Revision 1

Store at -20C

#11903

PSMB5 Antibody

Cell Signaling TECHNOLOGY®

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For Research Use Only. Not for Use in Diagnostic Procedures.

Applications:	Reactivity:	Sensitivity:	MW (kDa):	Source/Isotype:	UniProt ID:	Entrez-Gene Id:
W	H M R Mk	Endogenous	22	Rabbit	#P28074	5693

Product Usage Information

Application	Dilution
Western Blotting	1:1000

Storage

Supplied in 10 mM sodium HEPES (pH 7.5), 150 mM NaCl, 100 µg/ml BSA and 50% glycerol. Store at –20°C. Do not aliquot the antibody.

Specificity/Sensitivity

PSMB5 Antibody recognizes endogenous levels of total PSMB5 protein. Based upon sequence alignment, this antibody is predicted to react with precursor and mature forms of PSMB5. This antibody does not cross-react with PSMB8.

Source / Purification

Polyclonal antibodies are produced by immunizing animals with a synthetic peptide corresponding to residues near the carboxy terminus of human PSMB5 protein. Antibodies are purified by protein A and peptide affinity chromatography.

Background

The 26S proteasome is a highly abundant proteolytic complex involved in the degradation of ubiquitinated substrate proteins. It consists largely of two sub-complexes, the 20S catalytic core particle (CP) and the 19S/PA700 regulatory particle (RP) that can cap either end of the CP. The CP consists of two stacked heteroheptameric β-rings (β_{1-7}) that contain three catalytic β-subunits and are flanked on either side by two heteroheptameric α-rings (α_{1-7}). The RP includes a base and a lid, each having multiple subunits. The base, in part, is composed of a heterohexameric ring of ATPase subunits belonging to the AAA (ATPases Associated with diverse cellular Activities) family. The ATPase subunits function to unfold the substrate and open the gate formed by the α-subunits, thus exposing the unfolded substrate to the catalytic β-subunits. The lid consists of ubiquitin receptors and DUBs that function in recruitment of ubiquitinated substrates and modification of ubiquitin chain topology (1,2). Other modulators of proteasome activity, such as PA28/11S REG, can also bind to the end of the 20S CP and activate it (1,2).
The core particle performs three types of catalytic activities inside its chamber: chymotrypsin-like, trypsin-like, and caspase-like activities, which are provided by the constitutively expressed PSMB5 (β5/MB1/X/LMPX/Macropain epsilon chain), PSMB7 (β2/Z/Macropain chain Z) and PSMB6 (β1/Y/LMPY/Macropain delta chain) subunits, respectively. These catalytic subunits belong to the N-terminal nucleophile (Ntn) hydrolase family and are characterized by an unusual, essentially single-residue active site: The N-terminal threonine of each proteolytic subunit provides both the catalytic nucleophile (on its side chain) and the primary proton acceptor (on the main chain N-terminus). The catalytic β-subunits are synthesized with N-terminal propeptides, which are removed at the final step of proteasome biogenesis by limited proteolysis to expose the catalytic threonine residues (3). In immune responsive cells the constitutively expressed PSMB6, PSMB7, and PSMB5 subunits are replaced by three highly homologous induced β-subunits: PSMB9 (β1i/LMP2/RING12), PSMB10 (β2i/MECL-1/LMP10) and PSMB8 (β5i/LMP7/RING10), respectively, to form the immunoproteasome that has higher chymotrypsin-like and trypsin-like activities known to be favorable for antigen processing (4,5). PSMB5 is downregulated at the protein level by IFN-γ and replaced by PSMB8 in order to remodel the proteolytic specificity of the proteasome for more appropriate immunological processing of endogenous antigens (6-8). PSMB5 is also one of the predominant targets of bortezomib, an inhibitor of the chymotrypsin-like activity of the proteasome (9).

Background References

1. Finley, D. (2009) *Annu Rev Biochem* 78, 477-513.
2. Lee, M.J. et al. (2011) *Mol Cell Proteomics* 10, R110.003871.
3. Murata, S. et al. (2009) *Nat Rev Mol Cell Biol* 10, 104-15.
4. Boes, B. et al. (1994) *J Exp Med* 179, 901-9.
5. Cardozo, C. and Kohanski, R.A. (1998) *J Biol Chem* 273, 16764-70.
6. Akiyama, K. et al. (1994) *Science* 265, 1231-4.
7. Akiyama, K. et al. (1994) *FEBS Lett* 343, 85-8.
8. Gaczynska, M. et al. (1996) *J Biol Chem* 271, 17275-80.
9. Oerlemans, R. et al. (2008) *Blood* 112, 2489-99.

Species Reactivity

Species reactivity is determined by testing in at least one approved application (e.g., western blot).

Western Blot Buffer

IMPORTANT: For western blots, incubate membrane with diluted primary antibody in 5% w/v nonfat dry milk, 1X TBS, 0.1% Tween® 20 at 4°C with gentle shaking, overnight.

Applications Key

W: Western Blotting

Cross-Reactivity Key

H: Human **M:** Mouse **R:** Rat **Mk:** Monkey

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Limited Uses