

Cell-surface protein and extracellular matrix metalloproteinases (E.C. 3.4.24.-)

Overview: Matrix metalloproteinases (MMP) are calcium- and zinc-dependent proteinases regulating the extracellular matrix and are often divided (e.g. Verma and Hansch, 2007) on functional and structural bases into gelatinases, collagenases, stromelysins and matrilysins, as well as membrane-type MMP.

Nomenclature	EC number	Other names	Ensembl ID	Selective inhibitors
MMP1	3.4.24.7	Collagenase-1, interstitial collagenase, fibroblast collagenase	ENSG00000196611	
MMP2	3.4.24.24	Gelatinase-A, 72 kDa type IV collagenase precursor, TBE- 1	ENSG00000087245	ARP100 (Tuccinardi <i>et al.</i> , 2006)
MMP3	3.4.24.17	Stromelysin-1, transin-1	ENSG00000149968	
MMP7	3.4.24.23	Matrilysin, PUMP-1 protease, uterine metalloproteinase, matrin	ENSG00000137673	
MMP8	3.4.24.34	Neutrophil collagenase, PMNL collagenase	ENSG00000118113	
MMP9	3.4.24.35	Gelatinases-B, 92 kDa type IV collagenase, GELB	ENSG00000100985	
MMP10	3.4.24.22	Stromelysin-2, transin-2	ENSG00000166670	
MMP11		Stromelysin-3	ENSG00000099953	
MMP12	3.4.24.65	Macrophage metalloelastase, macrophage elastase, HME	ENSG00000110347	
MMP13		Collagenase-3	ENSG00000137745	CL82198, WAY170523 (Chen <i>et al.</i> , 2000)
MMP14	3.4.24.80	MT1-MMP, MMP- X1	ENSG00000157227	
MMP15		MT2-MMP, SMCP- 2	ENSG00000102996	
MMP16		MT3-MMP, MMP- X2	ENSG00000156103	
MMP17		MT4-MMP	ENSG00000198598	
MMP19		Matrix metalloproteinase RASI, MMP18	ENSG00000123342	
MMP20		Enamelysin, enamel metalloproteinase	ENSG00000137674	
MMP21		–	ENSG00000154485	
MMP23		Matrix metalloproteinase 21, MMP-21, matrix metalloproteinase 22, MMP-22, Femalysin, MIFR-1	ENSG00000189409	
MMP24		MT5-MMP	ENSG00000125966	
MMP25		MT6-MMP, leukolysin	ENSG00000008516	
MMP26		Matrilysin-2, endometase	ENSG00000167346	
MMP27		–	ENSG00000137675	
MMP28		Epilysin	ENSG00000129270	

A number of small molecule ‘broad spectrum’ inhibitors of MMP have been described, including marimastat and batimastat.

Tissue inhibitors of metalloproteinase (TIMP) proteins are endogenous inhibitors acting to chelate MMP proteins.

Nomenclature	Other names	Ensembl ID
TIMP1	Tissue inhibitor of metalloproteinases 1, metalloproteinase inhibitor 1, erythroid-potentiating activity, EPA, fibroblast collagenase inhibitor, collagenase inhibitor	ENSG00000102265
TIMP2	CSC-21K	ENSG00000035862
TIMP3	Tissue inhibitor of metalloproteinases 3, metalloproteinase inhibitor 3 Precursor , MIG-5	ENSG00000100234
TIMP4	Tissue inhibitor of metalloproteinases 4, metalloproteinase inhibitor 4	ENSG00000157150

ADAM (A Disintegrin And Metalloproteinase domain containing proteins) and ADAMTS (with thrombospondin motifs) metalloproteinases cleave cell-surface or transmembrane proteins to generate soluble and membrane-limited products.

