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PKR Antibody

Catalog # ASC10465

Product Information

Application	WB, E, IHC-P
Primary Accession	P19525
Other Accession	NP_002750, 31747519
Reactivity	Human, Mouse, Rat
Host	Rabbit
Clonality	Polyclonal
Isotype	IgG
Calculated MW	62094
Concentration (mg/ml)	1 mg/mL
Conjugate	Unconjugated
Application Notes	PKR antibody can be used for detection of PKR by Western blot at 1 - 2 g/mL. Antibody can also be used for immunohistochemistry starting at 5 g/mL.

Additional Information

Gene ID	5610
Other Names	PKR Antibody: PKR, PRKR, EIF2AK1, PKR, Interferon-induced, double-stranded RNA-activated protein kinase, Eukaryotic translation initiation factor 2-alpha kinase 2, eIF-2A protein kinase 2, eukaryotic translation initiation factor 2-alpha kinase 2
Target/Specificity	EIF2AK2;
Reconstitution & Storage	PKR antibody can be stored at 4℃ for three months and -20℃, stable for up to one year. As with all antibodies care should be taken to avoid repeated freeze thaw cycles. Antibodies should not be exposed to prolonged high temperatures.
Precautions	PKR Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	EIF2AK2
Synonyms	PKR, PRKR
Function	IFN-induced dsRNA-dependent serine/threonine-protein kinase that phosphorylates the alpha subunit of eukaryotic translation initiation factor 2 (EIF2S1/eIF-2-alpha) and plays a key role in the innate immune response to viral infection (PubMed:18835251, PubMed:19189853, PubMed:19507191, PubMed:21072047, PubMed:21123651, PubMed:22381929, PubMed:22948139, PubMed:23229543). Inhibits viral replication via the

integrated stress response (ISR): EIF2S1/eIF-2- alpha phosphorylation in response to viral infection converts EIF2S1/eIF-2-alpha in a global protein synthesis inhibitor, resulting to a shutdown of cellular and viral protein synthesis, while concomitantly initiating the preferential translation of ISR-specific mRNAs, such as the transcriptional activator ATF4 (PubMed:19189853, PubMed:21123651, PubMed:22948139, PubMed:23229543). Exerts its antiviral activity on a wide range of DNA and RNA viruses including hepatitis C virus (HCV), hepatitis B virus (HBV), measles virus (MV) and herpes simplex virus 1 (HHV-1) (PubMed:11836380, PubMed:19189853, PubMed:19840259, PubMed:20171114, PubMed:21710204, PubMed:23115276, PubMed:23399035). Also involved in the regulation of signal transduction, apoptosis, cell proliferation and differentiation: phosphorylates other substrates including p53/TP53, PPP2R5A, DHX9, ILF3, IRS1 and the HHV-1 viral protein US11 (PubMed:11836380, PubMed:19229320, PubMed:22214662). In addition to serine/threonine- protein kinase activity, also has tyrosine-protein kinase activity and phosphorylates CDK1 at 'Tyr-4' upon DNA damage, facilitating its ubiquitination and proteasomal degradation (PubMed:20395957). Either as an adapter protein and/or via its kinase activity, can regulate various signaling pathways (p38 MAP kinase, NF-kappa-B and insulin signaling pathways) and transcription factors (JUN, STAT1, STAT3, IRF1, ATF3) involved in the expression of genes encoding pro-inflammatory cytokines and IFNs (PubMed:22948139, PubMed:23084476, PubMed:23372823). Activates the NF-kappa-B pathway via interaction with IKBKB and TRAF family of proteins and activates the p38 MAP kinase pathway via interaction with MAP2K6 (PubMed:10848580, PubMed:15121867, PubMed:15229216). Can act as both a positive and negative regulator of the insulin signaling pathway (ISP) (PubMed:20685959). Negatively regulates ISP by inducing the inhibitory phosphorylation of insulin receptor substrate 1 (IRS1) at 'Ser-312' and positively regulates ISP via phosphorylation of PPP2R5A which activates FOXO1, which in turn up-regulates the expression of insulin receptor substrate 2 (IRS2) (PubMed:20685959). Can regulate NLRP3 inflammasome assembly and the activation of NLRP3, NLRP1, AIM2 and NLRC4 inflammasomes (PubMed:22801494). Plays a role in the regulation of the cytoskeleton by binding to gelsolin (GSN), sequestering the protein in an inactive conformation away from actin (By similarity).

