Product Data Sheet

Product Name: Cathepsin B from bovine spleen
Cat. No.: GF15486

Chemical Properties

Cas. No.	9047-22-7		
Formula		M.Wt	
Solubility		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			

Protocol

Cell experiment [1]:

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Cell lines	Macrophages
Preparation Method	Macrophages were maintained in μm-dishes for 5–7 days in the presence of 20mg/ml Macrophage colony stimulating factor, Co-incubation with freshly Cathepsin B(10μg/mL) was performed over 6 hours. After, cells were washed 3 times with PBS before they were loaded with fluorogen substrates, R110-Ile-Pro-Arg, and/or Suc-Ala-Ala-Pro-Phe-AMC in a concentration of 10 mmol/L for 30 minutes. Cells were washed again carefully and maintained in PBS for microscopy.
Reaction Conditions	10μg/mL; 6h
Applications	Cathepsin B was internalized by macrophages and then Cathepsin B converted to active trypsin intracellularly.

Animal experiment [2]:

Animal models	Hamsters
Preparation Method	Hamsters were instilled 115μg of active cathepsin B into the lungs of hamsters three times at 48h intervals. The tissue samples of lung were fixed in 10% neutral formalin and were stained for Hematoxylin-eosin staining.
Dosage form	115μg; Intranasal delivery.

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Applications	Cathepsin B-treated hamster large lung intrapulmonary airway contains a significantly greater number of secretory cells per millimeter of airway, with a significant increase in the number of total cells per millimeter of airway.

References:
[1] Sendler M, Weiss FU, Golchert J, et al. B-Mediated Activation of Trypsinogen in Endocytosing Macrophages Increases Severity of Pancreatitis in Mice. Gastroenterology. 2018 Feb;154(3):704-718.e10.
[2] Cardozo C, Padilla ML, Choi HS, et al. Goblet cell hyperplasia in large intrapulmonary airways after intratracheal injection of cathepsin B into hamsters. Am Rev Respir Dis. 1992 Mar;145(3):675-9.

Background

Cathepsin B from bovine spleen (Cathepsin B) is a member of the cysteine protease papain-like family. Cathepsin B is synthesized as a preproenzyme consisting of 335 amino acids, with a calculated molecular weight of approximately 36.7kDa. Cathepsin B is localized in the endosomal/lysosomal compartment, where Cathepsin B functions as both an endopeptidase and an exopeptidase. Cathepsin B primarily participates in the routine turnover of intracellular and extracellular proteins, thereby maintaining the homeostatic metabolic activity within the cell[1]. Cathepsin B has three major subtypes, including the primary transcript, the primary transcript lacking exon 2, and the primary transcript lacking both exons 2 and 3 [2]. Cathepsin B may also regulate biological processes such as angiogenesis, cell invasion, tumor proliferation, immune resistance, neurogenesis, and cell differentiation. Cathepsin B is frequently associated with the development of inflammatory responses and cancer progression [3, 4].

In vitro, Cathepsin B (10μg/mL) can be taken up by macrophages isolated from the bone marrow of C57Bl/6 mice, and it activates the activity of trypsin in macrophages while inducing inflammatory responses and cell death [5].

In vivo, Cathepsin B (115μg) was instilled into the lungs of hamsters. After 6 weeks, Cathepsin B induced the development of distorted alveolar focal areas and enlarged air space regions in the

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hamster lungs. Under the microscope, the lungs of hamsters treated with Cathepsin B showed a significantly higher number of secretory cells per millimeter of airway and a significant increase in the total number of cells per millimeter of airway [6-7].

References:

[1] Cavallo-Medved D, Moin K, Sloane B. Cathepsin B: Basis Sequence: Mouse. AFCS Nat Mol Pages. 2011;2011:A000508.
[2] Baudys M, Meloun B, Gan-Erdene T, et al. S-S bridges of cathepsin B and H from bovine spleen: a basis for cathepsin B model building and possible functional implications for discrimination between exo- and endopeptidase activities among cathepsins B, H and L. Biomed Biochim Acta. 1991;50(4-6):569-77.
[3] Mijanović O, Branković A, Panin AN, Savchuk S, Timashev P, Ulasov I, Lesniak MS. Cathepsin B: A sellsword of cancer progression. Cancer Lett. 2019 May 1;449:207-214.
[4] Brun S, Bestion E, Raymond E, et al. GNS561, a clinical-stage PPT1 inhibitor, is efficient against hepatocellular carcinoma via modulation of lysosomal functions. Autophagy. 2022 Mar;18(3):678-694..
[5] Sendler M, Weiss FU, Golchert J, et al. B-Mediated Activation of Trypsinogen in Endocytosing Macrophages Increases Severity of Pancreatitis in Mice. Gastroenterology. 2018 Feb;154(3):704-718.e10.
[6] Cardozo C, Padilla ML, Choi HS, et al. Goblet cell hyperplasia in large intrapulmonary airways after intratracheal injection of cathepsin B into hamsters. Am Rev Respir Dis. 1992 Mar;145(3):675-9.
[7] Lesser M, Padilla ML, Cardozo C. Induction of emphysema in hamsters by intratracheal instillation of cathepsin B. Am Rev Respir Dis. 1992 Mar;145(3):661-8.

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