# SANTA CRUZ BIOTECHNOLOGY, INC.

# p-CaMKII (22B1): sc-32289



## BACKGROUND

The Ca<sup>2+</sup>/calmodulin-dependent protein kinases (CaM kinases) comprise a structurally related subfamily of serine/threonine kinases which include CaMKI, CaMKII and CaMKIV. CaMKII is a ubiquitously expressed serine/ threonine protein kinase that is activated by Ca<sup>2+</sup> and calmodulin (CaM) and has been implicated in regulation of the cell cycle and transcription. There are four CaMKII isozymes, designated  $\alpha$ ,  $\beta$ ,  $\gamma$  and  $\delta$ , which may or may not be coexpressed in the same tissue types. CaMKIV is stimulated by Ca<sup>2+</sup> 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<sub>1</sub> cell cycle arrest apoptosis are induced in NIH 3T3 cells by KN-93, an inhibitor of CaMK-II (the multifunctional Ca<sup>2+</sup>/CaM kinase). Cell Growth Differ. 6: 1063-1070.
- 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

p-CaMKII (22B1) is a mouse monoclonal antibody raised against a synthetic peptide corresponding to residues 281-294 CaM kinase II  $\alpha$  subunit of rat origin.

#### PRODUCT

Each vial contains 200  $\mu$ g lgG<sub>1</sub> kappa light chain in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

p-CaMKII (22B1) is available conjugated to agarose (sc-32289 AC), 500  $\mu$ g/ 0.25 ml agarose in 1 ml, for IP; to HRP (sc-32289 HRP), 200  $\mu$ g/ml, for WB, IHC(P) and ELISA; to either phycoerythrin (sc-32289 PE), fluorescein (sc-32289 FITC), Alexa Fluor\* 488 (sc-32289 AF488), Alexa Fluor\* 546 (sc-32289 AF546), Alexa Fluor\* 594 (sc-32289 AF594) or Alexa Fluor\* 647 (sc-32289 AF647), 200  $\mu$ g/ml, for WB (RGB), IF, IHC(P) and FCM; and to either Alexa Fluor\* 680 (sc-32289 AF680) or Alexa Fluor\* 790 (sc-32289 AF790), 200  $\mu$ g/ml, for Near-Infrared (NIR) WB, IF and FCM.

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#### **APPLICATIONS**

p-CaMKII (22B1) is recommended for detection of Thr 286 phosphorylated CaMKII 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)] and immunofluorescence (starting dilution 1:50, dilution range 1:50-1:500).

Molecular Weight of p-CaMKII: 50 kDa.

Positive Controls: rat brain extract: sc-2392 or Sol8 cell lysate: sc-2249.

# STORAGE

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

# DATA





p-CaMKII (22B1): sc-32289. Western blot analysis of CaMKII phosphorylation in untreated ( $\bf{A}$ ) and lambda phosphatase treated ( $\bf{B}$ ) rat brain tissue extract.

p-Ca/MKII (22B1) HRP: sc-32289 HRP. Direct western blot analysis of Ca/MKII phosphorylation in Sol8 whole cell lysate.

# **SELECT PRODUCT CITATIONS**

- 1. Fan, R., et al. 2005. G protein-coupled receptor activation rapidly stimulates focal adhesion kinase phosphorylation at Ser 843. J. Biol. Chem. 280: 24212-24220.
- Zhong, W., et al. 2014. Serotonin 5-HT3 receptor-mediated vomiting occurs via the activation of Ca<sup>2+</sup>/CaMKII-dependent ERK1/2 signaling in the least shrew (*Cryptotis parva*). PLoS ONE 9: e104718.
- 3. Tapia-Rojas, C., et al. 2015. Andrographolide activates the canonical Wnt signalling pathway by a mechanism that implicates the non-ATP competitive inhibition of GSK-3 $\beta$ : autoregulation of GSK-3 $\beta$  *in vivo*. Biochem. J. 466: 415-430.
- 4. Ramírez, V.T., et al. 2016. Wnt-5a/Frizzled9 receptor signaling through the G<sub> $\alpha$  o</sub>-G<sub> $\beta$  y</sub> complex regulates dendritic spine formation. J. Biol. Chem. 291: 19092-19107.
- 5. Fan, J., et al. 2017. Amelioration of apelin-13 in chronic normobaric hypoxia-induced anxiety-like behavior is associated with an inhibition of NF $\kappa$ B in the hippocampus. Brain Res. Bull. 130: 67-74.
- Ravi, P., et al. 2018. FMRFa receptor stimulated Ca<sup>2+</sup> signals alter the activity of flight modulating central dopaminergic neurons in *Drosophila melanogaster*. PLoS Genet. 14: e1007459.
- Miranda-Silva, D., et al. 2019. Characterization of biventricular alterations in myocardial (reverse) remodelling in aortic banding-induced chronic pressure overload. Sci. Rep. 9: 2956.
- Tan, H., et al. 2020. Peimine inhibits the growth and motility of prostate cancer cells and induces apoptosis by disruption of intracellular calcium homeostasis through Ca<sup>2+</sup>/CaMKII/JNK pathway. J. Cell. Biochem. 121: 81-92.

### **RESEARCH USE**

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