abcam

ab227108

Anti-CaMKII antibody [EPR6686(2)] - BSA and Azide free

Recombinant | RabMAb

Key facts

Isotype	IgG
Host species	Rabbit
Storage buffer	pH: 7.2 - 7.4 Constituents: PBS
Form	Liquid
Clonality	Monoclonal
Immunogen	The exact immunogen used to generate this antibody is proprietary information.
Carrier free	Yes
Clone number	EPR6686(2)
Purification technique	Affinity purification Protein A
Specificity	The immunogen shares 100% homology with CaMK2 beta, 93% homology with CaMK2 gamma and 73% homology with CaMK2 alpha and delta.
Concentration	0.968 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →

Reactivity data

IHC-P

Tested

Species	Human
Dilution info	-
Notes	Perform heat-mediated antigen retrieval with citrate buffer pH 6 before commencing with IHC staining protocol.

Not recommended

Species	Mouse, Rat
Dilution info	-
Notes	-

WB

Tested

Species	Mouse, Rat, Human
Dilution info	-
Notes	-

ICC/IF

Tested

Species	Human
Dilution info	-
Notes	-

Expected

Species	Mouse, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

Flow Cyt (Intra)

Tested

Species	Human
Dilution info	-
Notes	ab199376 - Rabbit monoclonal IgG, is suitable for use as an isotype control with this antibody.

Expected

Species	Mouse, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

Target data

See full target information CAMK2B

Function

Calcium/calmodulin-dependent protein kinase that functions autonomously after Ca(2+)/calmodulin-binding and autophosphorylation, and is involved in dendritic spine and synapse formation, neuronal plasticity and regulation of sarcoplasmic reticulum Ca(2+) transport in skeletal muscle (PubMed:16690701). In neurons, plays an essential structural role in the reorganization of the actin cytoskeleton during plasticity by binding and bundling actin filaments in a kinase-independent manner. This structural function is required for correct targeting of CaMK2A, which acts downstream of NMDAR to promote dendritic spine and synapse formation and maintain synaptic plasticity which enables long-term potentiation (LTP) and hippocampus-dependent learning. In developing hippocampal neurons, promotes arborization of the dendritic tree and in mature neurons, promotes dendritic remodeling. Also regulates the migration of developing neurons (PubMed:29100089). Participates in the modulation of skeletal muscle function in response to exercise (PubMed:16690701). In slow-twitch muscles, is involved in regulation of sarcoplasmic reticulum (SR) Ca(2+) transport and in fast-twitch muscle participates in the control of Ca(2+) release from the SR through phosphorylation of triadin, a ryanodine receptor-coupling factor, and phospholamban (PLN/PLB), an endogenous inhibitor of SERCA2A/ATP2A2. In response to interferon-gamma (IFN-gamma) stimulation, catalyzes phosphorylation of STAT1, stimulating the JAK-STAT signaling pathway (By similarity). Phosphorylates reticulophagy regulator RETREG1 at 'Ser-151' under endoplasmic reticulum stress conditions which enhances RETREG1 oligomerization and its membrane scission and reticulophagy activity (PubMed:31930741).

Storage

Shipped at conditions	Blue Ice
Appropriate short-term storage conditions	+4°C

Appropriate long-term storage conditions	+4°C
Storage information	Do Not Freeze

Notes

ab227108 is the carrier-free version of ab134041.

Conjugation ready
Our carrier-free antibodies are typically supplied in a PBS-only formulation, purified and free of BSA, sodium azide and glycerol. This conjugation-ready format is designed for use with fluorochromes, metal isotopes, oligonucleotides, and enzymes, which makes them ideal for antibody labelling, functional and cell-based assays, flow-based assays (e.g. mass cytometry) and Multiplex Imaging applications.

Use our conjugation kits for antibody conjugates that are ready-to-use in as little as 20 minutes with 1 minute hands-on-time and 100% antibody recovery: available for fluorescent dyes, HRP, biotin and gold.

Compatibility
This product is compatible with the Maxpar® Antibody Labeling Kit from Fluidigm, without the need for antibody preparation. Maxpar® is a trademark of Fluidigm Canada Inc.

Supplementary info

This supplementary information is collated from multiple sources and compiled automatically.

