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KD-Validated Anti-cAMP Protein Kinase Catalytic Subunit Rabbit Monoclonal Antibody

Rabbit monoclonal antibody
Catalog # AGI2378

Product Information

Application	WB, FC, ICC
Primary Accession	P17612
Reactivity	Rat, Human, Mouse
Clonality	Monoclonal
Isotype	Rabbit IgG
Clone Names	23GB1030
Calculated MW	40590
Gene Name	PRKACA
Aliases	Protein Kinase; CAMP-Dependent; Catalytic; Alpha; CAMP-Dependent Protein Kinase Catalytic Subunit Alpha; PKACA; Protein Kinase A Catalytic Subunit; PKA C-Alpha; EC 2.7.11; EC 2.7.11.11
Immunogen	A synthesized peptide derived from human cAMP Protein Kinase Catalytic subunit

Additional Information

Gene ID	5566
Other Names	cAMP-dependent protein kinase catalytic subunit alpha, PKA C-alpha, 2.7.11.11, PRKACA, PKACA

Protein Information

Name	PRKACA
Synonyms	PKACA
Function	Phosphorylates a large number of substrates in the cytoplasm and the nucleus (PubMed:15642694, PubMed:15905176, PubMed:16387847, PubMed:17333334, PubMed:17565987, PubMed:17693412, PubMed:18836454, PubMed:19949837, PubMed:20356841, PubMed:21085490, PubMed:21514275, PubMed:21812984, PubMed:21852232, PubMed:31112131, PubMed:41652173). Phosphorylates CDC25B, ABL1, NFKB1, CLDN3, histone H1.4 (H1-4), PSMC5/RPT6, PJA2, RYR2, RORA, SLC6A6, SOX9, UHRF1 and VASP (PubMed:15178447, PubMed:15642694, PubMed:15905176, PubMed:16387847, PubMed:17333334, PubMed:17565987, PubMed:17693412, PubMed:18836454, PubMed:19949837, PubMed:20356841, PubMed:21085490, PubMed:21514275, PubMed:21812984, PubMed:41652173). Regulates the abundance of compartmentalized pools of its regulatory subunits through phosphorylation of PJA2 which binds and

ubiquitinates these subunits, leading to their subsequent proteolysis (PubMed:21423175). RORA is activated by phosphorylation (PubMed:21514275). Required for glucose- mediated adipogenic differentiation increase and osteogenic differentiation inhibition from osteoblasts (PubMed:19949837). Involved in chondrogenesis by mediating phosphorylation of SOX9 (By similarity). Involved in the regulation of platelets in response to thrombin and collagen; maintains circulating platelets in a resting state by phosphorylating proteins in numerous platelet inhibitory pathways when in complex with NF-kappa-B (NFKB1 and NFKB2) and I-kappa-B-alpha (NFKBIA), but thrombin and collagen disrupt these complexes and free active PRKACA stimulates platelets and leads to platelet aggregation by phosphorylating VASP (PubMed:15642694, PubMed:20356841). Prevents the antiproliferative and anti-invasive effects of alpha-difluoromethylornithine in breast cancer cells when activated (PubMed:17333334). RYR2 channel activity is potentiated by phosphorylation in presence of luminal Ca(2+), leading to reduced amplitude and increased frequency of store overload-induced Ca(2+) release (SOICR) characterized by an increased rate of Ca(2+) release and propagation velocity of spontaneous Ca(2+) waves, despite reduced wave amplitude and resting cytosolic Ca(2+) (PubMed:17693412). PSMC5/RPT6 activation by phosphorylation stimulates proteasome (PubMed:17565987). Negatively regulates tight junctions (TJs) in ovarian cancer cells via CLDN3 phosphorylation (PubMed:15905176). NFKB1 phosphorylation promotes NF-kappa-B p50-p50 DNA binding (PubMed:15642694). Acts as a key inhibitor of smoothened signaling pathway by mediating phosphorylation of GLI (GLI1, GLI2 and GLI3) transcription factors in absence of hedgehog (DHH, IHH or SHH) morphogens: GLI phosphorylation promotes their processing and prevents transcriptional activation of smoothened target genes (PubMed:16705181). GLI transcription factor phosphorylation is inhibited by interaction of PRKACA with SMO which sequesters PRKACA at the cell membrane (PubMed:36202993, PubMed:39138140). Also inhibits the smoothened signaling pathway in embryonic development by catalyzing phosphorylation of OFD1 in ciliogenesis (PubMed:33934390). Prevents meiosis resumption in prophase-arrested oocytes via CDC25B inactivation by phosphorylation (By similarity). May also regulate rapid eye movement (REM) sleep in the pedunculopontine tegmental (PPT) (By similarity). Phosphorylates APOBEC3G and AICDA (PubMed:16387847, PubMed:18836454). Phosphorylates HSF1; this phosphorylation promotes HSF1 nuclear localization and transcriptional activity upon heat shock (PubMed:21085490). Acts as a negative regulator of mTORC1 by mediating phosphorylation of RPTOR (PubMed:31112131). Phosphorylates AKAP19 (PubMed:27028580).

Cellular Location

Cytoplasm. Cell membrane. Membrane; Lipid-anchor. Nucleus. Mitochondrion {ECO:0000250|UniProtKB:P05132}. Note=Translocates into the nucleus (monomeric catalytic subunit). The inactive holoenzyme is found in the cytoplasm. Distributed throughout the cytoplasm in meiotically incompetent oocytes. Associated to mitochondrion as meiotic competence is acquired. Aggregates around the germinal vesicles (GV) at the immature GV stage oocytes (By similarity). Colocalizes with HSF1 in nuclear stress bodies (nSBs) upon heat shock (PubMed:21085490) Recruited to the cell membrane through interaction with SMO (By similarity). {ECO:0000250|UniProtKB:P05132, ECO:0000269|PubMed:21085490}

Tissue Location

Isoform 1 is ubiquitous. Isoform 2 is sperm- specific and is enriched in pachytene spermatocytes but is not detected in round spermatids.