

Product Information

Poly-D-lysine Hydrobromide

Product Numbers **P0296, P6403, P4408, P7886, P7280, P0899, P6407, P1149, P1024** and **P7405**

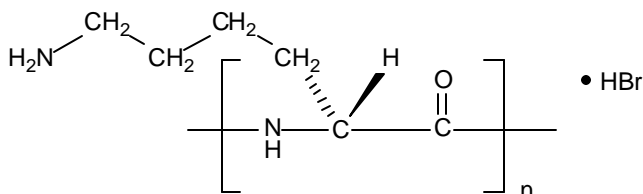
Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS: 27964-99-4

Synonym: PDL

Product Description

Product Number	Molecular Weight	Cell Culture Tested and g-irradiated
P0296	1,000–4,000	No
P6403	4,000–15,000	No
P4408	15,000–30,000	No
P7886	30,000–70,000	No
P7280	30,000–70,000	Yes
P0899	70,000–150,000	No
P6407	70,000–150,000	Yes
P1149	150,000–300,000	No
P1024	>300,000	No
P7405	>300,000	Yes



Poly-D-lysine is a positively charged amino acid polymer. There is approximately one HBr per lysine residue. The HBr allows the poly-D-lysine to be a crystalline solid and soluble in water. To remove the HBr, dissolve the product in a neutral buffer and dialyze to remove the salts. A method for molecular weight determination by viscosity has been published.¹

There may be a small amount of product in the β structure, but very little. This is because the HBr interferes with hydrogen bonding between the amino and carboxyl groups, or between the amino group and other N or O containing moieties. The secondary structures of polyamino acids have not been extensively studied, but it is known that the degree of secondary conformational regularity depends on the amino acid in the polymer.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

Sigma routinely tests the solubility of the poly-D-lysines at 50 mg per ml in water. Sterile solutions can be stored at $2-8\text{ }^{\circ}\text{C}$ for up to 2 years.

Storage/Stability

Store desiccated at $-20\text{ }^{\circ}\text{C}$.

Procedure

Poly-D-lysine is a nonspecific attachment factor for cells useful in promoting cell adhesion to solid substrates.²⁻⁵ Poly-D-lysine enhances electrostatic interaction between negatively charged ions of the cell membrane and the culture surface. When adsorbed to the culture surface, poly-D-lysine increases the number of positively charged sites available for cell binding.

Polymers of both D- and L-lysine are used to coat solid surfaces. Poly-L-lysine has been reported to improve the protein coating of ELISA plates.^{6,7} However, in culture applications, certain cells can digest poly-L-lysine. In this situation, poly-D-lysine should be used as the attachment factor so that the cells are not disrupted by excessive uptake of L-lysine. The lower molecular weight poly-D-lysine (30,000–70,000) is easier to use because it is less viscous in solution, but the higher molecular weight poly-lysine (>300,000) provides more attachment sites per molecule. The molecular weight poly-D-lysine often preferred by users is the 70,000–150,000.

Cell Culture:

When using poly-D-lysine as an attachment factor, the optimal conditions must be determined for each cell line and application. In general, the following steps can be used.

1. Add 50 ml of sterile tissue culture grade water to 5 mg of poly-D-lysine.
2. Aseptically coat culture surface with 0.5–1.0 ml of solution per 25 cm². Rock gently to ensure even coating of the culture surface.
3. After 5 minutes, remove solution by aspiration and thoroughly rinse surface with sterile tissue culture grade water.
4. Allow to dry at least two hours before introducing cells and medium.

If glassware or slides must be sterilized after coating with poly-lysine, γ -irradiation is recommended instead of autoclaving.

If uneven coating occurs, glass slides may be pretreated with 1 mM magnesium acetate for 2–3 hours and then rinsed well before coating. Alternatively, they may be acid washed (hydrochloric acid or sulfuric acid). This treatment should allow for an even coating with the poly-D-lysine solution.

Histology:

In general, a 0.1% (w/v) poly-D-lysine solution is recommended as a dip for histology slide preparation. After a five-minute exposure, drain slides and dry at room temperature overnight or in an oven (~60 °C) for ~1 hour. Store the solution in plastic bottles in the refrigerator and limit use to four times.

Related Products

Poly-L-lysine Solution (suitable for histochemical techniques)

- Poly-L-lysine Solution, 0.1% (w/v) in water (preservative added), Prod. No. P8920

References

1. Yaron, A., and Berger, A., The effect of urea and guanidine on the helix content of poly-N5-(3-hydroxypropyl)-L-glutamine in aqueous solvent systems. *Biochim. Biophys. Acta*, **69**, 397 (1963).
2. Jacobson, B.S., and Branton, D. Plasma membrane: rapid isolation and exposure of the cytoplasmic surface by use of positively charged beads. *Science*, **195**, 302, (1977).
3. Leifer, D., *et al.*, Monoclonal antibody to Thy-1 enhances regeneration of processes by rat retinal ganglion cells in culture. *Science*, **224**, 303 (1984).
4. Cannella, M., and Ross, R. Influence of substratum on the retrograde response of the rat superior cervical ganglion *in vitro*. *Exp. Neurology*, **95**, 652 (1987).
5. Needham, L., *et al.*, Endothelial functional responses and increased vascular permeability induced by polycations. *Lab. Invest.* **59(4)**, 538-548 (1988).
6. Banerjee, D.S., *et al.*, An ELISA method for quantitation of tubulin using poly-l-lysine coated microtiter plates. *Indian J. Exp. Bio.*, **27**, 972-976 (1989).
7. Stinitz, M. Quantitation of the blocking effect of Tween 20 and bovine serum albumin in ELISA microwells. *Anal. Biochem.*, **282**, 232-238 (2000).

CMH,ARO, TES,KTA 09/05-1

Cell Culture Poly-Lysine Selection Guide

Sigma offers both Poly-D-Lysine and Poly-L-Lysine in several molecular weight ranges. Poly-Lysine enhances electrostatic interaction between negatively charged ions of the cell membrane and positively charged surface ions of attachment factors on the culture surface. When adsorbed to the culture surface, it increases the number of positively charged sites available for cell binding.

Product Number	Product	Molecular Weight	Source	Storage	Target Cells For Attachment	Concentration For Use	Refs.
P7280	POLY-D-LYSINE HYDROBROMIDE	MW 30,000–70,000	synthetic	–20 °C; store solubilized product at –20 °C	Attachment of a variety of cell types	Use 0.5 ml of a 0.10 mg/ml solution to coat 25 cm ²	3,4,5
P6407	Lyophilized, Sterilized	MW 70,000–150,000					
P7405	by γ -irradiation	MW >300,000					
P9155	POLY-L-LYSINE HYDROBROMIDE	MW 30,000–70,000					
P6282	Lyophilized, Sterilized	MW 70,000–150,000					
P5899	by γ -irradiation	MW >300,000					
P4707	POLY-L-LYSINE 0.01% Solution	MW 70,000–150,000					
P4832	Sterile	MW 150,000–300,000					

Please refer to the catalog for additional extracellular matrices/attachment factors.