Product Data Sheet

Product Name: Poly-L-lysine hydrobromide (MW 150000-300000)
Cat. No.: GC19602

Chemical Properties

Cas. No.	25988-63-0		
SMILES	CN[C@@H](CCCC[NH3+])C(C)=O.[n].[Br-].[n]		
Formula	$C_8H_{19}BrN_2O$	M.Wt	150000-300000
Solubility	H_2O : 25 mg/mL (Need ultrasonic)	Storage	4°C, sealed storage, away from moisture and light
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			

Protocol

Cell experiment [1]:

Cell lines	Jurkat T-cells, THLE-3 hepatocyte-like cells, and human umbilical vein endothelial cells (HUVEC)
Preparation Method	Cells were seeded into 12- or 24-well plates at 1×10^6 cells/ml and cultured in serum-free RPMI-1640. After 24h, fresh medium containing Poly-L-lysine hydrobromide (PLL) or PLL–DNA complexes was added.
Reaction Conditions	10–30μg/ml; 24h.

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Applications	Poly-L-lysine hydrobromide induced significant apoptosis, manifested by mitochondrial membrane potential loss, cytochrome c release, and activation of caspases-9 and -3.

Animal experiment [2]:

Animal models	C57BL/6 mice (B16F10 melanoma) and SCID mice (P22 rat sarcoma).
Preparation Method	Subcutaneous implantation of 1 × 10^6 B16F10 cells or dorsal window-chamber implantation of P22 fragments; 24h later, mice received the first of two daily tail-vein administrations of Poly-L-lysine hydrobromide (50mg/kg) or PBS, followed by tissue harvest on day 10.
Dosage form	50mg/kg/day; i.v.
Applications	Poly-L-lysine hydrobromide dendrimer significantly suppressed intratumoral vascularization, induced extensive tumor-cell apoptosis/necrosis, and delayed solid-tumor growth without systemic toxicity.

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References:
[1] Mukherjee A, Debnath S, Bhowmik A, et al. DNA interactive property of poly-L-lysine induces apoptosis in MCF-7 cells through DNA interaction. J Biochem Mol Toxicol. 2023 Aug;37(8):e23378.
[2] Al-Jamal KT, Al-Jamal WT, Akerman S, et al. Systemic antiangiogenic activity of cationic poly-L-lysine dendrimer delays tumor growth. Proc Natl Acad Sci U S A. 2010 Mar 2;107(9):3966-71.

Background

Poly-L-lysine hydrobromide (MW 150000-300000) is a high-molecular-weight, positively charged synthetic polypeptide widely used to enhance cell adhesion to culture surfaces. Poly-L-lysine hydrobromide exhibits excellent water solubility and biocompatibility and serves as an essential reagent for the culture of primary neurons, epithelial cells, and stem cells[1-2]. When coated onto substrates, Poly-L-lysine hydrobromide forms a stable, uniform layer that resists detachment during long-term culture[3], and Poly-L-lysine hydrobromide is also employed as a drug-delivery vehicle[4].

In vitro, Poly-L-lysine hydrobromide (20μg/mL) applied to HeLa cells for 30min–2h significantly inhibits tumor-cell DNA, RNA, and protein synthesis, alters membrane permeability, induces leakage of intracellular small molecules, and causes cell rounding, granulation, and lysis[5]. Treatment of Jurkat T-cells, THLE-3 hepatocyte-like cells, and human umbilical vein endothelial cells (HUVEC) with Poly-L-lysine hydrobromide(10–30μg/ml) for 24h markedly induces apoptosis, as evidenced by mitochondrial membrane potential loss, cytochrome c release, and activation of caspase-9 and caspase-3.[6].

In vivo, Poly-L-lysine hydrobromide (50mg/kg/day; i.v.) administered to C57BL/6 mice bearing subcutaneous B16F10 melanoma on days 1 and 2 post-inoculation markedly

suppresses tumor neovascularization, induces widespread tumor-cell apoptosis/necrosis, and delays solid-tumor growth[7]. A single intraluminal insertion of a 5-0 monofilament nylon suture coated with 0.1%w/v Poly-L-lysine hydrobromide into the internal carotid artery of C57BL/6 mice produces 30–180min middle-cerebral-artery occlusion followed by 24h reperfusion, resulting in 100% consistent infarcts in expected ipsilateral regions (striatum, thalamus, hippocampus, frontoparietal cortex) and time-dependent neurological deficits[8].

References:

[1] Olivera-Ardid S, Bello-Gil D, Tuzikov A et al, et al. Poly-L-Lysine-Based αGal-Glycoconjugates for Treating Anti-αGal IgE-Mediated Diseases. Front Immunol. 2022 Mar 31;13:873019.
[2] Hatcher JM, Zwirek M, Sarhan AR, et al. Development of a highly potent and selective degrader of LRRK2. Bioorg Med Chem Lett. 2023 Oct 1;94:129449.
[3] Tengberg JF, Russo F, Benned-Jensen T, et al. LRRK2 and RAB8A regulate cell death after lysosomal damage in macrophages through cholesterol-related pathways. Neurobiol Dis. 2024 Nov;202:106728.
[4] Harsiddharay RK, Gupta A, Singh PK, et al. Poly-L-lysine Coated Oral Nanoemulsion for Combined Delivery of Insulin and C-Peptide. J Pharm Sci. 2022 Dec;111(12):3352-3361.
[5] Arnold LJ Jr, Dagan A, Gutheil J, et al. Antineoplastic activity of poly(L-lysine) with some ascites tumor cells. Proc Natl Acad Sci U S A. 1979 Jul;76(7):3246-50.
[6] Symonds P, Murray JC, Hunter AC, et al. Low and high molecular weight poly(L-lysine)s/poly(L-lysine)-DNA complexes initiate mitochondrial-mediated apoptosis differently. FEBS Lett. 2005 Nov 7;579(27):6191-8.
[7] Al-Jamal KT, Al-Jamal WT, Akerman S, et al. Systemic antiangiogenic activity of cationic poly-L-lysine dendrimer delays tumor growth. Proc Natl Acad Sci U S A. 2010 Mar 2;107(9):3966-71.
[8] Belayev L, Busto R, Zhao W, et al. Middle cerebral artery occlusion in the mouse by intraluminal suture coated with poly-L-lysine: neurological and histological validation. Brain Res. 1999 Jul 3;833(2):181-90.

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