

# p- $\gamma$ PAK (Ser 141): sc-16775

## BACKGROUND

Three isoforms of serine/threonine kinases, designated  $\alpha$ PAK p68,  $\beta$ PAK p65 and  $\gamma$ PAK p62, have been shown to exhibit a high degree of sequence homology with the *S. cerevisiae* kinase Ste 20, involved in pheromone signaling. The  $\alpha$ ,  $\beta$  and  $\gamma$ PAK isoforms complex specifically with Rac1 and Cdc42 in their active GTP-bound state, inhibiting their intrinsic GTPase activity leading to their autophosphorylation. There are eight sites of autophosphorylation on  $\gamma$ PAK, including Ser 19, Ser 141 and Thr 402, and phosphorylation of Ser 141 and Thr 402 is correlated with  $\gamma$ PAK activation. Once phosphorylated and their affinity for Rac/Cdc42 reduced, the PAK isoforms disassociate from the complex to seek downstream substrates. One such putative substrate is MEK kinase, an upstream effector of Mek4 which is involved in the JNK signaling pathway. While the PAK isoforms interact in a GTP-dependent manner with Rac1 and Cdc42, they do not interact with Rho.

## REFERENCES

- Didsbury, J., Weber, R.F., Bokoch, G.M., Evans, T. and Snyderman, R. 1989. Rac, a novel Ras-related family of proteins that are botulinum toxic substrates. *J. Biol. Chem.* 264: 16378-16382.
- Shinjo, K., Koland, J.G., Hart, M.J., Narasimhan, V., Johnson, D.I., Evans, T. and Cerione, R.A. 1990. Molecular cloning of the gene for the human placental GTP-binding protein Gp (G25K): identification of this GTP-binding protein as the human homolog of the yeast cell-division-cycle protein Cdc42. *Proc. Natl. Acad. Sci. USA* 98: 9853-9857.
- Boguski, M.S. and McCormick, F. 1993. Proteins regulating Ras and its relatives. *Nature* 366: 643-654.
- Lange-Carter, C.A., Pleiman, C.M., Gardner, A.M., Blumer, K.J. and Johnson, G.L. 1993. A divergence in the MAP kinase regulatory network defined by MEK kinase and Raf. *Science* 260: 315-319.
- Manser, E., Leung, T., Salihuddin, H., Zhao, Z.S. and Lim, L. 1994. A brain serine/threonine protein kinase activated by Cdc42 and Rac1. *Nature* 367: 40-46.
- Yan, M., Dai, T., Deak, J.C., Kyriakis, J.M., Zon, L.I., Woodgett, J.R. and Templeton, D.J. 1994. Activation of stress-activated protein kinase by MEKK1 phosphorylation of its activator SEK1. *Nature* 372: 798-800.
- Coso, O.A., Chiarello, M., Yu, J.C., Teramoto, H., Crespo, P., Xu, N., Miki, T. and Gutkind, J.S. 1995. The small GTP-binding proteins Rac1 and Cdc42 regulate the activity of the JNK/SAPK signaling pathway. *Cell* 81: 1137-1146.

## CHROMOSOMAL LOCATION

Genetic locus: PAK2 (human) mapping to 3q29; Pak2 (mouse) mapping to 16 B2.

## SOURCE

p- $\gamma$ PAK (Ser 141) is available as either goat (sc-16775) or rabbit (sc-16775-R) polyclonal affinity purified antibody raised against a short amino acid sequence containing Ser 141 phosphorylated  $\gamma$ PAK of human origin.

## PRODUCT

Each vial contains 200  $\mu$ g IgG in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

Blocking peptide available for competition studies, sc-16775 P, (100  $\mu$ g peptide in 0.5 ml PBS containing < 0.1% sodium azide and 0.2% BSA).

## APPLICATIONS

p- $\gamma$ PAK (Ser 141) is recommended for detection of Ser 141 phosphorylated  $\gamma$ PAK of mouse, rat and human origin by Western Blotting (starting dilution 1:200, dilution range 1:100-1:1000), immunoprecipitation [1-2  $\mu$ g per 100-500  $\mu$ 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).

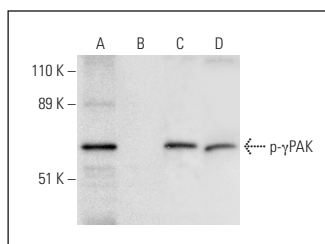
p- $\gamma$ PAK (Ser 141) is also recommended for detection of correspondingly phosphorylated  $\gamma$ PAK in additional species, including equine, canine, bovine, porcine and avian.

Suitable for use as control antibody for  $\gamma$ PAK siRNA (h): sc-36183,  $\gamma$ PAK siRNA (m): sc-36184,  $\gamma$ PAK shRNA Plasmid (h): sc-36183-SH,  $\gamma$ PAK shRNA Plasmid (m): sc-36184-SH,  $\gamma$ PAK shRNA (h) Lentiviral Particles: sc-36183-V and  $\gamma$ PAK shRNA (m) Lentiviral Particles: sc-36184-V.

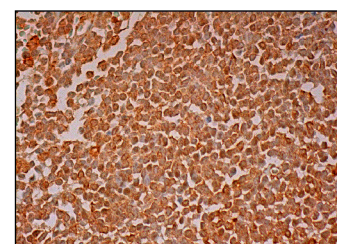
Molecular Weight of p- $\gamma$ PAK: 62 kDa.

Positive Controls: A-431 whole cell lysate: sc-2201.

## DATA



Western blot analysis of  $\gamma$ PAK phosphorylation in untreated (A, C) and lambda protein phosphatase (sc-200312A) treated (B, D) A-431 whole cell lysates. Antibodies tested include p- $\gamma$ PAK (Ser 141)-R: sc-16775-R (A, B) and  $\gamma$ PAK (G-10): sc-137208 (C, D).



p- $\gamma$ PAK (Ser 141): sc-16775. Immunoperoxidase staining of formalin fixed, paraffin-embedded human lymph node tissue showing cytoplasmic and nuclear staining of cells in germinal centers and cells in non-germinal centers.

## 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.

## PROTOCOLS

See our web site at [www.scbt.com](http://www.scbt.com) or our catalog for detailed protocols and support products.