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SAMHD1 Antibody

Catalog # ASC12061

Product Information

Application	WB, IHC, IF, E
Primary Accession	Q9Y3Z3
Other Accession	38016914, NP_056289, 25939
Reactivity	Human, Mouse
Host	Rabbit
Clonality	Polyclonal
Isotype	IgG
Calculated MW	72201
Application Notes	SAMHD1 antibody can be used for detection of SAMHD1 by Western blot at 1 - 2 μg/ml. Antibody can also be used for Immunohistochemistry starting at 5 μg/mL. For immunofluorescence start at 20 μg/mL.

Additional Information

Gene ID	25939
Other Names	SAM domain and HD domain 1, DCIP, CHBL2, HDDC1, MOP-5, SBBI88
Precautions	SAMHD1 Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	SAMHD1 (HGNC:15925)
Function	Protein that acts both as a host restriction factor involved in defense response to virus and as a regulator of DNA end resection at stalled replication forks (PubMed:19525956, PubMed:21613998, PubMed:21720370, PubMed:22056990, PubMed:23601106, PubMed:23602554, PubMed:24336198, PubMed:26294762, PubMed:26431200, PubMed:28229507, PubMed:28834754, PubMed:29670289). Has deoxynucleoside triphosphate (dNTPase) activity, which is required to restrict infection by viruses, such as HIV-1: dNTPase activity reduces cellular dNTP levels to levels too low for retroviral reverse transcription to occur, blocking early- stage virus replication in dendritic and other myeloid cells (PubMed:19525956, PubMed:21613998, PubMed:21720370, PubMed:22056990, PubMed:23364794, PubMed:23601106, PubMed:23602554, PubMed:24336198, PubMed:25038827, PubMed:26101257, PubMed:26294762, PubMed:26431200, PubMed:28229507). Likewise, suppresses LINE-1 retrotransposon activity (PubMed:24035396, PubMed:24217394, PubMed:29610582). Not able to restrict infection by HIV-2 virus; because restriction activity is counteracted by HIV-2 viral protein Vpx (PubMed:21613998, PubMed:21720370). In addition to virus restriction, dNTPase activity acts as a regulator of DNA precursor pools

	by regulating dNTP pools (PubMed:23858451). Phosphorylation at Thr-592 acts as a switch to control dNTPase-dependent and -independent functions: it inhibits dNTPase activity and ability to restrict infection by viruses, while it promotes DNA end resection at stalled replication forks (PubMed:23601106, PubMed:23602554, PubMed:29610582, PubMed:29670289). Functions during S phase at stalled DNA replication forks to promote the resection of gapped or reversed forks: acts by stimulating the exonuclease activity of MRE11, activating the ATR-CHK1 pathway and allowing the forks to restart replication (PubMed:29670289). Its ability to promote degradation of nascent DNA at stalled replication forks is required to prevent induction of type I interferons, thereby preventing chronic inflammation (PubMed:27477283, PubMed:29670289). Ability to promote DNA end resection at stalled replication forks is independent of dNTPase activity (PubMed:29670289). Enhances immunoglobulin hypermutation in B-lymphocytes by promoting transversion mutation (By similarity).
Cellular Location	Nucleus. Chromosome Note=Localizes to sites of DNA double-strand breaks in response to DNA damage.
Tissue Location	Expressed in heart, skeletal muscle, spleen, liver, small intestine, placenta, lung and peripheral blood leukocytes (PubMed:11064105). No expression is seen in brain and thymus (PubMed:11064105).

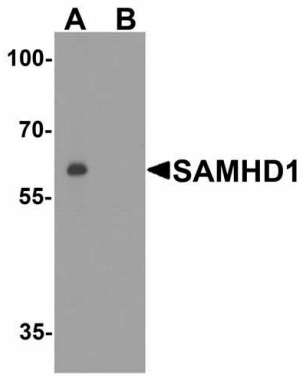
Background

The SAM domain and HD domain 1 (SAMHD1) protein is upregulated in response to viral infection and is thought to play a role in innate immunity (1). SAMHD1 blocks the infection of HIV-1 and SIVdeltaVpx before reverse transcription in macrophages and dendritic cells (2), and this restriction is regulated by phosphorylation of SAMHD1 (3). Mutations in this gene have been associated with Aicardi-Goutieres syndrome (1).

References

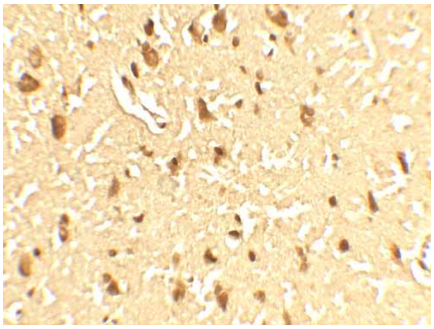
Rice GI, Bond J, Asipu A, et al. Mutations involved in Aicardi-Goutieres syndrome implicate SAMHD1 as regulator of the innate immune system. Nat. Genet. 2009; 41:829-32.;Hrecka K, Hao C, Gierszewska M, et al. Vpx relieves the inhibition of HIV-1 infection of macrophages mediated by the SAMHD1 protein. Nature 2011; 474:654-7.;Welbourn S, Dutta SM, Semmes OJ, et al. Restriction of virus infection but not catalytic dNTPase activity is regulated by phosphorylation of SAMHD1. J. Virol. 2013; 87:11516-24.;

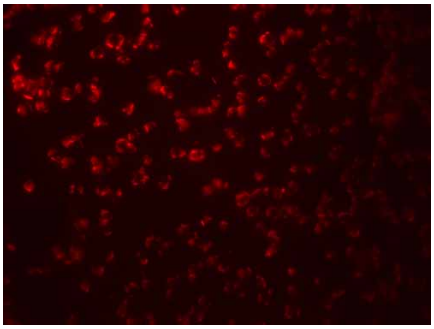
Images



Western blot analysis of SAMHD1 in Daudi cell lysate with SAMHD1 antibody at 1 µg/ml in (A) the absence and (B) the presence of blocking peptide.

Immunohistochemistry of SAMHD1 in human brain tissue with SAMHD1 antibody at 5 µg/ml.





Immunofluorescence of SAMHD1 in Daudi cells with SAMHD1 antibody at 20 µg/ml.

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