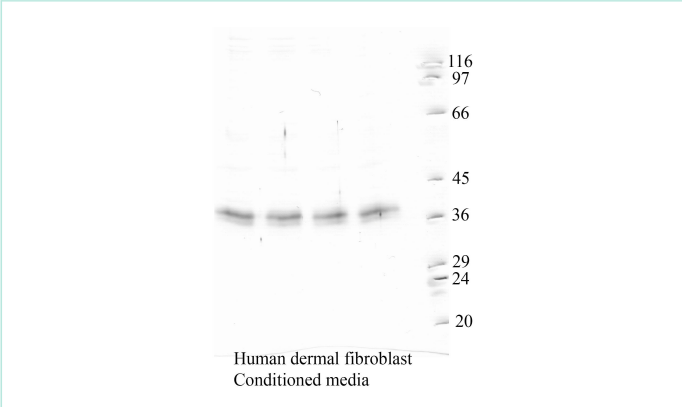


Anti-CTSK Rabbit Polyclonal Antibody

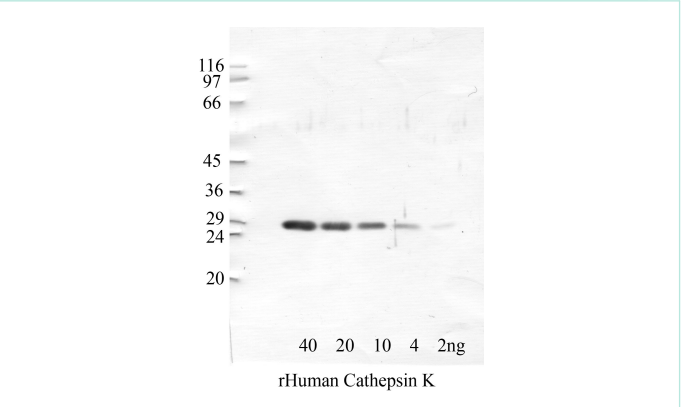
Cathepsin K, EC 3.4.22.38, Cathepsin O, Cathepsin O2, Cathepsin X,

Gene: CTSK **UniProt:** P43235 **Host:** Rabbit **Clonality:** Polyclonal (pAb)

Product Image



Propeptide domain
RP1CathepsinK



Catalytic domain
RP2CathepsinK

— Western Blot (2-panel validation across domain-specific antibody clones)

Actual Western blot validation for anti-CTSK rabbit polyclonal antibody. 2-panel validation across domain-specific antibody clones — each panel labeled with its catalog number and target domain. Reducing conditions; 10–20 µg/lane on 7.5–10% SDS-PAGE.

Key Product Facts

Supplier	Triple Point Biologics, Inc. (Sudbury, Ontario, Canada)
Product Name	Anti-CTSK Rabbit Polyclonal Antibody
Gene Symbol	CTSK
Alternative Names	Cathepsin K, EC 3.4.22.38, Cathepsin O, Cathepsin O2, Cathepsin X,
UniProt ID	P43235
Host Species	Rabbit
Clonality	Polyclonal (pAb)
Isotype	IgG
Concentration	1mg/ml
Purity	Affinity purified
Pack Size	100ug
Validated Application	WB
Recommended Dilution	WB-1/1000
Species Reactivity	Validated- Human Potential-Mouse, Rat, Pan, Monkey, Dog, Pig
Immunogen Type	Synthetic Peptide from Uniprot Sequence
Conjugation	none
Buffer / Preservatives	Sodium Chloride 500 mM, Sodium Phosphate 10 mM, Potassium Phosphate 1.8 mM, Potassium Chloride 2.7 mM, Glycerol 50% (v/v)
Website	triplepointbiologics.com/anti-cathepsin-k-rabbit-polyclonal-antibody

Available Domain-Specific Variants

Triple Point Biologics produces antibodies to defined structural domains of CTSK. Each variant is directed at a specific structural region of the protein. Exact peptide sequences are proprietary; each variant is validated for the applications listed.

Domain / Variant	Epitope Region (approx. residues)	Cat. No.	Availability
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Propeptide domain	16–114 Region spanning the inhibitory propeptide of human cathepsin K, which lies between the signal peptide and the mature catalytic chain; this domain functions as an intramolecular chaperone and competitive inhibitor of the active site prior to lysosomal processing	RP1Cathepsin K	In catalog
Catalytic domain	115–329 Region encompassing the mature catalytic domain of human cathepsin K, containing the papain-fold active site with the catalytic dyad (Cys139 and His278) and the substrate-binding cleft responsible for collagenolytic and elastolytic endoprotease activity	RP2Cathepsin K	In catalog
—	115–329 Broad region spanning both the propeptide and catalytic domains of human cathepsin K, encompassing the majority of the processed preproprotein and providing reactivity across multiple structural features of the full-length zymogen and mature enzyme forms	RP-CathepsinK	In catalog

Applications & Recommended Dilutions

App.	Species	Dilution Range	Notes
WB	Validated-Human Potential-Mouse, Rat, Pan, Monkey, Dog, Pig	1:1000	Optimal dilution should be determined per laboratory and lot.

Optimal dilutions should be determined by each laboratory for each application. Triple Point Biologics antibodies include a peptide-neutralized negative control aliquot for specific-signal confirmation.

Storage & Handling

Short-term Storage	+4°C (1–2 weeks)
Long-term Storage	Aliquot and store at -20°C
Shipping Conditions	Shipped in styrofoam cooler on blue ice
Hazard Warning	Product may contain Sodium Azide — POISONOUS AND HAZARDOUS. Handle by trained personnel only.
Shelf Life	12 months from date of receipt under recommended conditions

Target Background

Family & General Biology

Cathepsin K (CTSK, EC 3.4.22.38) is a lysosomal cysteine protease belonging to the papain-like (CA clan, C1 family) superfamily. Expressed as a 329-amino acid preproprotein, the mature enzyme is generated after removal of a signal peptide and an inhibitory propeptide. Among the eleven human cathepsins in this family, cathepsin K is distinguished by its exceptionally potent collagenolytic and elastolytic activity at acidic pH. Early literature referred to the enzyme variously as cathepsin O and cathepsin O2 before the current nomenclature was standardized. Paralogues within the family include cathepsins B, L, S, and V, but none recapitulates the full substrate repertoire of cathepsin K in skeletal tissue.

Expression & Localisation

Cathepsin K is most abundantly expressed in osteoclasts, where it is the dominant cysteine protease driving bone matrix degradation. Significant expression is also detected in synovial fibroblasts, chondroclasts, and lung epithelial cells. In the thyroid gland, follicular epithelial cells express cathepsin K to support thyroglobulin processing. At the subcellular level, the enzyme resides primarily in lysosomes and late endosomes. During active bone resorption, osteoclasts polarize their secretory machinery toward the bone surface, directing cathepsin K into the sealed acidic resorption lacuna where the local pH drops to approximately 4.5, optimal for protease activity.

Activation Mechanism

Cathepsin K is synthesised as a ~37 kDa zymogen (preprocathepsin K). After co-translational signal peptide cleavage in the endoplasmic reticulum, the resulting procathepsin K (~34 kDa) is trafficked via the Golgi through mannose-6-phosphate receptor-mediated sorting to lysosomes. Within the acidic lysosomal lumen, the propeptide is removed autocatalytically or by other resident cysteine and aspartyl proteases, yielding the mature ~27 kDa two-chain form stabilised by a single disulfide bond. The propeptide functions as an intramolecular chaperone required for correct folding and also serves as a potent competitive inhibitor of the active enzyme prior to its release.

Key Substrates

The physiologically most important substrate of cathepsin K is type I collagen; the enzyme is unique in its capacity to cleave within the triple-helical region at multiple sites, an activity dependent on complex formation with chondroitin sulfate glycosaminoglycans. Additional substrates include type II collagen, osteopontin, osteonectin, and aggrecan. In the thyroid, cathepsin K processes thyroglobulin to release thyroxine (T4) and triiodothyronine (T3). The enzyme also degrades fibrinogen, gelatin, and various extracellular matrix components at acidic pH. Elastolytic activity has been demonstrated against lung elastin, implicating cathepsin K in pulmonary matrix remodeling.

Inhibitor Profile

Endogenous regulation of cathepsin K activity is achieved principally by cystatin family inhibitors, including cystatin B (stefin B), cystatin C, and the kininogen-derived cystatins. Among exogenous inhibitors, E-64 and its analogues irreversibly block the catalytic cysteine (Cys139 in the mature enzyme). The selective, orally bioavailable small-molecule inhibitor odanacatib was advanced into late-stage clinical development for osteoporosis before being discontinued due to cardiovascular safety signals, illustrating the therapeutic importance of precise cathepsin K modulation. Chondroitin sulfate proteoglycans modulate rather than abolish activity; they redirect substrate specificity toward collagen and away from certain non-collagenous proteins.

Disease Relevance

Loss-of-function mutations in CTSK cause pycnodysostosis, an autosomal recessive osteosclerotic dysplasia characterised by dense but brittle bones, short stature, and osteoclast dysfunction. Conversely, excessive cathepsin K activity is implicated in postmenopausal osteoporosis, rheumatoid arthritis-associated bone erosion, and osteolytic bone metastasis from breast and prostate tumors. Emerging evidence also associates cathepsin K with atherosclerotic plaque instability through degradation of elastin and collagen in arterial walls. In tumor biology, cathepsin K expression in stromal cells and invading carcinoma cells correlates with invasive phenotypes, making it a marker of extracellular matrix remodeling in aggressive cancers.

Gene & Protein Reference

Gene Symbol	CTSK
HGNC	2536
NCBI Gene ID (Human)	1513
NCBI Gene ID (Mouse)	13038
Ensembl	ENSG00000143387
OMIM	601105
UniProt (Human)	P43235
UniProt (Mouse)	P55097
Protein Family	Papain-like cysteine protease superfamily, C1 family (cathepsins)
Predicted MW	~37 kDa (prepro); ~27 kDa (mature two-chain form)
Observed MW	~27–34 kDa depending on processing state and glycosylation; propeptide-containing zymogen ~34 kDa on SDS-PAGE
Chromosome	1q21.3
Paralogue	Cathepsin L (CTSL), Cathepsin S (CTSS), Cathepsin V (CTSV), Cathepsin B (CTSB)
Key Substrates	Type I collagen (triple-helical cleavage), type II collagen, osteopontin, osteonectin, aggrecan, thyroglobulin, fibrinogen, elastin
Activated by	Autocatalytic processing at acidic pH (~4.5) in lysosomes; facilitated by aspartyl proteases; chondroitin sulfate enhances collagenolytic activity
Inhibited by	Cystatin B, cystatin C, kininogens; E-64 and E-64 analogues (irreversible); small-molecule inhibitors including odanacatib (selective, clinical-stage)

About Triple Point Biologics

With over 30 years dedicated to antibody production, Triple Point Biologics is a Canadian company and the premier resource for proteinase and proteinase inhibitor research. Products have been cited in thousands of peer-reviewed publications.

The domain-specific antibody strategy — available in standard, ATK, SPA, and GSK kit formats — delivers predefined epitopes, built-in peptide-neutralized negative controls, and superior specificity for Western blot.

Website: www.triplepointbiologics.com

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Product specifications subject to change. Contact Triple Point Biologics for current product and availability information.