

Product Data Sheet

Product Name: Protamine sulfate

Cat. No.: GC62048

Chemical Properties

Cas. No. 9009-65-8

Formula M.Wt

Solubility H₂O : ≥ 33.33 mg/mL Storage Store at -20°C

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

Protamine sulfate

Protocol

Cell experiment [1]:

Cell lines hMSCs

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

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Trypsinized cells were washed, and then resuspended at 2×10^4 cells per milliliter. For the Protamine sulfate experiment, the cell suspension was additionally supplemented with Protamine sulfate to obtain final concentrations of 0, 50, and 100 µg/ml. The cells were seeded into 96-well plates at 1×10^3 cells per 50 µl per well in triplicate and cultured at 37°C, 5% CO₂. After 7 days, the medium was removed and the plate was placed in the -80°C freezer until the day of analysis.

Reaction Conditions 0-100 µg/ml; 7d

Applications There was no statistical difference in cell proliferation between untreated cells and cells treated with Protamine sulfate at 0-100 µg/ml tested for an extended period of time (7 days).

Animal experiment [2]:

Animal models Primates

Heparins were administered at an equi-gravimetric dose (0.5mg/kg) intravenously via the saphenous vein. However, low molecular weight heparins were administered at a dose of 1mg/kg intravenously via the saphenous vein. 15 minutes post drug administration, a second blood sample was collected, and primates were immediately treated with a 1mg/kg i.v. dose of Protamine sulfate or an equivalent volume of saline. Additional blood samples were collected at 15-, 45- and 120-minutes post Protamine sulfate administration.

Dosage form 0.5mg/kg; i.v.; once

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Applications Protamine sulfate can essentially completely neutralize the anticoagulant activity of unfractionated heparins administered by weight-based dosing. Neutralization of low molecular weight heparins is typically incomplete.

References:

- [1] Lin P, Lin Y, Lennon DP, Correa D, Schluchter M, Caplan AI. Efficient lentiviral transduction of human mesenchymal stem cells that preserves proliferation and differentiation capabilities. *Stem Cells Transl Med.* 2012;1(12):886-897.
- [2] Kouta A, Jeske W, Cera L, et al. Protamine Sulfate Neutralization Profile of Various Dosages of Bovine, Ovine and Porcine UFHs and Their Depolymerized Derivatives in Non-Human Primates. *Clin Appl Thromb Hemost.* 2021;27:10760296211005544.

Background

Protamine sulfate, polycationic peptide and a antiheparin agent, could neutralize the anticoagulant action of heparin and enhances lipid-mediated gene transfer[1][2][3].

Protamine sulfate has an inhibitory effect on thrombin in the conversion of fibrinogen to fibrin, and that this inhibition is concentration dependent, partial, and reversible[3]. Protamine sulfate is a 5-kDa cationic polypeptide derived from salmon sperm that can bind negatively charged unfractionated heparin (UFH). Protamine sulfate down-regulates thrombin generation by inhibiting factor V activation[4].

- [1]. Ahmed Kouta, et al. Protamine Sulfate Neutralization Profile of Various Dosages of Bovine, Ovine and Porcine UFHs and Their Depolymerized Derivatives in Non-Human Primates. *Clin Appl Thromb Hemost.* Jan-Dec 2021;27:10760296211005544.
- [2]. F L Sorgi, et al. Protamine sulfate enhances lipid-mediated gene transfer. *Gene Ther.* 1997 Sep;4(9):961-8.
- [3]. R J Cobel-Geard, et al. Interaction of protamine sulfate with thrombin. *Am J Hematol.* 1983 May;14(3):227-33.
- [4]. Fionnuala Ni Ainle, et al. Protamine sulfate down-regulates thrombin generation by inhibiting

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factor V activation. Blood. 2009 Aug 20;114(8):1658-65.

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