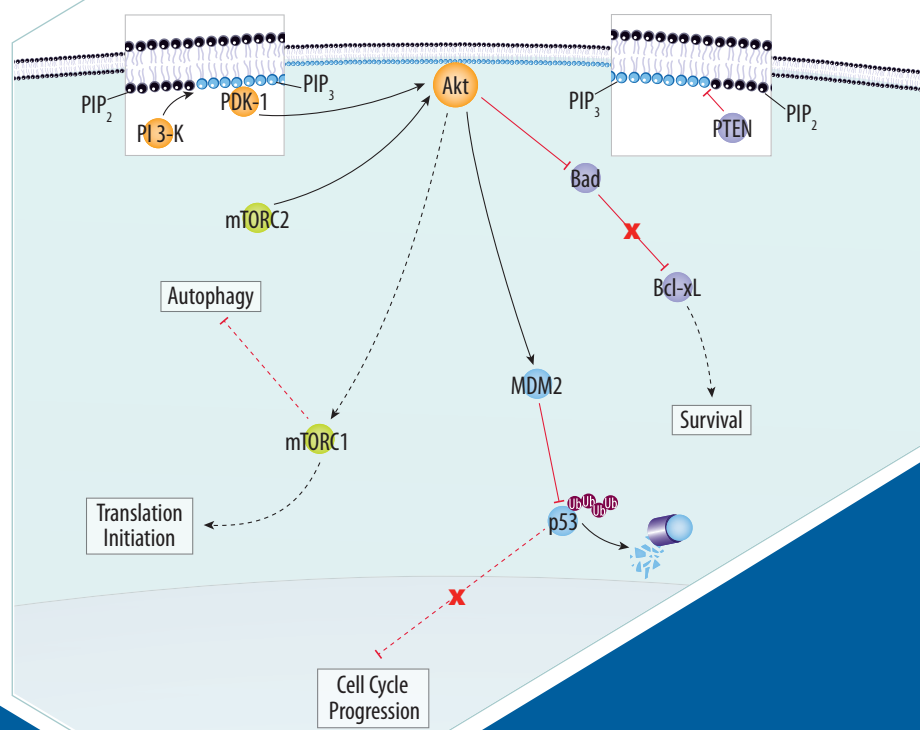
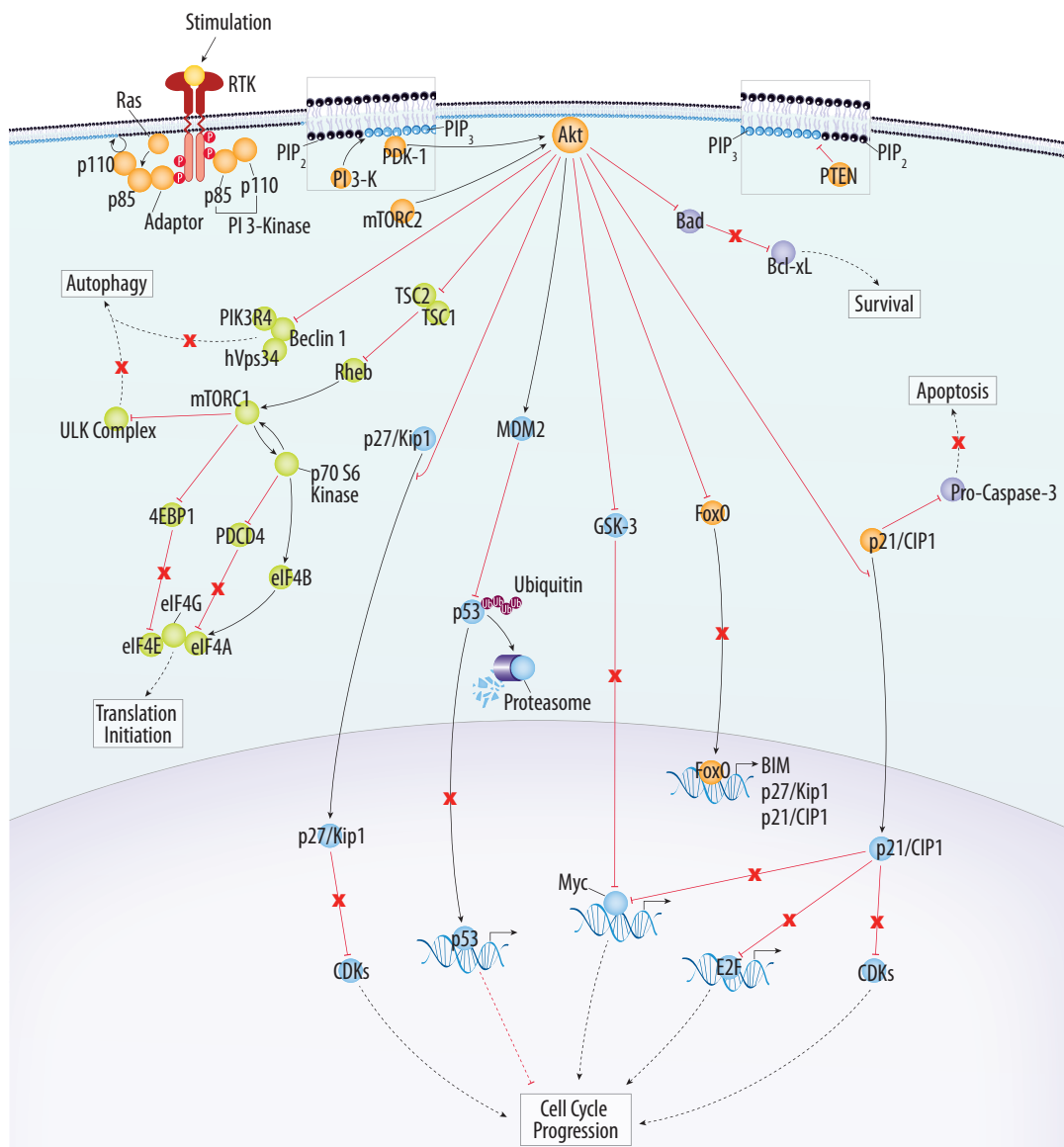


