

Certificate of Analysis

www.tocris.com

Product Name: Protamine sulfate

Catalog No.: 8822

Batch No.: 1

CAS Number: 53597-25-4

1. PHYSICAL AND CHEMICAL PROPERTIES

Solubility: water to 10 mg/ml with gentle warming

Storage: Store at +4°C

2. ANALYTICAL DATA

HPLC: Shows 90.9% purity

Dried Basis, USP Heparin Unit/mg: 155

Caution - Not Fully Tested • Research Use Only • Not For Human or Veterinary Use

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Description:

Protamine sulfate is a cationic peptide that enhances viral vector transduction efficiency in gene therapy applications. By neutralizing charge repulsion between viral particles and the cell surface, Protamine sulfate promotes vector attachment and uptake, leading to increased transduction efficiency. It is commonly used in combination with Polybrene (Cat. No. 7711) to enhance the delivery of adeno-associated virus (AAV) and lentiviral vectors. Protamine sulfate is widely applied in gene delivery workflows, including stem cell engineering and gene-modified cell therapy development. It is also an antagonist of apelin receptor. For more inf... Please see product specific page on www.tocris.com for full description.

Physical and Chemical Properties:

Minimum Purity: ≥90%

Storage: Store at +4°C

Solubility & Usage Info:

water to 10 mg/ml with gentle warming

This product is supplied in lyophilized form. It may appear as a solid, gel or glass-like form. Although purity is unaffected, it may be difficult to extract the full quantity from the vial. In such a situation, we recommend that solutions are made by adding solvent directly to the vial. The vial should then be vortexed vigorously to ensure the product has completely dissolved.

Stability and Solubility Advice:

Some solutions can be difficult to obtain and can be encouraged by rapid stirring, sonication or gentle warming (in a 45-60°C water bath).

Information concerning product stability, particularly in solution, has rarely been reported and in most cases we can only offer a general guide. *Unless contradicted by product-specific protocols or instructions, our standard recommendations apply:

SOLIDS: Provided storage is as stated on the product label and the vial is kept tightly sealed, the product can be stored for up to 6 months from date of receipt.

SOLUTIONS: We recommend that stock solutions, once prepared, are stored aliquoted in tightly sealed vials at -20°C or below and used within 1 month. Wherever possible solutions should be made up and used on the same day.

References:

Ellison *et al* (2024) Design and validation of a GMP stem cell manufacturing protocol for MPSII hematopoietic stem cell gene therapy. *Mol.Ther.Methods Clin.Dev.* **32** 101271. PMID: 38946936.

Le Gonidec (2017) Protamine is an antagonist of apelin receptor, and its activity is reversed by heparin. *FASEB J* **31** 2507. PMID: 28242772.

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