

CaMKII $\alpha/\beta/\gamma/\delta$ (G-1): sc-5306



The Power to Question

BACKGROUND

The Ca²⁺/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 Ca²⁺ 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 Ca²⁺ 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. G₁ cell cycle arrest apoptosis are induced in NIH 3T3 cells by KN-93, an inhibitor of CaMK-II (the multifunctional Ca²⁺/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 $\alpha/\beta/\gamma/\delta$ (G-1) is a mouse monoclonal antibody raised against amino acids 303-478 of CaMKII α of mouse origin.

PRODUCT

Each vial contains 200 μ g IgG₁ kappa light chain in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

CaMKII $\alpha/\beta/\gamma/\delta$ (G-1) is available conjugated to agarose (sc-5306 AC), 500 μ g/0.25 ml agarose in 1 ml, for IP; to HRP (sc-5306 HRP), 200 μ g/ml, for WB, IHC(P) and ELISA; to either phycoerythrin (sc-5306 PE), fluorescein (sc-5306 FITC), Alexa Fluor[®] 488 (sc-5306 AF488), Alexa Fluor[®] 546 (sc-5306 AF546), Alexa Fluor[®] 594 (sc-5306 AF594) or Alexa Fluor[®] 647 (sc-5306 AF647), 200 μ g/ml, for WB (RGB), IF, IHC(P) and FCM; and to either Alexa Fluor[®] 680 (sc-5306 AF680) or Alexa Fluor[®] 790 (sc-5306 AF790), 200 μ g/ml, for Near-Infrared (NIR) WB, IF and FCM.

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APPLICATIONS

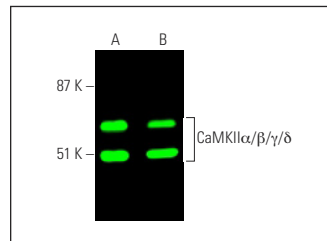
CaMKII $\alpha/\beta/\gamma/\delta$ (G-1) is recommended for detection of CaMKII α , CaMKII β , CaMKII γ and CaMKII δ subunits of mouse, rat and human origin by Western Blotting (starting dilution 1:200, dilution range 1:100-1:1000), immunoprecipitation [1-2 μ g per 100-500 μ g of total protein (1 ml 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).

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

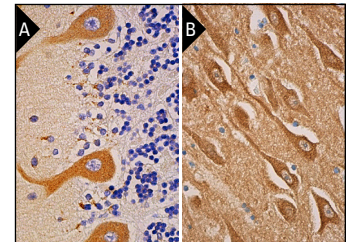
STORAGE

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

DATA



CaMKII $\alpha/\beta/\gamma/\delta$ (G-1): sc-5306. Near-infrared western blot analysis of CaMKII $\alpha/\beta/\gamma/\delta$ expression in rat brain (A) and mouse brain (B) tissue extracts. Detection reagent used: m-IgG κ BP-CFL 680: sc-516180.



CaMKII $\alpha/\beta/\gamma/\delta$ (G-1): sc-5306. Immunoperoxidase detection of CaMKII $\alpha/\beta/\gamma/\delta$ in formalin fixed, paraffin-embedded human cerebellum tissue, showing cytoplasmic staining of Purkinje cells and cells in molecular layer. Detection reagent used: m-IgG κ BP-HRP: sc-516102 (A). Immunoperoxidase staining of formalin fixed, paraffin-embedded human hippocampus tissue showing cytoplasmic and nuclear staining of neuronal cells and neuropil staining (B).

SELECT PRODUCT CITATIONS

1. Zhao, L. and Brinton, R.D. 2003. Vasopressin-induced cytoplasmic and nuclear calcium signaling in embryonic cortical astrocytes: dynamics of calcium and calcium-dependent kinase translocation. *J. Neurosci.* 23: 4228-4239.
2. Chen, M., et al. 2017. Amygdalar endothelin-1 regulates pyramidal neuron excitability and affects anxiety. *Sci. Rep.* 7: 2316.
3. Opazo, P., et al. 2018. CaMKII metaplasticity drives A β oligomer-mediated synaptotoxicity. *Cell Rep.* 23: 3137-3145.
4. Tan, H., et al. 2019. Peimine inhibits the growth and motility of prostate cancer cells and induces apoptosis by disruption of intracellular calcium homeostasis through Ca²⁺/CaMKII/JNK pathway. *J. Cell. Biochem.* 121: 81-92.
5. Connelly, K.A., et al. 2020. Load-independent effects of empagliflozin contribute to improved cardiac function in experimental heart failure with reduced ejection fraction. *Cardiovasc. Diabetol.* 19: 13.
6. Turlova, E., et al. 2021. TRPM7 mediates neuronal cell death upstream of calcium/calmodulin-dependent protein kinase II and calcineurin mechanism in neonatal hypoxic-ischemic brain injury. *Transl. Stroke Res.* 12: 164-184.
7. Mosalam, E.M., et al. 2022. Chronotherapeutic neuroprotective effect of verapamil against lipopolysaccharide-induced neuroinflammation in mice through modulation of calcium-dependent genes. *Mol. Med.* 28: 139.
8. Song, I., et al. 2023. Heparan sulfates regulate axonal excitability and context generalization through Ca²⁺/calmodulin-dependent protein kinase II. *Cells* 12: 744.

RESEARCH USE

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