

**KD-Validated Anti-AMPK alpha 1 Rabbit Monoclonal Antibody**  
**Rabbit monoclonal antibody**  
**Catalog # AGI1270****Specification****KD-Validated Anti-AMPK alpha 1 Rabbit Monoclonal Antibody - Product Information**

Application	WB, FC, ICC
Primary Accession	<a href="#">Q13131</a>
Reactivity	Rat, Human, Mouse
Clonality	Monoclonal
Isotype	Rabbit IgG
Calculated MW	Predicted, 64 kDa , observed, 63 kDa KDa
Gene Name	PRKAA1
Aliases	PRKAA1; Protein Kinase AMP-Activated Catalytic Subunit Alpha 1; 5'-AMP-Activated Protein Kinase Catalytic Subunit Alpha-1; Protein Kinase, AMP-Activated, Alpha 1 Catalytic Subunit; Hydroxymethylglutaryl-CoA Reductase Kinase; Acetyl-CoA Carboxylase Kinase; Tau-Protein Kinase PRKAA1; AMPK Subunit Alpha-1; AMPK, Alpha, 1; ACACA Kinase; HMGCR Kinase; EC 2.7.11.1; AMPKa1; 5'-AMP-Activated Protein Kinase, Catalytic Alpha-1 Chain; AMP-Activated Protein Kinase, Catalytic, Alpha-1; AMP -Activate Kinase Alpha 1 Subunit; AMPK Alpha 1; EC 2.7.11.27; EC 2.7.11.31; EC 2.7.11.26; EC 2.7.11; AMPKA1; AMPK1; AMPK
Immunogen	A synthesized peptide derived from human AMPK alpha 1

**KD-Validated Anti-AMPK alpha 1 Rabbit Monoclonal Antibody - Additional Information**

Gene ID	5562
<b>Other Names</b>	5'-AMP-activated protein kinase catalytic subunit alpha-1, AMPK subunit alpha-1, 2.7.11.1, Acetyl-CoA carboxylase kinase, ACACA kinase, Hydroxymethylglutaryl-CoA reductase kinase, HMGCR kinase, 2.7.11.31, PRKAA1 (<a href="http://www.genenames.org/cgi-bin/gene_symbol_report?hgnc_id=9376" target="_blank">HGNC:9376</a>), AMPK1

**KD-Validated Anti-AMPK alpha 1 Rabbit Monoclonal 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:<a href="http://www.uniprot.org/citations/17307971" target="\_blank">17307971</a>, PubMed:<a href="http://www.uniprot.org/citations/17712357" target="\_blank">17712357</a>, PubMed:<a href="http://www.uniprot.org/citations/24563466" target="\_blank">24563466</a>, PubMed:<a href="http://www.uniprot.org/citations/37821951" target="\_blank">37821951</a>). 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:<a href="http://www.uniprot.org/citations/17307971" target="\_blank">17307971</a>, PubMed:<a href="http://www.uniprot.org/citations/17712357" target="\_blank">17712357</a>). AMPK acts via direct phosphorylation of metabolic enzymes, and by longer-term effects via phosphorylation of transcription regulators (PubMed:<a href="http://www.uniprot.org/citations/17307971" target="\_blank">17307971</a>, PubMed:<a href="http://www.uniprot.org/citations/17712357" target="\_blank">17712357</a>). 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:<a href="http://www.uniprot.org/citations/34077757" target="\_blank">34077757</a>). 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:<a href="http://www.uniprot.org/citations/11518699" target="\_blank">11518699</a>, PubMed:<a href="http://www.uniprot.org/citations/11554766" target="\_blank">11554766</a>, PubMed:<a href="http://www.uniprot.org/citations/15866171" target="\_blank">15866171</a>, PubMed:<a href="http://www.uniprot.org/citations/17711846" target="\_blank">17711846</a>, PubMed:<a href="http://www.uniprot.org/citations/18184930" target="\_blank">18184930</a>). 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:<a href="http://www.uniprot.org/citations/14651849" target="\_blank">14651849</a>, PubMed:<a href="http://www.uniprot.org/citations/18439900" target="\_blank">18439900</a>, PubMed:<a href="http://www.uniprot.org/citations/20160076" target="\_blank">20160076</a>, PubMed:<a href="http://www.uniprot.org/citations/21205641" target="\_blank">21205641</a>). Also phosphorylates and inhibits GATOR2 subunit WDR24 in response to nutrient limitation, leading to suppress glucose-mediated mTORC1 activation (PubMed:<a href="http://www.uniprot.org/citations/36732624" target="\_blank">36732624</a>). 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:<a href="http://www.uniprot.org/citations/37079666" target="\_blank">37079666</a>). In response to nutrient limitation, promotes autophagy by phosphorylating and activating ATG1/ULK1 (PubMed:<a href="http://www.uniprot.org/citations/21205641" target="\_blank">21205641</a>). In that process, it also activates WDR45/WIPI4 (PubMed:<a href="http://www.uniprot.org/citations/28561066" target="\_blank">28561066</a>). Phosphorylates CASP6, thereby preventing its autoprocessing and subsequent activation (PubMed:<a href="http://www.uniprot.org/citations/32029622" target="\_blank">32029622</a>). 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:<a href="http://www.uniprot.org/citations/17486097" target="\_blank">17486097</a>). 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, EE2K, KLC1, NOS3 and SLC12A1 (PubMed:<a href="http://www.uniprot.org/citations/12519745" target="\_blank">12519745</a>, PubMed:<a href="http://www.uniprot.org/citations/20074060" target="\_blank">20074060</a>). 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:<a href="http://www.uniprot.org/citations/36367943" target="\_blank">36367943</a>).

