

PRKAA1 Antibody
Affinity Purified Rabbit Polyclonal Antibody (Pab)
Catalog # AP7260c

Specification

PRKAA1 Antibody - Product Information

Application	WB, IHC-P, FC,E
Primary Accession	O13131
Reactivity	Human
Host	Rabbit
Clonality	Polyclonal
Isotype	Rabbit IgG

PRKAA1 Antibody - Additional Information

Gene ID 5562

Other Names

5'-AMP-activated protein kinase catalytic subunit alpha-1, AMPK subunit alpha-1, Acetyl-CoA carboxylase kinase, ACACA kinase, Hydroxymethylglutaryl-CoA reductase kinase, HMGCR kinase, Tau-protein kinase PRKAA1, PRKAA1, AMPK1

Target/Specificity

This PRKAA1 antibody is generated from rabbits immunized with a recombinant protein from human PRKAA1.

Dilution

WB~~1:1000
IHC-P~~1:50~100
FC~~1:10~50

Format

Purified polyclonal antibody supplied in PBS with 0.09% (W/V) sodium azide. This antibody is purified through a protein A column, followed by peptide affinity purification.

Storage

Maintain refrigerated at 2-8°C for up to 2 weeks. For long term storage store at -20°C in small aliquots to prevent freeze-thaw cycles.

Precautions

PRKAA1 Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

PRKAA1 Antibody - Protein Information

Name PRKAA1 ([HGNC:9376](#))

Synonyms AMPK1

Function Catalytic subunit of AMP-activated protein kinase (AMPK), an energy sensor protein kinase that plays a key role in regulating cellular energy metabolism (PubMed:[17307971](#), PubMed:[17712357](#), PubMed:[24563466](#), PubMed:[37821951](#)). In response to reduction of intracellular ATP levels, AMPK activates energy-producing pathways and inhibits energy-consuming processes: inhibits protein, carbohydrate and lipid biosynthesis, as well as cell growth and proliferation (PubMed:[17307971](#), PubMed:[17712357](#)). AMPK acts via direct phosphorylation of metabolic enzymes, and by longer-term effects via phosphorylation of transcription regulators (PubMed:[17307971](#), PubMed:[17712357](#)). Regulates lipid synthesis by phosphorylating and inactivating lipid metabolic enzymes such as ACACA, ACACB, GYS1, HMGCR and LIPE; regulates fatty acid and cholesterol synthesis by phosphorylating acetyl-CoA carboxylase (ACACA and ACACB) and hormone-sensitive lipase (LIPE) enzymes, respectively (By similarity). Promotes lipolysis of lipid droplets by mediating phosphorylation of isoform 1 of CHKA (CHKalpha2) (PubMed:[34077757](#)). Regulates insulin-signaling and glycolysis by phosphorylating IRS1, PFKFB2 and PFKFB3 (By similarity). AMPK stimulates glucose uptake in muscle by increasing the translocation of the glucose transporter SLC2A4/GLUT4 to the plasma membrane, possibly by mediating phosphorylation of TBC1D4/AS160 (By similarity). Regulates transcription and chromatin structure by phosphorylating transcription regulators involved in energy metabolism such as CRTC2/TORC2, FOXO3, histone H2B, HDAC5, MEF2C, MLXIPL/ChREBP, EP300, HNF4A, p53/TP53, SREBF1, SREBF2 and PPARGC1A (PubMed:[11518699](#), PubMed:[11554766](#), PubMed:[15866171](#), PubMed:[17711846](#), PubMed:[18184930](#)). Acts as a key regulator of glucose homeostasis in liver by phosphorylating CRTC2/TORC2, leading to CRTC2/TORC2 sequestration in the cytoplasm (By similarity). In response to stress, phosphorylates 'Ser-36' of histone H2B (H2BS36ph), leading to promote transcription (By similarity). Acts as a key regulator of cell growth and proliferation by phosphorylating FNIP1, TSC2, RPTOR, WDR24 and ATG1/ULK1: in response to nutrient limitation, negatively regulates the mTORC1 complex by phosphorylating RPTOR component of the mTORC1 complex and by phosphorylating and activating TSC2 (PubMed:[14651849](#), PubMed:[18439900](#), PubMed:[20160076](#), PubMed:[21205641](#)). Also phosphorylates and inhibits GATOR2 subunit WDR24 in response to nutrient limitation, leading to suppress glucose-mediated mTORC1 activation (PubMed:[36732624](#)). In response to energetic stress, phosphorylates FNIP1, inactivating the non-canonical mTORC1 signaling, thereby promoting nuclear translocation of TFEB and TFE3, and inducing transcription of lysosomal or autophagy genes (PubMed:[37079666](#)). In response to nutrient limitation, promotes autophagy by phosphorylating and activating ATG1/ULK1 (PubMed:[21205641](#)). In that process also activates WDR45/WIPI4 (PubMed:[28561066](#)). Phosphorylates CASP6, thereby preventing its autoprocessing and subsequent activation (PubMed:[32029622](#)). In response to nutrient limitation, phosphorylates transcription factor FOXO3 promoting FOXO3 mitochondrial import (By similarity). Also acts as a regulator of cellular polarity by remodeling the actin cytoskeleton; probably by indirectly activating myosin (PubMed:[17486097](#)). AMPK also acts as a regulator of circadian rhythm by mediating phosphorylation of CRY1, leading to destabilize it (By similarity). May regulate the Wnt signaling pathway by phosphorylating CTNNB1, leading to stabilize it (By similarity). Also has tau-protein kinase activity: in response to amyloid beta A4 protein (APP) exposure, activated by CAMKK2, leading to phosphorylation of MAPT/TAU; however the relevance of such data remains unclear in vivo (By similarity). Also phosphorylates CFTR, EEF2K, KLC1, NOS3 and SLC12A1 (PubMed:[12519745](#), PubMed:[20074060](#)). Regulates hepatic lipogenesis. Activated via SIRT3, represses sterol regulatory element-binding protein (SREBP) transcriptional activities and ATP-consuming lipogenesis to restore cellular energy balance. Upon stress, regulates mitochondrial fragmentation through phosphorylation of MTFR1L (PubMed:[36367943](#)).