# PI 3-Kinase/Akt Signaling Pathways



# PI 3-Kinase/Akt Signaling Pathways

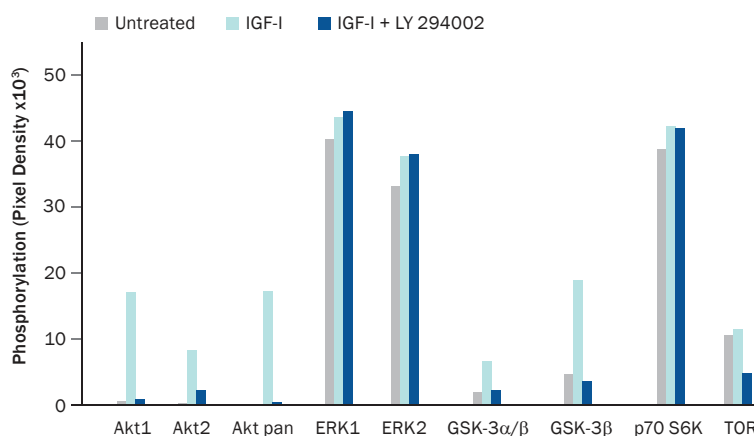
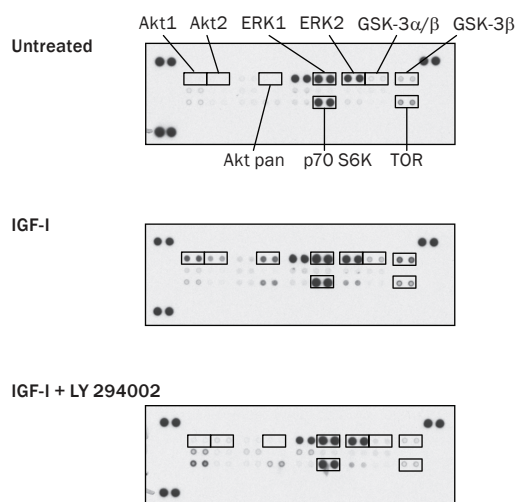
The Akt pathway is activated in response to growth factors and regulates many cellular processes, including protein synthesis, cell survival, proliferation, autophagy, and metabolism. Akt is a three-member family of serine-threonine protein kinases consisting of Akt1, Akt2, and Akt3. This family of kinases is activated downstream of PI 3-Kinase (PI 3-K)-dependent phosphatidylinositol (3,4,5)-triphosphate (PIP<sub>3</sub>) formation at the plasma membrane. Conversely, Akt activation is negatively regulated by the lipid phosphatase PTEN, which dephosphorylates PIP<sub>3</sub>. Due to its role in the promotion of protein synthesis, cell survival, and proliferation the Akt pathway can promote tumorigenesis. Accordingly, components of the Akt pathway are frequently altered in many human cancers. Akt is also known to suppress autophagy, which can either promote or inhibit cancer cell death in a context-dependent manner. Akt deficiency is associated with the development of diabetes in mice and humans, suggesting that cell signaling pathways downstream of Akt are also important for proper regulation of metabolism. The dysregulation or loss of Akt signaling in multiple diseases highlights the need for more research and a better understanding of this pathway and its regulation. R&D Systems offers a wide range of proteins, antibodies, ELISAs, and multianalyte profiling kits for studying PI 3-K/Akt signaling. A range of small molecule activators and inhibitors are also available from Tocris Bioscience. Explore our interactive Akt signaling pathway to find what you need!



# Proteome Profiler™ Antibody Arrays

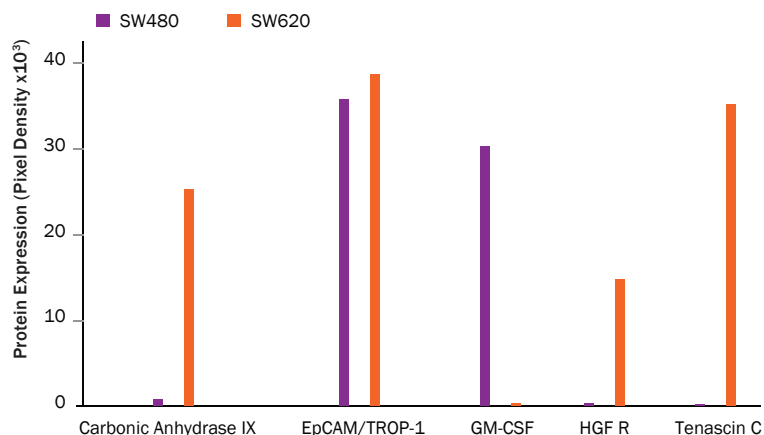
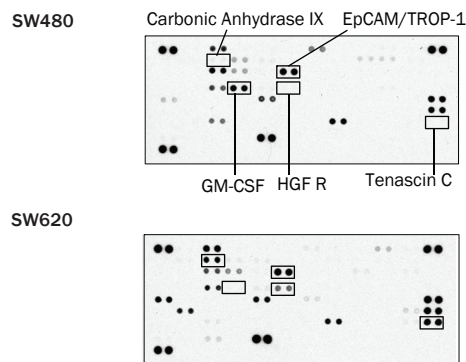
## Akt Pathway-Related Antibody Arrays: Get More Data from Your Samples

- Most cited membrane-based phospho-specific arrays
- Ideal for identifying signaling crosstalk
- Easier to perform than a Western blot
- Hands-on time as little as 3 hours



**Intracellular Signaling Transduction Response to IGF-I Treatment.** MCF-7 human breast cancer cells were either untreated or treated with 100 ng/mL of Recombinant Human (rh) IGF-I (Catalog # 291-G1) for 1 hour. Cells treated with rhIGF-I either received a 1 hour pre-treatment with the PI 3-Kinase inhibitor, LY 294002 (Catalog # 1130), or

received no pre-treatment. The phosphorylation status of each analyte was determined using the Proteome Profiler™ Human Phospho-MAPK Array Kit (Catalog # ARY002B). Membranes were exposed to X-ray film (left) and histograms were generated from pixel density measurements (right).