### Cellular Location

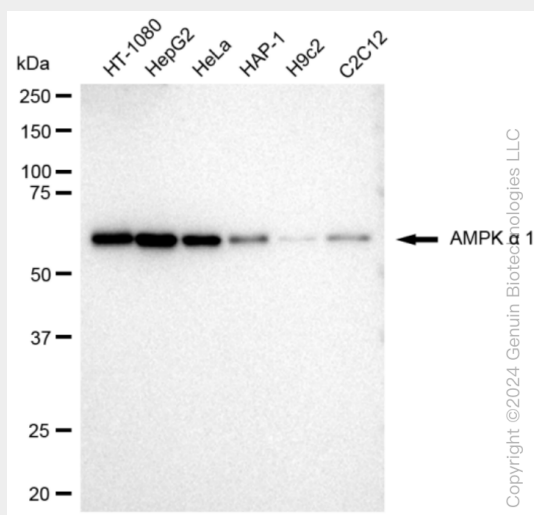
Cytoplasm. Nucleus Note=In response to stress, recruited by p53/TP53 to specific promoters.

### KD-Validated Anti-AMPK alpha 1 Rabbit Monoclonal Antibody - Protocols

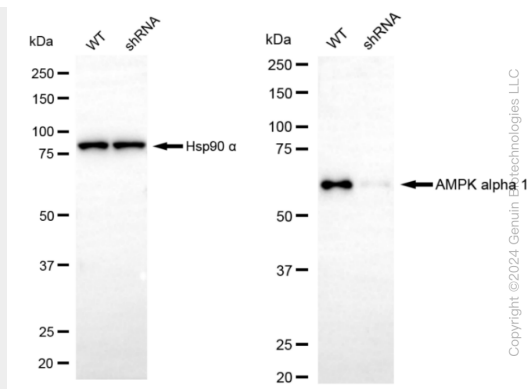
Provided below are standard protocols that you may find useful for product applications.

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

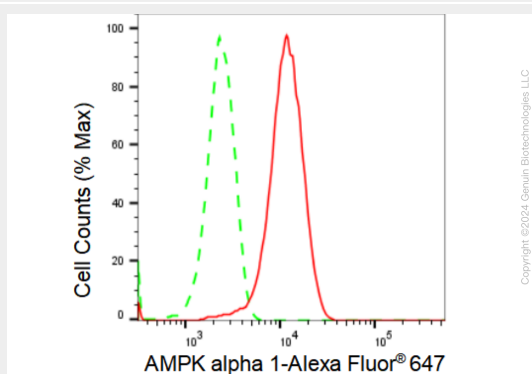
### KD-Validated Anti-AMPK alpha 1 Rabbit Monoclonal Antibody - Images



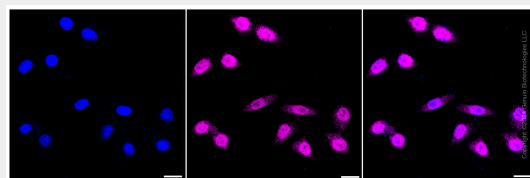
Western blotting analysis using anti-AMPK alpha 1 antibody (Cat#AGI1270). Total cell lysates (30 µg) from various cell lines were loaded and separated by SDS-PAGE. The blot was incubated with anti-AMPK alpha 1 antibody (Cat#AGI1270, 1:5,000) and HRP-conjugated goat anti-rabbit secondary antibody respectively.



Western blotting analysis using anti-AMPK alpha 1 antibody (Cat#AGI1270). AMPK alpha 1 expression in wild type (WT) and AMPK alpha 1 shRNA knockdown (KD) HeLa cells with 30 µg of total cell lysates. Hsp90 α serves as a loading control. The blot was incubated with anti-AMPK alpha 1 antibody (Cat#AGI1270, 1:5,000) and HRP-conjugated goat anti-rabbit secondary antibody respectively.



Flow cytometric analysis of AMPK alpha 1 expression in HepG2 cells using AMPK alpha 1 antibody (Cat#AGI1270, 1:2,000). Green, isotype control; red, AMPK alpha 1.



Immunocytochemical staining of HepG2 cells with AMPK alpha 1 antibody (Cat#AGI1270, 1:1,000). Nuclei were stained blue with DAPI; AMPK alpha 1 was stained magenta with Alexa Fluor® 647. Images were taken using Leica stellaris 5. Protein abundance based on laser Intensity and smart gain: Medium. Scale bar: 20 µm.