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# ProductInformation

**Anti-Matrix Metalloproteinase-22, Propeptide Region**
Developed in Rabbit
Affinity Isolated Antibody

Product Number **M 3941**

## Product Description

Anti-Matrix Metalloproteinase-22 (MMP-22), Propeptide Region is developed in rabbit using a synthetic peptide corresponding to the propeptide region of chicken matrix metalloproteinase-22 (MMP-22) as immunogen. Affinity isolated antigen specific antibody is obtained from rabbit anti-MMP-22 antiserum by immuno-specific purification which removes essentially all rabbit serum proteins, including immunoglobulins, which do not specifically bind to the peptide.

Anti-Matrix Metalloproteinase-22, Propeptide Region may be used for the detection and localization of matrix metalloproteinase-22. By immunoblotting against the reduced protein, the antibody identifies bands at 70 kDa and 66 kDa. This is larger than the predicted 53 kDa and possibly represents alternative splicing, posttranslational modifications, aggregation, or other phenomenon. The antibody specifically binds to MMP-22 and does not cross react with the other MMP family members (MMP-1, MMP-2, MMP-3, MMP-9, etc.).

The matrix metalloproteinases (MMPs) are a family of at least eighteen secreted and membrane-bound zinc-endopeptidases. Collectively, these enzymes can degrade all the components of the extracellular matrix, including fibrillar and non-fibrillar collagens, fibronectin, laminin and basement membrane glycoproteins. In general, a signal peptide, a propeptide, and a catalytic domain containing the highly conserved zinc-binding site characterizes the structure of the MMPs. In addition, fibronectin-like repeats, a hinge region, and a C-terminal hemopexin-like domain allow categorization of MMPs into the collagenase, gelatinase, stomelysin and membrane-type MMP subfamilies.[1-3] MMPs contain the motif His-Glu-X-X-His (X represents any amino acid) that binds zinc in the catalytic site, as well as another zinc molecule and two calcium molecules structurally. They fall within the matrixin subfamily and are EC designated 3.4.24.x. This group also contains astacin, reprolysin, and serralysin, as well as other more divergent metalloproteinases. All MMPs are synthesized as proenzymes, and most of them are secreted from the cells as proenzymes. Thus, the activation of these proenzymes is a critical step that leads to extracellular matrix breakdown.

MMPs are considered to play an important role in wound healing, apoptosis, bone elongation, embryo development, uterine involution, angiogenesis,[4] and tissue remodeling, and in diseases such as multiple sclerosis,[2, 5] Alzheimer's,[2] malignant gliomas,[2] lupus, arthritis, periodontis, glumerulonephritis, atherosclerosis, tissue ulceration, and in cancer cell invasion and metastasis.[6] Numerous studies have shown that there is a close association between expression of various members of the MMP family by tumors and their proliferative and invasive behavior and metastaic potential.

The tissue inhibitors of metalloproteinases (TIMPs) are naturally occurring proteins that specifically inhibit matrix metalloproteinases and regulate extracellular matrix turnover and tissue remodeling by forming tight-binding inhibitory complexes with the MMPs. Thus, TIMPs maintain the balance between matrix destruction and formation. An imbalance between MMPs and the associated TIMPs may play a significant role in the invasive phenotype of malignant tumors. MMPs and TIMPs can be divided into two groups with respect to gene expression: the majority exhibit inducible expression and a small number are produced constitutively or are expressed at very low levels and are not inducible. Among agents that induce MMP and TIMP production are the inflammatory cytokines TNF-$\alpha$ and IL-1$\beta$. A marked cell type specificity is a hallmark of both MMP and TIMP gene expression (i.e., a limited number of cell types can be induced to make these proteins).

Matrix Metalloproteinase-22 was first cloned from chicken fibroblasts and named CMMP.[7] Sequence comparisons showed that CMMP was a metallo-proteinase, but homology between chicken and human MMPs was too low to assign CMMP as a human ortholog. Later CMMP was given the moniker MMP-22. Chicken MMP-22 compares most closely to human MMP-27, with 59% sequence identity. Chicken MMP-22 encodes a 472 amino acid protein, with a predicted molecular weight of approximately 53 kDa. The signal sequence and lack of a transmembrane domain leads to the assumption that MMP-22 is a secreted MMP.

CMMP digests casein and gelatin and is constitutively expressed in cultured primary chicken embryo fibroblasts. It is up-regulated by TNFα and phorbol ester 12-O-tetradecanoylphorbol-13-acetate, but not regulated by interleukin-1, fibroblast growth factor basic, or retinoic acid.

**Reagent**
Anti-Matrix Metalloproteinase-22, Propeptide Region is supplied in phosphate buffered saline containing 50% glycerol and 0.05% sodium azide. The protein concentration is approximately 1 mg/ml.

**Precautions and Disclaimer**
Due to the sodium azide content a material safety data sheet (MSDS) for this product has been sent to the attention of the safety officer of your institution. Consult the MSDS for information regarding hazards and safe handling practices.

**Storage/Stability**
For continuous use, store at 2-8 °C for up to six months. For extended storage, the solution may be stored –20 °C. Do not store below –22 °C. If slight turbidity occurs upon prolonged storage, clarify the solution by centrifugation before use.

**Product Profile**
A minimum working antibody dilution of 1:1,000 is determined by immunoblotting a tissue cell lysate with an alkaline phosphatase conjugated secondary antibody and BCIP/NBT as the substrate. A starting dilution of 1:5,000 of anti-MMP-22 is recommended for chemiluminescent substrates.

Note: Higher antibody dilutions may be necessary for non-human samples.

In order to obtain the best results and assay sensitivity in various techniques and preparations we recommend determining optimum working dilutions by titration.

**References**

1. Borkakoti, N., Matrix metalloproteases: variations on a theme. Prog. Biophy. Mol. Biol., **70**, 73-94 (1998).
2. Yong, V.W., et al., Matrix metalloproteinases and diseases of the CNS. Trends in Neuroscience, **21**, 75-80 (1998).
3. Kähäri, V.M., and Saarialho-Kere, U., Matrix metalloproteinases in skin. Exp. Dermatol., **6**, 199-213 (1997).
4. Halpert, I., et al., Matrilysin is expressed by lipid-laden macrophages at sites of potential rupture in atherosclerotic lesions and localizes to areas of versican deposition, a proteoglycan substrate for the enzyme. Proc. Natl. Acad. Sci. USA, **93**, 9748-9753 (1996).
5. Chandler, S., et al., Matrix metalloproteinases, tumor necrosis factor and multiple sclerosis: an overview. J. Neuroimmunol., **72**, 155-161 (1997).
6. Birkedal-Hansen, H., et al., Matrix metallo-proteinases: a review. Crit. Rev. Oral. Biol. Med., **4**, 197-250 (1993).
7. Yang, M., and Kurkinen, M., Cloning and characterization of a novel matrix metalloproteinase (MMP), CMMP, from chicken embryo fibroblasts. CMMP, *Xenopus* XMMP, and human MMP19 have a conserved unique cysteine in the catalytic domain. J. Biol. Chem., **273**, 17893-17900 (1998).


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