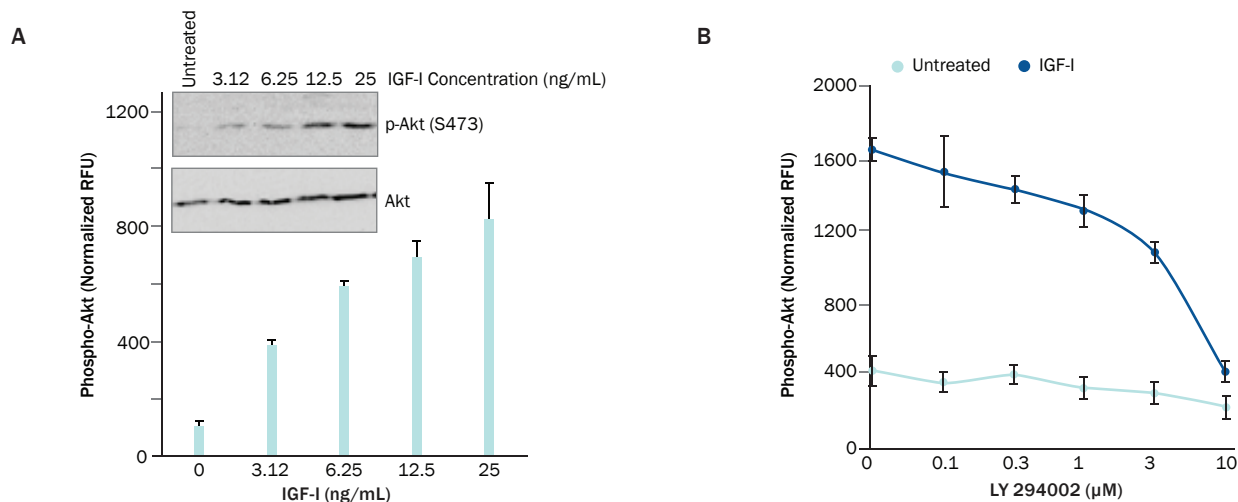
**Detection of Multiple Oncology-related Proteins in Cell Culture Supernates.** Supernates were collected from SW480 human colorectal adenocarcinoma cells and SW620 human colorectal adenocarcinoma metastatic site cells. The supernates were analyzed using the Proteome Profiler™ Human XL Oncology Array (Catalog # ARY026) to

determine the relative expression levels of 84 cancer-related proteins. Membranes were exposed to X-ray film (left) and histograms were generated from pixel density measurements (right).

# ELISAs for Intracellular Targets

## Cell-Based ELISA Assays: Analysis of Intact Cells

- Measure phosphorylated and total protein levels in the same well
- Culture cells and perform the assay in the same wells
- Utilize with either adherent or suspension cells
- Begin with as few as 10,000 cells per well

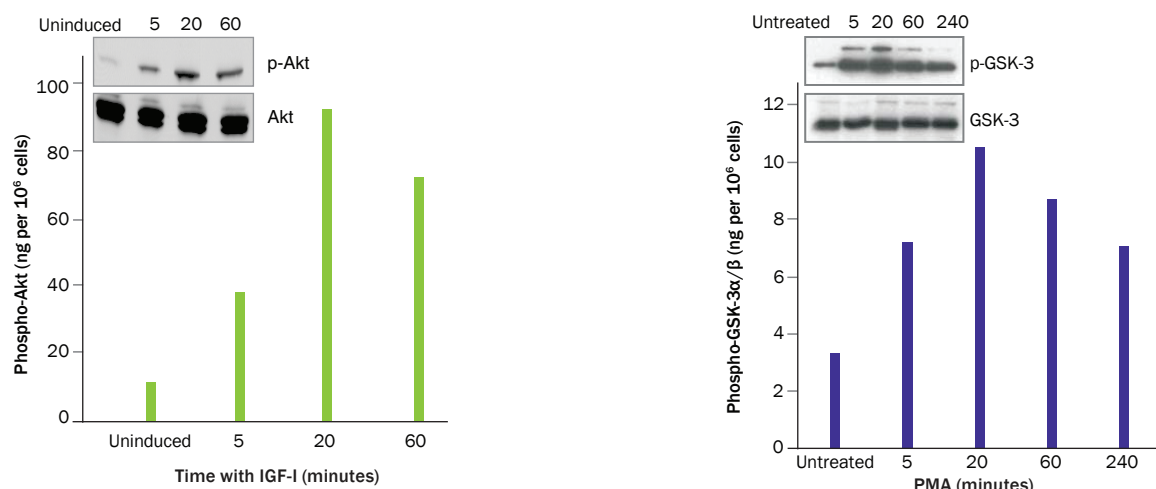


**Measurement of Akt Phosphorylation in MCF-7 Cells.** MCF-7 human breast adenocarcinoma cells were treated with increasing concentrations of Recombinant Human (rh) IGF-I (Catalog # 291-G1) for 20 minutes (A), or were pretreated for 10 minutes with the indicated concentrations of the PI 3-Kinase inhibitor LY 294002 (Catalog # 1130) and then incubated with no additions or with 25 ng/mL rhIGF-I for 20

minutes (B). After fixation of cells in the wells, phospho-Akt (S473) levels were determined and normalized total Akt levels in the same well using the Human/Mouse/Rat Phospho-Akt (S473) Pan Specific Cell-Based ELISA (Catalog # KCB887). Phosphorylated (S473) Akt and total Akt were also detected by Western blot (A; inset) using the antibodies supplied in the kit.

