



AKT/PKB PATHWAY

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Product Name	Cat #
14-3-3 alpha/beta Protein	Y71-30G
14-3-3 alpha/beta Protein	Y71-30N
14-3-3 epsilon Protein	Y75-30G
14-3-3 epsilon Protein	Y75-30N
14-3-3 sigma Protein	Y86-30G
14-3-3 sigma Protein	Y86-30N
14-3-3 theta Protein	Y84-30G
14-3-3 theta Protein	Y84-30N
14-3-3 zeta Protein	Y92-30G
14-3-3 zeta Protein	Y92-30N
4EBP1 Protein	E35-54BH
4EBP1 Protein	E35-54G
4EBP1 Protein	E35-54H
AKT1, Active	A16-10G
AKT1 Mutant (E17K), Active	A16-12G
AKT1, Unactive	A16-14G
AKT2, Active	A17-10G
AKT2, Active	A17-10H
AKT2 Mutant (E17K), Active	A17-12G
AKT2 Mutant (R274H), Active	A17-12BG
AKT2, Unactive	A17-14G
AKT2, Unactive	A17-15H
AKT3, Active	A18-10G
AKT3 Mutant (G171R), Active	A18-12BG
AKT3, Unactive	A18-14G
ALK, Active	A19-11G
ALK Mutant (F1174S), Active	A19-12FG
ALK Mutant (L1196M), Active	A19-12GG
ALK Mutant (S1206R), Active	A19-12IG
ALK1, Active	A09-11G
ALK2, Active	A06-11G
ALK2 Mutant (R206H), Active	A06-12BG
ALK3 (BMPR1A), Active	B04-11G
ALK4, Active	A07-11G

Product Name	Cat #
ALK6 (BMPR1B), Active	B05-11G
ALK7 Protein	A08-35G
BAG1 Protein	B05-31G
BAX Protein	B14-30G
BMP2K Protein	B03-11G
BMPR2, Active	B06-11H
DYRK2, Active	D10-10G
DYRK3, Active	D11-11G
EEF2K, Active	E01-10G
EGFR, Active	E10-11G
EGFR Mutant (T790M L858R), Active	E10-12DG
EGFR Mutant (T790M), Active	E10-12EG
EGFR Mutant (L858R), Active	E10-12BG
EGFR Mutant (L861Q), Active	E10-12CG
FAK, Active	P91-10G
FAK, Active	P91-11H
FGFR1 (FLT2), Active	F04-11G
FGFR1 Mutant (V561M), Active	F04-13G
FGFR2, Active	F05-11G
FGFR2 Mutant (N549H), Active	F05-12G
FGFR2 Mutant (K526E), Active	F05-12BG
FGFR2 Mutant (E565G), Active	F05-12CG
FGFR2 Mutant (K641R), Active	F05-12DG
FGFR2 Mutant (K659N), Active	F05-12EG
FGFR3, Active	F06-11G
FGFR3 Mutant (K650E), Active	F06-12CG
FGFR3 Mutant (K650M), Active	F06-12DG
FGFR3 Mutant (K650Q), Active	F06-12EG
FGFR3 Mutant (G697C), Active	F06-12FG
FGFR4, Active	F07-11G
FGFR4 Mutant (N535K), Active	F07-12G
FGFR4 Mutant (V550E), Active	F07-12BG
FGFR4 Mutant (V550L), Active	F07-12CG
FGFR4 Mutant (V550M), Active	F07-12DG

Product Name	Cat #
FKBP1A Protein	F37-30G
FLT1, Active	F11-11G
FLT3, Active	F12-11G
FLT3 Mutant (D835Y), Active	F12-12BG
FLT4, Active	F13-11G
FRS3 Protein	F80-30G
GSK3 alpha, Active	G08-10G
GSK3 beta, Active	G09-10G
GSK3 beta, Active	G09-10H
GSK3 beta, Unactive	G09-14G
HER2, Active	E27-11G
HER4, Active	E29-11G
HSP90 alpha Protein	H36-50H
HSP90 beta Protein	H36-54H
IGF1R, Active	I02-11H
IkBA Protein	I20-30G
IkBA Protein	I20-31G
IkBB Protein	I21-30G
InsR, Active	I08-11G
IRR, Active	I07-11G
IRS1 (N-Term) Protein	I40-35G
IRS1 (C-Term) Protein	I40-31G
KDR, Active	K01-11G
LYN A, Active	L13-18G
LYN B, Active	L13-10G
MDM2 (1-118) Protein	M45-31BH
MDM2 Protein	M45-31G
MDM4 (1-137) Protein	M47-31BH
MST1, Active	S25-10G
MST3, Active	S42-11G
MST4, Active	M59-10G
NFKB2 Protein	N13-31G
p70S6K, Active	R21-10H
p70S6K, Unactive	R21-14H

AKT/PKB Pathway

The AKT (or PKB) signaling pathway is the subject of intense investigation because it regulates a multitude of cellular processes including cell proliferation and survival, cell size and response to nutrient availability, glucose metabolism, tissue invasion and angiogenesis. AKT functions as a cardinal point in this pathway for transducing extracellular (growth factor and insulin) and intracellular (receptor tyrosine kinases, Ras and Src) signals. Therefore, the AKT pathway is ubiquitous in nature and operates in cells to regulate fundamental cellular processes.

AKT, a serine/threonine kinase, is a central component in the AKT pathway and exists as three isoforms in mammals (AKT1, AKT2 and AKT3). AKT is downstream of a key lipid kinase target, PI3K, which is responsible for the generation of the PIP3 phospholipid second messenger. Activation of AKT requires three events: 1) binding to PIP3 via the pleckstrin homology domain 2) activation loop phosphorylation on AKT at Thr308 by PDK1 3) phosphorylation within the carboxy-terminus at Ser473 by PDK2 (1).

Alterations in the AKT pathway, and specifically AKT itself, have been detected in a several types of cancer (2). Ectopic expression of AKT, especially constitutively activated AKT, is sufficient to induce oncogenic transformation of cells, tumor formation in transgenic mice as well as chemoresistance. Many tumors and tumor cells display elevated AKT protein expression and activity, and many of the proteins which regulate AKT itself (i.e., PI3K, PTEN, Ras, Src and tyrosine kinases) are also often mutated in cancer. More over, blockage of AKT signaling results in apoptosis and growth inhibition of tumor cells with elevated AKT. The observed dependence of certain tumors on AKT signaling for survival and growth has wide implications for cancer therapy, offering the potential for preferential tumor cell killing. In the last several years, through combinatorial chemistry, high-throughput and virtual screening, and traditional medicinal chemistry efforts, a number of inhibitors of the AKT pathway have been identified that are being further pursued for clinical utility (3).

REFERENCES

1. Vanhaesebroeck, B., et al.: The PI3K-PDK1 connection: more than just a road to PKB. *Biochem J.* 2000 Mar 15;346 Pt 3:561-76.
2. Altomare, D. A., et al.: Perturbations of the AKT signaling pathway in human cancer. *Oncogene.* 2005 Nov 14;24(50):7455-64.
3. Kumar, C. C., et al.: AKT crystal structure and AKT-specific inhibitors. *Oncogene.* 2005 Nov 14;24(50):7493-501.

Product Name	Cat #
p70S6Kb, Active	R22-10G
p70S6Kb, Unactive	R22-14G
p70S6KL1 Protein	R25-34G
PDGFR alpha, Active	P12-11G
PDGFR alpha, Active	P12-18G
PDGFR alpha Mutant (T674I), Active	P12-12CG
PDGFR alpha Mutant (D842V), Active	P12-12BG
PDGFR beta, Active	P13-11G
PDK1, Active	P14-10H
PHLPP2 Protein	P72-21G
PI3K (p55 gamma) Protein	P31-30CH
PI3K (p65 alpha) Protein	P31-31H
PI3K (p85 alpha) Protein	P31-30H
PI3K (p85 beta) Protein	P31-30BH
PI3K (p110 alpha/p55 gamma), Active	P27-10CH
PI3K (p110 alpha/p85 alpha), Active	P27-10H
PI3K (p110 alpha/p85 alpha), Active	P27-18H
PI3K (p110 alpha(E545K)/p85 alpha) Mutant, Active	P27-15H
PI3K (p110 beta/p85 alpha), Active	P28-10H
PI3K (p110 beta/p85 beta), Active	P28-10BH

Product Name	Cat #
PI3K (p110 delta/p85 alpha), Active	P30-10H
PI3K (p120 gamma), Active	P29-10H
PI4K2A, Active	P21-10G
PI4K2B, Active	P22-10G
PI4KA Protein	P31-30G
PI4KB, Active	P32-10G
PIK3C2A, Active	P23-11G
PIK3C2B Protein	P24-31BG
PIK3C2G, Active	P25-11G
PIK3C3 (Vps34), Active	P26-10G
PIP4K2A, Active	P76-10AG
PIP4K2B Protein	P76-30BG
PIP4K2C, Active	P76-10CG
PIP5K1A, Active	P16-10AG
PIP5K1B, Active	P16-10BG
PIP5K1C, Active	P16-10CG
PIP5K3 Protein	P17-31G
PTEN, Active	P23-20G
PTEN Protein	P23-34G
RGS1 Protein	R39-30H

Product Name	Cat #
RON, Active	M58-11G
RSK4, Active	R20-10G
SGK1, Active	S06-11G
SGK1, Unactive	S06-15G
SGK2, Active	S07-10G
SGK2, Unactive	S07-14G
SGK3, Active	S08-10G
SGK3, Unactive	S08-14G
SMAD1 Protein	S10-30G
SMAD2 Protein	S11-30G
SMAD3 Protein	S12-30G
SMAD4 Protein	S13-30G
SMAD5 Protein	S14-30G
SMAD9 Protein	S17-30G
STK3, Active	S24-10G
SYK, Active	S52-10G
TAK1-TAB1, Active	M15-13G
TGFBR1 (ALK5), Active	T07-11G
TGFBR1, Unactive	T07-35G
TGFBR2, Active	T08-11G