Cellular Location

Cytoplasm. Nucleus Note=In response to stress, recruited by p53/TP53 to specific promoters.

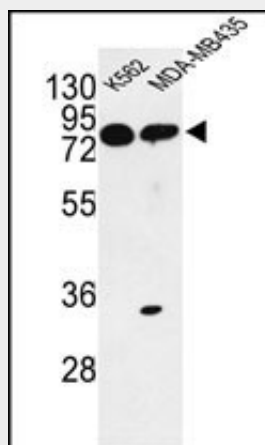
PRKAA1 Antibody - Protocols

Provided below are standard protocols that you may find useful for product applications.

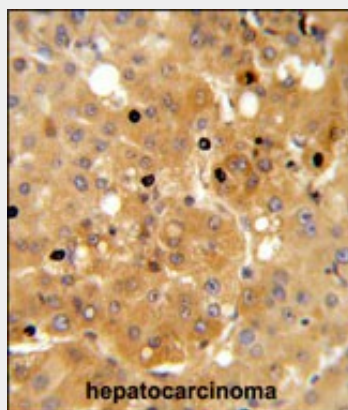
- [Western Blot](#)

- [Blocking Peptides](#)
- [Dot Blot](#)
- [Immunohistochemistry](#)
- [Immunofluorescence](#)
- [Immunoprecipitation](#)
- [Flow Cytometry](#)
- [Cell Culture](#)

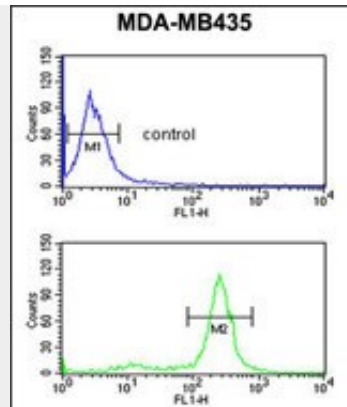
PRKAA1 Antibody - Images



Western blot analysis of PRKAA1 Antibody (Cat. #AP7260c) in K562, MDA-MB435 cell line lysates (35ug/lane). PRKAA1 (arrow) was detected using the purified Pab.



PRKAA1 Antibody (Cat. #AP7260c) IHC analysis in formalin fixed and paraffin embedded human hepatocarcinoma followed by peroxidase conjugation of the secondary antibody and DAB staining. This data demonstrates the use of the PRKAA1 Antibody for immunohistochemistry. Clinical relevance has not been evaluated.



PRKAA1 Antibody (Cat. #AP7260c) flow cytometric analysis of MDA-MB435 cells (bottom histogram) compared to a negative control cell (top histogram). FITC-conjugated goat-anti-rabbit secondary antibodies were used for the analysis.

PRKAA1 Antibody - Background

PRKAA1 is a protein belongs to the ser/thr protein kinase family. It is the catalytic subunit of the 5'-prime-AMP-activated protein kinase. PRKAA1 is a cellular energy sensor conserved in all eukaryotic cells. The kinase activity of PRKAA1 is activated by the stimuli that increase the cellular AMP/ATP ratio. PRKAA1 regulates the activities of a number of key metabolic enzymes through phosphorylation. It protects cells from stresses that cause ATP depletion by switching off ATP-consuming biosynthetic pathways.

PRKAA1 Antibody - References

Puissant,A., et.al., Cancer Res. 70 (3), 1042-1052 (2010)
McGeachie,M., et.al., Circulation 120 (24), 2448-2454 (2009)