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EIF2AK2 Antibody

Purified Mouse Monoclonal Antibody
Catalog # AO1950a

Product Information

Application	WB, IHC, FC, E
Primary Accession	P19525
Reactivity	Human
Host	Mouse
Clonality	Monoclonal
Clone Names	6H3A10
Isotype	IgG1
Calculated MW	62094
Description	The protein encoded by this gene is a serine/threonine protein kinase that is activated by autophosphorylation after binding to dsRNA. The activated form of the encoded protein can phosphorylate translation initiation factor EIF2S1, which in turn inhibits protein synthesis. This protein is also activated by manganese ions and heparin. Three transcript variants encoding two different isoforms have been found for this gene.
Immunogen	Purified recombinant fragment of human EIF2AK2 (AA: 329-551) expressed in E. Coli.
Formulation	Purified antibody in PBS with 0.05% sodium azide.

Additional Information

Gene ID	5610
Other Names	Interferon-induced, double-stranded RNA-activated protein kinase, 2.7.11.1, Eukaryotic translation initiation factor 2-alpha kinase 2, eIF-2A protein kinase 2, Interferon-inducible RNA-dependent protein kinase, P1/eIF-2A protein kinase, Protein kinase RNA-activated, PKR, Protein kinase R, Tyrosine-protein kinase EIF2AK2, 2.7.10.2, p68 kinase, EIF2AK2, PKR, PRKR
Dilution	WB~~1/500 - 1/2000 IHC~~1/200 - 1/1000 FC~~1/200 - 1/400 E~~1/10000
Storage	Maintain refrigerated at 2-8°C for up to 6 months. For long term storage store at -20°C in small aliquots to prevent freeze-thaw cycles.
Precautions	EIF2AK2 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

The protein encoded by this gene belongs to the cyclic nucleotide phosphodiesterase (PDE) family, and PDE1 subfamily. Members of the PDE1 family are calmodulin-dependent PDEs that are stimulated by a calcium-calmodulin complex. This PDE has dual-specificity for the second messengers, cAMP and cGMP, with a preference for cGMP as a substrate. cAMP and cGMP function as key regulators of many important physiological processes. Alternatively spliced transcript variants encoding different isoforms have been described for this gene. ; ;

References

1. J Alzheimers Dis. 2010;21(4):1217-31.2. Mol Cells. 2011 Aug;32(2):167-72.

Images

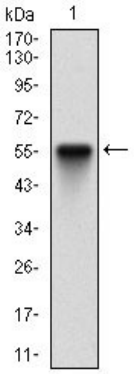


Figure 1: Western blot analysis using EIF2AK2 mAb against human EIF2AK2 (AA: 329-551) recombinant protein. (Expected MW is 51.7 kDa)

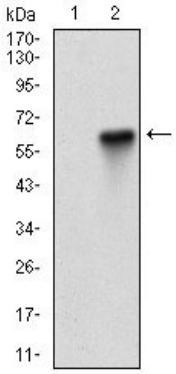


Figure 2: Western blot analysis using EIF2AK2 mAb against HEK293 (1) and EIF2AK2 (AA: 329-551)-hIgGFc transfected HEK293 (2) cell lysate.

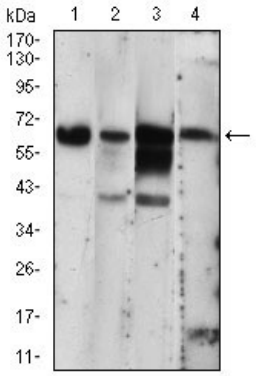
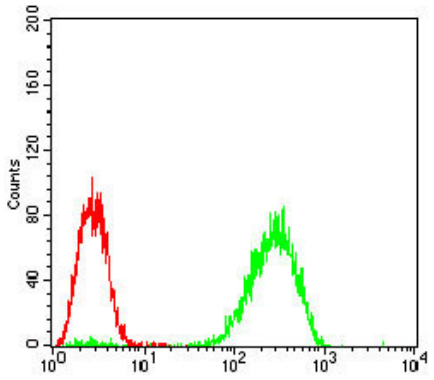


Figure 3: Western blot analysis using EIF2AK2 mouse mAb against A431 (1), THP-1 (2), MCF-7 (3), PC-12 (4) cell lysate.

Figure 4: Flow cytometric analysis of A431 cells using EIF2AK2 mouse mAb (green) and negative control (red).



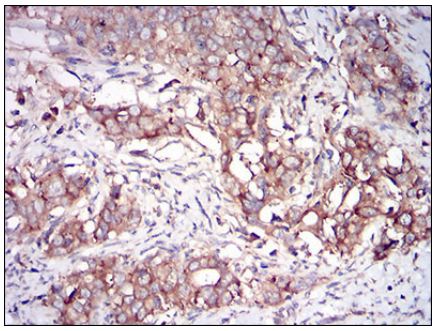


Figure 5: Immunohistochemical analysis of paraffin-embedded cervical cancer tissues using EIF2AK2 mouse mAb with DAB staining.

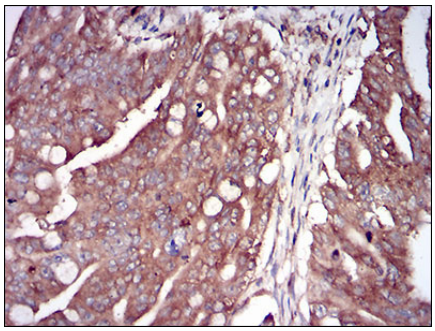


Figure 6: Immunohistochemical analysis of paraffin-embedded rectum cancer tissues using EIF2AK2 mouse mAb with DAB staining.