Cellular Location

Cytoplasm. Nucleus. Cytoplasm, perinuclear region. Note=Nuclear localization is elevated in acute leukemia, myelodysplastic syndrome (MDS), melanoma, breast, colon, prostate and lung cancer patient samples or cell lines as well as neurocytes from advanced Creutzfeldt- Jakob disease patients.

Tissue Location

Highly expressed in thymus, spleen and bone marrow compared to non-hematopoietic tissues such as small intestine, liver, or kidney tissues. Colocalizes with GSK3B and TAU in the Alzheimer disease (AD) brain. Elevated levels seen in breast and colon carcinomas, and which correlates with tumor progression and invasiveness or risk of progression.

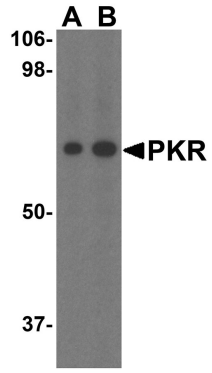
Background

PKR Antibody: The interferon-inducible, double-stranded RNA (dsRNA)-dependent protein kinase PKR is a member of the eukaryotic initiation factor-2 alpha (eIF2-alpha) kinase family, possessing serine-threonine kinase activity and two dsRNA-binding motifs that acts as part of the innate immune system. Upon binding dsRNA, PKR undergoes a conformational change leading to its activation and its phosphorylation of the translation factor eIF2, resulting in a general shutdown of protein synthesis and induction of apoptosis through upregulation of caspase-8 and capsase-9 activity in order to prevent the production of more viruses. To evade the antiviral effects of PKR, viruses have evolved multiple mechanisms, such as the inhibition of PKR by the non-structural protein (NS1) of the influenza virus. More recently, PKR has been implicated in several neurodegenerative diseases including Alzheimer, Huntington, and amyotrophic lateral sclerosis.

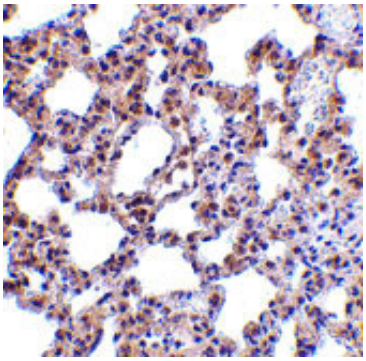
References

Meurs E, Chong K, Galabru J, et al. Molecular cloning and characterization of the human double-stranded RNA-activated protein kinase induced by interferon. Cell 1990; 62:379-90.
Saelens X, Kalai M, and Vandenabeele P. Translation inhibition in apoptosis: Caspase-dependent PKR activation and eIF2-alpha phosphorylation. J. Biol. Chem. 2001; 276:41620-8.
Gil J and Esteban M. Induction of apoptosis by the dsRNA-dependent protein kinase (PKR): Mechanism of action. Apoptosis 2000; 5:107-14.
Gil J, Garcia MA, and Esteban M. Caspase 9 activation by the dsRNA-dependent protein kinase, PKR: Molecular mechanism and relevance. FEBS Lett. 2002; 19:3665-74.

Images



Western blot analysis of PKR in MCF7 cell lysate with PKR antibody at (A) 1 and (B) 2 µg/mL.



Immunohistochemistry of PKR in rat lung tissue with PKR antibody at 5 µg/mL.