Nomenclature	EC number	Other names	Ensembl ID
ADAM2		Fertilin subunit β , PH30 β , cancer/testis antigen 15, CT15	ENSG00000104755
ADAM3		ADAM3A, cyritestin 1, CYRN1, tMDCI	ENSG00000197475
ADAM5		Transmembrane metalloproteinase-like, disintegrin-like, and cysteine-rich protein II, tMDC II	ENSG00000196115
ADAM6		C14orf96, tMDCIV	ENSG00000233988
ADAM7		Sperm maturation-related glycoprotein GP-83	ENSG00000069206
ADAM8		Cell surface antigen MS2, CD156a antigen	ENSG00000151651
ADAM9		Metalloprotease/disintegrin/cysteine-rich protein 9, myeloma cell metalloproteinase, meltrin γ , cellular disintegrin-related protein	ENSG00000168615
ADAM10	3.4.24.81	Mammalian disintegrin-metalloprotease, Kuzbanian protein homolog, CDw156, CD156c antigen	ENSG00000137845
ADAM11		Metalloproteinase-like, disintegrin-like, and cysteine-rich protein, MDC	ENSG00000073670
ADAM12		Meltrin α	ENSG00000148848
ADAM15		Metalloproteinase-like, disintegrin-like, and cysteine-rich protein 15, MDC-15, Metalloprotease RGD disintegrin protein, metargidin	ENSG00000143537
ADAM17	3.4.24.86	TNF α -converting enzyme, TNF α convertase, snake venom-like protease, CD156b antigen	ENSG00000151694
ADAM18		Transmembrane metalloproteinase-like, disintegrin-like, and cysteine-rich protein III, tMDC III, ADAM27	ENSG00000168619
ADAM19		Meltrin β , metalloprotease and disintegrin dendritic antigen marker, MADDAM	ENSG00000135074
ADAM20		–	ENSG00000134007
ADAM21		ADAM21P, ADAM31	ENSG00000139985
ADAM22		Metalloproteinase-like, disintegrin-like, and cysteine-rich protein 2, metalloproteinase-disintegrin ADAM22-3	ENSG00000008277
ADAM23		Metalloproteinase-like, disintegrin-like, and cysteine-rich protein 3, MDC-3	ENSG00000114948
ADAM28		Metalloproteinase-like, disintegrin-like, and cysteine-rich protein L, MDC-L, epididymal metalloproteinase-like, disintegrin-like, and cysteine-rich protein II, eMDC II	ENSG00000042980
ADAM29		Cancer/testis antigen 73, CT73	ENSG00000168594
ADAM30		–	ENSG00000134249
ADAM32		–	ENSG00000197140
ADAM33		–	ENSG00000149451

Additional family members include AC123767.2 (cDNA FLJ58962, moderately similar to mouse ADAM3, ENSG00000231168), AL160191.3 (ADAM21-like protein, ENSG00000235812), AC136428.3-2 (ENSG00000185520) and ADAMDEC1 (decysin 1, ENSG00000134028).

ADAMTS family

Nomenclature	EC number	Other names	Ensembl ID
ADAMTS1		METH-1	ENSG00000154734
ADAMTS2	3.4.24.14	Procollagen I/II amino propeptide-processing enzyme, procollagen I N-proteinase, PC I-NP, procollagen N-endopeptidase, pNPI	ENSG00000087116
ADAMTS3		Procollagen II amino propeptide-processing enzyme, procollagen II N-proteinase, PC II-NP	ENSG00000156140
ADAMTS4	3.4.24.82	Aggrecanase-1, ADMP-1	ENSG00000158859
ADAMTS5		Aggrecanase-2, ADMP-2, ADAMTS11	ENSG00000154736
ADAMTS6		–	ENSG00000049192
ADAMTS7		COMPase	ENSG00000136378
ADAMTS8		METH-2, METH-8	ENSG00000134917
ADAMTS9		–	ENSG00000163638
ADAMTS10		–	ENSG00000142303
ADAMTS12		–	ENSG00000151388
ADAMTS13		von Willebrand factor-cleaving protease, vWF-CP	ENSG00000160323
ADAMTS14		–	ENSG00000138316
ADAMTS15		–	ENSG00000166106
ADAMTS16		–	ENSG00000145536
ADAMTS17		–	ENSG00000140470
ADAMTS18		ADAMTS21	ENSG00000140873
ADAMTS19		–	ENSG00000145808
ADAMTS20		–	ENSG00000173157
PAPLN		Papilin	ENSG00000100767

Loss-of-function mutations of autoimmune antibodies are associated with thrombotic thrombocytopenic purpura

Other family members include AC104758.12-5 (FLJ00317 protein Fragment ENSG00000231463), AC139425.3-1 (ENSG00000225577), and AC126339.6-1 (ENSG00000225734).

Abbreviations: ARP100, 2-([1,1'-biphenyl]-4-ylsulfonyl)-[1-methylethoxy]amino)-N-hydroxyacetamide, CL82189, N-(4-[4-morpholinyl]butyl)-2-benzofurancarboxamide hydrochloride; WAY170523, N-(2-[4-([2-((hydroxyamino)carbonyl)-4,6-dimethylphenyl) (phenylmethyl) amino]sulfonyl) phenoxy]ethyl)-2-benzofurancarboxamide

Further Reading

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