3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone 800-325-5832 • (314) 771-5765
Fax (314) 286-7828
email: techserv@sial.com
sigma-aldrich.com

ProductInformation

Akt3, Active
Human, recombinant, expressed in *E. coli*

Product Number **A 9104**
Storage Temperature: -70 °C

Synonyms: Protein Kinase Bγ, (PKBγ);
RAC-γ Serine/Threonine-Protein Kinase; STK-2

Product Description

Akt3 is one of three highly conserved isoforms, which are designated in humans as PKBα (Akt1), PKBβ (Akt2), and PKBγ (Akt3). The Akt family has been implicated in numerous biological processes including adipocyte and muscle differentiation, glycogen synthesis, glucose uptake, apoptosis and cellular proliferation. Akt1 and 2 contain a key regulatory serine phosphorylation site in the carboxy-terminal region of the protein. Cloned Akt3 contains two regulatory phosphorylation sites, Thr^{305} and Ser^{472}, which correspond to Thr^{308} and Ser^{473} of PKBα. These results indicate that human Akt3 is regulated similarly to Akt1 and Akt2. The two phosphorylation sites act in concert to produce full activation of PKBγ, similar to PKBα.[1,2] IGF-1 leads to the activation of AKT3, which may play a role in regulating cell survival. Although Akt-3 is expressed widely, it is not highly expressed in liver or skeletal muscle, suggesting that its principle function may not be in regulating insulin signaling. Akt3 is also involved in tumorigenesis. In the estrogen receptor-deficient breast cancer cells and the androgen-insensitive prostate cells, the amount of Akt3 enzymatic activity was approximately 20-60-fold higher than in the cells that were estrogen- or androgen-responsive. In a prostate cancer cell line lacking the tumor suppressor PTEN (a lipid and protein phosphatase), the basal enzymatic activity of Akt3 was constitutively elevated and represented the major active Akt in these cells. These results indicate that Akt3 may contribute to the more aggressive clinical phenotype of the estrogen receptor-negative breast cancers and androgen-insensitive prostate carcinomas.[4] Small-molecule therapeutics that block PI3K signaling might inhibit cancer cells by blocking many aspects of the tumor-cell phenotype.[5]

The product is active recombinant, full-length human Akt3 containing an N-terminal GST tag. It is supplied at a concentration of approximately 100 µg/mL in 50 mM Tris-HCl, pH 7.5, 150 mM NaCl, 0.25 mM DTT, 0.1 mM EGTA and 30% glycerol.

Purity: ≥ 85% (SDS Page)

Molecular weight: ~83 kDa

Specific Activity: ≥ 300 units/mg protein (Bradford). Please refer to the Certificate of Analysis for the lot-specific activity.

Unit Definition: One unit will incorporate one nanomole of phosphate into the Akt/SGK substrate peptide (RPRAATF), per minute at 30 °C at pH 7.2 using a final concentration of 50 µM [^{32}P] ATP.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation instructions

For maximum product recovery, after thawing, centrifuge the vial before removing the cap

Storage/Stability

Stable for at least 12 months when stored as undiluted stock at –70 °C. After initial thawing, store in smaller, working aliquots at –70 °C. Use the working aliquots immediately upon thawing. Avoid repeated freeze-thaw cycles to prevent denaturing of the protein. Do not store in a frost-free freezer.

References:

1. Nakatani, K., et al., Identification of a human Akt3 (protein kinase Bγ) which contains the regulatory serine phosphorylation site. Biochem. Biophys. Res. Commun., **257**, 906-910 (1999).
2. Brodbeck, D. et al., A human protein kinase Bγ with regulatory phosphorylation sites in the activation loop and in the C-terminal hydrophobic domain., J. Biol. Chem., **274**, 9133-9136 (1999).
3. Masure, S., et al., Molecular cloning, expression and characterization of the human serine/threonine kinase Akt-3. Eur. J. Biochem., **265**, 353-360 (1999).
4. Nakatani, K., et al., Up-regulation of Akt3 in estrogen receptor-deficient breast cancers and androgen-independent prostate cancer lines., J. Biol. Chem., **274**, 21528-21532 (1999).
5. Vivanco, I. and Sawyers, C. L., The phosphatidylinositol 3-kinase Akt pathway in human cancer. Nat. Rev. Cancer, **2**, 489-501 (2002).

AH,PHC 05/05-1