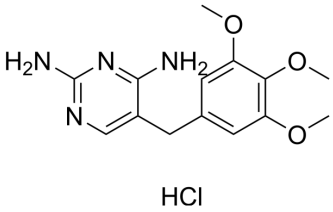
Trimethoprim hydrochloride

Cat. No.:	HY-B0510B
CAS No.:	60834-30-2
Molecular Formula:	$C_{14}H_{19}ClN_4O_3$
Molecular Weight:	326.78
Target:	Antibiotic; Bacterial; Antifolate; Influenza Virus
Pathway:	Anti-infection; Cell Cycle/DNA Damage
Storage:	Please store the product under the recommended conditions in the Certificate of Analysis.



BIOLOGICAL ACTIVITY

Description	Trimethoprim hydrochloride is a bacteriostatic antibiotic and an orally active dihydrofolate reductase inhibitor. Trimethoprim hydrochloride is active against a wide range of Gram-positive and Gram-negative aerobic bacteria. Trimethoprim hydrochloride has the potential for the research of urinary tract infections, Shigellosis and Pneumocystis pneumonia. Trimethoprim hydrochloride can inhibit infection of Influenza A virus in chick embryo when combinated with zinc[1][2][3][4].
IC_{50} & Target	Dihydrofolate reductase, Bacteria[1] Influenza A virus[4]
In Vitro	Trimethoprim interrupts folate metabolism by inhibition of the activity of dihydrofolase reductase (DHFR), which reduces dihydrofolate to tetrahydrofolate (THF)[1]. Trimethoprim (3 μg/mL; 1 h) induces protein aggregation and main heat shock proteins (Hsps) in E. coli cells, which indicates that Trimethoprim sulfate presence leads to protein misfolding[1]. Trimethoprim (1.5-3 μg/mL; 1 h) causes induction of DnaK, DnaJ, GroEL, ClpB, and IbpA/B Hsps in E. coli cells exposed to folate and heat stress[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	Trimethoprim (10 mg/kg; i.v.; once every 12 h; 3 d) shows antibacterial activity against H. influenzae, S. pneumoniae, E. coli and N. meningitidis in infected mice[2]. Trimethoprim can be connected with the thiomaltose (TM-TMP) and shows stability with a half-life of about 1 hour in complete serum, and has an MIC value around 1 μM against E. coli[2]. Trimethoprim (10 mg/mL; 0.5 mL; inject with Trimethoprim-Zn combined suspension) decreases the virus titer and increases the survival rate of chicken embryo[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Female C3H/HeOuJ mice (transurethrally infected with a 50 μL suspension containing 1-2×10^7 CFU of E. coli under 3% isoflurane)[2]
Dosage:	10 mg/kg
Administration:	i.v.; once every 12 h; for 3 d
Result:	Showed antibacterial activity against H. influenzae, S. pneumoniae, E. coli and N.

	meningitidis with CD_{50}s of 150 mg/kg, 335 mg/kg, 27.5 mg/kg and 8.4 mg/kg, respectively in infected mice.
Animal Model:	Fertilized eggs (injected H3N2 virus into amniotic and allantoic space at day 8)[4]
Dosage:	10 mg/mL; 0.5 mL
Administration:	The Trimethoprim-Zn combined suspension was injected into the air sac; single dosage
Result:	Decreased the virus titer and increased the survival rate of chicken embryo. The survival rate peaked at ratio about 0.18 (Zn/Trimethoprim).

CUSTOMER VALIDATION

- J Clin Microbiol. 2020 Jan 28;58(2):e01603-19.
- Chemosphere. 2019 Jun;225:378-387.
- J Mol Med (Berl). 2019 Aug;97(8):1183-1193.

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REFERENCES

[1]. Laskowska, E., et al., Trimethoprim induces heat shock proteins and protein aggregation in E. coli cells. Curr Microbiol, 2003. 47(4): p. 286-9.

[2]. Brogden, R.N., et al., Trimethoprim: a review of its antibacterial activity, pharmacokinetics and therapeutic use in urinary tract infections. Drugs, 1982. 23(6): p. 405-30.

[3]. Xiaojian Wang, et al. A Trimethoprim Conjugate of Thiomaltose Has Enhanced Antibacterial Efficacy In Vivo. Bioconjug Chem. 2018 May 16;29(5):1729-1735.\

[4]. El Habbal MH. Combination therapy of zinc and trimethoprim inhibits infection of influenza A virus in chick embryo. Virol J. 2021 Jun 3;18(1):113.

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