 L/kg. The binding of vancomycin to protein ranges from 10% to 50%. Factors that affect the overall activity of vancomycin include its tissue distribution, inoculum size, and protein-binding effects[1]. Vancomycin treatment of infected mice is associated with improved clinical, diarrhea, and histopathology scores and survival during treatment[3]. Vancomycin is a classic kidney injury modeling agent that induces disease by inducing oxidative stress-related apoptosis in animals. Rats and mice are generally used as animal models[4][5]. Dose reference for vancomycin induction[4][5]:

(1) Model animal: C57BL/6J male mice (6-week)

VIKI: 400 mg/kg/day, i.p, 7 day

(2) Model animals: Male Sprague-Dawley (SD) rats (200-250 g)

VIKI: 400 mg/kg/day, i.p, 7 day

Induction of kidney Injury Model[4]

- Background

  Vancomycin induces oxidative stress-related apoptosis in animals.

- Specific Mmodeling Methods

  Mice: C57BL/6 • male • 6-week-old

  Administration: 400 mg/kg • ip • once daily for 7 weeks

- Modeling Indicators

  Molecular changes: Induced cell apoptosis and kidney Cr, BUN, MDA, IL-1β, IL-6, TNF-α, and NF-κB increace.

- Opposite Product(s):

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

Animal Model:	C57BL/6J male mice[4]
Dosage:	400 mg/kg/day, 7 day
Administration:	intraperitoneal injection (i.p.)
Result:	Caused renal injury with a higher renal injury score and kidney index. Induced cell apoptosis and kidney Cr, BUN, MDA, IL-1β, IL-6, TNF-α, and NF-κB increace.

CUSTOMER VALIDATION

- Cell Metab. 2023 Sep 29:S1550-4131(23)00340-6.
- Chem Eng J. 2024 Apr 15, 486 150125.
- Small. 2021 Dec 19;e2107137.
- Emerg Microbes Infect. 2024 Dec;13(1):2321981.
- Emerg Microbes Infect. 2022 Feb 22;1-34.

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REFERENCES

[1]. Juan He, et al. Vitamin C reduces vancomycin-related nephrotoxicity through the inhibition of oxidative stress, apoptosis, and inflammation in mice. Ann Transl Med. 2021 Aug; 9(16): 1319.

[2]. Ping Yu, et al. N-acetylcysteine Ameliorates Vancomycin-induced Nephrotoxicity by Inhibiting Oxidative Stress and Apoptosis in the in vivo and in vitro Models. Int J Med Sci. 2022; 19(4): 740–752.

[3]. Rybak MJ, et al. The pharmacokinetic and pharmacodynamic properties of vancomycin. Clin Infect Dis. 2006 Jan 1;42 Suppl 1:S35-9.

[4]. Watanakunakorn C, et al. Mode of action and in-vitro activity of vancomycin. J Antimicrob Chemother. 1984 Dec;14 Suppl D:7-18.

[5]. Warren CA, et al. Vancomycin treatment's association with delayed intestinal tissue injury, clostridial overgrowth, and recurrence of Clostridium difficile infection in mice. Antimicrob Agents Chemother. 2013 Feb;57(2):689-96.

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