## DuoSet® IC (Intracellular) ELISA Development Systems: Customizable to Your Needs

- Utilize our validated matched antibody pairs, buffers, and protein standards
- Benefit from the sensitivity and specificity of a sandwich ELISA
- Optimize multiple experimental parameters in a single plate

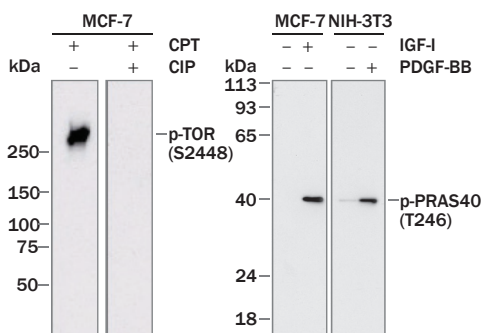


**Quantification of Phospho-Akt in MCF-7 Cells.** MCF-7 human breast adenocarcinoma cells were treated with 100 ng/mL of Recombinant Human IGF-I (Catalog # 291-G1) for the indicated times. The levels of phospho-Akt (S473) were quantified using the Phospho-Akt (S473) Pan Specific DuoSet® IC Kit (Catalog # DYC887B) and by Western blot (inset).

**Quantification of Phospho-GSK-3α/β in HeLa Cells.** HeLa human cervical epithelial carcinoma cells were induced with 200 nM PMA (Catalog # 1201). The levels of phospho-GSK-3α/β (S21/S9) were quantified using the Phospho-GSK-3α/β (S21/S9) DuoSet® IC Kit (Catalog # DYC2630) and by Western blot (inset).

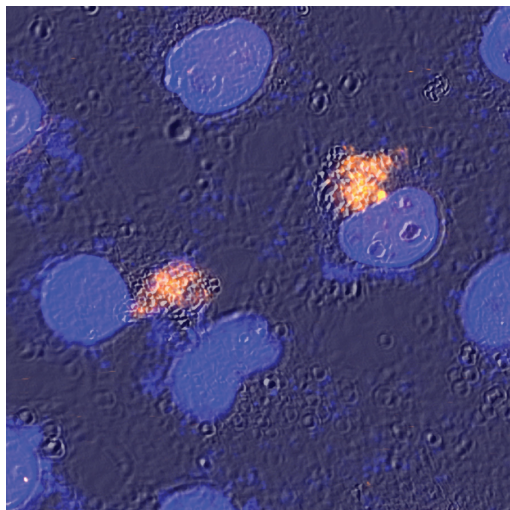
# R&D Systems® Antibodies

## Our Antibodies Are Highly Specific



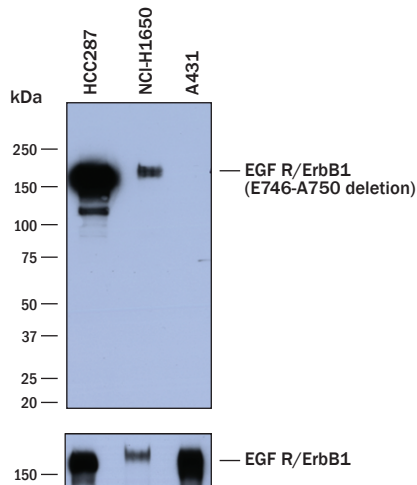
**Detection of Phospho-TOR and Phospho-PRAS40 by Western Blot.** (A) MCF-7 human breast cancer cells were treated with Camptothecin (CPT) (Catalog # 1100) for 5 hours. Lysates were run on SDS-PAGE in duplicate and transferred to PVDF membranes. One membrane was untreated (-) and the other was treated (+) with CIP for 1 hour. Both membranes were probed with Rat Anti-Human Phospho-TOR (S2448) Monoclonal Antibody (Catalog # MAB1665) followed by HRP-conjugated Anti-Rat IgG Secondary Antibody (Catalog # HAF005). (B) MCF-7 human breast cancer cells and NIH-3T3 mouse embryonic fibroblast cells were untreated (-) or treated (+) with Recombinant Human IGF-I (Catalog # 291-G1) for 20 minutes and Recombinant Human PDGF-BB (Catalog # 220-BB) for 5 minutes, respectively. PVDF membranes were probed with Mouse Anti-Human Phospho-PRAS40 (T246) Monoclonal Antibody (Catalog # MAB6890) followed by HRP-conjugated Anti-Mouse IgG Secondary Antibody (Catalog # HAF018).

## Highly Validated ICC Antibodies



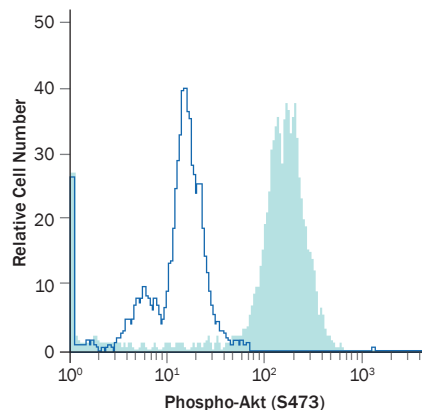
**Beclin 1/ATG6 in HeLa Cells.** Beclin 1/ATG6 was detected in immersion fixed HeLa human cervical epithelial carcinoma cells using Sheep Anti-Human/Mouse Beclin 1/ATG6 Antigen Affinity-purified Polyclonal Antibody (Catalog # AF5295). Cells were stained using the NorthernLights™ 557-conjugated Anti-Sheep IgG Secondary Antibody (yellow; Catalog # NL010) and counterstained with DAPI (blue). Specific staining was localized to autophagosomes.

## Antibodies for Hard-To-Find Mutant Targets



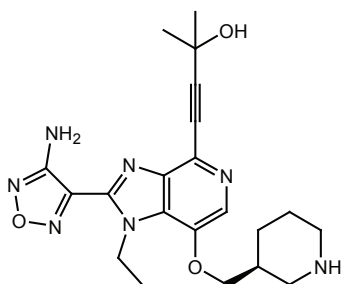
**Detection of Human EGF R/ErbB1 (aa 746-750 deletion) by Western Blot.** Lysates from HCC287 human non-small cell lung cancer cells, HCT-116 human colorectal carcinoma cells, and A431 human epithelial carcinoma cells were run on SDS-PAGE and transferred to a PVDF membrane. The membrane was probed with Mouse Anti-Human EGF R/ErbB1 (aa 746-750 deletion) Monoclonal Antibody (Catalog # MAB8336) followed by HRP-conjugated Anti-Mouse IgG Secondary Antibody (Catalog # HAF018). A specific band was detected for EGF R/ErbB1 (aa 746-750 deletion) at approximately 170 kDa (as indicated). For additional reference, total EGF R/ErbB1 was detected using Goat Anti-Human EGF R/ErbB1 Antigen Affinity-purified Polyclonal Antibody (lower panel, Catalog # AF231).

## Great Selection of Directly Conjugated, Phospho-Specific Antibodies for Flow Cytometry



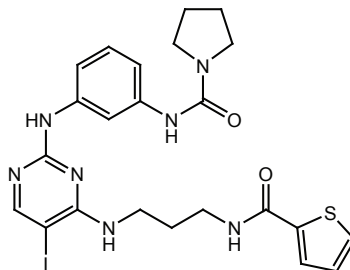
**Detection of Phospho-Akt by Flow Cytometry.** Resting Jurkat human acute T cell leukemia cells (open histogram) or Jurkat cells treated with 100 nM Calyculin A (Catalog # 1336) for 30 minutes (filled histograms) were stained with a PE-conjugated Mouse Anti-Human/Mouse Phospho-Akt (S473) Pan Monoclonal Antibody (Catalog # IC7794P).

## Small Molecules from Tocris Bioscience: Unrivalled Product Quality



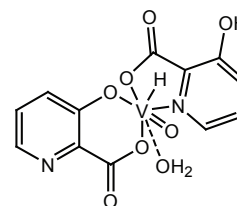
**GSK 690693 (Catalog # 4144)**

GSK 690693 is a pan-Akt kinase inhibitor ( $IC_{50}$  values are 2, 9, and 13 nM for Akt1, 3, and 2, respectively). The compound exhibits anti-proliferative and apoptotic effects in tumor cell lines.



**BX 795 (Catalog # 4318)**

BX 795 is a PDK1 inhibitor that inhibits Akt phosphorylation at Thr308. The compound inhibits anchorage-independent growth of PC3 and MDA-MB-468 cancer cell lines.



**VO-OHpic (Catalog # 3591)**

VO-OHpic is a potent PTEN (phosphatase and tensin homolog) inhibitor ( $IC_{50}$  = 35 nM) that exhibits selectivity for PTEN over SopB, PTPb, and SAC. The compound enhances Akt translocation in NIH/3T3 fibroblasts *in vitro*.

### Small Molecules that Target the Akt Signaling Pathway

Target	Product Name	Catalog #	Description
Akt	API-2	2151	Selective inhibitor of Akt/PKB signaling; antiviral
	GSK 690693	4144	Akt kinase inhibitor
	PHT 427	4598	Dual Akt and PDK1 inhibitor
	SC 79	4635	Akt activator
mTOR	Rapamycin	1292	mTOR inhibitor; immunosuppressant
	Temsirolimus <b>New</b>	5264	mTOR inhibitor
	Torin 1	4247	Potent and selective mTOR inhibitor
	XL 388	4893	Potent and selective mTOR inhibitor
PDK1	BX 795	4318	PDK1 inhibitor
	GSK 2334470	4143	Highly potent, selective PDK1 inhibitor
	PS 48	4087	PDK1 activator
PI 3-K	740 Y-P	1983	Cell-permeable PI 3-kinase activator
	BAG 956	3606	Dual PI 3-kinase and PDK1 inhibitor
	LY 294002 hydrochloride	1130	Prototypical PI 3-kinase inhibitor
	PI 103 hydrochloride	2930	Inhibitor of PI 3-kinase, mTOR and DNA-PK
	PF 04691502	4820	Potent and selective dual PI 3-K/mTOR inhibitor
	Wortmannin	1232	Potent, irreversible inhibitor of PI 3-kinase; also inhibits PLK1
PTEN	VO-OHpic	3591	Potent PTEN inhibitor

# Products for PI 3-Kinase/Akt Research

Proteome Profiler™ Membrane-based Arrays		
Membrane-based Array	Species	Analytes
Phospho-RTK Antibody Array Catalog # ARY001B	Human	ALK/CD246 • Axl • DDR1 • DDR2 • Dtk • EGF R • EphA1 • EphA2 • EphA3 • EphA4 • EphA5 • EphA6 EphA7 • EphA10 • EphB1 • EphB2 • EphB3 • EphB4 • EphB6 • ErbB2 • ErbB3 • ErbB4 • FGF R1 FGF R2α • FGF R3 • FGF R4 • Flt-3/Flk-2 • HGF R/c-MET • IGF-I R • Insulin R/CD220 • M-CSF R • Mer MSP R/Ron • MuSK • PDGF Rα • PDGF Rβ • c-Ret • ROR1 • ROR2 • Ryk • SCF R/c-kit • Tie-1 • Tie-2 TrkA • TrkB • TrkC • VEGF R1/Flt-1 • VEGF R2/KDR • VEGF R3/Flt-4
Phospho-RTK Antibody Array Catalog # ARY014	Mouse	Dtk • EGF R • EphA1 • EphA2 • EphA3 • EphA4 • EphA5 • EphA6 • EphA7 • EphA8 • EphB1 • EphB2 EphB4 • EphB6 • ErbB2 • ErbB3 • ErbB4 • FGF R2 (Il1c) • FGF R3 • FGF R4 • HGF R/c-MET • IGF-I R Insulin R/CD220 • M-CSF R • Mer • MSP R/Ron • MuSK • PDGF Rα • PDGF Rβ • c-Ret • SCF R/c-kit Tie-1 • Tie-2 • TrkA • TrkB • TrkC • VEGF R1/Flt-1 • VEGF R2/KDR • VEGF R3/Flt-4
Phospho-MAPK Antibody Array Catalog # ARY002B	Human	Akt1 (S473) • Akt2 (S474) • Akt3 (S472) • Akt pan (S473/S474/S472) • CREB (S133) • ERK1 (T202/Y204) ERK2 (T185/Y187) • GSK-3α/β (S21/S9) • GSK-3β (S9) • HSP27 (S78/S82) • JNK1 (T183/Y185) JNK2 (T183/Y185) • JNK3 (T221/Y223) • JNK pan (T183/Y185, T221/Y223) • MKK3 (S218/T222) MKK6 (S207/T211), MSK2 (S360) • p38α (T180/Y182) • p38β (T180/Y182) • p38δ (T180/Y182) p38γ (T183/Y185) • p53 (S46) • p70 S6 Kinase (T421/S424) • RSK1 (S380) • RSK2 (S386) • TOR (S2448)
Phospho-Kinase Antibody Array Catalog # ARY003B	Human	Akt (S473) • Akt (T308) • AMPK α1 (T174) • AMPK α2 (T172) • β-Catenin • Chk-2 (T68) • c-Jun (S63) CREB (S133) • EGF R (Y1068) • eNOS (S1177) • ERK1/2 (T202/Y204, T185/Y187) • FAK (Y397) • Fgr (Y412) Fyn (Y420) • GSK-3α/β (S21/S9) • Hck (Y411) • HSP27 (S78/S82) • HSP60 • JNK pan (T183/T185, T221/Y223) • Lck (Y394) • Lyn (Y397) • MSK1/2 (S376/S360) • p27/Kip1 (T198) • p38α (T180/Y182) p53 (S15) • p53 (S392), p53 (S46) • p70 S6 Kinase (T421/S424) • PDGF Rβ (Y751) • PLCγ-1 (Y783) PRAS50 (T246) • Pyk2 (Y402) • RSK1/2/3 (S380) • Src (Y419) • STAT2 (Y689) • STAT3 (S727) • STAT3 (Y705) STAT5a (Y699) • STAT5a/b (Y699) • STAT6 (Y641) • TOR (S2448) • WNK-1 (T60) • Yes (Y426)
Cell Stress Antibody Array Catalog # ARY018	Human	ADAMTS1 • Bcl-2 • Carbonic Anhydrase IX • Cited-2 • COX-2 • Cytochrome c • Dkk-4 • FABP1/L-FABP HIF-1α • HIF-2α • HSP27 (S78/S82) • HSP60 • HSP70 • IDO • JNK pan (T183/Y185) • NfκB1 p21/CIP1/CDNK1A • p27/Kip1 • p38α (T180/Y182) • p53 (S46) • PON1 • PON2 • PON3 • Thioredoxin-1 SIRT2 • SOD2
Apoptosis Antibody Array Catalog # ARY009	Human	Bad • Bax • Bcl-2 • Bcl-x • Pro-Caspase-3 • Cleaved Caspase-3 • Catalase • cIAP-1 • cIAP-2 • Claspin Clusterin • Cytochrome c • TRAIL R1/DR4 • TRAIL R2/DR5 • FADD • Fas/TNFSF6 • HIF-1α HO-1/HMOX1/HSP32 • HO-2/HMOX2 • HSP27 • HSP60 • HSP70 • HTRA2/Omi • Livin • PON2 p21/CIP1/CDNK1A • p27/Kip1 • p53 (S15) • p53 (S46) • p53 (S392) • Rad17 (S635) • SMAC/Diablo Survivin • TNF R1/TNFRSF1A • XIAP
XL Oncology Antibody Array Catalog # ARY026	Human	AFP • Amphiregulin • Angiopoietin-1 • ANGPTL4 • Autotaxin/ENPP-2 • Axl • Bcl-X • CA125/MUC-16 E-Cadherin • VE-Cadherin • CAP-G • CA-9 • Cathepsin B • Cathepsin D • Cathepsin S • CEACAM-5 Decorin • Dkk-1 • DLL-1 • EGF R/ErbB1 • Endoglin/CD105 • Endostatin • Enolase 2 • eNOS • EpCAM ERα • ErbB2 • ErbB3 • ErbB4 • FGF basic • FoxC2 • FKHR • Galectin-3 • GM-CSF • HCG • HGF R/c-MET HIF-1α • HFN-3β • HO-1/HMOX1 • ICAM-1/CD54 • CD25/IL-2 Rα • IL-6 • IL-8/CXCL8 • IL-18 Bpa KLK-3/PSA • KLK-5 • KLK-6 • Leptin (OB) • Lumican • MCP-1/CCL2 • MCP-2/CCL8 • MCP-3/CCL7 M-CSF • Mesothelin • MIP-1α/CCL3 • MIP-3α/CCL20 • MMP-2 • MMP-3 • MMP-9 • MSP/MST1 • MUC-1 Nectin-4 • Osteopontin • p27/Kip1 • p53 • PDGF-AA • PECAM-1/CD31 • Progesterone R • Progranulin Prolactin • Prostatin • E-Selectin • Maspin • PAI-1/Serpin E1 • SNAIL • SPARC • Survivin • Tenascin-C THBS-1 • Tie-2 • UPA-1 • VCAM-1 • VEGF • Vimentin
Ubiquitin Antibody Array Catalog # ARY027	Human	A20/TNFAIP3 • ATF4 • Bcl-2 • β-TrCP1/BTRC • Caspase-8 • CBL • Cyclin D1/CCND1 • CD44 cIAP-1/HIAP-2 • cIAP-2/HIAP-1 • COX-2/PTGS2 • EGF R • ERα/NR3A1 • ErbB2 • ErbB3 • ErbB4 • FASN F-box protein 15/FBXO15 • FBXW7/Cdc4 • FGF R2 • HGF R/c-MET • HIF-1α • HSP70 • HSP90AA1/HSP90a IGF-I R • IκBα • IκBε • IKKγ/NEMO • Insulin R • IRAK1 • IRF3 • IRS1 • M-CSF R • MSP R/Ron Nrf2/NFE2L2 • NIK/MAP3K14 • p21/CDKN1A/Cip1 • p53 • PDGF Rα • PDGF Rβ • RIP1 • SCF R/c-Kit TfR • TNF R1/TNFRSF1A • TRAF-2 • TRAF-3 • TRAF-6 • TrkA • VEGF R3/Flt-4 • Ubiquitin



