Product Data Sheet

Product Name: Tobramycin Sulfate
Cat. No.: GC16535

Chemical Properties

Cas. No.	79645-27-5; 49842-07-1
Chemical Name	(2S,3R,4S,5S,6R)-4-amino-2-(((1S,2S,3R,4S,6R)-4,6-diamino-3-(((2R,3R,5S,6R)-3-amino-6-(aminomethyl)-5-hydroxytetrahydro-2H-pyran-2-yl)oxy)-2-hydroxycyclohexyl)oxy)-6-(hydroxymethyl)tetrahydro-2H-pyran-3,5-diol sulfate
SMILES	OS(O)(=O)=O.O[C@@H]([C@@H]([C@H]1N)O[C@H]([C@@H](C2)N)O[C@H](CN)[C@H]2O)[C@H]([C@@H](C1)N)O[C@H]([C@@H]([C@H]3N)O)O[C@H](CO)[C@H]3O
Formula	$C_{18}H_{39}N_5O_{13}S$
M.Wt	565.59
Solubility	≥ 57.4mg/mL in Water, <5.66mg/mL in DMSO
Storage	Store at -20°C
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ for several months.
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.
Structure	Tobramycin Sulfate

Protocol

Cell experiment [1]:

Cell lines	HLMVEC (human lung microvascular endothelial cells)

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

Preparation Method	Tobramycin Sulfate (0.5mM) was co-incubated with HLMVEC for 24h, followed by co-culturing thrombin-activated platelets with pretreated HLMVEC to induce T cell migration. The migration inhibition effect was assessed by counting the number of T cells that migrated to the lower chamber of the Transwell.
Reaction Conditions	0.5mM; 24h
Applications	Tobramycin Sulfate treatment significantly inhibited platelet-induced T cell migration (inhibition rate 66.5%).

Animal experiment [2]:

Animal models	CBA/Ca mice
Preparation Method	Mice were given subcutaneous injections of Tobramycin Sulfate (200mg/kg/day) for 14 days. Gap prepulse inhibition of the acoustic startle reflex was used to assess behavioral evidence of tinnitus. GPIAS assessments were collected before (baseline), as well as at weeks 2, 6, 10, 14, and 18 from the start of Tobramycin Sulfate treatment.
Dosage form	200mg/kg/day; 14 days; s.c.
Applications	Tobramycin Sulfate treatment resulted in gap detection defects in 36% of mice in the GPIAS test, exhibiting tinnitus-like behavior, which was most pronounced 2 weeks after administration and gradually decreased over time.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA

References:
[1] GZIUT M, MACGREGOR H J, NEVELL T G, et al. Anti-inflammatory effects of Tobramycin Sulfate and a copper–Tobramycin Sulfate complex with superoxide dismutase-like activity[J]. British Journal of Pharmacology, 2013, 168(5): 1165-1181.
[2] LONGENECKER R J, GU R, HOMAN J, et al. Development of Tinnitus and Hyperacusis in a mouse model of Tobramycin Sulfate Cochleotoxicity[J]. Frontiers in Molecular Neuroscience, 2021, 14: 715952.

Background

Tobramycin Sulfate is a parenterally administered aminoglycoside antibiotic with significant antibacterial activity against aerobic Gram-negative bacteria such as *Pseudomonas aeruginosa*[1]. Tobramycin Sulfate exerts its bactericidal effect by irreversibly binding to the bacterial 30S ribosomal subunit, thereby inhibiting protein synthesis[2]. Tobramycin Sulfate is commonly used to treat conditions such as ocular infections, respiratory tract infections in patients with cystic fibrosis, and urinary tract infections[3,4].

In vitro, treatment of 96 clinically isolated *P. aeruginosa* strains with Tobramycin Sulfate (0.39-25μg/mL) for 18h resulted in MICs ≤ 3.12μg/mL for 83/96 strains on Mueller Hinton agar, while its bacteriostatic activity was stronger in Mueller Hinton broth (MIC values were 2-8 times lower)[5]. Pretreatment of human lung microvascular endothelial cells (HLMVEC) with Tobramycin Sulfate (0.5mM) for 24h significantly inhibited platelet-induced T-cell migration (inhibition rate 66.5%)[6].

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA

In vivo, combined administration of Tobramycin Sulfate (30mg/kg; once daily; s.c.) and Furanone C-30 (1mg/kg) to BALB/c mice implanted with a pre-infected *P. aeruginosa* silicone tube for up to 48h significantly reduced the bacterial load on the silicone implant. The synergistic clearance effect was significantly superior to monotherapy[7]. Intratracheal single-dose administration of Tobramycin Sulfate (250μg/mouse) on the first day after NMRI mice were infected with *Klebsiella pneumoniae* significantly increased the survival rate within 8 days post-infection by 33% compared to the untreated control group[8]. Treatment of CBA/Ca mice with Tobramycin Sulfate (200mg/kg/day; s.c. for 14 days) resulted in gap detection deficits in the gap pre-pulse inhibition of the acoustic startle (GPIAS) test in 36% of the mice, indicating tinnitus-like behavior. This behavior was most pronounced at 2 weeks post-administration and gradually diminished over time[9].

References:

[1] FIEL S B, ROESCH E A. The use of Tobramycin Sulfate for Pseudomonas aeruginosa: A review[J]. Expert Review of Respiratory Medicine, 2022, 16(5): 503-509.
[2] KRAUS L, DUCHARDT-FERNER E, BRÄUCHLE E, et al. Development of a novel Tobramycin Sulfate dependent riboswitch[J]. Nucleic Acids Research, 2023, 51(20): 11375-11385.
[3] CHEER S M, WAUGH J, NOBLE S. Inhaled Tobramycin Sulfate (TOBI®): A review of its use in the management of Pseudomonas aeruginosa infections in patients with cystic fibrosis[J]. Drugs, 2003, 63(22): 2501-2520.
[4] NEU H C. Tobramycin Sulfate: an overview[J]. The Journal of Infectious Diseases, 1976, S3-S19.
[5] MEYER R D, YOUNG L S, ARMSTRONG D. Tobramycin Sulfate (nebramycin factor 6): in vitro activity against Pseudomonas aeruginosa[J]. Applied Microbiology, 1971, 22(6): 1147-1151.
[6] GZIUT M, MACGREGOR H J, NEVELL T G, et al. Anti-inflammatory effects of Tobramycin Sulfate and a copper–Tobramycin Sulfate complex with superoxide dismutase-like activity[J]. British Journal of Pharmacology, 2013, 168(5): 1165-1181.
[7] CHRISTENSEN L D, VAN GENNIP M, JAKOBSEN T H, et al. Synergistic antibacterial efficacy of early combination treatment with Tobramycin Sulfate and quorum-sensing inhibitors against Pseudomonas aeruginosa in an intraperitoneal foreign-body infection mouse model[J]. Journal of Antimicrobial Chemotherapy, 2012, 67(5): 1198-1206.
[8] VAN'T VEEN A, MOUTON J W, GOMMERS D, et al. Pulmonary surfactant as vehicle for

intratracheally instilled Tobramycin Sulfate in mice infected with Klebsiella pneumoniae[J]. British Journal of Pharmacology, 1996, 119(6): 1145.
[9] LONGENECKER R J, GU R, HOMAN J, et al. Development of Tinnitus and Hyperacusis in a mouse model of Tobramycin Sulfate Cochleotoxicity[J]. Frontiers in Molecular Neuroscience, 2021, 14: 715952.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA