

Cathepsin K Human, Mouse Monoclonal Antibody, Clone: 3F9

Product Data Sheet

Source of Antigen: *E. coli*

Host: Mouse

Isotype: IgG2b

Cat. No.:

RD1820741003F9

(0.1 mg)

Research topic

Bone and cartilage metabolism

Preparation

The antibody is a mouse monoclonal antibody against recombinant Human Cathepsin K.

Amino Acid Sequence

The Human Cathepsin K is the part of the Human Procathepsin K. The Human Cathepsin K containing 224 amino acid residues (highlighted) of the Human Procathepsin K.

MRGSHHHHHH GSLYPEEILD THWELWKKTH RKQYNNKQVDE ISRRLIWEKN LKYISIHNLE ASLGVHTYEL AMNHLGDMTS
EEVVQKMTGL KVPLSHSRSN DTLYIPEWEG RAPDSVDYRK KGYVTPVKNQ GQCGSCWAFS SVGALEGQLK KKTGKLLNLS
PQNLVDCVSE NDGCGGGYMT NAFQYVQKNR GIDSEDAYPY VQEEESCMYN PTGKAAKCRG YREIPEGNEK ALKRAVARVG
PVSVAIDASL TSFQFYSKGV YYDESCNSDN LNHAFLAVGY GIQKGNKHWI IKNSWGENWG NKGYILMARN KNNACGIANL ASFPKM

Species Reactivity

Human

Not yet tested in other species.

Purification Method

Immunoaffinity chromatography on a column with immobilized protein G.

Antibody Content

0.1 mg (determined by BCA method, BSA was used as a standard)

Formulation

The antibody is lyophilized in 0.05 M phosphate buffer, 0.1 M NaCl, pH 7.2. **AZIDE FREE.**

Reconstitution

Add 0.1 ml of deionized water and let the lyophilized pellet dissolve completely. Slight turbidity may occur after reconstitution, which does not affect activity of the antibody. In this case clarify the solution by centrifugation.

Shipping

At ambient temperature. Upon receipt, store the product at the temperature recommended below.

Storage/Stability

The lyophilized antibody remains stable and fully active until the expiry date when stored at -20°C. Aliquot the product after reconstitution to avoid repeated freezing/thawing cycles and store frozen at -80°C. Reconstituted antibody can be stored at 4°C for a limited period of time; it does not show decline in activity after one week at 4°C.

Expiration

See vial label.

Lot Number

See vial label.

Quality Control Test

Indirect ELISA - to determine titer of the antibody

Applications

Immunohistochemistry, Western blotting

Introduction to the Molecule

Human cathepsin K (EC 3.4.22.38) is a member of the cysteine protease (papain) family with high primary sequence homology to cathepsins S, L, and B. It has been shown that cathepsin K plays a major role in the resorption of the bone matrix by osteoclasts. Cathepsin K has a potential as a drug target for the diseases related to bone matrix metabolism such as osteoporosis. Autoproteolytic processing of the N-terminal 99 amino acid propeptide produces the active, mature form of cathepsin K. It is presumed that the activation of procathepsin K in vivo occurs in the bone resorption pit, which has a low-pH environment. Humans lacking cathepsin K exhibit pycnodysostosis, which is characterized by short stature and osteosclerosis. Cathepsin K knockout mice develop osteopetrosis and display features characteristic of pycnodysostosis, and osteoclasts isolated from these mice exhibit impaired bone resorption in vitro. Factors that directly modulate osteoclastic bone resorption, including cytokines (RANK ligand, tumor necrosis factor-alpha and interferon gamma), hormones (retinoic acid and estrogen) and nuclear transcriptional factors (c-jun and Mitf) also regulate cathepsin K gene expression.

Cathepsin K is an attractive target for therapeutic intervention to prevent and ameliorate the significant deleterious impact of osteoporosis. In the cartilage, cathepsin K has a potent aggrecan-degrading activity and cathepsin K-generated aggrecan cleavage products specifically potentiate the collagenolytic activity of cathepsin K toward type I and II collagens. The osteoclast is not the only cell type expressing cathepsin K: It was found in epitheloid cells and multinucleated giant cells irrespective of the pathological condition and anatomical location, but not in normal resident macrophages. Cathepsin K seems to differentiate specific phenotypes of macrophages independently of the anatomical site, characterized by an enhanced specific proteolytic capability. The human embryo and early fetus demonstrate a significant expression of cathepsin K in different epithelial cell types besides osteoclasts. In primary prostate cancer and metastase, in situ hybridization and immunohistochemistry revealed variable expression of cat K in primary tumor samples, as well as nonosseous metastases, whereas expression in bone metastases was significantly higher than in primary tumor, and normal prostate tissues were negative. It is hypothesized that prostate cancer-expressed cat K may contribute to the invasive potential of CaP, while increased expression in bone metastases is consistent with a role in matrix degradation. Studies with Breast cancer revealed similar results. Activation of human pulmonary fibroblasts in primary cell cultures led to an increased activity of catK and to increased intracellular collagenolytic activity suggesting that catK plays a pivotal role in lung matrix homeostasis under physiological and pathological conditions. Cathepsin K gene expression was examined in adipose tissue of 21 lean and obese male subjects and significant correlations with BMI ($r = 0.54$, $P = 0.012$) and plasma leptin levels ($r = 0.54$, $P = 0.015$) were found. Cathepsin K can be considered a novel marker of obesity and a target for the inhibition of adipose mass growth.

Note

This product is for research use only.

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