PRODUCT INFORMATION

Cathepsin B (human, recombinant)

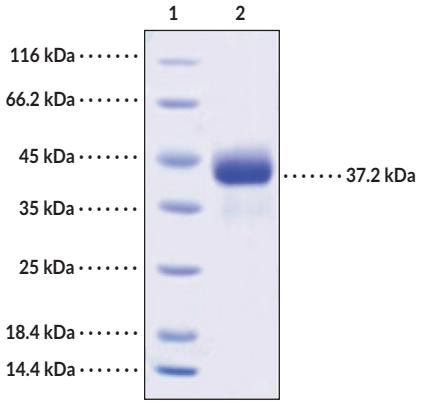
Item No. 41071

Overview and Properties

Synonyms:	Amyloid Precursor Protein Secretase, APP Secretase, APPS, Cathepsin B1, CPSB, CTSB, Cysteine Protease
Source:	Active recombinant human C-terminal His-tagged cathepsin B expressed in HEK293 cells
Amino Acids:	74-339
Uniprot No.:	P07858
Molecular Weight:	37.2 kDa
Storage:	-80°C (as supplied)
Stability:	≥1 year
Purity:	≥97% estimated by SDS-PAGE
Supplied in:	Lyophilized from sterile PBS, pH 7.4
Endotoxin Testing:	<1.0 EU/µg, determined by the LAL endotoxin assay
Protein Concentration:	**Batch specific** mg/ml
Activity:	**Batch specific** U/ml
Specific Activity:	**Batch specific** U/mg

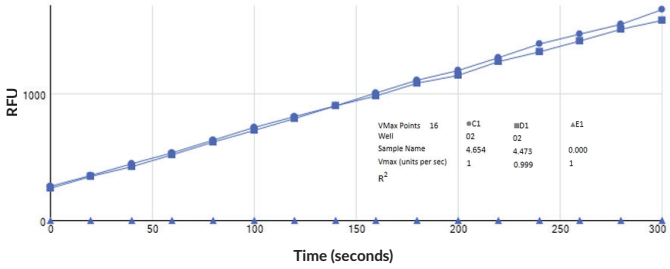
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Images



Lane 1: MW Markers
Lane 2: Cathepsin B (human, recombinant)

SDS-PAGE Analysis of Cathepsin B (human, recombinant).
This protein has a calculated molecular weight of 37.2 kDa.



Cathepsin B (human, recombinant) activity assay

CAYMAN CHEMICAL
1180 EAST ELLSWORTH RD
ANN ARBOR, MI 48108 · USA
PHONE: [800] 364-9897
[734] 971-3335
FAX: [734] 971-3640
CUSTSERV@CAYMANCHEM.COM
WWW.CAYMANCHEM.COM

PRODUCT INFORMATION

Description

Cathepsin B is a lysosomal cysteine protease and member of the papain family of peptidases that has endo- and exopeptidase activity.[1,2] Cathepsin B is translated as an inactive preproprotein containing a signal peptide, precursor peptide, and catalytic domain.[2] Following removal of the signal peptide, the precursor peptide is cleaved to release a single-chain polypeptide, which can be further cleaved and the pieces connected *via* disulfide bonds to form a double-chain form of the protein. Cathepsin B is ubiquitously expressed and localizes primarily to the lysosome where the acidic conditions are optimal for its dipeptidyl carboxypeptidase activity.[1] It is involved in lysosomal protein degradation and maintenance of the intracellular proteome but is also found in the cytoplasm, mitochondria, or nucleus, at the plasma membrane, or secreted into the extracellular matrix and is involved in diverse functions, such as cell death, cell division, and degradation of structural proteins.[3] In cancer cells, secreted cathepsin B cleaves and activates extracellular matrix proteins involved in invasion and metastasis.[4,5] The expression or protein levels of cathepsin B are increased in a variety of cancers, including esophageal cancer, hepatocellular carcinoma, and prostate cancer. Cathepsin B has a complex role in Alzheimer's disease, where it degrades amyloid-β but can also form pyroglutamic acid amyloid-β peptide, which has increased neurotoxicity compared with full-length amyloid-β (1-42).[3,6] It is also involved in the binding of viruses to host cells *via* cleavage of the glycoproteins from Middle East respiratory syndrome coronavirus (MERS-CoV) and Ebola virus.[7,8] Cayman's Cathepsin B (human, recombinant) protein can be used for enzyme activity assays. The proprotein consists of 332 amino acids, has a calculated molecular weight of 37.2 kDa, and a predicted N-terminus of Phe74 after signal and precursor peptide cleavage. By SDS-PAGE, under reducing conditions, the apparent molecular mass of the protein is 36 or 43 kDa for the pro- and mature forms, respectively, due to glycosylation.

References

1. Musil, D., Zucic, D., Turk, D., *et al.* The refined 2.15 Å X-ray crystal structure of human liver cathepsin B: The structural basis for its specificity. *EMBO J.* **10(9),** 2321-2330 (1991).
2. Mort, J.S., and Buttle, D.J. Cathepsin B. *Int. J. Biochem. Cell Biol.* **29(5),** 715-720 (1997).
3. Wang, J., Zheng, M., Yang, X., *et al.* The role of cathepsin B in pathophysiologies of non-tumor and tumor tissues: A systematic review. *J. Cancer* **14(12),** 2344-2358 (2023).
4. Liu, F., Zhou, T., Zhang, S., *et al.* Cathepsin B: The dawn of tumor therapy. *Eur. J. Med. Chem.* **269,** 116329 (2024).
5. Cavallo-Medved, D. and Sloan, B.F. Cell surface proteases. *Current topics in developmental biology* **54,** 313-333 (2003).
6 Hook, G., Yu, J., Toneff, T., *et al.* Brain pyroglutamate amyloid-β is produced by cathepsin B and is reduced by the cysteine protease inhibitor E64d, representing a potential Alzheimer's disease therapeutic. *J. Alzheimers. Dis.* **41(1),** 129-149 (2014).
7. Du, L., Yang, Y., Zhou, Y., *et al.* MERS-CoV spike protein: A key target for antivirals. *Expert Opin. Ther. Targets* **21(2),** 131-143 (2017).
8. Miller, E.H. and Chandran, K. Filovirus entry into cells - new insights. *Curr. Opin. Virol.* **2(2),** 206-214 (2012).

CAYMAN CHEMICAL
1180 EAST ELLSWORTH RD
ANN ARBOR, MI 48108 · USA
PHONE: [800] 364-9897
[734] 971-3335
FAX: [734] 971-3640
CUSTSERV@CAYMANCHEM.COM
WWW.CAYMANCHEM.COM