SANTA CRUZ BIOTECHNOLOGY, INC.

CaMKIIα (A-1): sc-13141

SANTA CRUZ BIOTECHNOLOGY

The Power to Question

BACKGROUND

The Ca^{2+}/calmodulin-dependent protein kinases (CaM kinases) comprise a structurally related subfamily of serine/threonine kinases which include CaMKI, CaMKII and CaMKIV. CaMKII is an ubiquitously expressed serine/threonine protein kinase that is activated by Ca^{2+} and calmodulin (CaM) and has been implicated in regulation of the cell cycle and transcription. There are four CaMKII isozymes, designated α, β, γ and δ, which may or may not be co-expressed in the same tissue type. CaMKIV is stimulated by Ca^{2+} and CaM but also requires phosphorylation by a CaMK for full activation. Stimulation of the T cell receptor CD3 signaling complex with an anti-CD3 monoclonal antibody leads to a 10-40 fold increase in CaMKIV activity. An additional kinase, CaMKK, functions to activate CaMKI through the specific phosphorylation of the regulatory threonine residue at position 177.

CHROMOSOMAL LOCATION

Genetic locus: CAMK2A (human) mapping to 5q32; Camk2a (mouse) mapping to 18 E1.

SOURCE

CaMKIIα (A-1) is a mouse monoclonal antibody raised against amino acids 303-478 of CaMKIIα of mouse origin.

PRODUCT

Each vial contains 200 µg IgG_{2a} kappa light chain in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

CaMKIIα (A-1) is available conjugated to agarose (sc-13141 AC), 500 µg/ 0.25 ml agarose in 1 ml, for IP; to HRP (sc-13141 HRP), 200 µg/ml, for WB, IHC(P) and ELISA; to either phycoerythrin (sc-13141 PE), fluorescein (sc-13141 FITC), Alexa Fluor® 488 (sc-13141 AF488), Alexa Fluor® 546 (sc-13141 AF546), Alexa Fluor® 594 (sc-13141 AF594) or Alexa Fluor® 647 (sc-13141 AF647), 200 µg/ml, for WB (RGB), IF, IHC(P) and FCM; and to either Alexa Fluor® 680 (sc-13141 AF680) or Alexa Fluor® 790 (sc-13141 AF790), 200 µg/ml, for Near-Infrared (NIR) WB, IF and FCM.

APPLICATIONS

CaMKIIα (A-1) is recommended for detection of CaMKIIα of mouse, rat and human origin by Western Blotting (starting dilution 1:200, dilution range 1:100-1:1000), immunoprecipitation [1-2 µg per 100-500 µg of total protein (1 ml of cell lysate)], immunofluorescence (starting dilution 1:50, dilution range 1:50-1:500), immunohistochemistry (including paraffin-embedded sections) (starting dilution 1:50, dilution range 1:50-1:500) and solid phase ELISA (starting dilution 1:30, dilution range 1:30-1:3000).

Suitable for use as control antibody for CaMKIIα siRNA (h): sc-29900, CaMKIIα siRNA (m): sc-29901, CaMKIIα siRNA (r): sc-156070, CaMKIIα shRNA Plasmid (h): sc-29900-SH, CaMKIIα shRNA Plasmid (m): sc-29901-SH, CaMKIIα shRNA Plasmid (r): sc-156070-SH, CaMKIIα shRNA (h) Lentiviral Particles: sc-29900-V, CaMKIIα shRNA (m) Lentiviral Particles: sc-29901-V and CaMKIIα shRNA (r) Lentiviral Particles: sc-156070-V.

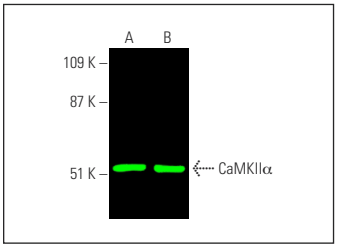
Molecular Weight of CaMKIIα: 50 kDa.

Positive Controls: mouse brain extract: sc-2253 or rat brain extract: sc-2392.

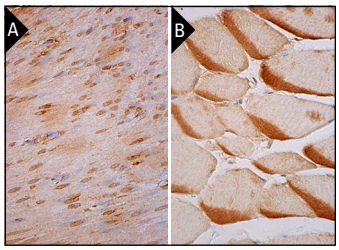
STORAGE

Store at 4° C, **DO NOT FREEZE**. Stable for one year from the date of shipment. Non-hazardous. No MSDS required.

DATA



CaMKIIα (A-1): sc-13141. Near-infrared western blot analysis of CaMKIIα expression in mouse brain (**A**) and rat brain (**B**) tissue extracts. Blocked with UltraCruz® Blocking Reagent: sc-516214. Detection reagent used: m-IgGκ BP-CFL 680: sc-516180.



CaMKIIα (A-1): sc-13141. Immunoperoxidase staining of formalin fixed, paraffin-embedded human stomach tissue showing cytoplasmic and nuclear staining of smooth muscle cells (**A**). Immunoperoxidase staining of formalin fixed, paraffin-embedded rat skeletal muscle tissue showing cytoplasmic staining of myocytes (**B**).

SELECT PRODUCT CITATIONS

1. Saha, S., et al. 2006. Regulation of Ca^{2+}/calmodulin kinase II inhibitor α (CaMKIINα) in virus-infected mouse brain. Biochem. Biophys. Res. Commun. 350: 444-449.
2. Cipolletta, E., et al. 2015. Targeting the CaMKII/ERK interaction in the heart prevents cardiac hypertrophy. PLoS ONE 10: e0130477.
3. Yan, X., et al. 2016. CaMKII-mediated CREB phosphorylation is involved in Ca^{2+}-induced BDNF mRNA transcription and neurite outgrowth promoted by electrical stimulation. PLoS ONE 11: e0162784.
4. Raffeiner, P., et al. 2017. Calcium-dependent binding of Myc to calmodulin. Oncotarget 8: 3327-3343.
5. Maurya, S.K., et al. 2018. Sarcolipin signaling promotes mitochondrial biogenesis and oxidative metabolism in skeletal muscle. Cell Rep. 24: 2919-2931.
6. Dong, X., et al. 2019. BAFF inhibits autophagy promoting cell proliferation and survival by activating Ca^{2+}-CaMKII-dependent Akt/mTOR signaling pathway in normal and neoplastic B-lymphoid cells. Cell. Signal. 53: 68-79.
7. Chen, P.J., et al. 2020. Phosphorylation of α-dystrobrevin is essential for αkap accumulation and acetylcholine receptor stability. J. Biol. Chem. 295: 10677-10688.
8. Zhang, Z., et al. 2021. Selenium restores synaptic deficits by modulating NMDA receptors and selenoprotein K in an Alzheimer's disease model. Antioxid. Redox Signal. 35: 863-884.

RESEARCH USE

For research use only, not for use in diagnostic procedures.