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MAp44

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MAp44 is a ~44 kDa alternate splice product of *MASP1* and is mainly expressed in the heart. Mannose/mannan binding lectin (MBL) associated serine proteases, MASP-1 and MASP-3 are other products of *MASP1*. Similar to MASP-1 (isoform 1 of *MASP1*, which represents the longest transcript), MAp44 has a C1r/C1s/Uegf/bmp1 (CUB) domain, calcium-binding EGF-like domain and complement control protein (CCP) domains. However, it lacks the serine protease domain of MASP-1 and therefore cannot perform MASP-1's functions. MAp44 binds to multimeric pathogen receptors such as MBL and the three ficolins, and is believed to play a regulatory role in the lectin pathway of complement activation.

KEYWORDS
Mannan-binding lectin serine peptidase 1 (C4/C2 activating component of Ra-reactive factor); Mannose-binding lectin-associated protein of 44 kDa; Mannose-binding lectin-associated serine protease 1; Mannose-binding protein-associated serine protease; MAP-1; MAP1; Map44; MAp44; MASP; MASP1

IDENTIFIERS
Molecule Page ID:A008392, Species:Human, NCBI Gene ID: 5648, Protein Accession:NP_001027019.1, Gene Symbol:MASP1

PROTEIN FUNCTION
MASP-1 (*MASP1* Isoform 1), MASP-3 (*MASP1* Isoform 2) and MAp44 (*MASP1* Isoform 3) are splice products of *MASP1* (Degn *et al*. 2009). MAp44 is also known as MAP-1. Similar to MASP-1, MAp44 circulates in the serum in complex with mannose/mannan-binidng lectin (MBL), L-ficolin or H-ficolin. However, unlike MASP-1 and MASP-3, MAp44 lacks serine protease domain (Skjoedt *et al*. 2010, Skjoedt *et al*. 2011, Skjoedt *et al*. 2012). The only known function of MAp44 is to down-regulate C4 activation by competing with MASP-1 and MASP-2 to bind to pattern recognition molecules such as MBL and ficolins. This further affects downstream complement pathway activation. MAp44 can also disrupt MASP-1-MASP-2 heterodimer and thereby down-regulate complement pathway (Degn *et al*. 2013).

REGULATION OF ACTIVITY
null

INTERACTIONS
MAp44, like other MASP proteins forms a head-to-tail homodimer (Skjoedt *et al*. 2012). The homodimer interacts with MBL, L-ficolin and H-ficolin, with H-ficolin being its preferred partner (Degn *et al*. 2009, Skjoedt *et al*. 2010, Skjoedt *et al*. 2011). MAp44 also interacts with the recently discovered novel collectin, CL-11 (CL-K1) (Ma *et al*. 2013).

The experimental methods used to characterize these interactions are documented in CMAP, a complement map database (Yang *et al*. 2013).

PHENOTYPES
No SNPs or disease associations have been documented so far.

MAJOR SITES OF EXPRESSION
MAp44 is mainly expressed in the myocardial fibers followed by the skeletal muscle, unlike other MASP proteins (MASP-1, MASP-2 and MASP-3), which are mainly expressed in the liver (Degn *et al*. 2009, Skjoedt *et al*. 2010).

SPLICE VARIANTS
MAp44 transcript (*MASP1* isoform 3) is an alternative splice variant of *MASP1* (Degn *et al*. 2009). *MASP1* also encodes for two more proteins, MASP-1 (*MASP1* isoform 1) and MASP-3 (*MASP1* isoform 2) (Dahl *et al*. 2001). *MASP1* encodes for six domains: two C1r/C1s/Uegf/bone morphogenetic protein 1 (CUB), an epidermal growth factor (EGF)-like, two complement control proteins (CCPs) and a serine protease domain. The first five domains (encoded by exons 1-11) together form the heavy (or 'A') chain, while the serine protease domain forms the light (or 'B') chain (encoded by exons 12-18) (Fujita *et al*. 2002). MAp44 is formed by alternative splicing at the ninth exon of *MASP1*. Thus, MAp44 has two CUB domains, EGF, one CCP domain, a unique C-terminal domain of 17 a.a (encoded by exon 9) and importantly lacks the serine protease domain (Degn *et al*. 2009, Skjoedt *et al*. 2010). Please refer to MASP-1 and MASP-3 Molecule Pages at www.signalinggateway.org for more information.

REGULATION OF CONCENTRATION
MAp44 is found in human serum at 0.24 µg/ml (Skjoedt et al. 2011) or 1.4 µg/ml in Ca^{2+}-dependent complexes with MBL and ficolins (Degn *et al*. 2009).

ANTIBODIES
Commercial antibody specific to MAp44 is available from Hycult Biotech.

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Table 1: Functional States

STATE DESCRIPTION	LOCATION	REFERENCES
MAp44	extracellular space	
2(MAp44)	extracellular space	Skjoedt MO *et al.* 2012
2(MAp44) - glycosylated	extracellular space	Skjoedt MO *et al.* 2011
2(MAp44)/MBL	extracellular space	Skjoedt MO *et al.* 2011; Skjoedt MO *et al.* 2010; Skjoedt MO *et al.* 2012
2(MAp44)/L-FCN	extracellular space	Degn SE *et al.* 2009; Skjoedt MO *et al.* 2011; Skjoedt MO *et al.* 2010
2(MAp44)/H-FCN	extracellular space	Degn SE *et al.* 2009; Skjoedt MO *et al.* 2011; Skjoedt MO *et al.* 2010
2(MAp44)/CL-K1	extracellular space	Ma YJ *et al.*

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SUPPLEMENTARY

Supplementary information is available online.

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This molecule exists in 7 states , has 6 transitions between these states and has 0 enzyme functions.(Please zoom in the pdf file to view details.)