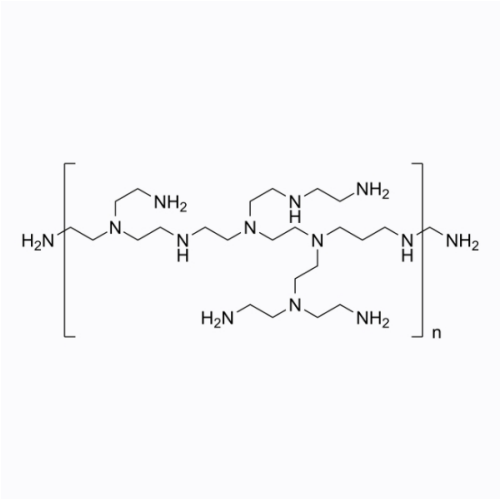
Product Data Sheet

Product Name: Polyethylenimine linear (MW:10000)
Cat. No.: GC19836

Chemical Properties

Cas. No.	9002-98-6		
Formula	$H(NHCH_2CH_2)nNH_2$	M.Wt	10000
Solubility		Storage	Store at RT,protect from 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

This plan only provides a guide, please modify it to meet your specific needs.

1. Solution preparation

(1) Prepare storage solution: Equilibrate the cryopreserved solid to room temperature, use sterile water to dissolve Polyethylenimine linear, and prepare a storage solution with a concentration of 1 mg/mL.

Note: Unused storage solution should be aliquoted and stored in the dark at -20°C or -80°C to avoid

repeated freezing and thawing.

(2) Prepare working solution: Before the formal experiment, dilute the storage solution with sterile water (or serum-free medium) to the required working concentration, for example: 250 μg/mL.

Note: Please adjust the optimal working concentration according to the actual situation or refer to the literature to set the gradient concentration yourself to explore. The working fluid must be prepared and used immediately.

2. Steps for transient transfection of 293T cells using Polyethylenimine linear [1] (from the literature, for reference only)

(1) Cell seeding: One day before transfection, 293T cells in the exponential growth phase were seeded into a 6 cm diameter culture dish. Ensure cell growth reaches 50-70% confluence.

(2 Change the culture medium: Remove the cell culture medium and replace it with serum-free culture medium.

(3) Prepare DNA-PEI complex: Prepare 240 μL of DNA solution (32 μg/mL). Add 180μL of sterile PEI solution (250 μg/mL). Vortex slightly to mix, and incubate at room temperature for 30 minutes.

(4) Add DNA-PEI complex: Add the complex dropwise to the cells and incubate in a 5% CO_2 incubator for 6 hours.

(5) Replace the culture medium: After 6hours, replace the culture medium containing the DNA-PEI complex with DMEM culture medium supplemented with fetal bovine serum (FBS).

(6) Culture and gene expression: Continue to culture in a CO_2 incubator for 48 hours, and then analyze gene expression.

Note: This experimental protocol only provides a reference for using Polyethylenimine linear in cell transfection experiments. Please modify the specific steps according to experimental needs. Please perform necessary control experiments, including untreated cells and cells using known effective transfection reagents, to evaluate transfection efficiency and cytotoxicity.

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References:

[1] Wang W , Zheng Q , Yu C ,et al.WSV056 Inhibits Shrimp Nitric Oxide Synthase Activity by Downregulating[J].Frontiers in microbiology, 2021, 12:796049.

Background

Polyethylenimine linear (PEI) is a hydrophilic cationic polymer that can be used as a gene carrier and has high transfection efficiency[1]. Polyethylenimine linear can be used to improve the chemical properties of negatively charged dyes and is often used as an adhesion promoter with a similar function to polylysine[2]. Polyethylenimine linear can be used for cell transfection. Polyethylenimine linear can bind to DNA and other negatively charged biomolecules and is a low-toxic and efficient cell transfection agent[3]. Polyethylenimine linear can be used for targeted delivery of nucleic acid drugs. Polyethylenimine linear attracts the influx of chloride and subsequently penetrates water into the lysosomes when the lysosomes are protonated, causing lysosome rupture and releasing the nucleic acid into the cytoplasm [4]. The molecular weight of this polyethylenimine linear product is 10kDa.

References:
[1] Jeong J.H., Song S.H., Lim D.W, et al. DNA transfection using linear poly(ethylenimine) prepared by controlled acid hydrolysis of poly(2-ethyl-2-oxazoline)[J]. Journal of Controlled Release. 2001(73): 391-399.
[2]Yan Li, Shu Xiong, et al. Loose nanofiltration membrane with highly-branched SPEI/PEI assembly for dye/salt textile wastewater treatment[J].Journal of Environmental Chemical Engineering. 2021.
[3]Wang C, Zhang Z, Liu Y, et al. Recent Progress on Nonviral Delivery Carriers for CRISPR/Cas9 Systems[J]. Mater. Matters, 2020, 15: 104-111.
[4]Piotrowski-Daspit A S, Kauffman A C, Bracaglia L G, et al. Polymeric vehicles for nucleic acid delivery[J]. Advanced drug delivery reviews, 2020, 156: 119-132.

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