# Products for PI 3-Kinase/Akt Research

Intracellular Akt Activation			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
Akt		H M R	
Phospho-Akt (S473)		H M R	H M R
Phospho-Akt (T308)			H M R
Akt1	H	H M R	H M R
Akt1 (E17K)		H	
Phospho-Akt1 (S473)			H M
Phospho-Akt1 (T308)		H	
Akt2		H M R	
Akt3		H	
GAB2		H	
GAB3		H	
GRB2		H M R	
GRB7		H M R	
PDK-1	H	H M R	
PI 3-Kinase p85 $\alpha$		H M R	
PI 3-Kinase p110 $\beta$		H	
PI 3-Kinase p110 $\gamma$		H	
PI 3-Kinase p110 $\delta$		H	
PI 3-Kinase p85 $\beta$		H	
PTEN	H	H M R	
Phospho-PTEN (S380)		H M R	
Ras		H	

Cell Cycle Regulation			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
CDK2		H M	
CDK4		H M	
E2F-1		H	
E2F-2		H	
E2F-4		H	
FoxO1/FKHR		H	
FoxO3		H M	
GSK-3 $\alpha$ / $\beta$		H M R	H M R
Phospho-GSK-3 $\alpha$ / $\beta$ (S21/S9)		H M R	H M R
GSK-3 $\beta$	H	H M R	
Phospho-GSK-3 $\beta$ (S9)		H	H M R
MDM2/HDM2	H	H M R	H
c-Myc		H	
p21/CIP1/CDKN1A		H	H
p27/Kip1		H M R	H
Phospho-p27/Kip1 (T157)		H	
Phospho-p27/Kip1 (T198)		H	
p53	H	H M R	H
Phospho-p53 (S15)		H	H
Phospho-p53 (S46)		H	
Phospho-p53 (S392)		H	H
Phospho-p53 (S18)		M	
Phospho-p53 (S37)		H	

TOR-Regulated Processes			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
4EBP1		H M	
Beclin 1		H M R	
DEPTOR/DEPDC6		H	
eIF4B		H	
eIF4E		H M R	
eIF4G1		H	
GBL		H M R	
p70 S6 Kinase	H	H M R	H M R
Phospho-p70 S6 Kinase (T421/S424)		H M R	
Phospho-p70 S6 Kinase (T389)		H	
Phospho-p70 S6 Kinase (T229)		H M R	
p70 S6 Kinase $\beta$		H	
PDCD4		H	
PIK3R4		H	
PRAS40		H	
Phospho-PRAS40 (T246)		H M	
PRR5		H	
Rheb		H M R	
Rictor		H	
RPTOR		H M	
TOR		H M R	
Phospho-TOR (S2448)		H	H
TSC1		H M R	
TSC2		H M	

Cellular Survival			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
APAF-1		H	
Bad		H M	
Phospho-Bad (S99)		H	
BAK		H M R	
Bax		H M R	
Bax- $\alpha$			H
Bcl-x		H M	
Bcl-xL	H M	H M R	H M
BIM Long	H	H M	
Caspase-3	H	H M	H M
Caspase-9		H	
Cytochrome c	H	H M R E	H M R
FoxO1/FKHR		H	
FoxO3		H M	



