

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]

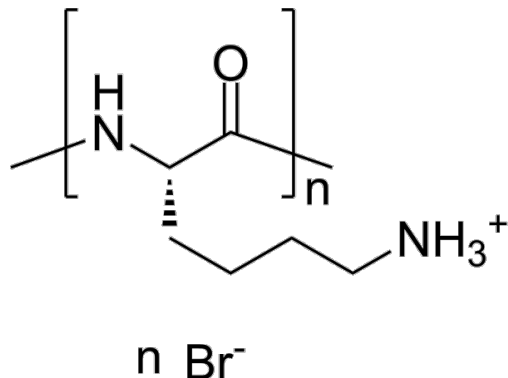
Formula $C_8H_{19}BrN_2O$ M.Wt 150000-300000

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 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C 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)

Caution: Product has not been fully validated for medical applications. For research use only.

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Cells were seeded into 12- or 24-well plates at 1×10^6 cells/ml and cultured in Preparation Method 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.

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.

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.

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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

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[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.

Experimental Protocol:

1. Prepare a 1mg/mL poly-lysine stock solution in sterile water, sterilize by filtration through a 0.22µm microporous filter, and store in aliquots at -20°C.

2. Dilute to 0.1mg/mL with sterile ultrapure water before use.

Note: It is recommended to use plastic containers and graduated cylinders when mixing or storing the solution and coating slides. Do not add fresh solution to used solution.

3. Equilibrate the diluted poly-lysine working solution to room temperature (18–26°C) before use.

4. Add the poly-lysine working solution to the culture vessel, gently rock to ensure even coverage, and incubate at room temperature for 5–10 minutes.

5. Aspirate the working solution, wash the culture vessel 1–2 times with PBS, and dry in an oven at 60°C for 1 hour or at room temperature (18–26°C) overnight.

Note: Poly-lysine is cytotoxic; the concentration of the coating solution may be reduced depending on specific experimental requirements.

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