

## Cathepsin Z Protein, Human, Recombinant (His)

### General Information

Synonyms:	CTSX;cathepsin Z
Protein Construction:	A DNA sequence encoding the human CTSZ (Q9UBR2) (Met 1-Val 303) was fused with a polyhistidine tag at the C-terminus. Predicted N terminal: Gly 24
Species:	Human
Expression Host:	HEK293 Cells
Accession:	Q9UBR2
Molecular Weight:	33 kDa (predicted); 40 kDa (reducing condition, due to glycosylation)

### QC Testing

Biological Activity:	Measured by its ability to cleave the fluorogenic peptide substrate, Mca-RPPGFSAFK (Dnp)-OH. The specific activity is >800 pmoles/min/ $\mu$ g.
Purity:	> 97 % as determined by SDS-PAGE
Endotoxin:	< 1.0 EU/ $\mu$ g of the protein as determined by the LAL method.
Formulation:	Lyophilized from a solution filtered through a 0.22 $\mu$ m filter, containing PBS, pH 7.4. Typically, a mixture containing 5% to 8% trehalose, mannitol, and 0.01% Tween 80 is incorporated as a protective agent before lyophilization.

### Preparation and Storage

**Reconstitution:**  
A Certificate of Analysis (CoA) containing reconstitution instructions is included with the products. Please refer to the CoA for detailed information.

**Stability & Storage:**

It is recommended to store recombinant proteins at -20°C to -80°C for future use. Lyophilized powders can be stably stored for over 12 months, while liquid products can be stored for 6-12 months at -80°C. For reconstituted protein solutions, the solution can be stored at -20°C to -80°C for at least 3 months. Please avoid multiple freeze-thaw cycles and store products in aliquots.

Actual storage temperature shall be subject to the COA.

**Shipping:**

In general, lyophilized powders are shipped with blue ice, while solutions are shipped with dry ice.

### Protein Background

Cathepsin Z (CTSZ), also known as Cathepsin X or CATX, belongs to the C1 family of lysosomal cysteine proteases. Its gene structure and activity properties show several unique features that distinguish it clearly from other human cysteine proteases. It has a very short pro-region that shows no similarity to those of other cathepsins and a three-residue insertion motif that forms a characteristic 'mini loop'. Cathepsin Z exhibits mono- and di-peptidase activity at its C-terminus, and in contrast to cathepsin B, it does not act as an endopeptidase. It is restricted to the cells of

the immune system, predominantly monocytes, macrophages and dendritic cells. Cathepsin Z is widely expressed in human tissues, suggesting that this enzyme could be involved in the normal intracellular protein degradation taking place in all cell types. It is capable to cleave regulatory motifs at C-terminus affecting the function of targeted molecules. Cathepsin X may regulate also the maturation of dendritic cells, a process, which is crucial in the initiation of adaptive immunity. Furthermore, higher levels of Cathepsin Z are also found in tumour and immune cells of prostate and gastric carcinomas and in macrophages of gastric mucosa, especially after infection by *Helicobacter pylori*. Cathepsin Z is also ubiquitously distributed in cancer cell lines and in primary tumors from different sources, suggesting that this enzyme may participate in tumor progression.

### Reference

Santamara I, et al. (1998) Cathepsin Z, a novel human cysteine proteinase with a short propeptide domain and a unique chromosomal location. *J Biol Chem.* 273(27): 16816-23.

Kos J, et al. (2009) The role of cathepsin X in cell signaling. *Cell Adh Migr.* 3(2): 164-6.

Sevenich L, et al. (2010) Synergistic antitumor effects of combined cathepsin B and cathepsin Z deficiencies on breast cancer progression and metastasis in mice. *Proc Natl Acad Sci U S A.* 107(6): 2497-502.

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