Growth Factors For RTK-Dependent Akt Activation			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
Amphiregulin	H M	H M	H M
Angiopoietin-1	H	H M	H
Angiopoietin-2	H M	H M	H M R
Angiopoietin-3	M	M	M
Angiopoietin-4	H	H	H
BDNF	H M R Ca E	H	H
Betacellulin/BTC	H M	H M	H M
EGF	H M R	H M R	H M R
EGF-L6	M		
Epiregulin	H M	H M	M
FGF acidic	H M B	H M B	H M
FGF basic	H M R B E	H B	H M R
FGF-3	H	H	
FGF-4	H M	H M	H
FGF-5	H	H	
FGF-6	H M	H M	
KGF/FGF-7	H M Ca	H Ca	H
FGF-8	H M	H M	
FGF-10	H M R	H M	
FGF-11		H	
FGF-12	H	H	
FGF-13		H	
FGF-15		M	
FGF-16	H	H	
FGF-17	H M	H	
FGF-19	H	H	H
FGF-20	H	H	
FGF-21	H M	H M	H M R
FGF-22	H	H	
FGF-23	H M	H M	H
HB-EGF	H	H M	H
IGF-I	H M R	H M	H M R
IGF-II	H M	H M	M
Insulin		H M B	H Ca P
Proinsulin	H	H M	H
LRIG1	H M	H M	
NRG1	H	H	H
NRG1- $\alpha$ /HRG1- $\alpha$	H	H	
NRG1- $\beta$ 1/HRG1- $\beta$ 1	H	H	H
$\beta$ -NGF	H M R	H R	H R

Growth Factors For RTK-Dependent Akt Activation			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
NT-3	H	H	H
NT-4	H M	H	H
PDGF	H P	H Ms	
PDGF-A		H	
PDGF-AA	H R	H R Ms	H M
PDGF-AB	H R	H Ms	H M R
PDGF-B		H Ms	
PDGF-BB	H R	H	H M R
PDGF-C		H M	
PDGF-CC	H M		H
PDGF-D		H	
PDGF-DD	H		H
PIGF	H	H	H
PIGF-2	H M	H M	M
TGF- $\alpha$	H	H	H
VEGF	H M R Ca F Z	H M R Ca Z	H M R Ca
VEGF/PIGF Heterodimer	H	H	H
VEGF-B	H M	H M	
VEGF-C	H	H M R	H
VEGF-D	H M	H M	H M

#### SPECIES KEY:

**H** Human, **M** Mouse, **R** Rat, **B** Bovine, **Ca** Canine, **P** Porcine, **E** Equine, **F** Feline, **Z** Zebrafish, **Ms** Multi-species

# Products for PI 3-Kinase/Akt Research

RTKs that Activate Akt			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
EGF R/ErbB1	H M	H M	H M
Phospho-EGF R/ErbB1			H
Phospho-EGF R/ErbB1 (Y1068)		H	H
Phospho-EGF R/ErbB1 (Y1173)		H	
Phospho-EGF R/ErbB1 (Y845)		H	
ErbB2/Her2	H	H M	H
Phospho-ErbB2/Her2			H
Phospho-ErbB2/Her2 (Y1196)		H	
Phospho-ErbB2/Her2 (Y1248)		H	
ErbB3/Her3	H M	H M	H
Phospho-ErbB3/Her3			H
Phospho-ErbB3/Her3 (Y1262)		H	
ErbB4/Her4	H M	H	H
Phospho-ErbB4/Her4			H
Phospho-ErbB4/Her4 (Y1188)			H
Phospho FGF R1-4 (Y653/Y654)		H	
FGF R1	H	H	H
Phospho-FGF R1			H
FGF R1 $\alpha$	H	H	
FGF R1 $\beta$	H	H	
FGF R2	H M	H M	H
Phospho-FGF R2			H
FGF R2 $\alpha$	H M	H	H
Phospho-FGF R2 $\alpha$			H
FGF R2 $\beta$	H M	H	
FGF R3	H M	H M	H
Phospho-FGF R3			H
FGF R4	H M	H M	H
Phospho-FGF R4			H
FGF R5/FGFRL1	M	H M	
HGF R/c-MET	H M Ca	H M Ca	H M Ca
Phospho-HGF R/c-MET			H
Phospho-HGF R/c-MET (Y1234/Y1235)		H M	H
Phospho-HGF R/c-MET (Y1349)		H M	
Phospho-HGF R/c-MET (1003)		H	
IGF-I R	H M	H M	H
Phospho-IGF-I R			H

RTKs that Activate Akt			
Molecule	Recombinant and Natural Proteins	Antibodies	ELISAs
Phospho-INS R (Y1162/3)/IGF-I R (Y1135/6)		H	
IGF-II R	H	H	
Insulin R/CD220	H M	H M	H
Phospho-Insulin R/CD220			H
INSRR		H	
PDGF R $\alpha$	H M	H M	H
Phospho-PDGF R $\alpha$			H
Phospho-PDGF R $\alpha$ (Y742)		H	
PDGF R $\beta$	H M	H M	H
Phospho-PDGF R $\beta$			H
Phospho-PDGF R $\beta$ (Y751)		H	
Phospho-PDGF R $\beta$ (Y1021)		H	
Tie-1	H	H	
Tie-2	H M R Z	H M R Z	H M
Phospho-Tie-2			H M
Phospho-Tie-2 (Y992)		H M	H
Phospho-Tie-2 (Y1102/Y1100)		H M	
TrkA	H R	H R	H R
Phospho-TrkA			H
Phospho-TrkA (Y785)		H R	R
TrkB	H M	H M	H
Phospho-TrkB			H
TrkC	H M	H M	
VEGF R1/Flt-1	H M	H M	H M
Phospho-VEGF R1/Flt-1			H
Phospho-VEGF R1/Flt-1 (Y1213)		H	
VEGF R2/KDR/Flk-1	H M	H M	H M
Phospho-VEGF R2/KDR/Flk-1			H
Phospho-VEGF R2/KDR/Flk-1 (Y1214)		H	
VEGF R3/Flt-4	H M	H M	H M
Phospho-VEGF R3/Flt-4			H

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