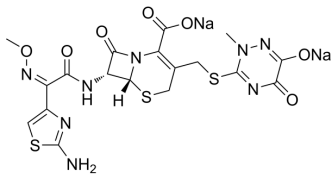
Ceftriaxone sodium salt

Cat. No.:	HY-B0712B
CAS No.:	74578-69-1
Molecular Formula:	$C_{18}H_{16}N_8Na_2O_7S_3$
Molecular Weight:	598.54
Target:	Antibiotic; GSK-3; Bacterial; Aurora Kinase
Pathway:	Anti-infection; PI3K/Akt/mTOR; Stem Cell/Wnt; Cell Cycle/DNA Damage; Epigenetics
Storage:	4°C, sealed storage, away from moisture and light * In solvent : -80°C, 1 year; -20°C, 6 months (sealed storage, away from moisture and light)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 50 mg/mL (83.54 mM; Need ultrasonic)

H_2O : ≥ 40 mg/mL (66.83 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Mass / Solvent / Concentration	1 mg	5 mg	10 mg
1 mM	1.6707 mL	8.3537 mL	16.7073 mL
5 mM	0.3341 mL	1.6707 mL	3.3415 mL
10 mM	0.1671 mL	0.8354 mL	1.6707 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 100 mg/mL (167.07 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (4.18 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (4.18 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Ceftriaxone sodium salt (Ro 13-9904) is a broad spectrum β-lactam third-generation cephalosporin antibiotic, which has good antibacterial activity against a variety of gram-negative and positive bacteria. Ceftriaxone sodium salt is a covalent inhibitor of GSK3β with IC_{50} value of 0.78 μM. Ceftriaxone sodium salt is an inhibitor of Aurora B. Ceftriaxone sodium salt has anti-inflammatory, antitumor and antioxidant activities. Ceftriaxone sodium salt can be used in the study of bacterial infections and meningitis[1][2][3][4][5][6][7].

IC_{50} & Target	β-lactam

In Vitro

Ceftriaxone sodium salt (100 μM, 24 h) protects MPP^+ treated astrocytes by inhibiting the NF-κB/JNK/c-Jun signaling pathway [3].
Ceftriaxone sodium salt (500 μM, 24-48 h) effectively inhibits unanchored cell growth in A549, H520 and H1650 lung cancer cells by inhibiting Aurora B[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[3]

Cell Line:	Astrocyte
Concentration:	100 μM
Incubation Time:	24 h
Result:	Improved cell viability and increased glutamate uptake after MPP^+ expose.

Western Blot Analysis[3]

Cell Line:	Astrocyte
Concentration:	100 μM
Incubation Time:	24 h
Result:	Enhanced GLT-1 and GFAP expression. Decreased the expression of p-p50⊠p-IKKα⊠p-Relb. Decreased the number of TUNEL-positive cells.

In Vivo

Ceftriaxone sodium salt (200 mg/kg Intraperitoneal injection for 6 weeks) improves functional markers and oxidative stress and inflammation parameters in a rat model of D-galactose (DGL) -induced liver and kidney injury[5].
Ceftriaxone sodium salt (200, 400 mg/kg, Intraperitoneal injection) has a protective effect on convulsion induced by Pentylenetetrazol (PTZ) and PTZ-related oxidative damage in rats[6].
Ceftriaxone sodium salt (100, 200 mg/kg, Intraperitoneal injection) reduces mechanical dysodynia and hyperalgesia by activating GLT-1 in streptozotocin (HY-13753)-induced diabetic rat models[7].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	DGL-induced rat model[5]
Dosage:	200 mg/kg
Administration:	i.p.
Result:	Reduced the BUN⊠Cr ⊠AST and ALT levels. Attenuated the MDA levels and enhanced GPx and CAT activities. Reduced the levels of IL-1β and TNF-α mRNA.

Animal Model:	PTZ-induced rat model[6]
Dosage:	200, 400 mg/kg
Administration:	i.p. 60 min before to PTZ (70 mg/kg)
Result:	Both of the two ceftriaxone groups had lower spike percentages than the saline group. Significantly lower MDA levels and higher SOD activity in 200 and 400 mg/kg.

CUSTOMER VALIDATION

- Nat Commun. 2022 Mar 2;13(1):1116.
- Emerg Microbes Infect. 2024 Dec;13(1):2321981.
- EBioMedicine. 2022 Apr;78:103943.
- Chemosphere. 2023 Oct 3:344:140353.

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REFERENCES

[1]. Nahata MC, et al. Ceftriaxone: a third-generation cephalosporin. Drug Intell Clin Pharm. 1985 Dec;19(12):900-6.

[2]. Nassar H, et al. Molecular docking, molecular dynamics simulations and in vitro screening reveal cefixime and ceftriaxone as GSK3β covalent inhibitors. RSC Adv. 2023 Apr 11;13(17):11278-11290.

[3]. Zhang Y, et al. Ceftriaxone Protects Astrocytes from MPP(+) via Suppression of NF-κB/JNK/c-Jun Signaling. Mol Neurobiol. 2015 Aug;52(1):78-92.

[4]. Li X, et al. Ceftriaxone, an FDA-approved cephalosporin antibiotic, suppresses lung cancer growth by targeting Aurora B. Carcinogenesis. 2012 Dec;33(12):2548-57.

[5]. Hakimizadeh E, et al. Ceftriaxone improves hepatorenal damages in mice subjected to D-galactose-induced aging. Life Sci. 2020 Oct 1;258:118119.

[6]. Uyanikgil Y, et al. Positive effects of ceftriaxone on pentylenetetrazol-induced convulsion model in rats. Int J Neurosci. 2016;126(1):70-5.

[7]. Gunduz O, et al. Anti-allodynic and anti-hyperalgesic effects of ceftriaxone in streptozocin-induced diabetic rats. Neurosci Lett. 2011 Mar 10;491(1):23-5.

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