3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone 800-325-5832 • (314) 771-5765
Fax (314) 286-7828
email: techserv@sial.com
sigma-aldrich.com

ProductInformation

ANTI-MATRIX METALLOPROTEINASE-13 (MMP-13), HINGE REGION
Developed in Rabbit, Affinity Isolated Antibody

Product Number **M 4052**

Product Description

Anti-Matrix Meltalloproteinase-13 (MMP-13) is developed in rabbit using a synthetic peptide corresponding to the hinge region of human MMP-13 (collagenase-3) as immunogen. Affinity isolated antigen specific antibody is obtained from rabbit anti-MMP-13 by immuno-specific purification which removes essentially all rabbit serum proteins, including immunoglobulins, which do not specifically bind to the peptide.

Rabbit Anti-MMP-13, Hinge Region specifically binds to collagenase-3 and does not cross-react with other MMP family members (MMP-1, MMP-2, MMP-3, MMP-9, etc). The antibody recognizes the latent proenzyme (60 kDa), the active form (48 kDa) and intermediate activation forms. By immunoblotting against the reduced protein, the antibody reacts with a band at 60 kDa. It also reacts with non-reduced MMP-13.

Rabbit Anti-MMP-13 may be used for the detection and localization of MMP-13by various immunochemical techniques such as immunoblotting, immunoprecipitation, immunohistochemistry and ELISA.

The matrix metalloproteinases (MMPs) are a family of at least eighteen secreted and membrane-bound zincendopeptidases. 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, the structure of MMPs is characterized by a single peptide, a propeptide, a catalytic domain containing the highly conserved zinc-binding site. 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.[1,2,3] MMPs contain the motif His-Glu-Xaa-His 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 TNFα and IL-1β. 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-13 (MMP-13) is also known as collagenase-3. MMP-13 degrades fibrillar collagens types I, II, III, type IV, IX, X, XI collagens, gelatin, fibronectin, laminin, tenascin, aggrecan and serpins. All

collagenases cleave fibrillar collagens at one specific site resulting in generation of N-terminal ¾ and C-terminal ¼ fragments, which then denature to gelatin at body temperature. The substrate specificity of collagenases is variable: MMP-1 degrades type III collagen more efficiently than type I or type II collagen, whereas MMP-8 is more potent in degrading type I collagen than type III or type II collagen.[7,8] MMP-13, in turn degrades type II collagen 6-fold more efficiently than type I and type II collagens and displays almost 50-fold stronger gelatinolytic activity than MMP-1 and MMP-8.[9,10] MMP-13 was first identified in tumor cells, but has since been found in synoviocytes and normal fibroblasts stimulated by IL-6 or a combination of TNF-α and IL-1. In rodents MMP-13 is thought to fill the role of MMP-1, which they appear to lack. Human tissue may express both MMP-1 and MMP-13. The human MMP-13 gene has the chromosomal location of 11q22.2-22.3.

Reagents
Rabbit Anti-MMP-13, Hinge Region is supplied in 0.01 M phosphate buffered saline, pH 7.4, containing 50% glycerol and 15 mM sodium azide as preservative. 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 0° to –20 °C. The antibody is supplied with 50% glycerol to prevent freezing. If slight turbidity occurs upon pro-longed storage, clarify the solution by centrifugation before use.

Product Profile
A working dilution of 1:1,000 is determined by immunoblotting using a conditioned media from human neutrophils. (Substrate: BCIP/NBT).

Note: Collagenase levels in quiescent cells and tissues are minimal, and stimulation of protein concentration is often needed to visualize the bands. In addition, cell types differ greatly in the quantity of collagenase produced.

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

References

1. Borkakoti, N., Prog. Biophy. Mol. Biol., 70, 73 (1998).
2. Yong, V.W., et al., Trends in Neuroscience, 21, 75 (1998).
3. Kähäri, V.-M., and Saarialho-Kere, U., Exp. Dermatol., 6, 199 (1997).
4. Halbert, I., et al., Proc. Natl. Acad. Sci., USA, 93, 9748 (1996).
5. Chandler, S., et al., J. Neuroimmunol., 72, 155 (1997).
6. Birkedal-Hansen, H., et al., Crit. Rev. Oral. Biol. Med., 4, 197 (1993).
7. Hasty, K.A., et al., J. Exp. Med., 159, 1455 (1984).
8. Mallya, S.K., et al., Biochemistry, 29, 10628 (1990).
9. Knäuper, V., et al., J Biol. Chem., 271, 1544 (1996).
10. Mitchell, P.G., et al., J. Clin. Invest., 97, 761 (1996).

Pcs5/99