SANTA CRUZ BIOTECHNOLOGY, INC.

CaMKII (M-176): sc-9035

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.

REFERENCES

1. Tombes, R.M., et al. 1995. G_1 cell cycle arrest apoptosis are induced in NIH 3T3 cells by KN-93, an inhibitor of CaMK-II (the multifunctional Ca^{2+}/CaM kinase). Cell Growth Differ. 6: 1063-1070.

2. Hama, N., et al. 1995. Calcium/calmodulin-dependent protein kinase II downregulates both calcineurin and protein kinase c-mediated pathways for cytokine gene transcription in human T cells. J. Exp. Med. 181: 1217-1222.

SOURCE

CaMKII (M-176) is a rabbit polyclonal antibody raised against amino acids 303-478 mapping at the C-terminus of CaMKIIα of mouse origin.

PRODUCT

Each vial contains 200 µg IgG in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

APPLICATIONS

CaMKII (M-176) is recommended for detection of CaMKIIα, CaMKIIβ, CaMKIIγ and CaMKIIδ subunits 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).

CaMKII (M-176) is also recommended for detection of CaMKIIα, CaMKIIβ, CaMKIIγ and CaMKIIδ subunits in additional species, including equine, canine, bovine, porcine and avian.

Molecular Weight of CAMKII: 50 kDa.

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

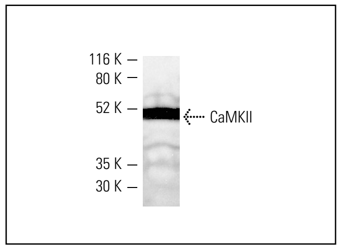
STORAGE

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

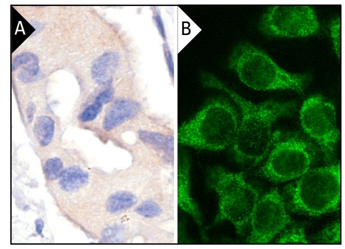
RESEARCH USE

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

DATA



CaMKII (M-176): sc-9035. Western blot analysis of CaMKII expression in rat brain extract.



CaMKII (M-176): sc-9035. Immunoperoxidase staining of formalin-fixed, paraffin-embedded human breast tumor showing cytoplasmic staining (**A**). Immunofluorescence staining of methanol-fixed HeLa cells showing cytoplasmic localization (**B**).

SELECT PRODUCT CITATIONS

1. Afroze, T., et al. 2003. Calcineurin-independent regulation of plasma membrane Ca^{2+} ATPase-4 in the vascular smooth muscle cell cycle. Am. J. Physiol., Cell Physiol. 375: C88-C95.

2. Nori, A., et al. 2003. Targeting of α-kinase-anchoring protein (α KAP) to sarcoplasmic reticulum and nuclei of skeletal muscle. Biochem. J. 370: 873-80.

3. Rose, A.J., et al. 2003. Exercise increases Ca^{2+}-calmodulin-dependent protein kinase II activity in human skeletal muscle. J. Physiol. 553: 303-309.

4. Kojundzic, S.L., et al. 2010. Depression of Ca^{2+}/calmodulin-dependent protein kinase II in dorsal root ganglion neurons after spinal nerve ligation. J. Comp. Neurol. 518: 64-74.

5. Yan, J.Z., et al. 2011. Protein kinase C promotes N-methyl-D-aspartate (NMDA) receptor trafficking by indirectly triggering calcium/calmodulin-dependent protein kinase II (CaMKII) autophosphorylation. J. Biol. Chem. 286: 25187-25200.

6. Ching, L.C., et al. 2011. Molecular mechanisms of activation of endothelial nitric oxide synthase mediated by transient receptor potential vanilloid type 1. Cardiovasc. Res. 91: 492-501.

7. Gomez-Pinilla, F., et al. 2011. Exercise impacts brain-derived neurotrophic factor plasticity by engaging mechanisms of epigenetic regulation. Eur. J. Neurosci. 33: 383-390.

8. Keskanokwong, T., et al. 2011. Dynamic Kv4.3-CaMKII unit in heart: an intrinsic negative regulator for CaMKII activation. Eur. Heart J. 32: 305-315.

9. Blenn, C., et al. 2011. Poly(ADP-ribose)glycohydrolase is an upstream regulator of Ca^{2+} fluxes in oxidative cell death. Cell. Mol. Life Sci. 68: 1455-1466.

10. Toyoda, T., et al. 2011. Myo1c regulates glucose uptake in mouse skeletal muscle. J. Biol. Chem. 286: 4133-4140.

11. Ellwanger, K., et al. 2011. Protein Kinase D controls voluntary running induced skeletal muscle remodeling. Biochem. J. 440: 327-324.