Activity summary	CaMKII also known as calcium/calmodulin-dependent protein kinase II is an enzyme functioning critically in cellular signaling. It consists of multiple isoforms including alpha beta gamma and delta with the delta isoform Delta 1829 frequently highlighted for its specific roles. The molecular weight of CaMKII is approximately 50 to 60 kDa varying slightly between isoforms. CaMKII is widely expressed in the brain but is also present in the heart skeletal muscle and other tissues. Its structure includes a catalytic domain regulatory segment and association domain which allows auto-regulation and interaction with other molecules.
Biological function summary	CaMKII plays a vital role in cellular processes such as learning memory and muscle contraction. It can form a complex structure involving multiple subunits which allows for its unique ability to signal in response to calcium influx and calmodulin binding. This causes autophosphorylation of CaMKII allowing it to remain active even when calcium levels diminish. This property makes CaMKII essential for long-term potentiation (LTP) in neuron synapses influencing cognitive functions deeply.
Pathways	CaMKII is an important component of both the calcium signaling and synaptic plasticity pathways. In the calcium signaling pathway CaMKII interacts with calmodulin and other kinases to modulate calcium entry and signaling. In synaptic plasticity CaMKII works closely with proteins like NMDA receptors which regulate synaptic strength and modulation essential for encoding learning and memory.

	These interactions highlight its significance as a mediator between signaling cascades and cellular responses.
Associated diseases and disorders	Abnormal regulation or expression of CaMKII links to Alzheimer's disease and cardiac arrhythmias. In Alzheimer's the dysregulation of CaMKII affects synaptic integrity and memory formation involving interaction with beta-amyloid plaques. In cardiac arrhythmias CaMKII dysfunction leads to improper cardiac muscle contractions often linked to the protein phospholamban. These associations highlight the clinical relevance of CaMKII in addressing and understanding mechanisms underpinning these diseases.

Product promise

Tested

We have tested this species and application combination and it works. It is covered by our product promise.

Expected

We have not tested this specific species and application combination in-house, but expect it will work. It is covered by our product promise.

Predicted

This species and application combination has not been tested, but we predict it will work based on strong homology. However, this combination is not covered by our product promise.

Not recommended

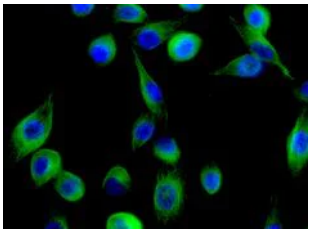
We do not recommend this combination. It is not covered by our product promise.

We are dedicated to supporting your work with high quality reagents and we are here for you every step of the way should you need us.

In the unlikely event of one of our products not working as expected, you are covered by our product promise.

Full details and terms and conditions can be found here:
Terms & Conditions.

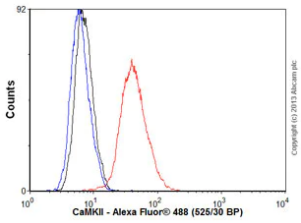
6 product images



Immunocytochemistry/ Immunofluorescence - Anti-CaMKII antibody [EPR6686(2)] - BSA and Azide free (ab227108)

CaMKII Immunocytochemistry/ Immunofluorescence staining using rabbit Anti-CaMKII antibody

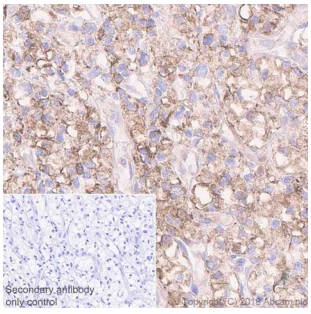
Immunofluorescent analysis of U87-MG cells labelling CaMKII with unpurified ab134041 at 1/250 dilution.
This data was developed using the same antibody clone in a different buffer formulation containing PBS, BSA, glycerol, and sodium azide (ab134041).



Flow Cytometry (Intracellular) - Anti-CaMKII antibody [EPR6686(2)] - BSA and Azide free (ab227108)

CaMKII Flow Cytometry (Intracellular) staining using rabbit Anti-CaMKII antibody

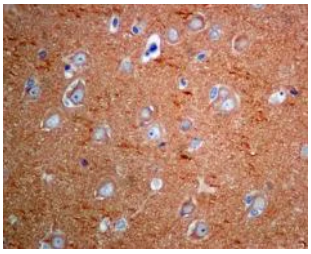
Overlay histogram showing SH-SY5Y cells stained with ab134041 (red line). The cells were fixed with 4% paraformaldehyde (10 min) and then permeabilized with 0.1% PBS-Tween for 20 min. The cells were then incubated in 1x PBS / 10% normal goat serum / 0.3M glycine to block non-specific protein-protein interactions followed by the antibody (unpurified ab134041, 1/1000 dilution) for 30 min at 22°C. The secondary antibody used was Alexa Fluor® 488 goat anti-rabbit IgG (H&L) (ab150077) at 1/2000 dilution for 30 min at 22°C. Isotype control antibody (black line) was rabbit IgG (monoclonal) (0.1µg/1x10^6 cells) used under the same conditions. Unlabelled sample (blue line) was also used as a control. Acquisition of >5,000 events were collected using a 20mW Argon ion laser (488nm) and 525/30 bandpass filter. This antibody gave a positive signal in SH-SY5Y cells fixed with 80% methanol (5 min)/permeabilized with 0.1% PBS-Tween for 20 min used under the same conditions.
This data was developed using the same antibody clone in a different buffer formulation containing PBS, BSA, glycerol, and sodium azide (ab134041).



Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-CaMKII antibody [EPR6686(2)] - BSA and Azide free (ab227108)

CaMKII Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-CaMKII antibody

Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) analysis of Human clear cell cancer of kidney tissue sections labeling CaMKII with Purified ab134041 at 1:500 dilution (1.5 µg/ml). Heat mediated antigen retrieval was performed using ab93684 (Tris/EDTA buffer, pH 9.0)ImmunoHistoProbe one step HRP Polymer (ready to use)was used as the secondary antibody.Negative control:PBS instead of the primary antibody.Hematoxylinwas used as a counterstainThis data was developed using the same antibody clone in a different buffer formulation containing PBS, BSA, glycerol, and sodium azide (ab134041).

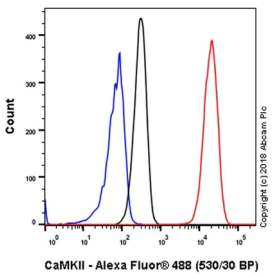


Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-CaMKII antibody [EPR6686(2)] - BSA and Azide free (ab227108)

CaMKII Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-CaMKII antibody

Immunohistochemical analysis of paraffin-embedded Human brain tissue labelling CaMKII with unpurified ab134041 at 1/250 dilution.
This data was developed using the same antibody clone in a different buffer formulation containing PBS, BSA, glycerol, and sodium azide (ab134041).

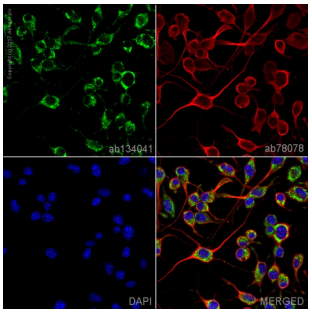
Perform heat mediated antigen retrieval with citrate buffer pH 6 before commencing with IHC staining protocol.



Flow Cytometry (Intracellular) - Anti-CaMKII antibody [EPR6686(2)] - BSA and Azide free (ab227108)

CaMKII Flow Cytometry (Intracellular) staining using rabbit Anti-CaMKII antibody

Intracellular Flow Cytometry analysis of SH-SY5Y (Human neuroblastoma epithelial cell) cells labeling CaMKII with purified ab134041 at 1/70 dilution (10 µg/ml) (red). Cells were fixed with 4% Paraformaldehyde and then permeabilized with 90% methanol for 30min. A Goat anti rabbit IgG (Alexa Fluor® 488) secondary antibody was used at 1/2000 dilution. Isotype control - Rabbit monoclonal IgG (Black). Unlabeled control - Cell without incubation with primary antibody and secondary antibody (Blue).
This data was developed using the same antibody clone in a different buffer formulation containing PBS, BSA, glycerol, and sodium azide (ab134041).



Immunocytochemistry/ Immunofluorescence - Anti-CaMKII antibody [EPR6686(2)] - BSA and Azide free (ab227108)

CaMKII Immunocytochemistry/ Immunofluorescence staining using rabbit Anti-CaMKII antibody

ab134041 staining CaMKII in Neuro-2A cells. The cells were differentiated with 20µM Trans-retinoic acid and serum starved (0.1%FBS/DMEM) for 48hours. They were then fixed with 100% methanol (5 min), permeabilized with 0.1% Triton X-100 for 5 minutes and then blocked with 1% BSA/10% normal goat serum/0.3M glycine in 0.1%PBS-Tween for 1h. The cells were then incubated overnight at +4°C with purified ab134041 at a 5µg/ml concentration and ab78078, Mouse monoclonal [2G10] to beta III Tubulin, at 5µg/ml concentration, followed by a further incubation at room temperature for 1h with an anti-rabbit AlexaFluor® 488 (ab150081) at 2 µg/ml (shown in green) and an anti-mouse AlexaFluor® 594 (ab150120) at 2 µg/ml (shown in pseudocolor red). Nuclear DNA was labelled with DAPI (shown in blue).
Image was taken with a confocal microscope (Leica-Microsystems, TCS SP8).

This data was developed using the same antibody clone in a different buffer formulation containing PBS, BSA, glycerol, and sodium azide (ab134041).

Please note: All products are 'FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES'.